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Technical Report Overview

Report: 2019 Chronic Toxicity Program - Elk Valley Testing to Satisfy Permit Requirements

Overview: This report presents the results of quarterly and semi-annual chronic toxicity tests undertaken in 2019 for Teck's steelmaking coal mining operations in the Elk Valley. This report interprets results by evaluating correspondence between water chemistry and toxicological responses and identifies recommendations for revision or augmentation of planned future programs.

This report was prepared for Teck by Golder Associates Ltd. and relies on testing completed by Nautilus Environmental.

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Future studies will be made available at **teck.com/elkvalley**

REPORT

2019 Chronic Toxicity Program
Elk Valley Testing to Satisfy Permit Requirements

Interpretive Report

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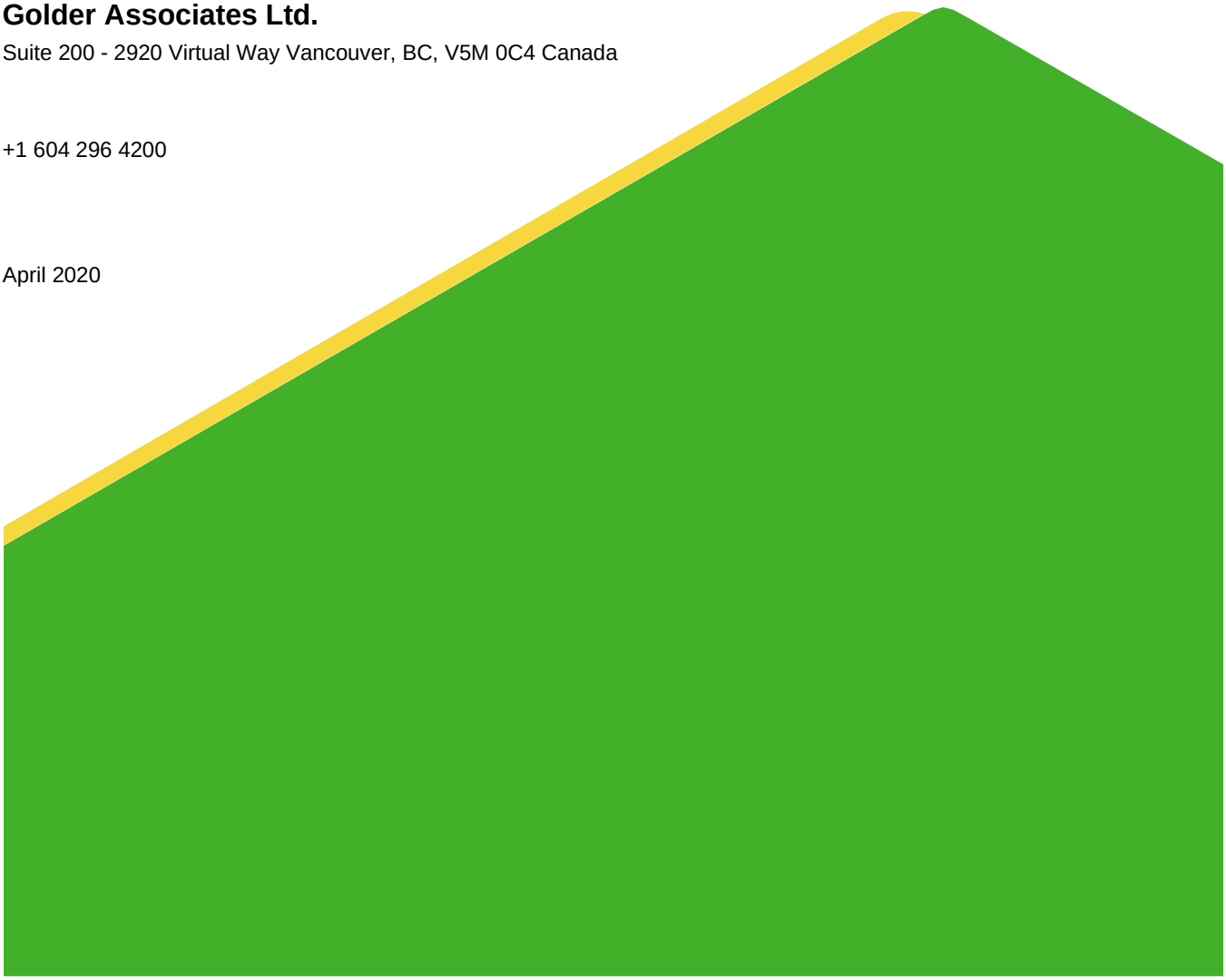
April 2020



Abbreviations

%	percent
~	approximately
<	less than
>	greater than
≥	greater than or equal to
=	equals
±	plus or minus
°C	degrees Celsius
∑TU	sum of toxic units
µg/L	micrograms per litre
AMP	Adaptive Management Plan
ANOVA	analysis of variance
AWTF	active water treatment facility
BC	British Columbia
BC ENV	British Columbia Ministry of Environment and Climate Change
BC WQG	British Columbia water quality guideline
$CaCO_3$	calcium carbonate
CCME	Canadian Council of Ministers of the Environment
C. dubia	*Ceriodaphnia dubia* (a water flea)
CETIS™	Comprehensive Environmental Toxicity Information System
CM_MC1	Reference site on Michel Creek upstream of Operations (EMS E258175)
CM_MC2	Test site on Michel Creek upstream of Andy Goode Creek (EMS E58937)
CMO	Coal Mountain Operation
CN	control normalized
Cu	copper
CV	coefficient of variation
DOC	dissolved organic carbon
e.g.	for example
EC_X	concentration resulting in x percent adverse effect for a dichotomous endpoint (e.g., normality)
EDTA	ethylene diamine tetraacetic acid
EMC	Environmental Monitoring Committee
EMS	Environmental Monitoring Station
EV_HC1	Test site on Harmer Spillway at Elk Valley Operations (EMS E102682)
EV_MC2	Test site on Michel Creek at Highway 3 Bridge (EMS E300091)
EVWQP	Elk Valley Water Quality Plan
FR_FRABCH	Test site on Fording River upstream of Chauncy Creek
FR_FRCP1	Test site on Fording River downstream of Cataract Creek (EMS E300071)
FR_UFR1	Reference site on Fording River upstream of Henretta Creek (EMS E216777)

GH_ER2	Reference site on Elk River upstream of Greenhills Operations (EMS 200389)
GH_ERC	Test site on Elk River downstream of Thompson Creek (EMS E300090)
GH_FR1	Test site on upper Fording River downstream of Josephine Falls [Order Station FR4] (EMS 200378)
Golder	Golder Associates Ltd.
H. azteca	*Hyalella azteca* (a freshwater amphipod species)
ID	Identification
i.e.	that is
IC_X	concentration resulting in x percent inhibition for a non-dichotomous endpoint (e.g., growth)
Km	kilometre
KU	key uncertainty
LAEMP	local aquatic effects monitoring program
LC_DCDS	Test site on LCO Dry Creek downstream of sedimentation ponds
LCO	Line Creek Operations
LC_LCDSSLCC	Test site on Line Creek downstream of South Line Creek (EMS E297110)
LC_LC3	Test site on Line Creek downstream West Line Creek and AWTF outfall
LC_LC5	Test site on Fording River downstream of Line Creek
LC_SLC	Reference site on South Line Creek West Side of Main Rock Drain
LC_X	concentration resulting in x percent lethality
mg	milligram
mg/L	milligrams per litre
mL	millilitre
mm	millimetre
MoE	British Columbia Ministry of Environment (now ENV)
MQ	management question
n	sample size
N	nitrogen
NaBr	sodium bromide
NaCl	sodium chloride
Nautilus	Nautilus Environmental
NO_3	nitrate
NR	normal range
NTU	Nephelometric Turbidity Units
O. mykiss	*Oncorhynchus mykiss* (rainbow trout)
PCA	principal component analysis
PC	principal component
P. promelas	*Pimephales promelas* (fathead minnow)
P. subcapitata	*Pseudokirchneriella subcapitata* (a green algae species)
Q1	quarter 1 (January–March)
Q2	quarter 2 (April–June)

Q3	quarter 3 (July–September)
Q4	quarter 4 (October–December)
QA/QC	quality assurance/quality control
RAEMP	Regional Aquatic Effects Monitoring Program
Ref	reference
RG_MIDAG	Test site on Michel Creek downstream of Andy Goode Creek
SD	standard deviation
SPO	Site Performance Objective
TDS	total dissolved solids
Teck	Teck Coal Limited
the Permit	Permit #107517 issued under the *Environmental Management Act*
TIE	toxicity identification evaluation
TKN	total Kjeldahl nitrogen
TOC	total organic carbon
TSS	total suspended solids
TU	toxic units
US EPA	United States Environmental Protection Agency
WCT	westslope cutthroat trout (*Oncorhynchus clarki lewisi*)
WQ	water quality

Technical Summary

Golder Associates Ltd. (Golder) was retained by Teck Coal Limited (Teck) to prepare this interpretive report on quarterly and semi-annual chronic toxicity tests undertaken in 2019 for Teck's coal mining operations in the Elk Valley.

As required in Permit 107517 Section 11, Teck has developed an Adaptive Management Plan (AMP) to support implementation of the Elk Valley Water Quality Plan (EVWQP). Following an adaptive management framework, the AMP identifies six Management Questions that will be re-evaluated at regular intervals as part of AMP updates throughout EVWQP implementation. For each Management Question, the AMP describes how the question will be periodically re-evaluated and how key uncertainties will be reduced. The chronic toxicity testing program discussed herein supports Management Question 2 (*"Will aquatic ecosystem health be protected by meeting the long-term Site Performance Objectives [SPOs]?"*) and Management Question 5 (*"Does monitoring indicate that mine-related changes in aquatic ecosystem conditions are consistent with expectations?"*). To inform the Management Questions listed above, this report presents and interprets the results from 2019 chronic toxicity testing and identifies recommendations for revision or augmentation of planned future programs.

To help answer these questions, the analysis of chronic toxicity data consisted of five steps:

- Reviewed data quality to confirm that results met acceptability criteria
- Standardized the data to help discern toxicological responses from other sources of variability in data
- Considered the size of response in each test and how it compared to responses in tests of reference waters (not influenced by mining) to categorize each result as "no", "possible", or "likely" adverse response
- Evaluated the correspondence between test responses and indicators of mine-related water quality. This evaluation included statistical assessment of patterns and specialized laboratory tests (called "toxicity identification evaluations") designed to identify causes of toxicity.
- Compared 2019 test results to previous years to identify potential patterns in toxicity responses and/or indicators of cause

The following bullets summarize key findings from the 2019 interpretive report.

- **Data Quality**—The data generally met acceptability criteria and were fit for the intended purpose. In the few cases where data quality was suspect, actions were taken to process the data to avoid improper influence on findings. For example, fathead minnow and rainbow trout waters were amended with copper to inhibit growth of naturally occurring microbes in site water, which has been documented in previous rounds of testing. Copper amendments were generally sufficient to inhibit microbial growth, except for four fathead minnow tests (see station summary below). These tests were investigated for potential causes of water quality-related toxicity but were excluded from statistical analyses.
- **Data Processing**—The data analysis benefited from the inclusion of a fourth reference water in all quarters tested in 2019. These reference water responses were used to refine "normal ranges" that bracket typical test performance under non mine-influenced conditions. The 2019 data confirmed that variations are observed among reference waters, confirming the value of collecting data from multiple references, and characterizing the range of responses expected for non mine-influenced conditions.

- **Initial Categorization**—The 2019 quarterly (quarters named as Q1, Q2, Q3, and Q4) test results categorized as “no adverse response”, “possible adverse response”, or “likely adverse response” are illustrated on Figure TS-1 and summarized station-by-station at the end of this technical summary:
  - With the integration of the Line Creek Operation (LCO) and the regional chronic toxicity programs, three additional test sites were included in the 2019 chronic toxicity interpretive report: LC_LC5 (Fording River downstream of Line Creek), LC_DCDS (Dry Creek downstream of sedimentation ponds), and LC_LC3 (Line Creek downstream of West Line Creek).
  - For all species, most tests were categorized as no adverse response. Likely adverse responses were most common for algae and least common for water flea and fathead minnow.
  - For algae, the results in the fall (Q3) testing event were atypical compared to prior rounds of testing, in which site waters have typically exhibited increased growth relative to the laboratory control. The laboratory noted no changes in methodology in these tests that would explain the anomalous results, but the findings are not consistent with water chemistry, so it is not known why the response pattern observed in previous rounds of testing was not apparent in the tests conducted in that quarter.
  - Stations FR_FRCP1 (Fording River below Cataract Creek) and CM_MC2 (Michel Creek below Corbin Creek) had the highest frequency of possible or likely adverse responses. This pattern is consistent with other recent years of testing.
- **Concentration-Response Assessment**—The constituents identified as potential causes of toxicity in 2019 tests are summarized in Table TS-1. Key findings were:
  - Sulphate and TDS, two related parameters into the ionic composition of site water, were identified in the winter (Q1) FR_FRCP1 test as potentially contributing to observed effects to water fleas. Nickel and nitrate also potentially contributed to observed effects for water fleas, and nickel potentially contributed to observed effects for amphipod growth. The interpretation of nickel as potentially contributing to effects aligned with toxicity identification evaluation findings for water fleas and amphipods.
  - Nitrate was identified in the winter FR_FRABCH (Q1) and LC_DCDS (Q3 and Q4) test as potentially contributing to observed effects to amphipods and rainbow trout.
  - Nickel was identified in CM_MC2 tests as a potential or likely cause of toxicity to two types of crustacean invertebrates (water fleas and amphipods). Results for Permit tests aligned with toxicity identification evaluation findings for these test species.
- **Temporal Assessment**—Some differences relative to previous years were identified:
  - At FR_FRCP1, there was a trend over time with more frequent and larger responses for water fleas until the end of 2018. Fewer and smaller responses for water fleas were observed over most of 2019. Although adverse responses were observed in Q1 2019 testing, not as many were observed relative to Q4 2018. In Q4 2018 and Q1 2019, the responses observed in water flea tests appeared to be influenced by higher sulphate and TDS concentrations relative to previous years’ testing, although nickel was concluded to be a main cause of observed responses in Q1 2019 in addition to sulphate and TDS. Teck has initiated several actions under the Adaptive Management Plan to better understand and manage water quality in the upper Fording River.

- At CM_MC2, there was a trend towards more and larger responses for water fleas and amphipods until the end of 2018. In most of 2019, fewer and smaller responses for crustacean species were observed compared to the end of 2018, a pattern consistent with that described above for FR_FRCP1. The trend in responses observed in water flea and amphipod tests at CM_MC2 corresponds with an increase in aqueous nickel concentrations between 2015 and 2018, and the fewer and smaller responses in 2019 correspond to lower nickel concentrations in 2019 compared to 2018. Teck has initiated several actions under the Adaptive Management Plan response framework to better understand and manage water quality in Michel Creek.

Recommendations from the 2019 testing program include minor refinements to test procedures to reduce confounding factors (i.e., factors that obscure responses to mine-related substances) and continuing the recently expanded reference water testing to support interpretation of test water responses.

Categories for 2019 test results are summarized by test species in Figure TS-1, with all quarterly results pooled.

- For all species, most tests were categorized as no adverse response. Likely adverse responses were most common for the green alga test and least common for the water flea and fathead minnow tests.
- Responses in test site waters were statistically different from one or more upstream reference waters in 40% of tests (66 of 165 tests), including tests with the water flea *Ceriodaphnia dubia* (6 of 48 tests), the green alga *Pseudokirchneriella subcapitata* (22 of 44 tests), the amphipod *Hyalella azteca* (15 of 29 tests), rainbow trout (*Oncorhynchus mykiss*; 8 of 22 tests), and fathead minnow (*Pimephales promelas*; 15 of 22 tests). The proportion of tests showing one or more statistical differences should not be interpreted to mean that 40% of tests exhibit toxicological impairment. The pairwise statistical differences are a conservative initial screening step, and simultaneous multiple comparisons to references provide numerous false positives. The remaining 60% of test results could be confidently designated as non-toxic.
- Of the tests for which at least one statistically significant result was identified, approximately 39% (26 of 67 tests) were categorized as no adverse response, approximately 20% (13 of 67 tests) were categorized as a possible adverse response, and approximately 41% (27 of 67 tests) were categorized as a likely adverse response.

Categories for 2019 test results are summarized by test site in Figure TS-2 to Figure TS-13, with a narrative summary for each test site (ordered upstream to downstream) in the bullets below. Constituents identified as potential causes of toxicity in 2019 tests categorized as possible or likely are summarized in Table TS-1.

- **FR_FRCP1**—This location is on the Fording River downstream of Cataract Creek. Adverse test responses were observed in all quarters, but were largest in magnitude and affected more test endpoints in Q1, when most or all of the Fording River flowed underground in this reach and water quality at FR_FRCP1 predominantly reflected flows from Cataract Creek. Analysis of correlations between test responses and water quality indicated the following:
  - In Q1 testing, sulphate and total dissolved solids were identified as potentially contributing to algal growth. Nickel was identified as potentially contributing to observed effects on water flea survival and reproduction, along with sulphate and total dissolved solids, and to a lesser extent, nitrate (reproduction only).
  - In Q3 testing, there was evidence of microbial growth in the fathead minnow test, which contributed to observed effects in this species' survival.

- For water flea reproduction in Q3, algal cell yield in Q1 and Q3, amphipod growth in Q4, and fathead minnow survival and biomass in Q1, no water quality constituent could be identified as potentially contributing to the observed responses.

- **FR_FRABCH**—This station, which is approximately five kilometers downstream of FR_FRCP1, is not a permit location but was added to the program in Q4 2018 to better represent mixed Fording River water quality and reduce the confounding influence of mid-winter Cataract Creek flows at FR_FRCP1. Likely or possible adverse responses were observed for cell yield in the Q3 algae test, for survival and viability in the Q2 and Q4 rainbow trout tests, and for survival in the Q1 fathead minnow test. No water quality constituent was identified as potentially contributing to tests results. There was evidence of microbial growth in the fathead minnow test in Q1.

- **GH_FR1**—This station is on the Fording River downstream of Greenhills Creek. Likely adverse responses were observed for cell yield in the Q3 algae test and survival and viability in the Q2 and Q4 rainbow trout tests. No water quality constituent was identified as potentially contributing to observed responses in these tests.

- **LC_LC5**—This station is on the Fording River downstream of Line Creek. Likely adverse responses were observed in Q2 for algal cell yield, and Q4 for amphipod survival and rainbow trout viability, but no water quality constituent was identified as potentially contributing to observed responses in these tests.

- **LC_DCDS**—This station is on Dry Creek downstream of the sedimentation ponds. Likely or possible adverse responses were observed in Q3 for amphipod growth, and Q4 for amphipod survival and growth, and rainbow trout survival and viability. Responses observed in Q4 could be attributed to nitrate, but no water quality constituent was identified as potentially contributing to the observed response in Q3.

- **GH_ERC**—This station is in the Elk River upstream of the Fording River confluence. One likely adverse response was observed in Q1 for fathead minnow survival, and one possible adverse response was observed in Q4 for amphipod growth. No water quality constituent was identified as potentially contributing to observed responses in these tests.

- **EV_HC1**—This station is in Harmer Creek, which flows into Grave Creek and then into the Elk River downstream of Sparwood. One likely adverse response was observed for cell yield in the Q3 algae test, and two possible adverse responses were observed for growth in the Q3 and Q4 amphipod tests. No water quality constituent was identified as potentially contributing to observed responses in these tests.

- **CM_MC2**—This station is on Michel Creek downstream of Corbin Creek. Analysis of correlations between test responses and water quality indicated:

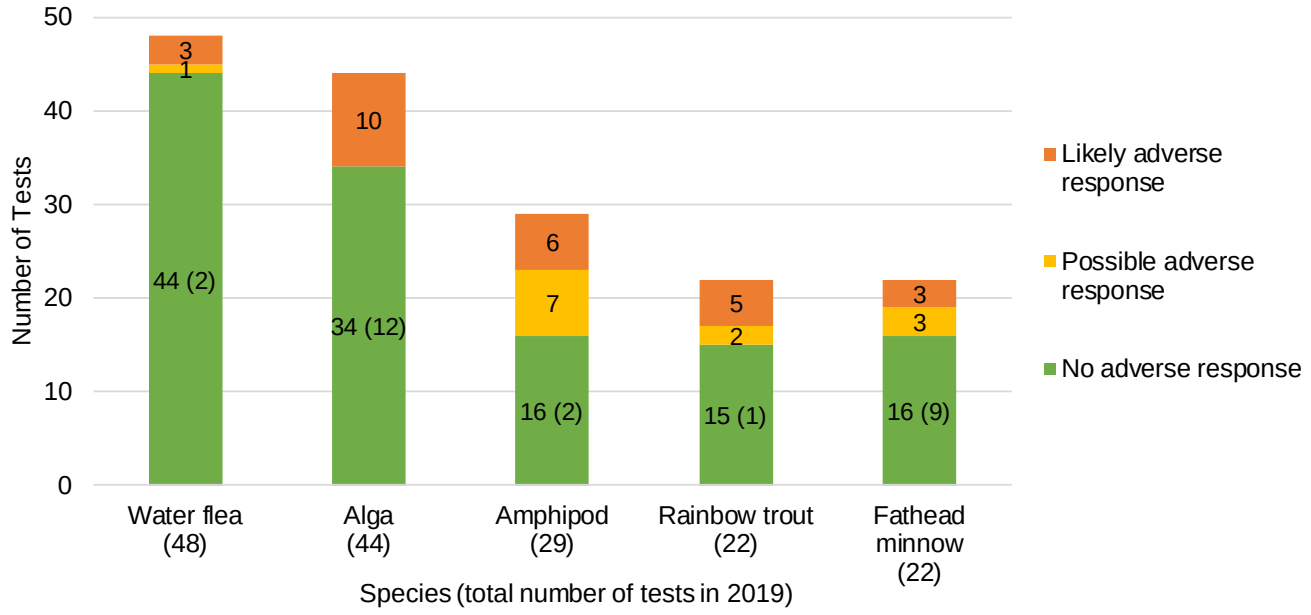
  - Nickel was identified as potentially contributing to water flea reproduction in Q1 and amphipod growth in Q3 and Q4.

  - In Q3 testing, there was evidence of microbial growth in the fathead minnow test, which contributed to observed effects in this species' survival.

  - No water quality constituent could be identified as potentially contributing to the observed responses in Q3 algal cell yield and Q4 amphipod growth and rainbow trout viability.

- **RG_MIDAG**— This station, which is approximately 2 kilometers downstream of CM_MC2, is not a permit location but was added to the program to characterize the spatial extent of effects observed in previous CM_MC2 testing. No adverse responses were observed in any test.
- **EV_MC2**—This station is located on Michel Creek downstream of Bodie Creek. One likely adverse response was observed for algae cell yield in Q3 and one possible adverse response was observed for rainbow trout viability in Q4. No water quality constituent was identified as potentially contributing to observed responses in these tests.
- **LC_LC3**—This station is located in Line Creek downstream of West Line Creek and immediately downstream of the active water treatment facility outfall. Likely or possible adverse responses were observed in Q3 for algal cell yield and amphipod survival and growth, and Q4 for amphipod survival. No water quality constituent was identified as potentially contributing to observed responses in these tests.
- **LC_LCDSSLCC**—This station is located in Line Creek downstream of South Line Creek. Likely or possible adverse responses were observed in Q3 for algal cell yield, amphipod growth, and fathead minnow survival and biomass, and in Q4 for amphipod survival. There was evidence of microbial growth in the fathead minnow test in Q3. No water quality constituent was identified as potentially contributing to observed responses in the other tests.

Figure TS-1: Summary of 2019 test results by species.



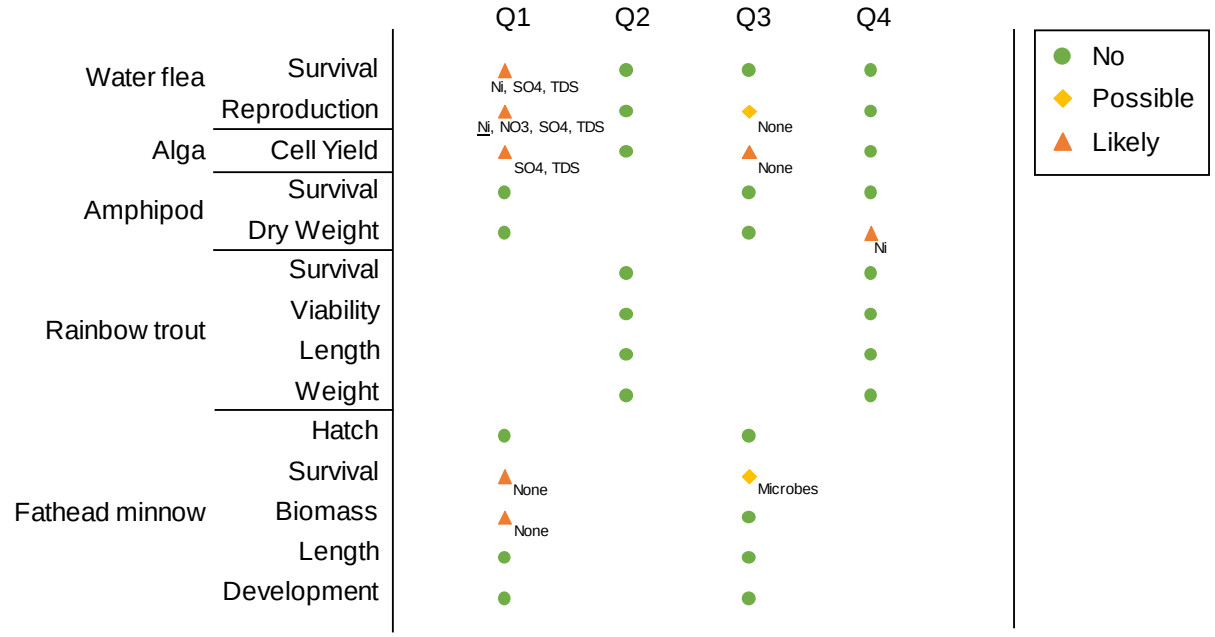
Note: Results are categorized in Section 3.3.1. The number of tests in each category is provided in bar labels. For the “no adverse response” category (green bars), the first number indicates the total number of tests in this category. The number in parentheses indicates how many tests with statistically significant responses relative to one or more references were eventually categorized as “no adverse response” based on the decision rules.

Table TS-1: Summary of Constituents Identified as Potentially Contributing to Observed Responses in 2019

Species	Endpoint	FR_FRCP1	FR_FRABCH	GH_FR1	LC_LC5	LC_DCDS	GH_ERC	EV_HC1	CM_MC2	RG_MIDAG	EV_MC2	LC_LC3	LC_LCDSSLCC
Q1													
Water flea	Survival	Ni[(a)], SO4, TDS	—	—	—	—	—	—	—	—	—	—	—
	Reproduction	**Ni[(a)]**, NO_3, SO_4, TDS	NO_3	—	—	—	—	—	Ni[(a)]	—	—	—	—
Alga	Cell yield	NO_3, SO_4,	—	—	—	—	—	—	—	—	—	—	—
Fathead Minnow	Survival	None	Microbes	—	—	—	None	—	—	—	—	—	—
	Biomass	None	—	—	—	—	—	—	—	—	—	—	—
Q2													
Rainbow trout	Survival	—	None	None	—	—	—	—	—	—	—	—	—
	Viability	—	None	None	—	—	—	—	—	—	—	—	—
Q3													
Water flea	Reproduction	None	—	—	—	—	—	—	—	—	—	—	—
Alga	Cell yield	None	None	None	None	—	—	None	None	—	None	None	None
Amphipod	Dry Weight	—	—	—	—	NO_3	—	None	Ni[(a)]	—	—	None	None
	Survival	—	—	—	—	—	—	—	—	—	—	None	—
Fathead Minnow	Biomass	—	—	—	—	—	—	—	Microbes	—	—	—	Microbes
	Survival	Microbes	—	—	—	—	—	—	Microbes	—	—	—	Microbes
Q4													
Amphipod	Dry Weight	Ni[(a)]	—	—	—	NO_3	None	None	Ni[(a)]	—	—	—	—
	Survival	—	—	—	None	NO_3	—	—	None	—	—	None	None
Rainbow trout	Survival	—	—	None	—	NO_3	—	—	—	—	—	—	—
	Viability	—	None	—	None	NO_3	—	—	None	—	None	—	—

Bold = Primary explanatory variable identified if multiple constituents were identified as potentially causing observed response.
Species and endpoint shown only if one or more tests identified as likely or possible for that quarter. Remaining test endpoints exhibited no indications of toxicity at any test site for that quarter.
— = test was categorized as no adverse response.
Q = quarter of chronic toxicity testing
Ni = nickel; NO_3 = nitrate; SO_4 = sulphate; TDS = total dissolved solids.
None = no water quality constituent was identified that provides a plausible explanation for the pattern of toxicity observed.
[(a)] Causation assessment supported by Toxicity Identification Evaluations.

Figure TS-2: Summary of test results by category at FR_FRCP1.



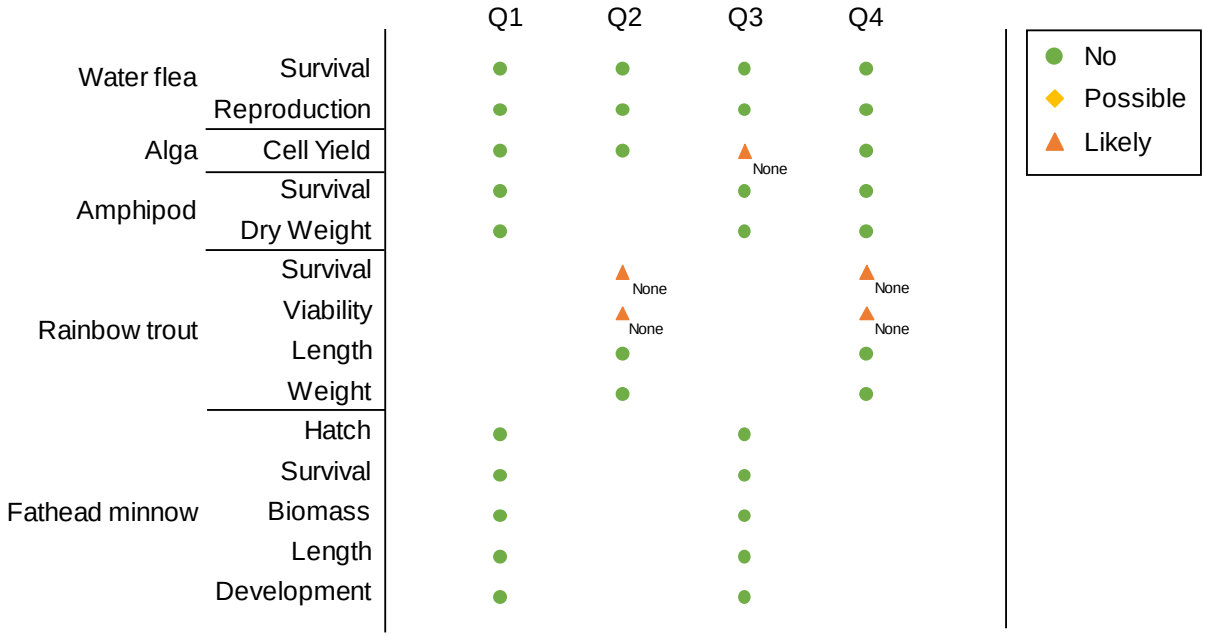
Note: Test results are categorized in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. Ni = nickel; NO_3 = nitrate; SO_4 = sulphate; TDS = total dissolved solids; None = no water quality constituent associated with observed responses was identified. Underlined = Primary explanatory variable identified if multiple constituents were identified as potentially causing observed response. Toxicity Identification Evaluations were conducted to support the causation assessment for water flea and amphipod tests.

Figure TS-3: Summary of test results by category at FR_FRABCH.



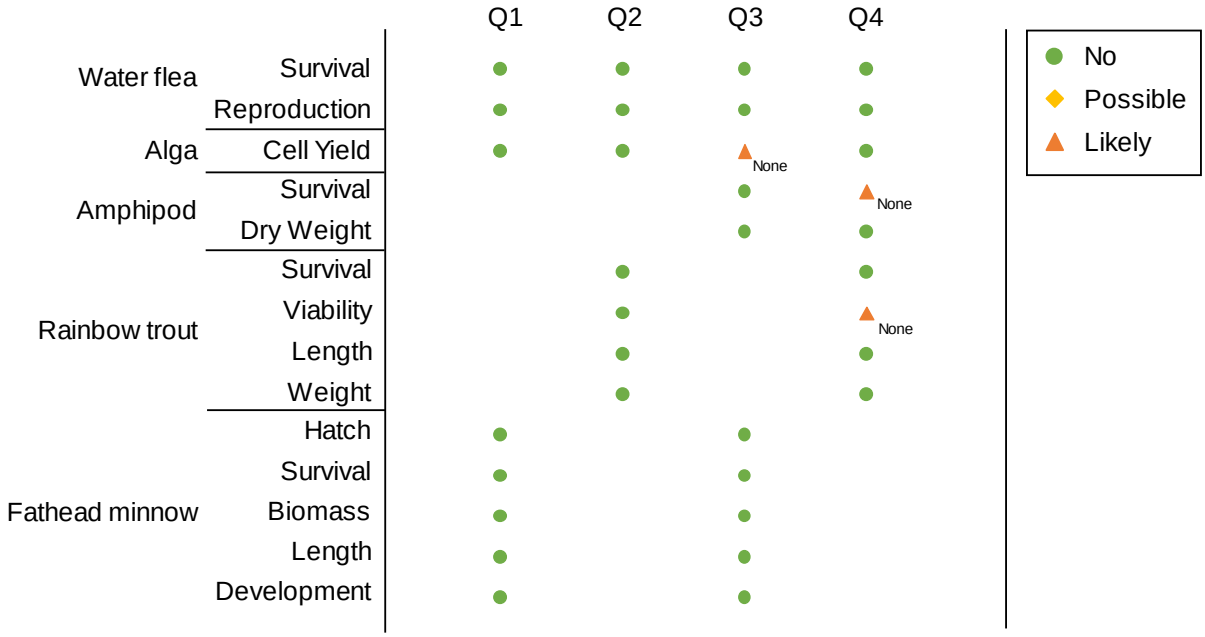
Note: Test results are categorized in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. NO_3 = nitrate; None = no water quality constituent associated with observed responses was identified. Station is not currently part of Permit requirements (station added to evaluate mainstem Fording River conditions).

Figure TS-4: Summary of test results by category at GH_FR1.



Note: Test results are categorized in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. None = no water quality constituent associated with observed responses was identified.

Figure TS-5: Summary of test results by category at LC_LC5.



Note: Test results are categorized in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. None = no water quality constituent associated with observed responses was identified.

Figure TS-6: Summary of test results by category at LC_DCDS.



Note: Test results are categorized in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. NO3 = nitrate; None = no water quality constituent associated with observed responses was identified.

Figure TS-7: Summary of test results by category at GH_ERC.



Note: Test results are categorized in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. None = no water quality constituent associated with observed responses was identified.

Figure TS-8: Summary of test results by category at EV_HC1.



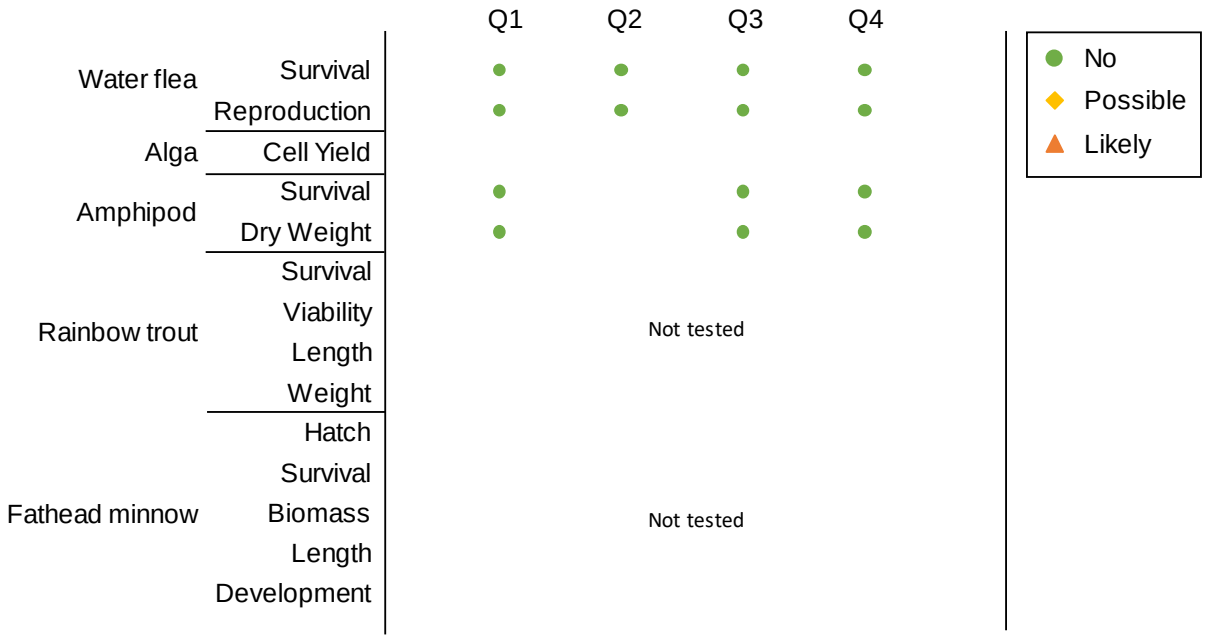
Note: Test results are categorized in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. None = no water quality constituent associated with observed responses was identified.

Figure TS-9: Summary of test results by category at CM_MC2.



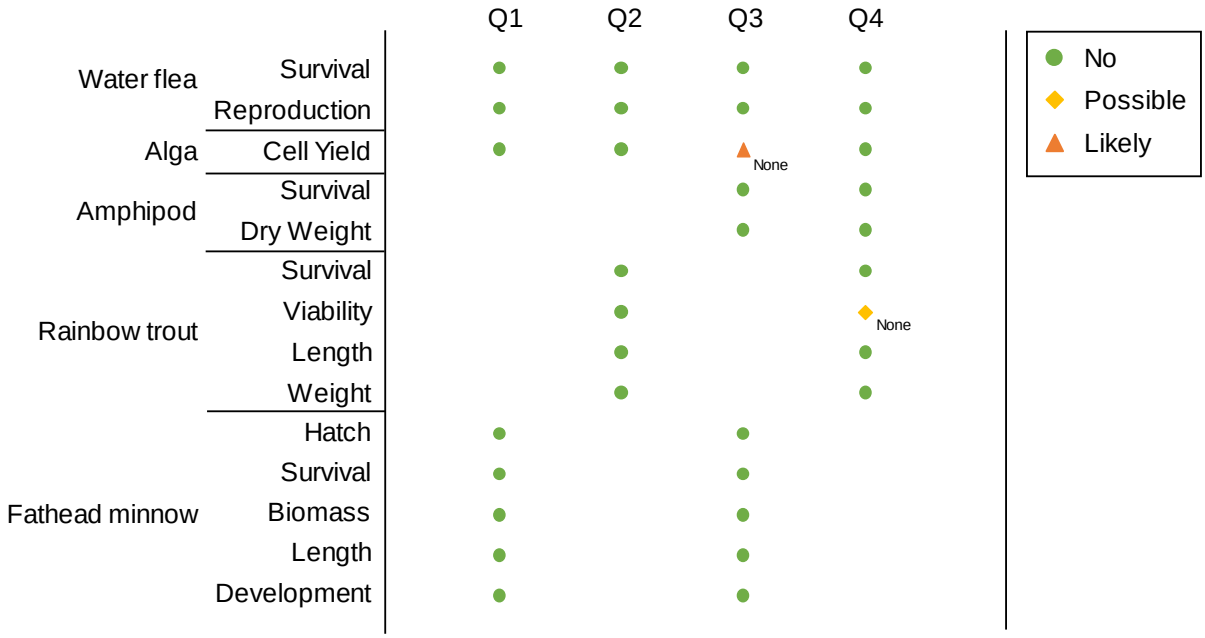
Note: Test results are categorized in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. Ni = nickel; None = no water quality constituent associated with observed responses was identified. Toxicity Identification Evaluations were conducted to support the causation assessment for water flea and amphipod tests.

Figure TS-10: Summary of test results by category at RG_MIDAG.



Note: Test results are categorized in Section 3.3.1. Not tested = no testing conducted for rainbow trout or fathead minnow, as station is not currently part of Permit requirements. Station was assessed for sensitive invertebrate species to characterize spatial extent of effects.

Figure TS-11: Summary of test results by category at EV_MC2.



Note: Test results are categorized in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. None = no water quality constituent associated with observed responses was identified.

Figure TS-12: Summary of test results by category at LC_LC3.



Note: Test results are categorized in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. None = no water quality constituent associated with observed responses was identified.

Figure TS-13: Summary of test results by category at LC_LCDSSLCC.



Note: Test results are categorized in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. None = no water quality constituent associated with observed responses was identified.

Study Limitations

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We have relied in good faith on information provided by others as noted. We assume that the information provided is factual and accurate. We accept no responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of omissions, misinterpretations or fraudulent acts of persons interviewed or contacted.

The services performed as described in this report were conducted in a manner consistent with the level of care and skill normally exercised by other members of the engineering and science professions currently practising under similar conditions, subject to the time limits and financial and physical constraints applicable to the services. The content of this report is based on information collected during our investigation, our present understanding of site conditions, the assumptions stated in this report, and our professional judgement in light of such information at the time of this report. This report provides a professional opinion and, therefore, no warranty is expressed, implied, or made as to the conclusions, advice and recommendations offered in this report. This report does not provide a legal opinion regarding compliance with applicable laws. With respect to regulatory compliance issues, it should be noted that regulatory statutes and the interpretation of regulatory statutes are subject to change. The findings and conclusions of this report are valid only as of the date of the report. If new information is discovered in future work, or if the assumptions stated in this report are not met, Golder Associates should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

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1.0 INTRODUCTION

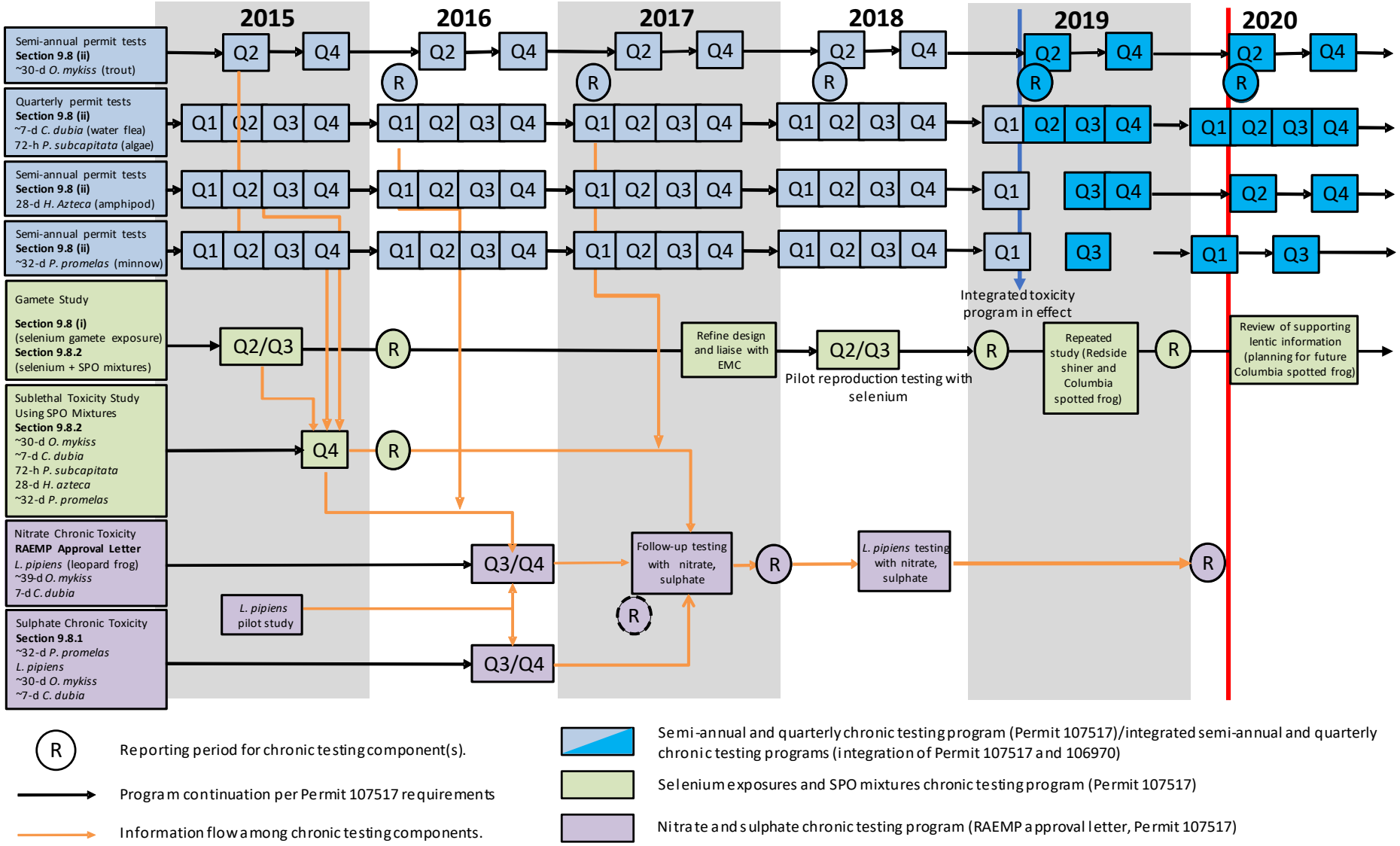
Golder Associates Ltd. (Golder) is pleased to provide Teck Coal Limited (Teck) with the following interpretive report summarizing quarterly and semi-annual chronic toxicity tests undertaken in 2019 for Teck's coal mining operations in the Elk Valley. This study represents the fifth full year of chronic toxicity testing and interpretation to satisfy requirements under permits and associated regulatory approvals.

1.1 Context and Background

Requirements for regional chronic toxicity testing associated with Teck's coal mining operations in the Elk Valley are specified in Section 9.8 of Permit 107517 issued under the Environmental Management Act (EMA) and a 14 November 2014 letter from the British Columbia Ministry of Environment (BC MOE) approving the study design for the Regional Aquatic Effects Monitoring Program (the RAEMP approval letter). Chronic toxicity testing requirements specified in these documents are summarized in Appendix A. The chronic toxicity testing program has been organized into three subprograms (Figure 1.1-1), reflecting the underlying objectives of Permit 107517 and the RAEMP approval letter requirements:

- **Quarterly and Semi-Annual Testing**. This subprogram, depicted in blue in Figure 1.1-1, includes periodic testing of water samples at compliance points in the Elk Valley. Relative to other subprograms, these tests are the most prescriptive in terms of protocols, frequency, and sampling locations. This subprogram addresses Permit 107517 requirements in Section 9.8(ii). Testing conducted in 2019 under permit 107517 Section 9.8 (ii) was aligned with tests conducted for the Line Creek Operations program (Permit 106970) to create an integrated chronic toxicity testing program, designed to eliminate redundancy and standardize testing across the two programs. The integrated program was approved by BC Ministry of Environment and Climate Change Strategy on March 4, 2019.
- **Supplemental Studies using Resident Fish and Amphibians**. This subprogram, depicted in green in Figure 1.1-1, began with a Westslope Cutthroat Trout (WCT) Gamete Study and Sublethal Toxicity Study Using Site Performance Objectives Mixtures. The first phase of work included chronic toxicity tests required to satisfy Permit 107517 requirements specified in sections 9.8(i) and 9.8.2. In the 25 August 2018 amendment to Permit 107517, the WCT subprogram was revised to shift focus from WCT to other species. In 2018, pilot studies were initiated with one amphibian species (Columbia spotted frog, *Rana luteiventris*) (Golder et al. 2019) and one fish species (redside shiner, *Richardsonius balteatus*) (Golder et al. 2018).
- **Nitrate and Sulphate Toxicity Studies**. This subprogram, depicted in purple in Figure 1, addresses requirements for additional chronic testing of nitrate and sulphate. Requirements for additional nitrate testing were specified in the RAEMP approval letter and requirements for additional sulphate testing were specified in Permit Section 9.8.1. Both requirements were intended to address residual uncertainty for these substances for untested species (i.e., amphibians) and at high hardness levels. In August 2018, BC Ministry of Environment and Climate Change (BC ENV) notified Teck that the interpretive report for high hardness levels was accepted, therefore satisfying Permit requirements for this uncertainty. Amphibian testing was carried out in 2018; draft interpretive reporting has been conducted and finalization is expected for April 2020.

Figure 1.1-1: Overview of Elk Valley chronic toxicity surface water testing program



1.2 Linkages to the Water Quality Adaptive Management Plan for Teck

As required in Permit 107517 Section 11, Teck has developed an Adaptive Management Plan (AMP) to support implementation of the EVWQP to achieve water quality targets including calcite targets, to ensure that human health and the environment are protected, and where necessary, restored, and to facilitate continuous improvement of water quality in the Elk Valley. Following an adaptive management framework, the AMP identifies six Management Questions (MQs) that will be re-evaluated at regular intervals as part of AMP updates throughout EVWQP implementation. Triggers also have been identified for specific MQs, which if reached, initiate action under the AMP Response Framework. The AMP also identifies key uncertainties that need to be reduced to fill gaps in current understanding and support achievement of the EVWQP objectives.

The results presented in this report provide information relevant to two of the six MQs and many of the key uncertainties identified in the AMP. Chronic toxicity testing results, along with data collected from other programs, are needed for re-evaluating the answers to MQ 2 (“Will the aquatic ecosystem be protected by meeting the long-term Site Performance Objectives [SPOs]?”), and MQ 5 (“Does monitoring indicate that mine-related changes in aquatic ecosystem conditions are consistent with expectations?”). Reaching an answer of “no” or “uncertain” to a Management Question would lead to action under the Response Framework in the AMP. Examples of findings that have prompted action under the Response Framework are discussed in the methods (Section 2.2.2) and the results (Sections 3.4.1 and 3.4.3).

Chronic toxicity testing results also assist in reducing key uncertainty (KU) 2.1 (“How will the science-based benchmarks be validated and updated?”), KU 2.2 (“How will the integrated assessment methodology used to derive area-based SPOs be validated and updated?”), and KU 5.1 (“How will monitoring data be used to identify potentially important mine-related effects on the aquatic ecosystem?”). Progress on reducing these key uncertainties, and associated learnings, will be described in Annual AMP Reports.

Please refer to the 2018 AMP (Teck 2019a) for more information on the adaptive management framework, Management Questions, key uncertainties, the Response Framework, Continuous Improvement, linkages between the AMP and other EVWQP programs, and AMP reporting.

1.3 Objective

The objective of this interpretive report is to present results from 2019 chronic toxicity testing, interpret test results by comparing site water to reference water responses, evaluate correspondence between water chemistry and toxicological responses, and identify recommendations for revision or augmentation of planned future programs. This report is provided to Teck to meet the chronic toxicity related reporting requirements of Permit 107517 Section 10.3 (amended 9.8 (iii) in 18 January 2019). Appendix B-6 summarizes the 2019 acute toxicity testing results, which were obtained from the annual water quality report.

1.4 Incorporating Feedback from the Environmental Monitoring Committee

Technical advice was provided by EMC members on the 2018 chronic toxicity interpretive report via written advice and subsequent discussions during the May 2019 meeting and the March 2020 conference call. Key changes made in response to EMC advice were:

- Include a figure of chronic toxicity monitoring locations within the report to provide spatial context (Section 2.1).
- Use the 2019 *Ceriodaphnia dubia* brood data, including data collected past the time of protocol-specified test termination, to further evaluate the potential effects on timing and quantity of reproduction. Methods are provided in Section 2.3.3 and results are presented in Section 3.3.1.1. Coarse-level evaluation used in the 2018 report indicated a downward bias in reproduction for some test site waters, but in those studies it could not be determined whether the loss of third brood was indicative of minor delay (only), longer delay, or loss of reproduction. In 2019 tests, reproduction was evaluated for both the Environment Canada (2007a) protocol (i.e., reproduction is measured when ≥60% of controls produce three or more broods) and for an 8-day test duration; these analyses allowed for assessment of both total reproductive output and potential differences in the timing of that reproductive output.
- Discuss the mechanisms of toxicity, where known, for constituents identified as either a possible or likely cause of observed responses (Section 5.0).

1.5 Report Organization

The remaining sections of this report present the methods (Section 2.0), results of the 2019 chronic toxicity testing program including causation assessment and comparisons to previous findings (Section 3.0), summary of findings (Section 4.0), uncertainty assessment (Section 5.0), and recommendations (Section 6.0). A summary of the acute toxicity testing conducted in 2019 is presented in Appendix B.

2.0 METHODS

2.1 Field

Water samples were collected from reference locations upstream of mine-related influences and from test sites downstream of mining, as shown in Table 2.1-1 and Figure 2.1-1. Water samples were submitted to Nautilus Environmental (Nautilus; Burnaby, British Columbia and Calgary, Alberta) for toxicity testing (Section 2.2) and to ALS Environmental (Burnaby, BC) for chemical analysis. Weekly refresh samples were collected for toxicity tests with exposure duration longer than 7 days. Water samples were submitted for chemical analysis each time samples (whether for test initiation or weekly refresh) were collected. Water collection dates are provided in Appendix B.

Rationales for inclusion of stations in Table 2.1-1 are:

- All four references (FR_UFR1, GH_ER2, CM_MC1, LC_SLC) were incorporated by Teck to provide information on responses in Elk Valley waters for samples upstream of the zone of mine influence. The four reference locations are not specified in the Permit but are included to assist with the interpretation of responses observed in mine-influenced waters. Over the last five years, the breadth of reference water testing has increased, as it has been demonstrated that responses (and associated variation) in reference water are helpful for understanding and interpreting site water responses.
- Ten of twelve test sites evaluated in 2019 (i.e., all except FR_FRABCH and RG_MIDAG, see next bullet) were included in the integrated chronic toxicity program developed from Permit 107517 and Permit 106960 requirements. Of the 10 test sites, three (LC_DCDS, LC_LC5, LC_LC3) were added to the program in 2019 following the integration of Line Creek toxicity testing and regional toxicity testing (Golder 2018c).
- Two of twelve test sites (FR_FRABCH and RG_MIDAG) are not permit locations, but rather were incorporated in the integrated chronic toxicity program by Teck in 2019 to provide information on responses downstream of the Permit-specified locations. These additional locations included a candidate future compliance location (FR_FRABCH) and a station to characterize the spatial extent of effects in Michel Creek (RG_MIDAG). These stations were added following the AMP Response Framework (see Section 2.2.2 for more details). In Michel Creek, the station used to characterize the spatial extent of effects was changed from CM_MC3 in 2018 testing to RG_MIDAG in 2019 testing. As discussed at the June 2019 EMC meeting, CM_MC3 was not representative of mainstem Michel Creek in the winter due to an ice jam. Therefore, station RG_MIDAG was selected as a replacement station in consideration of safe access, consistency with the biological monitoring program, and review of aqueous nickel concentrations.

Table 2.1-1: Reference Locations and Tests Sites used in the Quarterly and Semi-Annual Toxicity Testing

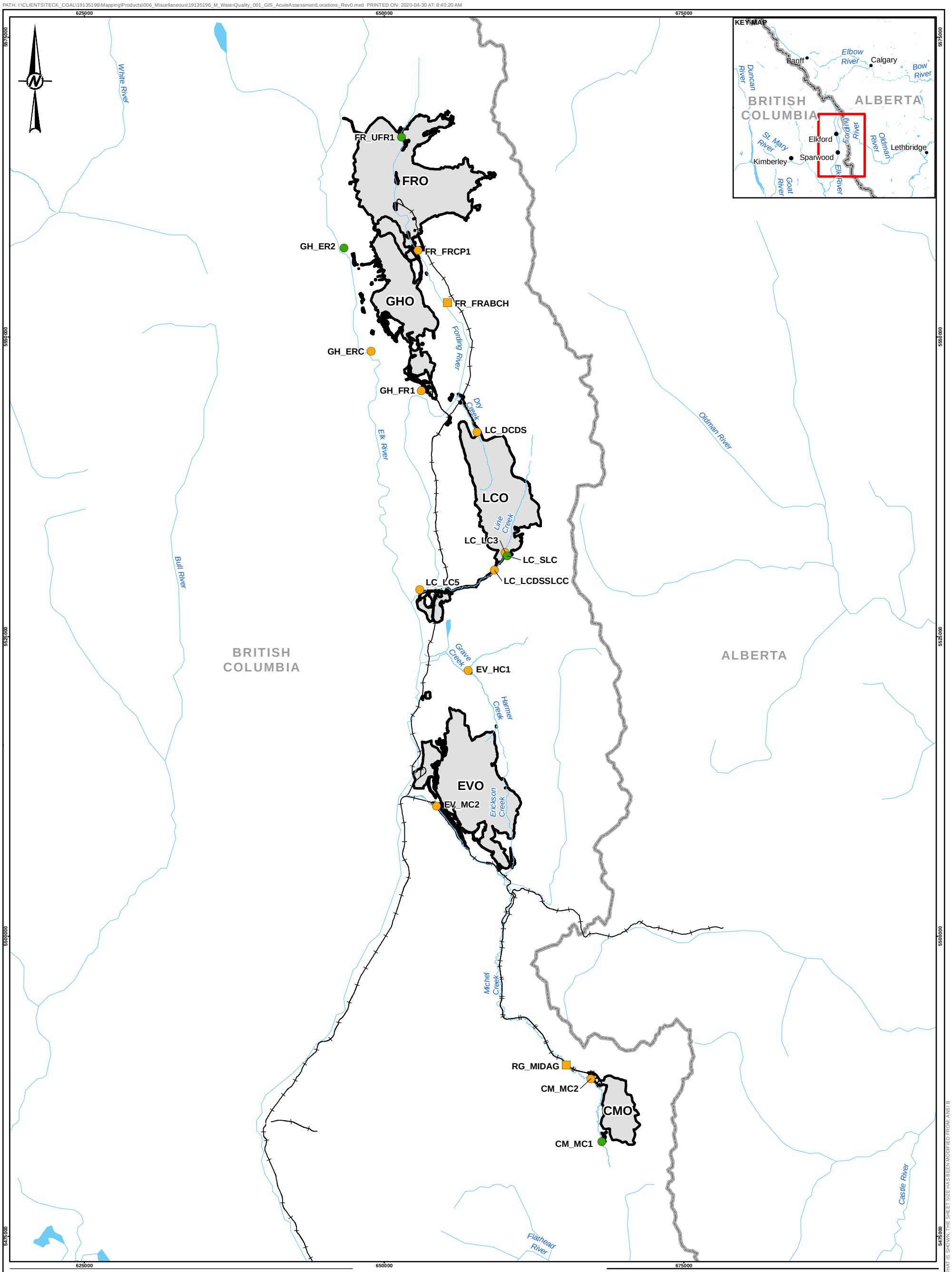
Watercourse	Reference or Test Site	Teck WQ Station ID[a]	EMS ID	Station Name
Fording River	Reference	FR_UFR1	E216777	Fording River upstream of Henretta Creek
	Test Site	FR_FRCP1	E300071	Fording River downstream of Cataract Creek
		FR_FRABCH [b]	—	Fording River upstream of Chauncey Creek
		GH_FR1	200378	Upper Fording River downstream of Greenhills Creek [Order Station FR4]
		LC_LC5 [c]	200028	Fording River downstream Line Creek [Order Station FR5]
Dry Creek	Test Site	LC_DCDS [c]	E295210	LCO Dry Creek downstream of sedimentation ponds
Elk River	Reference	GH_ER2	200389	Elk River upstream of Greenhills Operations
	Test Site	GH_ERC	E300090	Elk River downstream of Thompson Creek
Michel Creek	Reference	CM_MC1	E258175	Michel Creek upstream of Operations
	Test Site	CM_MC2	E258937	Michel Creek upstream of Andy Goode Creek
		RG_MIDAG [b]	—	Michel Creek downstream of Andy Goode Creek
		EV_MC2	E300091	Michel Creek at Highway 3 Bridge
Harmer Creek	Test Site	EV_HC1	E102682	Harmer Spillway at Elk Valley Operations
South Line Creek	Reference	LC_SLC	E282149	South Line Creek West Side of Main Rock Drain
Line Creek	Test Site	LC_LC3 [c]	200337	Line Creek downstream West Line Creek and AWTF outfall
		LC_LCDSSLCC	E297110	Line Creek downstream of South Line Creek

ID = Identification; WQ = water quality

[a] Stations are listed from upstream to downstream for each watercourse.

[b] Station not currently part of Permit requirements but added to characterize spatial extent of effects (RG_MIDAG) or to evaluate mainstem Fording River conditions (FR_FRABCH). Non-permitted sites that were monitored in 2019 may be adjusted in future sampling events to better understand/reflect spatial extent or mixed conditions.

[c] Stations added as of 2019 after the Permit 107517 (regional) and Permit 106970 (LCO) permit integration (Golder 2018c)



LEGEND

- RAILWAY
- WATERCOURSE
- BRITISH COLUMBIA - ALBERTA BORDER
- TECK MINE OPERATION
- WATERBODY

WATER QUALITY MONITORING STATIONS

- REFERENCE LOCATION
- TEST SITE LOCATION INCLUDED IN QUARTERLY AND SEMI-ANNUAL CHRONIC TOXICITY PROGRAM
- TEST SITE LOCATION INCLUDED FOLLOWING AMP RESPONSE FRAMEWORK

0 5 10
1:300,000 KILOMETRES

REFERENCE(S)

HYDROGRAPHY AND ROADS OBTAINED FROM TECK COAL LIMITED. BASE DATA OBTAINED FROM GEOGRATIS, © DEPARTMENT OF NATURAL RESOURCES CANADA. ALL RIGHTS RESERVED.
PROJECTION: UTM ZONE 11 DATUM: NAD 83

CLIENT
TECK COAL LIMITED

PROJECT
ELK VALLEY WATER QUALITY PROGRAM PERMIT IMPLEMENTATION

TITLE
WATER QUALITY MONITORING STATIONS FOR 2019 QUARTERLY AND SEMI-ANNUAL CHRONIC TOXICITY PROGRAM

CONSULTANT
GOLDER

YYYY-MM-DD	2020-04-30
DESIGNED	VA
PREPARED	PS
REVIEWED	EJC
APPROVED	ADB

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2.2 Laboratory

2.2.1 Quarterly and Semi-Annual Testing Program

Test organisms and procedures used in the quarterly and semi-annual testing program followed the general requirements outlined in Permit Section 9.8(ii), with only minor refinements (developed over time with the review and endorsement of EMC). An overview of this program is provided in Table 2.2-1. Laboratory reports for each round of quarterly and semi-annual testing are provided in Appendix B, including detailed methodology, raw data, laboratory notes, quality assurance overview, and statistical significance tests, per protocol requirements.

For *C. dubia*, the test protocol specifies that test duration must be 7 ± 1 day, with the test being terminated on the day that at least 60% of control organisms have produced three broods. Both Golder and the toxicity testing laboratory (Nautilus Environmental) have encountered cases where a marginal achievement of the control brood criterion can introduce high uncertainty in the interpretation of the remaining test treatments. To better evaluate potential effects on brood patterns, per discussions with EMC, the 2019 tests were extended to a maximum of 8 days, regardless of the timing of controls reaching 60% with three broods. In the laboratory reports (Appendix B), the main body of each report[1] contains results per strict Environment Canada protocol requirements; Appendix A of each laboratory report contains the raw data for both test durations. In this interpretive report, per discussions with EMC, results per protocol requirements were used in statistical analyses. This was done to be consistent with reporting in previous years, with comparisons between the two enumeration methods conducted separately.

The methods to compare and analyze the two test durations, and corresponding evaluation of differences in timing and quantity of reproductive output, are described in Section 2.3.3, with results presented in Section 3.3.1.1.

[1] In Q1 and Q2 laboratory reports that were submitted to BC ENV on 30 July 2019 (Q1) and 30 October 2019 (Q2), *C. dubia* results were mistakenly reported as the extended test duration (i.e., not per Environment Canada standard protocol). Upon identifying this error, Nautilus re-issued the Q1 and Q2 reports with *C. dubia* results summarized in the main body of the reports according to the protocol. Appendix B contains the re-issued laboratory reports with the reporting error corrected.

Table 2.2-1: Summary of Quarterly and Semi-Annual Toxicity Tests

Test Species	Test Duration [days]	Endpoint(s)	Test Protocol	Number of Replicates per Test	Frequency of Testing
Water flea—*Ceriodaphnia dubia*	7 ± 1[(a)]	Survival and reproduction	Environment Canada (2007a)	10	Quarterly
Green alga—*Pseudokirchneriella subcapitata* (formerly *Selenastrum capricornutum*, reclassified as *Raphidocelis subcapitata*)	3	Cell yield (growth inhibition)	Environment Canada (2007b)	8 (references and laboratory control); 4 (test sites)	Quarterly
Rainbow trout—*Oncorhynchus mykiss*	30	Survival, viability (which incorporates incidence of deformities), length, weight, behaviour[(b)]	Environment Canada (1998) embryo-alevin test	4	Semi-annual
Amphipod—*Hyalella azteca*	28	Survival and growth	Modified from US EPA (2000), as described in Norberg-King et al. (2014)	5	Semi-annual[(d)]
Fathead minnow—*Pimephales promelas*	28 days post-hatch[(c)]	Survival, hatch, length, biomass, normal development	US EPA (1996) and ASTM (2013)	4	Semi-annual

(a) Protocol test duration is 7 ± 1 days, *C. dubia* tests were extended to maximum of 8 days in 2019 tests to evaluate potential brood effect.
(b) The behaviour endpoint is limited to documentation of unusual behaviours, rather than a quantitative endpoint. Permit 107517 also includes hatching as an endpoint. Hatch rate is not part of the Environment Canada (1998) protocol. However, the survival endpoint provides an appropriate measure of successful hatch, since the test is terminated shortly following hatch (Appendix B).
(c) Test duration is from <24 hour eggs until the organisms reach 28 days post-hatch. Total test duration is usually between 30 and 32 days (James Elphick, pers. comm.).
(d) Under the integration of Permit 107517 and Permit 106970, testing of *H. azteca* is required on a semi-annual basis. Sampling for Q1 2019 began prior to the receipt of the approval letter for the integrated program, therefore, samples were tested using *H. azteca* according to the previous permit (107517) requirements.

Table 2.2-2 summarizes the number of tests conducted in 2019 for each test species and station. Following permit requirements, quarterly (*Ceriodaphnia dubia* and *Pseudokirchneriella subcapitata*) and semi-annual (*Hyalella azteca*, *Pimephales promelas*, and *Oncorhynchus mykiss*) chronic toxicity tests were conducted using water collected from 10 of 12 test sites listed in Table 2.1-1, plus additional testing at FR_FRABCH and RG_MIDAG. The Fording River (FR_UFR1), Elk River (GH_ER2), Michel Creek (CM_CM1), and South Line Creek (LC_SLC) references were tested in all four quarters. Laboratory negative control water tests were also conducted for each species and test date, as specified in Appendix B.

For some tests, minor amendments of site waters were incorporated to improve the ability of the tests to identify mine-related responses, as distinct from spurious adverse effects caused by a natural biological agent (e.g., microbes causing fungal infections in fish) or lack of nutritional elements for laboratory organisms (e.g., low halides inhibiting crustacean development). These adjustments, which consisted of additional or trace amounts of copper or halides, were carefully designed to avoid introduction of adverse responses—the adjustments reduce variation in test responses without introducing analytical bias.

Per the 18 January 2019 amendment to Permit 107517, *P. promelas* and *O. mykiss* tests in 2019 were conducted in copper-amended water to curtail growth of microbes in site water; this test revision incorporates the outcome of previous investigations of anomalous responses (i.e., sporadic mortality phenomenon). For both fish species,

waters were augmented with up to 20 µg/L copper in consideration of key toxicity-modifying factors including water hardness, pH, and dissolved organic carbon (DOC).

As part of their approval of the 18 January 2019 amendment, EMC requested clarification of the potential for copper to modifying the toxicity of other water quality variables; the primary concern was whether copper could reduce toxicity of other metals due to competition for binding sites. As discussed at the June 2019 EMC meeting, a review of mixture toxicity literature indicated a potential for copper interaction with other metals, with synergism (more than additive) effects most frequently reported in the literature for two common Elk Valley metals (nickel and cadmium). However, those interactions do not reduce toxicity, do not necessarily occur at low metals concentrations, and review of site-specific testing with *P. promelas* and *O. mykiss* indicated a lack of interaction at the copper amendments used to date. Therefore, as discussed at the June 2019 EMC meeting, the advantages of copper amendments (curtailing microbial growth) are interpreted to outweigh potential disadvantages (copper or mixture-related effects).

Per discussions with EMC[2] and subsequent approval by ENV[3], non-amended *P. promelas* test results from previous sampling years (2015 and Q1 2016) are not included in the statistical analysis of quarterly test results due to their low reliability for assessing toxicant-based responses.

[2] EMC conference call on 30 November 2016; summary of the conference call is provided in Teck (2016b).
[3] MoE (2016). Letter to Teck Coal Limited. Re: Copper amendment for microbial control in the Fish Early-Life Stage Toxicity Test. 23 December 2016.

Table 2.2-2: Summary of Quarterly and Semi-Annual Tests Conducted in 2019 [a,b,c]

Watercourse	Reference [d] or Test Site	Teck WQ Station ID	*C. dubia*	*P. subcapitata*	*O. mykiss* [c]	*H. azteca* [f][g]	*P. promelas* [c]
Fording River	Reference	FR_UFR1	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q1, Q3, Q4	Q1, Q3
	Test Site	FR_FRCP1	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q1, Q3, Q4	Q1, Q3
		FR_FRABCH [e]	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q1, Q3, Q4	Q1, Q3
		GH_FR1	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q1, Q3, Q4	Q1, Q3
		LC_LC5	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q3, Q4	Q1, Q3
Dry Creek	Test Site	LC_DCDS	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q3, Q4	Q1, Q3
Elk River	Reference	GH_ER2	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q1, Q3, Q4	Q1, Q3
	Test Site	GH_ERC	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q3, Q4	Q1, Q3
Michel Creek	Reference	CM_MC1	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q1, Q3, Q4	Q1, Q3
	Test Site	CM_MC2	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q1, Q3, Q4	Q1, Q3
		RG_MIDAG [e]	Q1, Q2, Q3, Q4	—	—	Q1, Q3, Q4	—
		EV_MC2	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q3, Q4	Q1, Q3
Harmer Creek	Test Site	EV_HC1	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q3, Q4	Q1, Q3
South Line Creek	Reference	LC_SLC	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q3, Q4	Q1, Q3
Line Creek	Test Site	LC_LC3	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q3, Q4	Q1, Q3
		LC_LCDSSLCC	Q1, Q2, Q3, Q4	Q1, Q2, Q3, Q4	Q2, Q4	Q3, Q4	Q1, Q3
Total number of tests per species			**64**	**60**	**30**	**40**	**30**

(a) Stations are listed from upstream to downstream for each watercourse.
(b) One test was conducted per test species, quarter, and station (i.e., each Q in this table represents one test). Q1 = quarter 1; Q2 = quarter 2; Q3 = quarter 3; Q4 = quarter 4. "—" indicates that the test was neither conducted nor required under Permit 107517 or 106970.
(c) *O. mykiss* and *P. promelas* tests were conducted using copper-amended samples (Appendix B).
(d) Reference locations (highlighted in light green) are not specified in the Permit but are included to assist with the interpretation of responses observed in mine-influenced waters.
(e) Station not currently part of Permit requirements but added to characterize spatial extent of effects (RG_MIDAG) or to evaluate mainstem Fording River conditions (FR_FRABCH). Non-permitted sites that were monitored in 2019 may be adjusted in future sampling events to better understand/reflect spatial extent or mixed conditions.
(f) Under the integration of Permit 107517 and Permit 106970, testing of *H. azteca* is required on a semi-annual basis. Sampling for Q1 2019 began prior to the receipt of the approval letter for the integrated program, therefore, samples were tested using *H. azteca* according to the previous permit (107517) requirements in Q1 (Appendix B). All stations included testing of *H. azteca* on at least two occasions, with additional Q1 results from regional stations under Permit 107517.
(g) Testing for *H. azteca* did not meet control passing criteria in Q2 (i.e. laboratory control survival was <80%). Testing with *H. azteca* was repeated in Q3. In 2020, resumption of testing for this species will include Q2/Q4 for all stations in the integrated program.

2.2.2 Supplemental Testing—Toxicity Identification Evaluation

Findings in chronic toxicity monitoring were reviewed in relation to MQ2 (“Will the aquatic ecosystem be protected by meeting the long-term SPOs?”) and MQ5 (“Does monitoring indicate that mine-related changes in aquatic ecosystem conditions are consistent with expectations?”) of the AMP. Unexpected findings would potentially indicate a “no” or “uncertain” answer to these questions, and therefore prompted an evaluation of potential actions under the AMP Response Framework.

For the 2019 chronic toxicity program, supplemental tests were conducted to evaluate potential cause(s) of responses observed in FR_FRCP1 tests (Section 2.2.2.1) and CM_MC2 tests (Section 2.2.2.2). Following the AMP Response Framework, Toxicity Identification Evaluations (TIEs) were conducted to investigate the cause of adverse responses observed in the Q1 and Q3 FR_FRCP1 tests and to support the interpretation of nickel as the suspected cause of adverse responses in CM_MC2 tests. To provide context for these supplemental studies, additional information on AMP response actions related to these findings is briefly summarized below and will be discussed further in annual reporting under the AMP.

An overview of methods for supplemental testing and context of related adaptive management responses is provided below. Results are discussed in Section 3.4.

2.2.2.1 FR_FRCP1 Adaptive Management Responses

Seasonally variable responses have been observed in previous chronic toxicity testing at FR_FRCP1 (Golder 2018a), and this finding has triggered further evaluation and investigation under the AMP response framework. Water quality monitoring data also show strong seasonal variation in conditions, which is now understood to reflect a seasonal pattern of subsurface flow in the Fording River. The channel bed of the upper Fording River changes from bedrock near the Fording River Operations South Tailings Pond to alluvial sediments in downstream reaches. Due to greater permeability of alluvial sediments, a portion of the Fording River flow naturally goes subsurface in this area and travels underground for several kilometers before re-emerging as surface flow. The effect of this subsurface flow on surface hydrology (and associated water quality) is most pronounced in winter when flow in the Fording River is seasonally lowest.

The effect of subsurface flow on water quality in the upper Fording River is to reduce the dilution available for inputs of mine-affected tributaries entering the Fording River mainstem. In particular, inputs from Cataract Creek can have a pronounced effect on winter water quality at FR_FRCP1, which is located approximately 525 m downstream of the mouth of Cataract Creek. Water quality at FR_FRCP1 has been reported to exceed one or more compliance limits for selenium, nitrate, and sulphate during winter low-flow conditions since 2015. Seasonal peaks of mine-related constituents occur between November and March of each year, reflecting the influence of Cataract Creek inputs (with low or no dilution from upstream surface flow of the Fording River during periods when a relatively large portion of the Fording River flows subsurface).

Given the current understanding of seasonal hydrology and water quality at FR_FRCP1, Teck has initiated several actions:

- First, diversion of Cataract Creek flows upstream to the Swift Creek Ponds was initiated by Teck in August 2019, prior to Q3 testing. This conveyance is ultimately intended to divert Cataract Creek water for treatment through Swift Ponds, but it also prevents discharge of surface flows from Cataract Creek into the Fording River in a reach that seasonally dries. Commencing conveyance prior to constructing the AWTF was

proposed as a short-term mitigation action to ameliorate water quality in the reach of the Fording River with low or no winter surface flow[4].

- Second, Teck has applied to relocate the Fording River Operations compliance location from FR_FRCP1 to a location approximately 5 km downstream, where the Fording River has returned to surface. The new location will better attain the objective of a compliance location to monitor fully mixed conditions in the receiving environment downstream of FRO and will capture and reflect all or most point and non-point source discharges from the mine site. The proposed location, named FR_FRABCH, is immediately upstream of the confluence with Chauncey Creek. Monitoring at this location is expected to reflect mixed Fording River conditions, to be less subject to midwinter flows of Cataract Creek water in the Fording River channel, and to capture subsurface flow from Kilmarnock Creek that surfaces downstream of FR_FRCP1. Station FR_FRABCH was added to the chronic toxicity program in Q4 2018, and testing continued at the station in all quarters of 2019, as a better representation of potential effects in mixed Fording River conditions.
- Third, Teck has initiated TIE studies to better understand the cause(s) of toxicity at FR_FRCP1. Methods for the FR_FRCP1 TIE are as follows (Appendix B-5):
  - Treatments were conducted with *C. dubia* and *H. azteca*, which have been shown to be sensitive to some mine-related constituents of potential concern.
  - *C. dubia* water collection dates were February 26 (Q1), May 7 (Q2), August 20 (Q3), and November 12 (Q4). *H. azteca* water samples were collected on a weekly basis between February 26 to March 19 (Q1), August 20 to September 10 (Q3), and November 12 to December 3 (Q4).
  - Treatments were designed to identify whether toxicity was caused by divalent metal cations (using EDTA treatment). Treated and untreated samples were tested concurrently, so that any effect of the treatment could be discerned.

  Results of the FR_FRCP1 TIEs are discussed in Sections 3.4.1 (*C. dubia*) and 3.4.3 (*H. azteca*).

2.2.2.2 CM_MC2 Adaptive Management Responses

Adverse responses have been observed in previous chronic toxicity testing at CM_MC2 (Golder 2018a), with a general increasing trend of frequency and magnitude of responses in crustacean tests from 2015 to 2018. In addition, biological monitoring in 2015, 2016, 2017, and 2018 reported reduced abundance of mayflies (a sensitive benthic invertebrate taxon) at Michel Creek downstream of Corbin Creek relative to previous years and relative to upstream portions of Michel Creek. These findings triggered further evaluation and investigation under the AMP response framework.

In 2017, a TIE was initiated to investigate the cause of adverse responses observed in CM_MC2 chronic toxicity tests. Nautilus (2018) identified nickel as the likely cause of toxicity in these tests. This interpretation was supported by 1) a review of nickel toxicity data that indicated a potential for effects on sensitive invertebrate species at concentrations near 5 µg/L, below the BC water quality guideline of 150 µg/L for high-hardness waters; and 2) a review of water quality data that indicated the increasing trend in chronic toxicity test responses corresponded with an increasing trend in aqueous nickel concentrations between 2015 (generally ranged from 5 to 15 µg/L) to 2017 (generally ranged from 10 to 45 µg/L) (Golder 2018a).

[4] The portion of the Upper Fording River that is primarily subsurface flow varies based on flow conditions, and is greatest in winter. In December 2018, the spatial extent of limited surface flow was approximately two kilometres (i.e., surface flows reappeared near the confluence with Porter Creek), although most of the subsurface flow returned to surface several kilometres downstream (i.e., closer to Chauncey Creek).

As a result of identifying nickel as a potential toxicant in CM_MC2 tests, Teck has initiated several actions:

- First, Teck has expanded monitoring at Coal Mountain Operations (CMO) to better understand and delineate potential effects. Station CM_MC3 was added to the chronic toxicity program in Q1 2018, and was replaced with station RG_MIDAG in 2019 (see Section 2.1 for details). RG_MIDAG is not a Permit location but was added to the program to characterize the spatial extent of potential effects in chronic toxicity tests. Biological monitoring was conducted at CMO under the RAEMP between 2015 and 2017. In 2018,monitoring under the RAEMP was expanded to include additional sites in Michel Creek. A formalized local aquatic effects monitoring program (LAEMP) for CMO was developed and implemented in 2019 based on Permit 107517 requirements.
- Second, Teck has continued TIE studies in 2019 to further support the interpretation of nickel as the cause of adverse responses in CM_MC2 crustacean tests. Methods for the 2019 Michel Creek TIE are as follows (Appendix B-5):
  - Treatments were conducted with *C. dubia* and *H. azteca,* which have been shown to be sensitive to nickel. Treatments were conducted using CM_MC2 (Q1 to Q4) and RG_MIDAG (Q2 to Q4) water. *C. dubia* water collection dates were February 26 (Q1), May 7 (Q2), August 20 (Q3), and November 12 (Q4). *H. azteca* water samples were collected weekly between February 26 to March 19 (Q1), August 20 to September 10 (Q3), and from November 12 to December 3 (Q4).
  - Treatments were designed to identify whether toxicity was caused by divalent metal cations (using EDTA treatment). Treated and untreated samples were tested concurrently, so that any effect of the treatment could be discerned.

  Results of the Michel TIEs are discussed in Sections 3.4.1 (*C. dubia*) and 3.4.3 (*H. azteca*).
- Third, Teck initiated studies to support the development of site-specific effects benchmarks for nickel in the Elk Valley. This work includes an ongoing series of laboratory-based toxicity studies and desktop data analyses to better understand the toxicity of nickel in Elk Valley waters, the influence of water chemistry factors on toxicity, and to what extent nickel may be contributing to observed effects in the chronic toxicity and biological monitoring programs. The outcome of this work is expected to be a set of site-specific benchmarks that will support evaluation and management of nickel at CMO and throughout the Elk Valley.
- Fourth, Teck is evaluating mitigation options for nickel at CMO. This evaluation is proceeding in parallel to the toxicity investigation work described in the preceding bullet.

2.3 Data Analysis

Data analysis for 2019 quarterly and semi-annual tests consisted of the following five steps:

- Review and summarize quality assurance/quality control information from laboratory reports to establish that organism performance in the laboratory control water met acceptability criteria for the protocol (Section 2.3.1).
- Address key sources of variance that could affect responses observed in test waters, so that the ability to detect a true toxicological response is improved (Section 2.3.2).
- Categorize 2019 test results as no, possible, or likely adverse response, based on the response size in the test and how the response compares to the typical range observed in local and regional reference waters (Section 2.3.3).

- Conduct a causation assessment to examine potential causes of responses observed in 2019 tests categorized as possible or likely (Section 2.3.4).
- Compare 2019 test results to previous years to identify potential response patterns (i.e., were adverse responses observed in the same quarter and test species in 2019 and previous years) and potential causation patterns (i.e., were adverse responses attributed to the same constituents in 2019 and previous years?) (Section 2.3.5).

2.3.1 Quality Assurance/Quality Control

Laboratory reports for each round of quarterly and semi-annual testing include a quality assurance section (Appendix B). Quality assurance information was reviewed and summarized to establish that organism performance in the laboratory control water met acceptability criteria for the protocol as it pertains to the health histories and sensitivity of the organisms, and that no deviations from test procedures occurred that would influence the reliability of the data.

2.3.2 Sources of Variance

Responses observed in test waters are subject to several sources of variance, including:

- variation in test organism performance (Section 2.3.2.1)
- variation in test organism sensitivity to toxicants (Section 2.3.2.2)
- variation in background water quality characteristics (e.g., environmental and toxicity modifying factors) and their effect on test responses (Section 2.3.2.3)
- variation in concentrations of toxicants in test waters (Section 2.3.2.4)
- other random inter-individual variability that manifests as experimental “noise”.

One of the objectives of the quarterly and semi-annual interpretive report is to identify toxicological responses and distinguish these responses from other sources of variance. The ability to detect a true toxicological response is improved when confounding effects of the other sources of variance are minimized. Therefore, the following sections outline the approach used to evaluate and address the first four sources of variance. Addressing the first four sources of variance is expected to substantially improve the ability to identify a true toxicological response; therefore, no methods were applied to estimate other factors contributing to experimental noise.

2.3.2.1 Organism Performance

To control for temporal variation in test organism performance (batch sensitivity) as a potential confounding factor, response data (including reference waters and test waters) were control normalized[5] before performing data analyses. Individual replicate values were control normalized for each species endpoint. The species endpoint means and standard deviations that are presented herein were calculated from the control normalized replicate values. The objective of control normalization was to use control responses to reduce or eliminate variation in test organism performance among test batches, such that the ability to detect a true toxicological response between test site waters and reference waters is improved. Control normalization was implemented for all endpoints except for *P. subcapitata* cell yield, per agreement at the 5 February 2018 conference call with the EMC. Algal cell yield

[5] $control\ normalized\ response = \left(\frac{site\ water\ response}{laboratory\ control\ response}\right) \times 100$

was excluded from normalization because it is largely influenced by the variability in nutrient concentrations and ionic strength of lab water and site water.

2.3.2.2 Organism Sensitivity

To evaluate whether temporal variation in test organism sensitivity was a potential confounding factor, reference toxicant test data were summarized from laboratory reports and compared across test batches. For each test species and endpoint, effect concentrations from reference toxicant tests were expressed as a percentage of the historical mean reference toxicant effect concentration and plotted for visual examination. Values greater than 100% indicate that organisms in that batch are less sensitive relative to the historical mean, whereas values less than 100% indicate organisms are more sensitive relative to the historical mean. Observations of organism sensitivity were considered qualitatively by visually assessing whether responses in reference toxicant tests were consistently above or below the historical mean. Organism sensitivity was considered stable if reference toxicant results fell close to the historical mean (i.e., within 15%). Reference toxicant results that deviated farther from the historical mean were evaluated for patterns (e.g., values consistently above or below the historical mean, temporal trends in sensitivity). As discussed in Appendix B, the sensitivity of organisms used in the toxicity tests is considered appropriate if the mean response in reference toxicant tests falls within two standard deviations of historical results obtained from the laboratory.

2.3.2.3 Background Conditions (Normal Ranges)

To evaluate whether temporal or spatial variation in background water quality and its effect on test responses might be a confounding factor, normal ranges (NRs) were developed for responses in reference waters. For each endpoint, two types of NRs were calculated:

- Local NR—Local NRs were developed separately for each reference location. Each NR was inclusive of findings from multiple batches of tests (e.g., Fording River NR included all tests conducted to date with Fording River reference water).
- Regional NR—The regional NR was inclusive of findings from multiple batches and multiple reference locations (Fording River, Elk River, Michel Creek, and South Line Creek references).

NRs were developed using the 2015 to 2019 quarterly results from Elk River and Fording River reference sites, the 2017 to 2019 quarterly results from the Michel Creek reference site, and the 2018 to 2019 quarterly results from the South Line Creek reference site[6]. Per discussions with the EMC at the February 2018 meeting, NRs were defined as the 2.5th to 97.5th percentiles of mean test results (i.e., NRs were intended to identify results that fall at the tails of the distribution, with an overall 5% chance that a randomly selected result would fall outside the NR). Percentiles were estimated using the normal distribution function in Systat^{TM}. For some endpoints, assumptions of normality were not met (i.e., p value <0.05), indicating that a normal distribution may not be appropriate for the dataset. This generally occurred when the sample size was small (e.g., two South Line Creek reference tests for *P. promelas*) or the variance in reference test results was low (e.g., control normalized development for *P. promelas* was 100% in 22 of 27 reference tests). Because normality was not met in all datasets, NRs in some cases may represent a central percentile of values larger or smaller than 95%; however, NRs were still considered to be useful to characterize the typical range of responses observed in reference waters. Responses in reference waters tested between 2015 and 2019 were also plotted for visual assessment.

[6] Reference site tests with results compromised by confounding factors (e.g., evidence of microbial growth) were not included in normal range calculations.

As discussed at the March 2020 EMC call, because of the small number of South Line Creek reference tests for *H. azteca*, *O. mykiss*, and *P. promelas* (n = 2 to 5) and Michel Creek reference tests for *O. mykiss* (n = 4), local NRs in these cases were considered preliminary and were not used in the statistical evaluation of test results. Therefore, test sites in these local watersheds were paired with the best reference match *a priori*, based on geography and availability of data (see Section 2.3.3 for more details).

The approach used herein to develop local and regional NRs, as well as the NRs themselves, are based on findings to date; each year of monitoring improves the characterization of inter- and intra-station variations for reference waters. The approach and NRs developed herein are expected to undergo refinement with future chronic toxicity testing results. For example, the preliminary NRs based on low sample sizes will be recalculated for future years of monitoring and will achieve the sample sizes required for derivation of reliable NRs.

2.3.2.4 Variation in Concentrations of Toxicants

To evaluate variation in concentrations of toxicants in test waters, coefficients of variation (CVs) were calculated for mean water chemistry concentrations in the longer duration tests and reviewed to assess variability in weekly concentrations. The CV is a measure of relative variability, calculated as the ratio of the standard deviation to the arithmetic mean. If a concentration was below the reported detection limit, the full detection limit was used. CVs were calculated for *H. azteca*, *O. mykiss*, and *P. promelas* tests, as these are the only tests with weekly refresh samples. *C. dubia* and *P. subcapitata* tests are conducted using water collected on a single day (Section 2.1); therefore, this source of variance is not expected to be a confounding factor for these species.

2.3.3 Evaluation of 2019 Test Results

The 2019 test results were evaluated using the following three statistical comparisons:

- **Batch-specific comparison**—Pairwise comparisons of test site responses to reference responses, with analysis limited to batch-specific findings (i.e., test site results for each quarter were compared to all references tested in that quarter). Each quarterly laboratory report includes statistical analyses using CETIS™ (Comprehensive Environmental Toxicity Information System; Tidepool Scientific Software 2013) to identify test sites with mean results statistically significant (p <0.05; herein referred to as 'significantly') lower than the mean response in associated Fording River, Elk River, Michel Creek, or South Line Creek reference waters.
- **Local reference comparison**—Mean test site responses were compared to local NRs. As described in the previous section, local NRs were inclusive of findings from multiple batches at a single reference location. Each test site was paired with the best reference match *a priori*, based on geography and availability of data. When available, test sites were paired with an upstream reference in the same local watershed. If an upstream reference was not available, then the test site was paired with the upstream reference on the watercourse that the tributary flows into (e.g., Dry Creek is a tributary of Fording River, so the Fording River reference was used for LC_DCDS). Pairings are provided in Table 2.3-1. Reference pairings used herein are expected to change over time, as additional data are collected for the chronic toxicity testing program (e.g., new reference stations and/or increased sample size for the existing reference station design).
- **Regional reference comparison**—Mean test site responses were compared to regional NRs. As described in the previous section, regional NRs were inclusive of findings from multiple batches and multiple reference locations.

Table 2.3-1: Reference and Test Site Pairings used in the Local Normal Range Comparison.

Test Site	Local Reference Comparison	Rationale
FR_FRCP1	Fording River (FR_UFR1)	Reference is located on the same watercourse.
FR_FRABCH[(a)]		
GH_FR1		
LC_LC5		
LC_DCDS		LCO Dry Creek is a tributary to Fording River
GH_ERC	Elk River (GH_ER2)	Reference is located on the same watercourse.
EV_HC1		Harmer Creek (via Grave Creek) is a tributary to Elk River.
CM_MC2	Michel Creek (CM_MC1) for all species except *O. mykiss*; Elk River (GH_ER2) for *O. mykiss*	Reference is located on the same watercourse. Currently there are insufficient Michel Creek reference tests with *O. mykiss* to develop reliable normal ranges.
RG_MIDAG[(a)]		
EV_MC2		
LC_LC3	South Line Creek (LC_SLC) for *C. dubia* and *P. subcapitata*; Fording River (FR_UFR1) for *H. azteca*, *O. mykiss*, and *P. promelas*	Reference is located on the same watercourse. Currently there are insufficient South Line Creek reference tests with *H. azteca*, *O. mykiss*, and *P. promelas* to develop reliable normal ranges. Line Creek is a tributary to Fording River.
LC_LCDSSLCC		

(a) Station not currently part of Permit requirements but added to characterize spatial extent of effects (RG_MIDAG) or to evaluate mainstem Fording River conditions (FR_FRABCH). Non-permitted sites that were monitored in 2019 may be adjusted in future sampling events to better understand/reflect spatial extent or mixed conditions.

The 2019 test site results were categorized as no, possible, or likely adverse response according to the methods in Figure 2.3-1. Categories for 2019 test results were presented by test species and test site. Test results were interpreted as follows:

- A test was considered to reflect **no adverse response** if the mean result was:
  - not significantly lower[7] than any reference in the batch (per statistical comparisons in laboratory reports [Appendix B]) or
  - significantly lower than one or more references in the batch but within the local NR and mean effect size[8] was less than 20%
- A test was considered to reflect a **possible adverse response** if the mean result was significantly lower than one or more references in the batch, but was:
  - within the local NR and the mean effect size was between 20 and 50% or
  - below the local NR but within the regional NR

  Tests in this category were considered to have uncertainty regarding whether the result represents an adverse response to toxicants in the test water or alternatively may reflect variance in test organism performance related to background water quality.

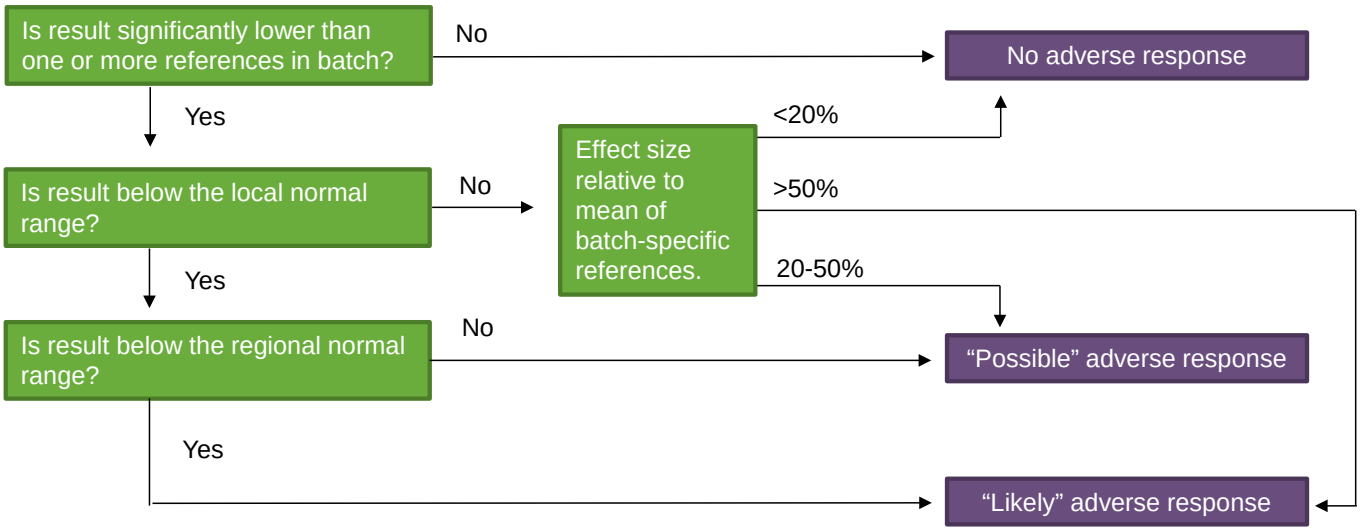
[7] Responses are considered to be lower for the positive aspect of performance (i.e., survival, growth, reproduction). In cases of lower response, the effect size is higher relative to any reference in the batch.
[8] Effect size relative to the mean of batch-specific reference results.

- A test was considered to reflect a **likely adverse response** if the mean endpoint result was significantly lower than one or more references in the batch and:
  - within the local NR but the effect size was greater than 50% or
  - below the regional NR

Any endpoint categorized as a possible or likely adverse response in one or more tests conducted in 2019 was carried forward to the concentration-response analysis to evaluate causation (Section 2.3.4). If an endpoint was carried forward, then all available tests for that endpoint were included in the concentration-response analysis (i.e., tests conducted with reference and test site waters between 2015 and 2019).

Although the statistical comparisons to NRs remain the primary basis for classification of test results, the effect size decision point recognizes that there can be different levels of test variance (and statistical power) in individual rounds of testing. The effect size decision rule helps to discern results that are statistically significant but with low magnitude of response from those that are larger in response magnitude. The use of the 50% effect size threshold provides a means of flagging larger responses, but for which the variance in NRs is wide (i.e., low statistical power to identify an adverse response).

Figure 2.3-1: Decision framework for inclusion of endpoints and constituents in the concentration-response analysis.



Individual replicate and mean results were plotted for all endpoints. Example data plots are provided in Figure 2.3-2 (individual replicate results) and Figure 2.3-3 (mean results) with annotation to explain how data plots were interpreted in Section 3.3. As shown on Figure 2.3-3 (mean results), local and regional NRs were shown to illustrate the normal range of test organism responses observed in reference waters tested between 2015 and 2019. Test sites were paired with a single reference for comparison to the local NR; local NRs were used for three reference locations for *H. azteca*, *O. mykiss*, *P. promelas* and four reference locations for *C. dubia* and *P. subcapitata* (see Table 2.3-1). For *H. azteca*, *O. mykiss*, and *P. promelas*, three plots were made for each endpoint: one for the Fording River reference and its paired test sites, one for the Elk River reference and its paired test sites, and one for the Michel Creek reference and its paired test sites. For *C. dubia* and *P. subcapitata*, a fourth plot was made for each endpoint for South Line Creek and its paired test sites.

As discussed in Section 2.3.5, mean responses in chronic toxicity tests were plotted over time (2015 to 2019) to compare 2018 responses to previous years. The annotation on Figure 2.3-3 (mean results for 2019) also applies to how data plots were interpreted in Section 3.5 (mean results for 2015 to 2018).

Figure 2.3-2: Example data plot for individual replicate results.

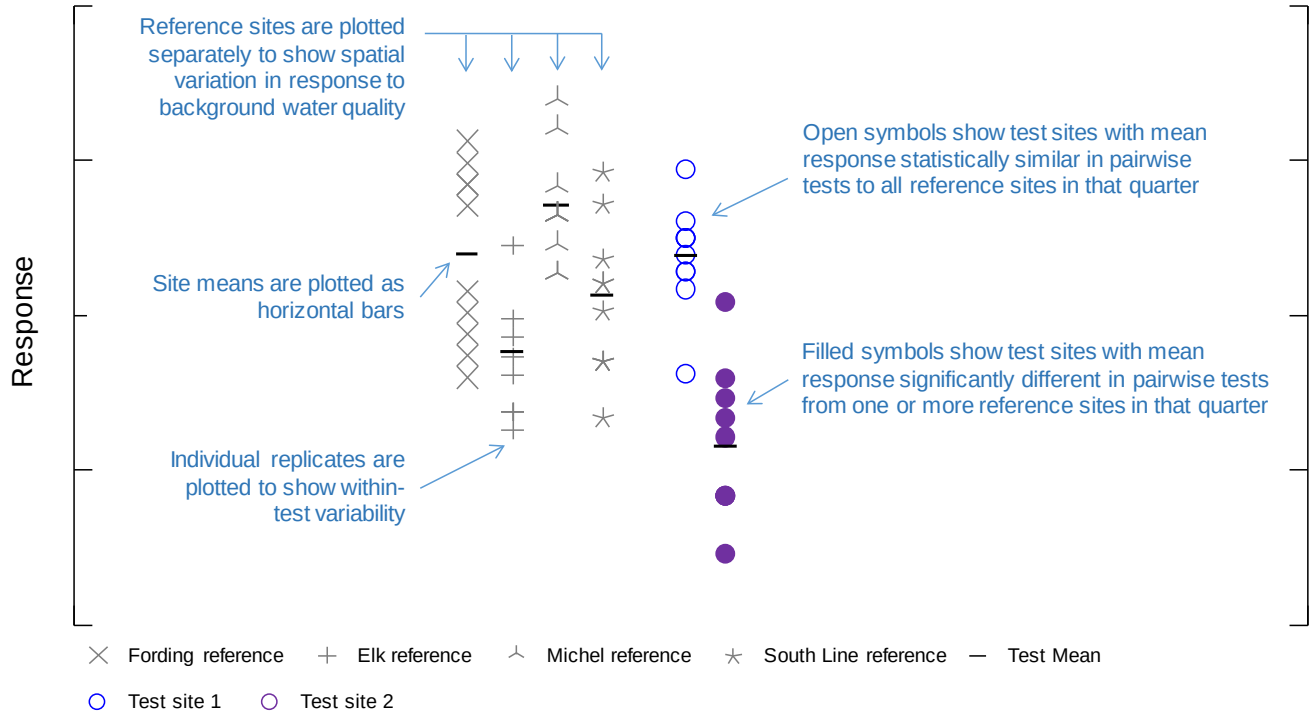
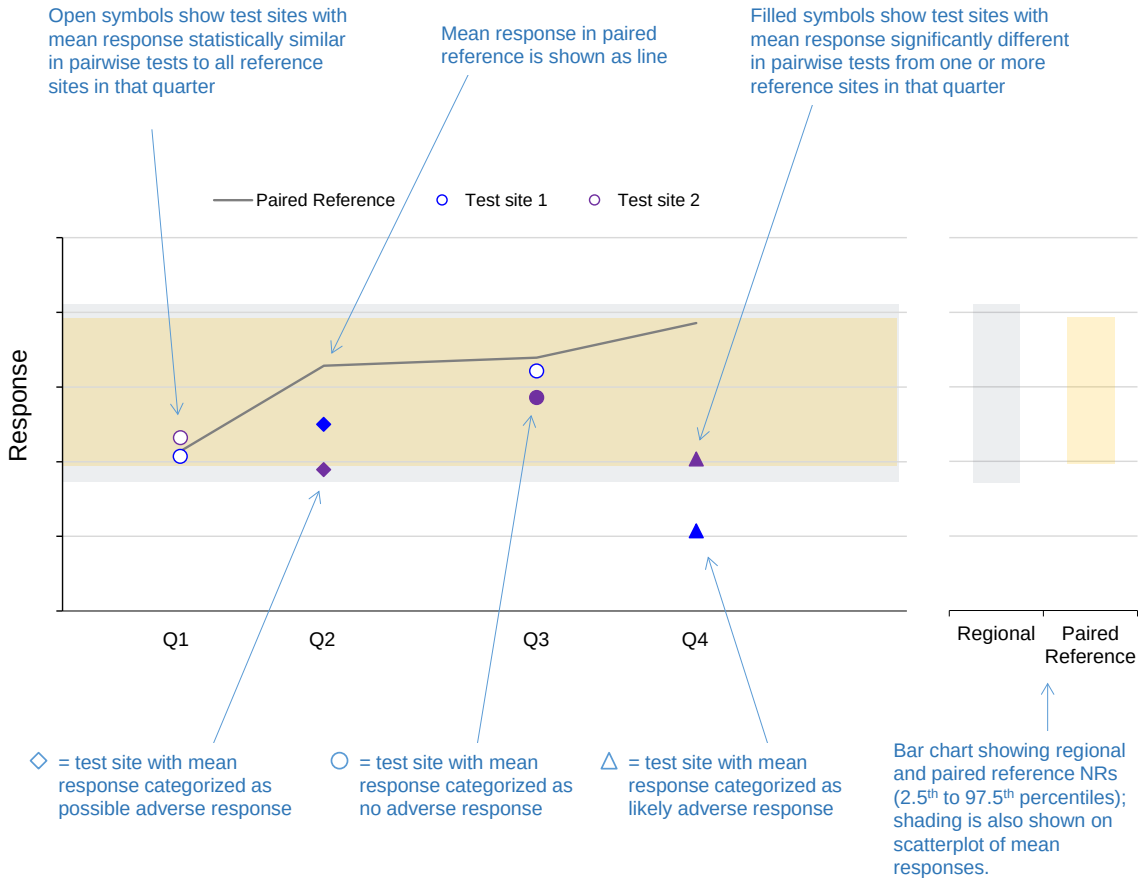


Figure 2.3-3: Example data plot for mean results.



Evaluation of *Ceriodaphnia dubia* Broods

Potential implications of the Environment Canada test protocol on *C. dubia* reproduction was discussed with the EMC at the October 2018 meeting, February 2019 conference call, May 2019 meeting, and March 2020 conference call. The *C. dubia* test protocol specifies that the test ends when ≥60% of controls produce three or more broods. This has implications for the chronic toxicity testing program, as the reproductive output in reference and/or test site waters could be biased low by tests being terminated just before the third brood is counted. The third brood accounts for approximately 50% of the reproductive output (James Elphick, pers. comm.), which means that minor differences in brood output can have a large impact on reproduction results. Furthermore, a minor delay in reproduction, either due to toxicological processes or due to random variations, can cause large variations in enumerated reproductive output. Each replicate that does not produce a third brood prior to test termination could theoretically result in a reduction of the overall reproductive output by 5% (e.g., if zero of 10 replicates have a third brood, then the reproductive output could be reduced by 50%; if two of 10 replicates have a third brood, then the reproductive output could be reduced by 40%, and so on). To evaluate the potential effects on reproductive output, 2019 *C. dubia* testing was conducted two ways:

- according to standard Environment Canada protocol (i.e., 7 ± 1 days)
- with results of the test extended to a maximum of 8 days, regardless of the timing of controls reaching 60% with three broods

The bench sheets for each *C. dubia* reproduction test were tabulated by the laboratory. The number of neonates in the first three broods was recorded for the Environment Canada protocol test termination, and separately for the 8-day test (regardless of what day the third brood was produced). Any reproductive output from a fourth or greater brood was omitted from the data prior to statistical analysis. The proportion of adults producing three broods in both test terminations was also calculated. An analysis of variance (ANOVA) was used to identify test sites with mean results significantly lower than the batch-specific mean response in associated Fording River, Elk River, Michel Creek, or South Line Creek reference waters in the 8-day tests. The results of the ANOVAs were compared to the batch-specific comparisons conducted by the laboratory on Environment Canada protocol tests to determine if differences in conclusions occurred between the two test terminations.

2.3.4 Causation Assessment

A causation assessment was conducted to identify potential contributors to adverse responses observed in 2019 quarterly and semi-annual tests. The assessment was conducted for all endpoints for which one or more "possible" or "likely" adverse responses were identified in 2019.

To support this assessment, responses in chronic toxicity tests were paired with matching water chemistry data. The selection of matched (concurrent and co-located) chemistry data depended on the duration of the test, as some tests entailed collection of multiple water samples on a weekly basis with measurements of chemical constituents in each sample. Tests with *C. dubia* and *P. subcapitata* were conducted using water collected on a single day and were paired with water chemistry collected on that day. For other test species, effects data were paired with the mean concentration of the weekly submitted samples collected over the duration of the test.

The causation assessment consisted of five components: TIEs (when applicable), comparison of water quality data against BC water quality guidelines (WQGs) and EVWQP benchmarks, Spearman rank order correlations between response and explanatory variables, graphical analysis, and identification of potential contributors to adverse responses. The first four components are used as lines of evidence to support the fifth (combined identification of potential contributors). Components are described in the following sections.

Toxicity Identification Evaluations

TIE results (Appendix B-5 and B-6) were reviewed and summarized as to whether treatments reduced toxicity (improved response) in TIE testing (Section 2.2.2.1). If a treatment significantly improved the response relative to the unamended sample, the constituent group associated with that treatment was identified as a potential contributor to toxicity in the unamended sample. For example, if a response was improved in the EDTA-treated sample, then divalent metals were identified as a plausible contributor to toxicity in the unamended sample.

Water Quality Screening

Mean water chemistry concentrations in 2019 tests, as well as concentrations measured in weekly refresh samples, were screened against the lowest level 1 EVWQP benchmarks (cadmium, nitrate, selenium, sulphate) or chronic BC WQGs (other constituents)[9]. As discussed in Section 2.3.2.4, CVs were calculated for the mean concentrations and reviewed to assess variability in weekly concentrations. Interpretation of screening results is provided in the last subsection (identification of potential contributors).

[9] Per concurrence at the March 2019 EMC meeting, 5 µg/L was used herein. This value is slightly lower than the interim level 1 screening value (5.3 µg/L) used in recent aquatic health assessments conducted for Teck in the Elk Valley. This value could change pending further evaluation of site-specific toxicity data.

Spearman Rank Correlation

Spearman rank order correlations were conducted using paired response and water chemistry data from all reference and test sites[10]. Although correlation does not necessarily indicate causation, the analysis of correspondence between test results and water quality may provide insight into potential causes. The correlation analysis included all 2015, 2016, 2017, 2018, and 2019 quarterly and semi-annual test results for reference locations and test sites.

Total concentrations were used for metals that have a chronic BC WQG for the total fraction (e.g., zinc) or that lack a chronic BC WQG (e.g., lithium). Dissolved concentrations were used for metals with a chronic BC WQG for the dissolved fraction (e.g., cadmium). Water quality variables were $\log_{10}$ transformed prior to conducting the Spearman rank order correlations.

Correlations were also conducted using responses paired with principal components (PCs) identified via principal component analysis (PCA) of water quality data, and responses paired with the sum of toxic units (∑TU). The objective of this analysis was to test whether responses could be explained by an overall indicator of mine water influence on water quality (PCA) or mixture effects (∑TU), in addition to testing individual water quality constituents. These explanatory variables are explained further in the following bullets:

- PCA is a multivariate analysis technique used to describe patterns of inter-correlations among variables of interest. It calculates dominant components of variance from a matrix of chemical variables to reduce the multidimensional nature of the data while retaining much of the information from the original variables. PC scores were used in the Spearman rank correlation as an overall indicator of mine water influence on water quality.[11] Water quality variables were $\log_{10}$ transformed prior to conducting the PCA in Systat™. PCAs were conducted with two separate datasets (i.e., 2019 only versus pooled data from 2015 to 2019) to evaluate whether the relationship between test responses and PCs (i.e., indicators of overall mine influence) differed in 2019 relative to the pooled dataset. For example, if water quality differed slightly in 2019 relative to previous years, then the relationship between test responses and PCs may be different for 2019 relative to the pooled dataset. For each PC, component loadings (i.e., the water quality constituents that are strongly correlated with the PC) were reviewed to identify similarities and differences between the two datasets.
- ∑TU is an exposure metric for mixtures. For each constituent in the mixture with a BC WQG, the measured concentration was divided by the chronic BC WQG to calculate toxic units (TUs). If a chronic BC WQG was not available, the short-term BC WQG was used. Where total and dissolved guidelines were available (i.e., iron), the total guideline was used because total concentrations were above BC WQGs more frequently than dissolved concentrations. For nickel, because recent studies conducted by Teck have indicated potential effects attributable to nickel at concentrations lower than the BC WQG, 5 µg/L was used in the denominator[12]. Calculated TUs for all constituents in the mixture were summed. The TUs for each mixture was calculated two ways: 1) using the WQG in the denominator (i.e., as described above) and 2) using the lowest level 1 benchmark from the EVWQP in the denominator (Teck 2014; applies to sulphate, nitrate, and

[10] Some *P. promelas* and *O. mykiss* tests were excluded from the Spearman rank correlation due to evidence of microbial growth in tests, or quality assurance/quality control criteria were not met in tests. See Section 3.1.
[11] The number of PCs retained for correlation analysis was determined from the inflection point of a plot of eigenvalues (the PCA "'scree plot"). PCs were retained if they had an eigenvalue greater than 1 and were in the steep portion of the scree plot to the left of the inflection point. PCs with eigenvalues less than 1 and/or to the right of the inflection point are relatively uninformative in terms of patterns of covariation among water quality variables.
[12] Per concurrence at the March 2019 EMC meeting, the interim screening value of 5 µg/L was used herein. This value corresponds to the lowest level 1 screening value used in recent aquatic health assessments conducted for Teck in the Elk Valley. This value could change pending further evaluation of site-specific toxicity data.

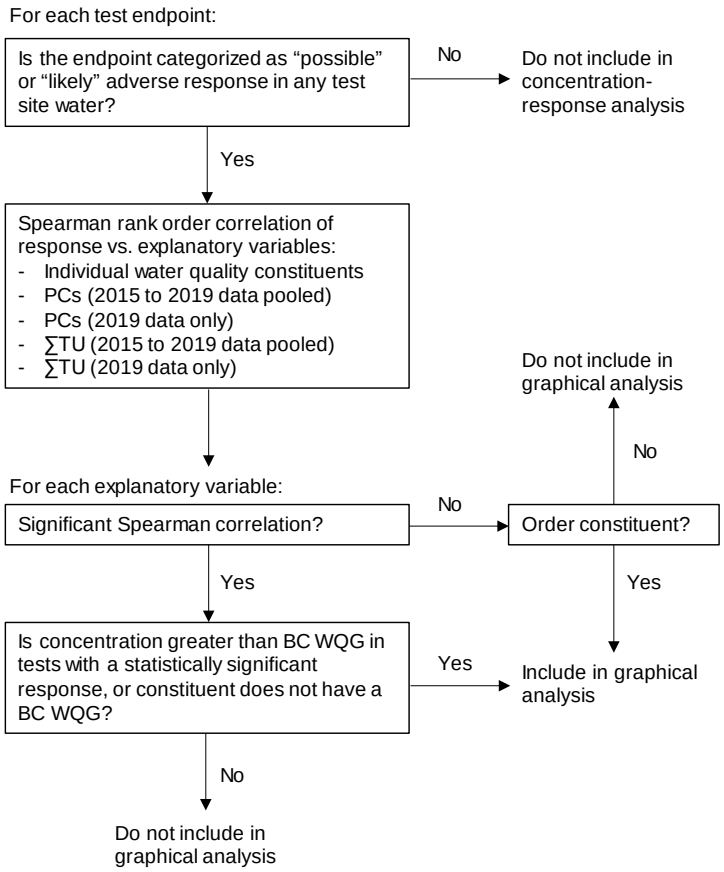
dissolved cadmium). Per discussions with the EMC at the 5 February 2019 conference call, selenium was excluded from the ∑TU calculation because benchmarks reflect bioaccumulation-based exposures over long periods and not direct toxicity in standardized toxicity tests. ∑TUs were conducted with separate datasets (i.e., 2019 only versus pooled 2015 to 2019) to evaluate whether the relationship between test responses and ∑TUs (i.e., indicators of potential mixture effects) differed in 2019 relative to the pooled dataset.

In reporting prior to 2020, a significant Spearman correlation was determined using a critical value of $p < 0.05$ to identify constituents that could potentially be explanatory variables in the causation assessment. Because of the large number of correlation analyses being conducted (more than 50 per endpoint), there is an inflated chance of obtaining a significant result by chance (i.e., spurious significant outcomes due to simultaneous multiple comparisons). Per discussions during the March 2020 EMC conference call, the *p* value was decreased to 0.005 in this report to reduce the chances of false positives occurring (Teck 2020). The potential for spurious correlations is also affected by the generally high degree of covariance among water quality variables in mine-influenced water. Because the correlation coefficients were not adjusted for simultaneous multiple comparisons, the significance results presented herein should be interpreted as indicative of a potential relationship between test responses and water quality, not strong evidence that a relationship exists. A Spearman rank correlation coefficient of 0.4 was used herein to identify explanatory variables with strong correlations.

Graphical Analysis

Figure 2.3-4 outlines how the screening against BC WQGs and EVWQP benchmarks and Spearman rank correlation were used to identify explanatory variables for graphical analysis.

Figure 2.3-4: Decision framework for inclusion of endpoints and explanatory variables in the graphical analysis.



Note: BC WQG = British Columbia water quality guideline; PCs = principal components; ∑TU = sum of toxic units. Order constituents are screened against lowest level 1 EVWQP benchmarks, nickel is screened against the interim screening value of 5 µg/L per concordance at the March 2019 EMC meeting, and all other constituents are screened against applicable BC WQGs.

For constituents with significant correlations, screening results in tests categorized as possible or likely were reviewed. Constituents with concentrations lower than the chronic BC WQG were not carried forward for graphical analysis.[13] If the concentration was greater than a chronic BC WQG or if the constituent did not have a chronic BC WQG, then the constituent was carried forward to the graphical analysis.

Graphical analysis (endpoint responses plotted against explanatory variables) was conducted for all Order constituents (cadmium, selenium, nitrate, sulphate)[14], and for all other constituents that had statistically significant correlations and that were either greater than a chronic BC WQG or did not have a chronic BC WQG. PC scores and ∑TUs with statistically significant correlations were also included in the graphical analysis as a combined indicator of exposure to mine-influenced water (PC scores) or a combined indicator of potential mixture effects (∑TUs). For constituents that lack a chronic BC WQG but are commonly assessed as a component of total dissolved solids (TDS) (e.g., calcium), the individual constituents were not plotted; instead, responses were plotted against the concentration of TDS. Concentration-response plots were visually examined to assess the consistency of correspondence between constituent concentrations and test responses. A consistent

[13] Nickel was an exception to this rule because recent studies conducted by Teck have indicated potential effects attributable to nickel at concentrations lower than the BC WQG.
[14] Order constituents were included in the graphical analysis even if no statistically significant correlation was present because these constituents are the most consistent and widespread indicators of mine-influenced water quality in the Elk Valley.

concentration-response relationship is visually apparent when there is broad overlap in responses measured in different tests but at similar concentrations.

Identification of Potential Contributors to Toxicity

Results from TIEs, screening against BC WQGs and EVWQP benchmarks, Spearman rank correlations, and graphical analysis were reviewed together for each test categorized as a possible or likely adverse effect to identify potential contributors to adverse responses.

For water quality, if the concentration of a constituent in a test categorized as possible or likely adverse effect was low, then it was considered unlikely to be causing toxicity, provided that both:

- the measured concentration was lower than concentrations measured in reference tests and tests categorized as no adverse response; and
- the BC WQG or lowest level 1 EVWQP benchmark for the constituent (if available) was not dependent on modifying factors (e.g., hardness).

Conversely, to evaluate whether the constituent could be contributing to observed effects, published toxicity data were reviewed if:

- a test categorized as possible or likely was higher than concentrations measured in reference tests and tests categorized as no adverse response and greater than BC WQG or lowest level 1 EVWQP; or
- the concentration was greater than a BC WQG or lowest level 1 EVWQP benchmark dependent on modifying factors; or
- a constituent in a test categorized as possible or likely was higher than concentrations measured in reference tests and tests categorized as no adverse response and no BC WQG is available.

Explanatory variables (i.e., ∑TUs, PC scores) identified as having statistically significant Spearman rank correlations and/or exhibited consistent exposure-response relationship in the graphical analysis were discussed for tests categorized as possible or likely to determine if they potentially contributed to toxicity.

2.3.5 Comparison of 2019 Results to Previous Years

Similarities and differences were summarized between test results in the 2019 program and previous programs (2015 to 2018), focusing on the incidence of adverse responses by season and station. The objectives for this comparison were to identify potential seasonal patterns (i.e., were adverse responses observed in the same quarter and test species in 2019 and previous years?) and potential causation patterns (i.e., were adverse responses attributed to the same constituents in 2019 and previous years?). Results were summarized by test species/endpoint and test site, as described below.

To summarize by test species and endpoint, mean responses in chronic toxicity tests were plotted against time for all endpoints. Responses were control normalized for all endpoints except *P. subcapitata* cell yield (Section 2.3.2.1). Local and regional NRs, developed using the approach described in the Section 2.3.2.3, were shown on plots to illustrate the normal range of test organism responses observed in reference waters tested in 2015 to 2019 inclusive. As was done for the evaluation of 2019 test results (Section 2.3.3), test sites were paired with a single reference for comparison to the local NR. Therefore, three to four plots were made for each endpoint. For *H. azteca*, *O. mykiss*, and *P. promelas*, three plots were made for each endpoint: one for the Fording River reference and its paired test sites, one for the Elk River reference and its paired test sites, and one for the Michel Creek reference and its paired test sites. For *C. dubia* and *P. subcapitata*, a fourth plot was made for each endpoint for South Line Creek and its paired test sites. Regional NRs were shown on all plots. An example data plot is shown in Figure 2.3-3 (2019 responses) and is annotated to explain how data plots were interpreted in Section 3.5 (2015 to 2019 responses). The symbols on each plot indicate whether the mean response was categorized as no (circle), possible (diamond), or likely (triangle). Categories were based on those provided in each annual report (i.e., tests were not re-categorized based on the method revisions used for the 2019 results). Due to the differences in the details of the statistical interpretations in each annual report, these interannual comparisons are semi-quantitative and should only be used to identify broad patterns rather than precise or detailed comparisons.

To summarize by test site, test categories were plotted against time for all endpoints. The symbols on each plot indicate whether the test endpoint was categorized as no (circle), possible (diamond), or likely (triangle). Categories were based on those provided in each annual report (i.e., tests were not re-categorized based on the methods used for the 2019 results). For tests categorized as possible or likely, symbols are annotated where a potential toxicant was identified.

3.0 RESULTS

3.1 Quality Assurance/Quality Control

Detailed laboratory quality assurance/quality control (QA/QC) information is provided in the Nautilus reports (Appendix B). The following bullets summarize QA/QC information for all quarterly and semi-annual tests:

- Health histories of the test organisms used in the exposures were acceptable and met requirements of the test protocols.
- Water quality constituents remained within ranges specified in the protocol throughout the tests.
- Tests met all control acceptability criteria, except for the Q2 *H. azteca* test. Control survival and weight did not meet the acceptability criteria, so the test was re-started in Q3 (Appendix B-2 and B-3). In the Q1 *H. azteca* test, organisms were smaller (average dry weight of 0.11 mg) than the recommended average of 0.15 mg (Appendix B-1). However, because the reference toxicant test fell within the historical value of mean and standard deviation, the laboratory deemed the sensitivity of the organisms to be appropriate (Appendix B-1) and the Q1 results were accepted for use in statistical analysis.
- Results of reference toxicant tests fell within the acceptable range for organism performance of mean and two standard deviations based on historical results obtained by the laboratory (i.e., sensitivity of organisms used in the tests was acceptable), except for the following:
  - Q3 *P. subcapitata* test—The reference toxicant result for growth (IC_{50} = 25.1 µg/L zinc) was marginally below the historical two standard deviation range (IC_{50} = 25.7 to 38 µg/L zinc) but was within three standard deviations of the historical mean; this is expected to occur by chance alone in 5% of cases (Appendix B-3). The laboratory investigated the health histories of *P. subcapitata* and found all testing and culturing procedures were followed appropriately, and the Q3 results were considered to be acceptable.
- There were no deviations from the test methodologies, except for the following:
  - Planned modification to the *C. dubia* test duration—tests were extended to 8 days to support the evaluation of potential brood impacts on reproductive output (see details in Section 2.3.3). The Environment Canada test protocol specifies that test duration must be 7 ± 1 day, with the test being terminated on the day that at least 60% of control organisms have produced three broods. To better evaluate potential effects on brood patterns, the laboratory was instructed to extend the test to 8 days, regardless of the timing of controls reaching 60% with three broods, and separate statistics were conducted for the alternate test termination. However, the results reported in the main body of the laboratory reports and in the statistical analyses conducted herein are based on the protocol test method.
  - Planned modification to the *H. azteca* method—All site waters were supplemented with 25 mg/L chloride and 0.02 mg/L bromide using NaCl and NaBr according to recommendations of the *Hyalella* Advisory Group (chaired by Chris Ingersoll, United States Geological Survey) (Norberg-King et al. 2014) because low concentrations of these halides are known to impair growth of this species (Appendix B).
  - Planned modification to the *P. promelas* and *O. mykiss* tests—Tests were conducted on copper-amended samples (up to 20 µg/L depending on site-specific toxicity-modifying factors) to reduce

potential adverse effects caused by fungi and microbes that have previously been observed in Elk Valley samples (Appendix B).

- *O. mykiss* tests—Eggs were exposed using a blocked design (i.e., eggs from one fish were used for replicate A of each test concentration, eggs from the second fish for replicate B, and so on); this approach deviates from the Environment Canada test method, which indicates that the eggs should be pooled prior to testing (Appendix B). This modification is appropriate because it reduces the risk of non-viable eggs affecting the test results (Appendix B). Pooling of eggs without blocking introduces a higher risk that the test will yield a negative control failure, or have a large uncertainty related to inconsistent egg quality that is dispersed throughout the test results (Appendix B). In Q2, eggs in one of the four replicates were considered poor quality, producing consistently lower results for survival across all samples; therefore, data from this replicate were excluded from statistical analysis (Appendix B-2). The modified test procedure in Q2 therefore avoided incorporation of additional variance associated with egg quality.

- Amending site water with copper successfully curtailed fungal growth in most *P. promelas* tests and all *O. mykiss* tests. Due to a laboratory miscommunication in Q1, 4 of 11 tests (FR_FRCP1, FR_FRABCH, GH_FR1, and CM_MC2) were amended with 10 and 20 µg/L; amendments with 20 µg/L copper only were planned for these tests. This miscommunication did not affect test reliability, as it only resulted in additional information generated. No microbial effects were observed in FR_FRCP1, GH_FR1, and CM_MC2 tests; results were similar in samples amended with 10 and 20 µg/L copper. For these three tests, results for the higher copper amendment (20 µg/L) were used herein for statistical analyses.

- A few of the tests with *P. promelas* exhibited indications of microbial influence, in spite of additional of copper up to a maximum of 20 µg/L. This was recognized in advance to be a possibility, because the copper concentration was established to avoid amendment that could introduce toxicity from copper itself.

  - Q1 FR_FRABCH test (Appendix B-1)— In the FR_FRABCH tests, copper amendments of 10 and 20 µg/L both had evidence of microbial growth associated with Sporadic Mortality Phenomenon. Microbial growth was noted by the laboratory through visual inspection of the test organisms in the exposure vessels during daily replenishments and/or at test termination. The Q1 FR_FRABCH test was excluded from statistical analyses conducted herein.

  - Q3 tests (Fording River reference, FR_FRCP1, FR_FRABCH, CM_MC2, LC_LCDSSLCC)—Microbial growth was observed in association with mortalities in the Fording reference test amended with 15 µg/L copper and FR_FRCP1, FR_FRABCH, CM_MC2, and LC_LCDSSLCC tests amended with 20 µg/L copper. It appears that 15 to 20 µg/L copper in Q3 was insufficient to curtail microbial growth in these tests. Reference and test sites with evidence of microbes were excluded from statistical analyses conducted herein.

  As discussed at the March 2020 EMC conference call, Nautilus is preparing a protocol that outlines the laboratory's approach to identify microbial interferences in fathead minnow and rainbow trout tests. It is anticipated that this protocol will be submitted to the EMC in Q2 2020.

- Containers with site water were labelled appropriately, except for two containers (FR_FRABCH and FR_FRCP1) during the second week of sample receipt in Q1 (Appendix B-1). Each had two labels attached identifying the sample as both FR_FRABCH and FR_FRCP1. Conductivity was measured in these samples and cross-referenced with values from the previous week to determine the correct sample identification for

each site. The laboratory was able to determine the correct identification using this method, as there was an approximate 3-fold difference in conductivity in these samples (Appendix B-1).In Q4, *C. dubia* survival in the Fording River reference test was 50%, although reproduction on the surviving organisms did not appear to be impaired. The laboratory noted this mortality rate as unusual and repeated the test twice using Fording River reference water samples from the first and second weeks of the Q4 testing period. Both re-tests showed no adverse effect, indicating the original test response was anomalous. As per recommendations from the laboratory, *C. dubia* results from the original Fording reference test were excluded, and results from the re-test using the Fording River reference water sample collected in the first week was included in statistical analyses conducted herein.

3.2 Sources of Variance in Test Water

3.2.1 Organism Performance

Performance in the negative laboratory control varied by less than 25% across quarters for all species and endpoints, except for *P. subcapitata* cell yield (55%), *H. azteca* dry weight (318%), and *P. promelas* biomass (52%). For *H. azteca* tests, the variance is due to lower dry weights observed in Q1, where the mean dry weight for laboratory control (0.11 mg) was small relative to Q3 (0.39 mg) and Q4 (0.46 mg). However, the variance did not result in any atypical signs of toxicity; no adverse responses were observed in Q1 tests for *H. azteca* dry weight. For other endpoints, laboratory control performance in 2019 quarterly tests varied from 0% (*P. promelas* development and *O. mykiss* length) to 22% (*C. dubia* survival). Although variability for most endpoints was small, control normalization was used to reduce the variability in test organism performance among 2019 batches.

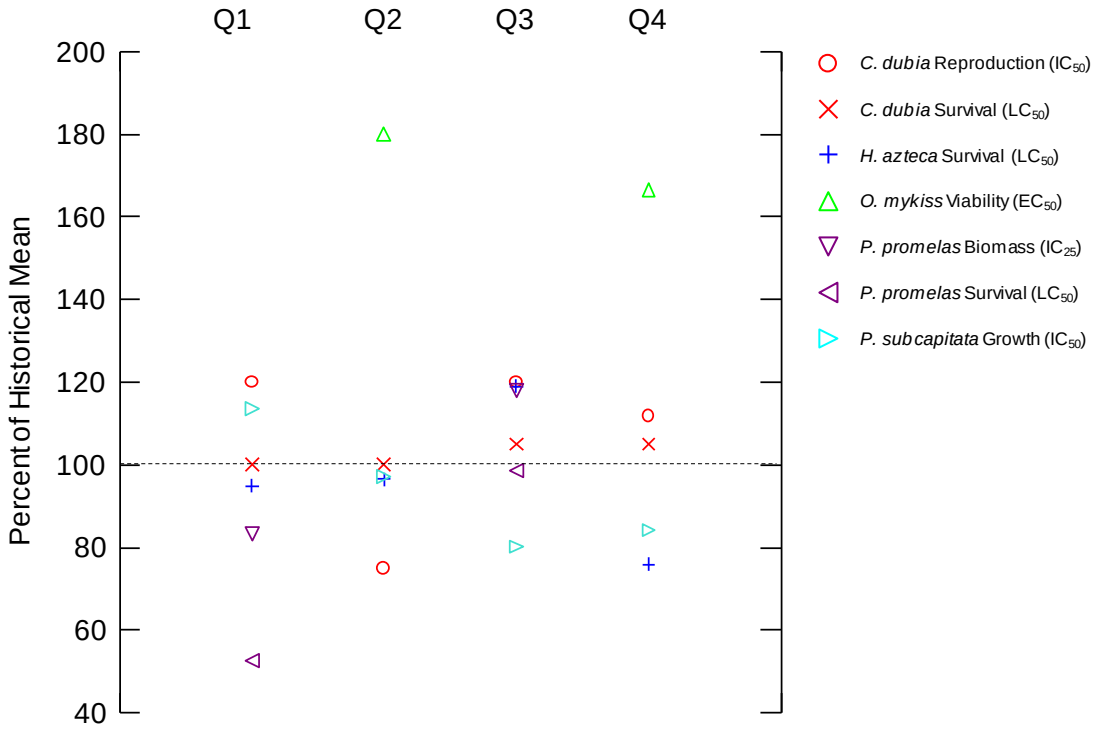
Raw results and control normalized results (for all endpoints except *P. subcapitata* cell yield) are presented in Section 3.3. Analyses presented herein are based on control normalized results.

3.2.2 Organism Sensitivity

Reference toxicant results from quarterly reports (Appendix B) are plotted in Figure 3.2-1.

Most (77%) of the reference toxicant results fell close to the historical mean (i.e., within 20% of the historical mean), indicating that test organism sensitivity was usually stable (Figure 3.2-1). The largest positive deviation from the historical mean was observed in Q2 for *O. mykiss* viability (180% of the historical mean) and the largest negative deviation was observed in Q1 for *P. promelas* survival (53% of the historical mean). Despite these deviations from the historical mean, all reference toxicant results were within two standard deviations of the historical mean (which is considered an appropriate sensitivity by the laboratory [Appendix B]), except for *P. subcapitata* growth in Q3. The observed IC_{50} for *P. subcapitata* growth with the reference toxicant zinc in Q3 was 25.1 µg/L, just outside the range of two standard deviations of the historical mean (25.7–38.0 µg/L). Most endpoints were not consistently above or below the historical mean, with the exception of *O. mykiss* viability, which was above the historical mean in both Q2 and Q4, but within two standard deviations. Overall, test organism sensitivity does not appear to be a confounding factor of variability in the interpretation of toxicity testing results among test batches.

Figure 3.2-1: Reference toxicant data from 2019 laboratory reports (Appendix B).



Note: IC_{50} = concentration resulting in 50% inhibition; IC_{25} = concentration resulting in 25% inhibition; LC_{50} = concentration resulting in 50% lethality; EC_{50} = concentration resulting in 50% effect. Dashed line indicates reference toxicant result is equal to the mean historical effect concentration.

3.2.3 Background Conditions (Normal Ranges)

As outlined in Section 2.3.2, local and regional NRs were developed for mean responses in reference waters. Development of NRs was intended to address potential confounding effects of background water quality and its effect on test responses. The following sections present the results of the evaluation of background conditions for each endpoint, concluding with a statement on how the reference responses may influence the interpretation of test responses.

3.2.3.1 Ceriodaphnia dubia

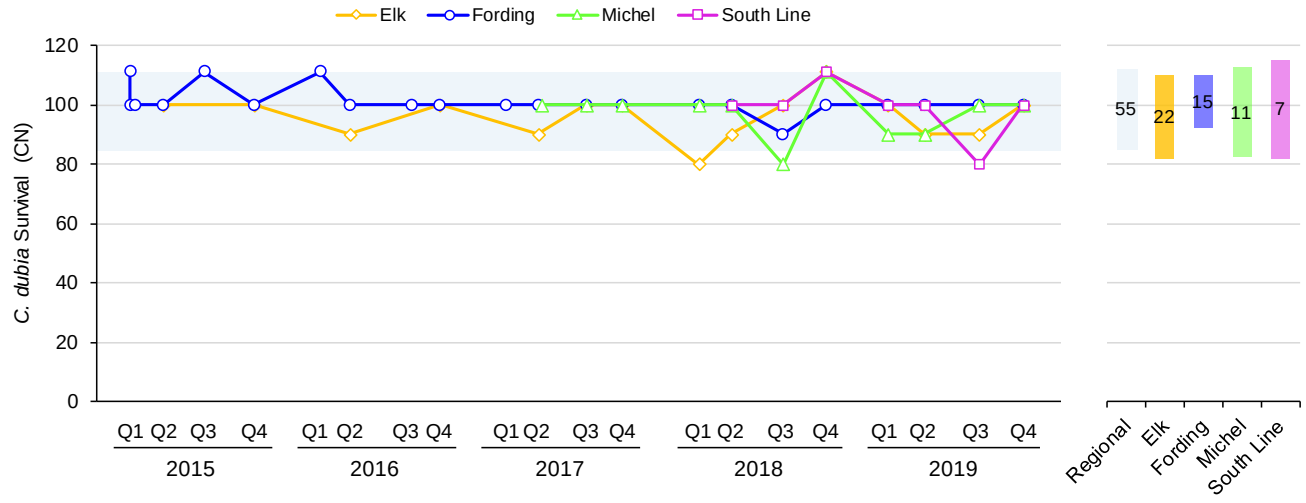
Mean control normalized responses for *C. dubia* tests in reference waters are plotted in Figure 3.2-2 (survival) and Figure 3.2-3 (reproduction). Results are as follows:

- Mean survival ranged from 80% to 111% in reference tests (Figure 3.2-2). Mean survival was similar across references, which resulted in broad overlap in the regional NR (85% to 112%) and the local NRs for the Elk (82% to 110%), Fording (92% to 110%), Michel (82% to 112%), and South Line (82% to 115%).
- Mean reproduction ranged from 68% to 131% in reference tests (Figure 3.2-3). Mean reproduction was generally variable across years and across references, except for Q1 to Q4 2015, Q4 2016 and Q4 2017, where mean reproduction was similar across references (i.e., <20% difference). The regional NR (65% to 127%) and local NRs for the Elk (63% to 122%), Fording (75% to 125%), Michel (59% to 138%), and South Line (65% to 112%) had broad overlap.

The evaluation of long-term reference responses for *C. dubia* tests indicates that, in any round of quarterly testing, one or more reference stations may yield a mean reproduction response that differs from the other

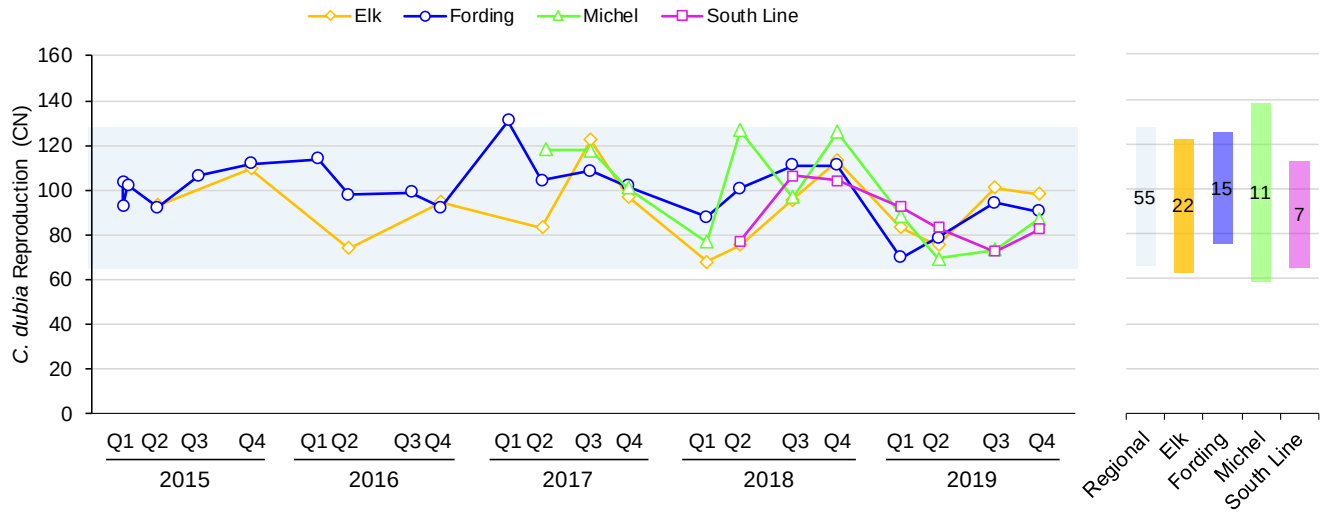
reference waters. However, there was no long-term systematic difference in mean reproduction among reference stations, which is expected because the water quality at all reference stations is broadly similar. There are some fluctuations in mean reproduction over time (e.g., Q1 and Q2 2019 mean reproduction was slightly lower than the long-term average). In aggregate, these findings indicate that comparisons to regional mean reproduction (at all references) within a batch provide the most reliable basis for identifying deviations form normal reproduction.

Figure 3.2-2: Mean results for *C. dubia* survival in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



Notes: CN = control normalized. Blue shading on scatterplot is the regional normal range. Sample size for each normal range is provided on the bar chart.

Figure 3.2-3: Mean results for *C. dubia* reproduction in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



Notes: CN = control normalized. Blue shading on scatterplot is the regional normal range. Sample size for each normal range is provided on the bar chart.

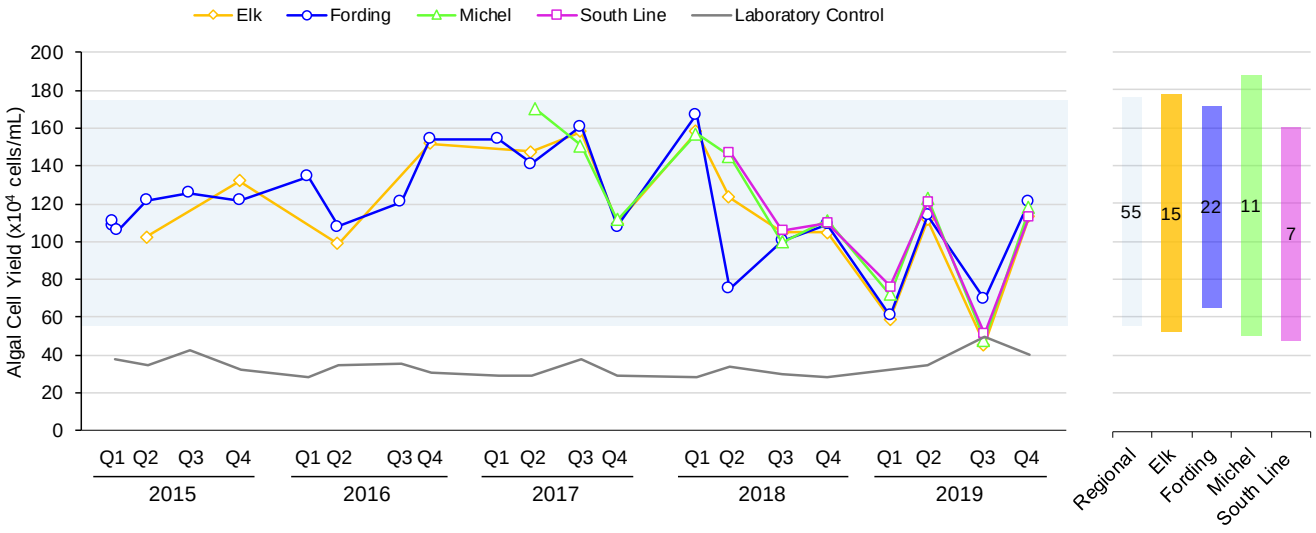
3.2.3.2 *Pseudokirchneriella subcapitata*

Mean cell yield ranged from 46 $\times 10^4$ to 170 $\times 10^4$ cells/mL in reference tests (Figure 3.2-4). Mean cell yield was similar across references, except: (1) in Q2 2017 when cell yield in the Michel Creek reference was approximately 15% to 20% higher than the Elk and Fording references; and (2) in Q2 2018 when cell yield in the Elk, Michel, and South Line references were approximately 90% to 100% higher than the Fording reference. In 2019, cell yield was variable across quarters. In Q1 and Q3, mean cell yield in references was 46% to 170% lower than mean cell yield in references in Q2 and Q4. Lower cell yield in these quarters contributed to wide normal ranges for the regional NR (55 to 176 ×104 cells/mL) and local NRs for the Elk (53 to 177 ×104 cells/mL), Fording (65 to 171 ×104 cells/mL), Michel (50 to 187 ×104 cells/mL), and South Line (47 to 160 ×104 cells/mL). In Q3 2019, cell yield in the laboratory control (49.6 $\times 10^4$ cells/mL) was approximately 40% lower than the Fording River reference (69.5 $\times 10^4$ cells/mL) and similar to cell yield in the other reference waters (Michel Creek = 48 $\times 10^4$ cells/mL; South Line Creek = 51.4 mg/L $\times 10^4$ cells/mL; Elk River = 45.6 $\times 10^4$ cells/mL).

Because cell yield is the only endpoint that is not control normalized (per discussions with EMC), mean cell yield in the negative laboratory control is also shown on Figure 3.2-4. In all but one quarter (Q3 2019), cell yield in reference tests was approximately 2 to 5 times higher than cell yield in the negative laboratory control, which ranged from 29 to 50 $\times 10^4$ cells/mL. This finding is not unusual, since the higher ionic strength associated with the reference waters would be expected to stimulate cell growth of this species relative to the low ionic strength associated with the laboratory control water (Appendix B).

The pattern of reference responses for *P. subcapitata* in 2019 suggests that temporal variation in organism sensitivity might be a confounding factor. The lower cell yields in Q1 and Q3 2019, which were the two lowest cell yields across the entire period of record for all reference stations, introduce additional uncertainty in the interpretation. As noted in the laboratory report (Appendix B-3), the Q3 2019 results were unusual compared to prior rounds of testing, in which site waters have typically exhibited increased growth relative to the laboratory control. The laboratory noted no changes in methodology in the Q3 2019 test, so it is not known why the stimulation in previous rounds of testing was not apparent in Q3 2019. The pattern of reduced cell yield was observed consistently across all reference waters, indicating that the result is not a result of water quality variations among references, but rather a factor related to organism sensitivity variations among batches. In previous rounds of testing with this species, the cell yield has covaried among reference stations (e.g., Elk River reference and Fording River reference yields have exhibited strong correlation), but the degree of temporal variation was greater in 2019 relative to previous years. Adjustment of the site water responses to the reference water responses helps to control for temporal variations, but it is not known whether the reduced cell yield was experienced equally between the site waters and reference waters. The effect of these unusual results on the interpretation of 2019 data, and particularly the Q3 2019 test site results, is discussed in Section 3.3.1.2.

Figure 3.2-4: Mean results for *P. subcapitata* cell yield in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



Notes: Blue shading on scatterplot is the regional normal range. Sample size for each normal range is provided on the bar chart.

3.2.3.3 *Hyalella azteca*

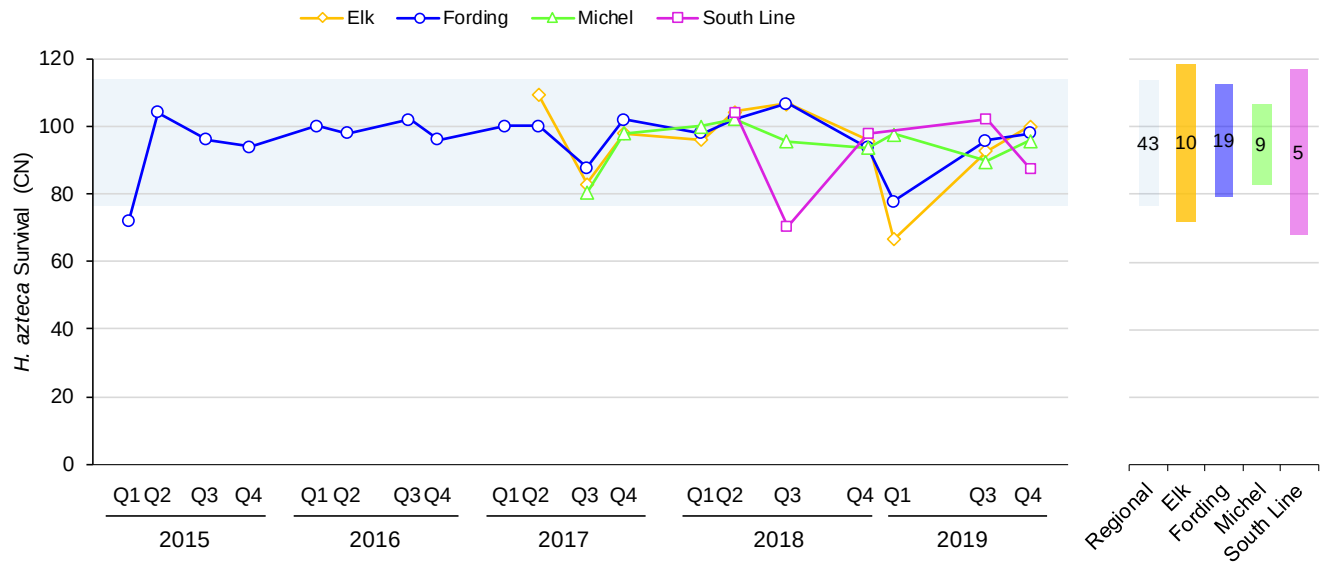
Mean control normalized responses for *H. azteca* tests in reference waters are plotted in Figure 3.2-5 (survival) and Figure 3.2-6 (dry weight). Results are as follows:

- Mean survival extended from 67% to 109% in reference tests (Figure 3.2-5). Mean survival was similar among references in most quarters and years. Exceptions to this were Q3 2018, when survival for South Line Creek was approximately 30% lower than Elk, Fording, and Michel references, and Q1 2019, when survival for Fording and Elk River were approximately 20 to 30% below Michel reference. Lower survival in these tests contributed to the local NRs for Elk (72% to 119%), Fording (80% to 112%), and South Line (68% to 107%) extending below the Michel NR (83% to 107%). The regional NR was 76% to 114%. The local NR for South Line Creek should be considered preliminary because only five values are available.
- Mean weight extended from 35% to 180% in reference tests (Figure 3.2-6). Except for Q2 and Q4 2017 and Q1 and Q2 2018, mean weight was variable across references tested in the same quarter. Some examples include Q1 2019 when mean weight in the Michel Creek reference was approximately 40% higher than the Elk and Fording references, and Q4 2019 when mean weight in the Fording River reference was approximately 50% to 85% higher than the Elk, Fording, and South Line references. The high variability in Q3 2017, Q3 and Q4 2018, and Q1, Q3, and Q4 2019 resulted in wide normal ranges for the regional NR (41% to 151%) and local NRs for the Elk (40% to 153%), Fording (44% to 153%), and Michel (49% to 152%). The local NR for South Line Creek (57% to 143%) should be considered preliminary because only five values are available.

The pattern of reference responses for *H. azteca* in 2019 indicates that the mean organism sensitivity was similar in 2019 to previous years, but the high variability among reference waters has continued into 2019. There are no long-term systematic differences among references over the long term, as reflected in the similar normal ranges among references, but the differences within a batch of quarterly can be large. In aggregate, these findings

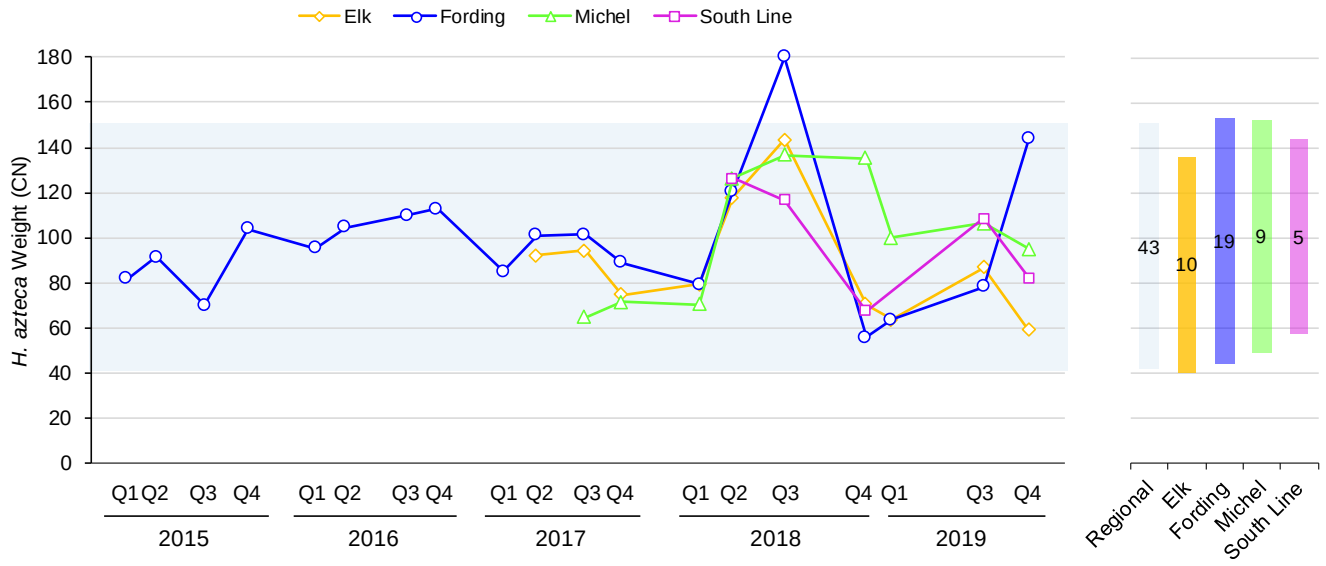
indicate that comparisons to regional mean reproduction (at all references) within a batch provide the most reliable basis for identifying deviations form normal *H. azteca* survival and growth.

Figure 3.2-5: Mean results for *H. azteca* survival in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



Notes: CN = control normalized. Blue shading on scatterplot is the regional normal range. Sample size for each normal range is provided on the bar chart.

Figure 3.2-6: Mean results for *H. azteca* weight in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



Notes: CN = control normalized. Blue shading on scatterplot is the regional normal range. Sample size for each normal range is provided on the bar chart.

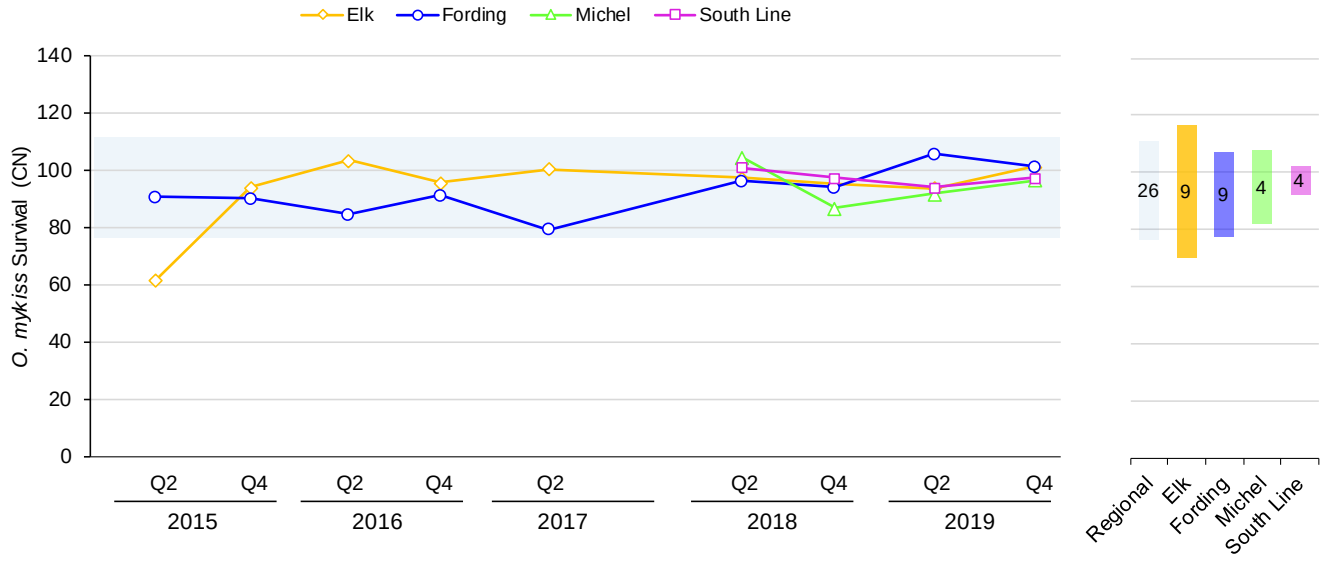
3.2.3.4 Oncorhynchus mykiss

Mean control normalized responses for *O. mykiss* tests in reference waters are plotted in Figure 3.2-7 (survival), Figure 3.2-8 (viability), Figure 3.2-9 (length), and Figure 3.2-10 (weight). Results are as follows:

- Mean survival extended from 61% to 106% in reference tests (Figure 3.2-7). Although mean survival has previously been variable in reference waters tested in the same quarter (e.g., Q2 2015 to 2017), mean survival was similar in 2019 reference tests. It is possible that the copper amendment helped to reduce microbial toxicity in water samples (including reference), which would be expected to reduce the variability in responses. The regional NR (77% to 111%) and local NRs for the Elk (70% to 117%), Fording (78% to 107%), Michel (82% to 108%), and South Line (92% to 102%) had broad overlap. The local NR for Michel Creek and South Line Creek should be considered preliminary because only four values are available for each reference site.
- Mean viability extended from 62% to 107% in reference tests (Figure 3.2-8). Although mean viability has previously been variable in reference waters tested in the same quarter (e.g., Q2 2015 to 2017), mean viability was similar in 2019 reference tests. The regional NR (77% to 113%) and local NRs for the Elk (71% to 118%), Fording (79% to 107%), Michel (79% to 109%), and South Line (91% to 107%) had broad overlap. The local NRs for Michel Creek and South Line Creek should be considered preliminary because only four values are available for each reference site.
- Mean length extended from 92% to 110% in reference tests (Figure 3.2-9). Mean length was similar across references, which resulted in broad overlap in the regional NR (95% to 108%) and the local NRs for the Elk (94% to 109%), Fording (95% to 108%), Michel (98% to 107%), and South Line (95% to 107%). The local NRs for Michel Creek and South Line Creek should be considered preliminary because only four values are available for each site.
- Mean weight extended from 94% to 111% in reference tests (Figure 3.2-10). Mean weight was similar across references, which resulted in broad overlap in the regional NR (96% to 111%) and the local NRs for the Elk (94% to 112%), Fording (96% to 109%), Michel (98% to 110%), and South Line (98% to 110%). The local NRs for Michel Creek and South Line Creek should be considered preliminary because only four values are available for each site.

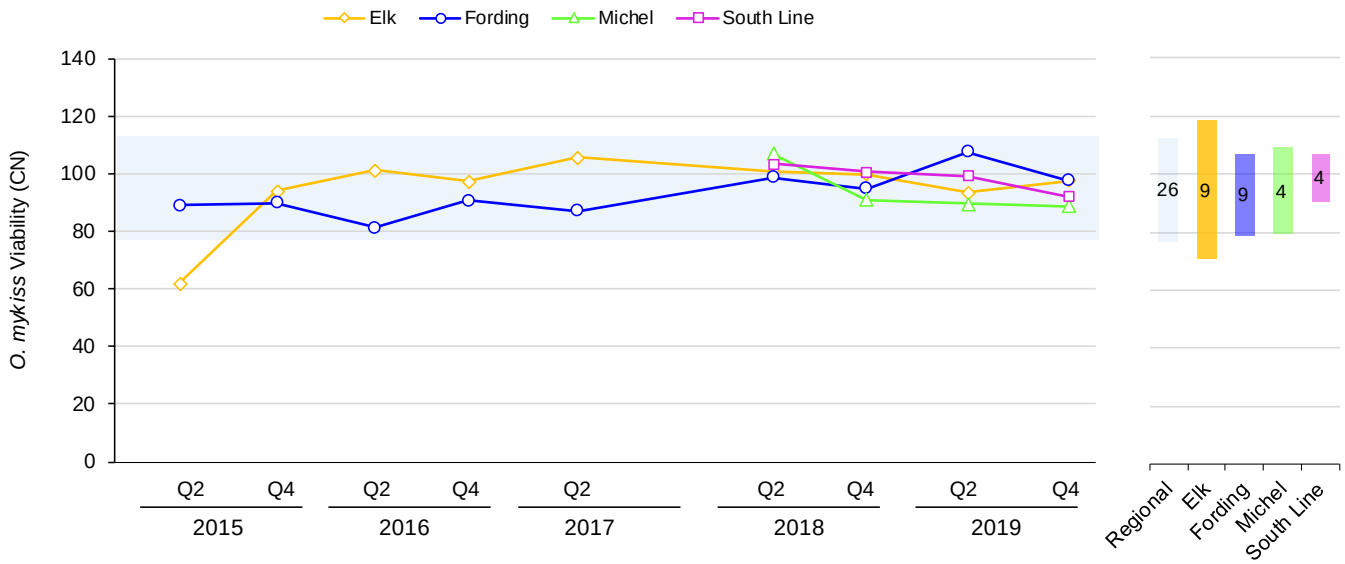
The pattern of reference responses for *O. mykiss* in 2019 indicates that the mean organism sensitivity was broadly similar in 2019 to previous years, but with reduced variability in reference response for survival and viability endpoints relative to the first three years of testing. There are no long-term systematic differences among reference site performances over the long term, as reflected in the similar normal ranges among references, and all test endpoints exhibited low variance among the four reference waters in 2019. In aggregate, these findings indicate that comparisons to regional mean reproduction (at all references) within a batch provide the most reliable basis for identifying deviations from normal *O. mykiss* survival and development. Because the differences among references were minor, the statistical analyses are relatively insensitive to the use of local or regional normal ranges.

Figure 3.2-7: Mean results for *O. mykiss* survival in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



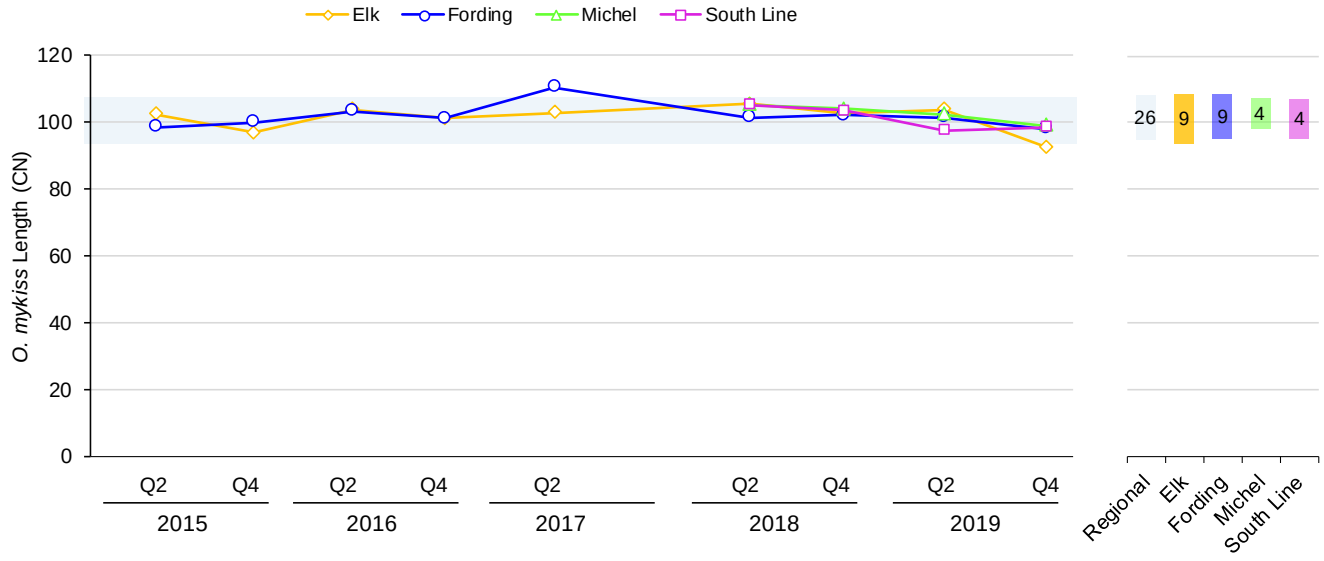
Notes: CN = control normalized. Blue shading on scatterplot is the regional normal range. The Q4 2017 tests were removed from reference envelope calculations because microbial effects were observed in these tests. Sample size for each normal range is provided on the bar chart.

Figure 3.2-8: Mean results for *O. mykiss* viability in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



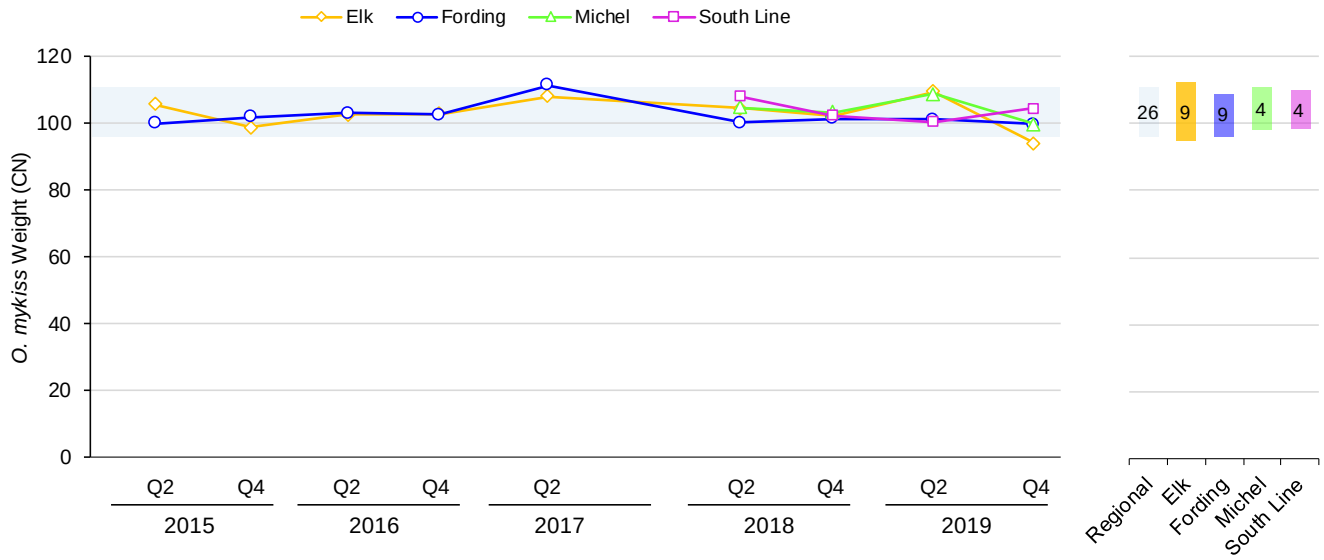
Notes: CN = control normalized. Blue shading on scatterplot is the regional normal range. The Q4 2017 tests were removed from reference envelope calculations because microbial effects were observed in these tests. Sample size for each normal range is provided on the bar chart.

Figure 3.2-9: Mean results for *O. mykiss* length in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



Notes: CN = control normalized. Blue shading on scatterplot is the regional normal range. The Q4 2017 tests were removed from reference envelope calculations because microbial effects were observed in these tests. Sample size for each normal range is provided on the bar chart.

Figure 3.2-10: Mean results for *O. mykiss* weight in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



Notes: CN = control normalized. Blue shading on scatterplot is the regional normal range. The Q4 2017 tests were removed from reference envelope calculations because microbial effects were observed in these tests. Sample size for each normal range is provided on the bar chart.

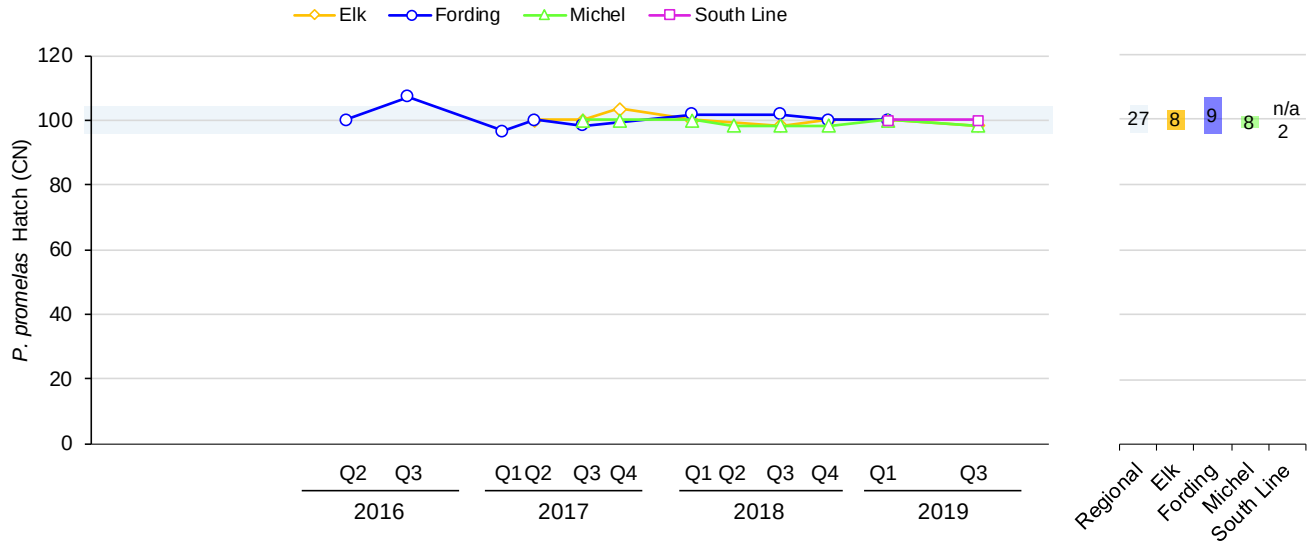
3.2.3.5 *Pimephales promelas*

Mean control normalized responses for *P. promelas* tests in reference waters are plotted in Figure 3.2-11 (hatch), Figure 3.2-12 (survival), Figure 3.2-13 (biomass), Figure 3.2-14 (length), and Figure 3.2-15 (normal development). These figures show results of copper-amended tests only. Results are as follows:

- Mean hatch extended from 97% to 107% in reference tests (Figure 3.2-11). Mean hatch was similar across references, which resulted in broad overlap in the regional NR (96% to 104%) and the local NRs for the Elk (97% to 103%), Fording (95% to 107%), and Michel (98% to 101%). The local NR for South Line Creek could not be calculated because mean hatch was 100% in both tests.
- Mean survival extended from 60% to 116% in reference tests (Figure 3.2-12). Mean survival was similar in Fording River reference tests. Mean survival was lower in the Elk tests in Q3 2017, Q1 2018, and Q3 2018, Michel tests in Q4 2017 and Q1 2019, and the South Line test in Q3 2019. Lower survival in these tests contributed to the local NRs for Elk (61% to 109%), Michel (57% to 123%), and South Line (50% to 102%) extending below the Fording NR (86% to 110%). The regional NR was 63% to 118%. The local NR for South Line Creek should be considered preliminary because only two values are available.
- Mean biomass extended from 54% to 130% in reference tests (Figure 3.2-13). Mean biomass was lower in the Q3 2018 Elk test, the Q4 2018 Michel test, and the Q3 2019 South Line Creek test. Lower survival in these tests contributed to the local NRs for Elk (52% to 132%), Michel (58% to 125%), and South Line (61% to 89%) extending below the Fording NR (74% to 124%). The regional NR was 59% to 127%. The local NR for South Line Creek should be considered preliminary because only two values are available.
- Mean length extended from 82% to 109% in reference tests (Figure 3.2-14). Mean length was similar across references, which resulted in broad overlap in the regional NR (84% to 114%) and the local NRs for the Elk (84% to 114%), Fording (85% to 109%), Michel (82% to 109%), and South Line (91% to 96%). The local NR for South Line Creek should be considered preliminary because only two values are available.
- Mean normal development ranged from 98% to 107% in reference tests (Figure 3.2-14). Mean normal development was similar across references, which resulted in broad overlap in the regional NR (97% to 103%) and the local NRs for the Elk (98% to 102%), Fording (99% to 101%), and Michel (96% to 106%). The local NR for South Line Creek could not be calculated because mean normal development was 100% in both tests.

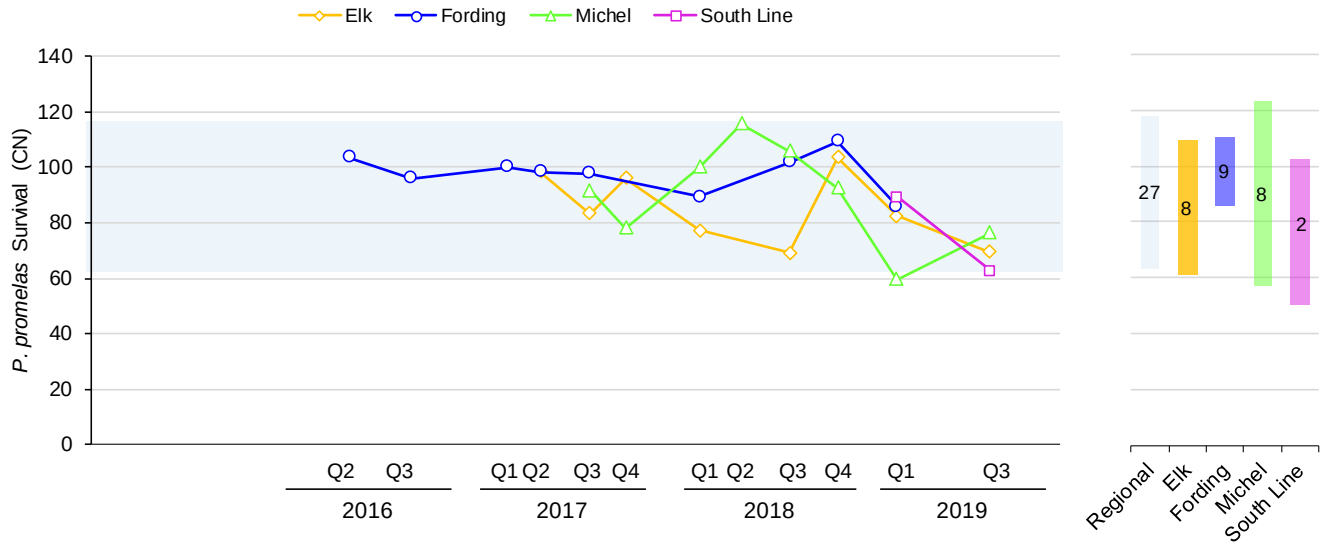
The pattern of reference responses for *P. promelas* in 2019 indicates that the mean organism sensitivity was broadly similar in 2019 to previous years for most endpoints, but with lower reference survival in 2019. Even with a subset of reference results removed (due to clear evidence for microbial interference) the remaining reference stations averaged approximately 20% lower survival than the long-term average. There are no long-term systematic differences among reference site performances, as reflected in the similar normal ranges among references (except Line Creek, which has only two observations). Variation was high among reference for the biomass endpoint, but with no consistent pattern among years. In aggregate, these findings indicate that comparisons to regional mean reproduction (at all references) within a batch provide the most reliable basis for identifying deviations form normal *P. promelas* survival and development.

Figure 3.2-11: Mean results for *P. promelas* hatch in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



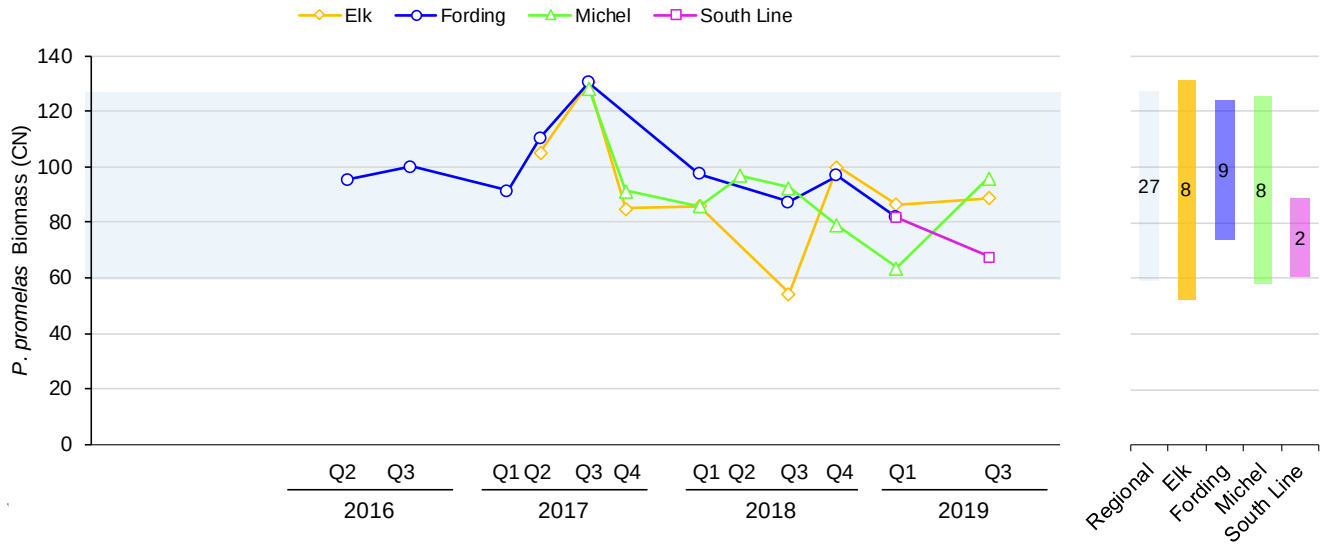
Notes: CN = control normalized; n/a = normal range could not be calculated due to low variance. Blue shading on scatterplot is the regional normal range. The following tests were excluded from normal range calculations: Q1 2016 (test waters were not amended with copper), Q4 2016 (dissolved oxygen concentrations fell below typical levels), Q2 2018 for Fording and Elk and Q3 2019 for Fording (microbial effects were observed in these tests). Sample size for each normal range is provided on the bar chart.

Figure 3.2-12: Mean results for *P. promelas* survival in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



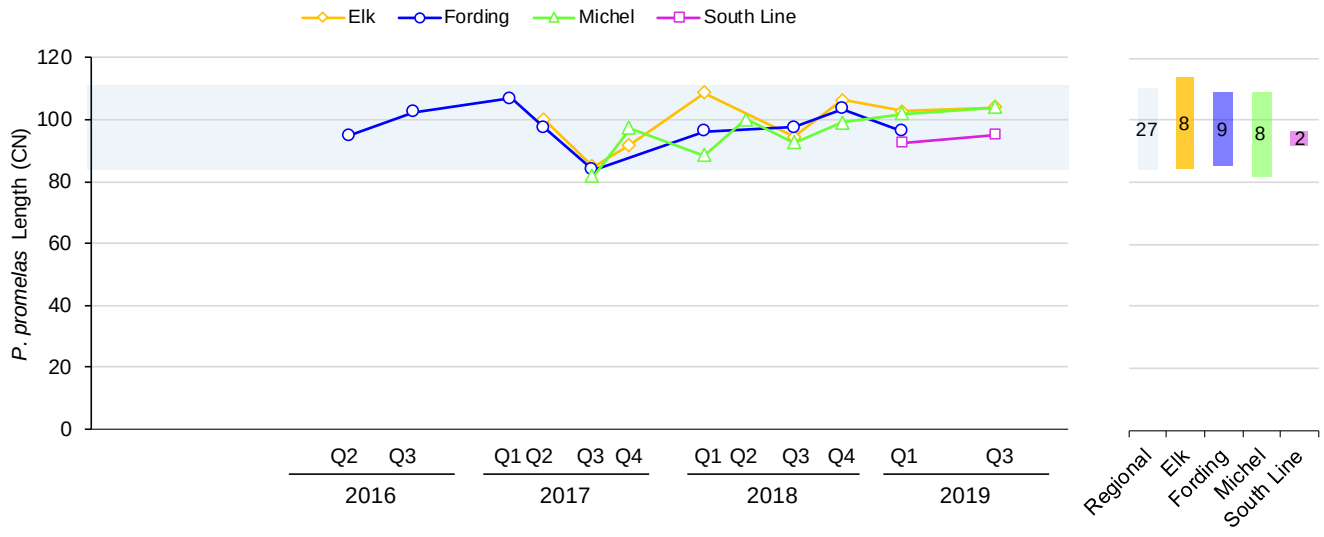
Notes: CN = control normalized. Blue shading on scatterplot is the regional normal range. The following tests were excluded from normal range calculations: Q1 2016 (test waters were not amended with copper), Q4 2016 (dissolved oxygen concentrations fell below typical levels), Q2 2018 for Fording and Elk and Q3 2019 for Fording (microbial effects were observed in these tests). Sample size for each normal range is provided on the bar chart.

Figure 3.2-13: Mean results for *P. promelas* biomass in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



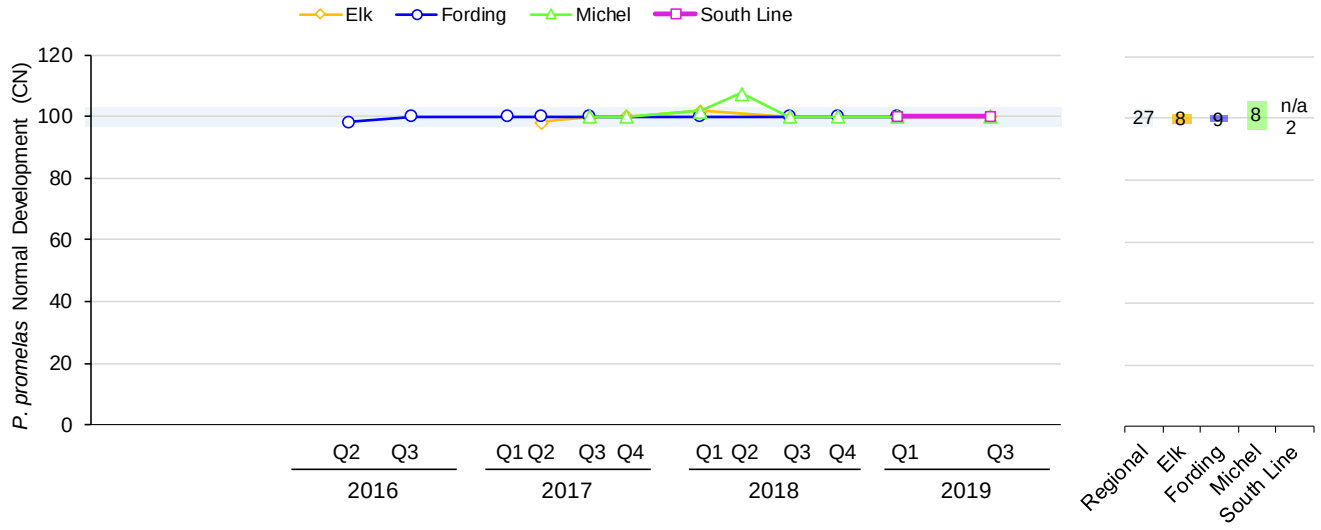
Notes: CN = control normalized. Blue shading on scatterplot is the regional normal range. The following tests were excluded from normal range calculations: Q1 2016 (test waters were not amended with copper), Q4 2016 (dissolved oxygen concentrations fell below typical levels), Q2 2018 for Fording and Elk and Q3 2019 for Fording (microbial effects were observed in these tests). Sample size for each normal range is provided on the bar chart.

Figure 3.2-14: Mean results for *P. promelas* length in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panel).



Notes: CN = control normalized. Blue shading on scatterplot is the regional normal range. The following tests were excluded from normal range calculations: Q1 2016 (test waters were not amended with copper), Q4 2016 (dissolved oxygen concentrations fell below typical levels), Q2 2018 for Fording and Elk and Q3 2019 for Fording (microbial effects were observed in these tests). Sample size for each normal range is provided on the bar chart.

Figure 3.2-15: Mean results for *P. promelas* development in Elk River reference, Fording River reference, Michel Creek reference, and South Line Creek reference tests (left panel).



Notes: CN = control normalized; n/a = normal range could not be calculated due to low variance. Blue shading on scatterplot is the regional normal range. The following tests were excluded from normal range calculations: Q1 2016 (test waters were not amended with copper), Q4 2016 (dissolved oxygen concentrations fell below typical levels), Q2 2018 for Fording and Elk and Q3 2019 for Fording (microbial effects were observed in these tests). Sample size for each normal range is provided on the bar chart.

3.2.4 Variation in Concentrations of Toxicants (Coefficients of Variation)

Coefficients of variation are presented in Appendix C. CVs were below 0.25 for most constituents, indicating that variability in concentrations among weekly refresh samples is generally low. This finding is consistent with previous investigations of variance in water quality constituents, in which only minor variations have been observed over a few weeks duration (i.e., the duration of the longest toxicity test in the Permit-based test program) relative to the larger seasonal variations. When constituent concentrations were greater than BC WQGs or lowest level 1 EVWQP benchmarks, CVs were generally either below 0.25 or comparable to CVs measured at reference locations for the same quarter and test. Some exceptions were observed, listed below by species:

- *H. azteca*—Q1 FR_FRCP1 (sulphate, total selenium, total uranium), Q4 FR_FRCP1 (sulphate, total selenium), Q3 and Q4 LC_LC3 and Q4 LC_LCDSSLCC (total selenium).
- *O. mykiss*—Q2 FR_FRCP1 (total selenium), Q4 FR_FRCP1 (sulphate, total selenium), Q4 GH_ERC (dissolved copper), Q4 LC_LC3 and Q4 LC_LCDSSLCC (total selenium).
- *P. promelas*—Q1 FR_FRCP1 (sulphate, nitrate, total selenium, total uranium), Q1 EV_MC2, Q1 EV_HC1, Q3 LC_LC3 (total selenium).

This source of variance is not expected to affect the overall interpretation of the quarterly and semi-annual toxicity testing program because weekly refresh samples were screened individually against chronic BC WQGs and EVWQP benchmarks (see Section 2.3.4), so constituents potentially contributing to observed responses were captured in the overall causation assessment.

3.3 Evaluation of 2019 Results

Raw results (mean and standard deviation) are presented in Table 3.3-1. Control normalized results (mean and standard deviation for all species except *P. subcapitata*) are presented in Table 3.3-2. Categories for 2019 test results (no, possible, or likely adverse response) are discussed below by test species (Section 3.3.1) and by test site (Section 3.3.2).

Table 3.3-1: Results of Quarterly and Semi-Annual Toxicity Tests—Raw Results[a]

Quarter	Location	*C. dubia*			*P. subcapitata*	*H. azteca*		*P. promelas* [b]					*O. mykiss*			
		% Survival	Reproduction (Protocol)	Reproduction (8-day Test)	Cell Yield [x 10^4 cells/mL]	% Survival	Dry weight [mg]	% Hatch	% Survival	Biomass [mg]	Length [mm]	% Normal Development	% Survival	% Viability	Length [mm]	Wet Weight [mg]
Q1	Laboratory control	100	25.3 ± 5.5	25.3 ± 5	32.0 ± 2.7	90.0 ± 14.1	0.11 ± 0.03	10: 100 20: 96.7 ± 3.8	10: 95.0 ± 6.4 20: 83.3 ± 15.9	10: 2.2 ± 0.1 20: 1.6 ± 0.2	10: 10.9 ± 0.2 20: 10.4 ± 0.5	10: 100 20: 100	—			
	Pooled Batch References	100 ± 0	24 ± 4	24 ± 4	67.2 ± 9.1	73 ± 23	0.08 ± 0.04	100 ± 0	75 ± 18	1.8 ± 0.3	10.7 ± 0.7	99 ± 3				
	Fording River reference	100	22.4 ± 3.1	22.4 ± 3	*60.9 ± 5.1*	70.0 ± 27.4	0.07 ± 0.04	100	81.7 ± 11.4	1.8 ± 0.3	10.5 ± 0.4	100				
	Elk River reference	100	24.2 ± 4.2	24.2 ± 4	*59.1 ± 4.9*	*60.0 ± 21.2*	0.07 ± 0.03	100	78.3 ± 12.6	1.9 ± 0.1	11.2 ± 0.6	100				
	Michel Creek reference	90	25.9 ± 3.6	25.9 ± 4	72.1 ± 5.5	88.0 ± 8.4	0.11 ± 0.05	100	**56.7 ± 13.9**	1.4 ± 0.4	11.1 ± 0.5	100				
	South Line Creek reference	100	23.5 ± 5.5	23.5 ± 5	76.5 ± 5.9	—		100	85.0 ± 22.0	1.8 ± 0.2	*10.1 ± 0. 7*	95 ± 4				
	FR_FRCP1	***0***	***0.0 ± 0.0***	***0 ± 0***	***9.5 ± 1.3***	70.0 ± 20.0	0.08 ± 0.02	91.7 ± 8.4	***15.0 ± 10.0***	***0.8 ± 0.2***	13.4 ± 2.1	94 ± 13				
	FR_FRABCH	100	*17.6 ± 6.0*	*16.9 ± 6*	71.8 ± 3.5	78.0 ± 14.8	0.07 ± 0.05	100	65.0 ± 44.4	1.5 ± 1.0	*10.2 ± 0.2*	98 ± 4				
	GH_FR1	100	*19.8 ± 5.9*	19.8 ± 6	71.5 ± 6.5	82.0 ± 8.4	0.09 ± 0.06	100	88.3 ± 11.4	2.0 ± 0.3	*10.2 ± 0.7*	95 ± 4				
	LC_LC5	100	24.1 ± 3.1	24.1 ± 3	76.8 ± 5.0	—		100	68.3 ± 45.7	1.5 ± 1.0	***9.7 ± 0.5***	100				
	LC_DCDS	100	22.7 ± 4.8	22.7 ± 5	82.8 ± 5.0	—		100	95.0 ± 3.3	2.0 ± 0.2	***9.7 ± 0.3***	96 ± 4				
	GH_ERC	100	27.0 ± 4.8	27 ± 5	*63.5 ± 3.9*	—		98.3 ± 3.3	***48.3 ± 55.9***	0.8 ± 0.9	*10.2 ± 0.1*	100 ± 0				
	EV_HC1	100	24.3 ± 4.6	24.3 ± 5	76.8 ± 6.6	—		100	90.0 ± 11.6	1.9 ± 0.1	***9.9 ± 0.3***	95 ± 3				
	CM_MC2	100	***14.5 ± 4.3***	***14.5 ± 4***	77.5 ± 3.1	96.0 ± 5.5	0.07 ± 0.03	100	81.7 ± 8.4	1.9 ±0.2	*10.0 ± 0.6*	98 ± 4				
	RG_MIDAG	100	23.3 ± 1.8	23.3 ± 2	—	78.0 ± 11.0	0.05 ± 0.03	—								
	EV_MC2	100	24.2 ± 4.1	24.2 ± 4	81.5 ± 2.9	—		100	93.3 ± 0.0	2.0 ± 0.2	***9.6 ± 0. 3***	96 ± 7				
	LC_LC3	100	21.8 ± 3.0	21.8 ± 3	79.5 ± 8.0	—		100	81.7 ± 3.3	2.1 ± 0.1	10.5 ± 0.2	100				
	LC_LCDSSLCC	100	23.2 ± 5.2	23.2 ± 5	81.5 ± 4.5	—		100	85.0 ± 13.7	2.0 ± 0.1	***9.8 ± 0.3***	98 ± 5				
Q2	Laboratory control	100	23.5 ± 2.8	23.5 ± 3	34.4 ± 3.0	—		—					83.3 ± 5.8	78.8 ± 8.6	21.1 ± 0.5	97.2 ± 2.1
	Pooled Batch References	100 ± 0	18 ± 4	18.3 ± 4	117.4 ± 8.6								80 ± 11	77 ± 13	21.4 ± 0.6	102 ± 6
	Fording River reference	100	18.5 ± 3.4	18.5 ± 3	*113.8 ± 7.6*								88.0 ± 10.6	84.7 ± 13.3	21.4 ± 0.2	98.5 ± 1.7
	Elk River reference	90	17.7 ± 4.5	17.7 ± 5	*111.5 ± 6.8*								77.9 ± 10.9	73.5 ± 9.1	21.9 ± 0.6	106.6 ± 8.4
	Michel Creek reference	90	17.8 ± 4.1	17.8 ± 4	123.0 ± 6.1								76.3 ± 14.9	70.6 ± 17.8	21.6 ± 0.5	105.7 ± 2.0
	South Line Creek reference	100	19.6 ± 4.2	19.3 ± 4	121.2 ± 9.0								78.1 ± 11.8	78.1 ± 11.8	20.6 ± 0.4	97.6 ± 2.5
	FR_FRCP1	100	18.7 ± 3.6	18.7 ± 4	*107.5 ± 9.9*								73.3 ± 3.3	68.9 ± 5.1	21.9 ± 0.1	116.1 ± 15.3
	FR_FRABCH	100	16.5 ± 3.3	16.5 ± 3	120.2 ± 5.1								**61.1 ± 13.5**	**58.9 ± 9.6**	*20.2 ± 0.7*	93.5 ± 7.9
	GH_FR1	100	18.8 ± 4.8	18.8 ± 5	120.5 ± 8.4								***57.8 ± 8.4***	**55.6 ± 10.1**	21.6 ± 0.8	103.5 ± 8.7
	LC_LC5	100	18.6 ± 2.0	18.6 ± 2	***104.2 ± 8.0***								75.8 ± 5.2	70.3 ± 9.0	21.6 ± 0.3	109.6 ± 1.2
	LC_DCDS	90	20.4 ± 7.0	20.4 ± 7	112.0 ± 7.3								79.5 ± 11.2	77.3 ± 12.7	22.2 ± 0.3	108.7 ± 5.5
	GH_ERC	80	19.2 ± 3.0	19.1 ± 3	120.0 ± 6.7								78.7 ± 20.3	75.3 ± 18.3	21.7 ± 0.7	108.0 ± 2.1
	EV_HC1	100	18.2 ± 2.2	18.2 ± 2	134.0 ± 5.1								79.5 ± 11.2	71.9 ± 10.1	21.4 ± 0.6	109.1 ± 3.8
	CM_MC2	90	16.7 ± 3.0	16.7 ± 3	113.5 ± 12.8								71.4 ± 7.0	67.2 ± 7.5	21.7 ± 0.9	107.7 ± 10.7
	RG_MIDAG	100	20.1 ± 2.4	20.1 ± 2	-								-			
	EV_MC2	100	19.6 ± 1.6	19.6 ± 2	*105.2 ± 9.7*								76.2 ± 14.0	74.0 ± 15.7	22.1 ± 0.3	105.5 ± 9.5
	LC_LC3	100	19.9 ± 2.8	19.9 ± 3	*113.8 ± 11.4*								76.6 ± 11.6	74.5 ± 10.6	22.0 ± 0.3	114.9 ± 8.0
	LC_LCDSSLCC	100	19.1 ± 1.5	19.1 ± 2	*110.8 ± 2.6*								84.2 ± 8.8	79.7 ± 11.8	21.9 ± 0.6	111.8 ± 4.6

Table 3.3-1: Results of Quarterly and Semi-Annual Toxicity Tests—Raw Results[a]

Quarter	Location	*C. dubia*			*P. subcapitata*	*H. azteca*		*P. promelas* [b]					*O. mykiss*			
		% Survival	Reproduction (Protocol)	Reproduction (8-day Test)	Cell Yield [x 10^4 cells/mL]	% Survival	Dry weight [mg]	% Hatch	% Survival	Biomass [mg]	Length [mm]	% Normal Development	% Survival	% Viability	Length [mm]	Wet Weight [mg]
Q3	Laboratory control	100	21.4 ± 6.5	25.1 ± 6	49.6 ± 7.8	96.0 ± 5.5	0.46 ± 0.16	15: 100 ± 0.0 20: 100 ± 0.0	15: 98.3 ± 3.3 20: 96.7 ± 3.8	15: 2.25 ± 0.24 20: 2.43 ± 0.16	15: 10.2 ± 0.2 20: 10.2 ± 0.2	15: 100 20: 100	—			
	Pooled Batch References[c]	90 ± 0	18 ± 6	19.4 ± 5	53.6 ± 13.2	91 ± 12	0.44 ± 0.17	99 ± 2	73 ± 22	2 ± 0.5	10.3 ± 0.6	100 ± 0				
	Fording River reference	100	20.2 ± 5.7	21.2 ± 4	69.5 ± 6.6	92.0 ± 8.4	0.36 ± 0.11	100 ± 0.0	86.7 ± 12.2	2.20 ± 0.08	10.3 ± 0.4	100				
	Elk River reference	90	21.6 ± 3.3	21.6 ± 3	**45.6 ± 8.9**	89.1 ± 19.2	0.40 ± 0.21	98.3 ± 3.3	68.3 ± 30.5	2.00 ± 0.52	10.6 ± 0.4	100				
	Michel Creek reference	100	15.7 ± 6.1	18.5 ± 4	**48.0 ± 8.6**	86.0 ± 8.9	0.49 ± 0.20	98.3 ± 3.3	75.0 ± 18.4	2.16 ± 0.22	10.6 ± 0.6	100				
	South Line Creek reference	80	15.5 ± 6.0	16.1 ± 7	**51.4 ± 13.3**	98.0 ± 4.5	0.50 ± 0.14	100 ± 0.0	***61.7 ± 22.0***	**1.52 ± 0.61**	*9.7 ± 0.5*	100				
	FR_FRCP1	90	16.1 ± 5.6	16.5 ± 5	***34.5 ± 6.6***	92.0 ± 11.0	0.34 ± 0.15	100 ± 0.0	**61.7 ± 16.7**	2.07 ± 0.19	11.1 ± 0.9	100				
	FR_FRABCH	100	17.9 ± 5.6	18.4 ± 4	***27.0 ± 5.5***	98.0 ± 4.5	0.47 ± 0.12	98.3 ± 3.3	71.2 ± 23.8	2.26 ± 0.18	10.9 ± 1.2	100				
	GH_FR1	100	19.4 ± 2.5	19.4 ± 3	***26.0 ± 4.5***	96.0 ± 5.5	0.51 ± 0.13	98.3 ± 3.3	83.3 ± 17.6	2.31 ± 0.18	10.4 ± 0.5	100				
	LC_LC5	80	17.5 ± 7.5	18.5 ± 8	***26.2 ± 1.5***	78.0 ± 21.7	0.35 ± 0.19	100 ± 0.0	86.7 ± 9.4	**2.04 ± 0.13**	9.9 ± 0.5	100				
	LC_DCDS	90	23.7 ± 3.4	23.7 ± 3	58.5 ± 6.5	90.0 ± 10.0	*0.30 ± 0.11*	98.3 ± 3.3	73.3 ± 18.9	**1.87 ± 0.33**	10.0 ± 0.2	100				
	GH_ERC	90	22.0 ± 5.0	22 ± 5	**56.2 ± 3.6**	90.0 ± 12.2	0.39 ± 0.20	98.3 ± 3.3	78.3 ± 10.0	2.37 ± 0.14	10.7 ± 0.4	100				
	EV_HC1	70	16.8 ± 7.1	16.8 ± 7	**52.5 ± 3.9**	84.0 ± 20.7	**0.31 ± 0.17**	100 ± 0.0	80.0 ± 17.2	2.06 ± 0.33	10.3 ± 0.2	100				
	CM_MC2	80	18.0 ± 4.1	18 ± 4	***22.8 ± 3.4***	86.0 ± 13.4	*0.27 ± 0.12*	98.3 ± 3.3	***26.7 ± 12.2***	***1.36 ± 0.11***	13.0 ± 2.1	100				
	RG_MIDAG	90	20.9 ± 5.6	20.9 ± 6	—	94.0 ± 5.5	0.49 ± 0.26	—								
	EV_MC2	100	20.5 ± 3.5	20.4 ± 3	**39.2 ± 5.4**	100.0 ± 0.0	0.65 ± 0.05	98.3 ± 3.3	75.0 ± 23.3	2.16 ± 0.32	10.6 ± 0.8	100				
	LC_LC3	100	22.4 ± 4.2	22.4 ± 4	***27.0 ± 3.6***	72.0 ± 16.4	0.30 ± 0.12	100 ± 0.0	91.7 ± 12.6	2.32 ± 0.11	10.7 ± 0.3	100				
	LC_LCDSSLCC	80	19.7 ± 4.9	21.5 ± 5	***29.8 ± 3.3***	86.0 ± 16.7	*0.23 ± 0.12*	100 ± 0.0	***61.7 ± 11.4***	**1.79 ± 0.21**	10.6 ± 0.6	96 ± 7				
Q4	Laboratory control	100	20.8 ± 3.4	21.5 ± 5	40.6 ± 3.4	96.0 ± 8.9	0.39 ± 0.18	—					90.0 ± 8.8	88.9 ± 9.6	21.2 ± 0.5	102.7 ± 9.9
	Pooled Batch References	100 ± 0	18.6 ± 5	20.8 ± 3	116.6 ± 9.2	92 ± 13	0.37 ± 0.22						89 ± 8	84 ± 10	20.6 ± 1	102 ± 7
	Fording River reference	100	18.8 ± 2.0	18.8 ± 2	121.6 ± 7.9	94.0 ± 8.9	0.56 ± 0.21						91.1 ± 6.9	86.7 ± 12.0	20.8 ± 0.9	102.6 ± 8.8
	Elk River reference	100	20.4 ± 5.0	21.9 ± 3	113.4 ± 7.7	96.0 ± 8.9	**0.23 ± 0.09**						91.1 ± 8.4	86.7 ± 3.3	19.6 ± 0.3	96.6 ± 8.0
	Michel Creek reference	100	18.1 ± 4.6	20.3 ± 3	117.9 ± 8.3	92.0 ± 11.0	0.37 ± 0.20						86.7 ± 8.8	78.9 ± 13.5	21.0 ± 1.2	102.5 ± 2.7
	South Line Creek reference	100	17.2 ± 6.0	22.1 ± 4	113.6 ± 11.6	84.0 ± 20.7	0.32 ± 0.26						87.5 ± 10.1	81.9 ± 10.6	20.9 ± 1.0	107.3 ± 7.8
	FR_FRCP1	90	17.4 ± 4.2	19.2 ± 2	***103.8 ± 10.0***	92.0 ± 4.5	***0.14 ± 0.03***						80.9 ± 3.7	76.4 ± 3.8	19.5 ± 1.7	98.1 ± 11.9
	FR_FRABCH	90	16.9 ± 3.6	19 ± 3	***103.5 ± 7.2***	84.0 ± 25.1	0.44 ± 0.18						***75.4 ± 9.9***	72.0 ± 6.6	20.9 ± 0.7	102.8 ± 11.8
	GH_FR1	100	20.0 ± 4.6	20 ± 5	119.5 ± 8.2	92.0 ± 11.0	0.41 ± 0.11						***62.1 ± 14.3***	***57.4 ± 12.2***	21.0 ± 0.9	112.0 ± 18.7
	LC_LC5	100	21.6 ± 2.6	22.7 ± 3	129.8 ± 8.5	***72.0 ± 22.8***	0.26 ± 0.22						***74.2 ± 4.7***	***63.9 ± 11.1***	21.2 ± 0.8	103.9 ± 2.0
	LC_DCDS	90	20.9 ± 3.7	21.5 ± 2	120.0 ± 7.0	***34.0 ± 31.3***	**0.20 ± 0.12**						***65.4 ± 8.0***	***58.5 ± 11.5***	21.3 ± 0.8	107.6 ± 3.6
	GH_ERC	90	18.1 ± 3.7	19.8 ± 3	124.8 ± 4.1	84.0 ± 20.7	**0.29 ± 0.19**						89.8 ± 8.9	85.3 ± 10.5	20.9 ± 0.8	106.5 ± 4.1
	EV_HC1	90	21.9 ± 2.2	21.9 ± 2	115.8 ± 3.9	82.0 ± 34.9	**0.28 ± 0.23**						80.0 ± 6.7	76.7 ± 8.8	21.2 ± 0.6	107.6 ± 2.6
	CM_MC2	90	17.9 ± 3.8	*18.4 ± 3*	111.5 ± 6.0	76.0 ± 26.1	**0.21 ± 0.02**						***73.3 ± 8.8***	***66.7 ± 3.3***	21.0 ± 0.7	107.5 ± 8.3
	RG_MIDAG	100	20.7 ± 3.1	20.7 ± 3	—	94.0 ± 8.9	0.32 ± 0.27						—			
	EV_MC2	80	21.2 ± 1.8	21.2 ± 2	**106.8 ± 3.5**	94.0 ± 8.9	**0.33 ± 0.16**						***72.2 ± 10.2***	***66.7 ± 6.7***	21.1 ± 0.5	103.6 ± 6.3
	LC_LC3	90	15.8 ± 4.5	*15.8 ± 4*	122.8 ± 8.5	***64.0 ± 43.4***	0.60 ± 0.1						81.4 ± 4.8	73.7 ± 15.3	21.3 ± 0.7	106.9 ± 10.2
	LC_LCDSSLCC	100	18.2 ± 3.5	19.3 ± 5	***104.0 ± 10.0***	***70.0 ± 33.9***	0.33 ± 0.20						80.8 ± 5.4	76.4 ± 3.4	21.8 ± 0.3	110.4 ± 3.0

Notes:(a) Results presented as survival or mean ± standard deviation. Results are from laboratory reports in Appendix B. Control normalized results are provided in Table 3.3-2.
(b) Results for copper-amended samples are provided; reference site results are samples amended with 10 to 15 µg/L. Laboratory control results are provided for laboratory control + 10 to 20 µg/L copper (Cu).
(c) For *P. promelas*, the Fording River reference was excluded from pooled batch references due to microbial growth in this test.
— = not tested; mg = milligrams; mL = millilitre; mm = millimetres;% = percent; ± = plus or minus.
Value = result significantly lower than Fording River reference.
Value = result significantly lower than Elk River reference.
Value = result significantly lower than Michel Creek reference.
Value = result significantly lower than South Line Creek reference.

Table 3.3-2: Results of Quarterly and Semi-Annual Toxicity Tests—Control normalized Results[a]

Quarter	Location	*C. dubia*			*H. azteca*		*P. promelas* [b]					*O. mykiss*			
		Survival	Reproduction (Protocol)	Reproduction (8-day Test)	Survival	Dry weight	Hatch	Survival	Biomass	Length	Normal Development	Survival	Viability	Length	Wet Weight
Q1	Laboratory control	100 ± 0	100 ± 22	100 ± 22	100 ± 16	100 ± 32	10: 100 ± 0 20: 100 ± 4	10: 100 ± 7 20: 100 ± 19	10: 95 ± 6 20: 82 ± 11	10: 100 ± 2 20: 100 ± 5	10: 100 ± 0 20: 100 ± 0				
	Pooled Batch References	98 ± 16	95 ± 17	95 ± 17	81 ± 25	75 ± 38	100 ± 0	79 ± 19	75 ± 14	98 ± 6	99 ± 3				
	Fording River reference	100 ± 0	89 ± 12	89 ± 12	78 ± 30	66 ± 36	100 ± 0	86 ± 12	79 ± 15	96 ± 4	100 ± 0				
	Elk River reference	100 ± 0	96 ± 17	96 ± 17	*67 ± 24*	64 ± 28	100 ± 0	82 ± 13	82 ± 6	102 ± 5	100 ± 0				
	Michel Creek reference	90 ± 32	102 ± 14	102 ± 14	98 ± 9	96 ± 48	100 ± 0	**60 ± 15**	62 ± 17	102 ± 4	100 ± 0				
	South Line Creek reference	100 ± 0	93 ± 22	93 ± 22	—		100 ± 0	89 ± 23	78 ± 6	*92 ± 7*	95 ± 4				
	FR_FRCP1	***0 ± 0***	***0 ± 0***	***0 ± 0***	78 ± 22	77 ± 20	95 ± 9	***18 ± 12***	***40 ± 10***	128 ± 20	94 ± 13				
	FR_FRABCH	100 ± 0	*70 ± 24*	*67 ± 23*	87 ± 16	64 ± 41	103 ± 0	78 ± 53	76 ± 51	*98 ± 2*	98 ± 4				
	GH_FR1	100 ± 0	*78 ± 23*	78 ± 23	91 ± 9	84 ± 55	103 ± 0	106 ± 14	104 ± 13	*98 ± 6*	95 ± 4				
	LC_LC5	100 ± 0	95 ± 12	95 ± 12	—		100 ± 0	72 ± 48	63 ± 42	***89 ± 4***	100 ± 0				
	LC_DCDS	100 ± 0	90 ± 19	90 ± 19	—		100 ± 0	100 ± 4	85 ± 7	***88 ± 3***	96 ± 4				
	GH_ERC	100 ± 0	107 ± 19	107 ± 19	—		98 ± 3	**51 ± 59**	35 ± 40	*93 ± 1*	100 ± 0				
	EV_HC1	100 ± 0	96 ± 18	96 ± 18	—		100 ± 0	95 ± 12	83 ± 4	***91 ± 3***	95 ± 3				
	CM_MC2	100 ± 0	***57 ± 17***	***57 ± 17***	107 ± 6	67 ± 25	103 ± 0	98 ± 10	100 ± 9	*96 ± 6*	98 ± 4				
	RG_MIDAG	100 ± 0	92 ± 7	92 ± 7	87 ± 12	48 ± 29	-								
	EV_MC2	100 ± 0	96 ± 16	96 ± 16	—		100 ± 0	98 ± 0	88 ± 8	***88 ± 3***	96 ± 7				
	LC_LC3	100 ± 0	86 ± 12	86 ± 12	—		100 ± 0	86 ± 4	89 ± 4	96 ± 1	100 ± 0				
	LC_LCDSSLCC	100 ± 0	92 ± 21	92 ± 21	—		100 ± 0	89 ± 14	87 ± 6	***90 ± 3***	98 ± 5				
Q2	Laboratory control	100 ± 0	100 ± 12	100 ± 12								100 ± 7	100 ± 11	100 ± 2	100 ± 2
	Pooled Batch References	95 ± 22	78 ± 17	78 ± 16								96 ± 14	97 ± 16	101 ± 3	105 ± 6
	Fording River reference	100 ± 0	79 ± 15	79 ± 15								106 ± 13	107 ± 17	101 ± 1	101 ± 2
	Elk River reference	90 ± 32	75 ± 19	75 ± 19								93 ± 13	93 ± 12	104 ± 3	110 ± 9
	Michel Creek reference	90 ± 32	76 ± 17	76 ± 17								92 ± 18	90 ± 23	102 ± 2	109 ± 2
	South Line Creek reference	100 ± 0	83 ± 18	82 ± 15								94 ± 14	99 ± 15	*98 ± 2*	100 ± 3
	FR_FRCP1	100 ± 0	80 ± 15	80 ± 15								88 ± 4	87 ± 6	104 ± 0	119 ± 16
	FR_FRABCH	100 ± 0	70 ± 14	70 ± 14								**73 ± 16**	**75 ± 12**	*96 ± 4*	96 ± 8
	GH_FR1	100 ± 0	80 ± 21	80 ± 21								***69 ± 10***	**71 ± 13**	102 ± 4	106 ± 9
	LC_LC5	100 ± 0	79 ± 9	79 ± 9								91 ± 6	89 ± 11	102 ± 1	113 ± 1
	LC_DCDS	90 ± 32	87 ± 30	87 ± 30								95 ± 13	98 ± 16	105 ± 2	112 ± 6
	GH_ERC	80 ± 42	82 ± 13	81 ± 13								94 ± 24	96 ± 23	103 ± 3	111 ± 2
	EV_HC1	100 ± 0	77 ± 9	77 ± 9								95 ± 13	91 ± 13	101 ± 3	112 ± 4
	CM_MC2	90 ± 32	71 ± 13	71 ± 13								86 ± 8	85 ± 9	103 ± 4	111 ± 11
	RG_MIDAG	100 ± 0	86 ± 10	86 ± 10								—			
	EV_MC2	100 ± 0	83 ± 7	83 ± 7								92 ± 17	94 ± 20	105 ± 1	108 ± 10
	LC_LC3	100 ± 0	85 ± 12	85 ± 12								92 ± 14	94 ± 13	104 ± 2	118 ± 8
	LC_LCDSSLCC	100 ± 0	81 ± 6	81 ± 6								101 ± 11	101 ± 15	104 ± 3	115 ± 5

Table 3.3-2: Results of Quarterly and Semi-Annual Toxicity Tests—Control normalized Results[a]

Quarter	Location	*C. dubia*			*H. azteca*		*P. promelas* [b]					*O. mykiss*			
		Survival	Reproduction (Protocol)	Reproduction (8-day Test)	Survival	Dry weight	Hatch	Survival	Biomass	Length	Normal Development	Survival	Viability	Length	Wet Weight
Q3	Laboratory control	100 ± 0	100 ± 30	100 ± 24	100 ± 6	100 ± 35	15: 100 ± 0 20: 100 ± 0	15: 100 ± 3 20: 100 ± 4	15: 98 ± 11 20: 97 ± 7	15: 100 ± 2 20: 100 ± 2	15: 100 ± 3 20: 100 ± 0	—			
	Pooled Batch References[c]	93 ± 27	85 ± 27	77 ± 20	95 ± 12	96 ± 37	99 ± 3	69 ± 23	82 ± 23	101 ± 6	102 ± 0				
	Fording River reference	100 ± 0	94 ± 27	84 ± 18	96 ± 9	78 ± 24	100 ± 0	88 ± 12	96 ± 4	101 ± 4	102 ± 0				
	Elk River reference	90 ± 32	101 ± 15	86 ± 13	93 ± 20	88 ± 45	98 ± 3	69 ± 31	87 ± 23	104 ± 4	102 ± 0				
	Michel Creek reference	100 ± 0	73 ± 29	74 ± 17	90 ± 9	108 ± 45	98 ± 3	76 ± 19	94 ± 9	104 ± 6	102 ± 0				
	South Line Creek reference	80 ± 42	72 ± 28	64 ± 26	102 ± 5	109 ± 30	100 ± 0	***63 ± 22***	**66 ± 27**	95 ± 5	102 ± 0				
	FR_FRCP1	90 ± 32	75 ± 26	66 ± 22	96 ± 11	75 ± 32	100 ± 0	**64 ± 17**	82 ± 8	109 ± 9	100 ± 0				
	FR_FRABCH	100 ± 0	84 ± 26	73 ± 17	102 ± 5	104 ± 25	98 ± 3	72 ± 23	88 ± 8	107 ± 12	100 ± 0				
	GH_FR1	100 ± 0	91 ± 12	77 ± 10	100 ± 6	113 ± 29	98 ± 3	86 ± 18	92 ± 7	102 ± 5	100 ± 0				
	LC_LC5	80 ± 42	82 ± 35	74 ± 31	81 ± 23	77 ± 42	100 ± 0	90 ± 10	**81 ± 5**	97 ± 5	100 ± 0				
	LC_DCDS	90 ± 32	111 ± 16	94 ± 14	94 ± 10	*65 ± 25*	98 ± 3	76 ± 20	**74 ± 13**	98 ± 2	100 ± 0				
	GH_ERC	90 ± 32	103 ± 24	88 ± 20	94 ± 13	87 ± 44	98 ± 3	80 ± 10	103 ± 6	105 ± 4	102 ± 0				
	EV_HC1	70 ± 48	79 ± 33	67 ± 28	88 ± 22	**67 ± 36**	100 ± 0	83 ± 18	82 ± 13	101 ± 2	100 ± 0				
	CM_MC2	80 ± 42	84 ± 19	72 ± 16	90 ± 14	*60 ± 27*	98 ± 3	***28 ± 13***	***54 ± 5***	127 ± 21	100 ± 0				
	RG_MIDAG	90 ± 32	98 ± 26	83 ± 22	98 ± 6	108 ± 57	—								
	EV_MC2	100 ± 0	96 ± 16	81 ± 14	104 ± 0	143 ± 11	98 ± 3	78 ± 24	86 ± 13	103 ± 8	100 ± 0				
	LC_LC3	100 ± 0	105 ± 20	89 ± 17	75 ± 17	67 ± 26	100 ± 0	95 ± 13	92 ± 5	105 ± 2	100 ± 0				
	LC_LCDSSLCC	80 ± 42	92 ± 23	86 ± 19	90 ± 17	*51 ± 26*	100 ± 0	***64 ± 12***	**71 ± 8**	104 ± 5	96 ± 7				
Q4	Laboratory control	100 ± 0	100 ± 16	100 ± 22	100 ± 9	100 ± 45	—					100 ± 10	100 ± 11	100 ± 3	100 ± 10
	Pooled Batch References	88 ± 33	84 ± 31	97 ± 15	94 ± 14	95 ± 56						99 ± 9	94 ± 11	97 ± 5	100 ± 7
	Fording River reference	100 ± 0	90 ± 10	87 ± 9	98 ± 9	143 ± 53						101 ± 8	98 ± 14	98 ± 4	100 ± 9
	Elk River reference	100 ± 0	98 ± 24	102 ± 15	100 ± 9	**59 ± 24**						101 ± 9	98 ± 4	93 ± 1	94 ± 8
	Michel Creek reference	100 ± 0	87 ± 22	94 ± 13	92 ± 11	98 ± 49						96 ± 10	89 ± 15	99 ± 5	100 ± 3
	South Line Creek reference	100 ± 0	83 ± 29	103 ± 19	88 ± 22	82 ± 66						97 ± 11	92 ± 12	99 ± 5	104 ± 8
	FR_FRCP1	90 ± 32	84 ± 20	89 ± 9	96 ± 5	***35 ± 8***						90 ± 4	86 ± 4	92 ± 8	96 ± 12
	FR_FRABCH	90 ± 32	81 ± 17	88 ± 13	88 ± 26	111 ± 46						**84 ± 11**	81 ± 7	99 ± 3	100 ± 12
	GH_FR1	100 ± 0	96 ± 22	93 ± 21	96 ± 11	104 ± 28						***69 ± 16***	***65 ± 14***	99 ± 4	109 ± 18
	LC_LC5	100 ± 0	104 ± 13	106 ± 15	***75 ± 24***	63 ± 57						***82 ± 5***	***72 ± 12***	100 ± 4	101 ± 2
	LC_DCDS	90 ± 32	100 ± 18	100 ± 11	***35 ± 33***	**52 ± 30**						***73 ± 9***	***66 ± 13***	101 ± 4	105 ± 3
	GH_ERC	90 ± 32	87 ± 18	92 ± 13	88 ± 22	**73 ± 48**						100 ± 10	96 ± 12	99 ± 4	104 ± 4
	EV_HC1	100 ± 0	105 ± 10	102 ± 10	85 ± 36	**72 ± 60**						89 ± 7	86 ± 10	100 ± 3	99 ± 10
	CM_MC2	90 ± 32	86 ± 18	*86 ± 14*	79 ± 27	**55 ± 6**						**83 ± 11**	***76 ± 5***	99 ± 3	105 ± 8
	RG_MIDAG	100 ± 0	100 ± 15	96 ± 14	98 ± 9	83 ± 68						—-			
	EV_MC2	80 ± 42	102 ± 9	99 ± 8	98 ± 9	**84 ± 40**						**80 ± 11**	***75 ± 8***	100 ± 2	101 ± 6
	LC_LC3	90 ± 32	76 ± 22	*73 ± 21*	***67 ± 45***	153 ± 25						90 ± 5	83 ± 17	101 ± 3	104 ± 10
	LC_LCDSSLCC	100 ± 0	88 ± 17	90 ± 21	***73 ± 35***	84 ± 51						90 ± 6	86 ± 4	103 ± 2	107 ± 3

Notes: (a) Results presented as survival or mean ± standard deviation. As discussed in Section 2.3.2, results were normalized for all endpoints except *P. subcapitata* cell yield.
(b) Results for copper-amended samples are provided; reference site results are samples amended with 10 to 15 µg/L. Laboratory control results are provided for laboratory control + 10 to 20 µg/L copper (Cu).
(c) For *P. promelas*, the Fording River reference was excluded from pooled batch references due to microbial growth in this test.
— = not tested; mg = milligrams; mL = millilitre; mm = millimetres;% = percent; ± = plus or minus.
Value = result significantly lower than Fording River reference.
Value = result significantly lower than Elk River reference.
Value = result significantly lower than Michel Creek reference.
Value = result significantly lower than South Line Creek reference.

3.3.1 Results by Test Species

3.3.1.1 Ceriodaphnia dubia

Standard Permit-based Testing

Individual replicate results are provided in Figures 3.3-1 and 3.3-2. Mean test results are provided in Tables 3.3-1 and 3.3-2 and Figures 3.3-3 and 3.3-4.

There was no evidence of statistically significant adverse effects on mean *C. dubia* survival (Figure 3.3-1; Figure 3.3-3), except for Q1 FR_FRCP1, where survival was 0%. In other tests and quarters, the few individual replicates for which mortality was observed were insufficient to cause a statistically significant response. Replicate results for survival are binomial (either 0% or 100%) because each replicate consists of a single female. Results of other testing of Elk Valley waters, conducted with additional replication of the survival endpoint, confirmed that adult survival is a relatively insensitive test endpoint (Golder 2018a); the observation of an occasional mortality to an adult female (including in reference samples) is believed to occur due to random events not associated with chemical toxicity.

Reproduction was significantly reduced relative to one or more references in 6 of 48 tests (Figures 3.3-2; Figure 3.3-4; Table 3.3-1; Table 3.3-2), including two FR_FRCP1 tests (Q1 and Q3), two FR_FRABCH tests (Q1 and Q4), one CM_MC2 test (Q1), and one LC_LC3 test (Q4). In two of six tests with significant results, mean reproduction was within the local NR and the effect size was less than 20% compared to the mean response in batch-specific references (FR_FRABCH [Q4 = 7%]; LC_LC3 [Q4 = 13%]), indicating no adverse response. In one of six tests with significant results (FR_FRCP1 Q3), mean reproduction was below the local NR and within the regional NR, indicating a “possible” adverse response. There is uncertainty whether these results represent an adverse response to the test water or variance in test organism performance related to background water quality. The effect size for FR_FRCP1 in Q3 was 19%. In the remaining three tests with significant results (Q1 tests with FR_FRCP1, FR_FRABCH, and CM_MC2), mean reproduction was below the local and regional NRs. These results indicate a likely adverse response to the test site water. Compared to the mean response in batch-specific references, the effect size in tests categorized as likely ranged from 41% (FR_FRABCH) to 100% (FR_FRCP1).

Based on the results presented above, *C. dubia* tests were categorized as follows:

- **No adverse response (44 of 48 tests):** Q1 tests with GH_FR1, LC_LC5, LC_DCDS, GH_ERC, EV_HC1, EV_MC2, RG_MIDAG, LC_LC3, and LC_LCDSSLCC; all Q2 tests; Q3 tests with FR_FRABCH, GH_FR1, LC_LC5, LC_DCDS, GH_ERC, EV_HC1, EV_MC2, CM_MC2, RG_MIDAG, LC_LC3, and LC_DCSSLCC; all Q4 tests.
- **Possible adverse response (1 of 48 tests)**: Q3 test with FR_FRCP1.
- **Likely adverse response (3 of 48 tests)**: Q1 tests with FR_FRCP1, FR_FRABCH, and CM_MC2.

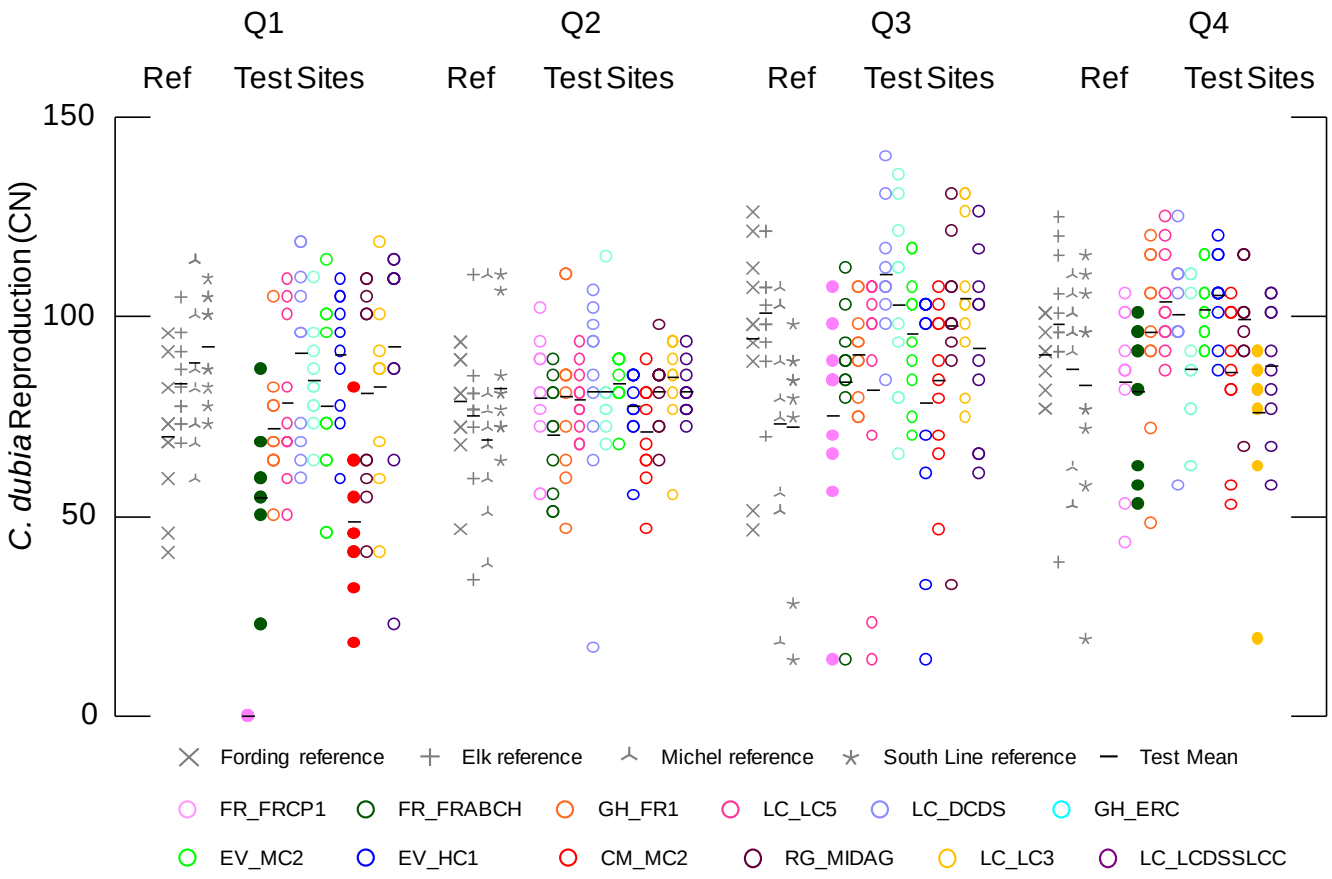
The causation assessment for *C. dubia* reproduction is presented in Section 3.4.1.

Figure 3.3-1: Individual replicate and mean results for *C. dubia* survival in reference (Ref) and test site waters.



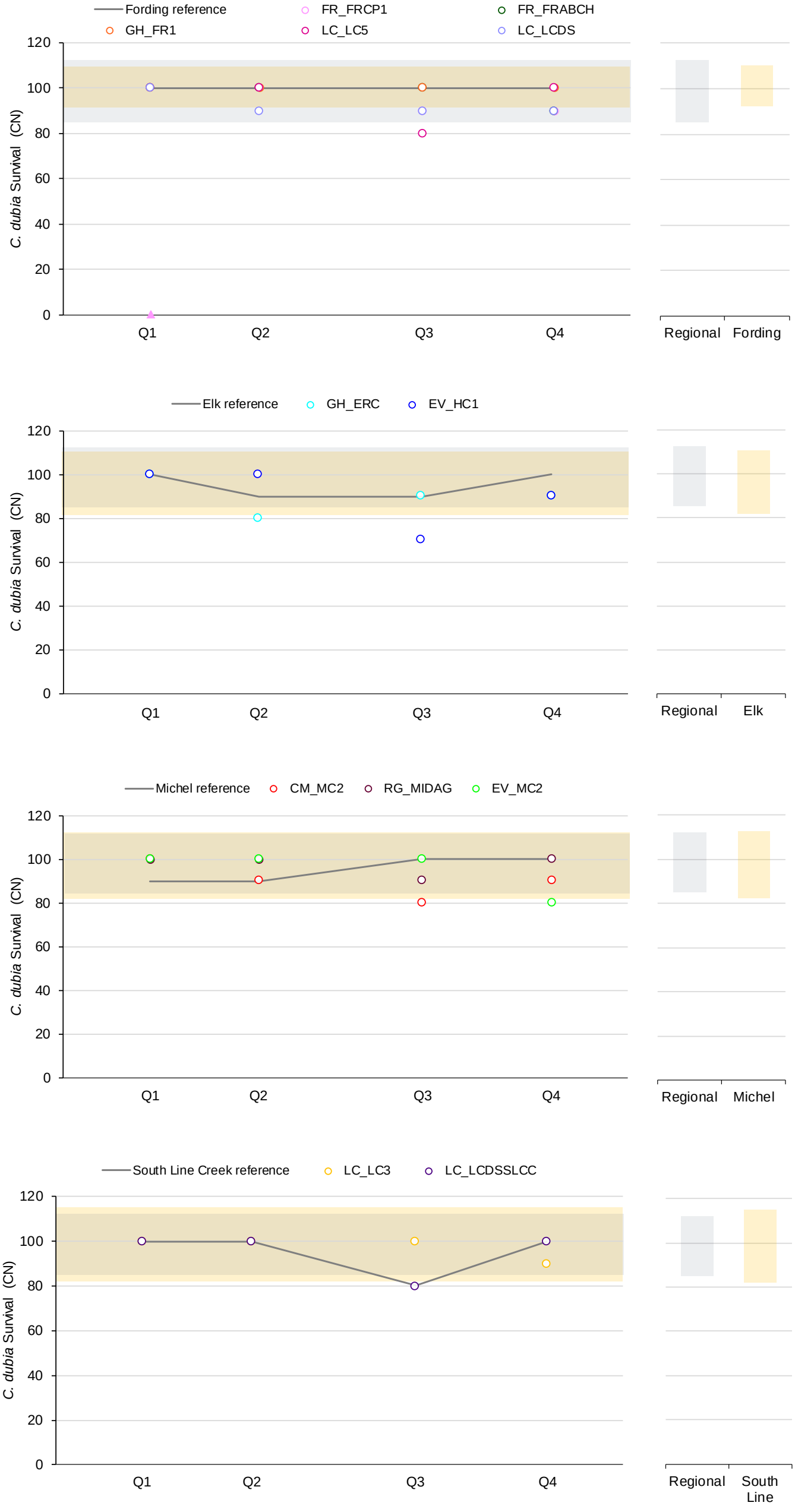
Note:See Figure 2.3-2 for description of lines and symbols. Replicate results are either 100% or 0% because there is a single adult female daphnid in each replicate. Mean results represent the combined data from ten replicates per treatment.

Figure 3.3-2: Individual replicate and mean results for *C. dubia* reproduction in reference (Ref) and test site waters.



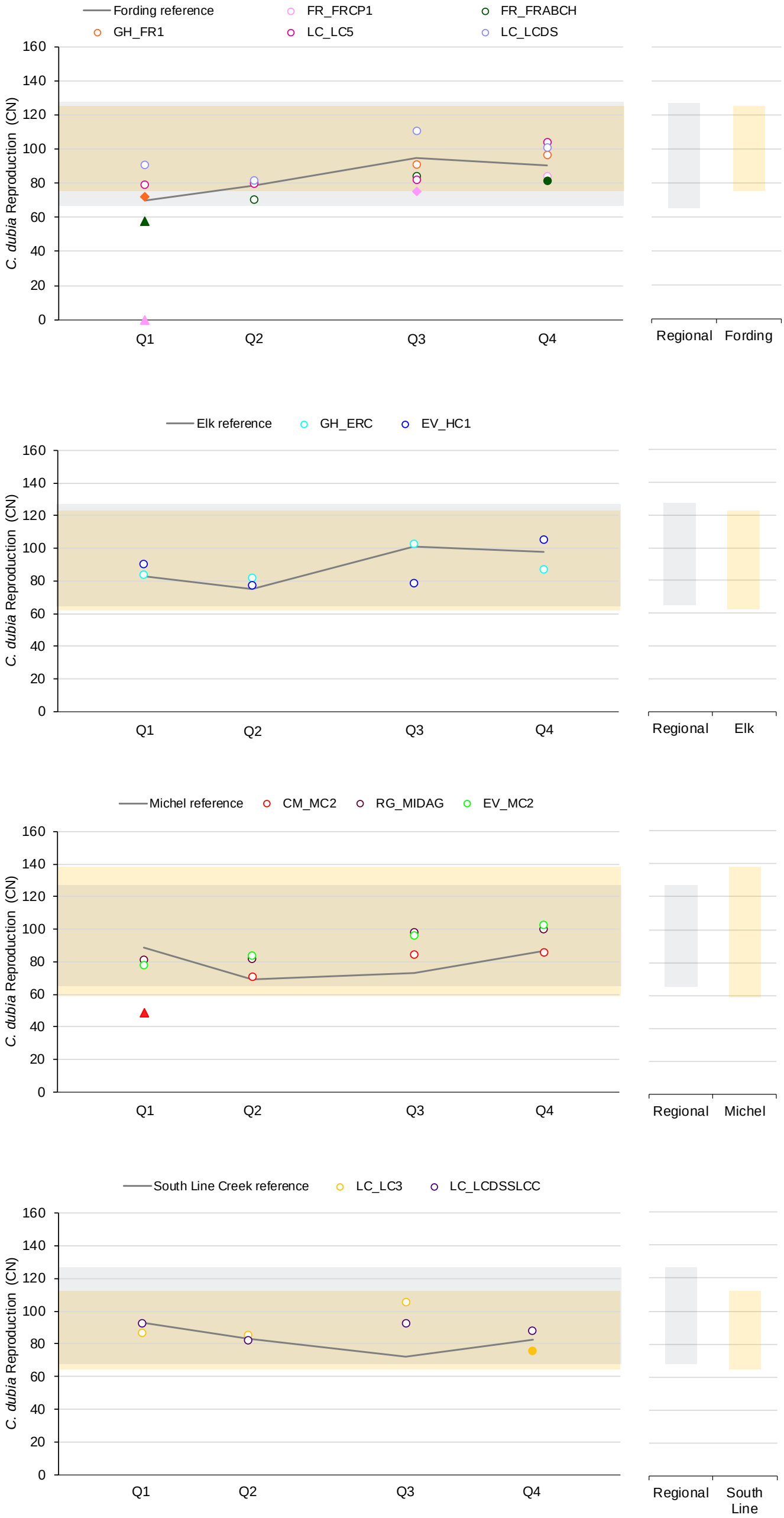
Note: See Figure 2.3-2 for description of lines and symbols.

Figure 3.3-3: Mean results for *C. dubia* survival in the Fording River reference and its paired test site waters (top left panel), the Elk River reference and its paired test site waters (second left panel), the Michel Creek reference and its paired test site waters (third left panel), and the South Line Creek and its paired test waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.3-4: Mean results for *C. dubia* reproduction in the Fording River reference and its paired test site waters (top left panel), the Elk River reference and its paired test site waters (second left panel), and the Michel Creek reference and its paired test site waters (third left panel), and the South Line Creek and its paired test waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Consideration of *Ceriodaphnia dubia* Broods

A comparison of *C. dubia* brood output between the Environment Canada protocol tests and 8-day tests is provided in Figure 3.3-5. At the broadest level, the differences between the two methods of quantifying reproductive output were not large:

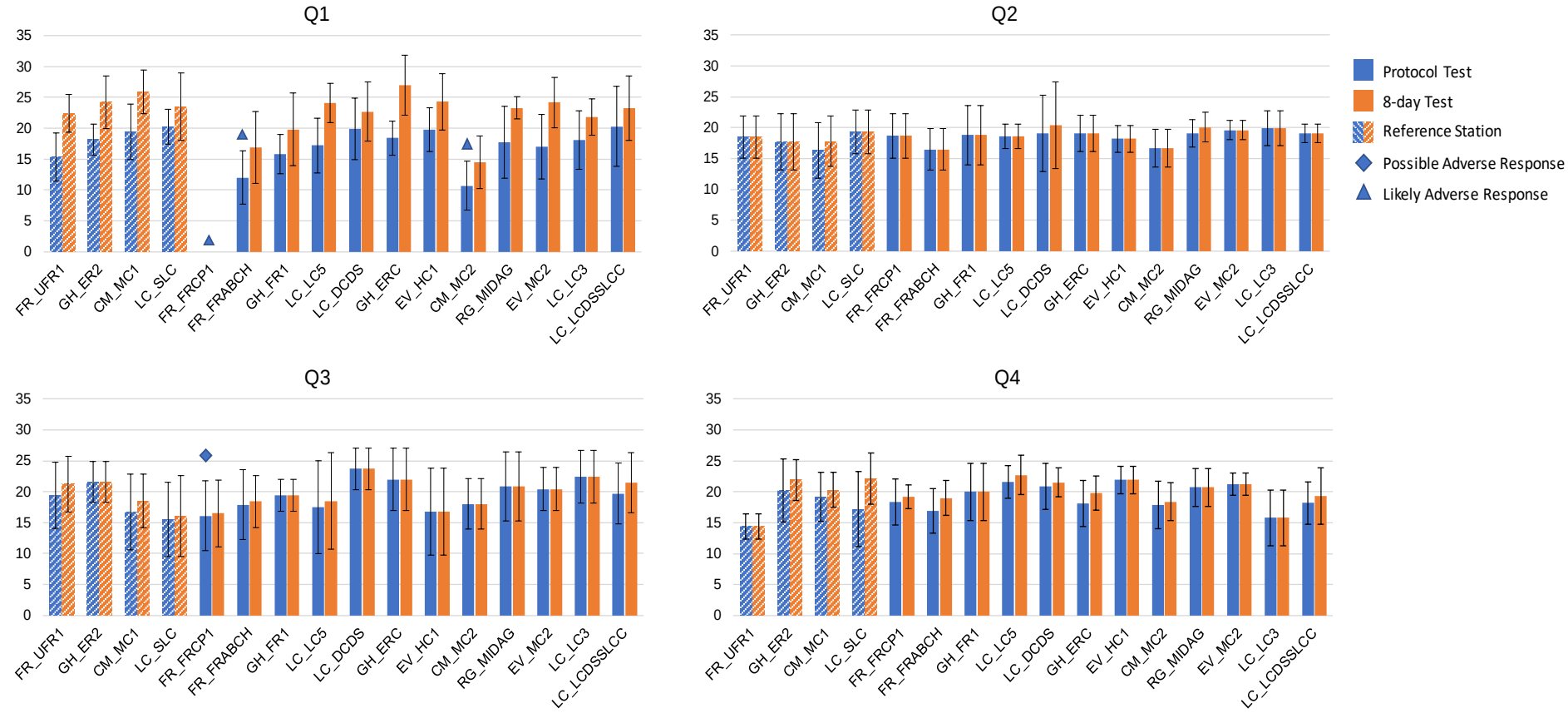
- In three quarters (Q2, Q3, Q4) there were few differences between the mean neonates counted using either method. In Q2 through Q4, the percent difference of mean number of neonates between the two test durations was <15%, except South Line Creek reference in Q4, when the mean number of neonates in the 8-day test was 22% greater relative to the protocol test.
- In Q1, there was a moderate degree of increase moving from the standard protocol to the 8-day test method. However, the increase was experienced approximately equally across all treatments, including reference. In Q1, 10 of 16 tests had differences of mean number of neonates greater than 20% (Fording River reference, Elk River reference, Michel Creek reference, FR_FRABCH, GH_FR1, LC_LC5, GH_ERC, CM_MC2, RG_MIDAG, EV_MC2). The greatest difference between the two test durations was 32% at the Fording River reference and GH_ERC.
- The higher frequency of differences between the test durations in Q1 compared to other quarters occurred because the Q1 Environment Canada protocol test was terminated on the sixth day, whereas most test sites had the third brood produced on the seventh day.

For comparisons of the pairwise tests conducted in each quarter, results generally did not differ. Tests that were significantly lower than one or more reference in the Environment Canada protocol test were also significantly lower than one or more reference in the 8-day test. One exception was in Q1, when GH_FR1 was significantly lower than the Michel Creek reference in the Environment Canada protocol test, but similar to all batch specific references in the 8-day test. In comparison to the local and regional NRs, the reproduction in Q1 GH_FR1 in the protocol test was categorized as no adverse response, indicating that conclusions would not have differed between the two test terminations.

Results of the comparisons between statistical methods provide three conclusions of importance for the monitoring program:

- Termination of the test based on negative control performance can result in loss of information from a third brood, and this was demonstrated in Q1 2019. This occurs in an unpredictable manner throughout the historical test record, because the Environment Canada test duration of 6, 7, or 8 days is subject to high uncertainty (and can be arbitrary when the test in terminated in the middle of the third brood event).
- The early termination of the Q1 tests in 2019 following the Environment Canada protocol (Day 6) resulted in estimates of reproduction that were biased low, if the objective was to characterize the full reproductive output from three broods. The magnitude of difference in Q1 2019 was more than 20% and up to 32% in individual samples. This variation carries forward into the reference normal ranges used to evaluate the significance of site water responses.
- Although the reproductive output was sometimes biased low (i.e., in Q1), there were no differences in the test conclusions of pairwise comparisons to reference, because both reference and test sites were subject to the potential downward bias of the protocol test. The 2019 analysis confirmed that the samples showing reduced reproduction in the Environment Canada test were not an artifact of test termination date.

Figure 3.3-5: Mean Number of *Ceriodaphnia dubia* Neonates in Protocol and 8-day Tests in 2019



Notes: Error bars represent the standard deviation of number of neonates.

3.3.1.2 *Pseudokirchneriella subcapitata*

Cell yield was significantly reduced relative to one or more references in 22 of 44 tests (Figure 3.3-6; Figure 3.3-7; Table 3.3-1), including,

- four FR_FRCP1 tests (Q1 to Q4)
- two FR_FRABCH tests (Q3 and Q4)
- one GH_FR1 test (Q3)
- two LC_LC5 tests (Q2 and Q3)
- one LC_DCDS test (Q2)
- two GH_ERC tests (Q1 and Q3)
- one EV_HC1 test (Q3)
- three EV_MC2 tests (Q2, Q3, and Q4)
- one CM_MC2 test (Q3)
- two LC_LC3 tests (Q2 and Q3)
- three LC_LCDSSLCC tests (Q2, Q3, and Q4)

In 12 of the 22 tests with significant results, mean cell yield was within the local NR and the effect size was less than 20% compared to the mean response in batch-specific references, indicating no adverse response (FR_FRCP1 [Q2, Q4], FR_FRABCH [Q4], LC_LC5 [Q2], LC_DCDS [Q2], GH_ERC [Q1, Q3], EV_MC2 [Q2, Q4], LC_LC3 [Q2], and LC_LCDSSLCC [Q2, Q4]). Compared to the mean response in batch-specific references, the effect size in tests categorized as no adverse response ranged from -5% (GH_ERC in Q3) to 11% (FR_FRABCH in Q4). In 10 of 22 tests with significant pairwise test results, mean cell yield was below the local and regional NRs (Q1 test with FR_FRCP1, Q3 tests with FR_FRCP1, FR_FRABCH, GH_FR1, LC_LC5, EV_HC1, EV_MC2, CM_MC2, LC_LC3, and LC_LCDSSLCC). The latter results indicate a likely adverse response to the test water. Compared to the mean response in batch-specific references, the effect size in tests categorized as likely was highest at FR_FRCP1 in Q1 (86%). In Q3 tests categorized as likely, effect sizes ranged from 2% (EV_HC1) to 57% (CM_MC2).

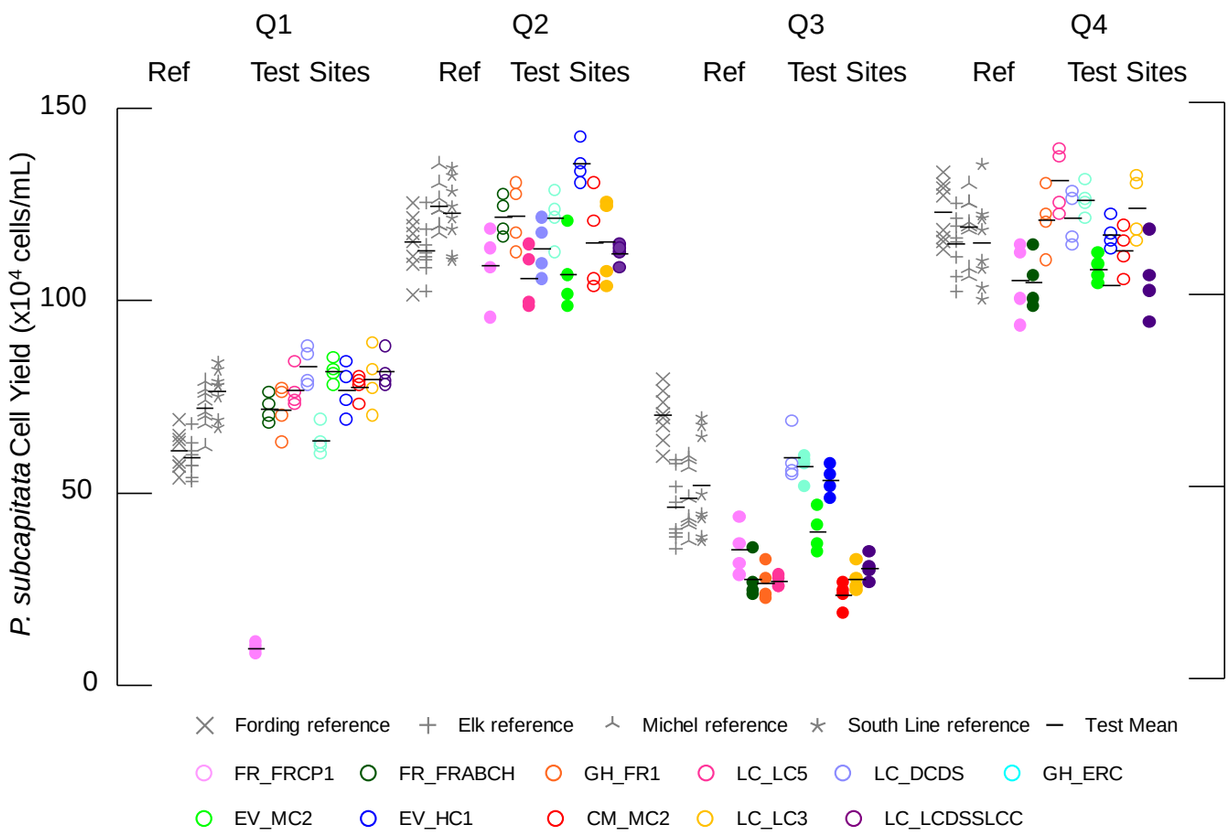
As discussed in Section 3.2.3.2, cell yield in Q3 2019 (and to a lesser extent, Q1 2019) was unusually low in reference waters relative to the negative laboratory control and to historical results. Although this did not disqualify the test results, which met the formal requirements for test validity, there is elevated uncertainty for the test outcomes in both Q1 and Q3 2019. Lower cell yield was also recorded for test sites in these quarters, as shown on Figure 3.3-6. It is uncertain whether the higher frequency of significant test results in this quarter was related to this unusual finding. However, the observation of a high proportion of tests designated as likely adverse response in Q3, coincident with the unusually low reference water cell yield, raises questions about the reliability of the findings. If a factor negatively influenced the cell counts in Q3, and that factor did not affect the treatments to a similar degree, there is increased potential for false positive results. The results from Q2 and Q4, which yielded similar cell yields to historical tests of Elk Valley waters (Figure 3.3-7), yielded no cases of possible or likely adverse responses.

Based on the results presented above, *P. subcapitata* tests were categorized as follows:

- **No adverse response (34 of 44 tests)**—Q1 tests with FR_FRABCH, GH_FR1, LC_LC5, LC_DCDS, GH_ERC, EV_HC1, CM_MC2, EV_MC2, LC_LC3, and LC_LCDSSLCC, all Q2 tests, Q3 tests with LC_DCDS and GH_ERC, and all Q4 tests.
- **Possible adverse response (0 of 44 tests)**—No tests were in this category.
- **Likely adverse response (10 of 44 tests)**—Q1 test with FR_FRCP1, and Q3 tests with FR_FRCP1, FR_FRABCH, GH_FR1, LC_LC5, EV_HC1, CM_MC2, EV_MC2, LC_LC3, and LC_LCDSSLCC.

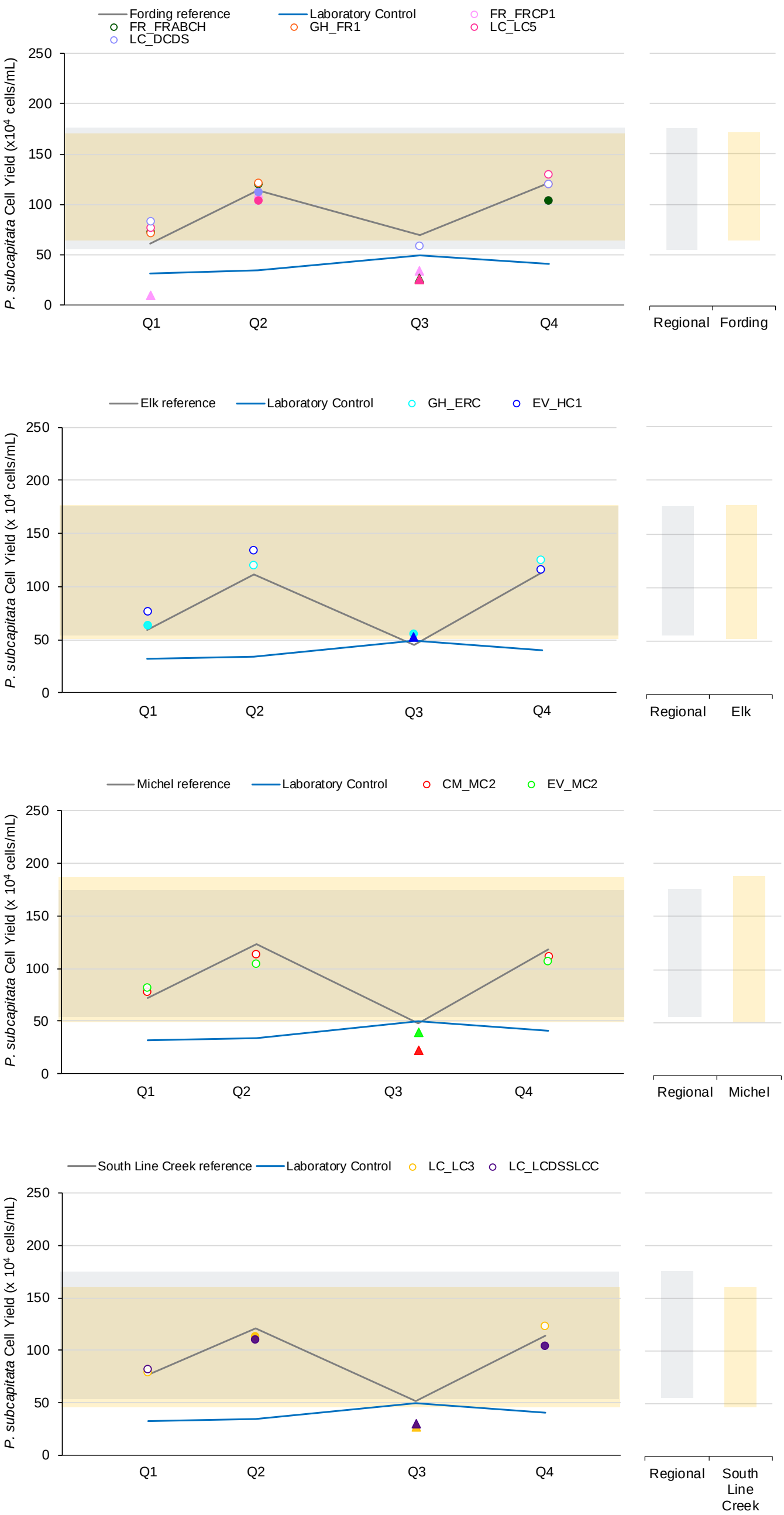
The causation assessment for *P. subcapitata* cell yield is presented in Section 3.4.2.

Figure 3.3-6: Individual replicate and mean results for *P. subcapitata* cell yield in reference (Ref) and test site waters.



Note: See Figure 2.3-2 for description of lines and symbols.

Figure 3.3-7: Mean results for *P. subcapitata* cell yield in the Fording River reference and its paired test site waters (top left panel), the Elk River reference and its paired test site waters (second left panel), and the Michel Creek reference and its paired test site waters (third left panel), and the South Line Creek and its paired test waters (bottom left panel). Regional and local normal ranges (2.5th and 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

3.3.1.3 Hyalella azteca

Survival was significantly reduced in 7 of 29 tests (Figure 3.3-8; Figure 3.3-10; Table 3.3-1; Table 3.3-2), including two LC_LC5 tests (Q3 and Q4), one LC_DCDS tests (Q4), one CM_MC2 test (Q4), two LC_LC3 tests (Q3 and Q4), and one LC_LCDSSLCC test (Q4). In one of seven tests with significant results (Q3 LC_LC5), mean survival was within the local NR and the effect size (15%) was less than 20% compared to the mean response in batch-specific references, indicating no adverse response. In one of seven tests with significant results, mean survival was below the local NR and within the regional NR (Q2 CM_MC2). The effect size in this test was 17%. This result indicates a possible adverse response. There is uncertainty whether this result represents a true adverse response to the test water or variance in test organism performance related to background water quality. In the remaining tests, mean survival was below both the local and regional NRs. Compared to the mean response in batch-specific references, effect sizes in tests with significant results ranged from 21% (LC_LC3 [Q3] and LC_LC5 [Q4]) to 63% (LC_DCDS [Q4]). These results indicate a likely adverse response to the test water.

Dry weight was significantly reduced in 11 of 29 tests (Figure 3.3-9; Figure 3.3-11; Table 3.3-1; Table 3.3-2), including one FR_FRCP1 test (Q4), two LC_DCDS tests (Q3 and Q4), one GH_ERC test (Q4), two EV_HC1 tests (Q3 and Q4), one EV_MC2 test (Q4), two CM_MC2 tests (Q3 and Q4), one LC_LC3 test (Q3), and one LC_LCDSSLCC test (Q3). In one of 11 tests with significant pairwise results (Q4 EV_MC2), mean dry weight was within the local NR and the effect size (11%) was less than 20% compared to the mean response in batch-specific references, indicating no adverse response. In 8 of 11 tests with significant results, mean dry weight was within the local NR and the effect size was between 20% and 50% compared to the mean response in batch-specific references. These results indicate a possible adverse response. The effect size for these tests categorized as possible adverse response ranged from 22% (Q4 GH_ERC) to 47% (Q3 LC_LCDSSLCC). There is uncertainty whether these results represent a true adverse response to the test water or variance in test organism performance related to background water quality. In the remaining test with significant results (Q4 FR_FRCP1), mean dry weight was below both the local and regional NRs. This result indicates a likely adverse response to the test water. Compared to the mean response in batch-specific references, the effect size in his test was 62%.

Both the survival and dry weight endpoints had inconsistency in response among replicates exposed to the same site water. This was observed in both reference and test site waters, with the most pronounced variability observed in Q4 2019. For example, survival in the Q4 LC_LC3 test ranged from 0% to 100% (0% to 104% control normalized) and in the Q4 LC_DCDS test ranged from 0% to 80% (0 to 83% control normalized). This inconsistency in response among replicates exposed to the same site water may suggest that the statistically significant result is reflective of unusual conditions across test vessels, rather than an adverse response to the test water. However, as reflected in the laboratory report (Appendix B-4), there were no unusual observations noted by the laboratory technicians that could explain this inconsistency (Melanie Gallant, pers. comm.). This pattern of response is unusual for this test protocol, as inter-replicate variations tend to be less pronounced for *H. azteca* relative to other test organisms (such as rainbow trout tests, which can be influenced by replicate-specific variations in egg quality). Similar to the results for *P. subcapitata*, these unusual findings did not warrant rejection as invalid test outcomes, but instead indicate higher uncertainty than in previous years of *H. azteca* testing.

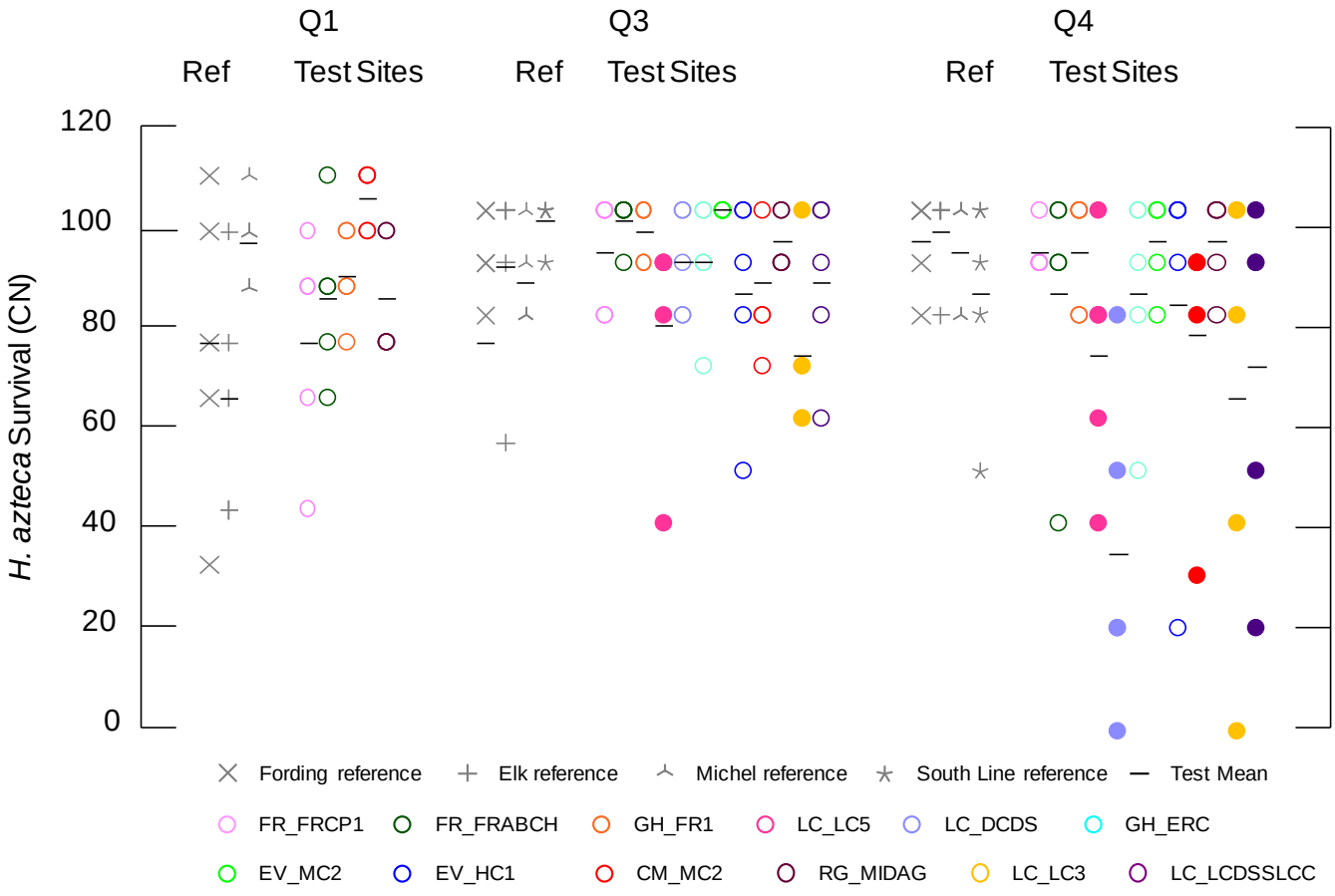
Based on the results presented above, *H. azteca* tests were categorized as follows:

- **No adverse response (16 of 29 tests)**—all Q1 tests, Q3 tests with FR_FRCP1, FR_FRABCH, GH_FR1, LC_LC5, GH_ERC, EV_MC2, and RG_MIDAG, and Q4 tests with FR_FRABCH, GH_FR1, EV_MC2, and RG_MIDAG.

- **Possible adverse response (7 of 29 tests)**—Q3 tests with LC_DCDS, EV_HC1, CM_MC2, and LC_LCDSSLCC, and Q4 tests with GH_ERC, EV_HC1, and CM_MC2.
- **Likely adverse response (6 of 29 tests)**—Q3 test with LC_LC3, and Q4 tests with FR_FRCP1, LC_LC5, LC_DCDS, LC_LC3, and LC_LCDSSLCC.

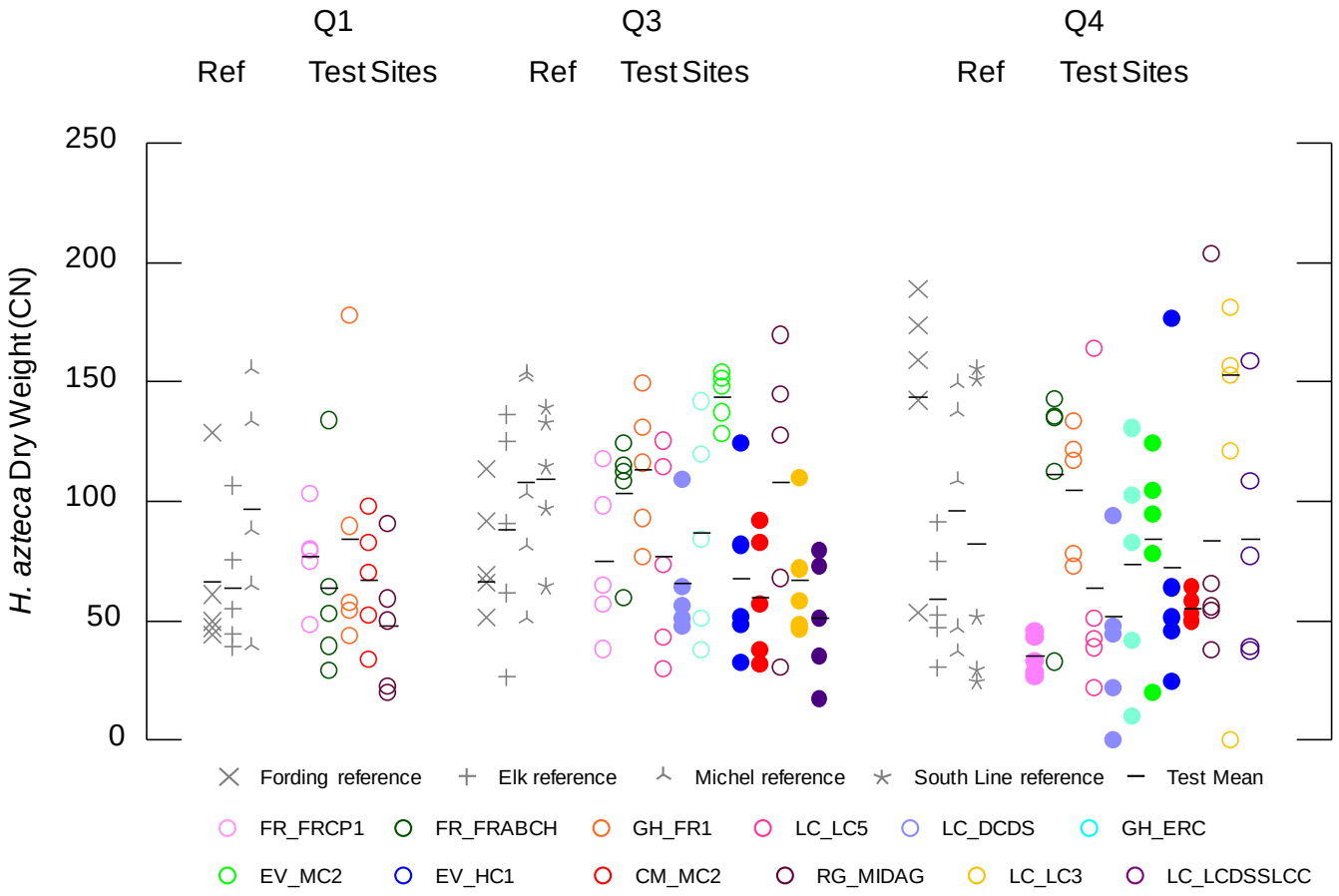
The causation assessment for *H. azteca* survival and dry weight is presented in Section 3.4.3.

Figure 3.3-8: Individual replicate and mean results for *H. azteca* survival in reference (Ref) and test site waters.



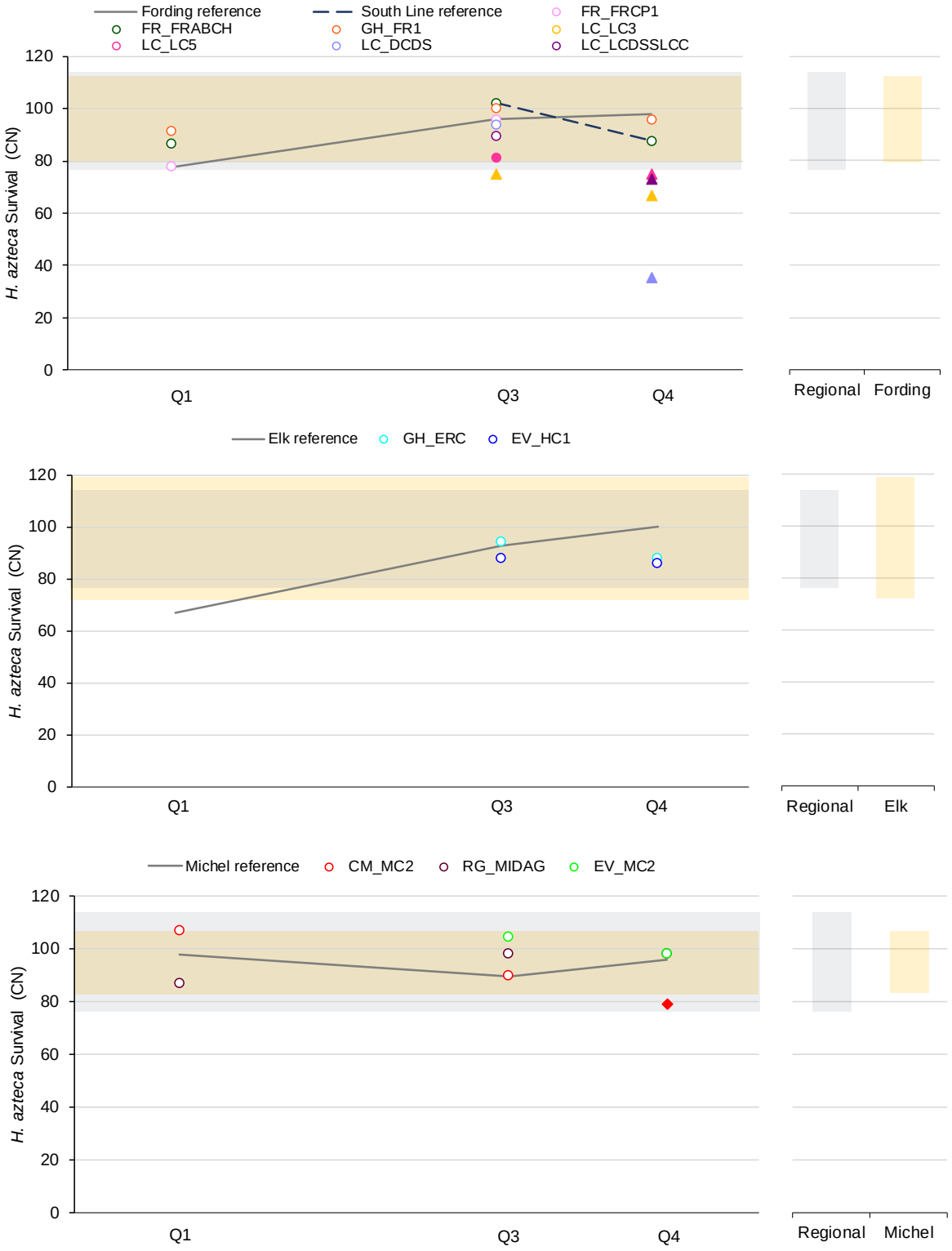
Note: See Figure 2.3-2 for description of lines and symbols.

Figure 3.3-9: Individual replicate and mean results for *H. azteca* dry weight in reference (Ref) and test site waters.



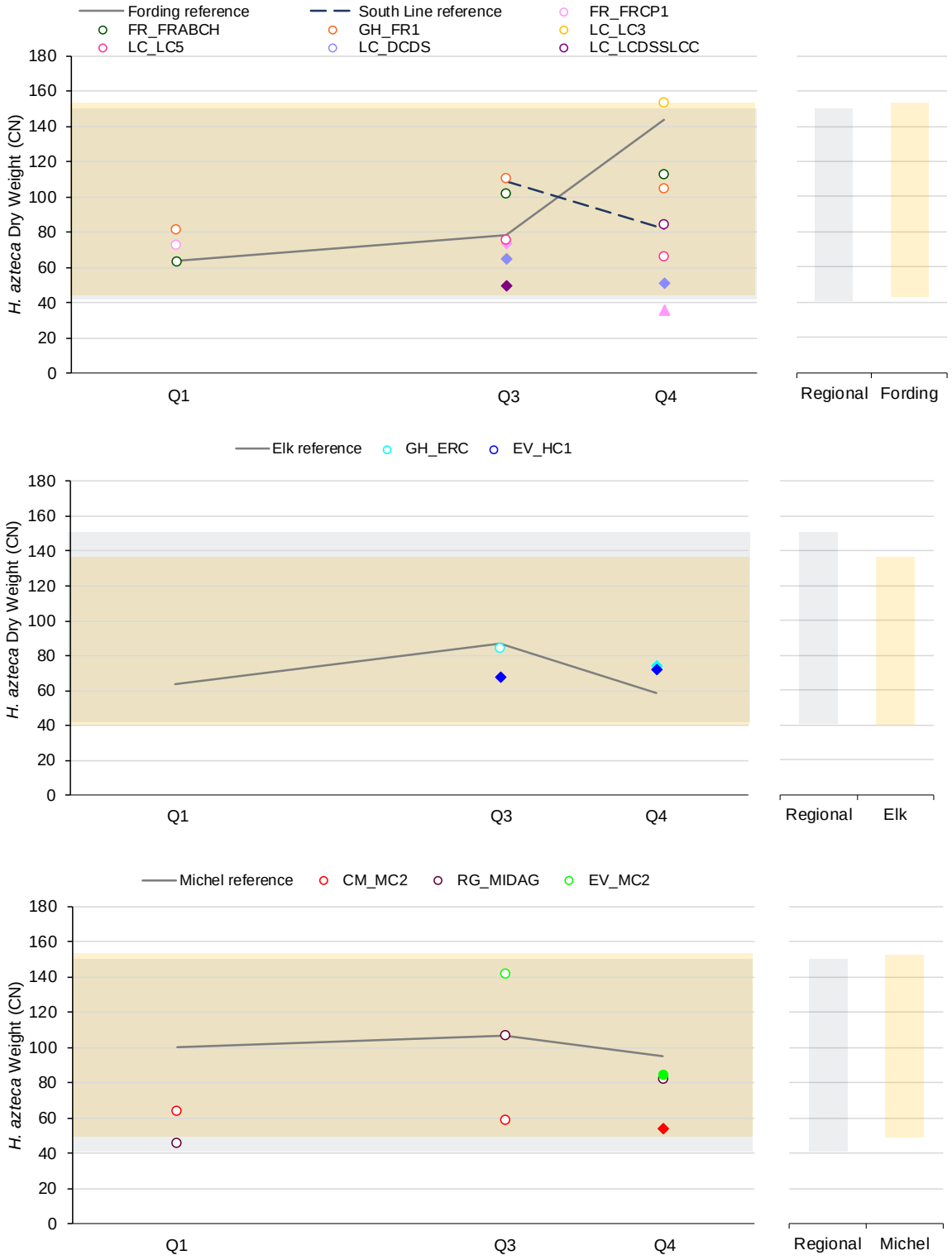
Note: See Figure 2.3-2 for description of lines and symbols.

Figure 3.3-10: Mean results for *H. azteca* survival in the Fording River reference and its test site waters (top left panel), the Elk River reference and its paired test site waters (middle left panel), and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.3-11: Mean results for *H. azteca* dry weight in the Fording River reference and its test site waters (top left panel), the Elk River reference and its paired test site waters (middle left panel), and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

3.3.1.4 *Oncorhynchus mykiss*

There were no adverse behavioral responses of *O. mykiss* in 2019 tests. The survival and viability endpoint responses were numerically similar, indicating a low rate of deformities in all samples (Appendix B). These results are as expected given that rainbow trout alevins are not sufficiently developed to exhibit indications of deformations or behaviour that are more commonly assessed at the fry stage. No effects of microbes on *O. mykiss* were observed in tests in Q2 or Q4 (Appendix B).

Survival was significantly reduced relative to one or more references in 8 of 22 tests (Figure 3.3-12; Figure 3.3-16; Table 3.3-1; Table 3.3-2), including two Q2 tests (FR_FRABCH and GH_FR1) and six Q4 tests (FR_FRABCH, GH_FR1, LC_LC5, LC_DCDS, EV_MC2, and CM_MC2). In four of the eight tests with significantly reduced survival, mean survival was within the local NR and the effect size was less than 20% compared to the mean response in batch-specific references (Q4 tests with FR_FRABCH, LC_LC5, EV_MC2, and CM_MC2) indicating no adverse response. Survival effect sizes for these tests ranged from 15% at FR_FRABCH to 19% at EV_MC2. In the remaining four tests with significant results, mean survival was below the local and regional NRs. These results indicate a likely adverse response to the test water. Compared to the mean response in batch-specific references, effect size in tests categorized as likely ranged from 24% (FR_FRABCH [Q2]) to 30% (GH_FR1 [Q4]).

Viability outcomes were similar to those for survival. Viability was significantly reduced relative to one or more references in 7 of 22 tests (Figure 3.3-13; Figure 3.3-17; Table 3.3-1; Table 3.3-2), including two Q2 tests (FR_FRABCH and GH_FR1) and five Q4 tests (GH_FR1, LC_LC5, LC_DCDS, EV_MC2, and CM_MC2). In two of the seven tests with significantly reduced results (Q4 tests with EV_MC2 and CM_MC2), mean viability was within the local NR and the effect size was 20% compared to the mean response in batch-specific references, indicating a possible adverse response. There is uncertainty whether these results represent an adverse response to the test water or variance in test organism performance related to background water quality. In the remaining five tests with significant results, mean viability was below the local and regional NRs. These results indicate a likely adverse response to the test water. Compared to the mean response in batch-specific references, effect size in tests categorized as likely ranged from 23% (FR_FRABCH [Q2]) to 31% (GH_FR1 [Q4]).

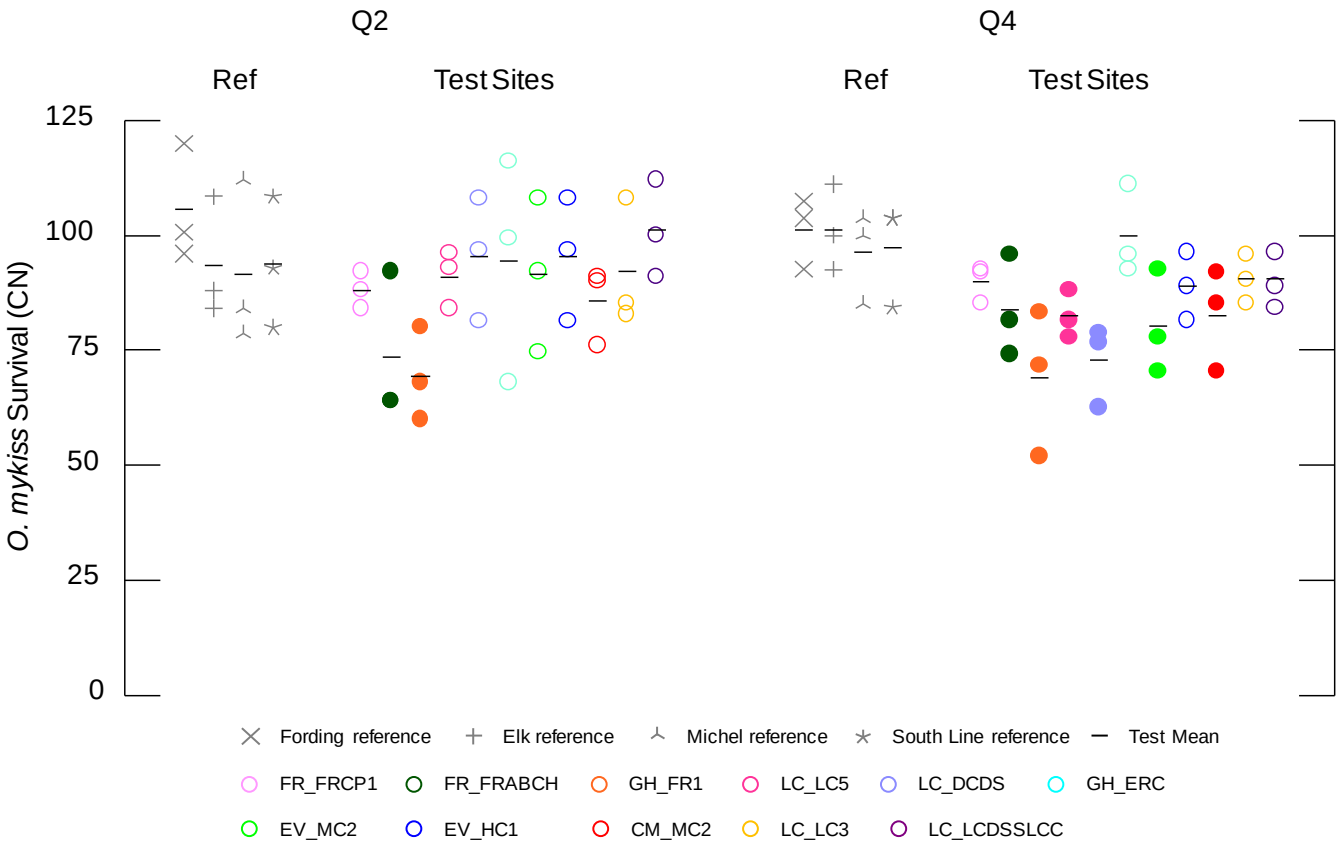
Length was significantly reduced relative to one or more references only in the Q2 FR_FRABCH test (Figure 3.3-14; Figure 3.3-18; Table 3.3-1; Table 3.3-2). In this test, mean length was within the local NR and the effect size (5%) was less than 20% compared to the mean response in batch-specific references, indicating no adverse response. Lack of growth responses (length or weight) is consistent with historical testing of this species, which indicate survival/viability is the most sensitive endpoint.

Based on the results presented above, *O. mykiss* tests were categorized as follows:

- **No adverse response (15 of 22 tests)**—Q2 tests with FR_FRCP1, LC_LC5, LC_DCDS, GH_ERC, EV_HC1, EV_MC2, CM_MC2, LC_LC3, LC_LCDSSLCC, and Q4 tests with FR_FRCP1, FR_FRABCH, GH_ERC, EV_HC1, LC_LC3, LC_LCDSSLCC.
- **Possible adverse response (2 of 22 tests)**—Q4 tests with EV_MC2 and CM_MC2.
- **Likely adverse response (5 of 22 tests)**—Q2 tests with FR_FRABCH, GH_FR1, and Q4 tests with GH_FR1, LC_LC5, LC_DCDS.

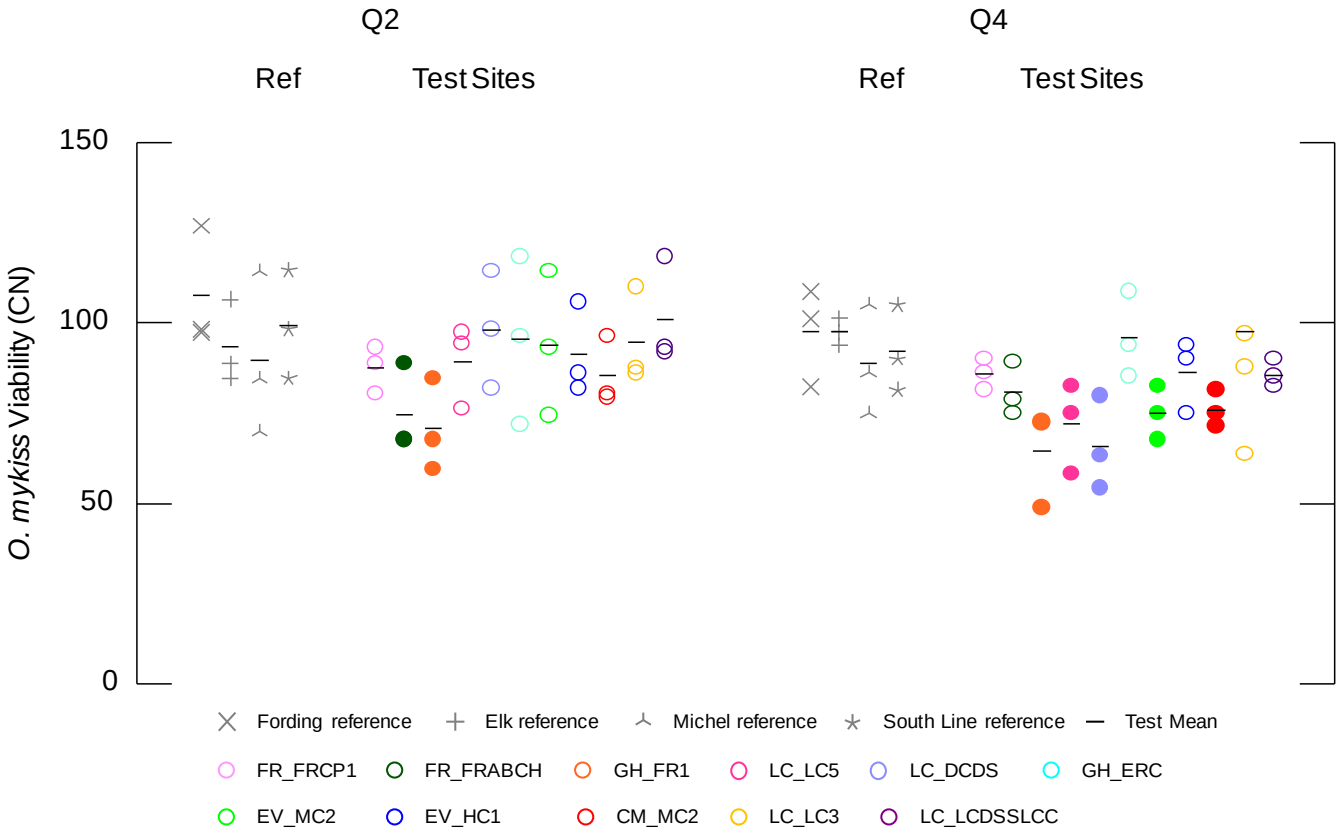
The causation assessment for *O. mykiss* survival and viability is presented in Section 3.4.4.

Figure 3.3-12: Individual replicate and mean results for *O. mykiss* survival in reference (Ref) and test site waters.



Note:See Figure 2.3-2 for description of lines and symbols.

Figure 3.3-13: Individual replicate and mean results for *O. mykiss* viability in reference (Ref) and test site waters.



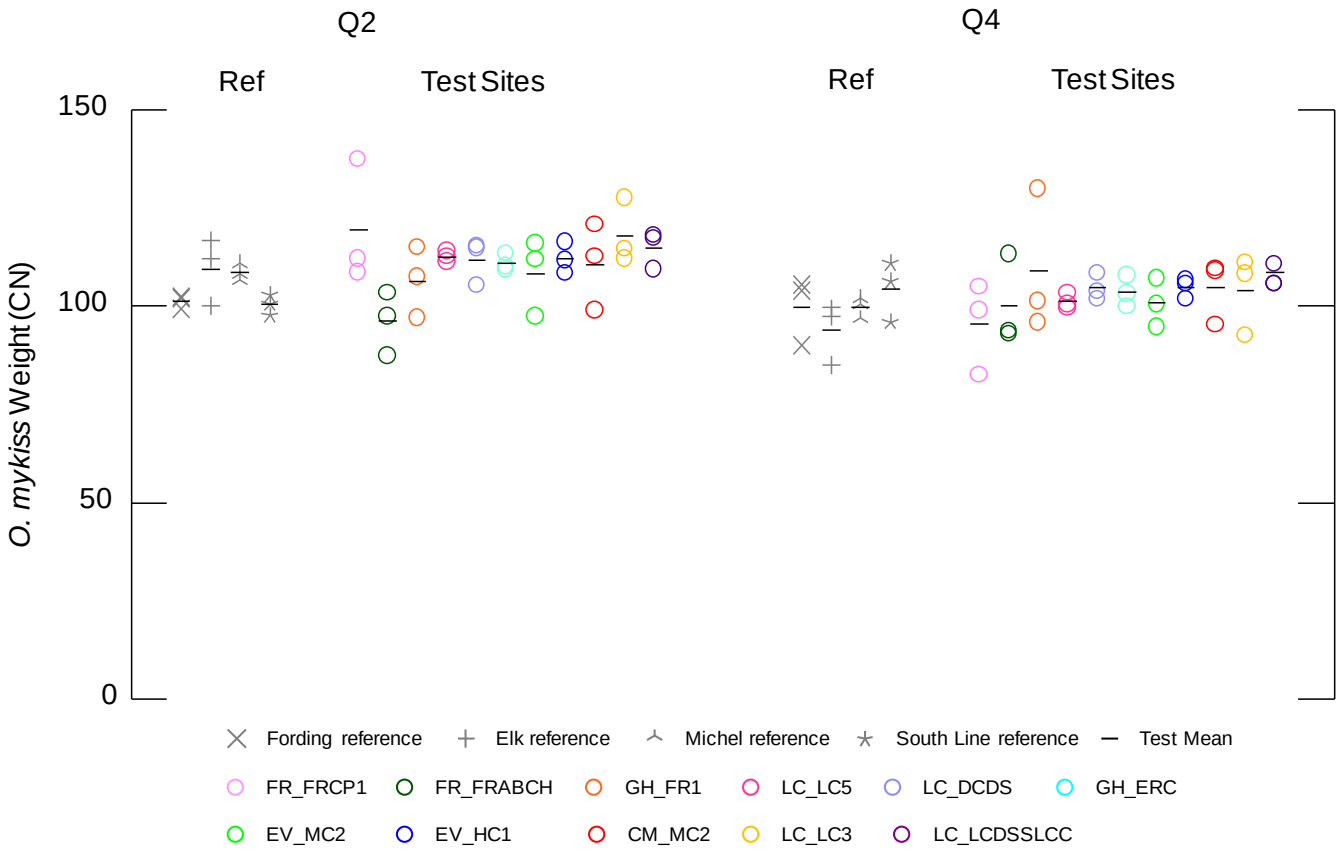
Note: See Figure 2.3-2 for description of lines and symbols.

Figure 3.3-14: Individual replicate and mean results for *O. mykiss* length in reference (Ref) and test site waters.



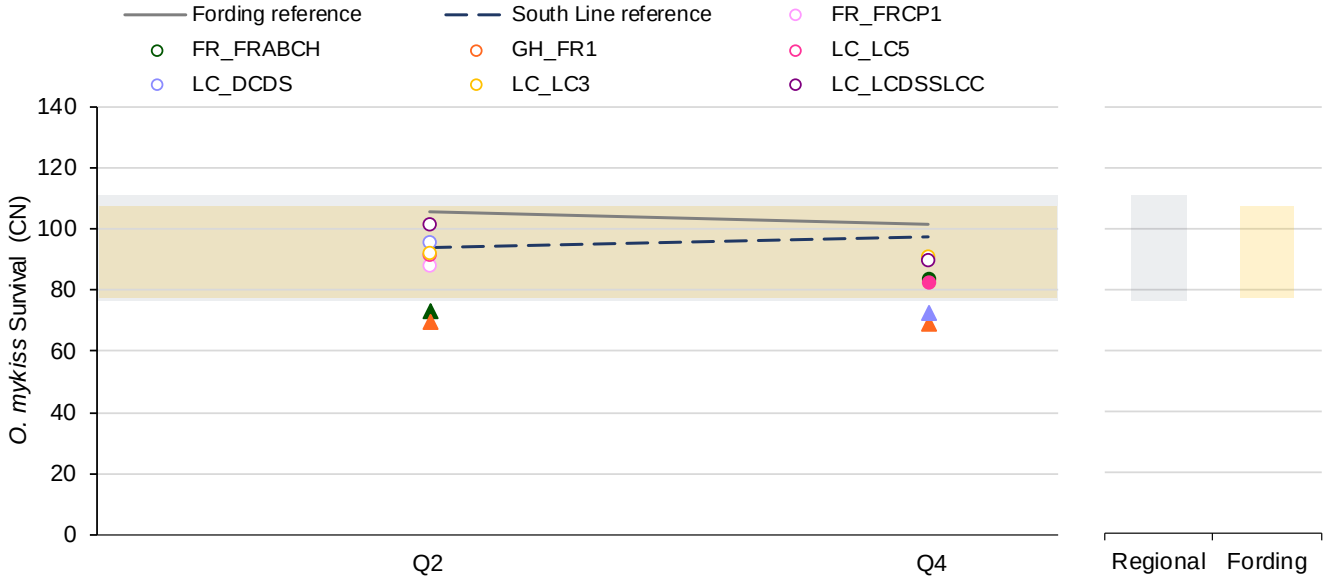
Note: See Figure 2.3-2 for description of lines and symbols.

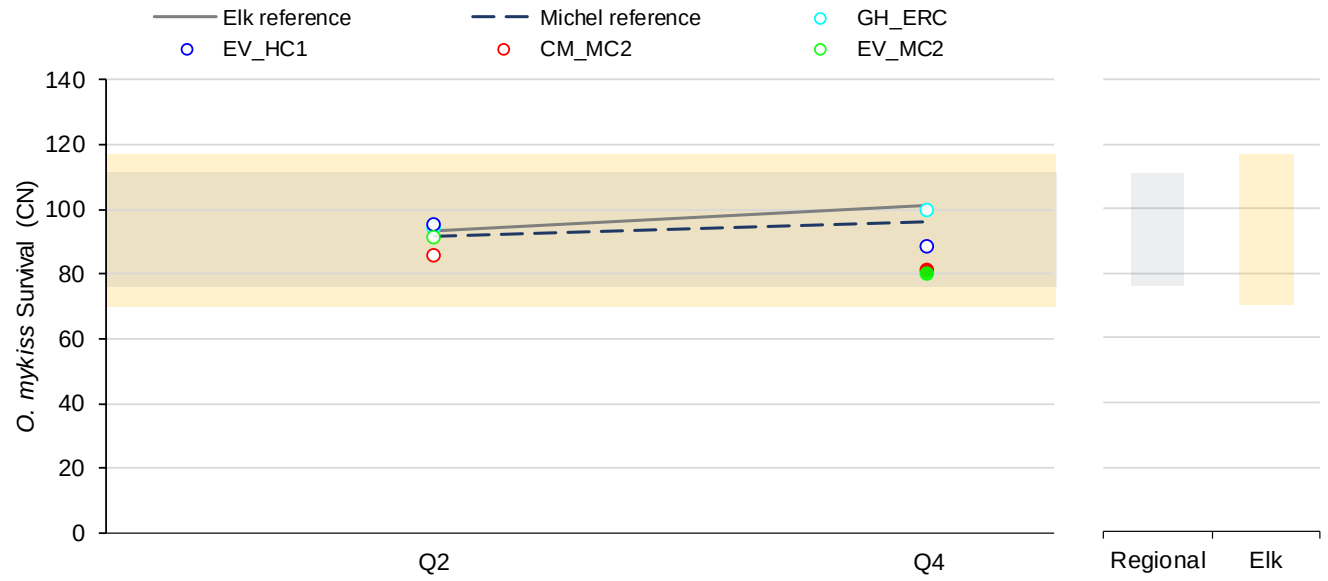
Figure 3.3-15: Individual replicate and mean results for *O. mykiss* weight in reference (Ref) and test site waters.



Note: See Figure 2.3-2 for description of lines and symbols.

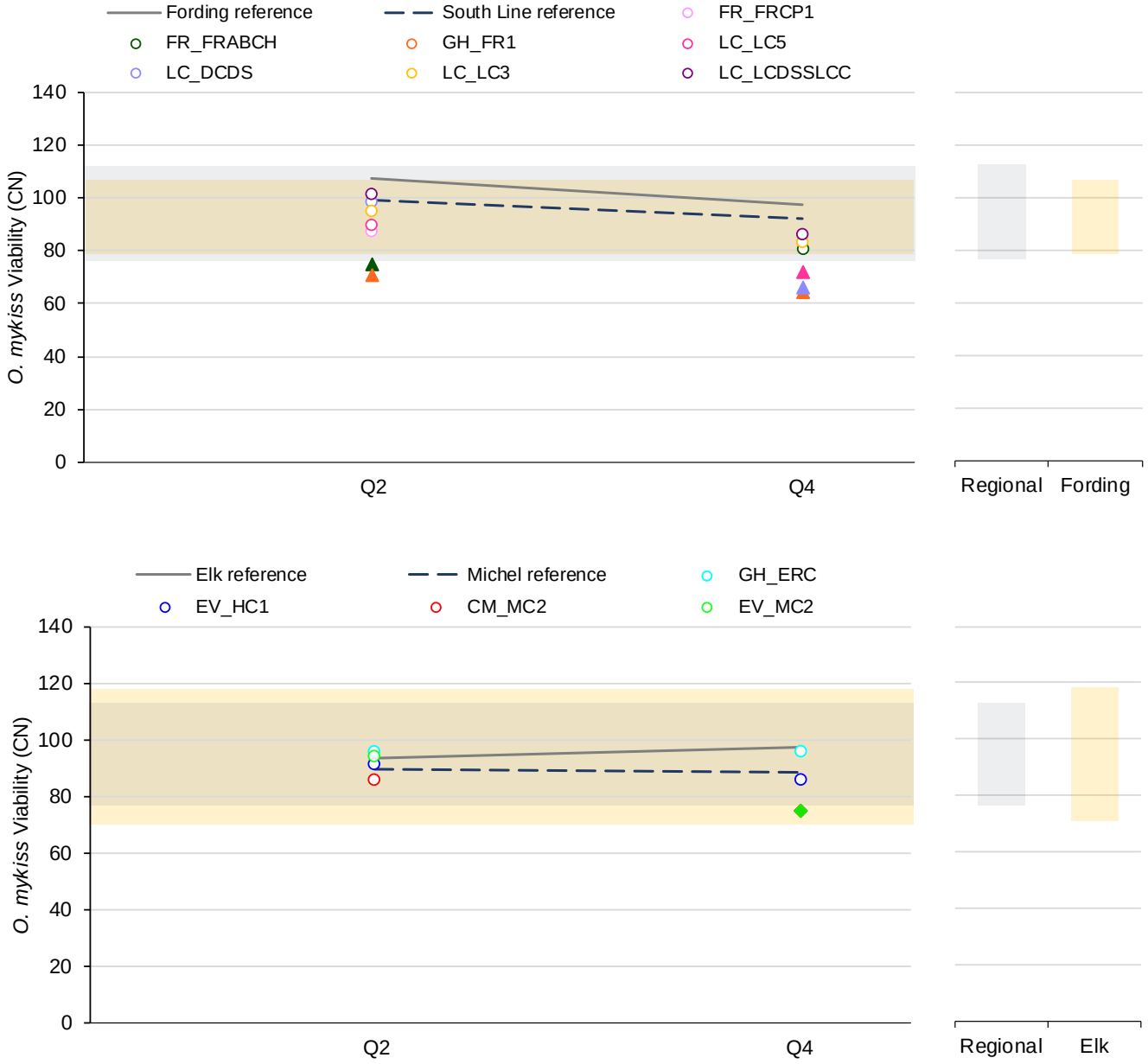
Figure 3.3-16: Mean results for *O. mykiss* survival in the Fording River reference and its test site waters (top left panel) and the Elk River reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).





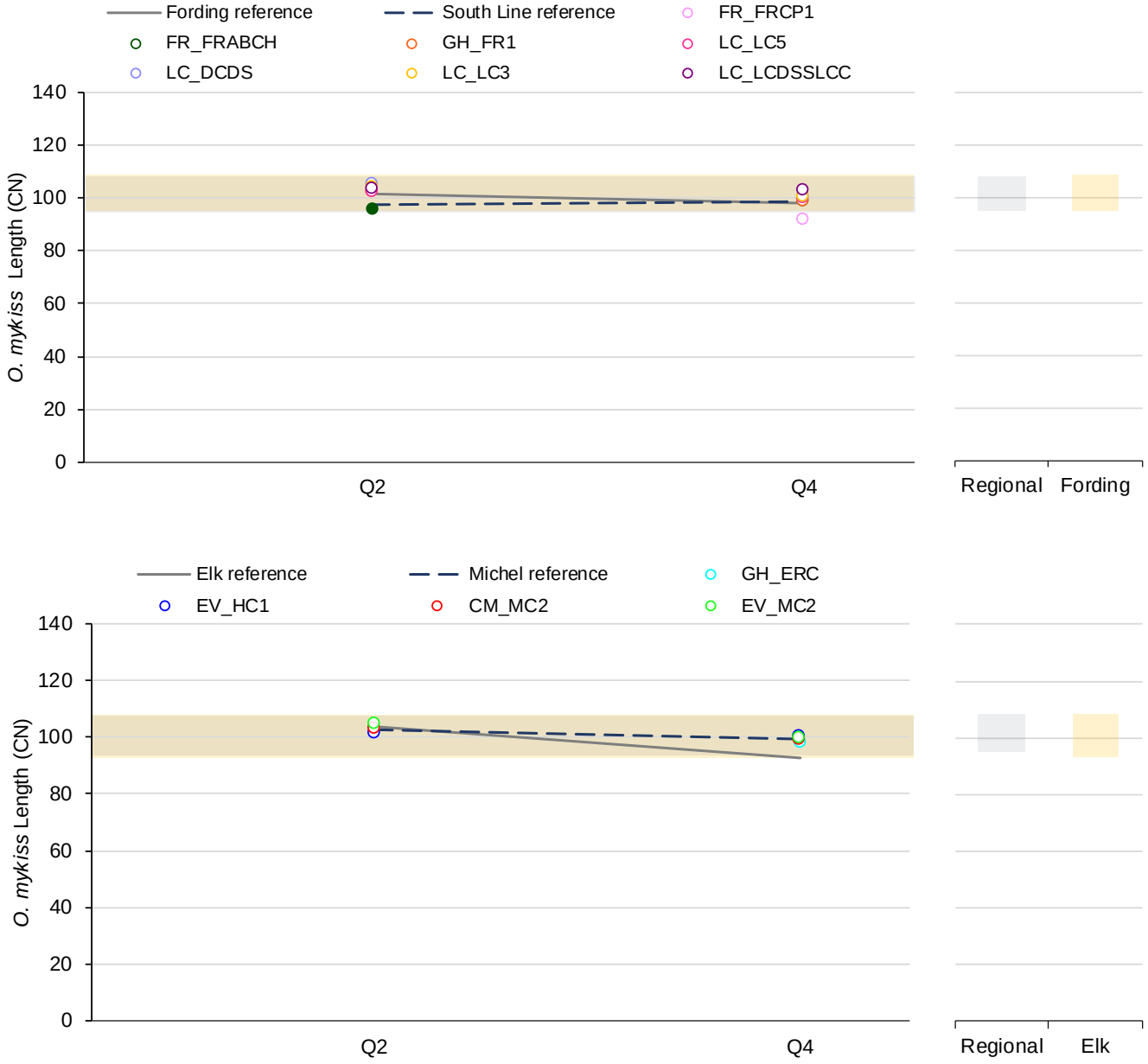
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.3-17: Mean results for *O. mykiss* viability in the Fording River reference and its test site waters (top left panel), and Elk River and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



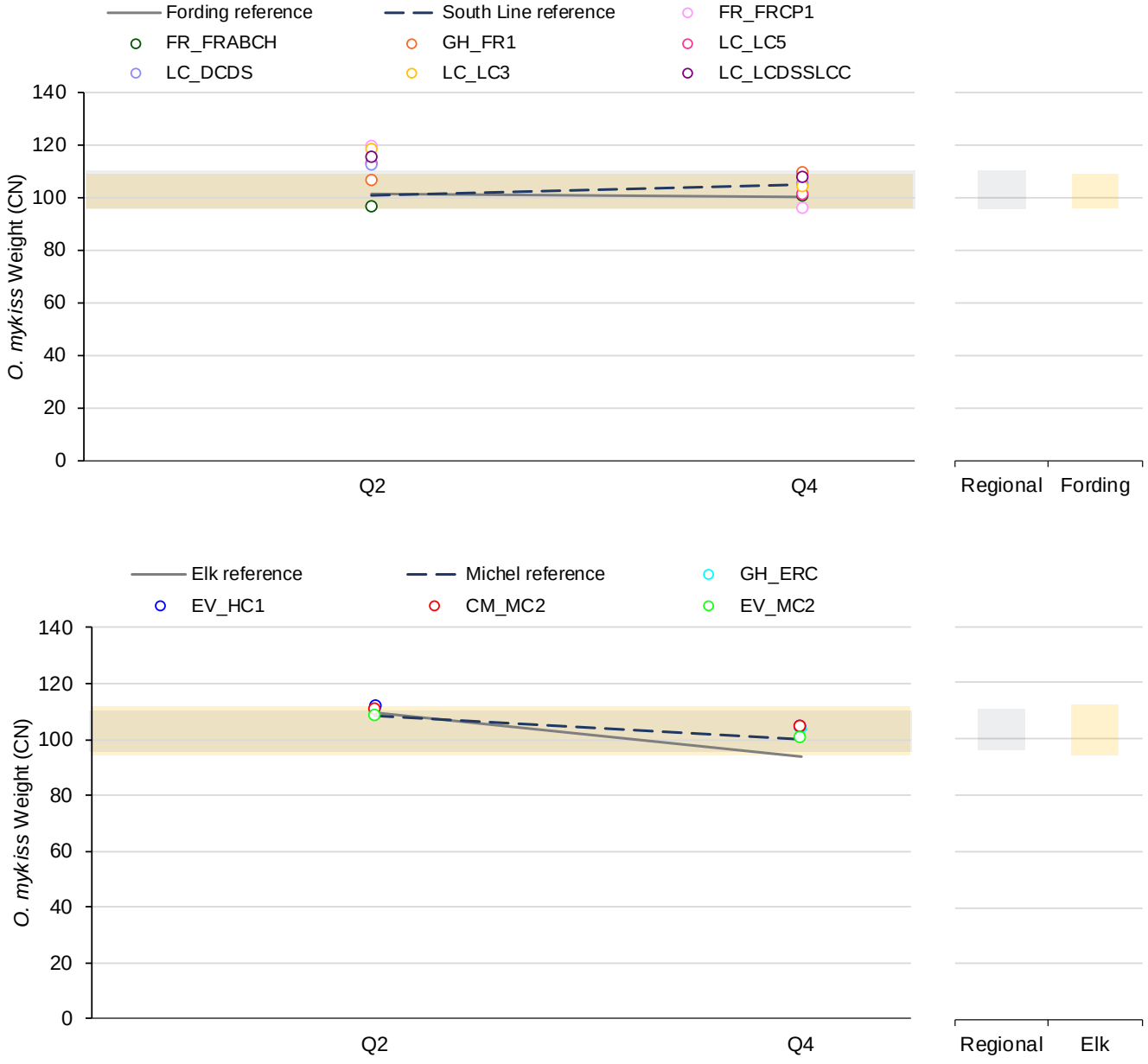
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.3-18: Mean results for *O. mykiss* length in the Fording River reference and its test site waters (top left panel), and the Elk River reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.3-19: Mean results for *O. mykiss* weight in the Fording River reference and its test site waters (top left panel), and the Elk River reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

3.3.1.5 *Pimephales promelas*

There was no evidence of adverse effects on hatch rate (Figure 3.3-20; Figure 3.3-25), or development (Figure 3.3-24; Figure 3.3-29) in 2019 tests.

Survival was significantly reduced relative to one or more references in 6 of 22 tests (Figure 3.3-21; Figure 3.3-26), including three Q1 tests (FR_FRCP1, FR_FRABCH, and GH_ERC) and three Q3 tests (FR_FRCP1, CM_MC2, and LC_LCDSSLCC). In three of six tests with significant results, mean survival was below the local NR and within the regional NR, indicating a possible adverse response. The effect sizes for these tests ranged from 2% (FR_FRABCH [Q1]) to 8% (FR_FRCP1 [Q3] and LC_LCDSSLCC [Q3]). There is uncertainty whether these results represent an adverse response to the test water or variance in test organism performance related to background water quality. In the remaining three tests with significant results, mean survival was below the local and regional NRs. These results indicate a likely adverse response to the test water. Compared to the mean response in batch-specific references, effect size in tests categorized as likely for survival ranged from 36% (GH_ERC [Q1]) to 77% (FR_FRCP1 [Q1]).

As discussed in the Q1 and Q3 laboratory reports (Appendix B-1 and B-3), microbial growth was observed in the Q1 test with FR_FRABCH and the Q3 tests with Fording reference, FR_FRCP1, FR_FRABCH, CM_MC2, and LC_LCDSSLCC. The reference test was amended with 15 µg/L copper, and all test sites were amended with 20 µg/L copper. Based on these results, it appears that 15 to 20 µg/L copper was insufficient to curtail microbial growth in a subset of the samples. As with previous test events in which microbial growth was observed, the mortalities occurred predominantly between days 6 and 12 of exposure, which is consistent with the conclusion that the adverse responses were associated with microbial growth (i.e., concentrated mortality approximately one week into the test). Due to this microbial growth, the Q3 Fording reference was not used to calculate effect sizes for that quarter, and all tests with evidence of microbes were removed from statistical analyses (i.e., PCA and Spearman rank correlation) conducted herein.

Biomass was significantly reduced relative to one or more references in 5 of 22 tests (Figure 3.3-22; Figure 3.3-27), including one Q1 test (FR_FRCP1) and four Q3 tests (LC_LC5, LC_DCDS, CM_MC2, and LC_LCDSSLCC). In the Q3 LC_LCDS and LC_LC5 tests, mean biomass was within local NR and the effect size (15%) was less than 20% compared to the mean response in batch-specific references, indicating no adverse response. In the Q3 LC_LCDSSLCC test, mean biomass was below the local NR and within the regional NR, indicating a possible adverse response. The effect size in this test was 11%. In the remaining two tests with significant results, mean biomass was below the local and regional NRs. These results indicate a likely adverse response to the test water. Compared to the mean response in batch-specific references, effect sizes in tests categorized as likely for biomass were 60% (Q3 CM_MC2) and 77% (Q1 FR_FRCP1).

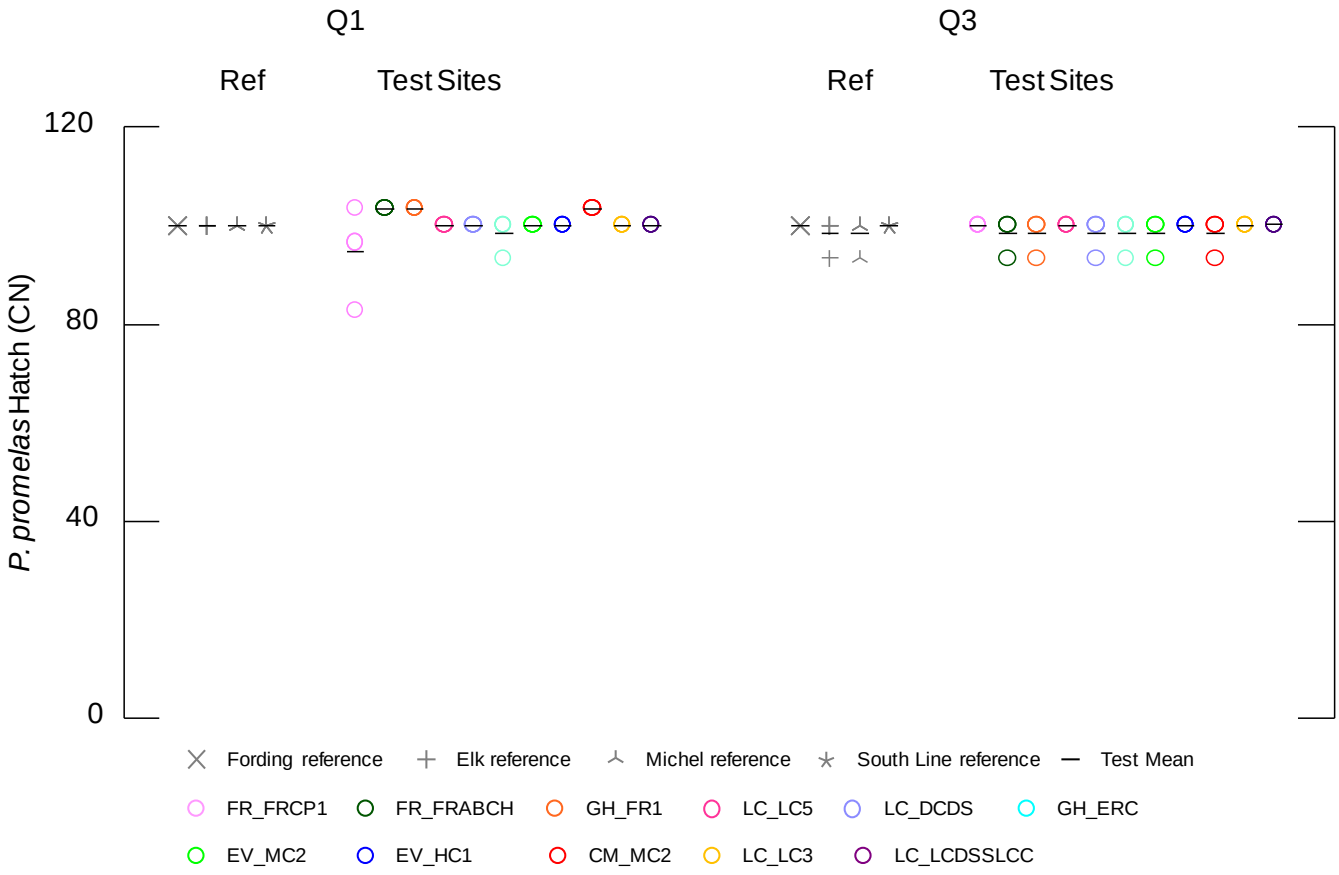
Length was significantly reduced relative to one or more references in 11of 22 tests (Figure 3.3-23; Figure 3.3-28), including Q1 tests from FR_FRABCH, GH_FR1, GH_ERC, CM_MC2, EV_MC2, EV_HC1, LC_LCDSSLCC, LC_DCDS and LC_LC5. In all 11 tests with significant pairwise results, mean length was within local NR and the effect size was less than 20% compared to the mean response in batch-specific references, indicating no adverse response. Compared to the mean response in batch-specific references, the effect size in tests categorized as no adverse response for length ranged from 0% (FR_FRABCH and GH_FR1 in Q2) to 8% (EV_MC2 in Q1).

Based on the results presented above, *P. promelas* tests were categorized as follows:

- **No adverse response (16 of 22 tests)**—Q1 tests with GH_FR1, LC_LC5, LC_DCDS, EV_HC1, EV_MC2, CM_MC2, LC_LC3, LC_LCDSSLCC, and Q3 tests with FR_FRABCH, GH_FR1, LC_LC5, LC_DCDS, GH_ERC, EV_HC1, EV_MC2, LC_LC3.
- **Possible adverse response (3 of 22 tests)**—Q1 test with FR_FRABCH; Q3 tests with FR_FRCP1 and LC_LCDSSLCC.
- **Likely adverse response (3 of 22 tests)**—Q1 tests with FR_FRCP1 and GH_ERC; Q3 test with CM_MC2.

The causation assessment for *P. promelas* survival, biomass, and length is presented in Section 3.4.5.

Figure 3.3-20: Individual replicate and mean results for *P. promelas* hatch in reference (Ref) and test site waters.



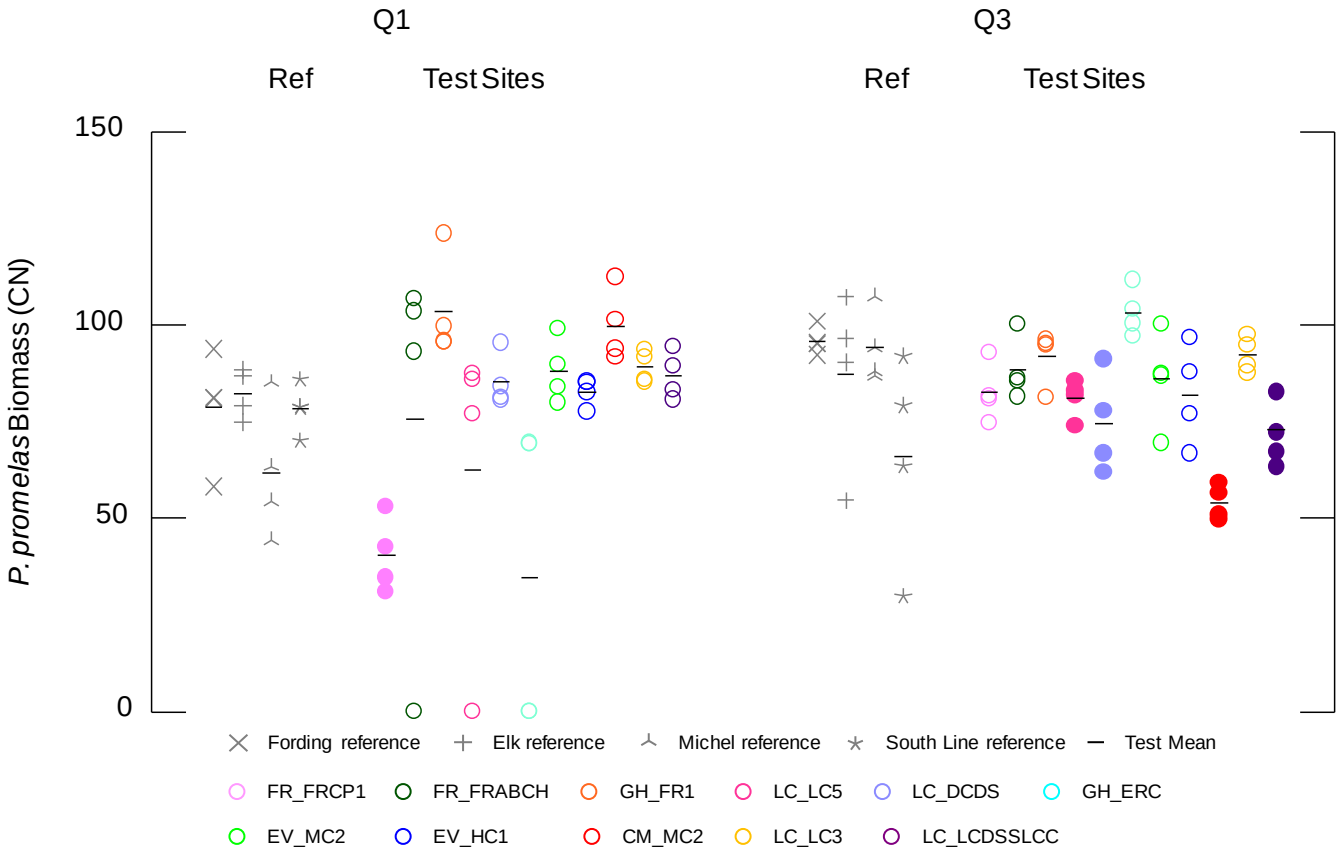
Note: See Figure 2.3-2 for description of lines and symbols.

Figure 3.3-21: Individual replicate and mean results for *P. promelas* survival in reference (Ref) and test site waters.



Note: See Figure 2.3-2 for description of lines and symbols.

Figure 3.3-22: Individual replicate and mean results for *P. promelas* biomass in reference (Ref) and test site waters.



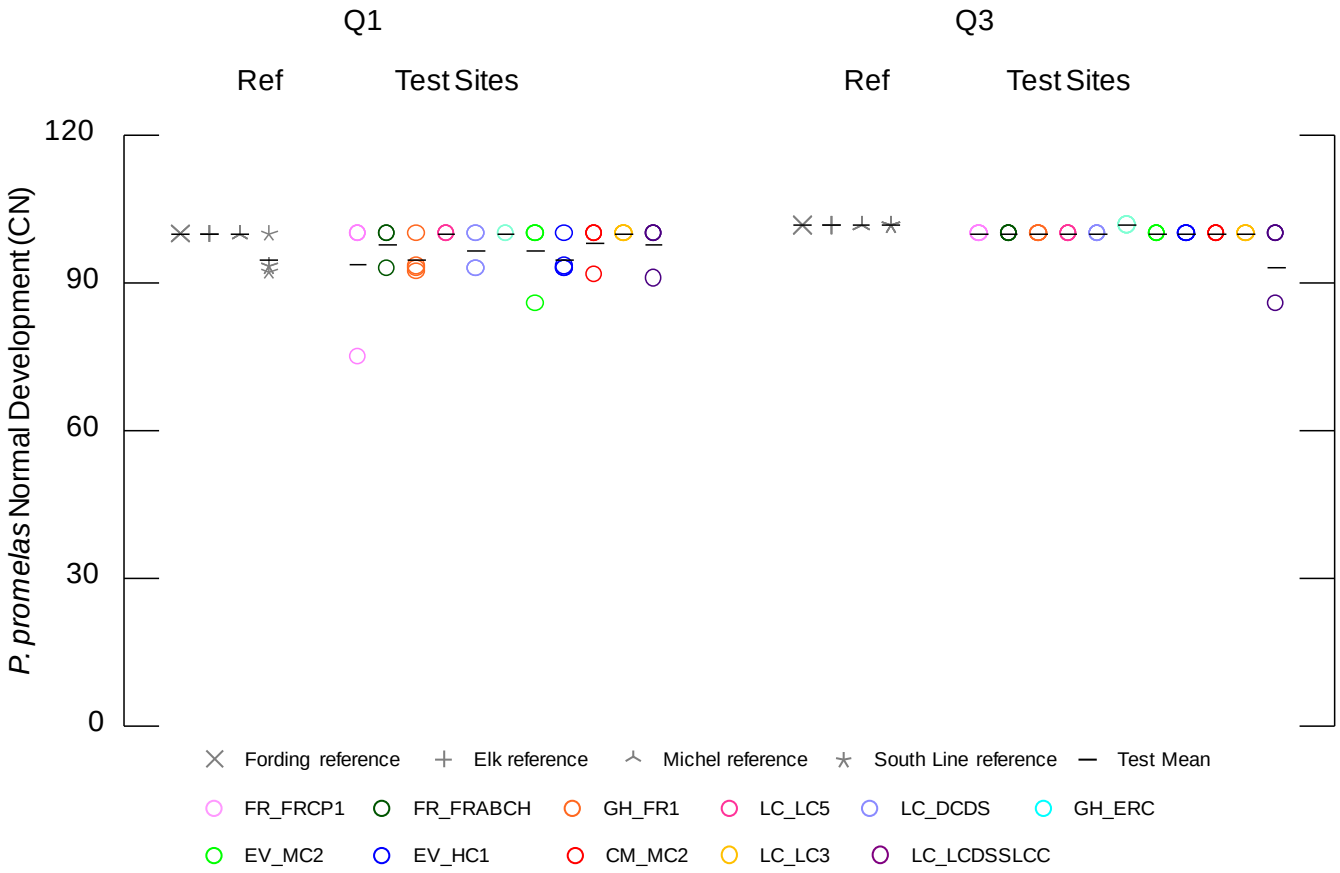
Note: See Figure 2.3-2 for description of lines and symbols.

Figure 3.3-23: Individual replicate and mean results for *P. promelas* length in reference (Ref) and test site waters.



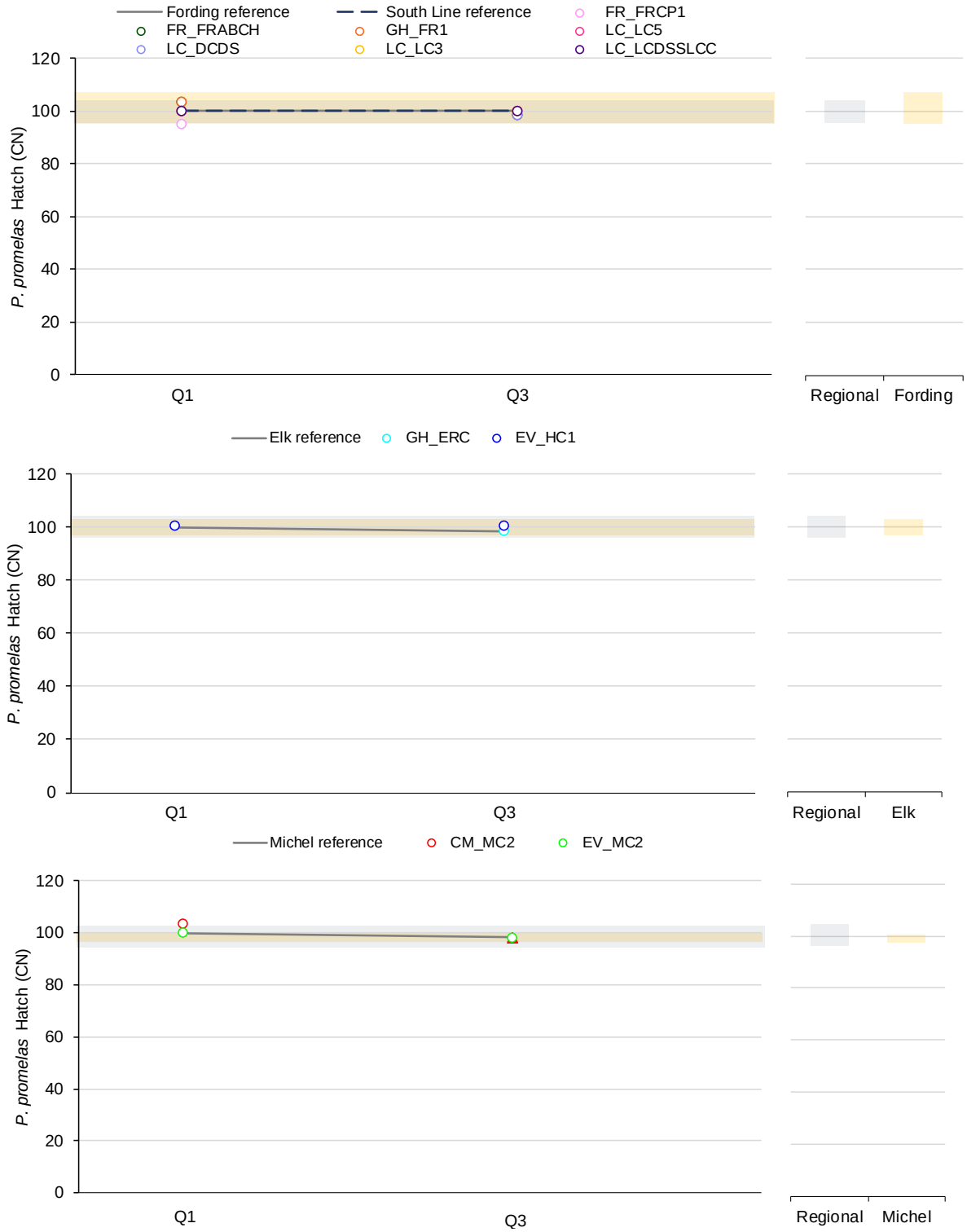
Note: See Figure 2.3-2 for description of lines and symbols.

Figure 3.3-24: Individual replicate and mean results for *P. promelas* normal development in reference (Ref) and test site waters.



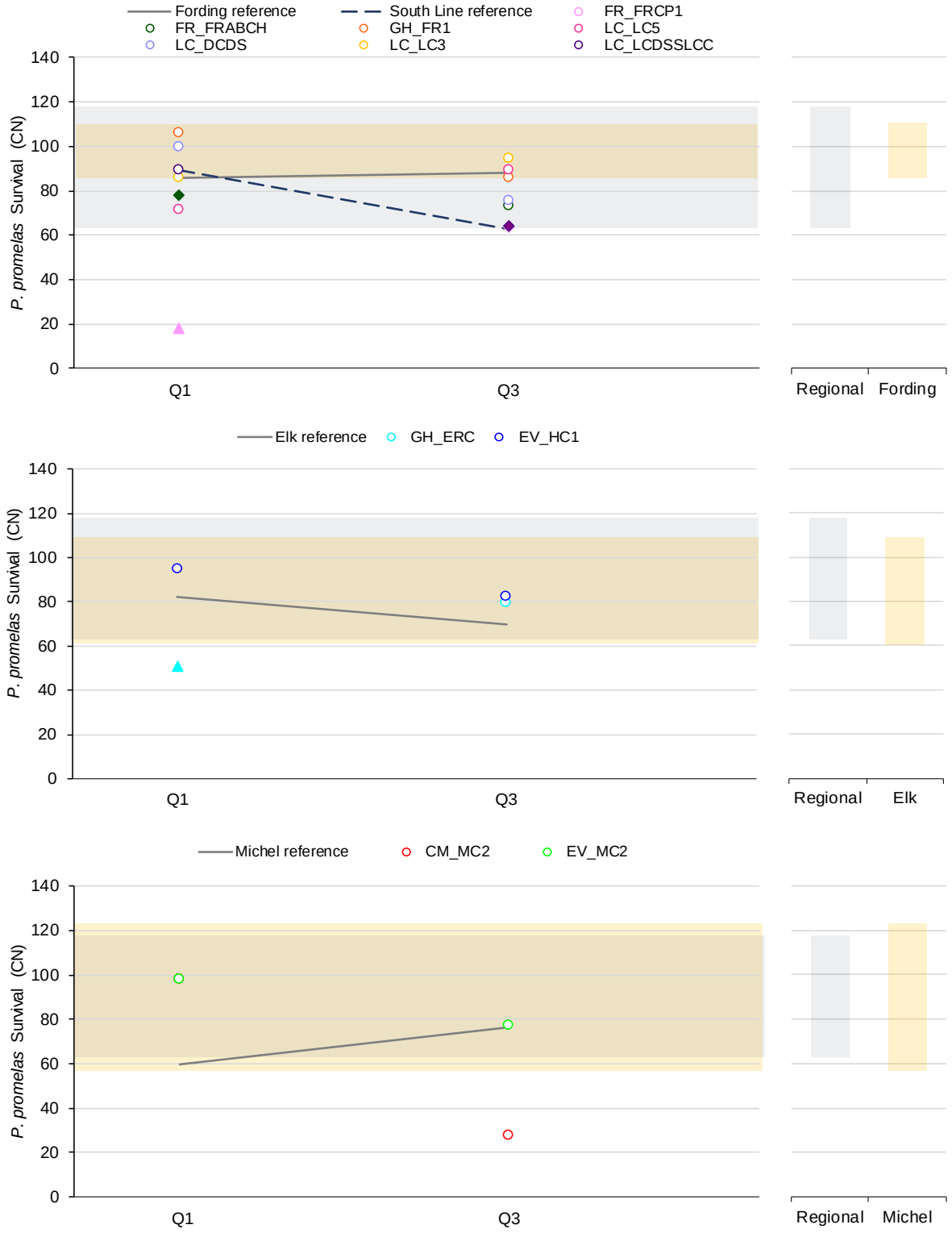
Note: See Figure 2.3-2 for description of lines and symbols.

Figure 3.3-25: Mean results for *P. promelas* hatch in the Fording River reference and its test site waters (top left panel) and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



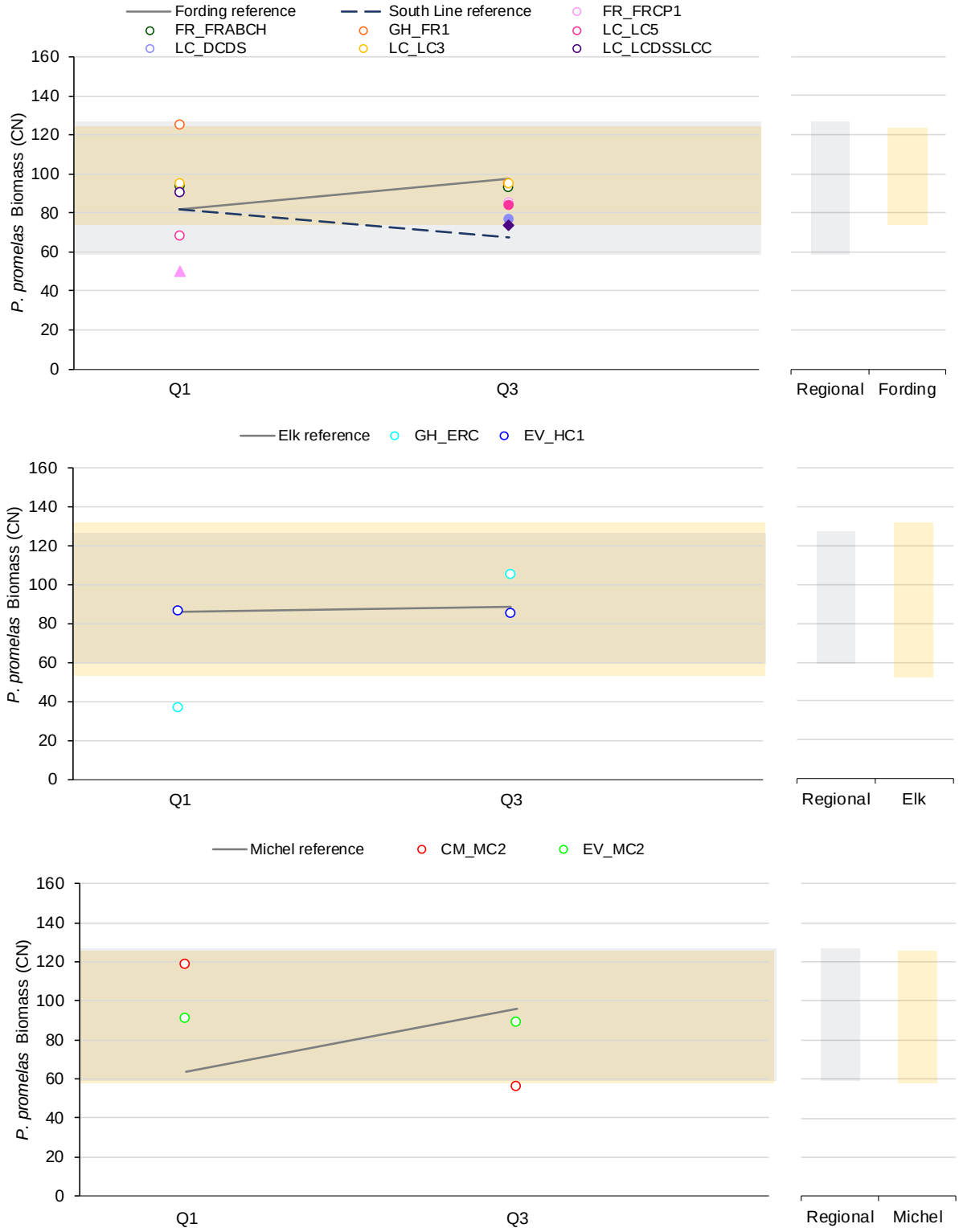
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3). Evidence of microbes were observed in Q1 FR_FRABCH, Q3 FR_FRCP1, FR_FRABCH, CM_MC2, and LC_LCDSSLCC *P. promelas* tests (Section 3.1).

Figure 3.3-26: Mean results for *P. promelas* survival in the Fording River reference and its test site waters (top left panel) and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



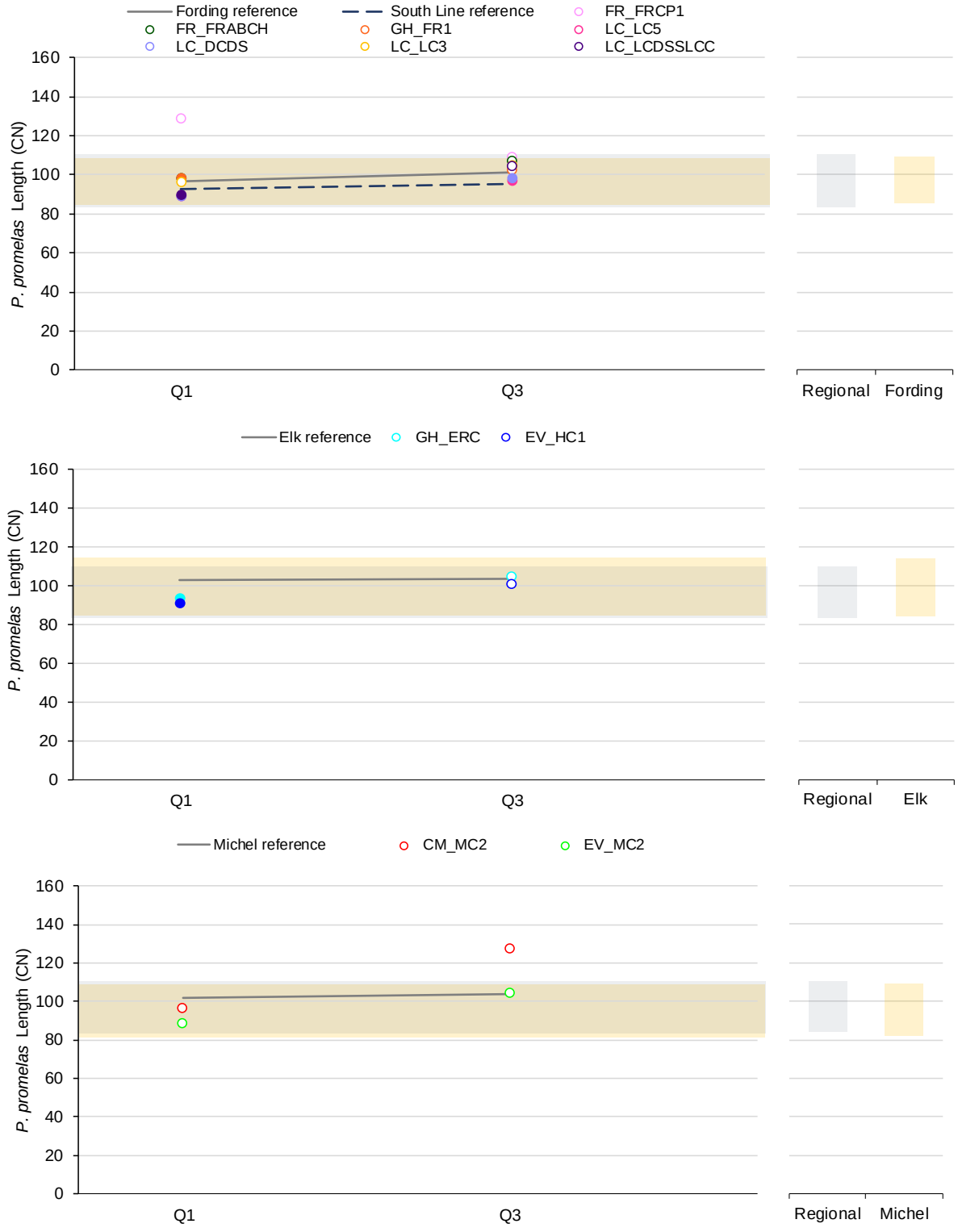
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3). Evidence of microbes were observed in Q1 FR_FRABCH, Q3 FR_FRCP1, FR_FRABCH, CM_MC2, and LC_LCDSSLCC *P. promelas* tests (Section 3.1).

Figure 3.3-27: Mean results for *P. promelas* biomass in the Fording River reference and its test site waters (top left panel) and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



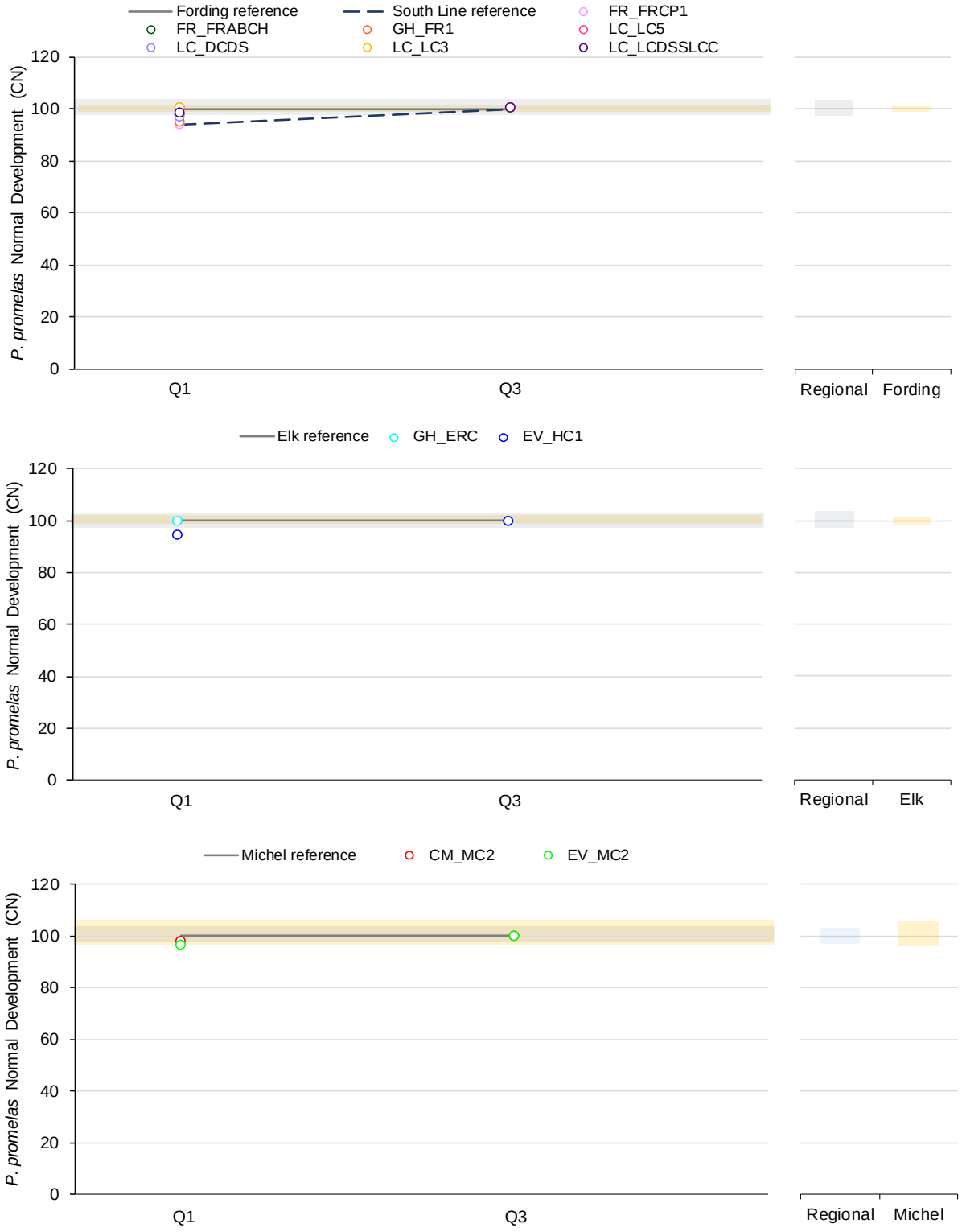
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3). Evidence of microbes were observed in Q1 FR_FRABCH, Q3 FR_FRCP1, FR_FRABCH, CM_MC2, and LC_LCDSSLCC *P. promelas* tests (Section 3.1).

Figure 3.3-28: Mean results for *P. promelas* length in the Fording River reference and its test site waters (top left panel) and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3). Evidence of microbes were observed in Q1 FR_FRABCH, Q3 FR_FRCP1, FR_FRABCH, CM_MC2, and LC_LCDSSLCC *P. promelas* tests (Section 3.1).

Figure 3.3-29: Mean results for *P. promelas* normal development in the Fording River reference and its test site waters (top left panel) and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note:See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3). Evidence of microbes were observed in Q1 FR_FRABCH, Q3 FR_FRCP1, FR_FRABCH, CM_MC2, and LC_LCDSSLCC *P. promelas* tests (Section 3.1).

3.3.2 Results by Test Site

Presentation of the combined results of chronic toxicity tests at each test site provides a means of assessing the strength of evidence for toxicity, including consistency of responses across sampling quarters. The presentation formats in this section were developed in consultation with the EMC and are intended to provide a high-level synthesis of the 2019 results for each test site.

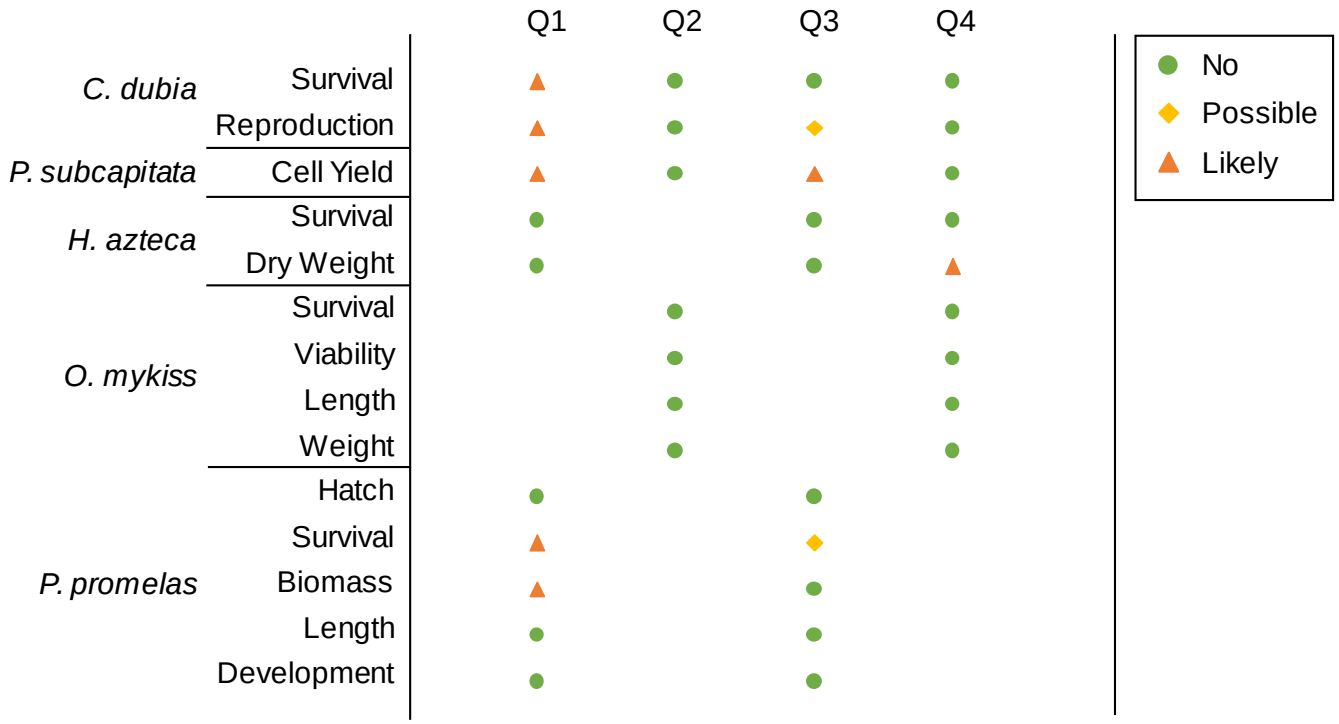
Results are summarized by test site in Figure 3.3-30 (FR_FRCP1), Figure 3.3-31 (FR_FRABCH), Figure 3.3-32 (GH_FR1), Figure 3.3-33 (LC_LC5), Figure 3.3-34 (LC_DCDS), Figure 3.3-35 (GH_ERC), Figure 3.3-36 (EV_HC1), Figure 3.3-37 (CM_MC2), and Figure 3.3-38 (RG_MIDAG), Figure 3.3-39 (EV_MC2), Figure 3.3-40 (LC_LC3), and Figure 3.3-41 (LC_LCDSSLCC). Results were as follows:

- **FR_FRCP1**—No adverse responses were observed in 8 of 14 endpoints in all quarters: *H. azteca* survival, *O. mykiss* survival, viability, length, and weight, and *P. promelas* hatch, length, and development. Two possible adverse responses were observed in Q3 for *P. subcapitata* cell yield and Q3 *P. promelas* survival. Likely adverse responses were observed in 6 of 14 endpoints: *C. dubia* survival and reproduction (Q1), *P. subcapitata* cell yield (Q1 and Q3), *H. azteca* dry weight (Q4), and *P. promelas* survival and biomass (Q1).
- **FR_FRABCH**—No adverse responses were observed for most test endpoints in all quarters (9 of 14). One possible response was observed in Q1 for *P. promelas* survival. Likely adverse responses were observed in 4 of 14 endpoints: *C. dubia* reproduction (Q1), *P. subcapitata* cell yield (Q3), and *O. mykiss* survival and viability (Q2) survival and biomass.
- **GH_FR1**—No adverse responses were observed for most test endpoints in all quarters (11 of 14). Likely adverse responses were observed in 3 of 14 endpoints: *P. subcapitata* cell yield (Q3) and *O. mykiss* survival and viability (Q2 and Q4).
- **LC_LC5**—No adverse responses were observed for most test endpoints in all quarters (11 of 14). Likely adverse responses were observed in 3 of 14 endpoints: *P. subcapitata* cell yield (Q3), *H. azteca* survival (Q4), and *O. mykiss* viability (Q4).
- **LC_DCDS**—No adverse responses were observed for most test endpoints in all quarters (10 of 14). One possible adverse response was observed in *H. azteca* dry weight (Q3 and Q4). Likely adverse responses were observed in 3 of 14 endpoints: *H. azteca* survival (Q4), and *O. mykiss* survival and viability (Q4).
- **GH_ERC**—No adverse responses were observed for most test endpoints in all quarters (12 of 14). One possible adverse response was observed in Q4 for *H. azteca* dry weight. One likely response was observed in Q1 for *P. promelas* survival.
- **EV_HC1**—No adverse responses were observed for most test endpoints in all quarters (12 of 14). One possible adverse response was observed in Q3 and Q4 for *H. azteca* dry weight. One likely response was observed in Q3 for *P. subcapitata* cell yield.
- **CM_MC2**—No adverse responses were observed in 7 of 14 endpoints in all quarters: *C. dubia* survival, *O. mykiss* survival, length, and weight, and *P. promelas* hatch, length, and development. Possible adverse responses were observed in 3 of 14 endpoints: *H. azteca* survival (Q4 and dry weight (Q3 and Q4), and *O. mykiss* viability (Q4). Likely adverse responses were observed in 4 of 14 endpoints: *C. dubia* reproduction (Q1), *P. subcapitata* cell yield (Q3), *P. promelas* survival and biomass (Q3).

- **RG_MIDAG**—No adverse responses were observed in all four endpoints.
- **EV_MC2**—No adverse responses were observed for most test endpoints in all quarters (12 of 14). One possible adverse response was observed in Q4 for *O. mykiss* viability. One likely response was observed in Q3 for *P. subcapitata* cell yield.
- **LC_LC3**—No adverse responses were observed for most test endpoints in all quarters (11 of 14). One possible adverse response was observed in Q3 for *H. azteca* dry weight. Likely responses were observed in 2 of 14 endpoints: *P. subcapitata* cell yield (Q3) and *H. azteca* survival (Q3 and Q4).
- **LC_LCDSSLCC**—No adverse responses were observed for most test endpoints in all quarters (9 of 14). Three possible adverse responses were observed in Q3 tests for *H. azteca* dry weight and *P. promelas* survival and biomass. Two likely adverse responses were observed in Q3 for *P. subcapitata* cell yield and Q4 for *H. azteca* dry weight.

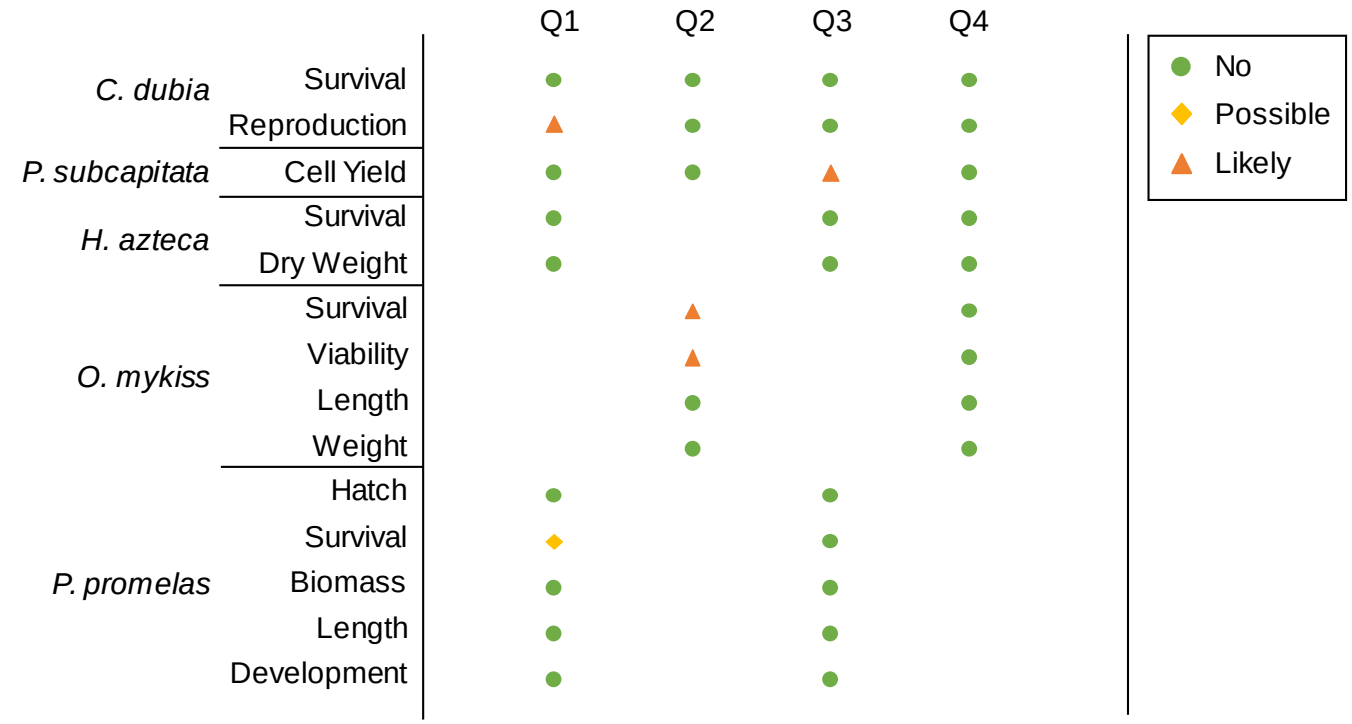
Overall, the observation of adverse responses in the greatest number of test endpoints at stations CM_MC2 (7 test endpoints with possible or likely adverse effects in at least one quarter) and FR_FRCP1 (6 test endpoints with possible or likely adverse effects in at least one quarter) matches findings from recent years.

Figure 3.3-30: Summary of test results by category at FR_FRCP1.



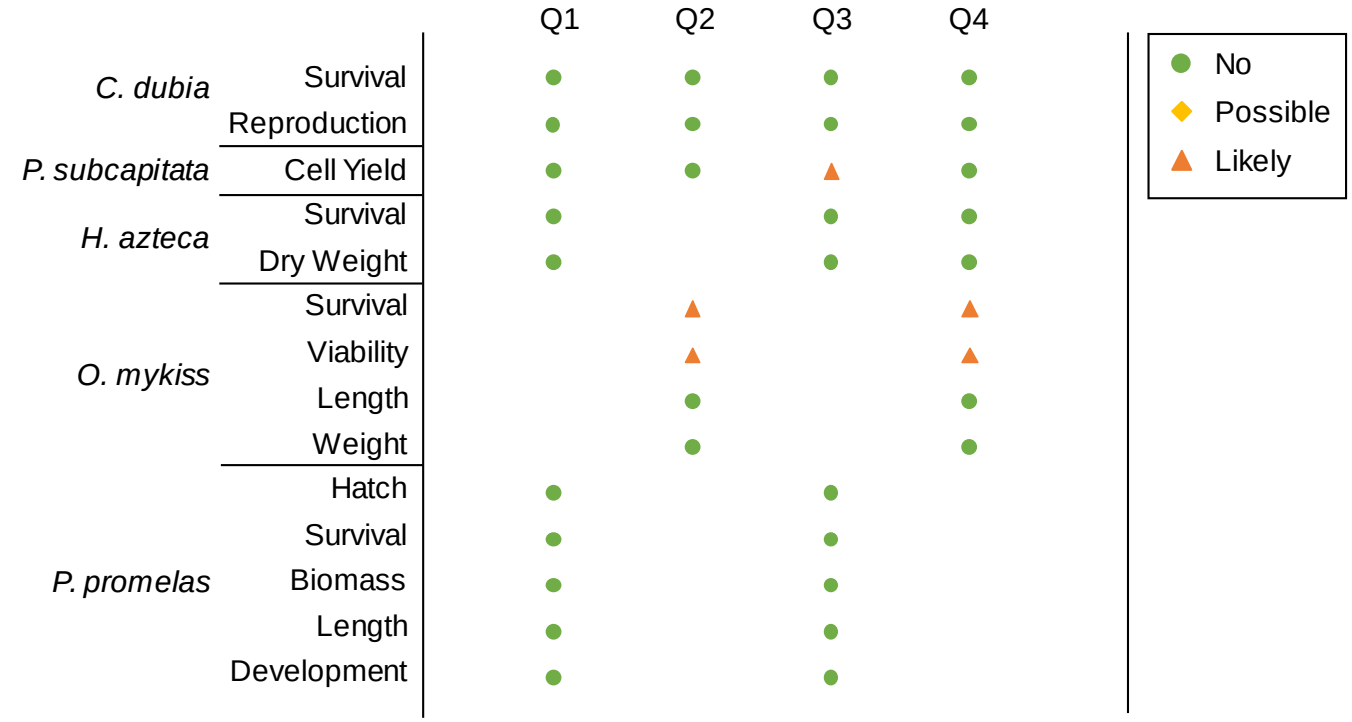
Note: Test results are categorized in Section 3.3.1. Evidence of microbes were observed in the Q3 *P. promelas* test (Section 3.1 and 3.3.1.5).

Figure 3.3-31: Summary of test results by category at FR_FRABCH.



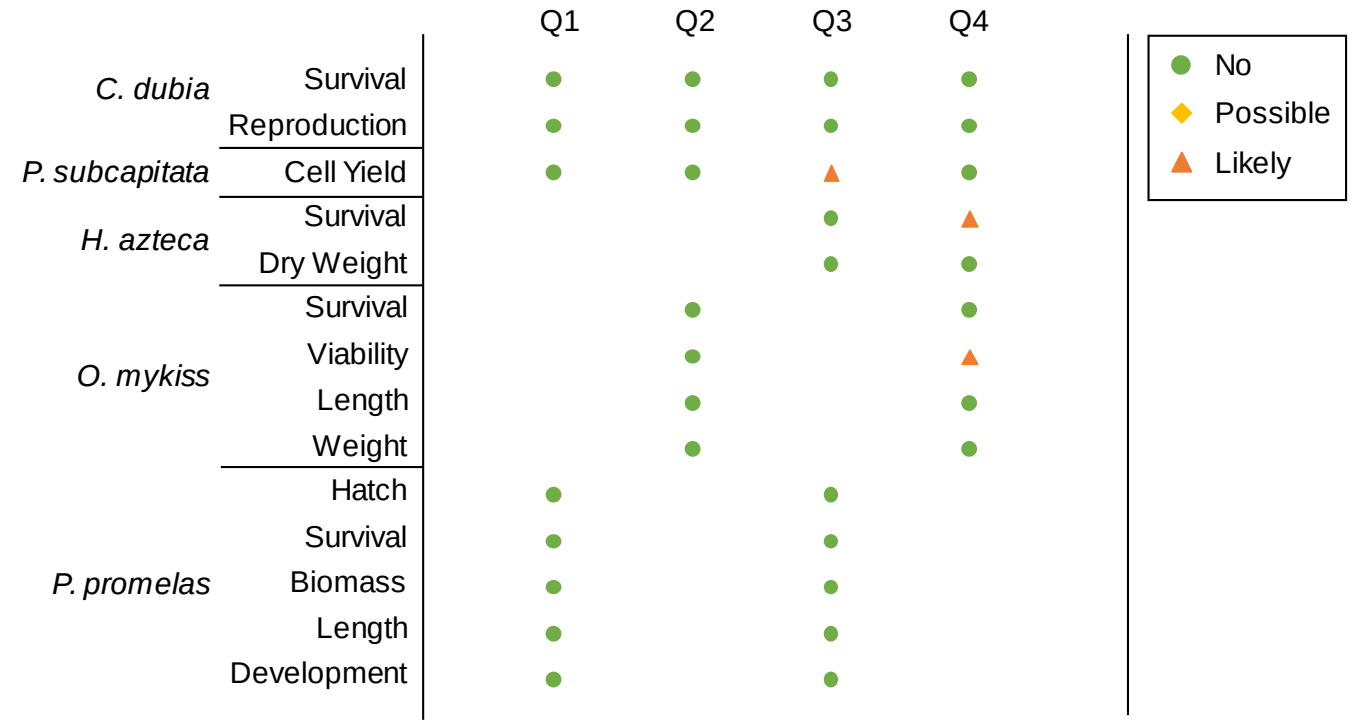
Note: Test results are categorized in Section 3.3.1. Evidence of microbes were observed in the Q1 and Q3 *P. promelas* tests (Section 3.1 and 3.3.1.5).

Figure 3.3-32: Summary of test results by category at GH_FR1.



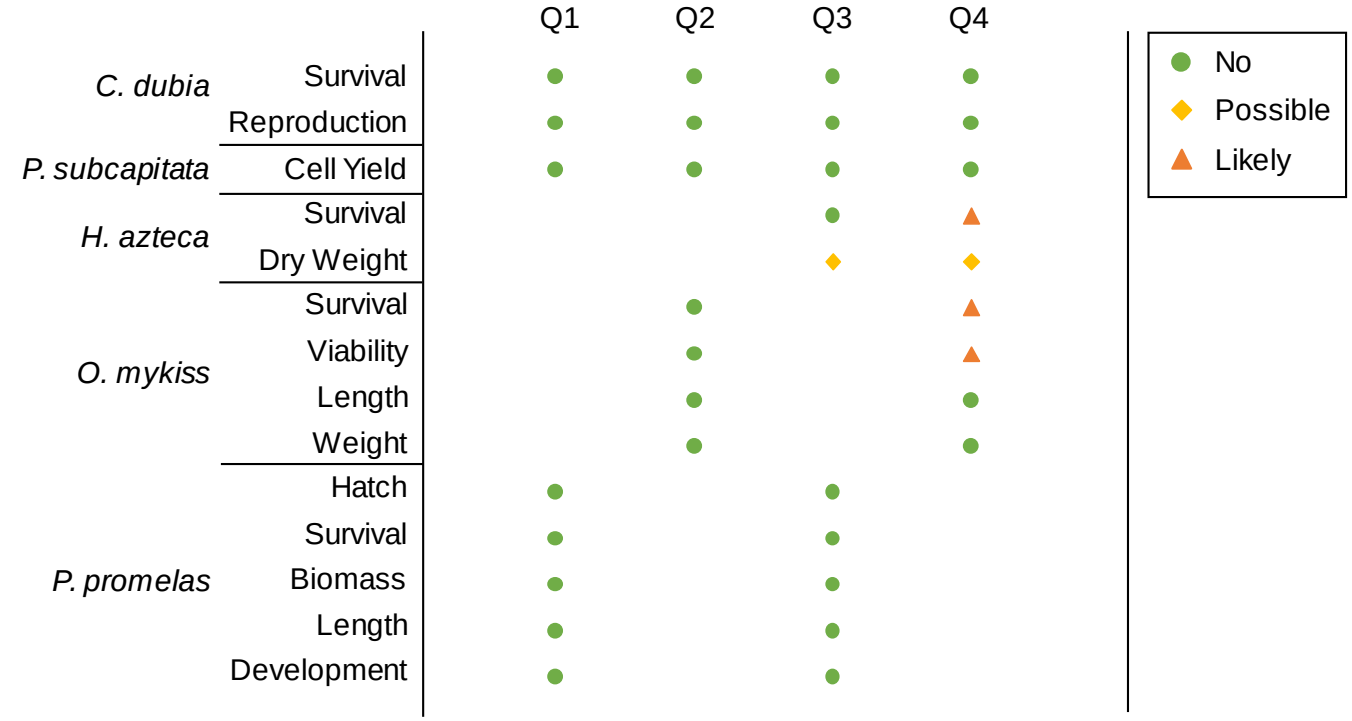
Note: Test results are categorized in Section 3.3.1.

Figure 3.3-33: Summary of test results by category at LC_LC5.



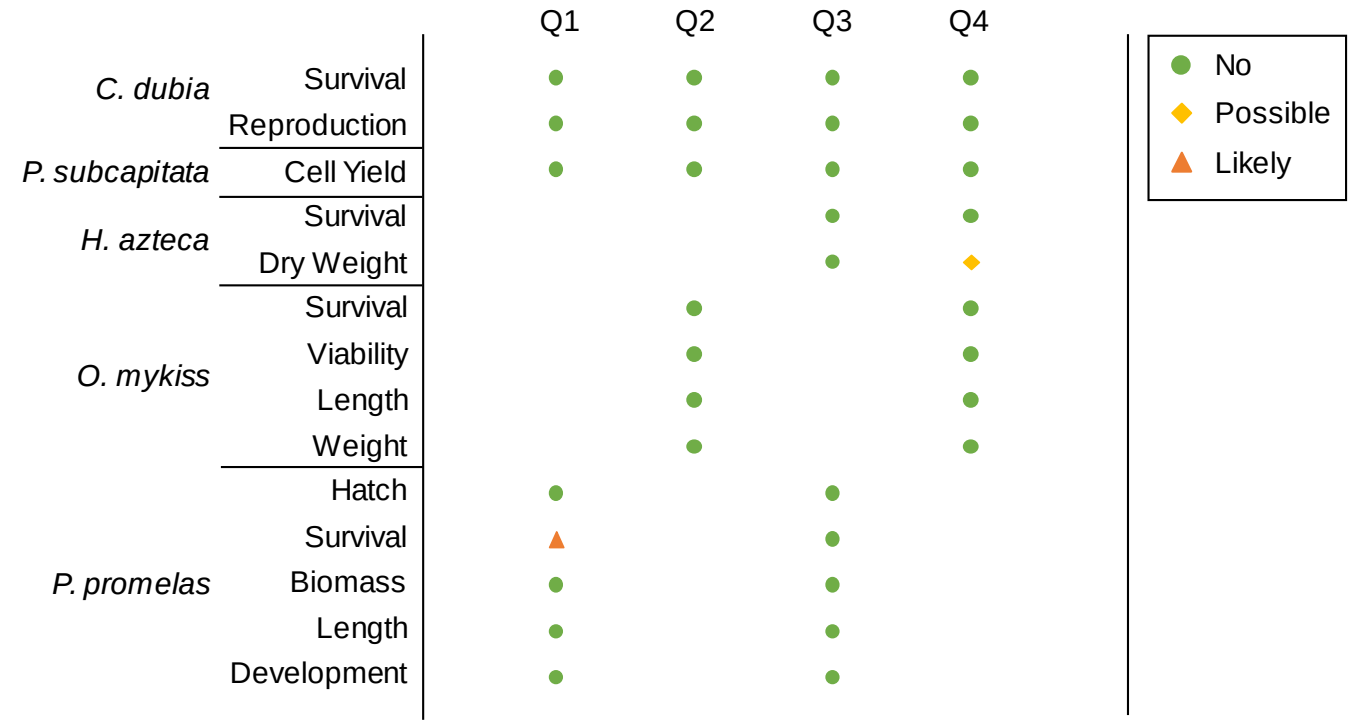
Note: Test results are categorized in Section 3.3.1.

Figure 3.3-34: Summary of test results by category at LC_DCDS.



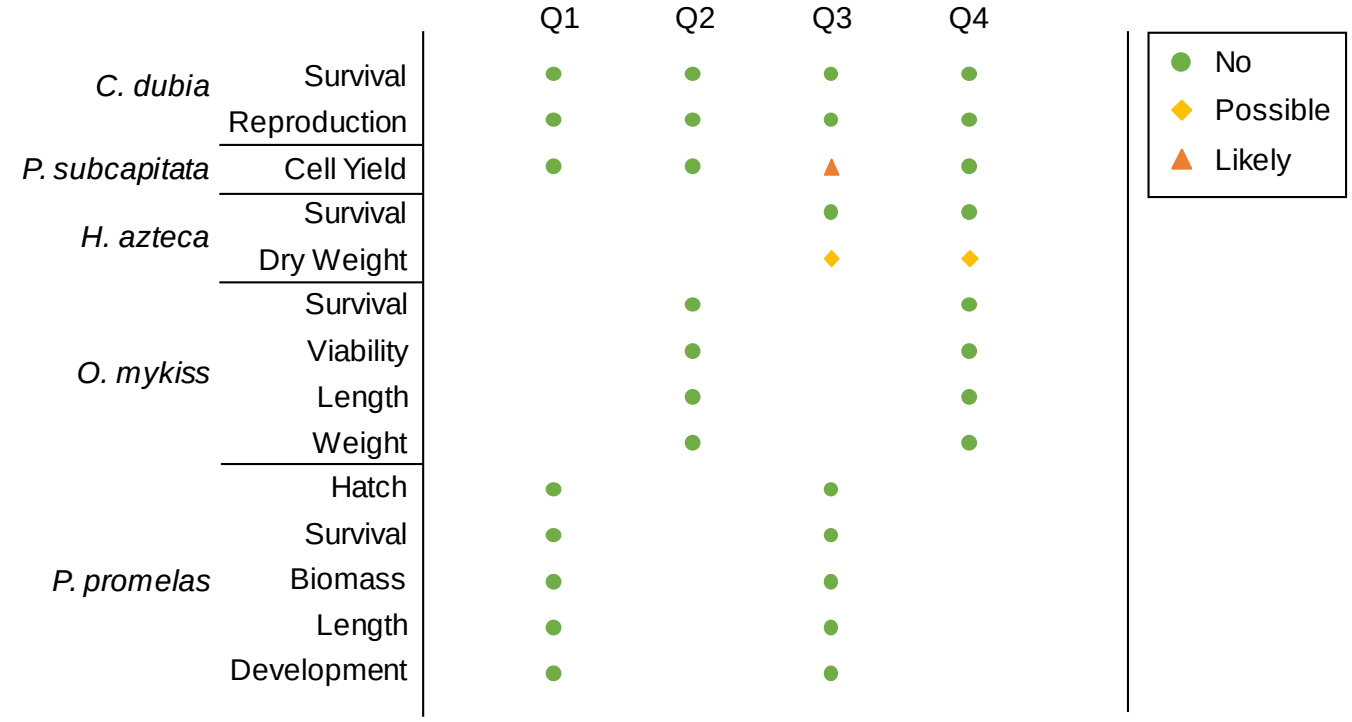
Note: Test results are categorized in Section 3.3.1.

Figure 3.3-35: Summary of test results by category at GH_ERC.



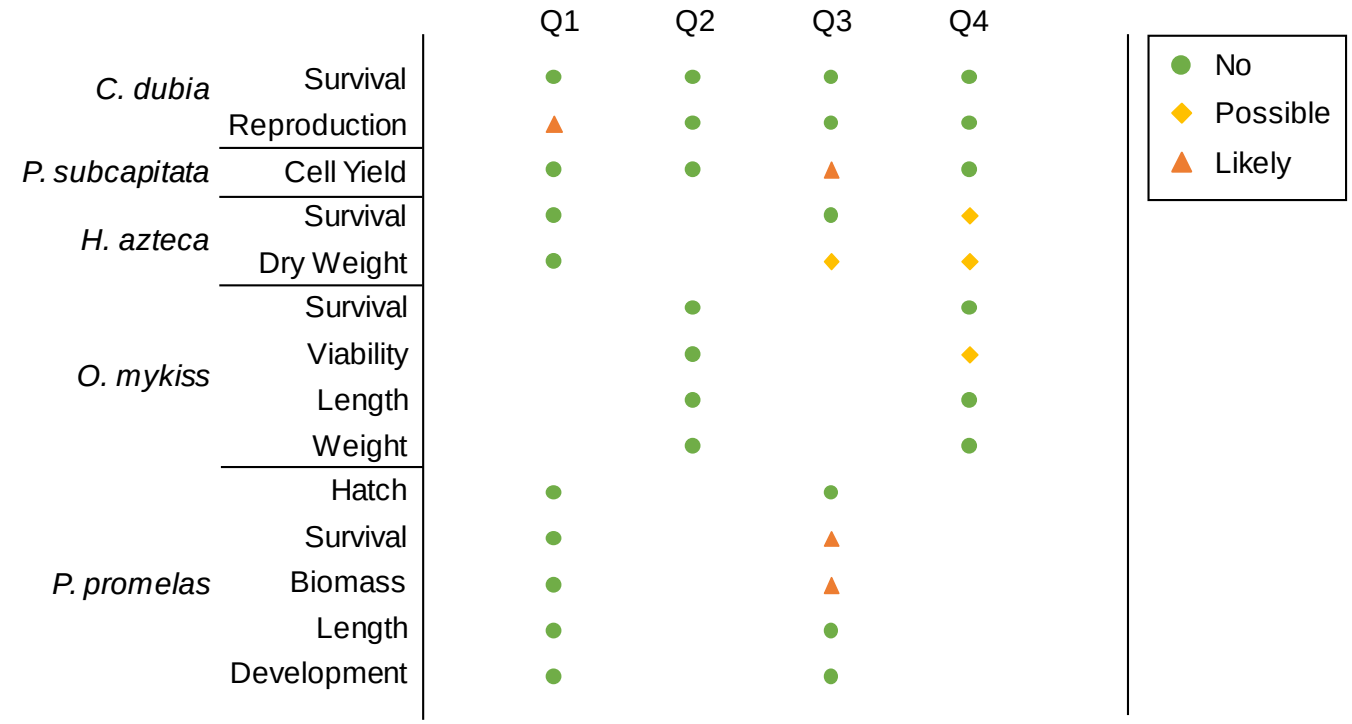
Note: Test results are categorized in Section 3.3.1.

Figure 3.3-36: Summary of test results by category at EV_HC1.



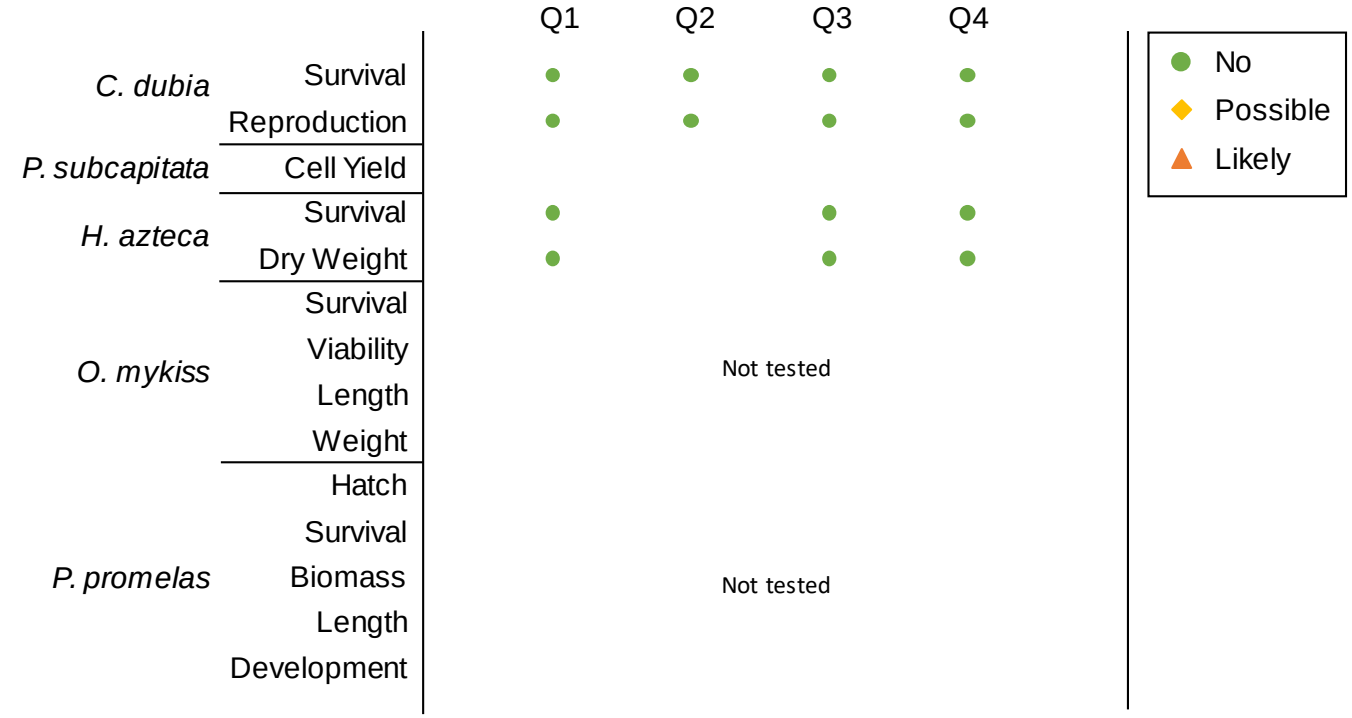
Note: Test results are categorized in Section 3.3.1.

Figure 3.3-37: Summary of test results by category at CM_MC2.



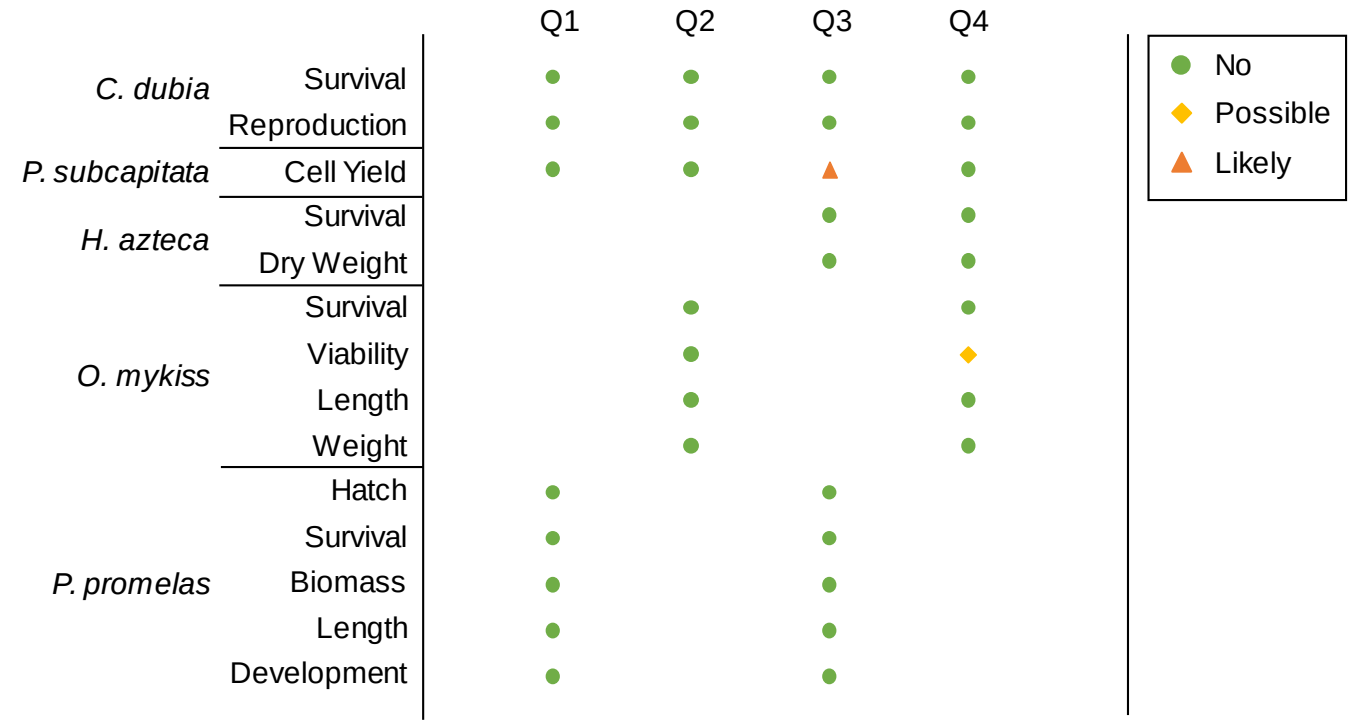
Note: Test results are categorized in Section 3.3.1. Evidence of microbes were observed in the Q3 *P. promelas* test (Section 3.1 and 3.3.1.5).

Figure 3.3-38: Summary of test results by category at RG_MIDAG.



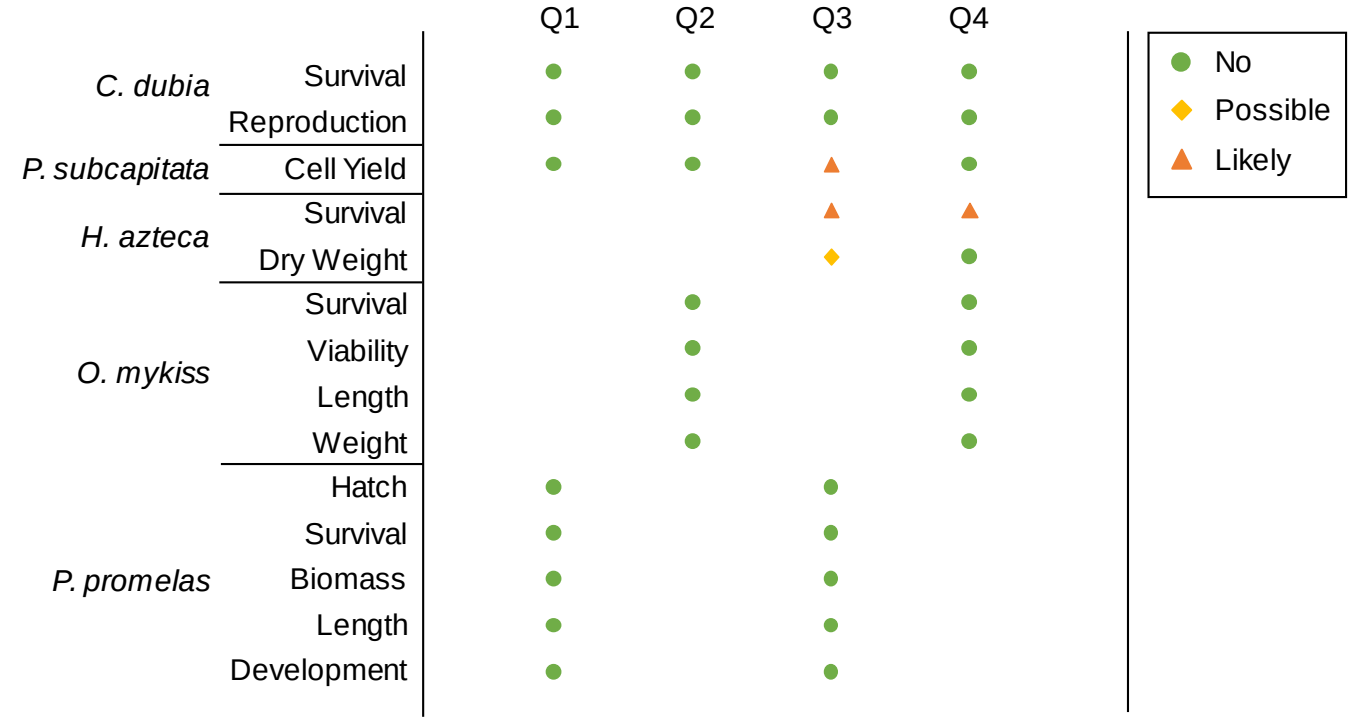
Note: Test results are categorized in Section 3.3.1. Not tested = no testing conducted for *O. mykiss* or *P. promelas*, as station is not currently part of Permit requirements. Station was assessed for sensitive invertebrate species to characterize spatial extent of effects.

Figure 3.3-39: Summary of test results by category at EV_MC2.



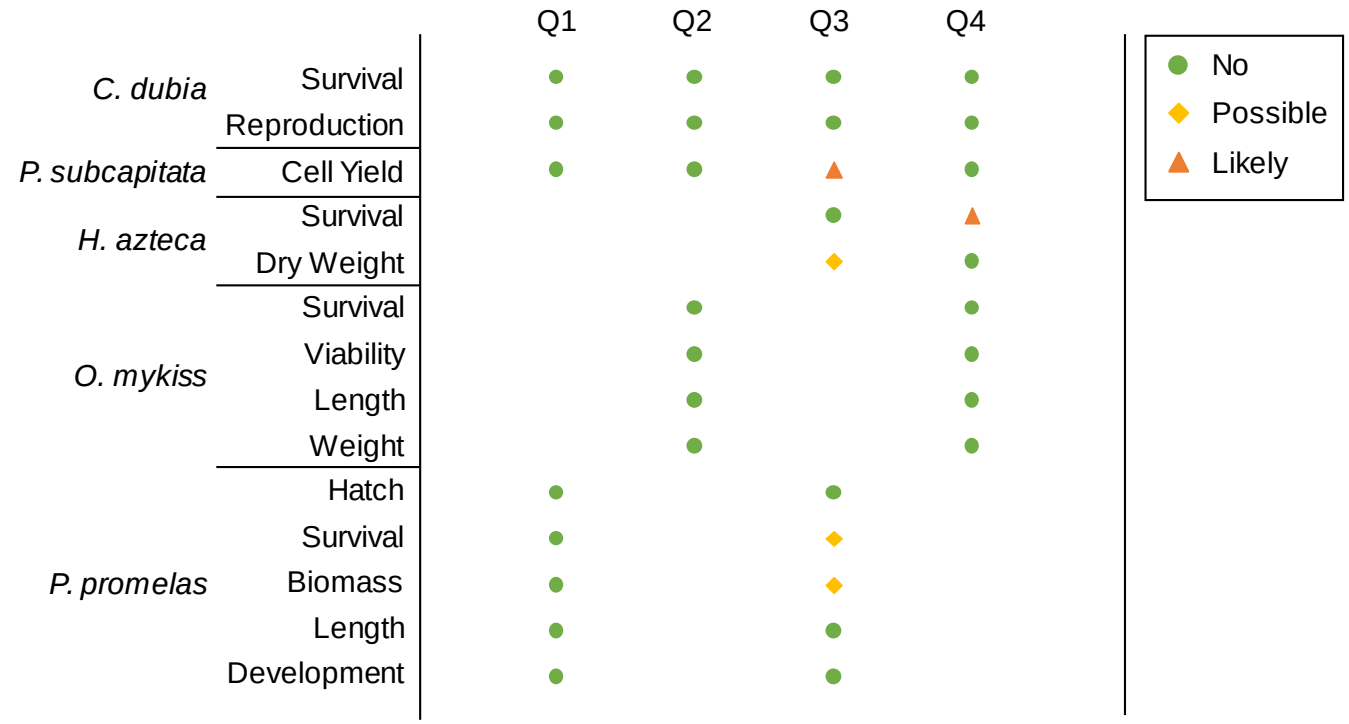
Note: Test results are categorized in Section 3.3.1.

Figure 3.3-40: Summary of test results by category at LC_LC3.



Note: Test results are categorized in Section 3.3.1.

Figure 3.3-41: Summary of test results by category at LC_LCDSSLCC.



Note: Test results are categorized in Section 3.3.1. Evidence of microbes were observed in the Q3 *P. promelas* test (Section 3.1 and 3.3.1.5).

3.4 Causation Assessment

Causation assessments were conducted for *C. dubia* survival and reproduction, *H. azteca* growth and survival, *P. subcapitata* cell yield, *O. mykiss* survival, viability, and *P. promelas* survival and biomass. These are the test endpoints for which possible or likely toxicity responses were observed for one or more test site waters in 2019. The following appendices have supporting information for the causation assessment:

- Appendix B provides TIEs.
- Appendix C provides water chemistry data screened against BC WQGs for all 2019 tests conducted with reference and test site waters. Sum of toxic units (∑TUs) and coefficient of variation for multi-week tests are also provided in this appendix.
- Appendix D provides response data paired with water chemistry data and other explanatory variables (i.e., PCs and ∑TUs).
- Appendix E provides PCA component loadings and percent of variance explained by each component.
- Appendix F provides Spearman rank order correlations.

Results of the causation assessment are provided in the following sections, organized by species and endpoint.

3.4.1 *Ceriodaphnia dubia* Reproduction and Survival

Toxicity Identification Evaluation (C. dubia)

Multiple rounds of TIE with *C. dubia* were conducted for FR_FRCP1, CM_MC2, and RG_MIDAG (Appendix B-5). The following bullets summarize TIE results for quarterly tests with adverse response:

- **FR_FRCP1**—Survival was significantly reduced relative to references in Q1, and reproduction was significantly reduced relative to references in Q1 and Q3 (Section 3.3.1.1). Survival was improved by 100% in the EDTA-treated test compared to the untreated test. In the Q1 test, reproduction was improved in the EDTA-treated test compared to the untreated test, although reproduction in the EDTA-treated test was still reduced by approximately 50% compared to the Fording River reference. In the Q3 test, reproduction was improved slightly in the tests treated with EDTA compared to the untreated tests. These results indicate that divalent metal cations (likely nickel) explain a portion of the pattern of chronic toxicity, but other toxicants may have also contributed.
- **CM_MC2** —Reproduction was significantly reduced relative to references in Q1 (Section 3.3.1.1). Reproduction was improved in the EDTA-treated test compared to the untreated test, with effects on reproduction improving from approximately 35% in the untreated to approximately 15% in the EDTA-treated test. These results indicate that divalent metals (likely nickel) may have contributed to toxicity in the Q1 test.
- **RG_MIDAG**—No adverse responses were observed in the treated or untreated tests for this station. Results were similar to the untreated laboratory control and between treated and untreated tests.

Water Quality Screening (C. dubia)

In tests categorized as possible or likely adverse effects, concentrations exceeded BC WQGs and lowest level 1 EVWQP benchmarks for at least one constituent:

- **FR_FRCP1 (Q1)**—Concentrations of nitrate, selenium, and sulphate exceeded lowest level 1 EVWQP benchmarks, the concentration of nickel exceeded the level 1 interim screening value, and the concentration of uranium exceeded the BC WQG.
- **FR_FRCP1 (Q3)**—The concentration of selenium exceeded the lowest level 1 EVWQP benchmark.
- **FR_FRABCH (Q1)**—Concentrations of nitrate and selenium exceeded lowest level 1 EVWQP benchmarks.
- **CM_MC2 (Q1)**—The concentration of nickel exceeded the level 1 interim screening value.

Spearman Rank Correlation (C. dubia)

Survival—For *C. dubia* survival, total ammonia (r_s = -0.271), PC3 (r_s = -0.188), and PC4 (r_s = 0.211) had statistically significant (but not strong) Spearman rank correlations[15] in the combined dataset (Table F-1). In the 2019 dataset, no constituent or explanatory variable had statistically significant or strong Spearman rank correlations[16].

Reproduction—Constituents and explanatory variables with a statistically significant Spearman rank correlation for *C. dubia* reproduction for the combined and 2019 datasets are provided in Table 3.4-1 and Table F-1.

[15] R_s values were statistically significant at $\alpha < 0.005$, r_s = -0.167 (negative correlations for all constituents and explanatory variables) or r_s = 0.167 (positive correlations for PC scores) for the 2015 to 2019 dataset.
[16] R_s values were statistically significant at $\alpha < 0.005$, r_s = -0.321 for the 2019 dataset.

Constituents and explanatory variables did not exhibit strong correlations ($r_s \leq -0.4$), except for total cobalt, total nickel, total thallium, and ∑TUs calculated with BC WQGs and EVWQP benchmarks in the combined dataset.

The PC scores that had statistically significant Spearman rank correlations are described below:

- **PC1 (combined dataset)**—This component accounted for 28% of the variance (Table E-1). PC1 had strong positive loadings for TDS, components of TDS (e.g., calcium), Order constituents (dissolved cadmium, sulphate, nitrate, selenium), and several metals (e.g., lithium, nickel, uranium).
- **PC2 (combined dataset)**—This component accounted for 17% of the variance (Table E-1). PC2 had strong positive loadings for DOC, TOC, total suspended solids (TSS), turbidity, and several metals (e.g., arsenic, aluminum, chromium, lead, iron).
- **PC3 (combined dataset)**—This component accounted for 9.9% of the variance (Table E-1). PC3 had strong negative loadings for tin, bismuth, and silver.
- **PC4 (combined dataset)**—This component accounted for 7.0% of the variance (Table E-1). PC4 had strong negative loadings for boron, cobalt, and strontium.

When compared, the factor loading scores from the combined dataset and the 2019-only dataset showed the following patterns:

- **PC1**—The component loadings in PC1, which appeared to be a strong signal of mine influence (i.e., strong loadings for TDS, Order constituents), exhibited similar patterns between the combined dataset and the 2019 only dataset. PC1 in both datasets had strong loadings for the same constituents (Table E-1).
- **PC2**—The component loadings in PC2 did not appear to follow a discernible pattern between the two datasets. In the combined dataset, PC2 appeared to by a signal of particulates (i.e., strong loading for TSS and turbidity). In the 2019 only dataset, PC2 had strong loadings for some metals (e.g., barium, beryllium, and bismuth) and were dissimilar compared to the combined dataset PC2 (Table E-1).
- **PC3 and PC4**—The component loadings in PC3 and PC4 had no apparent signals in either dataset. The interpretation of these PCs is unclear, and they showed no clear consistency between the two datasets (Table E-1).

Table 3.4-1: Constituents and Explanatory Variables with Significant Spearman Rank Correlations for *Ceriodaphnia dubia* Reproduction

Constituent[(a)]	R_s Combined Dataset	R_s 2019 Dataset	Comparison to BC WQGs/EVWQP Benchmarks	Retained for Graphical Analysis?
Total alkalinity	-0.218	ns	No WQG	No—included in TDS
Aluminum-dissolved	-0.197	ns	No exceedance	No
Antimony-total	-0.314	ns	No exceedance	No
Arsenic-total	-0.229	ns	No exceedance	No
Boron-total	-0.220	ns	No exceedance	No
Cadmium-dissolved	-0.213	ns	No exceedance	Yes—order constituent
Calcium	-0.233	ns	No WQG	No—included in TDS
Dissolved organic carbon	-0.193	ns	No WQG	Yes
Cobalt-total	-0.471	ns	No exceedance	No
Conductivity	-0.286	ns	No WQG	No—included in TDS

Table 3.4-1: Constituents and Explanatory Variables with Significant Spearman Rank Correlations for *Ceriodaphnia dubia* Reproduction

Constituent[a]	R_s Combined Dataset	R_s 2019 Dataset	Comparison to BC WQGs/EVWQP Benchmarks	Retained for Graphical Analysis?
Copper-dissolved	ns	-0.346	No exceedance	No
Hardness	-0.245	ns	No WQG	No—included in TDS
Iron-dissolved	-0.245	ns	No exceedance	No
Lead-total	-0.271	ns	No exceedance	No
Lithium-total	-0.308	ns	No WQG	Yes
Magnesium	-0.259	ns	No WQG	No—included in TDS
Manganese-total	-0.336	ns	No exceedance	No
Molybdenum-total	-0.260	ns	No exceedance	No
Nickel-total	-0.421	ns	Exceeds L1 interim screening value	Yes
Nitrate	-0.273	ns	Exceeds L1 EVWQP benchmarks	Yes
Nitrite	-0.302	ns	No exceedance	No
Total ammonia	-0.175	ns	No exceedance	No
Phosphorus	ns	-0.322	No WQG	Yes
Potassium	-0.339	ns	No WQG	No—included in TDS
Selenium-total	-0.213	ns	Exceeds L1 EVWQP benchmarks	Yes
Silver-total	-0.183	ns	No exceedance	No
Sodium	-0.247	ns	No WQG	No—included in TDS
Strontium-total	-0.227	ns	No WQG	Yes
Sulphate	-0.293	ns	Exceeds L1 EVWQP benchmarks	Yes
Thallium-total	-0.429	ns	No exceedance	No
Total dissolved solids	-0.265	ns	No WQG	Yes
Total Kjeldahl nitrogen	-0.234	ns	No WQG	Yes
Total organic carbon	-0.224	ns	No WQG	Yes
Total suspended solids	-0.252	ns	No WQG	Yes
Turbidity	-0.306	ns	No WQG	Yes
Uranium-total	-0.290	ns	No exceedance	No
Vanadium-total	-0.184	ns	No WQG	Yes
Zinc-total	-0.240	ns	No exceedance	No
∑TU-WQGs	-0.397	ns	No WQG	Yes
∑TU-WQGs/Benchmarks	-0.437	ns	No WQG	Yes
PC1 (combined dataset)	-0.353	-	No WQG	Yes
PC2 (combined dataset)	-0.178	-	No WQG	Yes
PC3 (combined dataset)	-0.273	-	No WQG	Yes

Notes: - = not applicable to dataset or endpoint; BC WQGs = British Columbia water quality guidelines; EVWQP = Elk Valley Water Quality Program; L1 = lowest level 1; ns = not significant; PC = principal component; ∑TU = sum of toxicity units; TDS = total dissolved solids.

(a) Total concentrations are shown for metals that have a BC WQG for the total fraction or that lack a chronic BC WQG. Dissolved concentrations were used for metals with a BC WQG for the dissolved fraction.

(b) Shaded values indicate a strong Spearman rank correlation at $r_s \leq -0.4$.

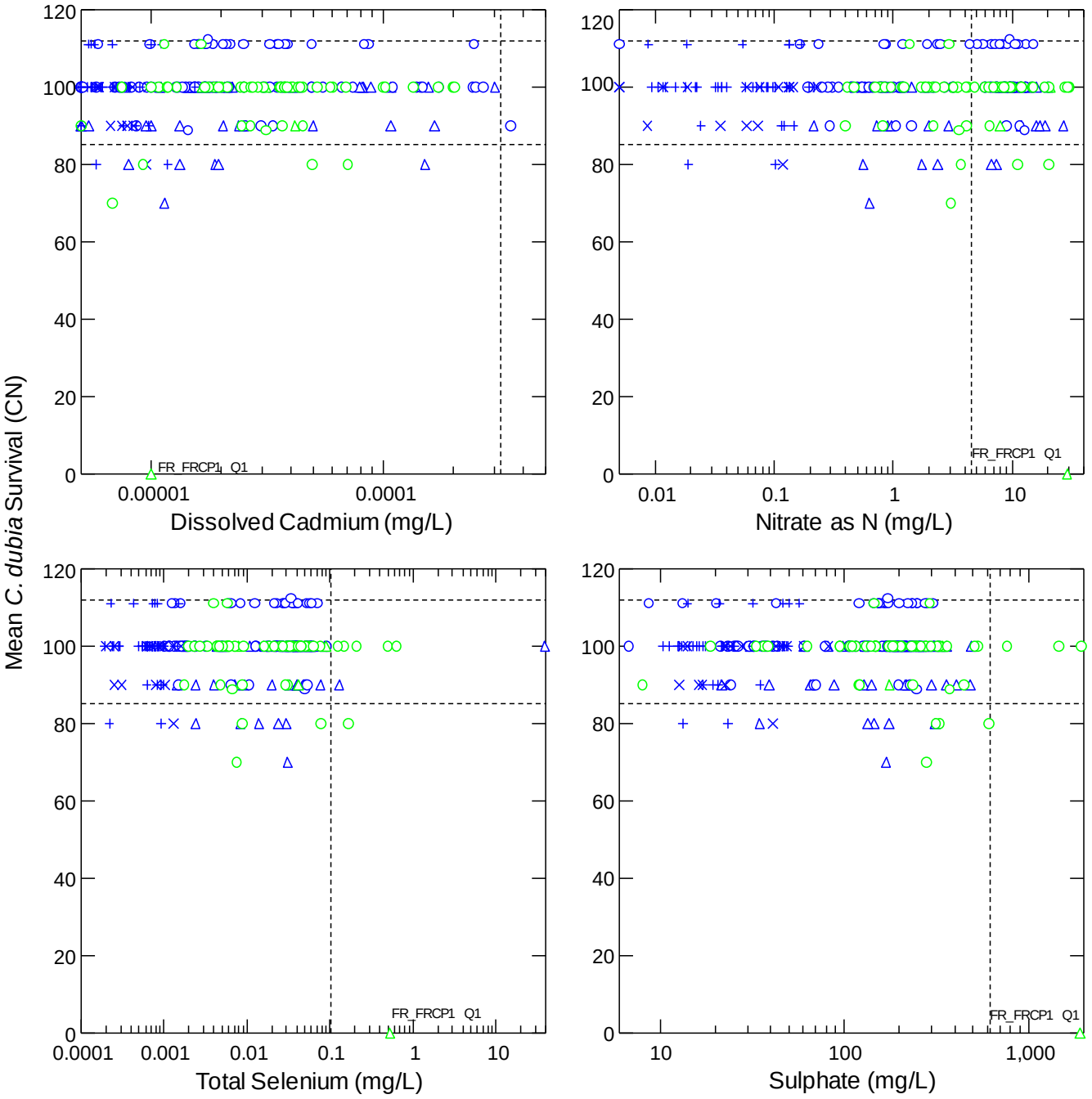
Graphical Analysis (C. dubia)

Survival—The four Order constituents (dissolved cadmium, nitrate, sulphate, total selenium), and explanatory variables that had significant Spearman rank correlations (PC3 and PC4 [combined dataset]) were carried through to graphical analysis (Figures 3.4-1 and 3.4-2).

Reproduction—The four Order constituents (dissolved cadmium, nitrate, sulphate, total selenium) and the 16 constituents and explanatory variables with significant Spearman rank correlations that were above BC WQGs or did not have BC WQGs (Table 3.4-1) were carried through to graphical analysis (Figures 3.4-3 to 3.4-8).

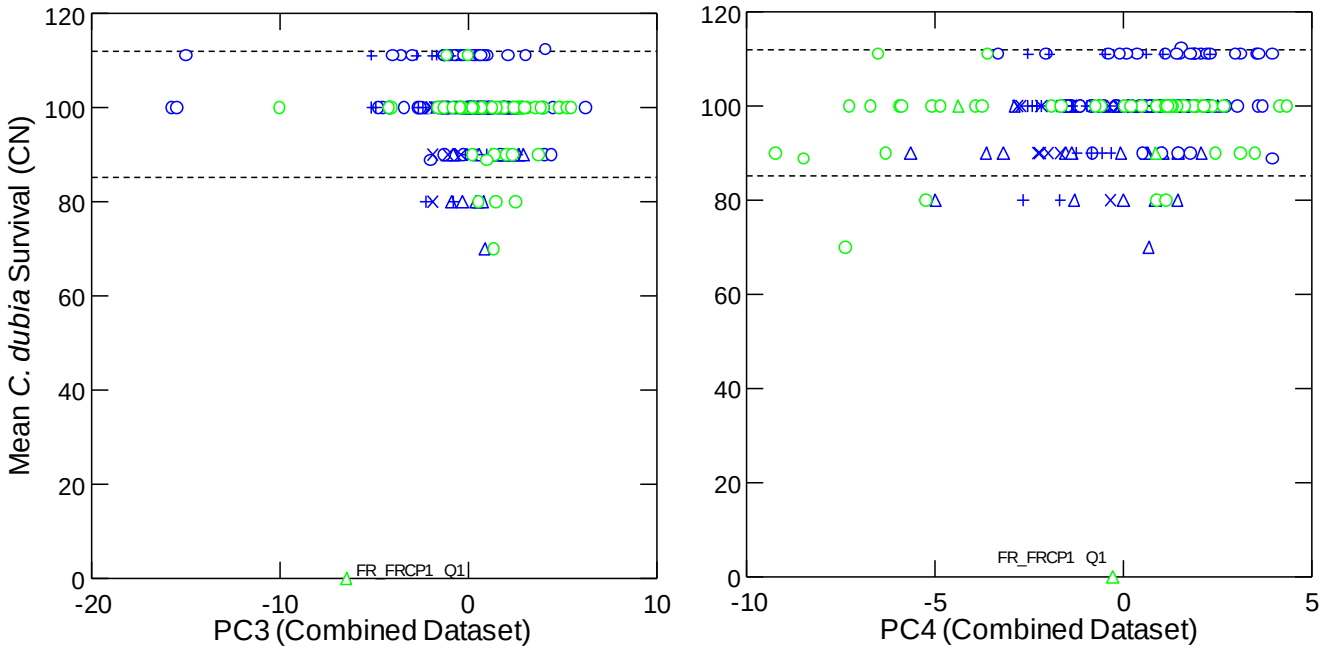
None of the evaluated explanatory variables exhibited a consistent exposure-response relationship across all tests. For PCs that were carried forward to graphical analysis, no consistent patterns were apparent between the PCs and test responses. However, a few variables exhibited a consistent relationship between explanatory variable and magnitude of adverse response; these included nickel and ∑TUs (when calculated using BC WQGs and EVWQP benchmarks). The potential for these variables to explain observed effects is discussed in the next section.

Figure 3.4-1: Mean *C. dubia* survival versus dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



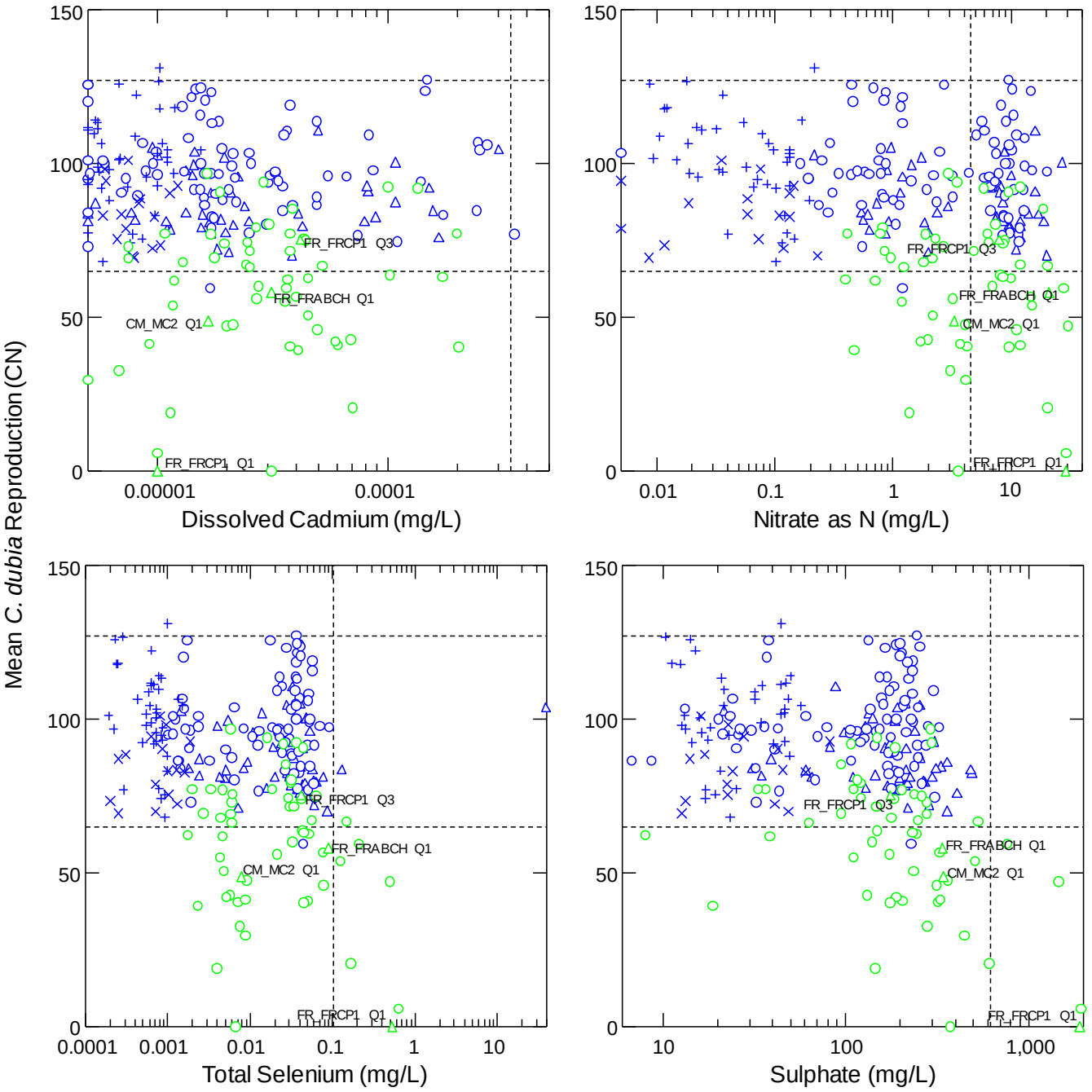
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-2: Mean *C. dubia* survival versus PC3 for the combined dataset (left) and PC4 for the combined dataset (right).



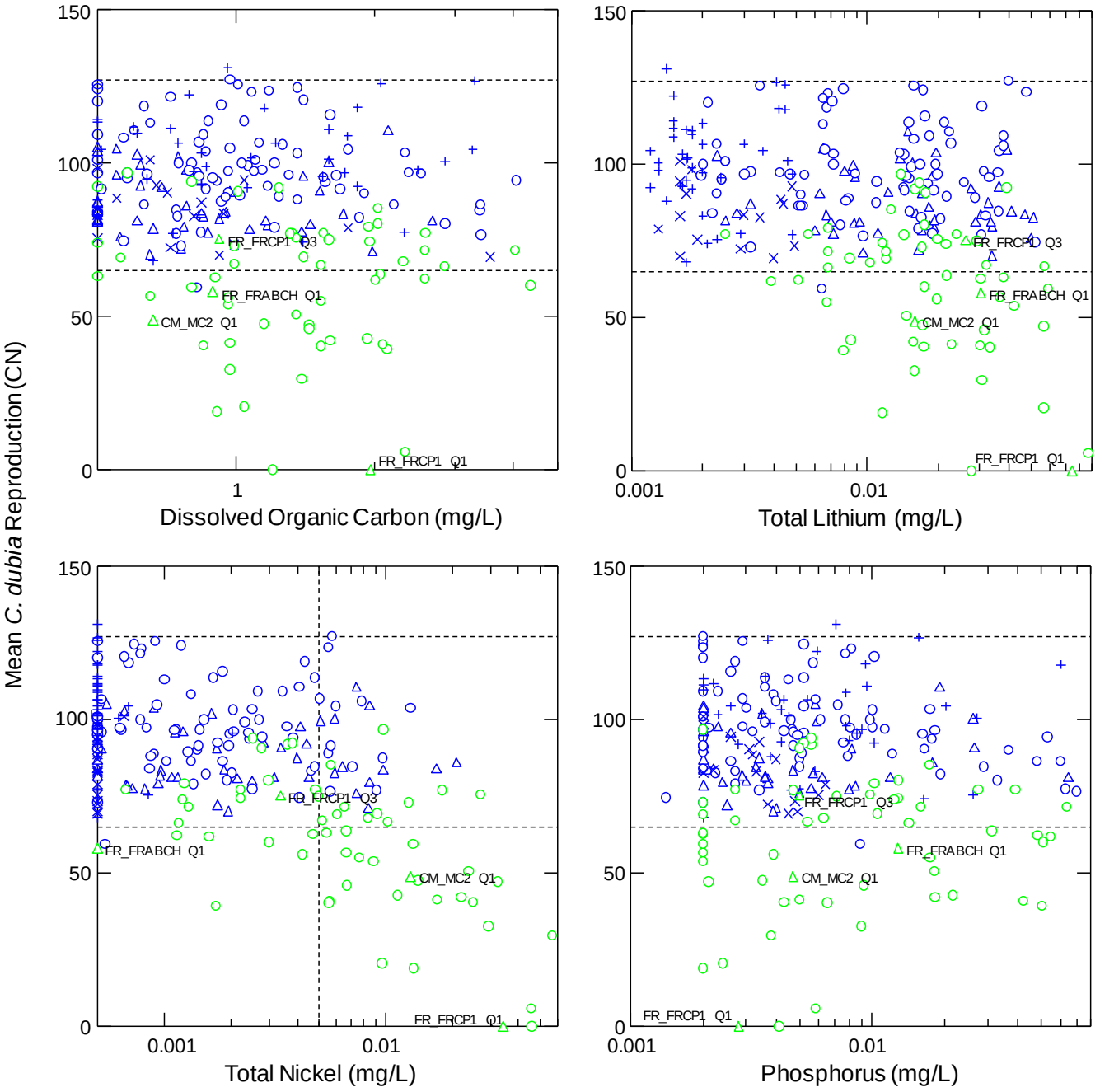
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-3: Mean *C. dubia* reproduction versus dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



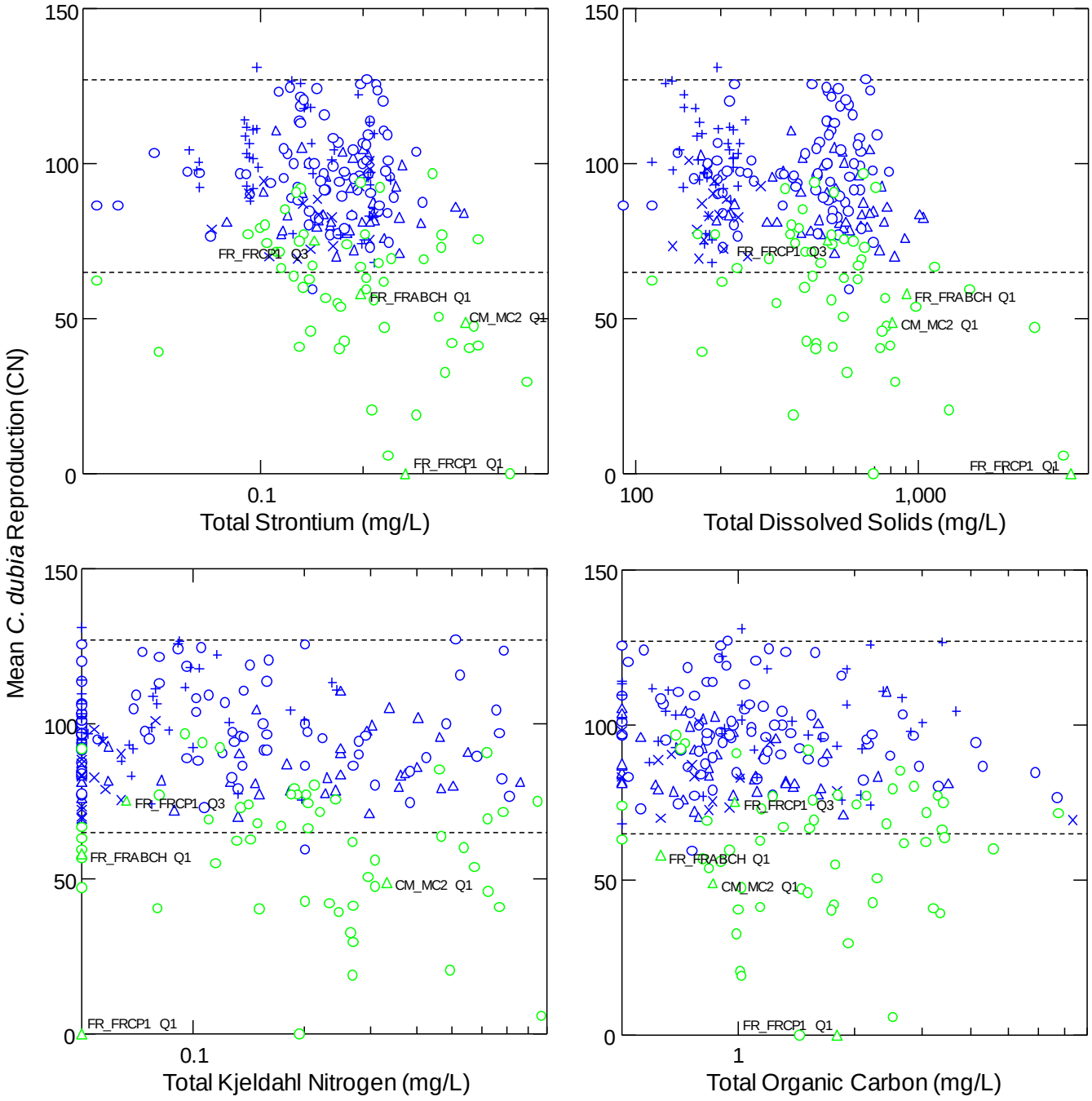
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-4: Mean *C. dubia* reproduction versus dissolved organic carbon (top left), total lithium (top right), total nickel (bottom left), and phosphorus (bottom right).



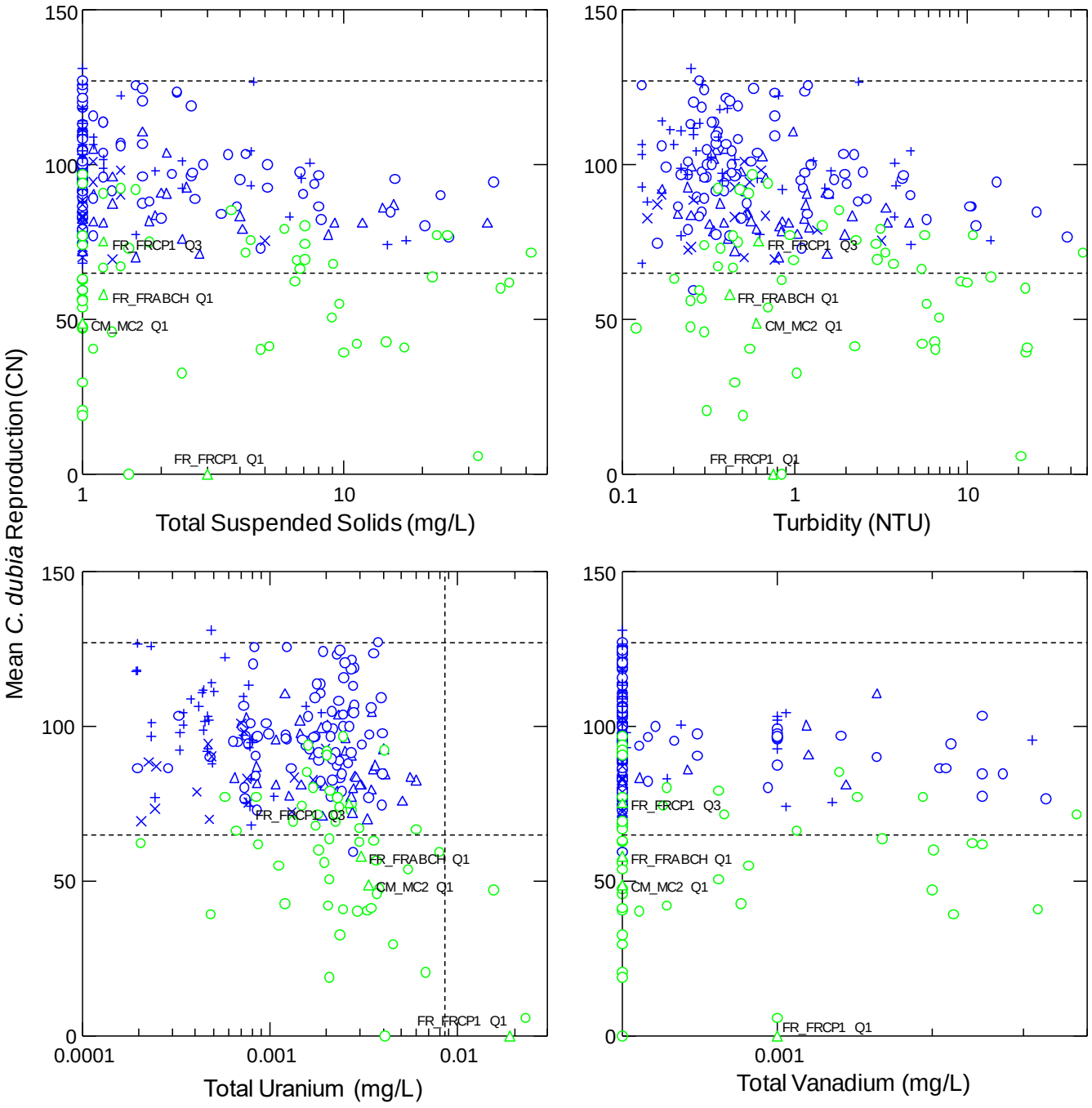
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-5: Mean *C. dubia* reproduction versus total strontium (top left), total dissolved solids (top right), total Kjeldahl nitrogen (bottom left), and total organic carbon (bottom right).



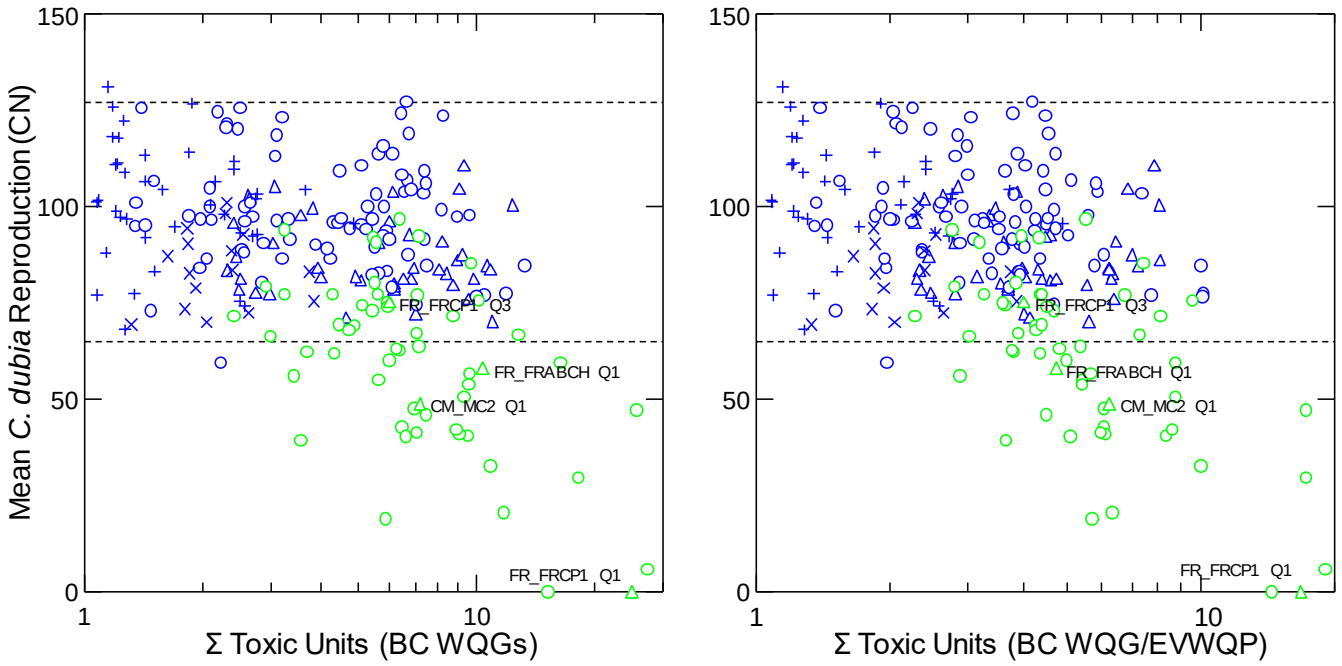
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-6: Mean *C. dubia* reproduction versus total suspended solids (top left), turbidity (top right), total uranium (bottom left), and total vanadium (bottom right).



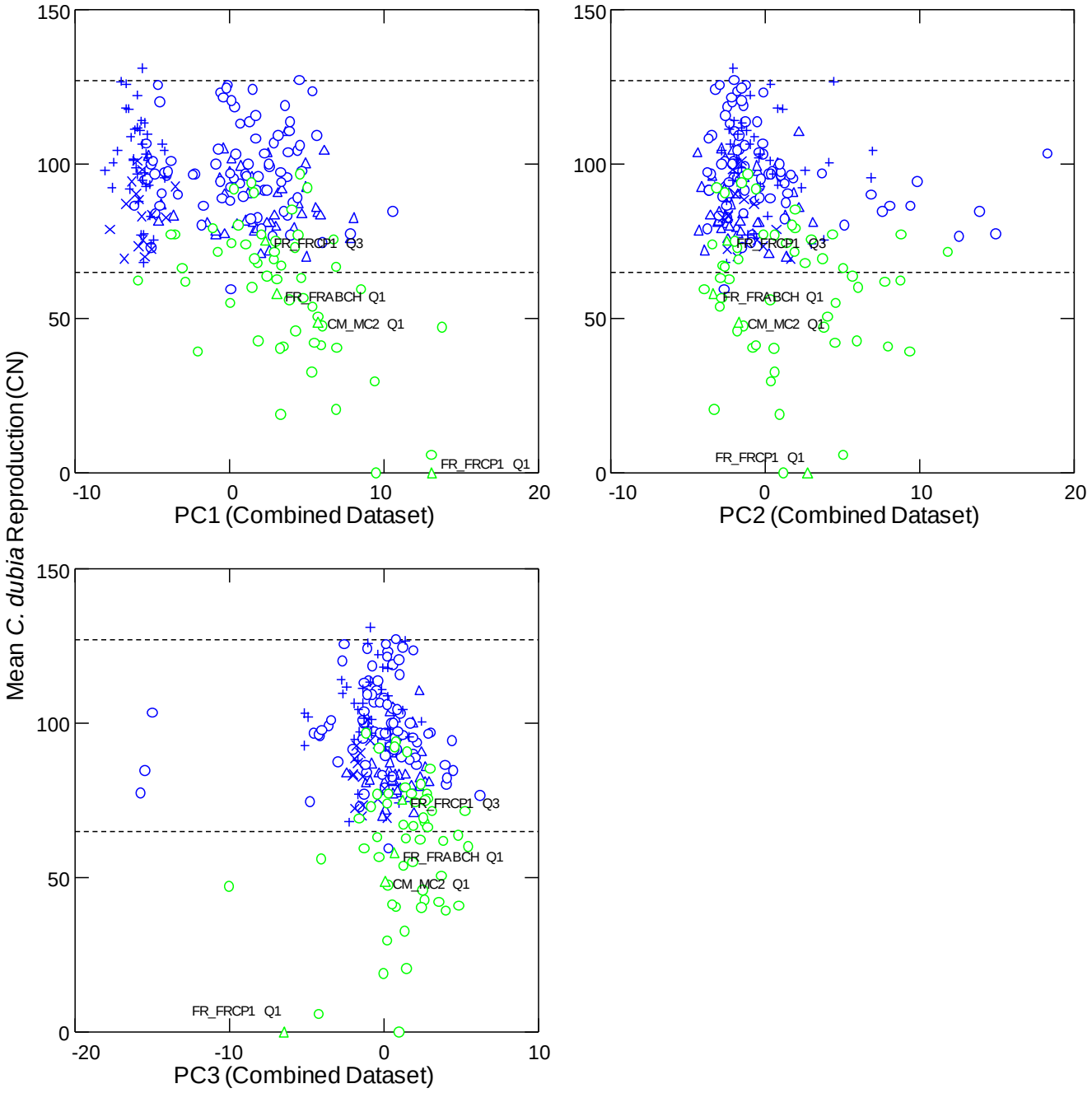
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-7: Mean *C. dubia* reproduction versus sum of toxic units calculated using BC WQGs only (left) and sum of toxic units calculated using BC WQGs and EVWQP benchmarks (right).



Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-8: Mean *C. dubia* reproduction versus PC1 for the combined dataset (top left), PC2 with the combined dataset (top right), and PC3 with the combined dataset (bottom left).



Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Identification of Potential Contributors to Toxicity (C. dubia)

In tests categorized as having a possible or likely adverse response, concentrations of most constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-1), and/or were lower than the chronic BC WQG (Appendix C). Such constituents are not expected to contribute to toxicity in these tests. Published toxicity data were reviewed for constituents that were higher than reference waters and test site waters categorized as no adverse response and/or above BC WQGs and lowest level 1 EVWQP benchmarks and are discussed below.

- **FR_FRCP1 (Q1)**—With respect to survival, nickel, sulphate, and TDS showed evidence of causing the observed response in this test. Concentrations of lithium, nickel, nitrate, selenium, sulphate, uranium, TDS, and several components related to TDS (e.g., calcium), and ∑TUs were higher than reference waters and test site waters categorized as no adverse response. The nitrate concentration in this test (29 mg/L NO_3-N) was lower than the LC_{10} of 39 mg/L NO_3-N for *C. dubia* in Fording River water (Golder 2018b), indicating it is not likely contributing to mortality. The nickel concentration (34 µg/L) was greater than the interim screening value for invertebrates (5.3 µg/L) and the TIE showed 100% improvement with the EDTA treatment, indicating that nickel may have contributed to or caused the observed effects. Concentrations of TDS (3,470 mg/L) and sulphate (1,910 mg/L) were higher than the maximum concentration tested in Fall 2016 sulphate testing that resulted in no adverse effects on survival (sulphate = 1,285 mg/L; TDS ~2,000 mg/L), so effects could not be evaluated using site-specific testing. In comparison to literature values, the concentration of sulphate in this test (1,910 mg/L) is higher than the LC_{50} of 1,580 mg/L (Elphick et al. 2011; test hardness of 320 mg/L as $CaCO_3$), suggesting that sulphate may have contributed to effects observed in this test. Given the correlation between sulphate and TDS (i.e., as sulphate increases, so does TDS), it is possible that TDS also contributed to the observed response.

  Effects on reproduction in this test were 100% due to the mortalities observed in this test, where no test organisms survived past the third or fourth day of the test, and no neonates were produced before mortalities were observed. Because there is a possibility that reproduction was delayed in this test, in addition to the effects on survival, the water quality data in this test were reviewed for potential effects to *C. dubia* reproduction.

  For reproduction, nickel showed the greatest evidence of causing the observed response in this test, although sulphate, TDS, and nitrate may have also contributed to the observed response. The concentration of nitrate in this test (29 mg/L NO_3-N) was higher than the level 2 benchmark from the EVWQP (21 mg/L NO_3-N at hardness >500 mg/L as $CaCO_3$). The level 2 benchmark is associated with 20% effect on *C. dubia* reproduction, indicating that nitrate may have contributed to chronic toxicity in this test. Concentrations of TDS (3,470 mg/L) and sulphate (1,910 mg/L) were higher than the approximate IC_{50} value for TDS (45% effect in the highest concentration tested [2,386 mg/L]) and sulphate (45% effect in the highest concentration tested [1,630 mg/L]) in alkalinity-supplemented Fording River water (Golder 2013), indicating that these constituents may have contributed to the observed response in this test. The nickel concentration (34 µg/L) was 1.4 times higher than the IC_{50} for nickel in Michel Creek water (24.6 µg/L) (Nautilus 2018), indicating that nickel may have contributed to toxicity in this test. This interpretation aligns with the 2019 *C. dubia* TIE testing conducted with Q1 FR_FRCP1 water, which showed increased reproduction with the addition of EDTA. Results of the TIE treatment are uncertain because although toxicity was reduced, there were still significant effects on reproduction, indicating that not all metals in the Q1 FR_FRCP1 sample were removed through EDTA treatment, or other water quality constituents (e.g., sulphate) also contributed to toxicity. Overall, nickel, followed by sulphate and TDS showed the greatest evidence of causing the observed

response on reproduction in this test, although nitrate may have also contributed to the observed response to a lesser extent.

Other exposure constituents that exhibited no strong evidence for potential causation:

- The lithium concentration in this test (0.074 mg/L) was lower than the reported IC_{25} of 0.32 mg/L for *C. dubia* (Kszos et al. 2003)[17], indicating that it is not likely contributing to toxicity.
- The selenium concentration in this test (530 µg/L) was higher than the maximum concentration tested in a mixture toxicity study that resulted in no adverse effects (149 µg/L) (Golder 2013), so site-specific toxicity testing data could not be used to rule out selenium. However, the information gleaned from the selenium concentration-response plot in Figure 3.4-3 indicates a lack of correspondence between selenium concentrations and observed effects on reproduction. Specifically, there was 0% reproduction (control-normalized) in the Q1 FR_FRCP1 test at a selenium concentration of 530 µg/L and 47% reproduction (control-normalized) in the Q1 2015 FR_FRCP1 test at a similar selenium concentration (500 µg/L). This lack of correspondence, in addition to the fact that stronger evidence for causation was identified for other constituents, indicates that selenium is not likely contributing to toxicity.
- The uranium concentration in this test (0.019 mg/L) was lower than the IC_{10} of 0.073 mg/L for *C. dubia* (CCME 2011), indicating that it is likely not contributing to toxicity.

In addition to the constituents discussed above, the ∑TUs were also higher in this test than in reference waters and/or test site waters categorized as no adverse response. The ∑TU values for these tests were largely driven by the hazard quotients for nickel, nitrate, and sulphate. When calculated using BC WQGs benchmarks (except for nickel, for which 5 µg/L was used [Section 2.3.4]), the nickel, nitrate, and sulphate hazard quotients accounted for 27%, 39%, and 18% of the ∑TU value. When calculated using BC WQGs and EVWQP benchmarks, the nickel, nitrate, and sulphate hazard quotients accounted for 41%, 11%, and 24% of the ∑TU value in this test. These results indicate that the relationship between ∑TU and reduced reproduction in the Q1 FR_FRCP1 test is largely driven by nickel, sulphate, and nitrate, which were all identified above as probable contributors to adverse effects.

- **FR_FRCP1 (Q3)**—Overall, no water quality constituent was identified as a likely cause of the observed response in these tests. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-1), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks (Appendix C).
- **FR_FRABCH (Q1)**—Overall, nitrate showed the greatest evidence of causing the observed response in this test. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-1), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks, except nitrate (Appendix C). The concentration of nitrate in this test (21 mg/L NO_3-N) was equal to the level 2 benchmark from the EVWQP (21 mg/L NO_3-N at hardness >500 mg/L as $CaCO_3$). The level 2 benchmark is associated with 20% effect on *C. dubia* reproduction, indicating that nitrate may have contributed to the observed response in this test.

[17] Sodium has been shown to ameliorate lithium toxicity (Kszos et al. 2003). The sodium concentrations in the Q1 FR_FRCP1 test (2.3 mg/L) was similar to conditions in which the IC_{25} was derived (2.8 mg/L), making the effect concentration from Kszos et al. (2003) relevant to the FR_FRCP1 test.

CM_MC2 (Q1)—Overall, results indicated that nickel likely contributed to observed responses in this test. Although the concentration of nickel was lower in this test than other test waters categorized as no adverse response, the nickel concentration was reviewed because nickel has been identified as the cause of *C. dubia* toxicity in Michel Creek tests in previous years (Section 3.5.8), and because the concentration in this test exceeded the level 1 interim screening value. The nickel concentration (13 µg/L) was greater than the IC_{25} for nickel in Michel Creek water (10.8 µg/L; Nautilus 2018). The identification of nickel as a causal factor aligns with the 2019 *C. dubia* TIE testing conducted with Q1 CM_MC2 waters, which indicated that divalent metals (likely nickel) were the probable cause of *C. dubia* toxicity. Other exposure constituents exhibited no strong evidence for potential causation:

- The concentration of strontium in this test was higher than reference waters and test site waters categorized as no adverse response (Table D-1). The strontium concentration in this test (0.40 mg/L) was more than an order of magnitude lower than the reported IC_{20} of 11 mg/L for *C. dubia* (McPherson et al. 2014), indicating that it is not likely contributing to toxicity.

3.4.2 *Pseudokirchneriella subcapitata* Cell Yield

Water Quality Screening (P. subcapitata)

In one test out of 10 tests categorized as possible or likely adverse effects (Q3 EV_MC2), concentrations were below BC WQGs and lowest level 1 EVWQP benchmarks. In the remaining nine tests, concentrations exceeded BC WQGs and lowest level 1 EVWQP benchmarks for at least one constituent:

- **FR_FRCP1 (Q1)**—Concentrations of nitrate, selenium, and sulphate exceeded lowest level 1 EVWQP benchmarks, the concentration of nickel exceeded the level 1 interim screening value, and the concentration of uranium exceeded the BC WQG.
- **FR_FRABCH (Q3)**—Concentrations of nitrate and selenium exceeded lowest level 1 EVWQP benchmark.
- **CM_MC2 (Q3)**—The concentration of nickel exceeded the level 1 interim screening value.
- **LC_LC3 (Q3)**—The concentration of selenium exceeded the lowest level 1 EVWQP benchmark, and the concentration of nickel exceeded the level 1 interim screening value.
- **FR_FRCP1, GH_FR1, LC_LC5, EV_HC1, LC_LC3, LC_LCDSSLCC (Q3)**—Concentrations of selenium exceeded the lowest level 1 EVWQP benchmark.

Spearman Rank Correlation (P. subcapitata)

Constituents and explanatory variables with a statistically significant Spearman rank correlation for *P. subcapitata* cell yield are provided in Table 3.4-2. Constituents and explanatory variables did not exhibit strong correlations (i.e., $r_s \leq -0.4$), except for dissolved copper in the 2019 dataset.

The PC scores for both datasets did not have statistically significant Spearman rank correlations, and were not carried forward to graphical analysis.

Table 3.4-2: Constituents and Explanatory Variable with Significant Spearman Rank Correlations for *Pseudokirchneriella subcapitata* Cell Yield.

Constituent[a]	R_S Combined Dataset	R_S 2019 Dataset	Comparison to BC WQGs/EVWQP Benchmarks	Retained for Graphical Analysis?
Copper-dissolved	-0.214	-0.419	No exceedances	No
Fluoride	-0.202	ns	No exceedances	No
∑TU-WQGs	-0.240	ns	No WQG	Yes
∑TU-WQGs/Benchmarks	-0.249	ns	No WQG	Yes

Notes: BC WQGs = British Columbia water quality guidelines; EVWQP = Elk Valley Water Quality Program; ns = not significant; ∑TU = sum of toxicity units; TDS = total dissolved solids.

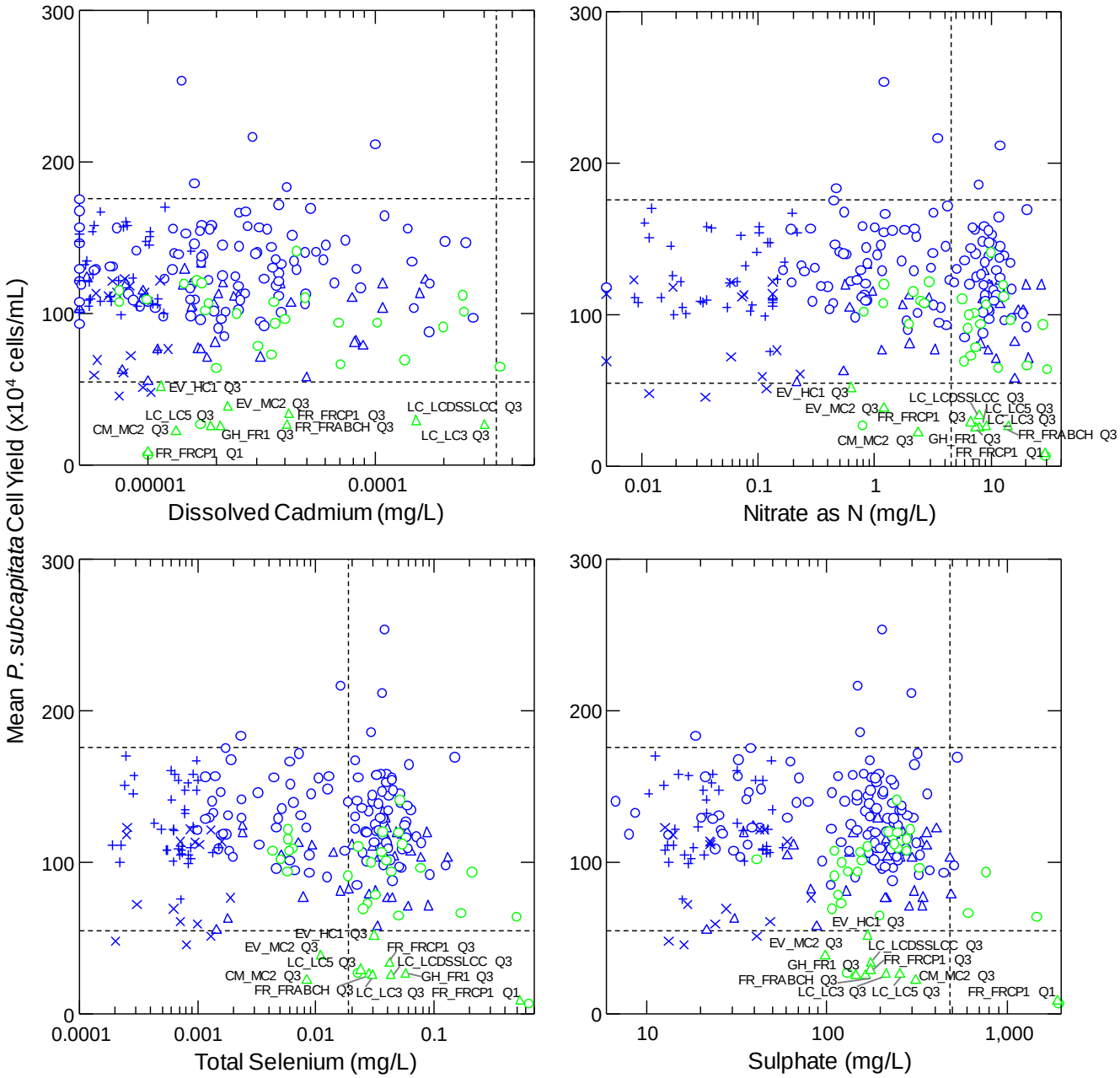
(a) Total concentrations are shown for metals that have a BC WQG for the total fraction or that lack a chronic BC WQG. Dissolved concentrations were used for metals with a BC WQG for the dissolved fraction.

(b) Shaded values indicate a strong Spearman rank correlation at $r_s \leq -0.4$.

Graphical Analysis (P. subcapitata)

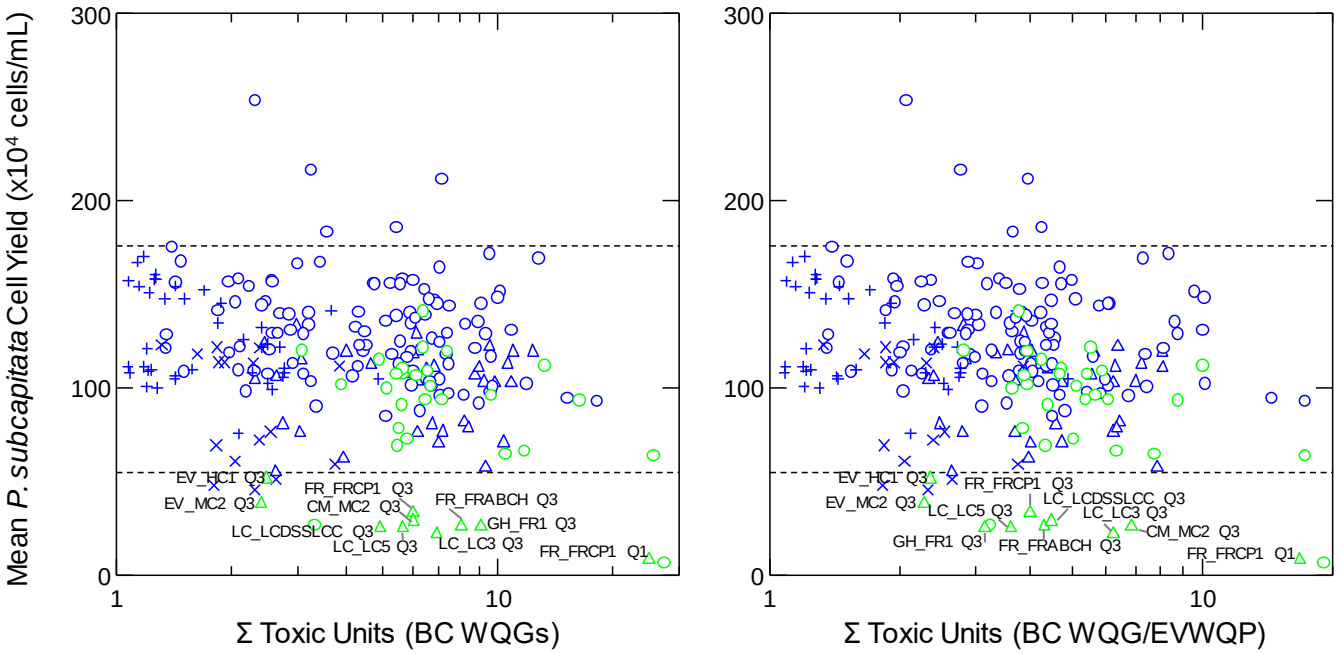
The four Order constituents (dissolved cadmium, nitrate, sulphate, total selenium) and explanatory variables that had significant Spearman rank correlations (∑TU calculated with BC WQGs only and BC WQGs and EVWQP benchmarks) (Table 3.4-2) were carried through to graphical analysis (Figure 3.4-9 and 3.4-10). None of the evaluated explanatory variables exhibited a consistent exposure-response relationship across *P. subcapitata* tests. Because no apparent relationships were observed for concentrations versus responses, the water quality screening was relied upon for identification of potential causes of observed effects in the following section.

Figure 3.4-9: Mean *P. subcapitata* cell yield versus dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-10: Mean *P. subcapitata* cell yield versus sum of toxic units calculated using BC WQGs only (left), sum of toxic units calculated using BC WQGs and EVWQP benchmarks (right).



Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Identification of Potential Contributors to Toxicity (P. subcapitata)

In tests categorized as having a possible or likely adverse response to *P. subcapitata*, concentrations of most constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-2), and/or were lower than the chronic BC WQG (Appendix C). Such constituents are not expected to contribute to toxicity in these tests. Published toxicity data were reviewed for constituents that were higher than reference waters and test site waters categorized as no adverse response and/or above BC WQGs and lowest level 1 EVWQP benchmarks and are discussed below.

- **FR_FRCP1 (Q1)**— Overall, sulphate and TDS showed the greatest evidence of causing the observed response in this test. Concentrations of lithium, nickel, nitrate, selenium, sulphate, uranium, TDS, and several components related to TDS (e.g., calcium), and ∑TUs were higher than other test waters categorized as no adverse response (Table D-2), but comparisons to toxicity benchmarks did not support a conclusion of causation for most constituents. Concentrations of sulphate (1,910 mg/L), and TDS (3,470 mg/L) in this test were greater than the highest concentrations in the Golder (2013) mixture toxicity test that resulted in no significant adverse effects to *P. subcapitata* cell yield (sulphate = 931 mg/L; TDS = 1,498 mg/L), so effects could not be evaluated using site-specific testing. In comparison to literature values, the concentration of sulphate in this test (1,910 mg/L) was higher than the IC_{25} of 1,727 mg/L (Elphick et al. 2011; test hardness of 320 mg/L as $CaCO_3$), indicating that sulphate may have contributed to the observed response. Given the correlation between sulphate and TDS (i.e., as sulphate increases, so does TDS), it is possible that TDS also contributed to the observed response. Other exposure constituents exhibited no strong evidence for potential causation:

- The lithium concentration in this test (0.074 mg/L) was lower than the reported NOEC of 50 mg/L for *P. subcapitata*[18], indicating that it is not likely contributing to toxicity.
- The concentration of nickel in this test (34 µg/L) was lower than the EC_{50} of 233 µg/L for *P. subcapitata* (Chen et al. 1997), indicating that it is not likely contributing to toxicity.
- Nitrate is not expected to have contributed to toxicity in this test because the test site concentration (29 mg/L NO_3-N) was lower than the highest concentration tested in the Golder (2013) mixture toxicity study that reported no adverse effects (41 mg/L NO_3-N).
- The concentration of selenium in this test (530 µg/L) was greater than the highest concentration in the Golder (2013) mixture toxicity test that resulted in no significant adverse effects to *P. subcapitata* cell yield (138 µg/L), so it cannot be ruled out that selenium may have also contributed to the observed response in this test based on toxicity testing data alone. Figure 3.4-9 indicates a lack of concentration-response relationship between the observed effects on cell yield and selenium concentrations, where cell yield was 9.5 x 10^4 cells/mL in the Q1 FR_FRCP1 test with 530 µg/L, and 64 x 10^4 cells/mL in the Q1 2015 FR_FRCP1 test at a similar selenium concentration (500 µg/L). The lack of relationship between the concentration and response in cell yield indicates that selenium is not likely contributing to toxicity.
- The uranium concentration in this test (0.019 mg/L) was lower than the reported IC_{10} of 0.04 mg/L for *P. subcapitata* (CCME 2011), indicating that it is not likely contributing to toxicity.

In addition to the constituents discussed above, the ∑TUs were also higher in this test than in reference waters and/or test site waters categorized as no adverse response. However, the ∑TU values for these tests were largely driven by the hazard quotients for nickel and nitrate. For example, in the ∑TUs calculated using BC WQGs (except for nickel, for which 5 µg/L was used [Section 2.3.4]) and EVWQP benchmarks, the hazard quotients for nickel and nitrate accounted for 66% (WQGs only) or 52% (WQGs and benchmarks) of the ∑TU value. These results indicate that the relationship between ∑TU and reduced cell yield in this test is largely driven by nickel and nitrate, which were identified above as unlikely causes of adverse effects. If the hazard quotient for these constituents were excluded from the calculation, then the ∑TUs for these tests would be within the range observed in reference waters and test sites categorized as no adverse response. This analysis indicates that mixture-related effects (as evaluated by ∑TUs) is unlikely to explain the observed response.

- **FR_FRCP1, FR_FRABCH, GH_FR1, LC_LC5, EV_HC1, CM_MC2, EV_MC2, LC_LC3, and LC_LCDSSLCC (Q3)**—No water quality constituent was identified as a potential cause of the observed response in these tests. Concentrations of constituents were equal to or lower than concentrations in other test waters categorized as no adverse response (Table D-5), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks (Appendix C). As discussed in Section 3.2.3.2 and 3.3.1.2, cell yield in Q3 was unusually low in reference and test site waters relative to the negative laboratory control. It is unclear whether the higher frequency of significant test results in this quarter was related to this seasonal anomaly in cell yield observed on a site-wide basis.

[18] Reported in Material Safety Data Sheet: https://static1.squarespace.com/static/54f0b505e4b017cb0d7a6f26/t/55687e5fe4b0182dddbc570e/1432911455281/Rockwood+Lithium+SDS+Lithium+Carbonate.pdf

3.4.3 *Hyalella azteca* Survival and Growth

Toxicity Identification Evaluation (H. azteca)

Multiple rounds of TIE with *H. azteca* were conducted for FR_FRCP1, CM_MC2, and RG_MIDAG (Appendix B-5). The following bullets summarize TIE results for quarterly tests with adverse responses:

- **FR_FRCP1**—No adverse responses were observed for survival. Dry weight was significantly reduced relative to reference in Q4 (Section 3.3.1.3). In Q4, *H. azteca* growth was marginally improved in the EDTA-treated tests compared to untreated tests, although growth in the EDTA-treated test was still reduced by more than 50% compared to the Fording River reference. The observation for growth indicates that divalent metal cations explain some of the pattern of toxicity in the Q4 test, but contributions from other toxicants are likely.
- **CM_MC2**—Survival was significantly reduced relative to reference in Q4, and dry weight was significantly reduced relative to references in Q3 and Q4 (Section 3.3.1.3). In Q4, the EDTA-treated test had lower survival relative to the untreated sample. Effects on survival were also observed in the Q1 EDTA-treated laboratory control, but not the Q3 or Q4 laboratory control. The laboratory reported that the treatment from the EDTA could have produced adverse responses on survival in these tests, and that the dose of EDTA used (5 mg/L) is close to a threshold for adverse effects. It is unknown if the EDTA treatment caused mortalities in the EDTA-treated *H. azteca* tests discussed above. For *H. azteca* growth, dry weight was improved in the EDTA-treated tests compared to untreated tests in Q3 and Q4. In Q3 and Q4, the effects on dry weight were approximately 40 to 45% in the untreated test, and approximately 20% in the EDTA-treated test compared to the Fording River reference tests. The *H. azteca* growth results indicate that divalent metal cations (likely nickel) were a primary contributor of sublethal effects in Q3 and Q4. Conclusions could not be made for *H. azteca* survival.
- **RG_MIDAG**—No adverse responses were observed in the treated or untreated tests for this station. Results were similar to the untreated laboratory control and between treated and untreated tests.

Water Quality Screening (H. azteca)

In one of 13 tests categorized as possible or likely (Q4 GH_ERC), concentrations did not exceed BC WQGs or EVWQP benchmarks. In the remaining tests categorized as possible or likely adverse effects for *H. azteca* survival and dry weight, concentrations exceeded BC WQGs or lowest level 1 EVWQP benchmarks for one or more constituent:

- **FR_FRCP1 (Q4)**—Concentrations of selenium, sulphate, and nitrate exceeded lowest level 1 EVWQP benchmarks, and the concentration of nickel exceeded the level 1 interim screening value.
- **LC_LC5 (Q4)**, **EV_HC1 (Q3 and Q4) and LC_LCDSSLCC (Q3)**—The concentration of selenium exceeded the lowest level 1 EVWQP benchmark.
- **LC_DCDS (Q3 and Q4)**—Concentrations of selenium and nitrate exceeded lowest level 1 EVWQP benchmarks, and the concentration of nickel exceeded the level 1 interim screening value.
- **CM_MC2 (Q3 and Q4)**—The concentration of nickel exceeded the level 1 interim screening value.
- **LC_LC3 (Q3)**—The concentration of selenium exceeded the lowest level 1 EVWQP benchmark, and the concentration of nickel exceeded the level 1 interim screening value.

- **LC_LC3 (Q4)**—Concentrations of selenium and nitrate exceeded lowest level 1 EVWQP benchmarks, the concentration of nickel exceeded the level 1 interim screening value, and the concentration of copper exceeded the BC WQG.
- **LC_LCDSSLCC (Q4)**—The concentration of selenium exceeded the lowest level 1 EVWQP benchmark, and the concentration of copper exceeded the BC WQG.

Spearman Rank Correlation (H. azteca)

Constituents and explanatory variables with a statistically significant Spearman rank correlation for *H. azteca* survival and dry weight are provided in Table 3.4-3.

Survival—Constituents and explanatory variables did not exhibit strong correlations ($r_s \leq -0.4$), except for total zinc in the 2019-only dataset

Dry Weight—Constituents and explanatory variables did not exhibit strong correlations ($r_s \leq -0.4$), except for total strontium, and PC1 in the combined dataset, and total cobalt and ∑TU calculated with BC WQGs and EVWQP benchmarks in the 2019 dataset.

The following PC scores had statistically significant Spearman rank correlations:

- **PC1 (combined dataset)**—This component accounted for 30% of the variance (Table E-3). PC1 had strong positive loadings for TDS, components of TDS (e.g., calcium), Order constituents (sulphate, nitrate, selenium), and several metals (e.g., lithium, nickel, uranium).
- **PC3 (combined dataset)**—This component accounted for 8.6% of the variance (Table E-3). PC3 had strong negative loadings for boron, strontium, and dissolved cobalt.

When compared, the factor loading scores from the combined dataset and the 2019 only dataset showed the following patterns:

- **PC1**—The component loadings in PC1, which appeared to be a strong signal of mine influence (i.e., strong loadings for TDS, Order constituents), exhibited similar patterns between the combined dataset and the 2019 only dataset. PC1 in both datasets had strong loadings for the same constituents (Table E-3).
- **PC3**—The component loadings in PC3 had no apparent signals in either dataset. The interpretation of this PC is unclear. In both datasets, component loadings for dissolved and total strontium were strong, but otherwise, there was no clear consistency between the two datasets (Table E-3).

Table 3.4-3: Constituents and Explanatory Variable with Significant Spearman Rank Correlations for *Hyalella azteca* Survival and Dry Weight.

Constituent[(a)]	Survival		Dry Weight		Comparison to BC WQGs/EVWQP Benchmarks	Retained for Further Analysis?	
	R_s Combined Dataset	R_s 2019 Dataset	R_s Combined Dataset	R_s 2019 Dataset		Survival	Dry Weight
Total alkalinity	-0.262	ns	-0.340	ns	No WQG	No – included in TDS	
Antimony-total	ns	ns	-0.284	ns	No exceedance	—	No
Boron-total	-0.268	ns	-0.309	ns	No exceedance	No	
Calcium	-0.282	ns	-0.379	ns	No WQG	No – included in TDS	
Chloride	-0.303	ns	-0.383	ns	No exceedance	No	
Cobalt-total	ns	ns	-0.252	-0.437	No exceedance	—	No
Conductivity	-0.282	ns	-0.371	ns	No WQG	No – included in TDS	
Hardness	-0.273	ns	-0.362	ns	No WQG	No – included in TDS	
Lithium-total	ns	ns	-0.242	ns	No WQG	—	Yes
Magnesium	-0.258	ns	-0.338	ns	No WQG	No – included in TDS	
Molybdenum-total	-0.329	ns	-0.379	ns	No exceedance	No	
Nickel-total	ns	ns	-0.300	ns	Exceeds L1 interim screening value	—	Yes
Nitrate	ns	ns	-0.229	ns	Exceeds L1 EVWQP benchmark	Yes	
Nitrite	ns	ns	-0.339	ns	No exceedance	—	No
Total ammonia	-0.237	ns	-0.248	ns	No exceedance	No	
Potassium	ns	ns	-0.274	ns	No WQG	—	No – included in TDS
Sodium	-0.340	ns	-0.363	ns	No WQG	No – included in TDS	
Strontium-total	-0.360	ns	-0.470	ns	No WQG	Yes	
Sulphate	-0.282	ns	-0.374	ns	Exceeds L1 EVWQP benchmark	Yes	
Total dissolved solids	-0.280	ns	-0.370	ns	No WQG	Yes	
Uranium-total	-0.253	ns	-0.334	ns	No exceedance	No	
Zinc-total	ns	-0.475	ns	ns	No exceedance	No	—
∑TU-WQGs	-0.224	ns	-0.285	ns	No WQG	Yes	
∑TU-WQGs/Benchmarks	-0.234	ns	-0.305	-0.404	No WQG	Yes	
PC1 (combined dataset)	-0.301	-	-0.412	-	No WQG	Yes	
PC3 (combined dataset)	0.204	-	0.257	-	No WQG	Yes	

Notes: — = not applicable to dataset or endpoint; BC WQGs = British Columbia water quality guidelines; EVWQP = Elk Valley Water Quality Program; L1 = lowest level 1; ns = not significant; PC = principal component; ∑TU = sum of toxicity units; TDS = total dissolved solids.

(a) Total concentrations are shown for metals that have a BC WQG for the total fraction or that lack a chronic BC WQG. Dissolved concentrations were used for metals with a BC WQG for the dissolved fraction.

(b) Shaded values indicate a strong Spearman rank correlation at $r_s \leq -0.4$.

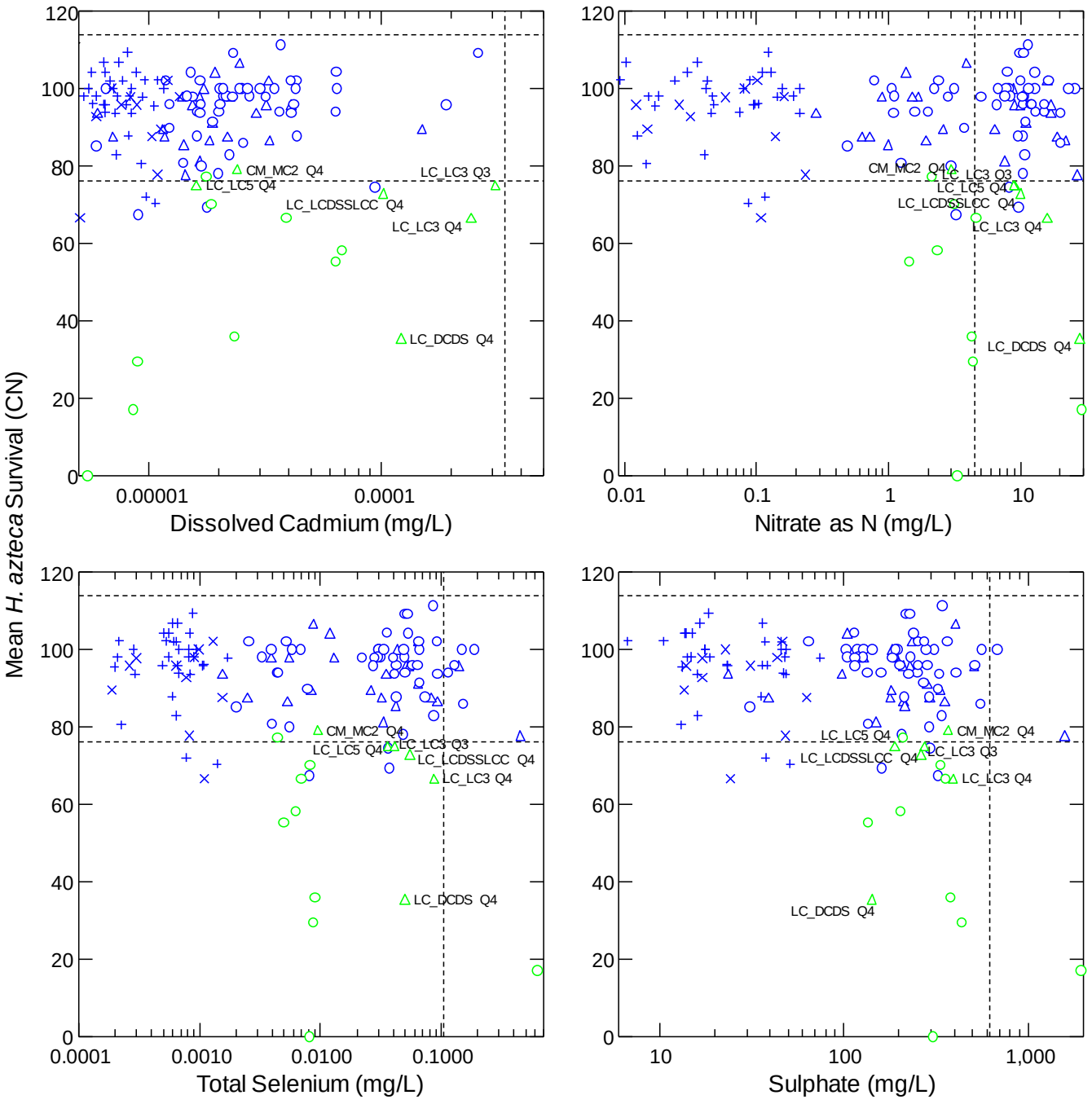
Graphical Analysis (H. azteca)

Survival—The four Order constituents (dissolved cadmium, nitrate, sulphate, total selenium), and constituents and explanatory variables with significant Spearman rank correlations that were above BC WQGs or did not have BC WQGs (total strontium, TDS, ∑TUs [calculated with BC WQGs only and with BC WQGs and EVWQP benchmarks], PC1 and PC3 [combined dataset]) (Table 3.4-3) were carried through to graphical analysis (Figures 3.4-11 and 3.4-13). Although nickel did not have significant Spearman rank correlations for survival, it was still carried through to graphical analysis because of the strong relationship observed between nickel and *H. azteca* survival at CMO.

Dry Weight—The four Order constituents (dissolved cadmium, nitrate, sulphate, total selenium), and constituents and explanatory variables with significant Spearman rank correlations that were above BC WQGs or did not have BC WQGs (total lithium, total nickel, total strontium, TDS, ∑TUs [calculated with BC WQGs only and with BC WQGs and EVWQP benchmarks], PC1 and PC3 [combined dataset]) (Table 3.4-3) were carried through to graphical analysis (Figures 3.4-14 to 3.4-16).

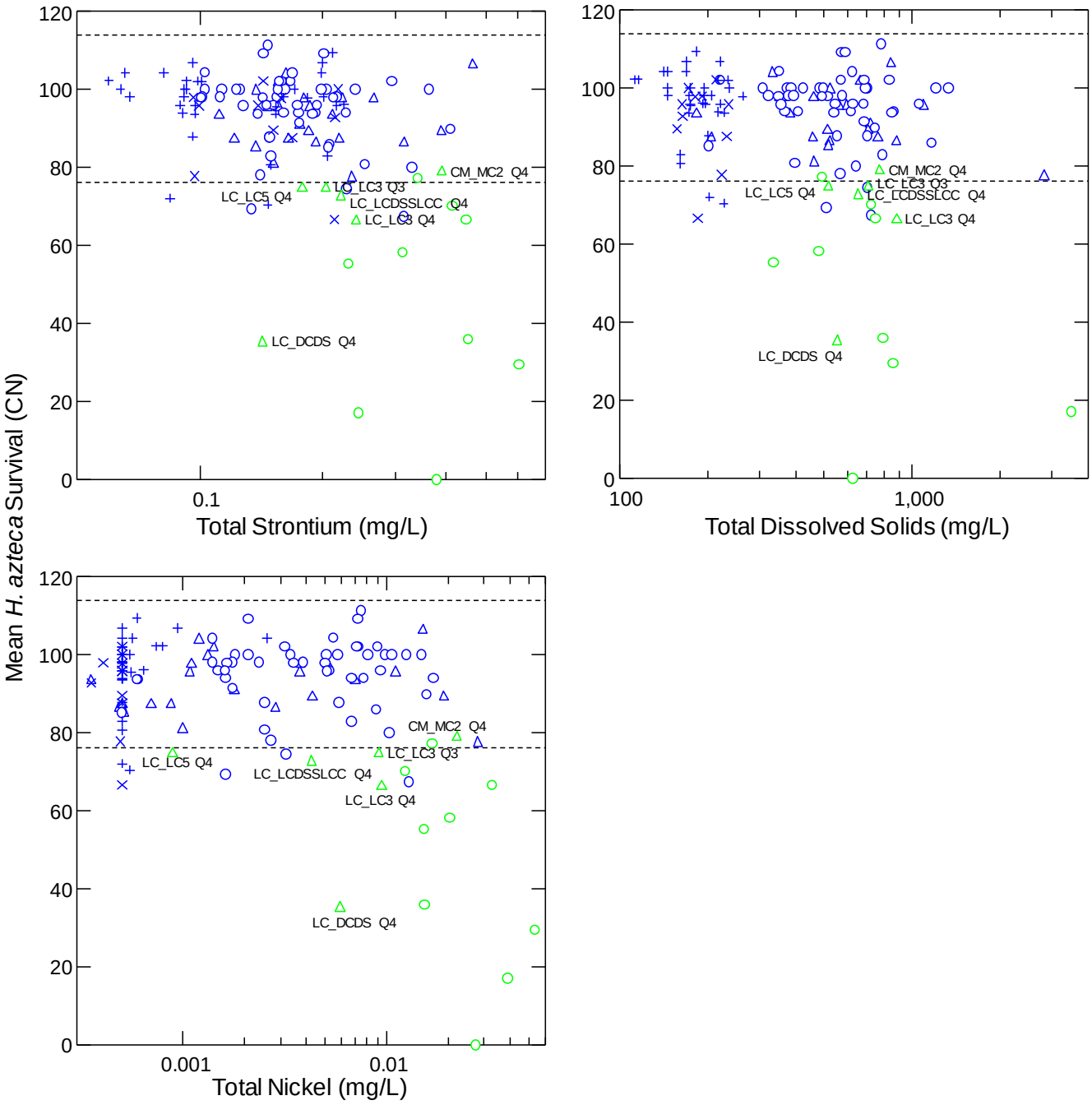
Most of the evaluated explanatory variables did not exhibit a consistent exposure-response relationship across *H. azteca* tests, and no consistent patterns were observed between the PCs carried forward to graphical analysis and test responses. However, nickel exhibited a somewhat consistent relationship between exposure concentration and magnitude of adverse response. This relationship was more evident for the growth endpoint relative to the survival endpoint for *H. azteca*. The potential for nickel and other constituents to explain observed effects is discussed in the next section.

Figure 3.4-11: Mean *H. azteca* survival versus dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



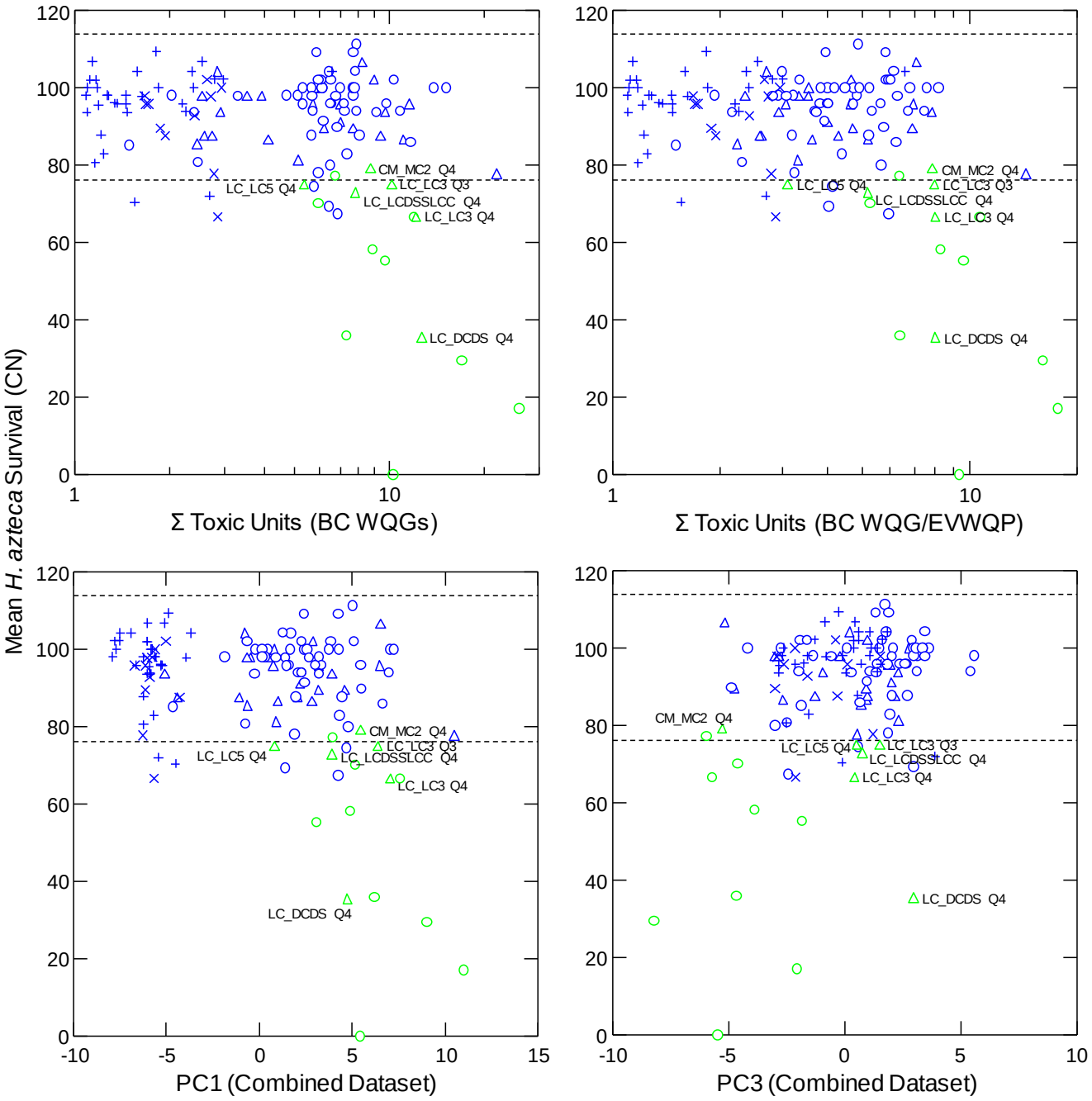
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-12: Mean *H. azteca* survival versus total strontium (top left), total dissolved solids (top right), and total nickel (bottom left).



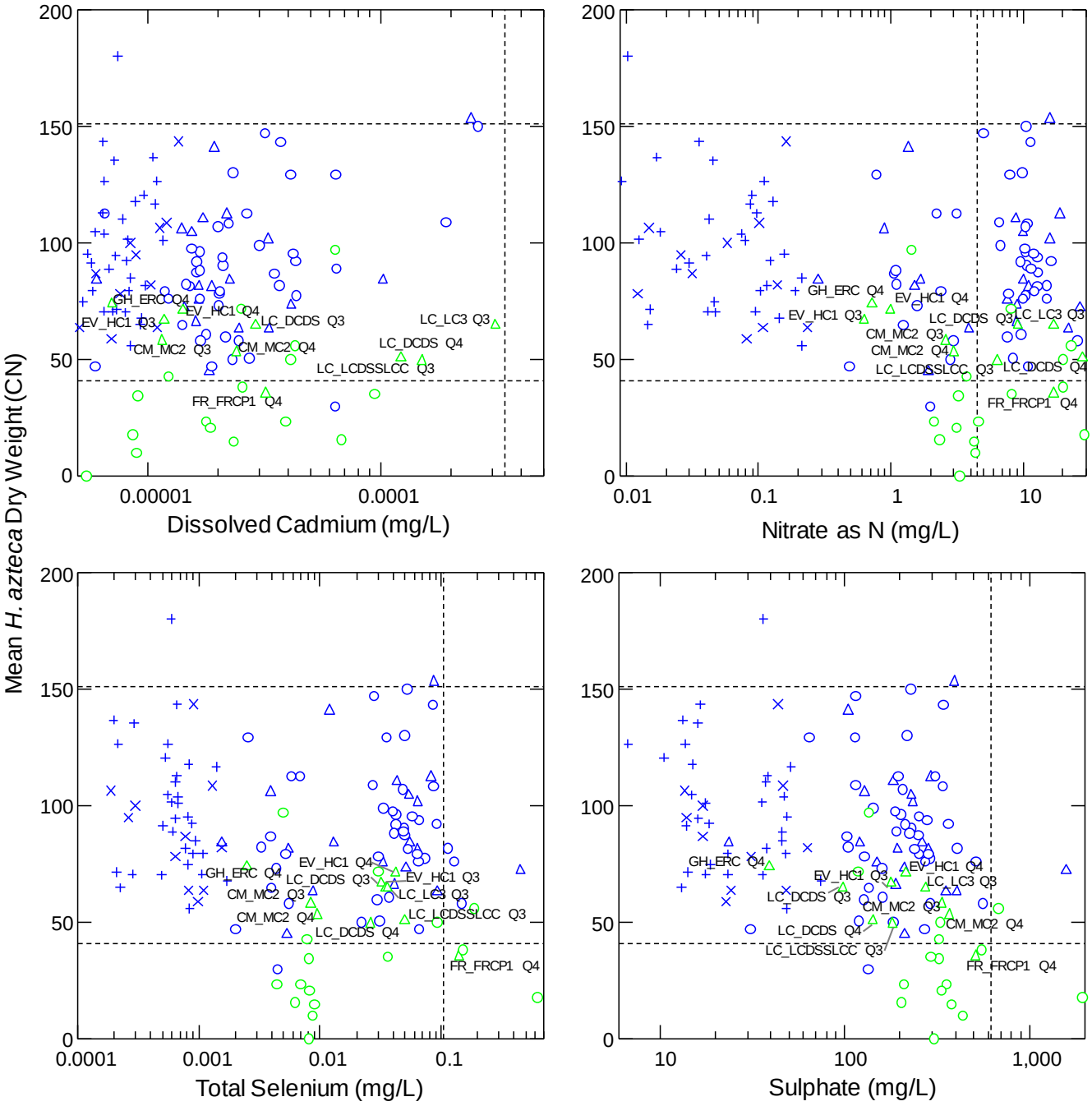
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-13: Mean *H. azteca* survival versus sum of toxic units calculated using BC WQGs only (top left), and sum of toxic units calculated using BC WQGs and EVWQP benchmarks (top right), PC1 with the combined dataset (bottom left), and PC3 with the combined dataset (bottom right).



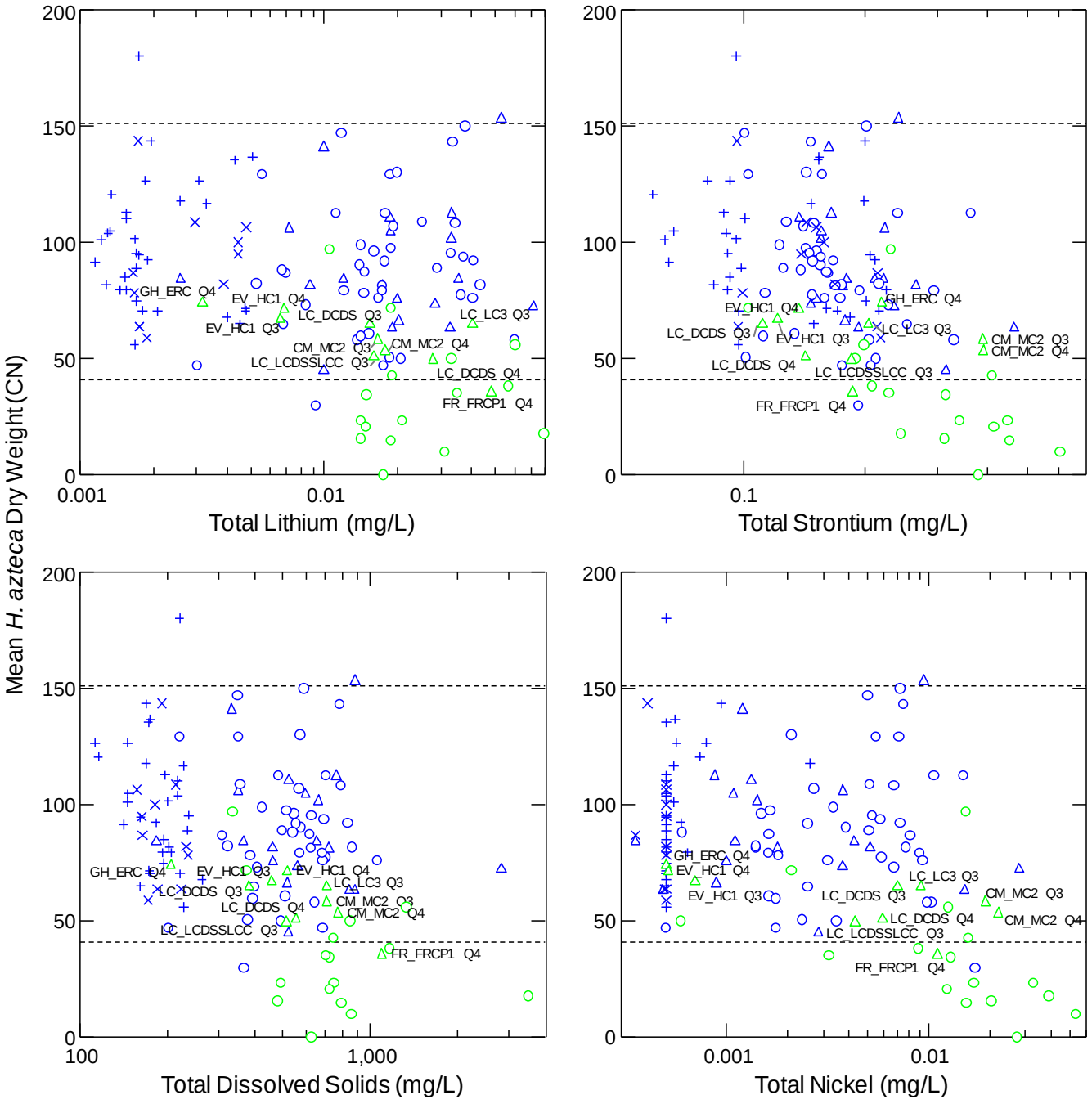
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-14: Mean *H. azteca* dry weight versus dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



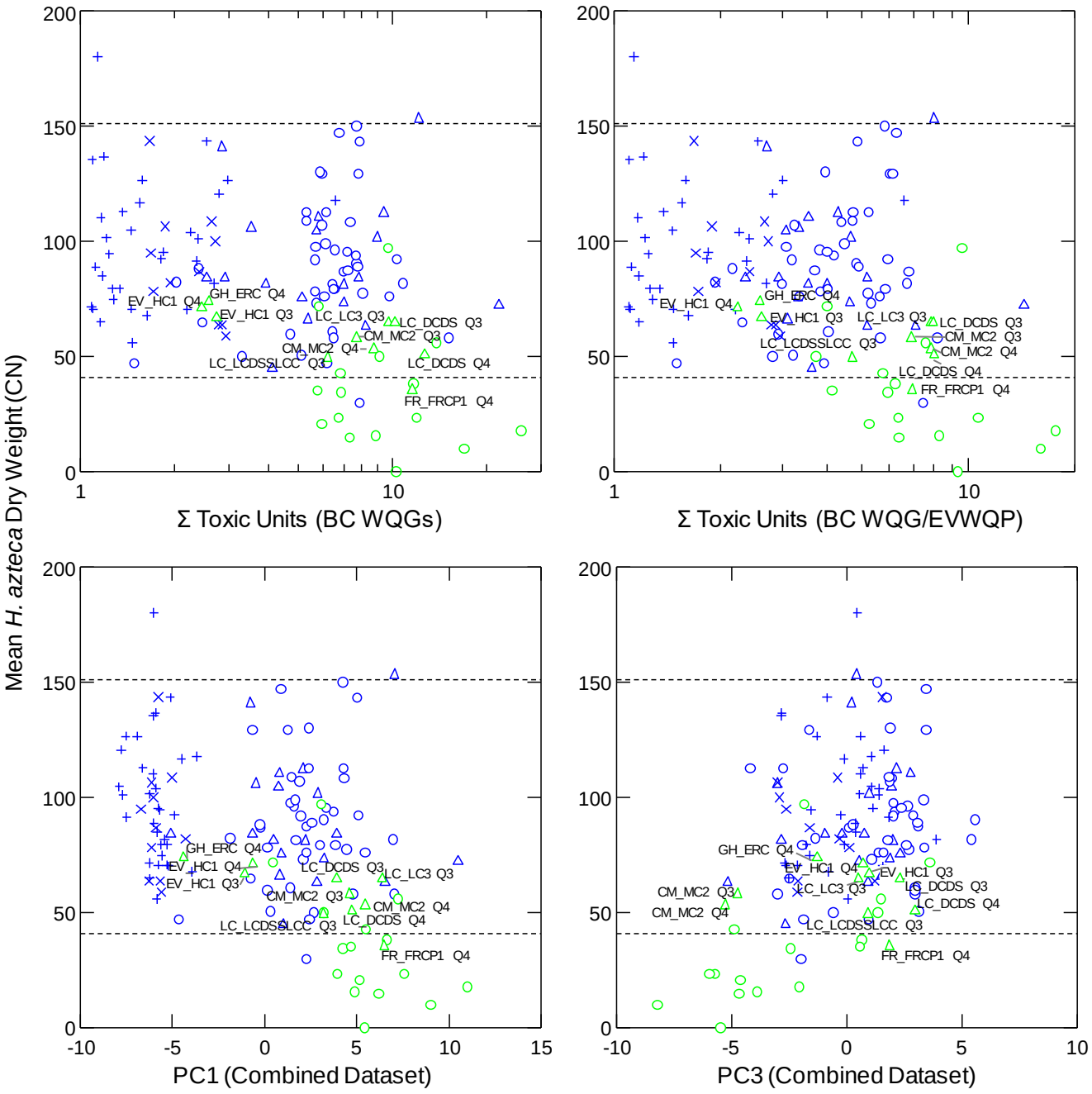
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-15: Mean *H. azteca* dry weight versus total lithium (top left), total strontium (top right), total dissolved solids (bottom left), and total nickel (bottom right).



Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-16: Mean *H. azteca* dry weight versus sum of toxic units calculated using BC WQGs only (top left), sum of toxic units calculated using BC WQGs and EVWQP benchmarks (top right), PC1 with the combined dataset (bottom left), and PC3 with the combined dataset (bottom right).



Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Identification of Potential Contributors to Toxicity (H. azteca)

Survival—In tests categorized as having a possible or likely adverse response, concentrations of most constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-3), and/or were lower than the chronic BC WQG (Appendix C). Such constituents are not expected to contribute to toxicity in these tests. Published toxicity data were reviewed for constituents that were higher than reference waters and test site waters categorized as no adverse response and/or above BC WQGs and lowest level 1 EVWQP benchmarks and are discussed below.

- **LC_DCDS (Q4)**—The strongest evidence for causation was observed for nitrate. Concentrations of nitrate and orthophosphate were higher than reference waters and test site waters categorized as no adverse response (Table D-3). Orthophosphate is a constituent that may result in ecological changes in the receiving environment under long-term discharge conditions but would not be expected to cause direct aquatic toxicity at the concentration observed in this sample (0.028 mg/L). In contrast, the nitrate concentration in this test (28 mg/L NO_3-N) was higher than the 14-day EC_{20} of 26 mg/L NO_3-N for *H. azteca* biomass in Elk River water (Teck 2014), indicating that nitrate may have contributed to the observed response in this test.

- **CM_MC2 (Q4)**—No water quality constituent was identified as a potential cause of the observed response in these tests. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-3). Although nickel was lower in these tests relative to test site waters categorized as no adverse response, the nickel concentration was reviewed because of the strong relationship observed between nickel and *H. azteca* survival at CMO. The nickel concentration in this test (22 µg/L) was similar to the highest concentrations in 2017 TIE testing that were associated with no observed effect on survival (20 µg/L) (Nautilus 2018), indicating that nickel did not contribute to the observed responses.

- **LC_LC3 (Q4)**—No water quality constituent was identified as a potential cause of the observed response in these tests. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-3), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks, except for dissolved copper and nitrate (Appendix C). Copper is not expected to have contributed to toxicity in this test because the test site concentration (0.51 µg/L) was more than an order of magnitude less than the LC_{50} species mean for *H. azteca* (12 µg/L for hardness ~300 mg/L as $CaCO_3$, DOC of ~4 mg/L, pH of ~7) reported in the US EPA criteria for copper technical report (US EPA 2007). The nitrate concentration in this test (16 mg/L NO_3-N) was lower than the 14-day EC_{10} of 19 mg/L for *H. azteca* biomass in Fording River water (Teck 2014), indicating that nitrate did not contribute to the observed response. There is some uncertainty in this result because of the shorter test duration used in the Fording River water test (14 days versus 28 days), and potential effects of nitrate on the observed response cannot be conclusively eliminated.

- **LC_LCDSSLCC (Q4)**—No water quality constituent was identified as a potential cause of the observed response in these tests. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-3), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks, except dissolved copper (Appendix C). The concentration of dissolved copper in this test (0.42 µg/L) was more than an order of magnitude less than the LC_{50} species mean for *H. azteca* (12 µg/L for hardness ~300 mg/L as $CaCO_3$, DOC of ~4 mg/L, pH of ~7) reported in the US EPA criteria for copper technical report (US EPA 2007), indicating that copper did not likely contribute to the observed response.

- **LC_LC3 (Q3) and LC_LC5 (Q4)**—No water quality constituent was identified as a potential cause of the observed response in these tests. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-3), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks (Appendix C). As discussed in Section 3.3.1.3, there was inconsistency in response among replicates exposed to the same site water, with the most pronounced variability observed in Q4 tests. It is uncertain whether this inter-replicate inconsistency, which is non-characteristic of this test protocol, reflects a test artifact or an actual adverse response to the test water.

Dry Weight—In tests categorized as having a possible or likely adverse response, concentrations of most constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-3), and/or were lower than the chronic BC WQG (Appendix C). Such constituents are not expected to contribute to toxicity in these tests. Published toxicity data were reviewed for constituents that were higher than reference waters and test site waters categorized as no adverse response and/or above BC WQGs and lowest level 1 EVWQP benchmarks and are discussed below.

- **FR_FRCP1 (Q4)**—The strongest evidence for causation was observed for nickel. The concentration of nitrate was higher than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-3), but did not exhibit strong evidence for potential causation. The nitrate concentration in this test (17 mg/L NO_3-N) was lower than the 14-day EC_{10} of 19 mg/L for *H. azteca* biomass in Fording River water (Teck 2014), indicating that nitrate likely did not contribute to the observed response. Because of the shorter test duration used in the Fording River water test (14 days versus 28 days), there is some uncertainty in this result and potential effects of nitrate on the observed response cannot be conclusively eliminated. The concentration of nickel in this test (11 µg/L) was similar to the concentrations in the 2017 TIE testing that were associated with no effect on growth (10 µg/L), indicating that nickel is not contributing to toxicity. However, there is uncertainty in this comparison because the thresholds for adverse effects of nickel to *H. azteca* may be under-estimated (i.e., the IC_X may be lower), due to lower-doses of nickel administered during the second half of the 28-day exposure (Nautilus 2018). Results of the TIE treatment indicated that divalent metals (likely nickel) contributed, at least partly, to the observed response in the Q4 FR_FRCP1 test. Nickel related affects could not be ruled out.

- **LC_DCDS (Q3)**— The strongest evidence for causation was observed for nitrate. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-3), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks, except for nitrate (Appendix C). The nitrate concentrations in this test (17 mg/L NO_3-N) was equal to the 14-day EC_{10} of 17 mg/L for *H. azteca* biomass in Elk River water (Teck 2014), indicating that nitrate may have contributed to the observed response in this test.

- **LC_DCDS (Q4)**—The strongest evidence for causation was observed for nitrate. Concentrations of nitrate and orthophosphate were higher than reference waters and test site waters categorized as no adverse response (Table D-3). Similar to findings for *H. azteca* survival, although orthophosphate is a constituent that may result in ecological changes in the receiving environment under long-term discharge conditions, it would not be expected to cause direct aquatic toxicity at the concentration observed in this sample (0.028 mg/L). The nitrate concentration in this test (28 mg/L NO_3-N) was higher than the 14-day EC_{20} of 26 mg/L for *H. azteca* biomass in Elk River water (Teck 2014), indicating that nitrate may have contributed to the observed response in this test.

- **CM_MC2 (Q3 and Q4)**—Evidence for potential causation was observed for nickel. Although concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-3), the nickel concentrations were reviewed because of the strong relationship observed between nickel and *H. azteca* reproduction at CMO. Nickel concentrations in Q3 (19 µg/L) and Q4 (22 µg/L) were similar to the IC_{25} (22.4 µg/L) (Nautilus 2018), indicating that nickel contributed to the observed response. This interpretation aligns with the 2019 *H. azteca* TIE testing conducted with Q3 and Q4 CM_MC2 waters, which indicated that divalent metals (likely nickel) were the probable cause of *H. azteca* sublethal toxicity.

- **EV_HC1, LC_LC3, LC_LCDSSLCC (Q3) and GH_ERC, EV_HC1 (Q4)**—No water quality constituent was identified as a potential cause of the observed response in these tests. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-3), and/or were lower than the chronic BC WQG and EVWQP benchmarks (Appendix C). As discussed in Section 3.3.1.3, the inconsistency in responses among replicates exposed to the same site water in *H. azteca* tests brings uncertainty to the responses observed. It is uncertain if this inter-replicate inconsistency reflects a test artifact or an actual adverse response to the test water.

3.4.4 *Oncorhynchus mykiss* Survival and Viability

Water Quality Screening (O. mykiss)

In one out of seven tests categorized as possible or likely (Q4 EV_MC2), concentrations did not exceed BC WQGs or EVWQP benchmarks. In the remaining six tests categorized as possible or likely, concentrations of one or more constituent exceeded a BC WQG or EVWQP benchmark:

- **FR_FRABCH, GH_FR1 (Q2) and LC_LC5, GH_FR1 (Q4)**—The concentration of selenium exceeded the EVWQP benchmark.

- **LC_DCDS (Q4)**—Concentrations of selenium and nitrate exceeded EVWQP benchmarks and nickel exceeded the level 1 interim screening value.

- **CM_MC2 (Q4)**—The concentration of nickel exceeded the level 1 interim screening value.

Spearman Rank Correlation (O. mykiss)

Constituents and explanatory variables with a statistically significant Spearman rank correlation for *O. mykiss* survival are provided in Table 3.4-5.

Survival and Viability—Most constituents and explanatory variables with significant Spearman rank correlations also exhibited strong correlations (i.e., $r_s \leq -0.4$) in the combined dataset.

The following PC scores had statistically significant Spearman rank correlations for one or more endpoints:

- **PC1 (combined dataset)**—This component accounted for 29% of the variance (Table E-4). PC1 had strong positive loadings for TDS, components of TDS (e.g., calcium), Order constituents (sulphate, nitrate, selenium), and several metals (e.g., antimony, lithium, uranium).

- **PC2 (2019 only dataset)**—This component accounted for 15% of the variance (Table E-4). PC2 had strong positive loadings for TSS, TOC, turbidity, and several metals (e.g., aluminum, cobalt, iron).

When compared between the combined dataset and the 2019 only dataset, the factor loading scores exhibited the following patterns:

- **PC1**—The component loadings in PC1, which appeared to be a strong signal of mine influence (i.e., strong loadings for TDS, Order constituents), exhibited similar patterns between the combined dataset and the 2019 only dataset. PC1 in both datasets had strong loadings for mostly the same constituents (Table E-4).
- **PC2**—The component loadings in PC2, which correlated with particulate-associated parameters (i.e., strong loading for TSS), exhibited somewhat similar patterns between the combined dataset and the 2019 only dataset (Table E-4). The pattern observed between the two datasets was similar for most constituents that appeared to be a signal of particulates (e.g., TSS, TOC, turbidity, aluminum, and iron), although some minor differences were also observed for some strong loadings for metals. For example, PC2 had strong loadings for chromium and copper in the combined dataset, but not in the 2019 only dataset.

Table 3.4-5: Constituents and Explanatory Variable with Significant Spearman Rank Correlations for *Oncorhynchus mykiss* Survival and Viability

Constituent[(a)]	Survival		Viability		Comparison to BC WQGs/EVWQP Benchmarks	Retained for Graphical Analysis?	
	R_s Combined Dataset	R_s 2019 Dataset	R_s Combined Dataset	R_s 2019 Dataset		Survival	Viability
Total alkalinity	-0.454	-0.568	-0.486	-0.650	No WQG	No—included in TDS	
Barium-total	-0.340	-0.601	-0.313	-0.614	No exceedance	No	
Bromide	-0.339	ns	-0.333	ns	No WQG	No—low detection frequency	
Calcium	-0.519	-0.664	-0.548	-0.713	No WQG	No—included in TDS	
Chloride	-0.356	-0.507	-0.376	ns	No exceedance	No	
Conductivity	-0.508	-0.664	-0.536	-0.684	No WQG	No—included in TDS	
Hardness	-0.507	-0.660	-0.534	-0.691	No WQG	No—included in TDS	
Lithium-total	-0.363	-0.617	-0.385	-0.611	No WQG	Yes	
Magnesium	-0.489	-0.649	-0.515	-0.673	No WQG	No—included in TDS	
Nickel-total	ns	-0.548	ns	ns	Exceeds L1 interim screening value	Yes	
Nitrate	-0.435	-0.658	-0.444	-0.613	Exceeds L1 EVWQP benchmarks	Yes	
Nitrite	-0.523	-0.680	-0.480	-0.627	No exceedance	No	
pH	-0.262	ns	ns	ns	No exceedance	No	—
Potassium	-0.431	-0.686	-0.427	-0.652	No WQG	No—included in TDS	
Selenium-total	-0.446	-0.672	-0.462	-0.660	Exceeds L1 EVWQP benchmarks	Yes	
Sodium	ns	-0.552	-0.309	-0.607	No WQG	No—included in TDS	
Sulphate	-0.480	-0.663	-0.509	-0.657	No exceedance	Yes—order constituent	
Total dissolved solids	-0.513	-0.684	-0.541	-0.704	No WQG	Yes	
Uranium-total	-0.414	-0.573	-0.442	-0.564	No exceedance	No	
∑TU-WQGs	-0.303	-0.622	-0.296	-0.558	No WQG	Yes	
∑TU-WQGs/Benchmarks	ns	-0.480	ns	ns	No WQG	Yes	—
PC1 (combined dataset)	-0.439	-	-0.484	-	No WQG	Yes	
PC2 (2019 dataset)	-	-0.603	-	-0.627	No WQG	Yes	

Notes: — = not applicable to dataset or endpoint; BC WQGs = British Columbia water quality guidelines; EVWQP = Elk Valley Water Quality Program; L1 = lowest level 1; ns = not significant; PC = principal component; ∑TU = sum of toxicity units; TDS = total dissolved solids.

(a) Total concentrations are shown for metals that have a BC WQG for the total fraction or that lack a chronic BC WQG. Dissolved concentrations were used for metals with a BC WQG for the dissolved fraction.

(b) Shaded values indicate a strong Spearman rank correlation at $r_s \leq -0.4$.

Graphical Analysis (O. mykiss)

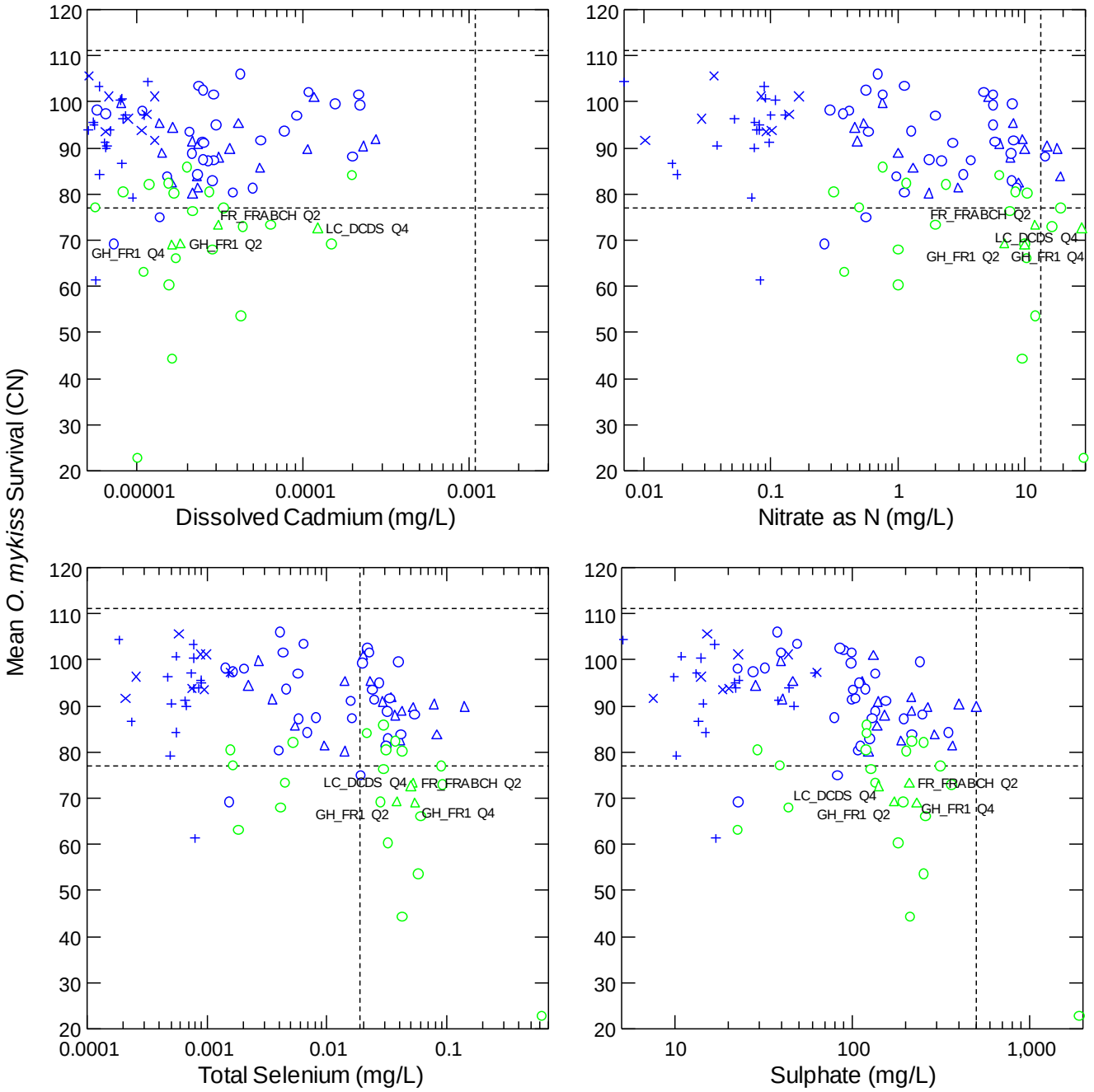
Survival—The four Order constituents (dissolved cadmium, nitrate, sulphate, total selenium), and constituents and explanatory variables with significant Spearman rank correlations that were above BC WQGs or did not have BC WQGs (total lithium, total nickel, total dissolved solids, ∑TU [calculated with BC WQGs only and BC WQGs and EVWQP benchmarks], PC1 [combined dataset], and PC2 [2019 dataset]) (Table 3.4-5) were carried through to graphical analysis (Figures 3.4-17 and 3.4-19). Although bromide exhibited significant negative correlations, it was not included in graphical analysis because of low detection frequency[19].

Viability—The four Order constituents (dissolved cadmium, nitrate, sulphate, total selenium), and constituents and explanatory variables with significant Spearman rank correlations that were above BC WQGs or did not have BC WQGs (total lithium, total nickel, total dissolved solids, ∑TU [calculated with BC WQGs only], PC1 [combined dataset] and PC2 [2019 dataset]) (Table 3.4-5) were carried through to graphical analysis (Figures 3.4-3 to 3.4-21). Although bromide had significant negative correlations, it was not included in graphical analysis because of low detection frequency[19].

There are no consistent patterns between concentrations of constituents and responses or between the PCs carried forward to graphical analysis and test responses across *O. mykiss* tests. Because no apparent relationships were observed for concentrations versus responses, the water quality screening was relied upon for identification of potential causes of observed effects in the following section.

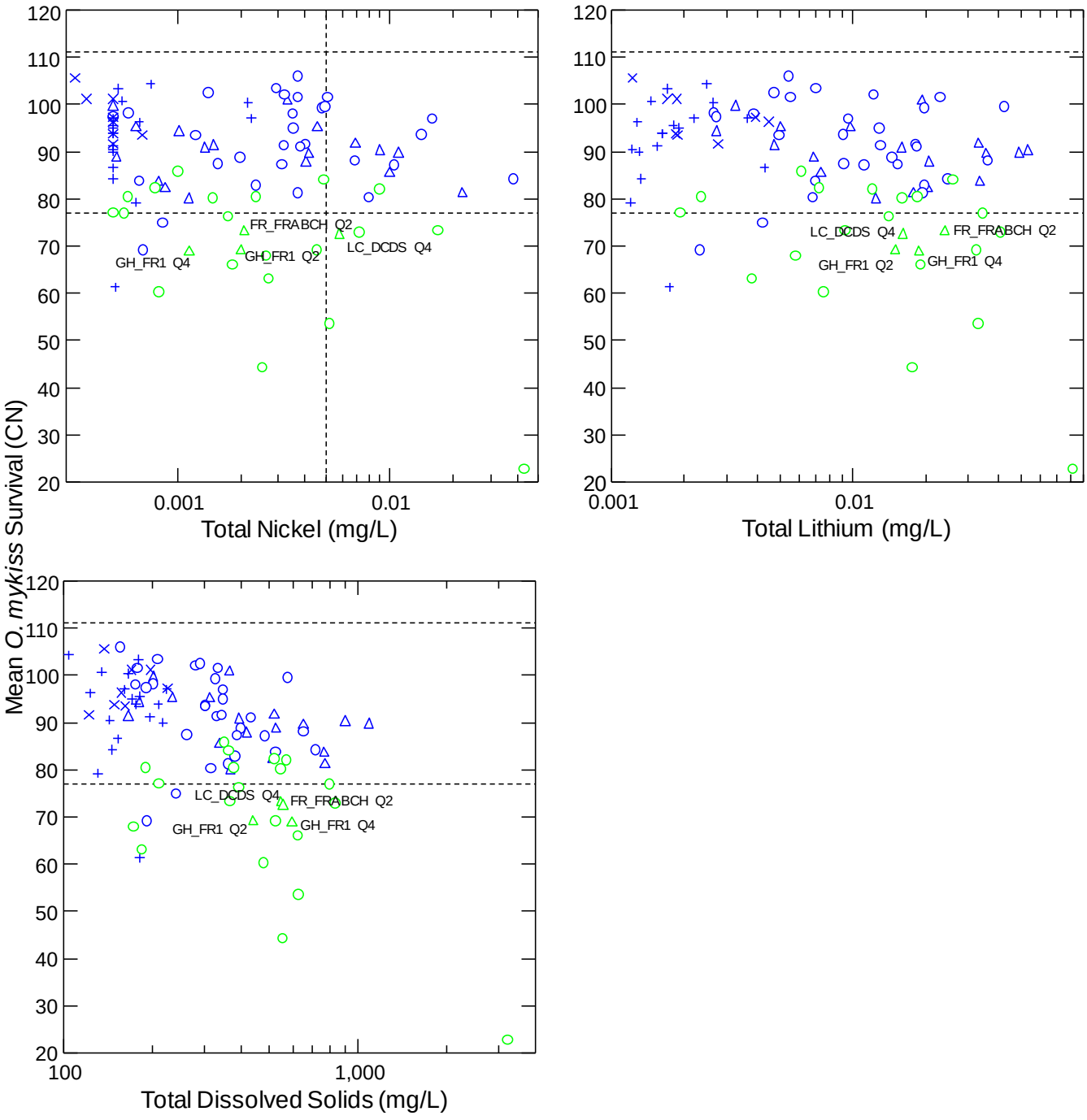
[19] 80% of 98 samples had bromide concentrations below detection limits (Table D-4).

Figure 3.4-17: Mean *O. mykiss* survival versus dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



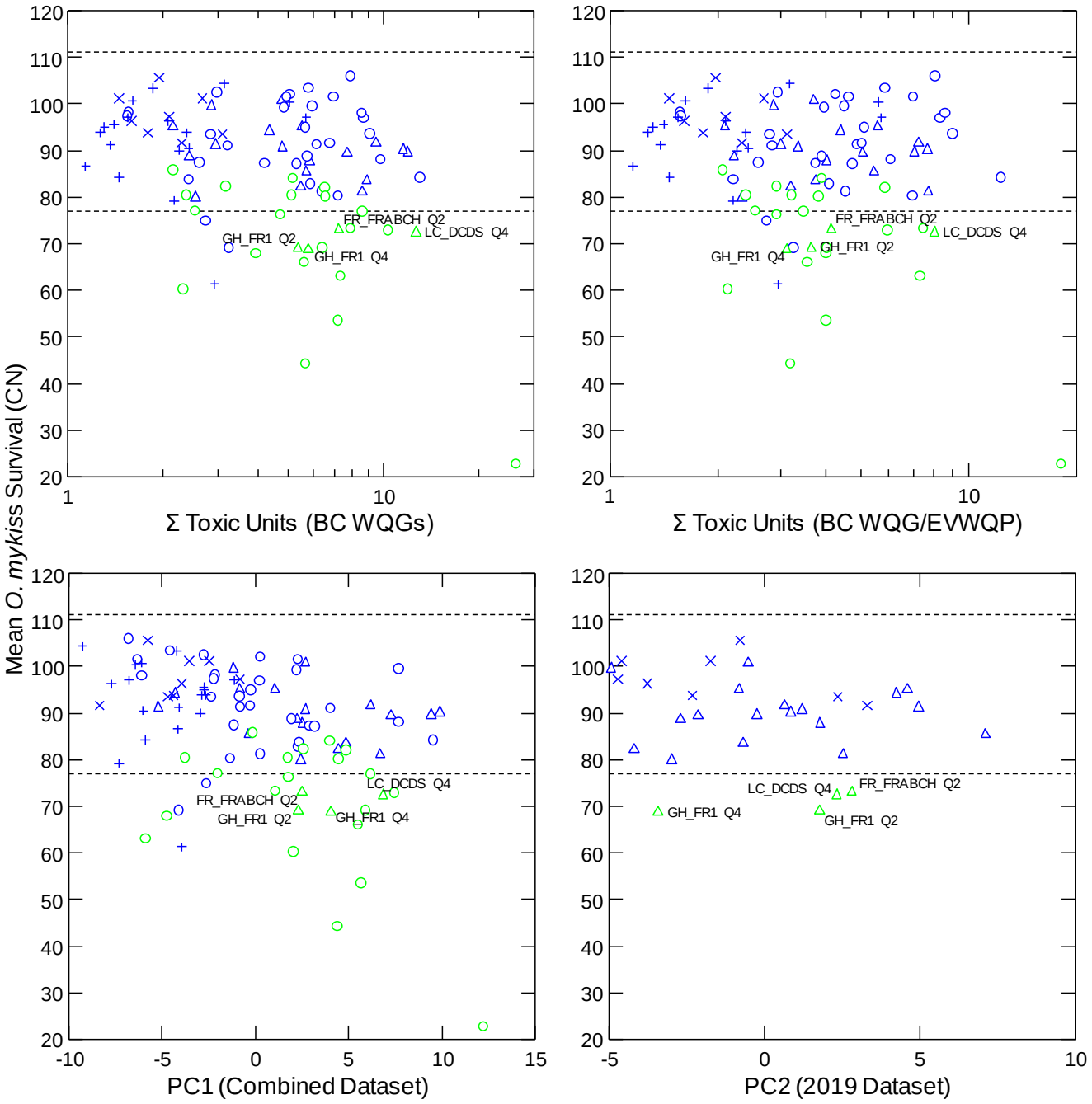
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-18: Mean *O. mykiss* survival versus total lithium (top left), total nickel (top right), total dissolved solids (bottom left), and sum of toxic units calculated using BC WQGs only (bottom right).



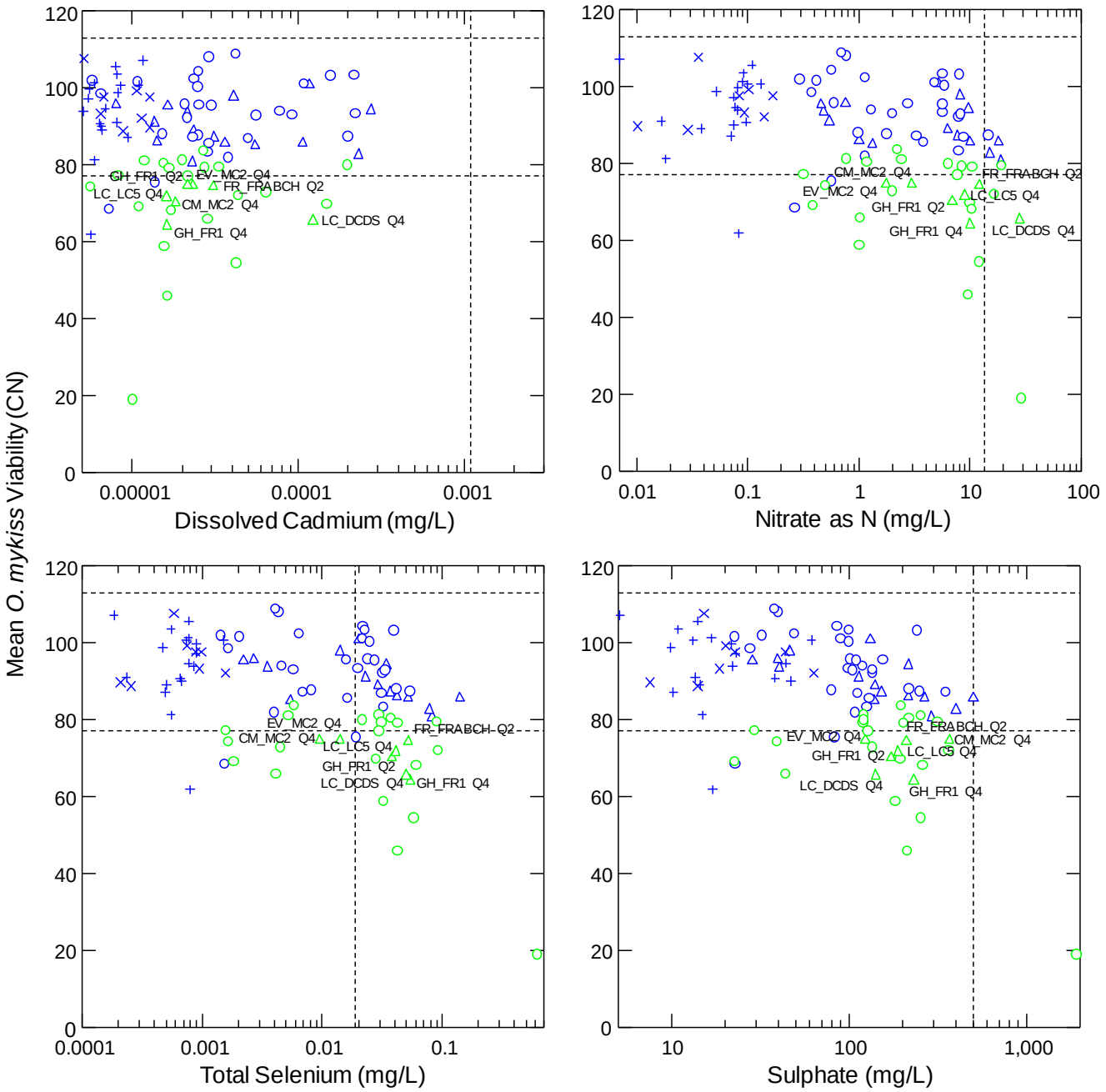
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-19: Mean *O. mykiss* survival versus sum of toxic units calculated using BC WQGs only (top left), sum of toxic units calculated using BC WQGs and EVWQP benchmarks (top right), PC1 with the combined dataset (bottom left), and PC2 with the combined dataset (bottom right.



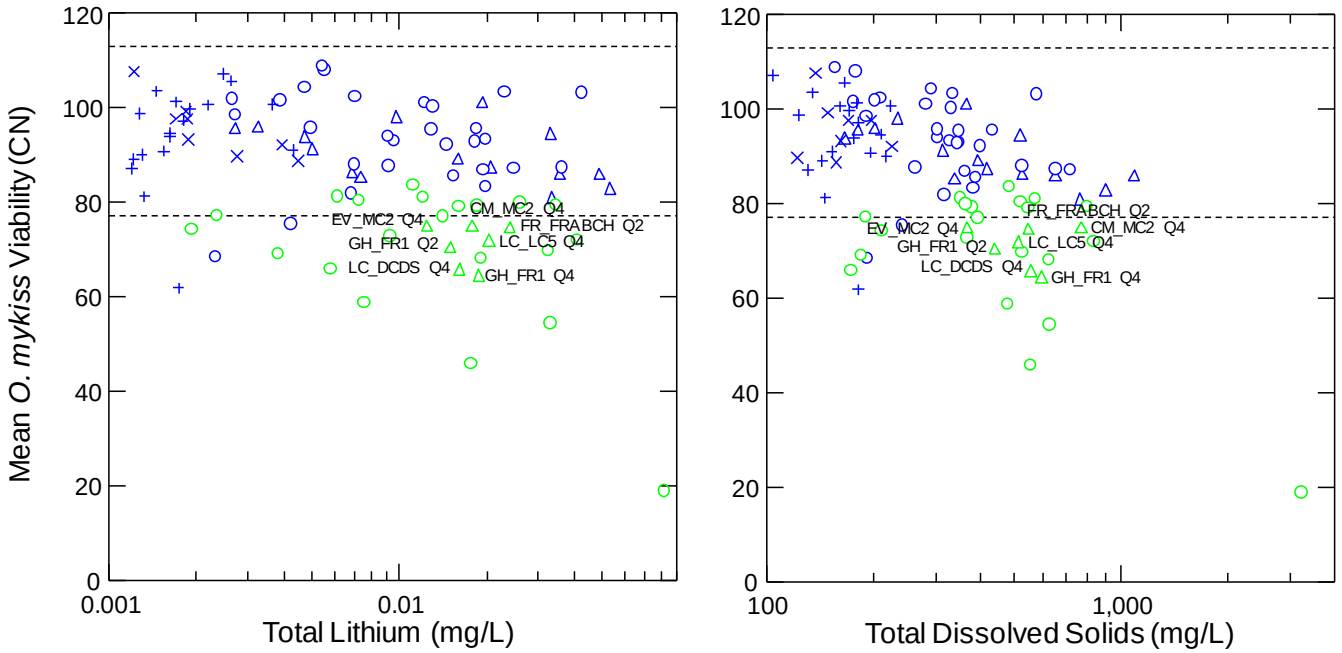
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-20: Mean *O. mykiss* viability versus dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



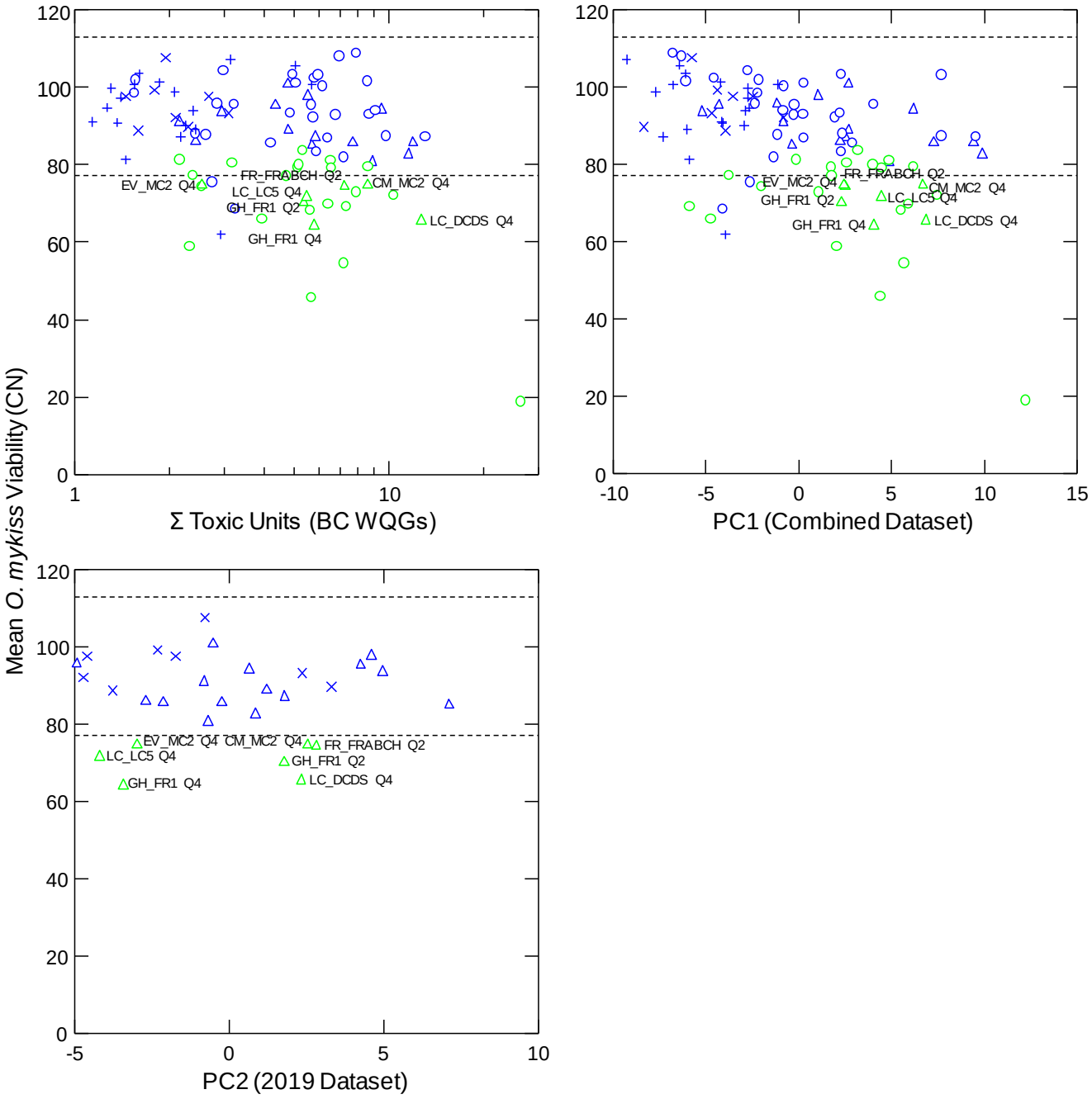
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-21: Mean *O. mykiss* viability versus total lithium (left) and total dissolved solids (right).



Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-21: Mean *O. mykiss* viability versus sum of toxic units calculated using BC WQGs only (top left), and PC1 with the combined dataset (top right), and PC2 with the 2019 only dataset (bottom left).



Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Identification of Potential Contributors to Toxicity (O. mykiss)

In tests categorized as having a possible or likely adverse response, concentrations of most constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-4), and/or were lower than the chronic BC WQG (Appendix C). Such constituents are not expected to contribute to toxicity in these tests. Published toxicity data were reviewed for constituents that were higher than reference waters and test site waters categorized as no adverse response and/or above BC WQGs and lowest level 1 EVWQP benchmarks and are discussed below.

- **FR_FRABCH, GH_FR1 (Q2) and GH_FR1, LC_LC5, CM_MC2, EV_MC2 (Q4)**—No water quality constituent was identified as a potential cause of the observed response in these tests. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-4), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks (Appendix C).

- **LC_DCDS (Q4)**—The strongest evidence for causation was observed for nitrate. Concentrations of nitrate and orthophosphate were higher than reference waters and test site waters categorized as no adverse response (Table D-4). Orthophosphate is a constituent that may result in ecological changes in the receiving environment under long-term discharge conditions, but is not expected to have direct aquatic toxicity. Therefore, orthophosphate is not likely contributing to toxicity in this test. The nitrate concentration in this test (28 mg/L NO_3-N) was higher than the level 2 benchmark from the EVWQP (24 mg/L NO_3-N at hardness ~400 mg/L as $CaCO_3$). The level 2 benchmark is associated with 20% effect on *O. mykiss* development, indicating that nitrate may have contributed to the observed response in this test.

3.4.5 *Pimephales promelas* Survival and Biomass

As discussed in Section 3.3.1.5, four of six tests categorized as possible or likely (Q1 test with FR_FRABCH, Q3 tests with FR_FRCP1, CM_MC2, LC_LCDSSLCC) had microbial growth and were excluded from the statistical analysis (i.e., PCA and Spearman rank correlation). These tests were compared to BC WQGs and level 1 EVWQP benchmarks for discussion purposes, although constituents identified as potential contributors to toxicity remain uncertain with the known evidence of microbes.

Water Quality Screening (P. promelas)

In the Q1 GH_ERC test, concentrations did not exceed BC WQGs or lowest level 1 EVWQP benchmarks. In the remaining five tests categorized as possible or likely adverse effects, concentrations of one or more constituent exceeded a BC WQG or lowest level 1 EVWQP benchmark:

- **FR_FRCP1 (Q1)**—Concentrations of sulphate, nitrate, and selenium exceeded the lowest level 1 EVWQP benchmarks, the concentration of nickel exceeded the level 1 interim screening value, and the concentration of uranium exceeded the BC WQG.

- **FR_FRABCH (Q1)**—Concentrations of nitrate and selenium exceeded the lowest level 1 EVWQP benchmarks.

- **FR_FRCP1 and LC_LCDSSLCC (Q3)**—The concentration of selenium exceeded the lowest level 1 EVWQP benchmark.

- **CM_MC2 (Q3)**—The concentration of nickel exceeded the level 1 interim screening value.

Spearman Rank Correlation (P. promelas)

Survival—No constituents or explanatory variables had significant Spearman rank correlations for *P. promelas* survival except for PC2 (2019 dataset)[20]. The correlations for total chromium, PC1 and PC2 (2019 dataset) were strong (i.e. r_s >0.4).

Biomass—No constituents or explanatory variables had significant Spearman rank correlations for *P. promelas* biomass. The correlations for PC2 and PC4 (2019 dataset) were strong (i.e. r_s >0.4).

The following PC scores had statistically significant or strong Spearman rank correlations:

- **PC1 (2019 dataset)**—This component accounted for 37% of the variance (Table E-5). PC1 had strong positive loadings for TDS, components of TDS (e.g., calcium), Order constituents (dissolved cadmium, sulphate, nitrate, selenium), and strong negative loadings for several dissolved metals (e.g., chromium, copper, mercury).
- **PC2 (2019 dataset)**—This component accounted for 15% of the variance (Table E-5). PC2 had strong positive loadings for several total and dissolved metals (e.g., barium, bismuth, vanadium), some dissolved metals (e.g., copper, lead, mercury), and a strong negative loading for total chromium.
- **PC4 (2019 dataset)**—This component accounted for 8% of the variance (Table E-5). PC4 had strong positive loadings for several metals (e.g., aluminum, beryllium, iron).

When compared between the combined dataset and the 2019 only dataset, the factor loading scores showed the following patterns:

- **PC1**—The component loadings in PC1, which appeared to be a strong signal of mine influence (i.e., strong loadings for TDS and Order constituents), exhibited similar patterns between the combined dataset and the 2019 only dataset. PC1 in both datasets had strong loadings for similar constituent groups (Table E-5).
- **PC2**—The component loadings in PC2 did not follow a discernible pattern between the two datasets. In the combined dataset, PC2 appeared to be a signal of particulates (i.e., strong loading for TSS and turbidity). In the 2019 only dataset, PC2 had strong loadings for some dissolved metals (e.g., copper, lead, mercury) and had dissimilar loadings compared to the combined dataset PC2 (Table E-5).
- **PC4**—The component loadings in PC4 had no apparent signals in either dataset, nor consistency between the two datasets (Table E-5).

[20] PC2 had a significantly positive correlation at $\alpha < 0.005$, $r_s = 0.521$.

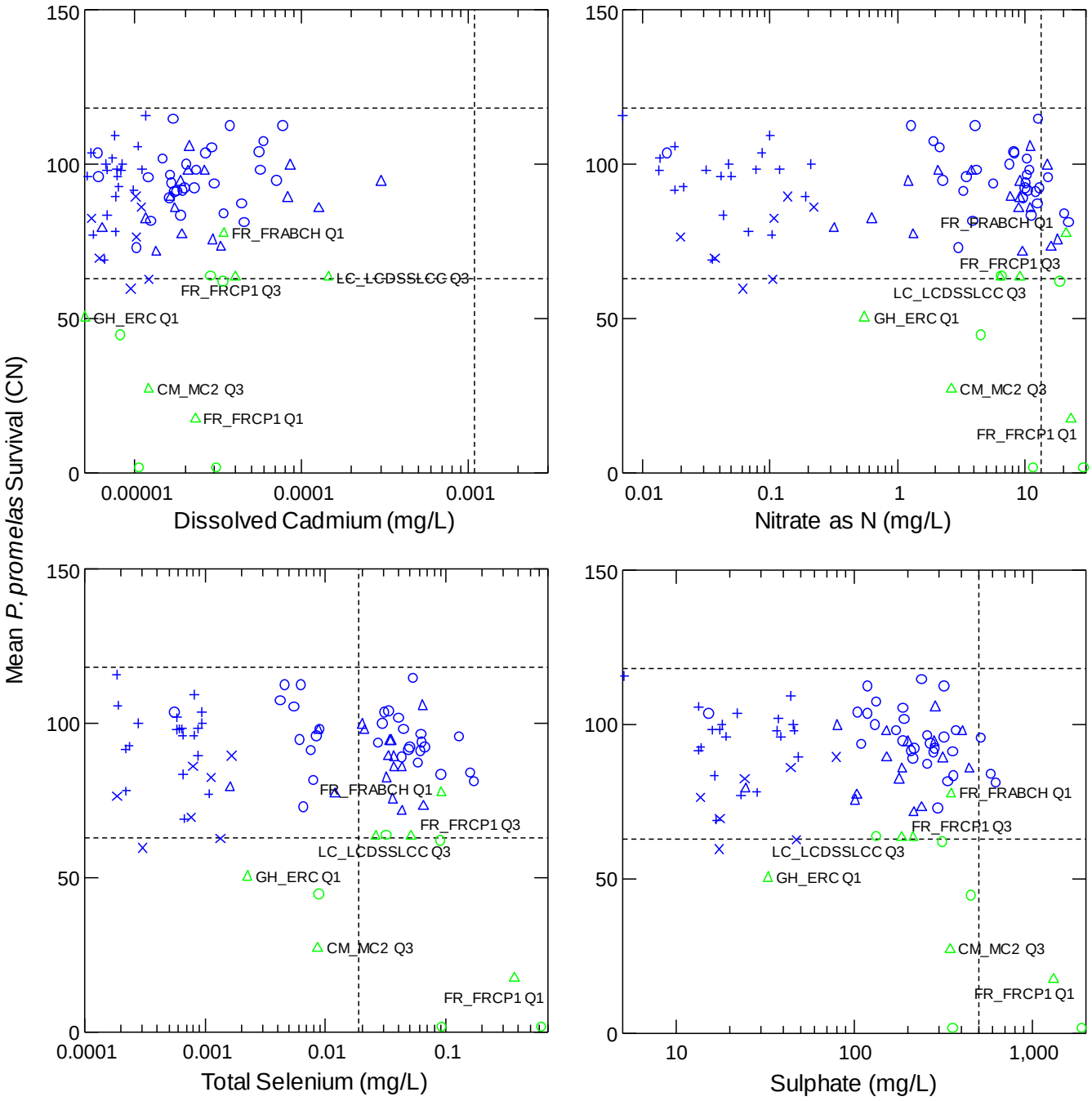
Graphical Analysis (P. promelas)

Survival—The four Order constituents (dissolved cadmium, nitrate, sulphate, total selenium), and explanatory variables that had significant or strong Spearman rank correlations (PC1 and PC2 [2019 dataset]) were carried through to graphical analysis (Figure 3.4-22 and 3.4-23)

Biomass—The four Order constituents (dissolved cadmium, nitrate, sulphate, total selenium), and explanatory variables that had strong Spearman rank correlations (PC2 and PC4 [2019 dataset]) were carried through to graphical analysis (Figure 3.4-24 and 3.4-25)

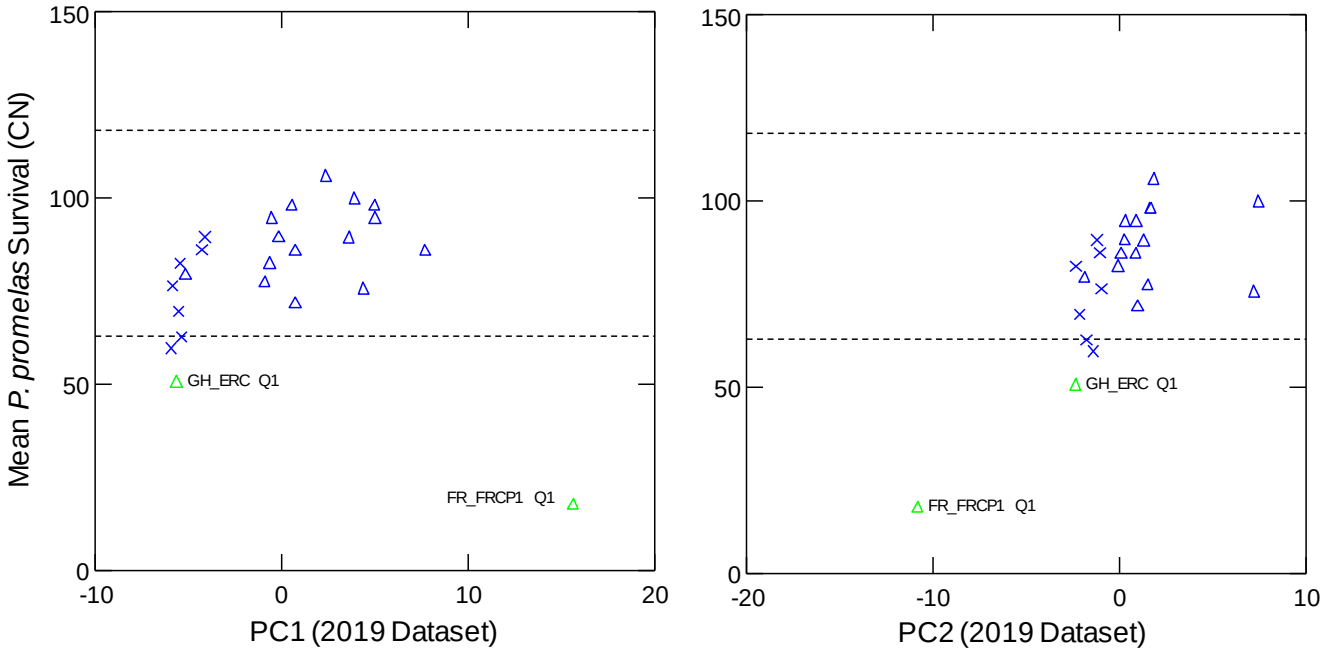
The evaluated explanatory variables did not exhibit a consistent exposure-response relationship across *P. promelas* tests. For PCs that were carried forward to graphical analysis, no consistent patterns were apparent between the PCs and test responses. Because no apparent relationships were observed for concentrations versus responses, the water quality screening was relied upon for identification of potential causes of observed effects in the following section.

Figure 3.4-22: Mean *P. promelas* survival versus dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



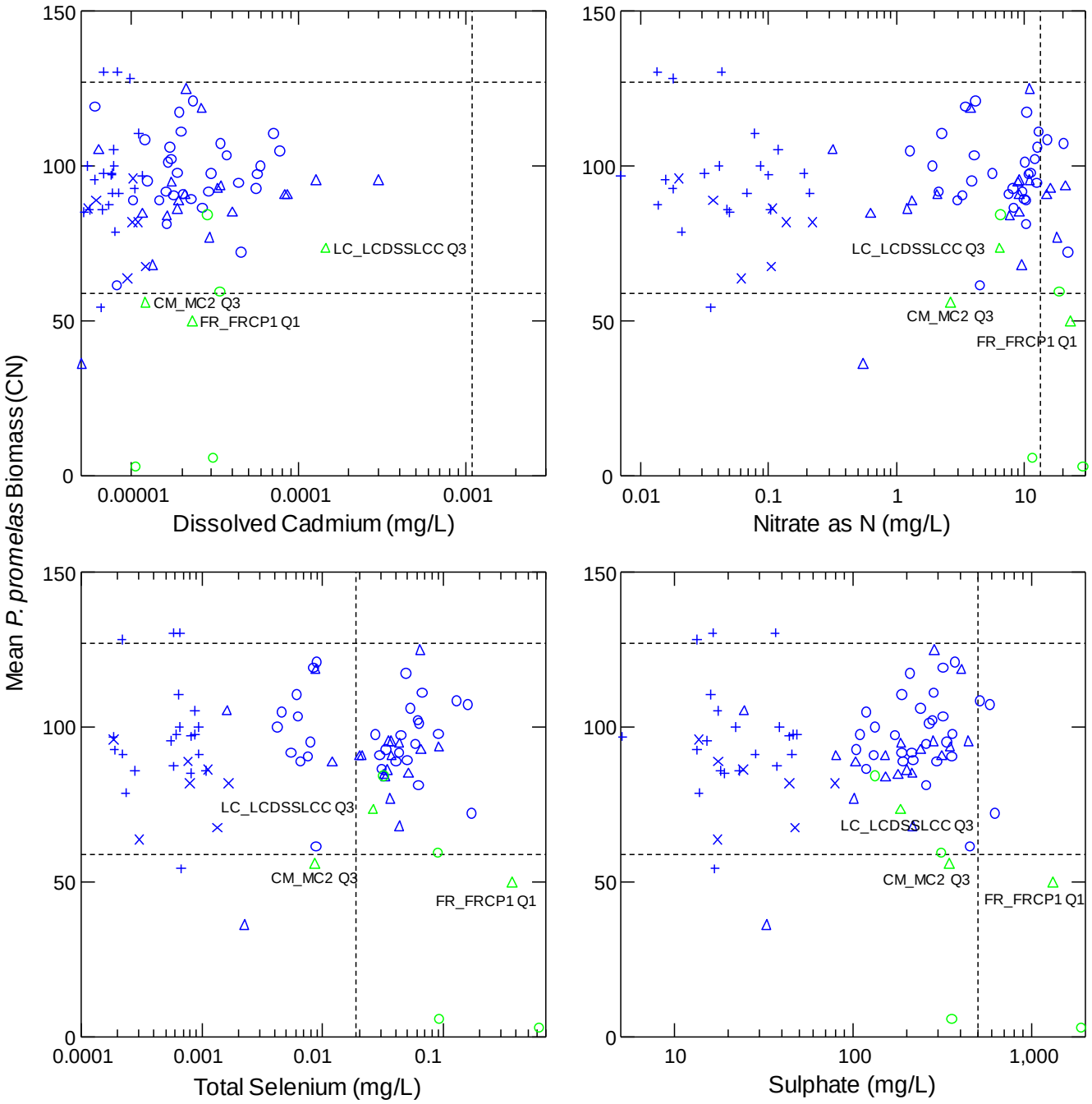
Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-23: Mean *P. promelas* survival versus PC1 with the 2019 only dataset (left) and PC2 with the 2019 only dataset (right).



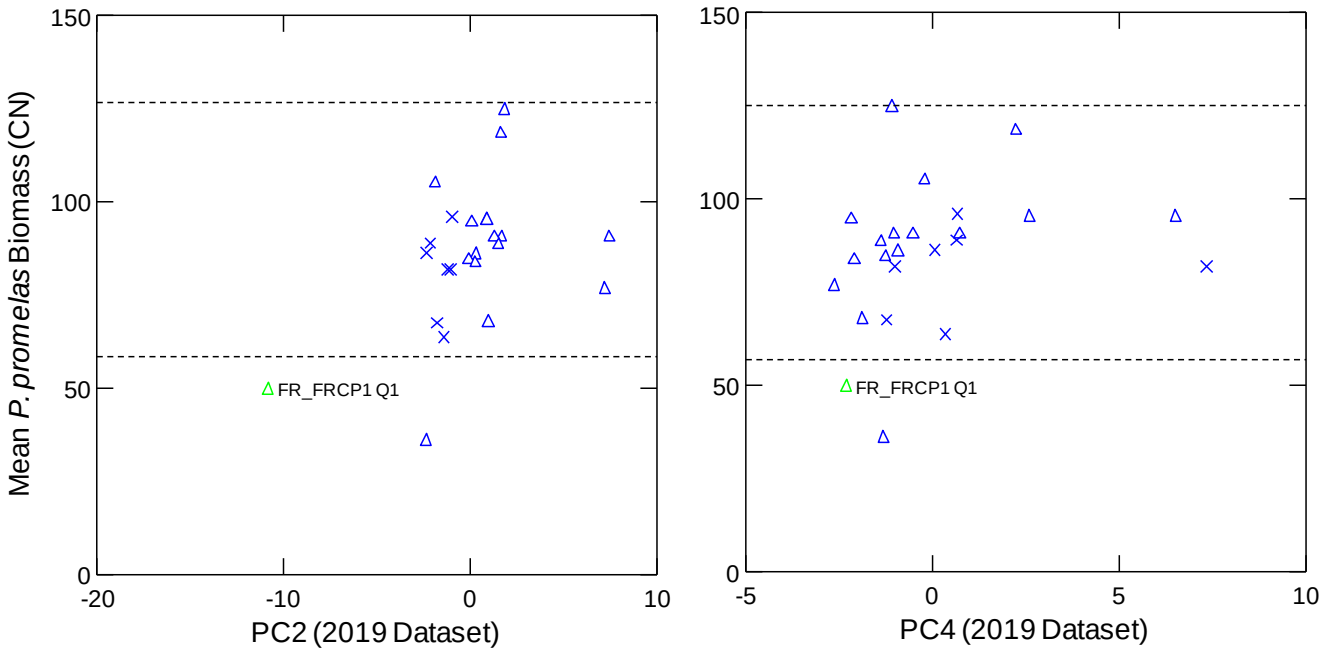
Note: Symbols indicate reference waters (blue +), test site waters with mean results categorized as no adverse response (blue Δ), and test site waters with mean results categorized as possible or likely adverse response (green Δ). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description). Tests with evidence of microbes (see Section 3.3.3.5) were excluded from the principal component analysis, and are therefore excluded from this plot.

Figure 3.4-24: Mean *P. promelas* biomass versus dissolved cadmium (top left), nitrate (top right), total selenium (bottom left), and sulphate (bottom right).



Note: Symbols indicate reference waters (blue × = 2015 to 2018; blue + = 2019), test site waters with mean results categorized as no adverse response (blue ○ = 2015 to 2018; blue Δ = 2019), and test site waters with mean results categorized as possible or likely adverse response (green ○ = 2015 to 2018; green Δ = 2019). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description).

Figure 3.4-25: Mean *P. promelas* biomass versus PC2 with the 2019 only dataset (left) and PC4 with the 2019 only dataset (right).



Note: Symbols indicate reference waters (blue +), test site waters with mean results categorized as no adverse response (blue Δ), and test site waters with mean results categorized as possible or likely adverse response (green Δ). Test site waters categorized as possible or likely in 2019 (green Δ) are labelled with the test site and quarter. Horizontal lines are regional normal range (see Figure 2.3-3 for description). Tests with evidence of microbes (see Section 3.3.3.5) were excluded from the principal component analysis, and are therefore excluded from this plot.

Identification of Potential Contributors to Toxicity (P. promelas)

In tests categorized as having a possible or likely adverse response, concentrations of most constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-5), and/or were lower than the chronic BC WQG (Appendix C). Such constituents are not expected to contribute to toxicity in these tests. Published toxicity data were reviewed for constituents that were higher than reference waters and test site waters categorized as no adverse response and/or above BC WQGs and lowest level 1 EVWQP benchmarks and are discussed below.

- **FR_FRCP1 (Q1)**—No water quality constituent was identified as a potential cause of the observed responses in this test. Concentrations of lithium, nickel, nitrate, selenium, sulphate, uranium, TDS, and several components related to TDS (e.g., calcium), and ∑TUs were higher than reference waters and test site waters categorized as no adverse response (Table D-5), but comparisons to toxicity benchmarks did not support a conclusion of causation for these constituents. Concentrations of sulphate (1,314 mg/L) and TDS (2,389 mg/L) in this test were higher than the maximum concentration tested in the Fall 2016 sulphate testing that resulted in no adverse effects (1,248 mg/L sulphate; ~2,000 mg/L TDS) (Golder 2018b), so effects could not be evaluated using site-specific testing. In comparison to literature values, the concentration of sulphate in this test (1,314 mg/L) was below the 7-day growth IC_{10} (1,323 mg/L) and the 7-day LC_{10} (2,451 mg/L) (Elphick et al. 2011; test hardness of 320 mg/L as $CaCO_3$), indicating that it is likely not contributing to sublethal or lethal effects in this test. Because of the shorter test duration used in Elphick et al. (2011) (7 days versus 32 days), there is uncertainty in these results and potential effects of sulphate on the observed response cannot be conclusively eliminated Given the correlation between sulphate and TDS (i.e., as sulphate increases, so does TDS), the similar conclusions were made for TDS. Other exposure constituents exhibited no strong evidence for potential causation:
  - The lithium concentration in this test (0.063 mg/L) was lower than the reported IC_{25} of 0.38 mg/L for *P. promelas* (Kszos et al. 2003)[21], indicating that it is not likely contributing to toxicity.
  - The nickel concentration in this test (24 µg/L) was less than the NOEC of 57 µg/L (EU 2008), indicating that it is not likely contributing to toxicity.
  - The nitrate concentration in this test (23 mg/L NO_3-N) was approximately two times lower than the 32-d EC_{10} of 55.5 mg/L NO_3-N (US EPA 2010), indicating that it is not likely contributing to toxicity.
  - The selenium concentration in this test (370 µg/L) was lower than the 32-day NOEC for *P. promelas* (390 µg/L) reported by Spehar (1986) for sodium selenate (as reported in Norberg-King 1989), indicating that selenium is not likely contributing to toxicity.
  - The uranium concentration in this test (13 µg/L) was lower than the 7-day IC_{10} of 1,040 µg/L (CCME 2011), indicating that it is not likely contributing to toxicity. There is uncertainty in this comparison because the test conducted herein (32 days) was approximately four times longer than the test used to derive the IC_{10} (7 days). This uncertainty is partially offset by the magnitude difference between the test concentration and the IC_{10}. Overall, uranium is not expected to have contributed to the observed response.

[21] Sodium has been shown to ameliorate lithium toxicity (Kszos et al. 2003). The sodium concentrations in the Q1 FR_FRCP1 test (2.1 mg/L) was similar to conditions in which the IC_{25} was derived (2.8 mg/L), making the effect concentration from Kszos et al. (2003) relevant to the FR_FRCP1 test.

In addition to the constituents discussed above, the ∑TUs were also higher in this test than in reference waters and/or test site waters categorized as no adverse response. However, the ∑TU values for these tests were largely driven by the hazard quotient for nickel. For example, in the ∑TUs calculated using BC WQGs (except for nickel, for which 5 µg/L was used [Section 2.3.4]) and EVWQP benchmarks, the hazard quotient for nickel accounted for between 26% and 40% of the ∑TU value. These results indicate that the relationship between ∑TU and reduced growth and survival in this test is largely driven by nickel, which was identified above as an unlikely cause of adverse effects. If the hazard quotient for nickel were excluded from the calculation, then the ∑TUs for these tests would be within the range observed in reference waters and test sites categorized as no adverse response. This analysis indicates that mixture-related effects (as evaluated by ∑TUs) is unlikely to explain the observed response.

- **FR_FRABCH (Q1)**—No water quality constituent was identified as a potential cause of the observed responses in this test. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-1) and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks, except nitrate (Appendix C). The nitrate concentrations in this test (21 mg/L as N) was lower than the 32-d EC_{10} of 55.5 mg/L (US EPA 2010), indicating that it is not likely contributing to toxicity.
- **GH_ERC (Q1), FR_FRCP1, CM_MC2, and LC_LCDSSLCC (Q3)**—No water quality constituent was identified as a potential cause of the observed response in these tests. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-5), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks (Appendix C).

3.5 Comparison of 2019 Results to Previous Years

Mean results for 2015 through 2019 inclusive were plotted to evaluate potential temporal patterns in responses. As outlined in Section 2.3.5, mean results were control normalized prior to plotting so that data processing was the same across years. An example plot is provided in Figure 2.3-3. Briefly, figures are interpreted as follows:

- Symbol color corresponds to an individual test site or reference location.
- Symbol type corresponds to the response category (circle = no; diamond = possible; triangle = likely). Categories were designated in each reporting year (i.e., 2015 results were categorized in Golder [2016], 2016 results were categorized in Golder [2017], 2017 results were categorized in Golder [2018a], and 2018 results were categorized in Golder [2019][22], and 2019 results were categorized in Section 3.3.1).
- Open symbols indicate test sites with a mean response statistically equivalent to all references tested in that batch. Filled symbols indicate test sites with a mean response significantly lower than one or more references tested in that batch.
- Local and regional NRs are provided on the plot to illustrate the range of responses in reference waters.

Plots were visually examined to identify potential seasonal or inter-annual changes in responses. Because some laboratory methods have changed over time and the methods used to categorize test results (i.e., narrative

[22] Line Creek data from 2015, 2016, 2017, and 2018 are categorized in Appendix G.

conclusions) as “no”, “possible”, or “likely” adverse response have changed over time, these graphics are intended to represent a coarse-level inter-annual comparison[23].

Mean results are plotted in the following figures:

- *C. dubia* survival (Figures 3.5-1) and reproduction (Figure 3.5-2)
- *P. subcapitata* cell yield (Figure 3.5-3)
- *H. azteca* survival (Figure 3.5-4) and dry weight (Figure 3.5-5)
- *O. mykiss* survival (Figure 3.5-6), viability (Figure 3.5-7), length (Figure 3.5-8), and weight (Figure 3.5-9)
- *P. promelas* hatch (Figure 3.5-10), survival (Figure 3.5-11), biomass (Figure 3.5-12), length (Figure 3.5-13), and development (Figure 3.5-14)

The following sections compare 2019 test results to previous years (i.e., 2015 to 2018) for each test site.

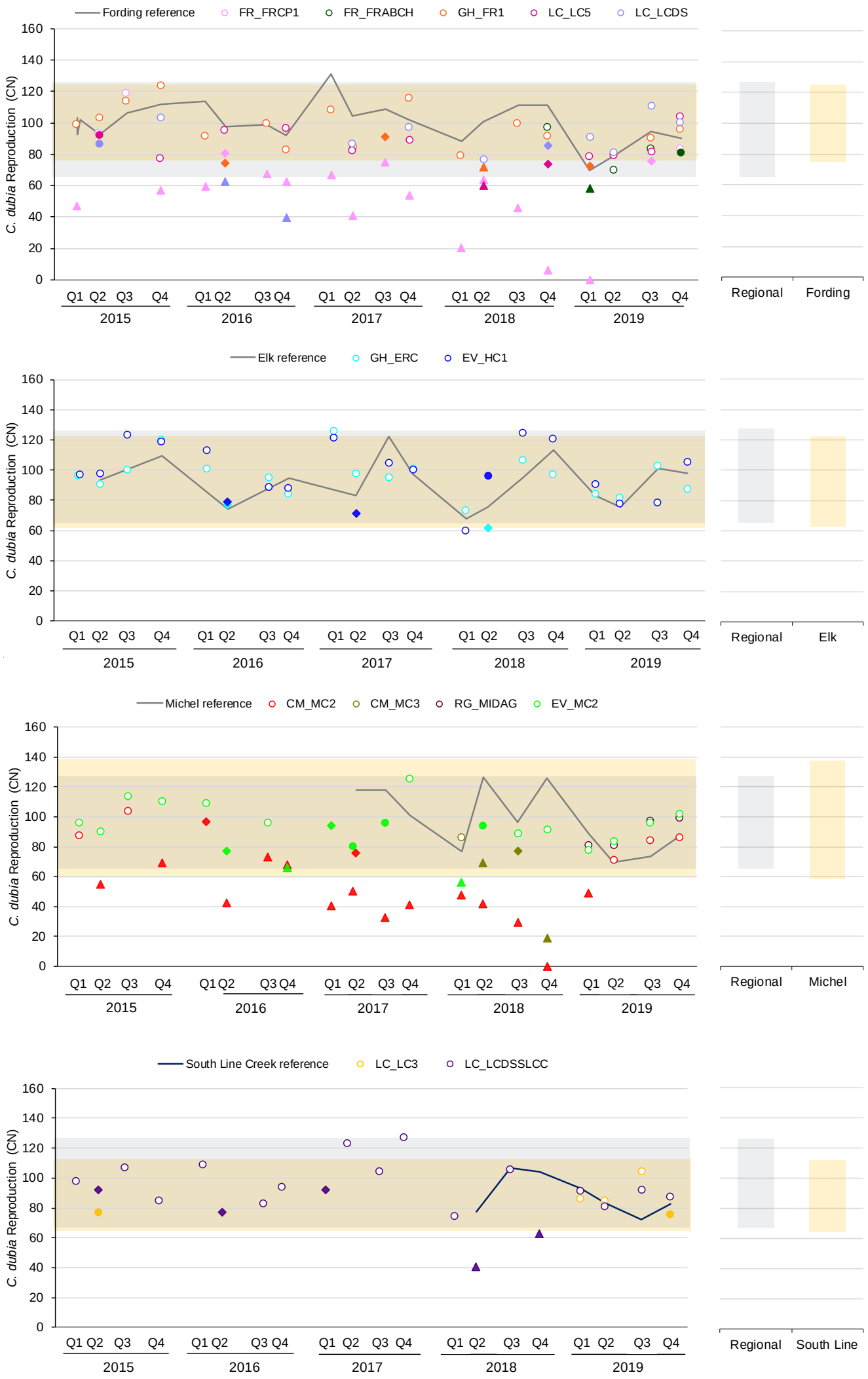
[23] In 2016 only, there was a fourth narrative conclusion called “significant (no category)”. This narrative conclusion occurred when there was insufficient information to categorize the test as possible or likely, Specifically, this narrative occurred when the following was true: 1) a single reference was tested in a batch (e.g., the Fording River reference was the only reference tested for *H. azteca*), and 2) there was no reference envelope calculated for that endpoint (e.g., *H. azteca* growth; Golder 2017). If both of these were true and the mean response for a test site was significantly lower than the reference tested in that batch, then the test was categorized as significant (no category).

Figure 3.5-1: Mean results for *C. dubia* survival in the Fording River reference and its paired test site waters (top left panel), the Elk River reference and its paired test site waters (**second** left panel), the Michel Creek reference and its paired test site waters (**third** left panel), and the South Line Creek and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



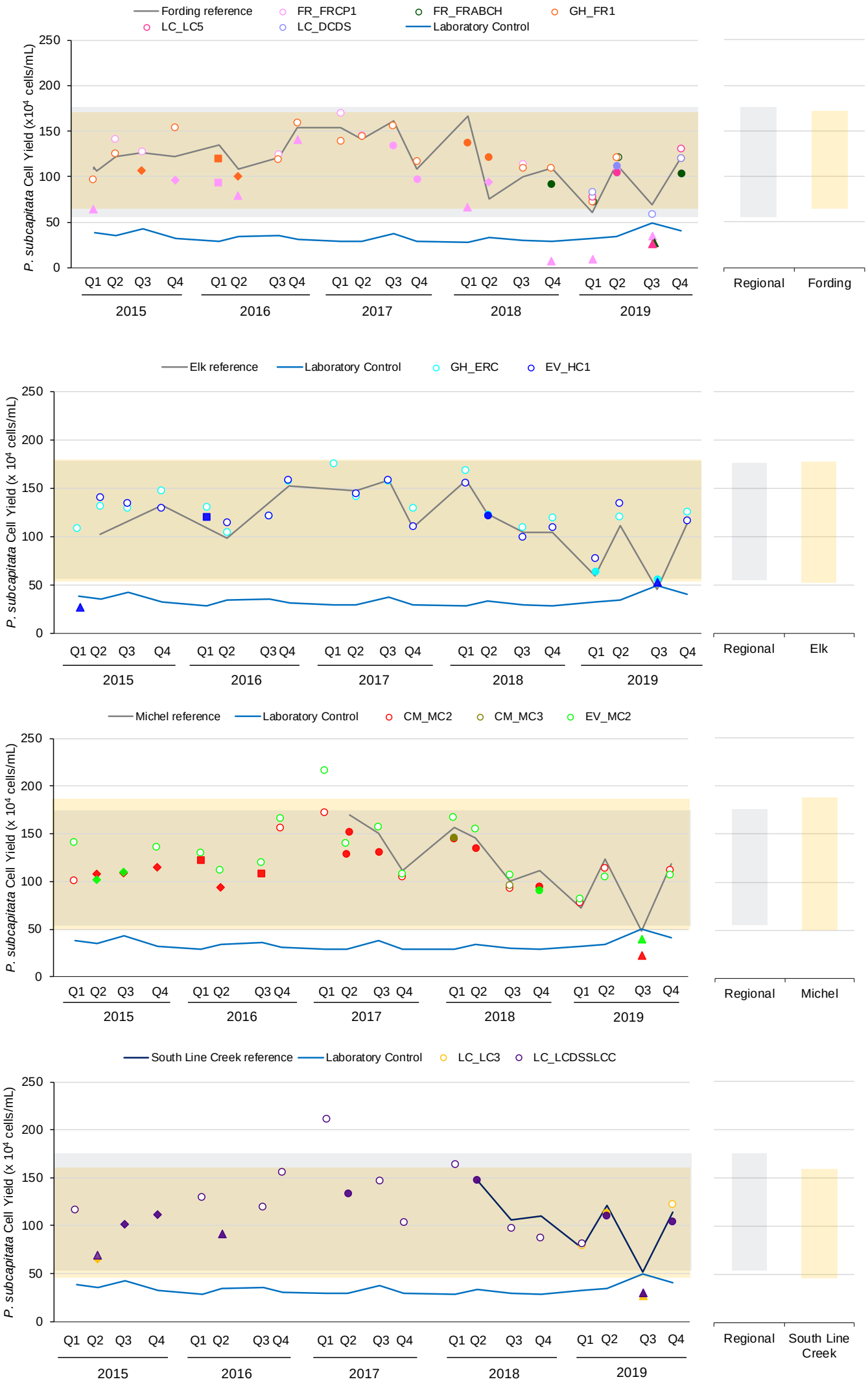
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-2: Mean results for *C. dubia* reproduction in the Fording River reference and its paired test site waters (top left panel), in the Elk River reference and its paired test site waters (middle left panel), the Michel Creek reference and its paired test site waters (third left panel), and the South Line Creek and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



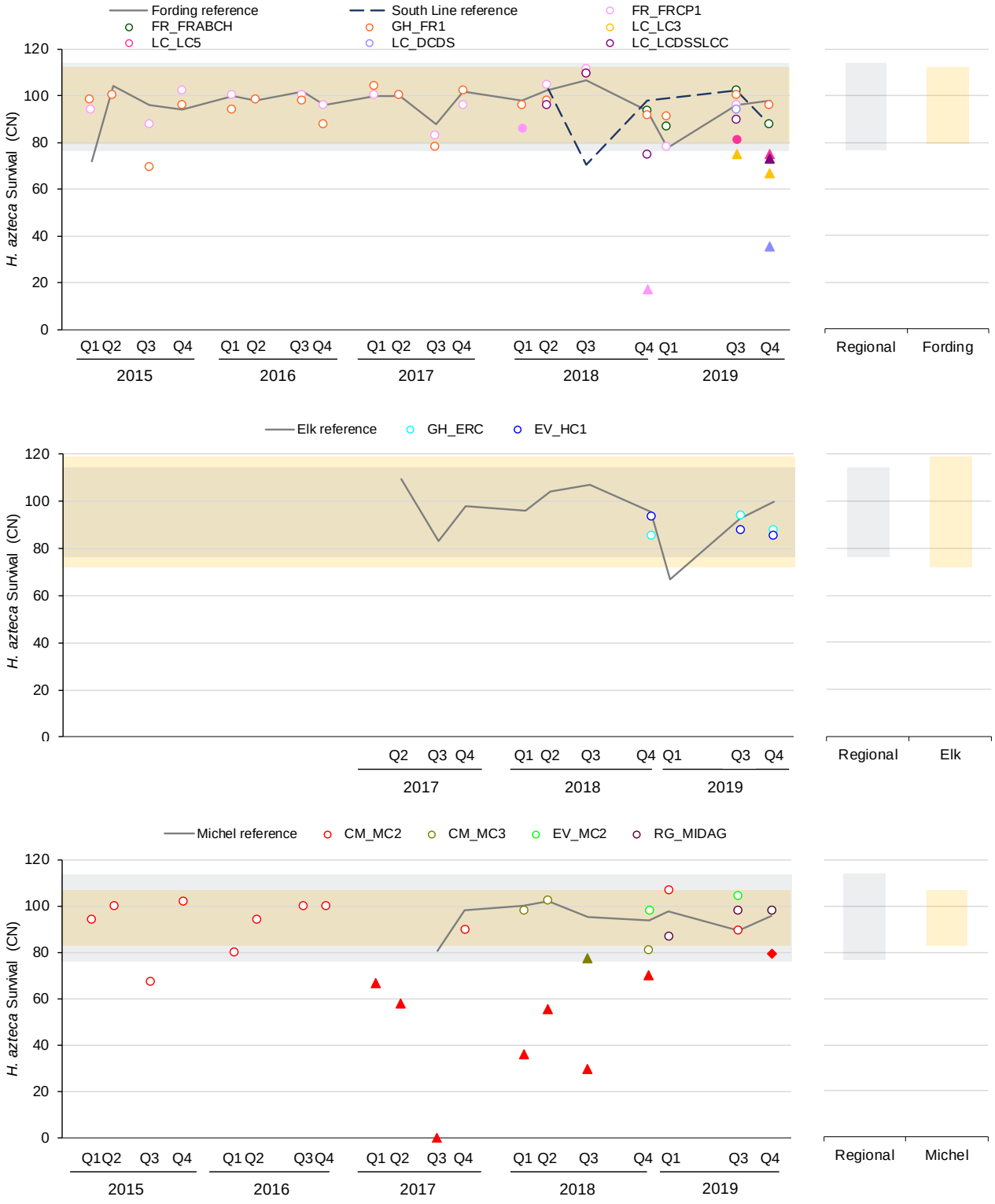
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-3: Mean results for *P. subcapitata* cell yield in the Fording River reference and its paired test site waters (top left panel), the Elk River reference and its paired test site waters (second left panel), the Michel Creek reference and its paired test site waters (third left panel), and the South Line Creek and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



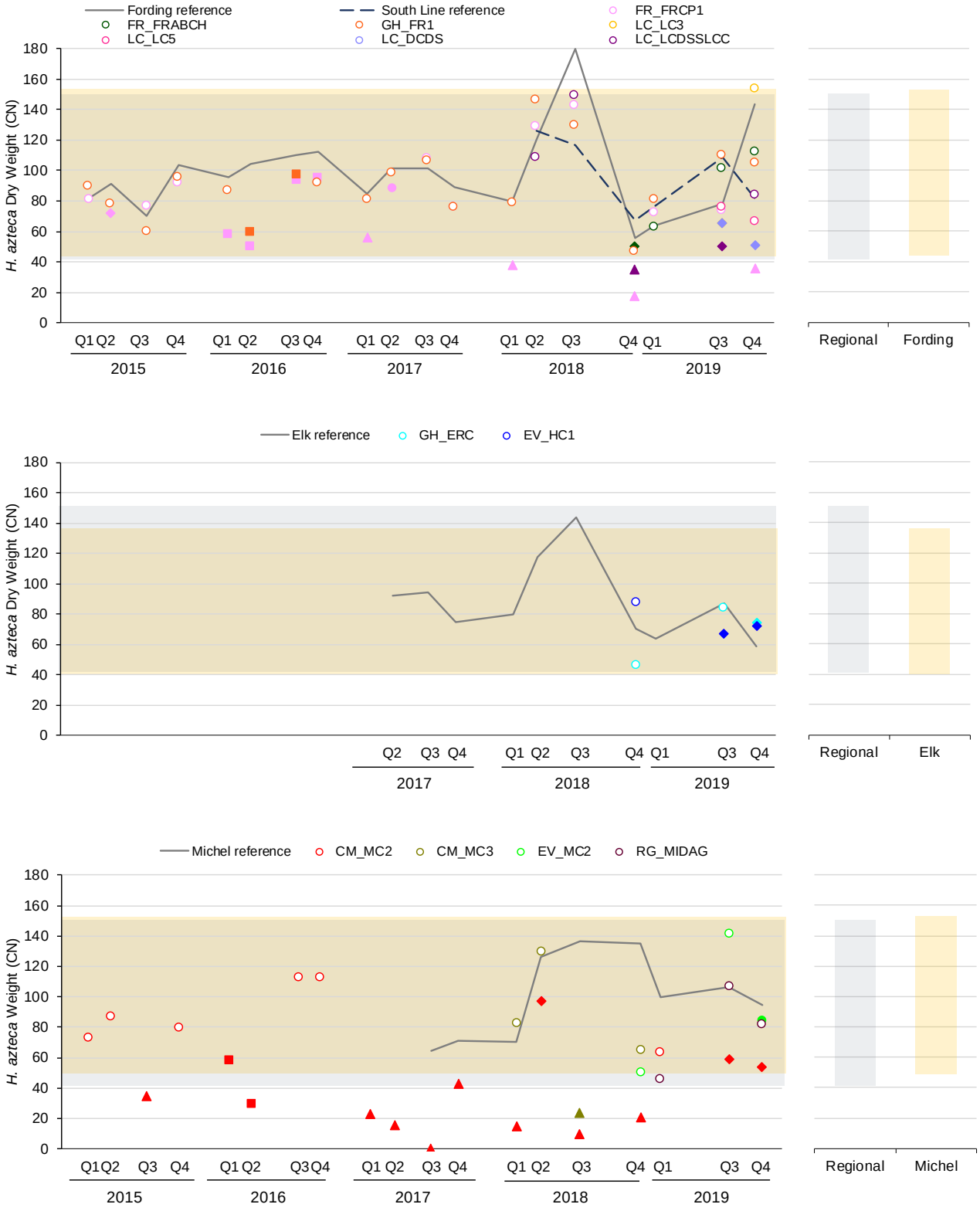
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-4: Mean results for *H. azteca* survival in the Fording River reference and its paired test site waters (top left panel), the Elk River reference and its paired test site waters (middle left panel), and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-5: Mean results for *H. azteca* dry weight in the Fording River reference and its paired test site waters (top left panel), the Elk River reference and its paired test site waters (middle left panel), and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



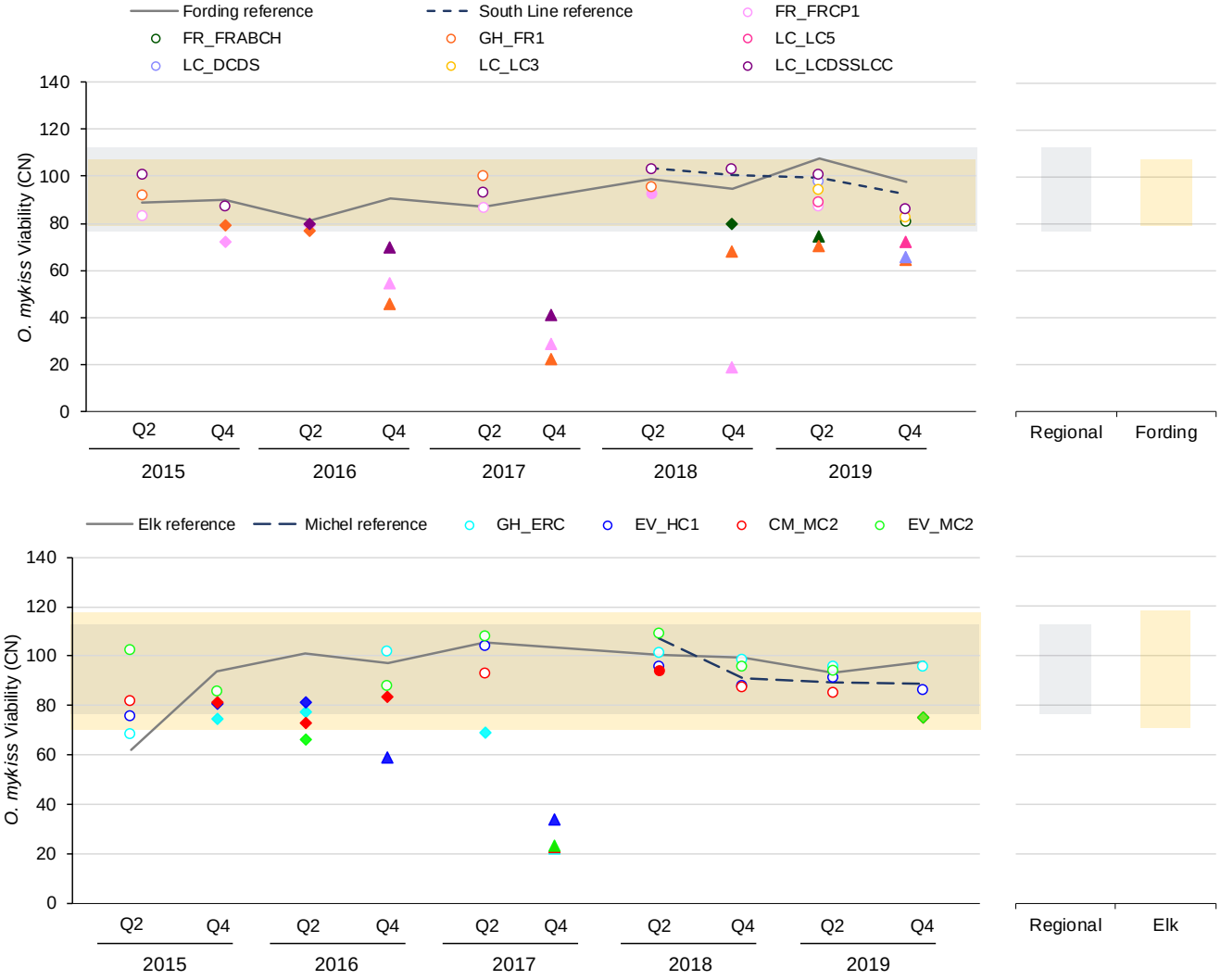
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-6: Mean results for *O. mykiss* survival in the Fording River reference and its paired test site waters (top left panel) and the Elk River reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-7: Mean results for *O. mykiss* viability in the Fording River reference and its paired test site waters (top left panel) and the Elk River reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



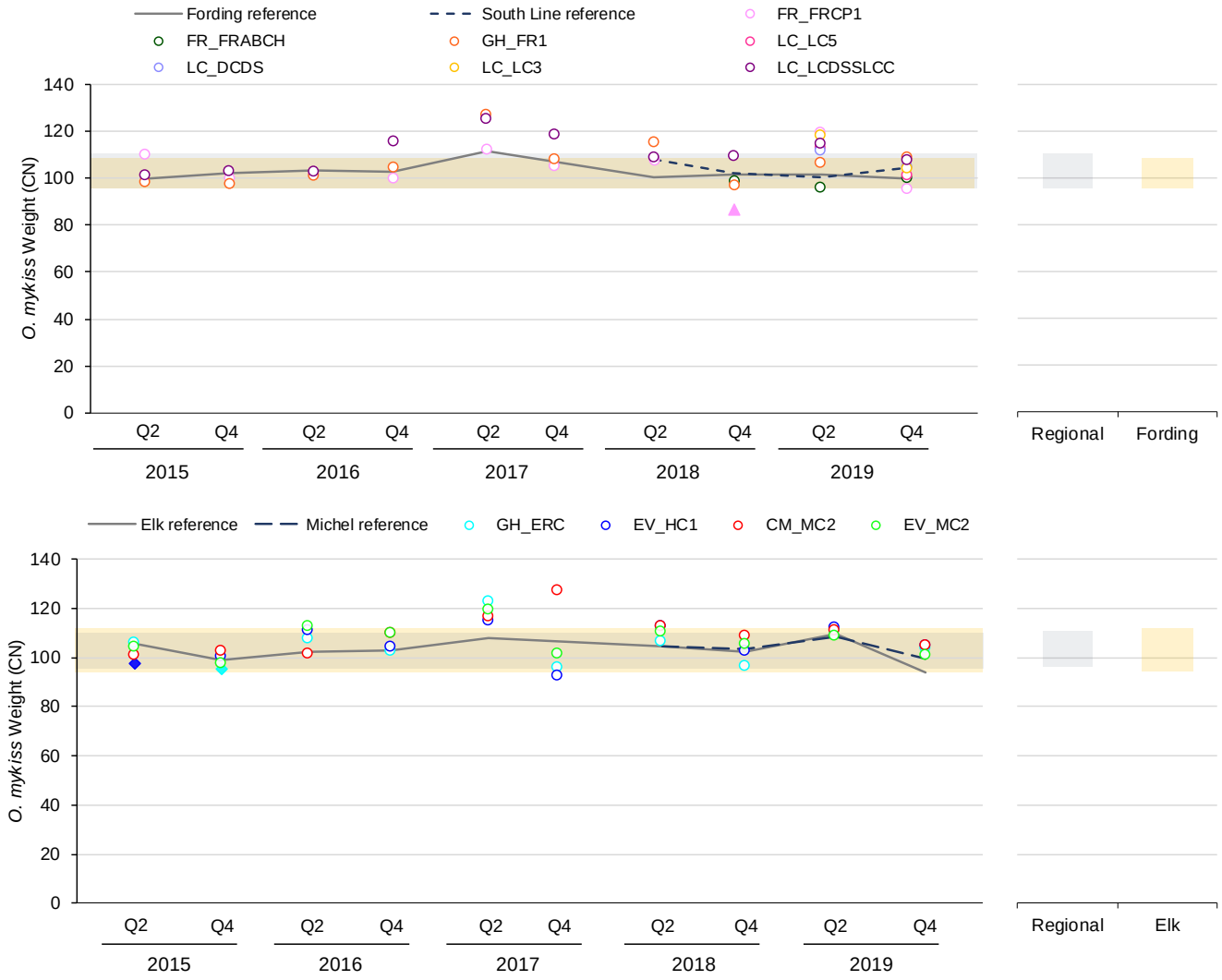
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-8: Mean results for *O. mykiss* length in the Fording River reference and its paired test site waters (top left panel) and the Elk River reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



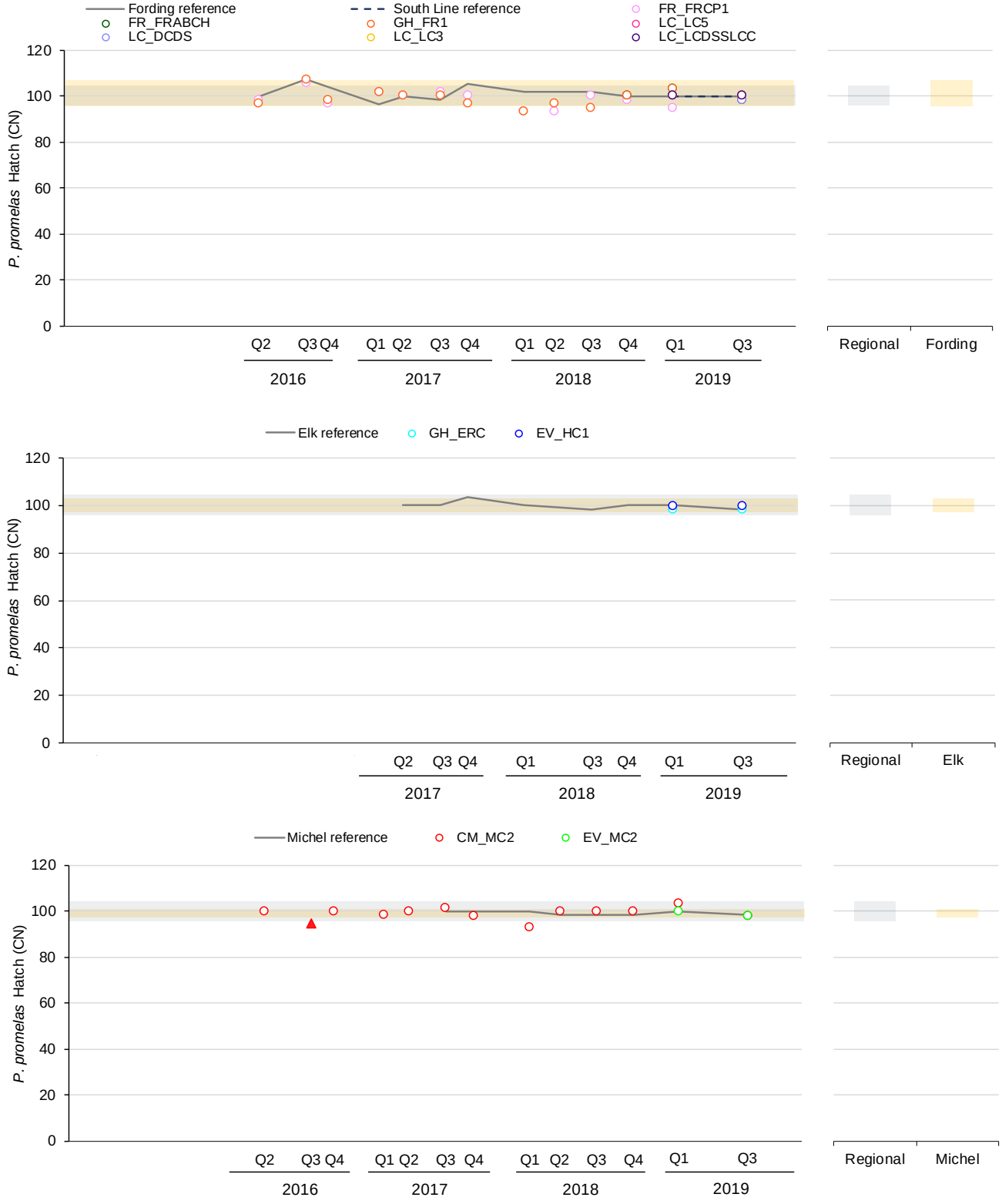
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-9: Mean results for *O. mykiss* weight in the Fording River reference and its paired test site waters (top left panel) and the Elk River reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



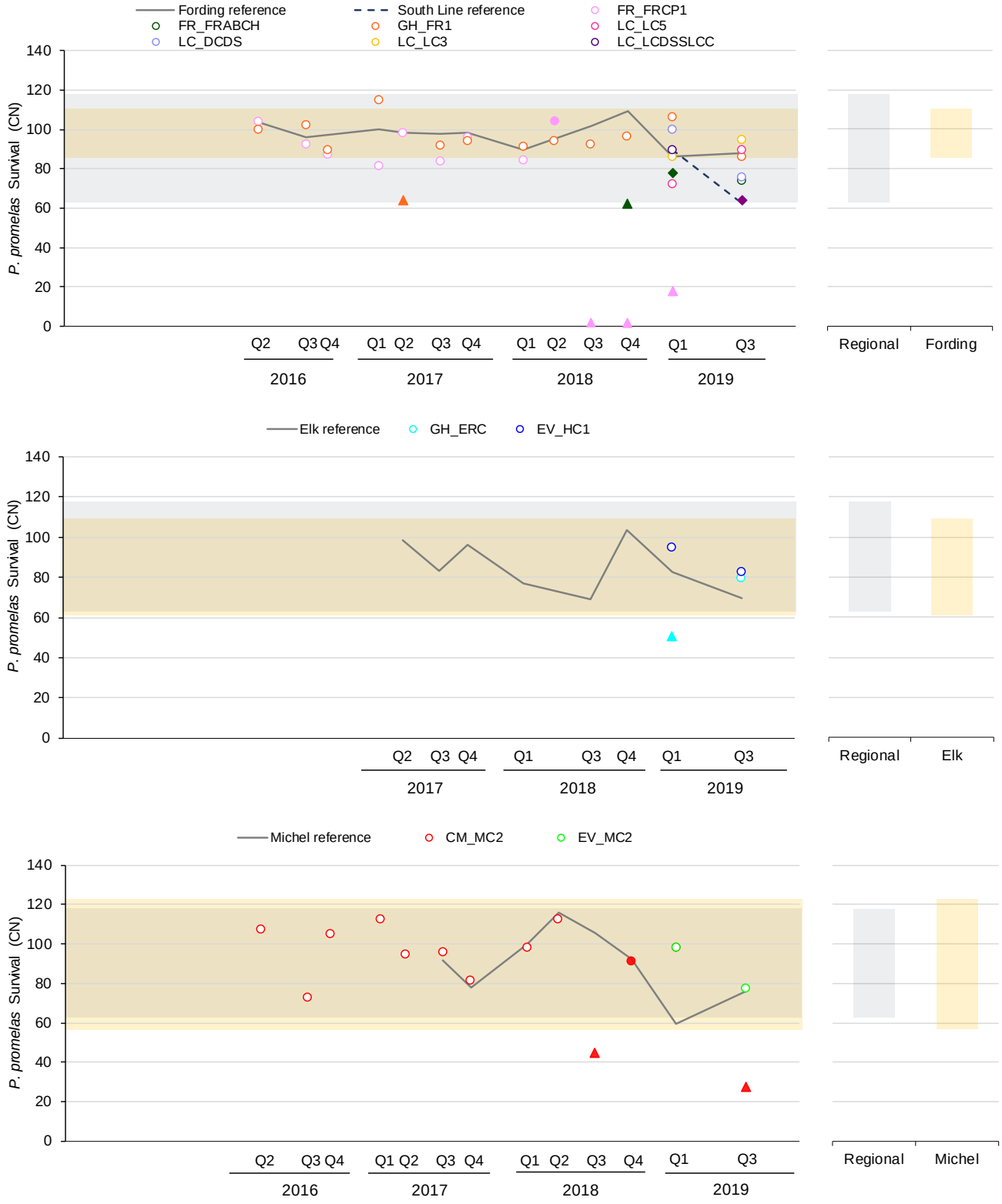
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-10: Mean results for *P. promelas* hatch in the Fording River reference and its paired test site waters (top left panel) and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-11: Mean results for *P. promelas* survival in the Fording River reference and its paired test site waters (top left panel) and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



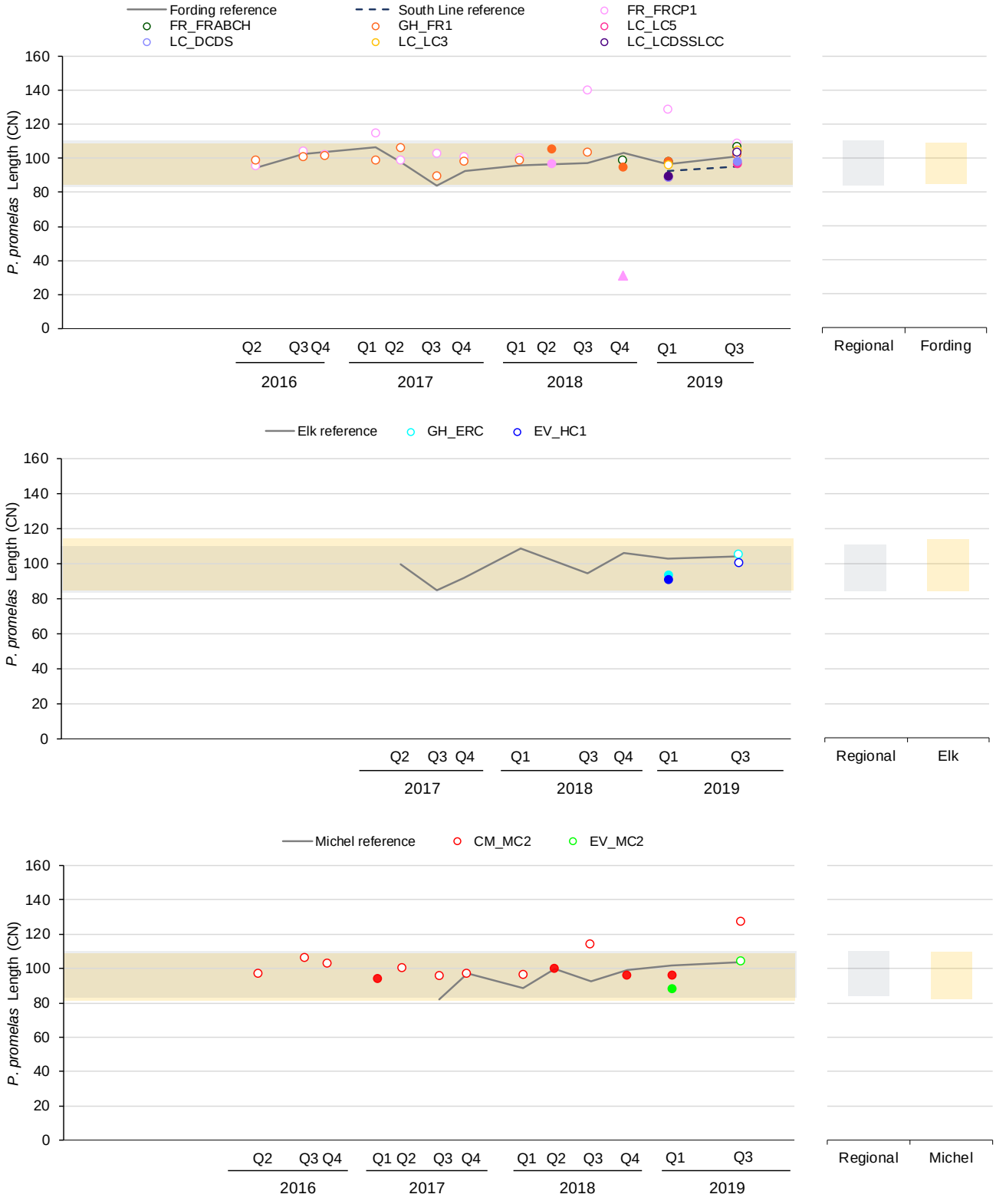
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-12: Mean results for *P. promelas* biomass in the Fording River reference and its paired test site waters (top left panel) and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



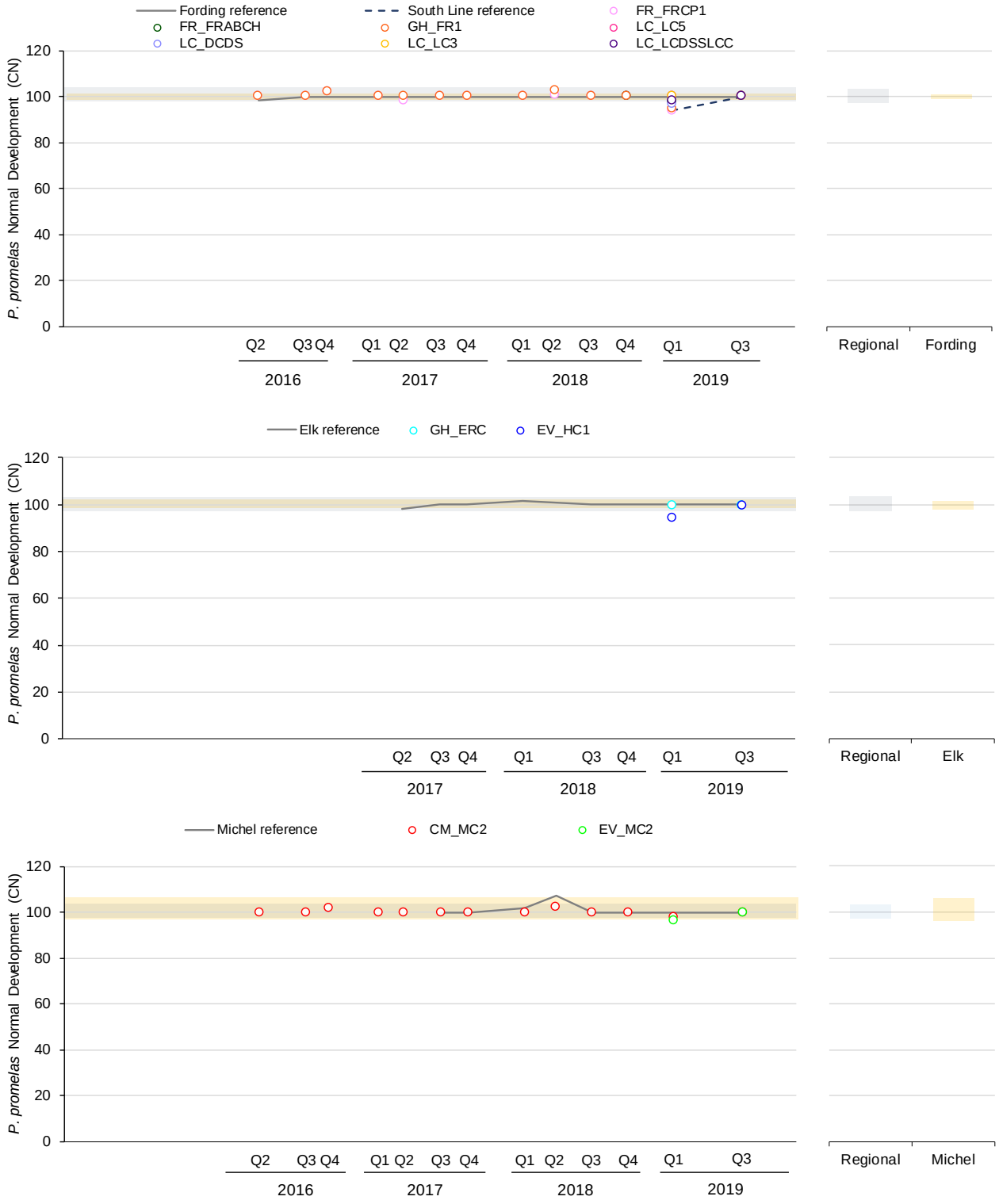
Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-13: Mean results for *P. promelas* length in the Fording River reference and its paired test site waters (top left panel) and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

Figure 3.5-14: Mean results for *P. promelas* normal development in the Fording River reference and its paired test site waters (top left panel) and the Michel Creek reference and its paired test site waters (bottom left panel). Regional and local normal ranges (2.5th to 97.5th percentile) are shown as bars (right panels).



Note: See Figure 2.3-3 for description of lines and symbols. Test sites were compared to their paired local NR (Section 2.3.3).

3.5.1 FR_FRCP1

Results for FR_FRCP1 (Fording River downstream of Cataract Creek in 2015–2019 are summarized in Figure 3.5-15. An overview of the results is provided below:

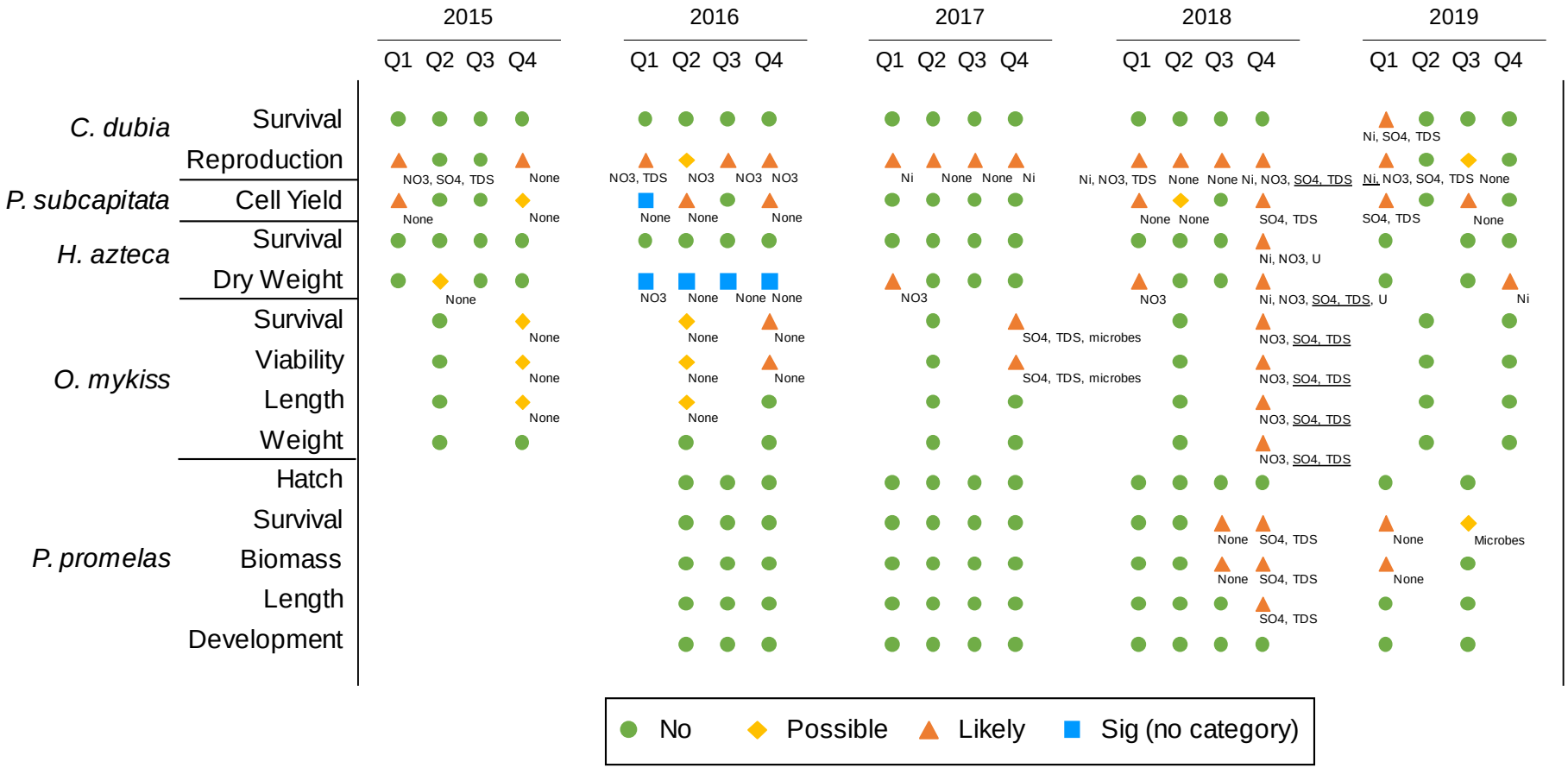
- ***C. dubia***—There was no adverse response on survival in *C. dubia* tests at this station, except for Q1 2019 (Figure 3.5-1). Reproduction has consistently been the most sensitive endpoint for this test, with mean reproduction generally below the local and regional NRs over the period of monitoring (Figure 3.5-2). However, after Q1 2019, responses have remained within the local and regional NRs, breaking the trend of more and larger responses from 2015 to Q1 2019. Several constituents have been identified as potentially contributing to observed response over time, including nickel (Q1 and Q4 2017, Q1 and Q4 2018, Q1 2019), nitrate (Q1 2015, Q1 to Q4 2016, Q1 and Q4 2018, Q1 2019), and sulphate and TDS (Q1 2015, Q1 2016, Q1 and Q4 2018, Q1 2019).
- ***P. subcapitata***—Although 50% of tests were categorized as possible or likely adverse response, mean cell yield was within the local and regional NRs in most quarterly tests (Figure 3.5-3). Notable exceptions were Q4 2018 when cell yield was 7 $x10^4$ cells/mL, and Q1 and Q3 2019 when cell yield was 9.5 and 35 $x10^4$ cells/mL, respectively. In Q3 2019, most tests exhibited had adverse responses on cell yield as discussed in Section 3.2.3.2 and 3.3.1.2. Sulphate and TDS were identified as potentially contributing to the observed response in the Q4 2018 and Q1 2019. No water quality constituent was identified as potentially contributing to observed responses in other tests.
- ***H. azteca***—There was no adverse response on survival in *H. azteca* tests, except for Q4 2018 (Figure 3.5-4). As expected, the sublethal endpoint (growth in dry weight) was the most sensitive endpoint for this species. Mean dry weight was generally within the local and regional NRs, except for Q1 and Q4 2018 and Q4 2019 tests (Figure 3.5-5). Adverse responses on dry weight were observed in approximately half of the tests. Water quality constituents identified as potentially contributing to observed responses were nitrate in Q1 tests in 2016, 2017, and 2018, and nickel in the Q4 test in 2019. In Q4 2018, several constituents were identified as potentially contributing to the observed growth response, including nickel, nitrate, uranium, sulphate, and TDS. For the survival endpoint in Q4 2018, nickel, nitrate, and uranium were identified as potential toxicants.
- ***O. mykiss***—Mean length and weight were within the local and regional NRs, except for Q4 2018, which was categorized as likely adverse response, and Q4 2019, which was categorized as no adverse response (Figure 3.5-8; Figure 3.5-9). Overall the growth endpoints have not been a sensitive indicator of responses for this species. Mean survival and viability have historically been the most sensitive endpoints, and yield similar temporal response trends; both survival and viability were below the local and regional NRs in 40% of the tests (Figure 3.5-6; Figure 3.5-7). The magnitude of response for survival and viability was greater in Q4 tests compared to Q2 tests. Within those Q4 tests, there was a trend towards more frequent and larger responses over time until 2019, when no adverse responses were observed. There is some uncertainty in this trend given that Q4 2017 tests had evidence of microbial effects. Sulphate and TDS were also identified as potentially contributing to the observed response in Q4 2017. In Q4 2018, the strongest evidence for causation was identified for sulphate and TDS, although nitrate may also have contributed to the observed responses. No water quality constituent was identified as potentially contributing to observed responses in other tests.

- ***P. promelas***—There were no adverse responses on hatch and development in *P. promelas* tests (Figures 3.5-10 and 3.5-14). Mean survival, biomass, and length were within local and regional NRs with the following exceptions: hatch in the Q1 2019 test, survival and biomass in Q3 and Q4 2018 and Q1 2019 tests, and length in the Q4 2018 test (Figures 3.5-11 to 3.5-13). Sulphate and TDS were identified as potentially contributing to observed responses in Q4 2018, and the Q3 2019 test had evidence of microbes. No water quality constituent was identified as potentially contributing to observed responses in other tests.

Overall, FR_FRCP1 has shown relatively consistent patterns of response over time, with toxicity indicated in several test endpoints, particularly under base flow conditions. Interannual differences, and a broad trend towards more frequent and larger responses for *C. dubia* were observed until Q2 of 2019. In the latter portion of 2019, mean reproduction was within local and regional NRs, indicating that a break in the observed trend has occurred in 2019. Several parameters have been identified as potential causes of toxicity in previous testing. In Q1 2019 testing, sulphate and TDS were identified as potentially contributing to observed effects to one out of five test species. This pattern in causation appears to be related to elevated sulphate and TDS concentrations in Q1 2019, which were similar to concentrations measured in Q4 2018 (when sulphate and TDS were also identified as potentially contributing to observed responses in all test species). The concentrations measured in Q4 2018 and Q1 2019 were generally higher (~2,000 mg/L sulphate and ~3,300 mg/L TDS) relative to most previously tested concentrations of sulphate (~100 to 750 mg/L, except for one test at ~1,500 mg/L) and TDS (~350 to 1,500 mg/L, except for one test at ~2,500 mg/L) in chronic toxicity monitoring (Appendix D). The fewer responses observed in Q3 to Q4 of 2019 could be attributed to the decrease in concentrations of sulphate and TDS in these quarters (~100 to 500 mg/L sulphate and ~300 to 1,500 mg/L TDS) relative to Q1 2019 (i.e., back to conditions similar to 2015).

As discussed in Section 2.2.2.2, water quality under winter low flow conditions at FR_FRCP1 is not representative of conditions in the upper Fording River; as such this station does provide a reliable indicator of broader aquatic health responses to evaluate cumulative discharges from Fording River Operations in the receiving environment (Teck 2019c). During low flow conditions, water quality at FR_FRCP1 is predominantly discharge from upstream mine-impacted Cataract Creek. Station FR_FRABCH (Section 3.5.2) was added to the program in 2018 to characterize the potential for effects in conditions that are more representative of the upper Fording River.

Figure 3.5-15: Summary of test results by category at FR_FRCP1.



Note: Results are categorized in the following: 2015 tests in Golder (2016), 2016 tests in Golder (2017), 2017 tests in Golder (2018a), 2018 tests in Golder (2019), and 2019 tests in Section 3.3.1. Possible, likely, and significant (no category) symbols are annotated with constituent(s) identified as potentially contributing to observed response. Ni = nickel; NO3 = nitrate; SO4 = sulphate; TDS = total dissolved solids; U = uranium; None = no water quality constituent was identified. Underlined = Primary explanatory variable identified if multiple constituents were identified as potentially causing observed response. Toxicity Identification Evaluations were conducted to support the causation assessment for *C. dubia* tests in Q4 2018 and Q1 to Q4 2019, and *H. azteca* tests in Q1, Q3, and Q4 2019.

3.5.2 FR_FRABCH

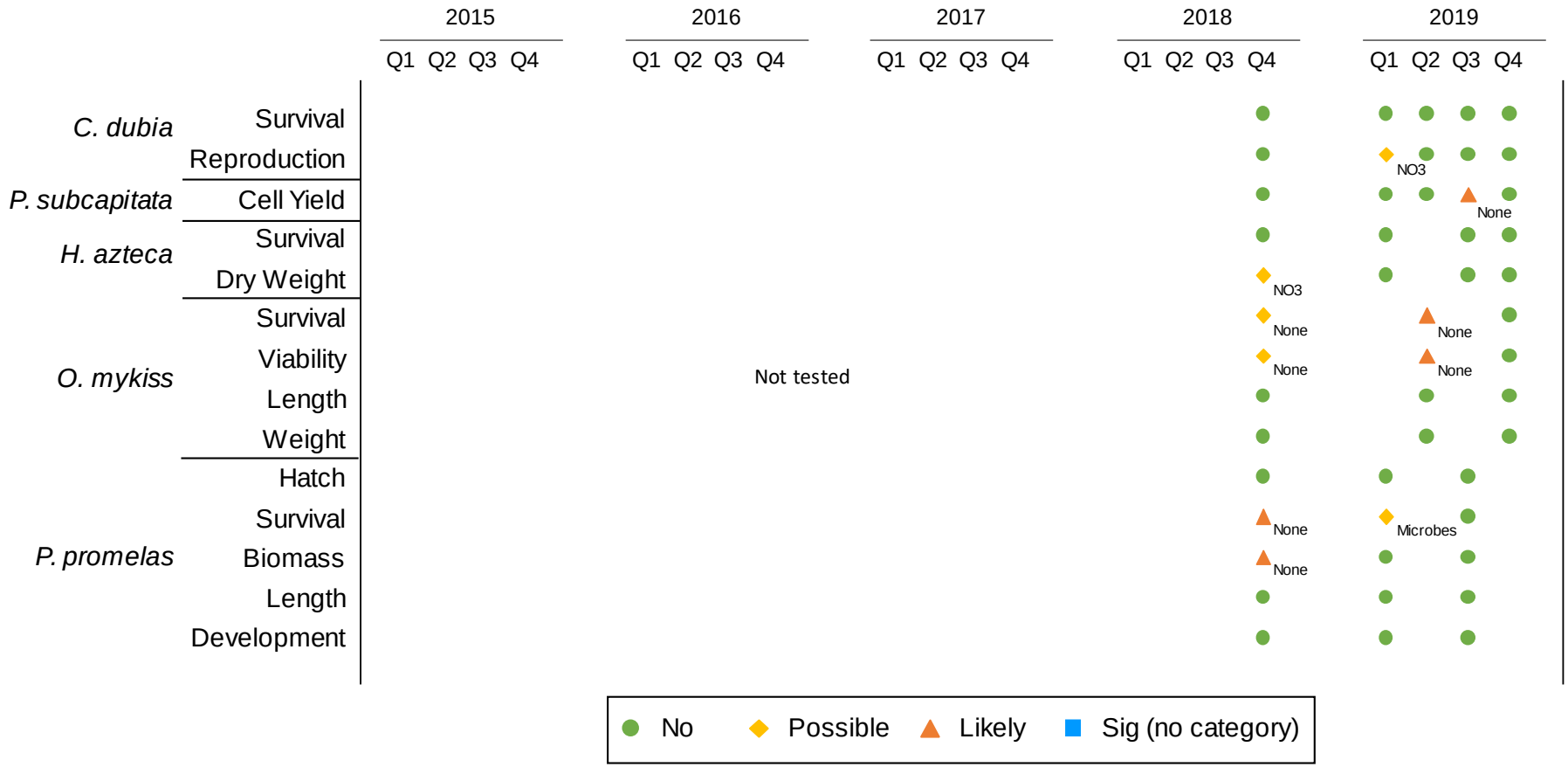
This station, which is approximately 5 kilometers downstream of FR_FRCP1, is not a Permit location but was added to the program in Q4 2018 to better represent mixed Fording River water quality, capture more completely constituent loadings from upstream mining, and reduce the confounding influence of mid-winter Cataract Creek flows at FR_FRCP1 (see Section 2.2.2.1).

Results are summarized in Figure 3.5-16. An overview of the results is provided below:

- ***C. dubia***— There was no adverse response on survival in *C. dubia* tests (Figure 3.5-1). Mean reproduction was within the local and regional NRs, except for Q1 2019 (Figure 3.5-2). A potential contributor to the observed response in this test was nitrate.
- ***P. subcapitata***—Mean cell yield was within the local and regional NRs except for Q3 2019 (Figure 3.5-3). As discussed in Sections 3.2.3.2 and 3.3.1.2, most of the tests in this quarter had adverse responses on cell yield. No water quality constituent was identified as potentially contributing to observed responses in this test.
- ***H. azteca***—There was no adverse responses observed in tests except for dry weight in Q4 2018, but mean survival and dry weight were within the local and regional NRs (Figure 3.5-4; Figure 3.5-5). Nitrate was identified as potentially contributing to observed response.
- ***O. mykiss***—Mean length and weight were within the local and regional NRs (Figure 3.5-7; Figure 3.5-8). Mean survival and viability were categorized as possible and likely responses in Q4 2018 and Q2 2019 respectively (Figure 3.5-6; Figure 3.5-7). No water quality constituent was identified as potentially contributing to observed responses.
- ***P. promelas***—Mean responses were within the regional and local NRs, except for survival and biomass in Q4 2018 and Q1 2019 and biomass in Q4 2018 (Figures 3.5-10 to 3.5-14). No water quality constituent was identified as potentially contributing to observed responses, but responses observed in Q1 2019 were consistent with effects caused by microbial growth.

Overall, FR_FRABCH showed fewer and lower magnitude responses relative to FR_FRCP1. Q1 2019 had the most responses in tests compared to other quarters. Nitrate has been identified as a potential or likely cause of observed effects in two FR_FRABCH tests (*C. dubia* and *H. azteca*), although concentrations have been consistent (~20 mg/L NO_3-N) since testing began in Q4 2018.

Figure 3.5-16: Summary of test results by category at FR_FRABCH.



Note: Results are categorized in the following: 2015 tests in Golder (2016), 2016 tests in Golder (2017), 2017 tests in Golder (2018a), 2018 tests in Golder (2019), and 2019 tests in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. NO3 = nitrate; None = no water quality constituent was identified.

3.5.3 GH_FR1

Results for GH_FR1 (Fording River downstream of Greenhills Creek) in 2015–2019 are summarized in Figure 3.5-17. An overview of the results is provided below:

- ***C. dubia***— There was no adverse response on survival in *C. dubia* tests (Figure 3.5-1). Mean reproduction was generally within the local and regional NRs, except for Q2 2016 and 2018, and Q1 2019 (Figure 3.5-2), and 20% of tests have been categorized as possible or likely adverse response. A potential contributor to the observed response in Q2 2016 was nitrate. No water quality constituent was identified as potentially contributing to observed responses in other tests.
- ***P. subcapitata***—Mean cell yield was within the local and regional NRs and 80% of tests were categorized as no adverse response (Figure 3.5-3). No water quality constituent was identified as potentially contributing to observed responses.
- ***H*. azteca**—There was no adverse response on survival in any test in any year and mean survival was within the local and regional NRs except for Q3 tests in 2015 and 2017 (Figure 3.5-4). No adverse response on dry weight was observed in the majority of tests and mean dry weight was within the local and regional NRs (Figure 3.5-5). No water quality constituent was identified as potentially contributing to observed responses.
- ***O. mykiss***—Mean length and weight were generally within the local and regional NRs (Figure 3.5-8; Figure 3.5-9). Mean survival and viability were below the local NR in approximately half of the tests (Figure 3.5-6; Figure 3.5-7). No water quality constituent was identified as potentially contributing to observed responses. Responses observed in Q4 2017 were consistent with effects caused by microbial growth (Golder 2018a).
- ***P*. *promelas***—Mean responses were consistent over time and within the regional and local NRs, except for survival in Q2 2017 (Figures 3.5-10 to 3.5-14). No water quality constituent was identified as potentially contributing to observed responses. Responses observed in 2017 were consistent with effects caused by microbial growth (Golder 2018a).

Overall, GH_FR1 has shown fewer and lower magnitude responses relative to FR_FRCP1, with no apparent consistent pattern of responses over time and no clear evidence of causal factors. Adverse responses have been observed on *O. mykiss* survival and viability in Q4 of every year. At least one of the Q4 *O. mykiss* test responses (2017) was consistent with effects caused by microbes and none of the responses could be attributed to a water quality constituent. In Q3 2019, the adverse response for algal growth was considered to be a suspect result due to the atypically low cell yield in all samples, including reference. There has been no overt change in the frequency or magnitude of responses over time, with the profile observed in 2019 closely matching that observed in 2015 (Figure 3.5-17).

Figure 3.5-17: Summary of test results by category at GH_FR1.



Note: Results are categorized in the following: 2015 tests in Golder (2016), 2016 tests in Golder (2017), 2017 tests in Golder (2018a), 2018 tests in Golder (2019), and 2019 tests in Section 3.3.1. Possible, likely, and significant (no category) symbols are annotated with constituent(s) identified as potentially contributing to observed response. NO3 = nitrate; None = no water quality constituent was identified.

3.5.4 LC_LC5

Station LC_LC5 (Fording River downstream of Line Creek) was added to the regional chronic toxicity testing program with the integration of the Line Creek toxicity testing and regional toxicity testing permits. Tests before 2019 (i.e., 2015 to 2018) were reviewed in the causation assessment in Appendix G.

Results are summarized in Figure 3.5-18. An overview of the results is provided below:

- ***C. dubia***— There was no adverse response on survival in *C. dubia* tests (Figure 3.5-1). Mean reproduction was generally within the local and regional NRs except for Q2 and Q4 2018 (Figure 3.5-2). No water quality constituent was identified as potentially contributing to observed responses.
- ***P. subcapitata***—There was no adverse response on cell yield in any test in any year except Q3 2019 (Figure 3.5-3). As discussed in Sections 3.2.3.2 and 3.3.1.2, most of the tests in this quarter had adverse responses on cell yield. No water quality constituent was identified as potentially contributing to the observed response.
- ***H*. azteca**—Testing for this species began in Q3 2019. There was no adverse response on dry weight in any tests (Figure 3.5-5). In Q4, survival was below the local and regional NRs (Figure 3.5-4). No water quality constituent was identified as potentially contributing to the observed response.
- ***O. mykiss***—Testing for this species began in Q2 2019. Mean survival, length, and weight were within the local and regional NRs (Figure 3.5-6; Figure 3.5-8; Figure 3.5-9). Mean viability was below the local and regional NRs in Q4 (Figure 3.5-7). No water quality constituent was identified as potentially contributing to the observed response.
- ***P. promelas***—Testing for this species began in Q1 2019. There were no adverse responses observed for any endpoint, and mean responses were within the local and regional NRs (Figure 3.5-10 to Figure 3.5-14)

Overall, LC_LC5 has shown few adverse responses over time, with no apparent consistent pattern of responses and no clear evidence of causal factors. At least some of the adverse responses documented for this station in 2019 appear to be suspect, particularly the response to algae in Q3 2019 and *H. azteca* survival in Q4 2019. Additional monitoring with these endpoints will confirm whether the 2019 results are anomalous.

Figure 3.5-18: Summary of test results by category at LC_LC5.



Note: Results are categorized in the following: 2015, 2016, 2017, and 2018 tests in Appendix G, 2019 tests in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. None = no water quality constituent was identified.

3.5.5 LC_DCDS

Station LC_DCDS (Dry Creek downstream of sedimentation ponds) was added to the regional chronic toxicity testing program after integration of the Line Creek toxicity testing and regional toxicity testing permits. Tests before 2019 (i.e., 2015 to 2018) were reviewed in the causation analysis in Appendix G.

Results are summarized in Figure 3.5-19. An overview of the results is provided below:

- ***C. dubia***—There was no adverse response on survival in *C. dubia* tests (Figure 3.5-1). Mean reproduction was generally within the local and regional NRs, except for Q2 and Q4 2016 (Figure 3.5-2). Nitrate was identified as potentially contributing to observed responses in the Q4 2018 test. No water quality constituent was identified as potentially contributing to observed responses in other tests.
- ***P. subcapitata***—There was no adverse response on cell yield in any test in any year (Figure 3.5-3). Mean cell yield was generally within the local and regional NRs.
- ***H*. azteca**—Testing for this species began in Q3 2019. Adverse responses were observed for survival in Q4 and dry weight in Q3 and Q4 (Figure 3.5-5). Nitrate was identified as potentially contributing to observed responses in Q3 and Q4.
- ***O. mykiss***—Testing for this species began in Q2 2019. Mean length and weight were within or above the local and regional NRs (Figure 3.5-8; Figure 3.5-9). Mean survival and viability were below the local and regional NRs in Q4 (Figure 3.5-6; Figure 3.5-7). Nitrate was identified as potentially contributing to observed responses.
- ***P. promelas***—Testing for this species began in Q1 2019. Mean responses were within the local and regional NRs for all endpoints except for normal development in Q1, although the response was not significantly lower than references in this quarter (Figure 3.5-12) and was therefore categorized as no adverse response. Mean survival was categorized as likely adverse response in Q1 (Figure 3.5-11) and no water quality constituent was identified as potentially contributing to the observed response.

Overall, LC_DCDS has shown few adverse responses, with no apparent consistent pattern of responses over time for *C. dubia* and *P. subcapitata* tests. Nitrate was identified as a potential or likely cause of observed effects in Q4 2018 and Q3 and Q4 2019 tests. This is likely due to the observed increase in nitrate in these quarters (~20 to ~30 mg/L NO_3-N) compared to concentrations in previous quarters and years (<5.0 mg/L NO_3-N).

Figure 3.5-19: Summary of test results by category at LC_DCDS.



Note: Results are categorized in the following: 2015, 2016, 2017, and 2018 tests in Appendix G, 2019 tests in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. NO3 = nitrate; None = no water quality constituent was identified.

3.5.6 GH_ERC

Results for GH_ERC (Elk River upstream of Fording River confluence) in 2015–2019 are summarized in Figure 3.5-20. An overview of the results is provided below:

- ***C. dubia***—There was no adverse response on survival in *C. dubia* tests (Figure 3.5-1). Mean reproduction was generally within the local and regional NRs, except for Q2 2018 (Figure 3.5-2). Tests were categorized as no adverse response except for Q2 2016 and 2018. No water quality constituent was identified as potentially contributing to observed responses.
- ***P. subcapitata***—There was no adverse response on cell yield in any test in any year (Figure 3.5-3). Mean cell yield was within the local and regional NRs.
- ***H. azteca***—Testing for this species began in Q4 2018. There was no adverse response on survival in any tests (Figure 3.5-4). For dry weight, mean results were categorized as no adverse response in all tests except for Q4 2019, when mean dry weight was categorized as possible adverse response. Despite this test result, mean dry weight was within the local and regional NRs in all tests (Figure 3.5-5). No water quality constituent was identified as potentially contributing to the observed response.
- ***O. mykiss***—Mean length and weight were generally within the local and regional NRs (Figure 3.5-8; Figure 3.5-9). Mean survival and viability were generally within the local and regional NRs in most quarterly tests, and adverse responses have not been observed since Q4 2017 (Figure 3.5-6; Figure 3.5-7). TSS was identified as potentially contributing to observed responses in Q2 2017. No water quality constituent was identified as potentially contributing to observed responses in other tests. Responses observed in Q4 2017 were consistent with effects caused by microbial growth (Golder 2018a).
- ***P. promelas***—Testing for this species began in Q1 2019. Mean responses were within the local and regional NRs for all endpoints except for survival and biomass in Q1, although biomass was not significantly lower than references in this quarter (Figure 3.5-12) and was therefore categorized as no adverse response. Mean survival was categorized as likely adverse response in Q1 (Figure 3.5-11) and no water quality constituent was identified as potentially contributing to the observed response.

Overall, GH_ERC has shown few adverse responses, with no apparent consistent pattern of responses over time and no clear evidence of causal factors. Adverse responses have been observed on *O. mykiss* survival and viability in Q2 and/or Q4 of every year between 2015 to 2017, but were not observed in 2018 or 2019.

Figure 3.5-20: Summary of test results by category at GH_ERC.



Note: Results are categorized in the following: 2015 tests in Golder (2016), 2016 tests in Golder (2017), 2017 tests in Golder (2018a), 2018 tests in Golder (2019), and 2019 tests in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. TSS = total suspended solids; None = no water quality constituent was identified.

3.5.7 EV_HC1

Results for EV_HC1 (Harmer Creek) in 2015–2019 are summarized in Figure 3.5-21. An overview of the results is provided below:

- ***C. dubia***—There was no adverse response on survival in *C. dubia* tests (Figure 3.5-1). Mean reproduction was generally within local and regional NRs in most quarterly tests, and tests were categorized as no adverse response except for Q2 2016 and 2017 (Figure 3.5-2). No water quality constituent was identified as potentially contributing to observed responses.
- ***P. subcapitata***—Mean cell yield was generally within the local and regional NRs in most quarterly tests (Figure 3.5-3) except for Q1 2015 and Q3 2019. As discussed in Sections 3.2.3.2 and 3.3.1.2, most tests in Q3 2019 had adverse responses on cell yield. No water quality constituent was identified as potentially contributing to observed responses.
- ***H. azteca***—Testing for this species began in Q4 2018. There was no adverse response on survival in any tests (Figure 3.5-4). For dry weight, mean results were categorized as no adverse response in Q4 2018 and possible adverse response in Q1 2019. Despite these test results, mean dry weight was within the local and regional NRs in all tests (Figure 3.5-5). No water quality constituent was identified as potentially contributing to the observed response.
- ***O. mykiss***—Mean length and weight were generally within the local and regional NRs (Figure 3.5-8; Figure 3.5-9). Mean survival and viability were generally within the local and regional NRs in most quarterly tests, and adverse responses have not been observed since Q4 2017 (Figure 3.5-6; Figure 3.5-7). No water quality constituent was identified as potentially contributing to observed responses in other tests. Responses observed in Q4 2017 were consistent with effects caused by microbial growth (Golder 2018a).
- ***P. promelas***—Testing for this species began in Q1 2019. There was no adverse response on *P. promelas* endpoints and responses were within the local and regional NRs except for normal development in Q1 2019 (Figures 3.5-10 to 3.5-14).

Overall, EV_HC1 has shown few adverse responses over time, with no apparent consistent pattern of responses and no clear evidence of causal factors. Adverse responses have been observed on *O. mykiss* survival and viability in Q2 and/or Q4 of every year between 2015 to 2017, but were not observed in 2018 or 2019.

Figure 3.5-21: Summary of test results by category at EV_HC1.



Note: Results are categorized in the following: 2015 tests in Golder (2016), 2016 tests in Golder (2017), 2017 tests in Golder (2018a), 2018 tests in Golder (2019), and 2019 tests in Section 3.3.1. Possible, likely, and significant (no category) symbols are annotated with constituent(s) identified as potentially contributing to observed response. None = no water quality constituent was identified.

3.5.8 CM_MC2

Results for CM_MC2 (Michel Creek downstream of Corbin Creek) in 2015–2019 are summarized in Figure 3.5-22. An overview of the results is provided below:

- ***C. dubia***—There was no adverse response on survival in *C. dubia* tests (Figure 3.5-1). Mean reproduction was generally below the local and regional NRs and 80% of tests were categorized as possible or likely response (Figure 3.5-2). After Q1 2019, responses were within the local and regional NRs, breaking the trend of more frequent and larger responses from 2015 to Q1 2019. Nickel was identified as potentially contributing to observed responses in 2017, 2018, and 2019 tests.
- ***P. subcapitata***—Mean cell yield was within the local and regional NRs except for Q3 2019 (Figure 3.5-3), and 65% of tests were categorized as no adverse response. As discussed in Sections 3.2.3.2 and 3.3.1.2, most tests in Q3 2019 had adverse responses on cell yield. TSS was identified as potentially contributing to the observed response in Q2 2015. No water quality constituent was identified as potentially contributing to observed responses in other tests.
- ***H. azteca***—Mean survival and dry weight were below the local and regional NRs in approximately half of the tests, and tests were categorized as possible or likely adverse response in 42% of tests for survival and 68% of tests for dry weight (Figure 3.5-4; Figure 3.5-5). Responses were trending towards more and larger responses over time until Q4 2018, when responses were within local and/or regional NRs in 2019. Nickel was identified as potentially contributing to observed responses in most tests.
- ***O. mykiss***—Mean survival, viability, length and weight were generally within the local and regional NRs, and adverse responses have not been observed since Q4 2017 (Figure 3.5-6 to Figure 3.5-9). No water quality constituent was identified as potentially contributing to observed responses. Responses observed in 2017 were consistent with effects caused by microbial growth (Golder 2018a).
- ***P. promelas***—Mean responses were consistent over time and generally within the regional and local NRs, except for hatch in Q3 2016 and Q1 2018, survival in Q3 2018 and survival and biomass in Q3 2019 (Figures 3.5-10 to 3.5-14). No water quality constituent was identified as potentially contributing to observed responses, but responses observed in Q3 2019 were consistent with effects caused by microbial growth.

Overall, CM_MC2 has shown some consistent patterns of response over time for *C. dubia* reproduction and *H. azteca* survival and dry weight. These two crustacean species are known to be sensitive to dissolved nickel exposure, and multiple lines of evidence have implicated nickel at this sampling location. Interannual variation and a trend toward more frequent and larger responses for *C. dubia* and *H. azteca* were observed until Q1 2019. Since that time, mean responses for *C. dubia* have been within local and regional NRs, indicating that effects could not be distinguished from variability in reference water tests. The pattern in responses between 2015 and 2018 corresponds with an increase in aqueous nickel concentrations from 2015 (generally ranged from 5 to 15 µg/L) to 2018 (generally ranged from 10 to 60 µg/L). A decrease in nickel concentrations at CM_MC2 was observed between 2018 and 2019, with 2019 nickel concentrations ranging from 8 to 20 µg/L (i.e., similar to 2015). The decrease in nickel concentrations may help explain the fewer and lower-magnitude responses observed in 2019 relative to 2018, particularly for crustaceans. Station RG_MIDAG (Section 3.5.8) was added to the program to characterize the spatial extent of effects in Michel Creek.

Figure 3.5-22: Summary of test results by category at CM_MC2.



Note: Results are categorized in the following: 2015 tests in Golder (2016), 2016 tests in Golder (2017), 2017 tests in Golder (2018a), 2018 tests in Golder (2019), and 2019 tests in Section 3.3.1. Possible, likely, and significant (no category) symbols are annotated with constituent(s) identified as potentially contributing to observed response. Ni = nickel; TSS = total suspended solids; None = no water quality constituent was identified. Toxicity Identification Evaluations were conducted to support the causation assessment for *C. dubia* tests in 2017 (Q3 and Q4), 2018 (Q1 to Q4), and 2019 (Q1 to Q4) and *H. azteca* tests in 2018 (Q1 to Q4) and 2019 (Q1, Q3, and Q4).

3.5.9 RG_MIDAG

In 2018, non-permit station CM_MC3 was added to the program in 2018 as part of the AMP response framework to characterize the spatial extent of effects observed in previous CM_MC2 testing. Station CM_MC3 was replaced with station RG_MIDAG in 2019, which is approximately 2 kilometers downstream of CM_MC2. As discussed at the June 2019 EMC meeting, the replacement occurred because there was uncertainty in the amount of flow along Michel Creek at CM_MC3 due to an ice dam in winter conditions. Michel Creek flows were consolidated in one channel throughout the year at RG_MIDAG, making this station a better candidate to evaluate the spatial extent of observed effects.

Results are summarized in Figure 3.5-23. No adverse response was observed for RG_MIDAG tests and results remained within the local and regional NR.

Figure 3.5-23: Summary of test results by category at downstream stations in Michel Creek (CM_MC3 and RG_MIDAG).



Note: 2018 test results are for CM_MC3 (test results categorized in Golder [2019]).In 2019, CM_MC3 was replaced by RG_MIDAG, the station located 2 km downstream of CM_MC3 (tests categorized in Section 3.3.1). Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. Ni = nickel; None = no water quality constituent was identified.

3.5.10 EV_MC2

Results for EV_MC2 (Michel Creek downstream of Bodie Creek) in 2015–2019 are summarized in Figure 3.5-24. An overview of the results is provided below:

- ***C. dubia***—There was no adverse response on survival in *C. dubia* tests (Figure 3.5-1). Mean reproduction was generally within the local and regional NRs, except for Q2 2016 and Q1 2018 (Figure 3.5-2). Adverse responses were observed in Q2 and Q4 2016, Q1 2017, and Q1 2018. A potential contributor to the observed response in Q2 2016 was turbidity. No water quality constituent was identified as potentially contributing to observed responses in other tests.
- ***P. subcapitata***—Although mean cell yield was within or above the local and regional NRs in previous years, possible adverse responses were observed in Q2 and Q3 2015 tests (Figure 3.5-3). Mean cell yield was below the local and regional NRs in Q3 2019, and this test was categorized as likely adverse response. As discussed in Sections 3.2.3.2 and 3.3.1.2, most tests in Q3 2019 had adverse responses on cell yield. No water quality constituent was identified as potentially contributing to observed responses.
- ***H. azteca***—Testing for this species began in Q4 2018. There was no adverse response on survival or dry weight in any quarter, and both endpoints were within the local and regional NRs (Figure 3.5-4; Figure 3.5-5).
- ***O. mykiss***—Mean length and weight were generally within the local and regional NRs and no adverse responses were observed (Figure 3.5-8 and Figure 3.5-9). Survival and viability were generally within the local and regional NRs, except for Q2 2016, Q4 2017, and Q4 2019 (Figure 3.5-6 to Figure 3.5-9). No water quality constituent was identified as potentially contributing to observed responses. Responses observed in 2017 were consistent with effects caused by microbial growth (Golder 2018a).
- ***P. promelas***—Testing for this species began in Q1 2019. There was no adverse response on *P. promelas* endpoints and all endpoints were within the local and regional NRs (Figures 3.5-10 to 3.5-14).

Overall, EV_MC2 has shown few adverse responses over time, with no apparent consistent pattern of responses and no clear evidence of causal factors.

Figure 3.5-24: Summary of test results by category at EV_MC2.



Note: Results are categorized in the following: 2015 tests in Golder (2016), 2016 tests in Golder (2017), 2017 tests in Golder (2018a), 2018 tests in Golder (2019), and 2019 tests in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. None = no water quality constituent was identified.

3.5.11 LC_LC3

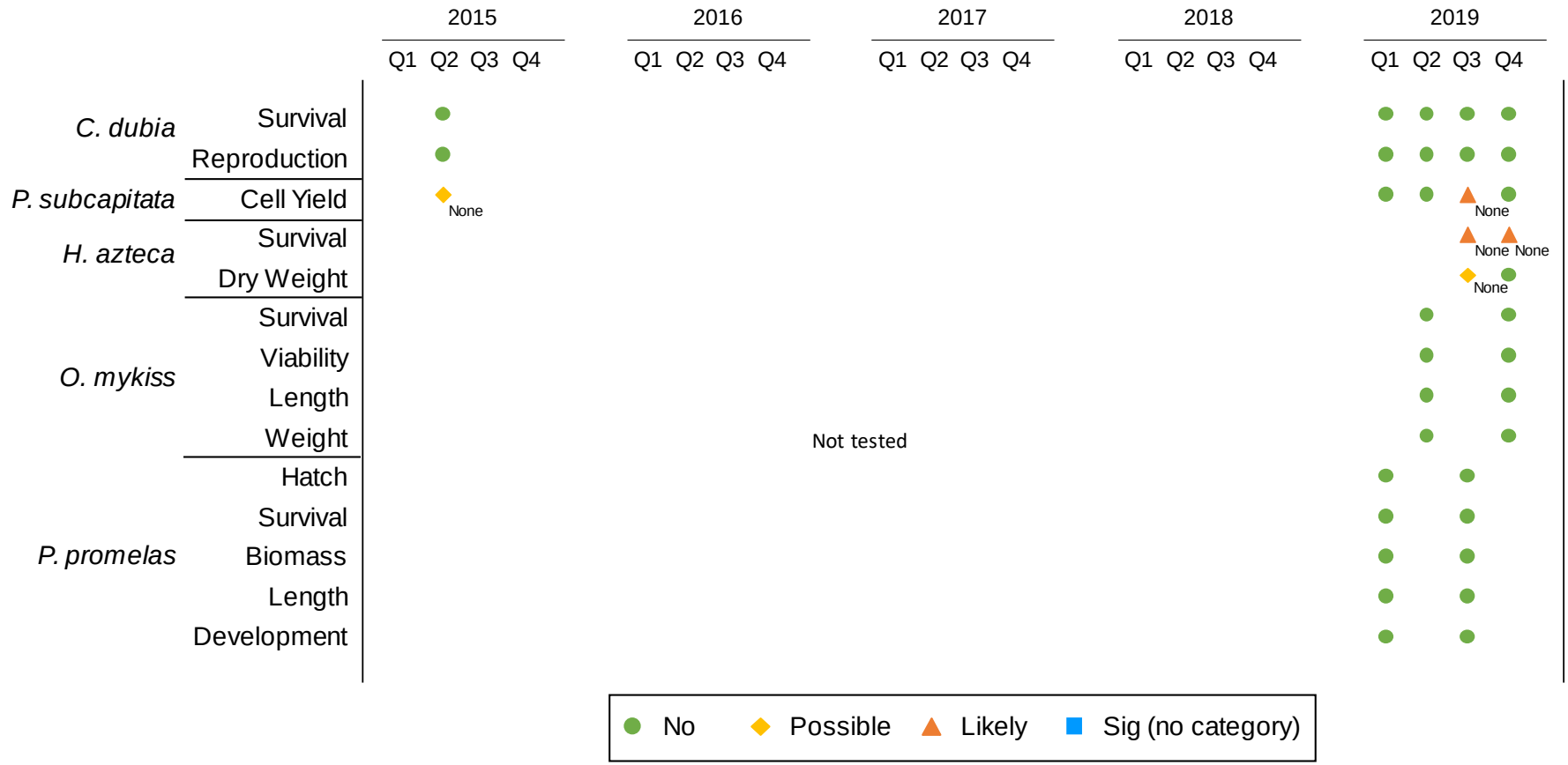
Station LC_LC3 (Line Creek downstream of West Line Creek) was added to the regional chronic toxicity testing program after integration of the Line Creek toxicity testing and regional toxicity testing permits. Tests before 2019 (i.e., 2015 to 2018) were reviewed in the causation assessment in Appendix G.

Results are summarized in Figure 3.5-25. Endpoints were categorized as no adverse response and/or within the local and regional NR, except for the following:

- ***P. subcapitata***—Mean cell yield was within the local and regional NRs (Figure 3.5-3) except for Q3 2019. As discussed in Sections 3.2.3.2 and 3.3.1.2, most of the tests in this quarter had adverse responses on cell yield. No water quality constituent was identified as potentially contributing to observed responses in this test.
- ***H. azteca***—Testing for this species began in Q3 2019. Dry weight was within the local and regional NRs (Figure 3.5-4; Figure 3.5-5). Mean survival was below the local and regional NRs and categorized as likely adverse response in Q3 and Q4. No water quality constituent was identified as potentially contributing to the observed response.

Overall, LC_LC3 has shown few adverse responses over time, with no apparent consistent pattern of responses and no clear evidence of causal factors.

Figure 3.5-25: Summary of test results by category at LC_LC3.



Note: Results are categorized in the following: 2015 test in Appendix G, 2019 tests in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. None = no water quality constituent was identified.

3.5.12 LC_LCDSSLCC

Results for LC_LCDSSLCC (Line Creek downstream of South Line Creek) in 2015–2019 are summarized in Figure 3.5-26. An overview of the results is provided below:

- ***C. dubia***—There was no adverse response on survival in *C. dubia* tests (Figure 3.5-1). Mean reproduction was generally within or above the local and regional NR, except for Q2 and Q4 2018 (Figure 3.5-2). Although within the local and regional NRs, adverse responses were also observed in Q2 2015 and 2016 and Q1 2017. A potential contributor to the observed response in Q2 2016 was nitrate. No water quality constituent was identified as potentially contributing to observed responses in other tests.
- ***P. subcapitata***—Mean cell yield was within the local and regional NRs in most quarterly tests (Figure 3.5-3) except for Q3 2019. As discussed in Sections 3.2.3.2 and 3.3.1.2, most of the tests in this quarter had adverse responses on cell yield. A quarter of tests were categorized as possible or likely adverse effects. No water quality constituent was identified as potentially contributing to observed responses.
- ***H. azteca***—Survival and dry weight were within the local and regional NRs, except for Q4 2018 and Q4 2019 (survival only) (Figure 3.5-4; Figure 3.5-5). No water quality constituent was identified as potentially contributing to the observed response.
- ***O. mykiss***—Mean survival, viability, length and weight were within or above the local and regional NRs (Figure 3.5-6 to Figure 3.5-9) except for survival and viability in Q4 2016 and Q4 2017. Adverse responses have not been observed since Q4 2017. No water quality constituent was identified as potentially contributing to observed responses. Responses observed in 2017 were consistent with effects caused by microbial growth (Golder 2018a).
- ***P. promelas***—Testing for this species began in Q1 2019. Mean responses were generally within the regional and local NRs (Figures 3.5-10 to 3.5-14). Possible adverse responses were observed for survival and biomass in Q3; these responses were consistent with effects caused by microbial growth.

Overall, LC_LCDSSLCC has shown few adverse responses over time, with no apparent consistent pattern of responses and no clear evidence of causal factors.

Figure 3.5-26: Summary of test results by category at LC_LCDSSLCC.



Note: Results are categorized in the following: 2015 tests in Golder (2016), 2016 tests in Golder (2017), 2017 tests in Golder (2018a), 2018 tests in Golder (2019), and 2019 tests in Section 3.3.1. Possible and likely symbols are annotated with constituent(s) identified as potentially contributing to observed response. NO3 = nitrate; None = no water quality constituent was identified.

4.0 SUMMARY

The following bullets summarize results from the 2019 interpretive report.

- **Quality Assurance/Quality Control**—QA/QC information indicated that organism performance in the laboratory control water generally met acceptability criteria for health histories and sensitivity of the organisms (Section 3.1). Where deviations occurred that could influence the reliability of the data (e.g., poor egg quality in one of four replicates in Q2 *O. mykiss* testing), actions were taken to address this influence (e.g., exclusion of this replicate from statistical analyses). There were some atypical findings for both green algae cell yield (Q1 and Q3) and *H. azteca* survival (Q1 and Q3), with adverse responses that did not match previous tests or water quality; these unusual findings did not warrant rejection as invalid test outcomes, but instead indicate higher uncertainty than in previous years for these endpoints.
- **Sources of Variance**—Key sources of variance that could affect responses observed in test waters were addressed herein, including variation in test organism performance (addressed by control normalization), variation in test organism sensitivity to toxicants (addressed by reviewing reference toxicant results), variation in background water quality characteristics (addressed by developing regional and local NRs), and variation in concentrations of toxicants in test waters (addressed by reviewing CVs) (Section 3.2). Addressing these sources of variance is expected to improve the ability to identify a true toxicological response. The 2019 also evaluated whether the method of enumeration for *C. dubia* neonate production in the three-brood test was unduly influenced by the test termination date; although Q1 counts were influenced by termination on day six of the test, the changes were observed relatively consistently across treatments and therefor did not affect the interpretation of findings.
- **Evaluation of 2019 Test Results**—The 2019 test results categorized as “no adverse response”, “possible adverse response”, or “likely adverse response” are illustrated on Figure 4-1. Key findings were:
  - For all species, most tests were categorized as no adverse response. Likely adverse responses were most common for *P. subcapitata* and least common for *C. dubia* and *P. promelas*.
  - The apparent sensitivity of *P. subcapitata* in 2019 is suspect given the number of samples affected by anomalously low cell yields in Q1 and Q3. The rate of adverse responses for *C. dubia* decreased in 2019 relative to previous years.
  - Stations FR_FRCP1 and CM_MC2 had the highest frequency of possible or likely adverse responses, a finding consistent with previous years of monitoring.
- **Causation Assessment**—Constituents identified as potential causes of toxicity in 2019 tests categorized as possible or likely (Section 3.4) are summarized in Table 4-1. Key findings were:
  - Nickel was identified in the Q1 FR_FRCP1 test as potentially contributing to observed effects to *C. dubia*. Nitrate, sulphate, and TDS were also identified as potentially contributing to observed effects, although the evidence was not as strong for these constituents compared to nickel. Sulphate and TDS were identified as potentially contributing to observed effects to *P. subcapitata*.
  - Nitrate was identified in the Q1 FR_FRABCH test as potentially contributing to observed effects to *C. dubia* and Q3 and Q4 LC_DCDS tests as potentially contributing to observed effects to *H. azteca* and *O. mykiss*.

- In several CM_MC2 tests, nickel was identified as a potential or likely cause of toxicity to *C. dubia* (Q1) and *H. azteca* (Q3 and Q4), which generally aligned with TIE findings for *C. dubia* and *H. azteca*.
- Microbial effects were observed in Q1 FR_FRABCH and Q3 FR_FRCP1, CM_MC2, and LCLCDSSLCC *P. promelas* tests. No water quality constituents were identified as potential causes of toxicity in these tests.
- For other tests categorized as possible or likely adverse response, no water quality constituents were identified as causing toxicity.

- **Comparison of 2019 Results to Previous Years**—Similarities and differences were summarized between test results in the 2019 program and previous programs (2015 to 2018), focusing on the incidence of adverse responses by season and station (Section 3.5). Key findings were:
  - At FR_FRCP1, there was a trend towards more frequent and larger responses for *C. dubia* until Q2 of 2019, when mean reproduction was within local and regional NRs, indicating that a break in the observed trend has occurred in 2019. For Q1 2019, the observed response observed for *C. dubia* was attributed to several constituents, including sulphate and TDS, which were similar to concentrations measured in Q4 2018. FR_FRCP1 water during low flow conditions (e.g., Q1 2019) was primarily Cataract Creek water. Teck has initiated several actions under the AMP response framework, including diverting Cataract Creek through Swift Creek Ponds for eventual treatment, which avoids discharging into the seasonally dry reach of the Fording River, applying to relocate the Fording River Operations compliance location from FR_FRCP1 to FR_FRABCH to better capture all upstream mine influence, and initiating TIE studies to better understand the cause(s) of toxicity at FR_FRCP1.
  - At LC_DCDS, nitrate was identified as a potential or likely cause of observed effects in Q4 2018 and Q4 2019 tests, which corresponded with an observed increase in nitrate in these quarters (~20 to ~30 mg/L NO_3-N) compared to concentrations in previous quarters and years (5.0 - 10 mg/L NO_3-N). Teck has initiated actions under the LCO Nitrate Compliance Action Plan, including an increase to explosives bagging (~80% bagged at Dry Creek in 2019) to reduce nitrate releases from waste rock placed in the LCO Dry Creek watershed.
  - At CM_MC2, there was a trend toward more and larger responses for *C. dubia* and *H. azteca* until Q1 2019, when mean responses were within local and regional NRs, indicating that a break in the observed trend has occurred in 2019. In recent years, there been a consistent pattern of nickel being identified as a potential or likely cause of observed effects in most of these tests. The pattern in responses corresponds with an increase in aqueous nickel concentrations from 2015 (generally ranged from 5 to 15 µg/L) to 2018 (generally ranged from 10 to 60 µg/L). The observed decrease in nickel concentrations at CM_MC2 between 2018 and 2019 may help explain the reduced magnitude of crustacean toxicity in the latter half of 2019, where nickel concentrations ranged from 8 to 20 µg/L. Spatially, nickel concentrations decrease from upstream to downstream on Michel Creek. At the station further downstream on Michel Creek (RG_MIDAG), nickel concentrations were lower relative to CM_MC2 (i.e., ~1 to ~5 µg/L) and no adverse test responses were observed at this station in 2019. As discussed in Section 2.2.2.2, Teck has initiated several actions under the AMP response framework. These include expanding monitoring at CMO (including the addition of CM_MC3 and RG_MIDAG to characterize spatial extent of effects at CM_MC2), initiating laboratory and desktop studies to support the

development of site-specific effects benchmarks for nickel in the Elk Valley, and evaluating mitigation options for nickel at CMO.

- At other stations, there was no apparent consistent pattern of responses and no clear evidence of causal factors. The elevated incidence of adverse effects to green algae cell yield in Q3 and the elevated incidence of adverse effects to *H. azteca* in Q4 did not occur in a concentration-dependent manner, are inconsistent with previous patterns, and appear to be anomalous.

Figure 4-1: Summary of 2019 test results by species.

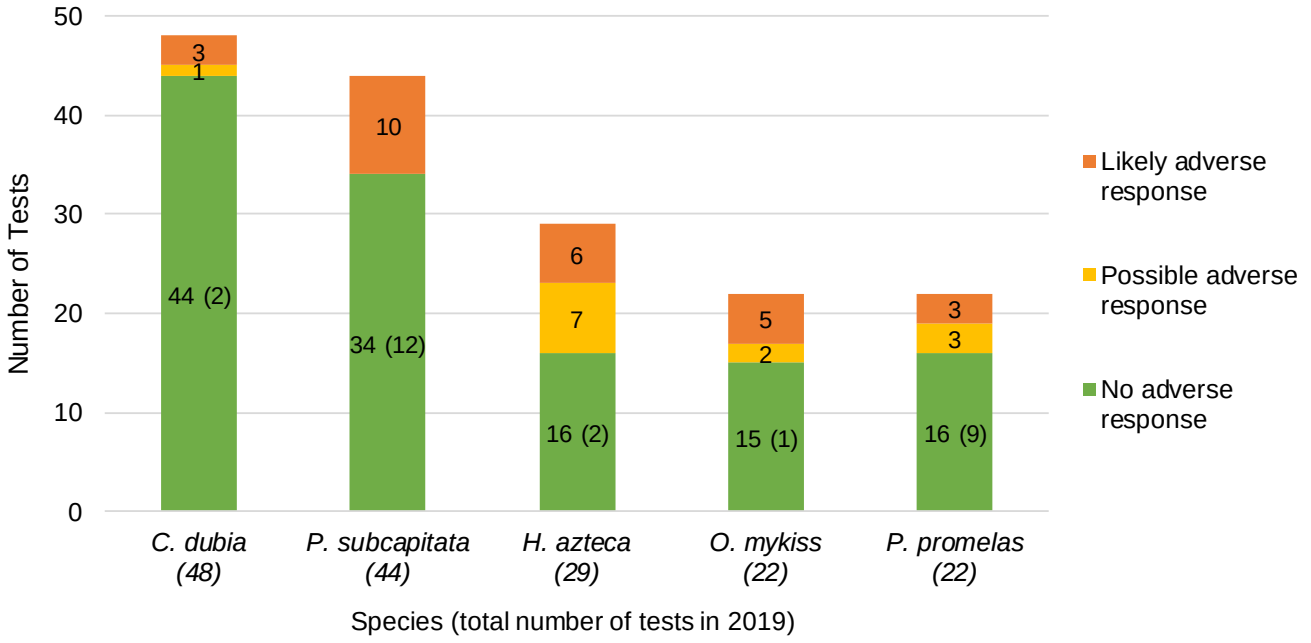


Table 4-1: Summary of Constituents Identified as Potentially Contributing to Observed Responses in 2019

Species	Endpoint	FR_FRCP1	FR_FRABCH	GH_FR1	LC_LC5	LC_DCDS	GH_ERC	EV_HC1	CM_MC2	RG_MIDAG	EV_MC2	LC_LC3	LC_LCDSSLCC
Q1													
C. dubia	Survival	Ni[(a)], SO_4, TDS	—	—	—	—	—	—	—	—	—	—	—
	Reproduction	**Ni[(a)]**, NO_3, SO_4, TDS	NO_3	—	—	—	—	—	Ni[(a)]	—	—	—	—
P. subcapitata	Cell yield	SO_4, TDS	—	—	—	—	—	—	—	—	—	—	—
P. promelas	Survival	None	Microbes	—	—	—	None	—	—	—	—	—	—
	Biomass	None	—	—	—	—	—	—	—	—	—	—	—
Q2													
O. mykiss	Survival	—	None	None	—	—	—	—	—	—	—	—	—
	Viability	—	None	None	—	—	—	—	—	—	—	—	—
Q3													
C. dubia	Reproduction	None	—	—	—	—	—	—	—	—	—	—	—
P. subcapitata	Cell yield	None	None	None	None	—	—	None	None	—	None	None	None
H. azteca	Dry Weight	—	—	—	—	NO_3	—	None	Ni[(a)]	—	—	None	None
	Survival	—	—	—	—	—	—	—	—	—	—	None	—
P. promelas	Biomass	—	—	—	—	—	—	—	Microbes	—	—	—	Microbes
	Survival	Microbes	—	—	—	—	—	—	Microbes	—	—	—	Microbes
Q4													
H. azteca	Dry Weight	Ni[(a)]	—	—	—	NO_3	None	None	Ni[(a)]	—	—	—	—
	Survival	—	—	—	None	NO_3	—	—	None	—	—	None	None
O. mykiss	Survival	—	—	None	—	NO_3	—	—	—	—	—	—	—
	Viability	—	None	—	None	NO_3	—	—	None	—	None	—	—

Notes:
Bold = Primary explanatory variable identified if multiple constituents were identified as potentially causing observed response.
Species and endpoint shown in table only if one or more tests identified as likely or possible for that quarter.
Constituents were identified in Section 3.4.1 to Section 3.4.5.
'—' = test was categorized as no adverse response.
Ni = nickel; NO_3 = nitrate; SO_4 = sulphate; TDS = total dissolved solids.
None = no water quality constituent was identified.

[(a)] Causation assessment supported by Toxicity Identification Evaluations.

5.0 UNCERTAINTY

Sources of uncertainty associated with the interpretation of the quarterly and semi-annual toxicity testing program were:

- **Pairing of water quality and response data**—For the *H. azteca*, *P. promelas*, and *O. mykiss* tests, refresh water samples were collected on a weekly basis for the duration of the test. Refresh water samples, as well as the mean concentration over the test, were compared to chronic BC WQGs. In the causation assessment, effects data for these tests were paired with the mean concentration of the weekly samples to conduct correlations. If concentrations of water quality constituents were higher (or lower) in one of the weekly samples, then examination of weekly samples may have resulted in different conclusions regarding constituents retained for graphical analysis. This uncertainty is not expected to affect the overall interpretation of the quarterly and semi-annual toxicity testing program because weekly refresh samples were screened against chronic BC WQGs and EVWQP benchmarks, so constituents potentially contributing to observed effects were captured in the overall causation assessment. In addition, results of other testing of Elk Valley waters confirmed that variations over the span of a few weeks tend to be low (Golder 2018a).
- **Mixture effects**—The causation assessment presented in Section 3.4 evaluated individual water quality constituents potentially contributing to observed test responses. Although ∑TUs were used in the causation assessment as an exposure metric for mixtures, it cannot be ruled out that some constituents may act in combination in such a way that is not captured by the ∑TU calculations. A qualitative multiple-stressor analysis was conducted in Chapter 8 of the EVWQP to assess potential interactions among the four EVWQP constituents. Although mechanisms of action have not been definitively determined, the available information indicates that these constituents likely have different mechanisms of action:
  - Selenium produces adverse effects following dietary accumulation of seleno-amino acids into protein-rich tissues.
  - Although the specific mechanism of action is uncertain, nitrate may exhibit toxicity following uptake and conversion to nitrite, which can then impair oxygen transport. In the Elk Valley, nitrate is not likely to contribute meaningfully to the osmotic pressure that may be important for sulphate toxicity, because it is present at low concentrations relative to the total ionic content of mine-influenced water.
  - Sulphate appears to act primarily on the iono-regulatory organs of freshwater organisms, and may exert stress because of general osmoregulatory pressure or disruption of cellular membrane function in conjunction with other components of TDS.

  In addition to those constituents discussed in the EVWQP, nickel was also identified herein as a likely cause of toxicity in some tests. Potential mechanisms for nickel toxicity on aquatic organisms include disruption of trace element and ion homeostasis (e.g., calcium, magnesium, and iron), allergic reactions at respiratory epithelia, disruption of energy metabolism, and oxidative stress (Brix et al. 2017).

  Notwithstanding the different mechanisms of action, conceptually it is possible that effects from multiple constituents could operate in an additive manner where they ultimately affect the same toxicological endpoint (e.g., nitrate and TDS could separately influence *O. mykiss* survival via different toxicological pathways).

  Most water quality constituents evaluated in the causation assessment had concentrations below water quality guidelines or orders of magnitude below effect concentrations. Based on the information above (i.e., different mechanisms of action and most concentrations below water quality guidelines or toxicological

benchmarks), there is a low potential for additive effects of multiple constituents. It is unlikely that combined effects among the constituents would occur, and the approach taken in the assessment of evaluating each substance independently is expected to provide a reliable assessment of the overall potential for adverse effects from water quality.

- **Microbial Influence**—For fathead minnows and rainbow trout, the uncertainty related to microbial activity (i.e., sporadic mortality phenomenon) has been substantially reduced through use of up to 20 µg/L copper amendment (Appendix B). For fathead minnow, survival was still affected in the Q1 and Q3 reference and test sites waters, and the timing of mortalities suggested insufficient control of microbial effects in this case. However, the implementation of copper amendment has greatly reduced this source of variance (that is unrelated to mining activity) and thereby reduced the incidence of false positive toxicity findings. As a result, the incidence of toxicity to fathead minnows decreased substantially from 2015 to 2019, to the extent that fathead minnows currently yield one of the lowest rates of significant results among the five species tested in quarterly or semi-annual chronic testing. For rainbow trout, such observations were not apparent in 2019 semi-annual tests, but the potential for future interferences remains.
- **Anomalous Endpoint Results**— There were some atypical findings for both green algae cell yield (Q1 and Q3) and *H. azteca* survival (Q1 and Q3), with adverse responses that did not match previous tests or water quality; these unusual findings did not warrant rejection as invalid test outcomes, but instead indicate higher uncertainty than in previous years for these endpoints. The laboratory was unable to identify an explanation for these results related to laboratory test procedures or quality assurance. The causation analysis was also unable to identify an explanation for these test results based on water quality composition. These results were retained in the toxicity summaries for each location; testing in 2020 will help to confirm whether the findings are anomalous (i.e., not repeated through testing under similar exposure conditions).

6.0 RECOMMENDATIONS

Recommendations for future quarterly and semi-annual toxicity testing programs are:

- **Continue standard Environment Canada protocol tests for *C. dubia***—In 2019, the test durations for *C. dubia* were run according to protocol methods (i.e. 7 ± 1 day), with the test being terminated on the day that at least 60% of control organisms have produced three broods. A parallel set of results was obtained by extending the test to 8 days, regardless of when the control organisms produced a third brood, and counting output from the first three broods only. A comparison of results produced from the two test durations indicated that Q1 results were variable between the two test durations, and Q2, Q3, and Q4 results were similar between the two test durations. Despite the variability between results in Q1, the same test conclusions were drawn (i.e. test sites that were lower than one or more reference in the protocol test generally had the same outcome in the 8-day test). These results indicate that although the reproductive output was sometimes biased low (i.e., in Q1), there were no differences in test conclusions (i.e., pairwise significant tests compared to reference) between the two test durations because both reference and test sites are subject to the potential downward bias of the protocol test. Moving forward, it is recommended that:
  - the two methods be compared again in 2020, as the effect of test termination can vary among test batches.
  - if tests in 2020 do not identify a difference between neonate counting procedures (i.e., influence test significance decisions), testing can return to the Environment Canada protocol only in successive years.

  - temporal trend assessment for *C. dubia* reproduction should maintain the calculations using the Environment Canada protocol for consistency with earlier statistics, unless the 2020 data indicate that changes are warranted.

- **Maintain modified *P. promelas* test procedures**—Nautilus conducted *P. promelas* quarterly tests with reference water treated with 10 µg/L and 15 µg/L or test site water treated with 15 µg/L and 20 µg/L (Appendix B). Due to the efficacy and minimal impact on control performance, copper treatment is recommended as a method to effectively mitigate toxicity due to microbial/fungal interference, while still allowing a relevant measure of the presence of other toxicants in the samples. In most testing conducted to date, a copper amendment of 15 to 20 µg/L has effectively mitigated toxicity due to microbial effects. A subset of *P. promelas* tests conducted in 2019 indicated that a copper dose of 20 µg/L was insufficient to always curtail microbial influences. This suggests that under some conditions, additional copper (e.g., 20 µg/L or more) may be required to effectively mitigate microbial/fungal interference, or copper may be less effective under some environmental conditions. Copper additions up to 20 µg/L are approved for testing with fathead minnow; testing with higher copper doses (e.g., 40 µg/L) remains an option for Teck to consider as part of test refinement, but would require ENV approval for formal amendment of the study design. Given the cost and complexity of additional studies conducted over multiple copper concentrations, we recommend staying with the 20 µg/L amendment ceiling, and evaluating how frequently evidence of microbial interference is observed. Consistent with the January 2018 amendment to Permit 107517, ameliorating factors that influence copper toxicity (e.g., hardness, DOC) will be considered when determining the base copper amendment within the range of 10 µg/L to 20 µg/L. We also recommend that, where the optimal copper concentration is unclear, a concentration toward the upper end of this range be applied.

- **Maintain *O. mykiss* test procedures**—Nautilus conducted *O. mykiss* semi-annual tests with reference and test site water treated with 20 µg/L (Appendix B). Due to the efficacy and minimal impact on control performance, copper treatment is recommended as a method to effectively mitigate toxicity due to microbial/fungal interference, while still allowing a relevant measure of the presence of other toxicants in the samples. No microbial effects were observed in 2019 testing using a copper dose of 20 µg/L, indicating that this is an appropriate dose for this species to effectively reduce microbial effects. Copper additions up to 20 µg/L copper are approved for testing with rainbow trout; therefore, it is recommended to continue testing with this dose. Similar to fathead minnow testing, we recommend that, where the optimal copper concentration is unclear, a concentration toward the upper end the range of 10 µg/L to 20 µg/L be applied, particularly as rainbow trout are predicted to be less sensitive to copper relative to fathead minnows.

- **Continue toxicity testing with Elk River, Fording River, Michel Creek, and South Line Creek reference waters**—Test organism responses references were usually comparable within a given season. However, in some quarterly tests, responses were significantly different in reference waters. Inclusion of all four references provided useful information about the natural variability in reference responses and important context for the interpretation of test site results. The 2019 data confirmed findings from previous years that, although individual references can vary within a single batch of testing, the long-term performance of reference waters is generally equivalent across all four reference sites. The strength of including multiple reference stations appears to come from increased sample size used to develop reliable reference normal ranges, rather than a need to characterize references in specific watersheds within the Elk Valley.

7.0 CLOSURE

We trust the above meets your present requirements. If you have questions or require additional details, please contact the undersigned.

Golder Associates Ltd.



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https://golderassociates.sharepoint.com/sites/13124g/35002020_chronic_tox/02-chronic_tox_report/3. deliverable/19135196-p3500-rev0-rg-2019_chronictox_report-28apr_29.docx

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APPENDIX A

Legal Requirements

Permit #107517 issued under the Environmental Management Act (Elk Valley EMA Permit) – Section 9.8

9.8. CHRONIC TOXICITY TESTING PROGRAM

The Permittee must develop and implement a toxicity testing program for receiving environments affected by coal mining operations. The purpose of the program is to evaluate chronic toxicity at the compliance points and other locations throughout the Elk Valley.

The toxicity testing program must include, at a minimum, the following elements:

i. Once every three years beginning in 2015, bioassays must be conducted to evaluate the survival and development (incidence of deformities) of targeted aquatic species using gametes obtained from species utilizing habitats in the Fording River, their tributaries, and associated lentic habitats, and the Koocanusa Reservoir. The concentrations of selenium in the eggs of each female spawned must be measured;

ii. Quarterly or semi-annual surface-water chronic toxicity testing using a suite of toxicity tests:

The following toxicity test must be conducted during each semi-annual (spring and fall) sampling event:

- 30-day early life-stage test with the rainbow trout (*Oncorhynchus mykiss;* EPS1/RM/28) using <24-hour post-fertilization eggs; endpoints: survival, hatching, growth, deformity, behaviour;

The following toxicity tests must be conducted during each quarterly sampling event at all compliance points:

- 7-day water-only test with the cladoceran, Ceriodaphnia dubia (EPS1/RM/21); endpoints: survival, reproduction;
- 72-hour test with the alga, *Pseudokirchneriella subcapitata* (EPS1/RM/25); endpoints: growth inhibition;

The following toxicity tests must be conducted during each quarterly sampling event at compliance points in the Fording River (specifically FRO and GHO Fording) and Michel Creek (CMO):

- 28-day water-only test with amphipod, *Hyalella Azteca* (adapted from USEPA 2000); endpoints: survival, growth; and
- 30-day early life-stage test with the fathead minnow, *Pimephales promelas* (USEPA 1996) using <24-hour post-fertilization eggs; endpoints: survival, hatching, growth, deformity.

iii. Toxicity testing methods must be consistent with Environment Canada's, U.S. Environmental Protection Agency's, or ASTM's approved biological test methods;

iv. A Quality Assurance/Quality Control component; and

v. A proposed schedule of dates that coincide with water quality sampling and that target predicted worst-case times such as low flow, during flocculant use, or when discharge quality is expected to be reduced.

The suite of toxicity tests will be reviewed on an annual basis by the EMC and recommendations provided to the Director for consideration.

9.8.1. SULPHATE TOXICITY AT HIGH HARDNESS CONCENTRATIONS

The Permittee must develop with input from the EMC, and implement a toxicity testing program specifically to assess sulphate toxicity at high hardness concentrations. Results will be used to support finalization of long term sulphate site performance objectives.

The following toxicity test shall be conducted as a component of the Sulphate toxicity testing program.

- 30-day early life-stage test with the fathead minnow, *Pimephales promelas* (USEPA 1996) using <24-hour post-fertilization eggs; endpoints: survival, hatching, growth, deformity.
- Other sensitive species (amphibian, trout, water flea, etc.) shall be included.

Monitoring results and interpretation must be compiled into a written report and submitted to the satisfaction of the Director by December 31, 2017.

9.8.2. **SUBLETHAL TOXICITY STUDY**

The Permittee must develop with input from the EMC, and implement a sublethal toxicity study to confirm that surface waters meeting the Site Performance Objectives for the order stations are not toxic to sensitive aquatic receptors. The Permittee must submit the study design to the Director by April 30, 2015.

Letter from the British Columbia (B.C.) Ministry of Environment (MOE) approving the study design for the Regional Aquatic Effects Monitoring Program (RAEMP)

Excerpt of toxicity testing requirements:

Teck shall work in collaboration with the Ministry and Ktunaxa Nation representatives ideally in a monitoring committee forum to prioritize the following studies for discussion and implementation. Recommendations from the monitoring committee must include brief study designs and be submitted to the Director for approval. These studies shall consider, at a minimum, the following studies previously recommended by the Technical Advisory Committee (TAC) established for the ABMP.

Nitrate Toxicity

Additional toxicity testing to study the effects of nitrate, including:

a. Amphibian toxicity testing to assess the sensitivity of representative species to nitrate using long-term metamorphosis tests;
b. Chronic toxicity testing to assess the sensitivity of invertebrates to nitrate using long-term tests; and
c. Early life stage rainbow trout toxicity testing to assess the relationship between water hardness and nitrate toxicity across a range of hardness representative of the Elk and Fording Rivers.

APPENDIX B

Quarterly and Semi-Annual Laboratory Reports

First Quarter 2019
Nautilus Toxicity Testing on Elk Valley Samples with *Ceriodaphnia dubia*, *Pseudokirchneriella subcapitata*, *Hyalella azteca*, and *Pimephales promelas*

Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia*, *Pseudokirchneriella subcapitata*, *Hyalella azteca*, and *Pimephales promelas*

First Quarter 2019 Results

Revised Final Report

March 24, 2020

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

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SIGNATURE PAGE

Report By:
Jeslin Wijaya, B.Sc.
Laboratory Biologist

Reviewed By:
Melanie Gallant. Ph.D.
Environmental Toxicologist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

SUMMARY

Summaries of sample information and test results from the toxicity tests conducted on samples collected from the Elk Valley to meet requirements of the quarterly toxicity testing program required under BC Ministry of Environment and Sustainability permit number 107517 in the first quarter of 2019 are provided in the tables below.

For the first quarter of 2019 program, stations were sampled to align with the integrated chronic toxicity testing program, which was designed to eliminate redundancy between permit 107517 Section 9.8 (ii) and Permit 106970 toxicity testing programs. The integrated program was approved by BC Ministry of Environment and Sustainability on March 4, 2019 (BC ENV 2019).

Sample and Test Type Information

Sample IDs	FR_UFR1 (site control), GH_ER2 (site control), CM_MC1 (site control), LC_SLC (site control) [#], FR_FRABCH*, FR_FRCP1, GH_FR1, GH_ERC [#], CM_MC2, EV_MC2 [#], EV_HC1[#], LC_DCDS [#], LC_LC3 [#], LC_LC5 [#], LC_LCDSSLCC [#], RG_MIDAG[†]*
Sample collection dates	February 25/26, March 5, 12, 19, and 26, 2019
Sample receipt dates	One or two days after sample collection
Sample receipt temperatures	Ranged from 0.0 to 6.6°C
Test types	*Ceriodaphnia dubia* 7-d survival and reproduction *Pseudokirchneriella subcapitata* 72-h growth inhibition *Hyalella azteca* 28-d survival and growth *Pimephales promelas* 32-d survival and growth

[†] Not tested with *P. promelas* and *P. subcapitata*

[#] Not tested with *H. azteca*

* Station not currently part of Permit requirements but added to characterize spatial extent of effects (RG_MIDAG) or to evaluate mainstem Fording River conditions (FR_FRABCH). Non-permitted sites that were monitored in 2019 may be adjusted in future sampling events to better understand/reflect spatial extent or mixed conditions

Summary of Results

Endpoint	Mean ± SD				
	Laboratory Control	FR_UFR1 (Site Control)	GH_ER2 (Site Control)	CM_MC1 (Site Control)	LC_SLC (Site Control)
C. dubia					
Survival (%)	100	100	100	90	100
Reproduction	21.9 ± 3.5	15.3 ± 3.9*∂	18.2 ± 2.5	19.4 ± 4.6	20.3 ± 2.8
P. subcapitata					
Cell Yield (x 10^4 cells/mL)	32.0 ± 2.7	60.9 ± 5.1#∂	59.1 ± 4.9#∂	72.1 ± 5.5	76.5 ± 5.9
H. azteca					
Survival (%)	90.0 ± 14.1	70.0 ± 27.4	60.0 ± 21.2*#	88.0 ± 8.4	NT
Dry weight (mg)	0.11 ± 0.03	0.07 ± 0.04	0.07 ± 0.03	0.11 ± 0.05	NT
***P. promelas* (10 µg/L Cu)**					
Hatch (%)	100	100	100	100	100
Survival (%)	95.0 ± 6.4	81.7 ± 11.4	78.3 ± 12.6	56.7 ± 13.9*α∂	85.0 ± 22.0
Biomass (mg)	2.2 ± 0.1	1.8 ± 0.3	1.9 ± 0.1*	1.4 ± 0.4*	1.8 ± 0.2*
Length (mm)	10.9 ± 0.2	10.5 ± 0.4	11.2 ± 0.6	11.1 ± 0.5	10.1 ± 0. 7β#
Normal Development (%)	100	100	100	100	94.1

SD = Standard Deviation
* Result was significantly lower than the laboratory control
α Result was significantly lower than the site control FR_UFR1
β Result was significantly lower than the site control GH_ER2
Result was significantly lower than the site control CM_MC1
∂ Result was significantly lower than the site control LC_SLC

Summary of Results (continued)

Endpoint	Mean ± SD					
	FR_FRCP1	FR_FRABCH	GH_FR1	GH_ERC	CM_MC2	EV_MC2
C. dubia						
Survival (%)	0*αβ#∂	100	100	100	100	100
Reproduction	0.0 ± 0.0*αβ#∂	12.7 ± 5.3*β#∂	15.8 ± 3.2*	18.4 ± 2.8	10.7 ± 4.0*β#∂	17.0 ± 5.2
P. subcapitata						
Cell Yield (x 10^4 cells/mL)	9.5 ± 1.3*αβ#∂	71.8 ± 3.5	71.5 ± 6.5	63.5 ± 3.9#∂	77.5 ± 3.1	81.5 ± 2.9
H. azteca						
Survival (%)	70.0 ± 20.0	78.0 ± 14.8	82.0 ± 8.4	NT	96.0 ± 5.5	NT
Dry weight (mg)	0.08 ± 0.02	0.07 ± 0.05	0.09 ± 0.06	NT	0.07 ± 0.03	NT
***P. promelas* (10 µg/L Cu)**						
Hatch (%)	93.3 ± 9.4	95.0 ± 6.4	100	98.3 ± 3.3	100	100
Survival (%)	0*αβ#∂	58.3 ± 30.5*α∂	96.7 ± 3.8	48.3 ± 55.9*αβ∂	90.0 ± 11.6	93.3 ± 0.0
Biomass (mg)	0.0 ± 0.0*αβ#∂	1.9 ± 0.1*	2.0 ± 0.3	0.8 ± 0.9*	2.1 ± 0.2	2.0 ± 0.2
Length (mm)	0.0 ± 0.0*αβ#∂	12.3 ± 2.2	10.6 ± 0.3	10.2 ± 0.1*β#	10.0 ± 0.7β#	9.6 ± 0. 3*αβ#
Normal Development (%)	100	100	100	100	98.2	96.4

SD = Standard Deviation, NT=Not Tested
* Result was significantly lower than the laboratory control
α Result was significantly lower than the site control FR_UFR1
β Result was significantly lower than the site control GH_ER2
Result was significantly lower than the site control CM_MC1
∂ Result was significantly lower than the site control LC_SLC

Summary of Results (continued)

Endpoint	Mean ± SD					
	EV_HC1	RG_MIDAG	LC_LCDSSLCC	LC_DCDS	LC_LC3	LC_LC5
C. dubia						
Survival (%)	100	100	100	100	100	100
Reproduction	19.8 ± 3.6	17.7 ± 5.8	20.3 ± 6.5	19.9 ± 5.0	18.1 ± 4.7	17.2 ± 4.4
P. subcapitata						
Cell Yield (x 10^4 cells/mL)	76.8 ± 6.6	NT	81.5 ± 4.5	82.8 ± 5.0	79.5 ± 8.0	76.8 ± 5.0
H. azteca						
Survival (%)	NT	78.0 ± 11.0	NT	NT	NT	NT
Dry weight (mg)	NT	0.05 ± 0.03	NT	NT	NT	NT
***P. promelas* (10 µg/L Cu)**						
Hatch (%)	100	NT	100	100	100	100
Survival (%)	90.0 ± 11.6	NT	85.0 ± 13.7	95.0 ± 3.3	81.7 ± 3.3	68.3 ± 45.7*
Biomass (mg)	1.9 ± 0.1*	NT	2.0 ± 0.1	2.0 ± 0.2*	2.1 ± 0.1	1.5 ± 1.0
Length (mm)	9.9 ± 0.3*αβ#	NT	9.8 ± 0.3*αβ#	9.7 ± 0.3*αβ#	10.5 ± 0.2*	9.7 ± 0.5*αβ#
Normal Development (%)	94.4	NT	98.0	96.5	100	100

SD = Standard Deviation, NT=Not Tested
* Result was significantly lower than the laboratory control
α Result was significantly lower than the site control FR_UFR1
β Result was significantly lower than the site control GH_ER2
Result was significantly lower than the site control CM_MC1
∂ Result was significantly lower than the site control LC_SLC

Summary of Results (continued)

Endpoint	Mean ± SD				
	Laboratory Control	**FR_FRCP1**	**GH_FR1**	**CM_MC2**	**FR_FRABCH**
***P. promelas* (20 µg/L Cu)**					
Hatch (%)	96.7 ± 3.8	91.7 ± 8.4	100	100	100
Survival (%)	83.3 ± 15.9	15.0 ± 10.0*	88.3 ± 11.4	81.7 ± 8.4	65.0 ± 44.4
Biomass (mg)	1.6 ± 0.2	0.8 ± 0.2*	2.0 ± 0.3	1.9 ±0.2	1.5 ± 1.0
Length (mm)	10.4 ± 0.5	13.4 ± 2.1	10.2 ± 0.7	10.0 ± 0.6	10.2 ± 0.2
Normal development (%)	100	93.8[§]	94.6[§]	97.9	97.6

SD = Standard Deviation, NT=Not Tested,
* Result was significantly lower than the 10 µg/L copper-treated laboratory control
[α] Result was significantly lower than the 10 µg/L copper-treated site control FR_UFR1
[β] Result was significantly lower than the 10 µg/L copper-treated site control GH_ER2
[#] Result was significantly lower than the 10 µg/L copper-treated site control CM_MC1
[§] Result was significantly lower than the 20 µg/L copper-treated laboratory control

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on samples collected from various locations in the Elk Valley as part of a quarterly toxicity testing program required under BC Ministry of Environment and Climate Change Strategy permit number 107517.

Stations sampled in the first quarter of 2019 align with the integrated chronic toxicity testing program, which was designed to eliminate redundancy between permit 107517 Section 9.8 (ii) and Permit 106970 toxicity testing programs. The integrated program was approved by BC Ministry of Environment and Sustainability on March 4, 2019 (BC ENV 2019). Test species required to be tested quarterly include a cladoceran (*Ceriodaphnia dubia*) and a unicellular green alga (*Pseudokirchneriella subcapitata*). Tests are also required on a semi-annual basis using rainbow trout (*Oncorhynchus mykiss*; Q2 and Q4), an amphipod (*Hyalella azteca*; Q2 and Q4), and fathead minnow (*Pimephales promelas*; Q1 and Q3). However, since sampling for the Q1 2019 toxicity testing program began in February 2019, prior to receipt of the BC ENV (2019) approval letter for the integrated program, samples were tested using *H. azteca* according to the previous permit (107517) requirements in Q1. Tests with this species would not otherwise have been required in Q1 under the integrated program.

Water samples used for testing were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 0.0 to 6.6°C and were stored in the dark at 4 ± 2°C prior to testing. Table 1 summarizes the toxicity tests that were conducted on each sample as well as sample collection dates. Samples were collected weekly on the dates shown in Table 1 for the duration of the *H. azteca,* and *P. promelas* tests. The *P. promelas* test was conducted at the Nautilus Environmental laboratory in Calgary, AB; the other toxicity tests were conducted at the Burnaby, BC location.

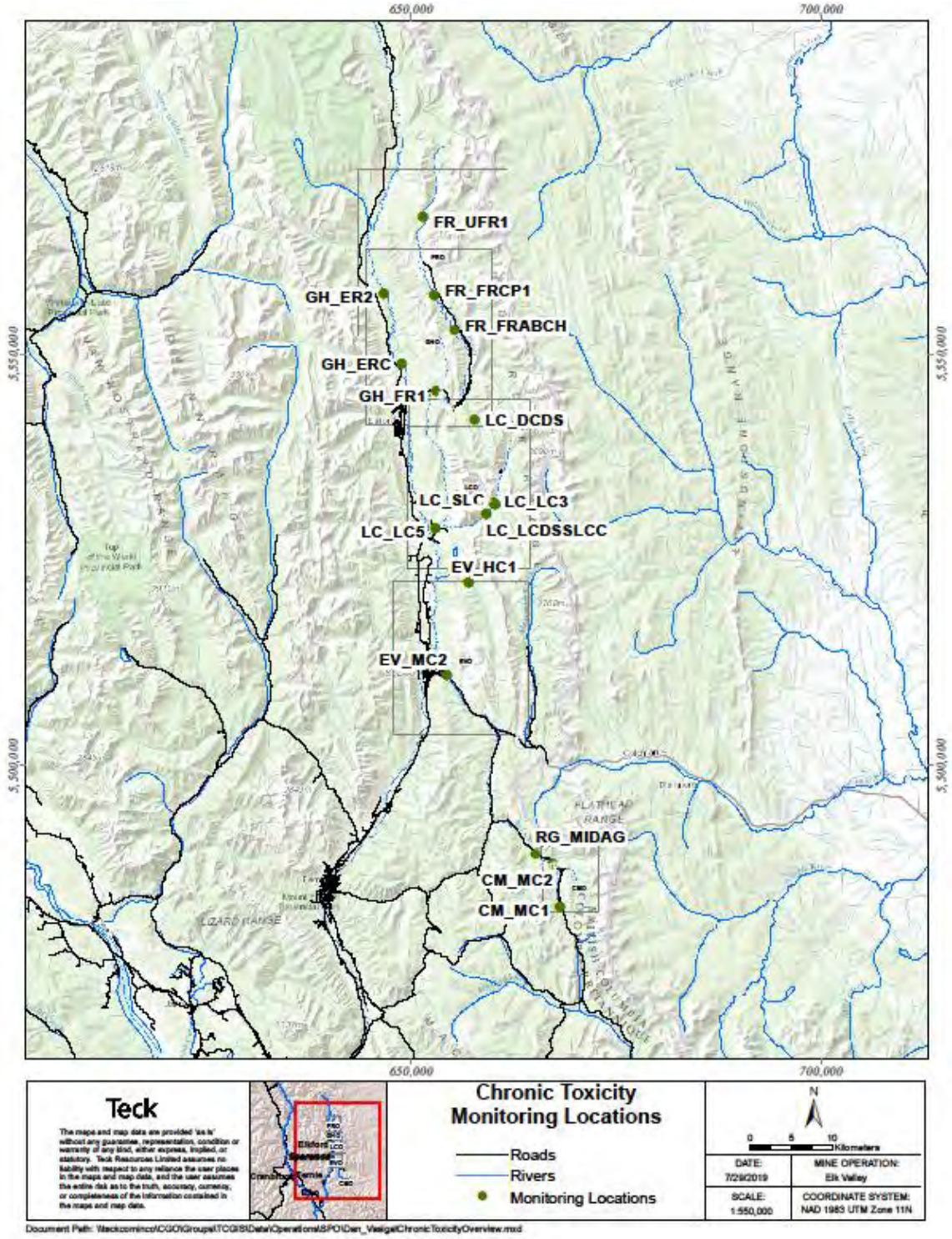
This report presents the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. Results of analytical chemistry that was performed on the samples tested in this program are uploaded by Teck to the Environmental Management System database. These samples were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix E. This report revises and replaces an earlier version of this report dated July 30, 2019. Changes were made to this report to present data analysis for *C. dubia* in a manner that was consistent with the data for other quarters and the Environment Canada test method and to correct data presented for percent deformities of fathead minnows.

Table 1. Summary of toxicity testing program.

Sample ID	EMS Location ID	Species Tested	Sample Collection Dates
FR_UFR1 *	E300071	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	February 26, March 5, 12, 19, and 26, 2019
GH_ER2 *	E300090	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	February 25/26, March 5, 12, 19, and 26, 2019
CM_MC1 *	E258937	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	February 26, March 5, 12, 19, and 26, 2019
LC_SLC *	E282149	*C. dubia*, *P. subcapitata*, and *P. promelas*	February 26, March 5, 12, 19, and 26, 2019
FR_FRCP1	E299272	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	February 26, March 5, 12, 19, and 26, 2019
FR_FRABCH	-	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	February 26, March 5, 12, 19, and 26, 2019
GH_FR1	E200028	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	February 25/26, March 5, 12, 19, and 26, 2019
GH_ERC	E258175	*C. dubia*, *P. subcapitata*, and *P. promelas*	February 25/26, March 5, 12, 19, and 26, 2019
EV_HC1	E299270	*C. dubia*, *P. subcapitata*, and *P. promelas*	February 26, March 5, 12, 19, and 26, 2019
EV_MC2	E102682	*C. dubia*, *P. subcapitata*, and *P. promelas*	February 26, March 5, 12, 19, and 26, 2019
CM_MC2	E300091	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	February 26, March 5, 12, 19, and 26, 2019
RG_MIDAG	-	*C. dubia* and *H. azteca*	February 26, March 5, 12, and 19, 2019
LC_LCDSSLCC	E282149	*C. dubia*, *P. subcapitata* and *P. promelas*	February 26, March 5, 12, 19, and 26, 2019
LC_DCDS	E291569	*C. dubia*, *P. subcapitata* and *P. promelas*	February 26, March 5, 12, 19, and 26, 2019
LC_LC3	E297110	*C. dubia*, *P. subcapitata* and *P. promelas*	February 26, March 5, 12, 19, and 26, 2019
LC_LC5	0200389	*C. dubia*, *P. subcapitata* and *P. promelas*	February 26, March 5, 12, 19, and 26, 2019

***** Site water controls

Figure 1. Chronic toxicity monitoring locations.



2.0 METHODS

Methods for the toxicity tests using *C. dubia*, *P. subcapitata*, *H. azteca,* and *P. promelas* are summarized in Tables 2 through 5. Laboratory control water was 20% Perrier water prepared with deionized water for *C. dubia*; dechlorinated City of Calgary municipal tap water with the addition of 4 mg/L potassium chloride (KCl) for *P. promelas*; reconstituted water prepared by addition of reagent grade salts to dechlorinated Metro Vancouver municipal tap water for *H. azteca* according to a recipe provided in Environment Canada (2013); and deionized water with supplemented nutrients for *P. subcapitata*.

For *C. dubia*, the test protocol specifies that test duration must be 7 ± 1 day, with the test being terminated on the day that at least 60% of control organisms have produced three broods. To better evaluate the potential effect of brood patterns on responses, the laboratory was instructed to extend the test to 8 days, regardless of the timing of controls reaching 60% with three broods. However, the results reported here are based on the regular test method (which in this case, was based on Day 7 data).

For the *H. azteca* tests, all of the site waters were supplemented with 25 mg/L chloride and 0.02 mg/L bromide using NaCl and NaBr, respectively, according to recommendations of the *Hyalella* Advisory Group (chaired by Chris Ingersoll, USGS) (Norberg-King et al., 2014), since low concentrations of these halides are known to impair growth of this species. The laboratory control water contained approximately 75 mg/L chloride and 0.8 mg/L bromide, respectively.

Fathead minnows are known to be susceptible to adverse effects caused by fungi and microbes (Grothe and Johnson, 1996; Kszos et al., 1997; Downey et al. 2000). Results of toxicity tests and Toxicity Identification Evaluation efforts conducted in 2015 indicated that artefactual toxicity (i.e., adverse effects that were not associated with toxicants in the sample) had occurred in fathead minnow tests using ambient water samples from the Elk Valley and amendment of the samples with a low dose of copper appeared to counteract the adverse effect. Consequently, the *P. promelas* tests were tested on the samples with addition of 10 µg/L copper, in order to reduce the potential adverse effects caused by fungi and microbes in the samples. Four of the site waters (FR_FRCP1, GH_FR1, CM_MC2 and FR_FRABCH) were also tested using 20 µg/L copper to evaluate whether higher concentration of copper was necessary to control microbial growth in these samples, which contained a higher hardness than the other samples. Copper-amended control water treatments using the same concentrations were also evaluated to test whether copper itself caused any adverse response.

Statistical analyses were performed using CETIS (Tidepool Scientific Software, 2013), and involved comparison of results to both the laboratory and site water controls.

Table 2. Test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test species	*Ceriodaphnia dubia*
Organism source	In-house culture
Organism age	<24 hour old neonates, produced within a 12 hour window
Test type	Static-renewal
Test duration	8 days*
Test vessel	20-mL glass test tube
Test volume	15 mL
Test solution depth	10 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	10 per treatment
Number of organisms	1 per replicate
Control water	20% Perrier water and 80% deionized water + 5 µg/L Se and 2 µg/L vitamin B12
Test solution renewal	Daily (100% renewal)
Test temperature	25 ± 1°C
Feeding	Daily with *Pseudokirchneriella subcapitata* and YCT (3:1 ratio)
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival and reproduction checked daily
Test protocol	Environment Canada (2007a), EPS 1/RM/21
Statistical software	CETIS Version 1.9.4
Test endpoints	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods; no ephippia present
Reference toxicant	Sodium chloride (NaCl)

* Test duration was extended to 8 days to allow for evaluation of brood patterns. Summarized data and calculated endpoints are based on results from Day 7, according to the standard test procedure; however, all of the data through 8 days are provided in Appendix for subsequent evaluations.

Table 3. Test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test species	*Pseudokirchneriella subcapitata*, strain CPCC# 37
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Center, and originally isolated from Nivelta River, Norway.
Organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test concentrations	Full strength sample diluted to 95.2% (v/v) by addition of nutrients, plus laboratory control
Test replicates	4 per treatment; 8 for laboratory control and site control
Number of organisms	10,000 cells/mL
Control water	Deionized water supplemented with nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature and pH measured at test initiation; pH of two control wells measured at test termination
Test protocol	Environment Canada (2007b), EPS 1/RM/25
Statistical software	CETIS Version 1.9.4
Test endpoints	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤ 20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc (added as $ZnSO_4$)

Table 4. Test conditions: *Hyalella azteca* survival and growth test.

Test species	*Hyalella azteca*
Organism source	Aquatic Research Organisms, NH
Organism age	7- to 8-days old
Test type	Static-renewal
Test duration	28 days
Test vessel	375-mL glass container
Test volume	300 mL
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	5 per treatment
Number of organisms	10 per replicate
Control water	Reconstituted water containing ~75 mg/L Cl and 0.8 mg/L Br (Environment Canada 2013). Samples were supplemented with 25 mg/L Cl and 0.02 mg/L Br.
Test solution renewal	Twice daily (~80% renewal)
Test temperature	23 ± 1°C
Feeding	1 mL of YCT daily to each container. Tetramin daily, with amounts increasing weekly: Week 1: 0.25 mg, Week 2: 0.5 mg, Week 3: 1 mg, Week 4: 1.5 mg in each test container.
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity measured upon arrival; hardness and alkalinity measured at test termination; total ammonia measured at test initiation and termination
Test protocol	Modified from US EPA (2000), as described in Norberg-King et al. (2014)
Statistical software	CETIS Version 1.9.4
Test endpoints	Survival and dry weight
Test acceptability criteria for controls	Mean control survival of ≥80% survival
Reference toxicant	Sodium chloride (NaCl)

Table 5. Test conditions: *Pimephales promelas* survival and growth test.

Test species	*Pimephales promelas*
Organism source	Aquatic Biosystems, CO
Organism age	<24 hours
Test type	Static-renewal
Test duration	From egg stage until 28 days post hatch
Test vessel	1-L glass jar
Test volume	1 L
Test concentrations	100% (undiluted) sample amended with 10 or 20 µg/L Cu, plus laboratory control and control amended with 10 or 20 µg/L Cu
Test replicates	4 per treatment
Number of organisms	10 per replicate
Control water	Dechlorinated City of Calgary municipal tapwater
Test solution renewal	Daily (80% renewal)
Test temperature	25 ± 1°C
Feeding	Twice a day, after hatch, with newly hatched brine shrimp (*Artemia* nauplii)
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None unless dissolved oxygen fell to less than 60% saturation
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity measured upon arrival; survival checked daily
Test protocol	US EPA (1996) and ASTM (2013)
Statistical software	CETIS Version 1.9.4
Test endpoints	Hatch, survival, length, biomass, normal development (which assesses incidence of deformities)
Test acceptability criteria for controls	>66% hatch, ≥70% post-hatch survival
Reference toxicant	Sodium chloride (NaCl)

3.0 RESULTS

3.1 *Ceriodaphnia dubia*

Results of the toxicity tests using *C. dubia* are provided in Table 6. The Fording River (FR_UFR1), Elk River (GH_ER2), Michel Creek (CM_MC1) and South Line Creek (LC_SLC) site water controls performed similarly to the laboratory control for this species, indicating that there were no adverse effects on survival associated with the upstream Fording River, Elk River, Michel Creek and South Line Creek stations.

Survival in the samples tested ranged from 90 to 100%, except for FR_FRCP1, where survival was 0%. Additional testing, including use of EDTA treatment, was performed with this sample, the results of which will be summarized separately. Reproduction was significantly reduced in FR_FRCP1 relative to the laboratory control and all four site water controls. In FR_FRABCH, CM_MC2, FR_UFR1 and GH_FR1, reproduction was significantly reduced relative to one or more of the site or laboratory water controls

3.2 *Pseudokirchneriella subcapitata*

Results of the toxicity tests using *P. subcapitata* are provided in Table 7. The site water controls FR_UFR1, GH_ER2, CM_MC1 and LC_SLC produced 1.8 to 2.4-fold greater growth than the laboratory control. This finding is not unusual, since the higher ionic strength associated with the site water controls would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water.

With the exception of sample FR_FRCP1, there were no adverse effects on cell yield in any of the samples tested relative to the laboratory control; stimulation ranged between 98.4 and 158.8%. Cell yield was significantly reduced in sample FR_FRCP1; growth was reduced by approximately 70% relative to the laboratory control for this sample. Compared to the upstream site water CM_MC1 and SC_LSC controls, there was statistically significant decrease in growth in sample FR_FRCP1 and GH_ERC.

3.3 *Hyalella azteca*

Results of the toxicity tests using *H. azteca* are provided in Table 8. Survival in site water control GH_ER2 was significantly reduced by 33% relative to the laboratory control. The remaining site water controls FR_UFR1 and CM_MC1 performed similarly to the laboratory control, indicating

that there were no adverse effects associated with these upstream site waters. There were no adverse effects on survival or dry weight in any of the other samples tested.

3.4 *Pimephales promelas*

Results of the toxicity tests using *P. promelas* are provided in Table 9. Adverse effects on survival were observed in site water control CM_MC1 and on biomass in GH_ER2, CM_MC1 and LC_SLC when compared to the laboratory control. Differences in hatch rate, length and normal development between site water controls and laboratory control were not observed.

There were no adverse effects observed on hatch for all samples tested when compared to the site water controls or laboratory control. Sample FR_FRCP1 (amended) had 0% survival, therefore the length endpoint could not be determined. Adverse effects on survival were also observed in 10 µg/L Cu amended samples FR_FRABCH, GH_ERC and LC_LC5 compared to laboratory and in some cases, one or more of the site water controls; survival in FR_FRABCH, GH_ERC and LC_LC5 were 58.3, 48.3 and 68.3%, respectively. Samples FR_FRABCH, FR_FRCP1, GH_ERC, EV_HC1 and LC_DCDS exhibited statistically significant reduction in biomass relative to the laboratory control. All samples, except for FR_FRABCH and GH_FR1, exhibited a reduction in length relative to the laboratory control and (one or more) site water controls tested. There was decreased normal development in FR_FRCP1 and GH_FR1 relative to the 20 µg/L copper amended laboratory control; however, the decrease was small (i.e., < 10%) and exacerbated by the fact that there was 100% normal development in the control.

With the exception of FR_FRABCH, microbial growth was not observed in any of the samples supplemented with 10 µg/L and 20 µg/L copper, or in the unamended laboratory control. A communication error resulted in some site waters being amended with 10 instead of 20 µg/L Cu; however, this is not expected to affect results as microbial growth was not observed in these samples, with the exception of FR_FRABCH). The samples that were supplemented with 20 µg/L copper produced results that were similar with the 10 µg/L copper-treated samples. It is inconclusive whether or not addition of copper curtailed microbial growth in these tests, however, results indicate addition of copper of up to 20 µg/L did not exacerbate toxicity in any of the samples tested.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Sample ID	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	21.9 ± 3.5
FR_UFR1 (Site Control)	100	15.3 ± 3.9[*∂]
GH_ER2 (Site Control)	100	18.2 ± 2.5
CM_MC1 (Site Control)	90	19.4 ± 4.6
LC_SLC (Site Control)	100	20.3 ± 2.8
FR_FRCP1	0[*αβ#∂]	0.0 ± 0.0 [*αβ#∂]
FR_FRABCH	100	12.7 ± 5.3 [*β#∂]
GH_FR1	100	15.8 ± 3.2 [*]
GH_ERC	100	18.4 ± 2.8
EV_HC1	100	19.8 ± 3.6
EV_MC2	100	17.0 ± 5.2
CM_MC2	100	10.7 ± 4.0 [*β#∂]
RG_MIDAG	100	17.7 ± 5.8
LC_LCDSSLCC	100	20.3 ± 6.5
LC_DCDS	100	19.9 ± 5.0
LC_LC3	100	18.1 ± 4.7
LC_LC5	100	17.2 ± 4.4

SD = Standard Deviation
* Result was significantly lower than the laboratory control
[α] Result was significantly lower than the site control FR_UFR1
[β] Result was significantly lower than the site control GH_ER2
Result was significantly lower than the site control CM_MC1
[∂] Result was significantly lower than the site control LC_SLC

Table 7. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Sample ID	Cell Yield (x 10^4 cells/mL) (Mean ± SD)	Stimulation relative to laboratory control (%)
Laboratory Control	32.0 ± 2.7	-
FR_UFR1 (Site Control)	60.9 ± 5.1[#∂]	90.3
GH_ER2 (Site Control)	59.1 ± 4.9[#∂]	84.7
CM_MC1 (Site Control)	72.1 ± 5.5	125.3
LC_SLC (Site Control)	76.5 ± 5.9	139.1
FR_FRABCH	71.8 ± 3.5	124.4
FR_FRCP1	9.5 ± 1.3 [*αβ#∂]	-
GH_FR1	71.5 ± 6.5	123.4
GH_ERC	63.5 ± 3.9 [#∂]	98.4
CM_MC2	77.5 ± 3.1	142.2
EV_MC2	81.5 ± 2.9	154.7
EV_HC1	76.8 ± 6.6	140.0
LC_DCDS	82.8 ± 5.0	158.8
LC_LC3	79.5 ± 8.0	148.4
LC_LCDSSLCC	81.5 ± 4.5	154.7
LC_LC5	76.8 ± 5.0	140.0

SD = Standard Deviation
* Result was significantly lower than the laboratory control
[α] Result was significantly lower than the site control FR_UFR1
[β] Result was significantly lower than the site control GH_ER2
Result was significantly lower than the site control CM_MC1
[∂] Result was significantly lower than the site control LC_SLC

Table 8. Results: *Hyalella azteca* survival and growth test.

Sample ID	(Mean ± SD)	
	Survival (%)	Dry weight (mg)
Laboratory Control	90.0 ± 14.1	0.11 ± 0.03
FR_UFR1 (Site Control)	70.0 ± 27.4	0.07 ± 0.04
GH_ER2 (Site Control)	60.0± 21.2 *#	0.07 ± 0.03
CM_MC1 (Site Control)	88.0 ± 8.4	0.11 ± 0.05
FR_FRCP1	70.0 ± 20.0	0.08 ± 0.02
FR_FRABCH	78.0 ± 14.8	0.07 ± 0.05
GH_FR1	82.0 ± 8.4	0.09 ± 0.06
CM_MC2	96.0 ± 5.5	0.07 ± 0.03
RG_MIDAG	78.0 ± 11.0	0.05 ± 0.03

SD = Standard Deviation
* Result was significantly lower than the laboratory control
# Result was significantly lower than the site control CM_MC1

Table 9. Results: *Pimephales promelas* survival and growth test.

Sample ID	(Mean ± SD)				
	Hatch (%)	Survival (%)	Biomass (mg)	Length (mm)	Normal development (%)
Laboratory Control	100 ± 0.0	93.0 ± 9.4	2.0 ± 0.3	10.2 ± 0.7	100
10 µg/L Cu Amendments					
Laboratory Control [+Cu]	100 ± 0.0	95.0 ± 6.4	2.2 ± 0.1	10.9 ± 0.2	100
FR_UFR1 (Site Control) [+Cu]	100 ± 0.0	81.7 ± 11.4	1.8 ± 0.3	10.5 ± 0.4	100
GH_ER2 (Site Control) [+Cu]	100 ± 0.0	78.3 ± 12.6	1.9 ±0.1*	11.2 ± 0.6	100
CM_MC1 (Site Control) [+Cu]	100 ± 0.0	56.7 ± 13.9*$^{\alpha\partial}$	1.4 ± 0.4*	11.1 ± 0.5	100
LC_SLC (Site Control) [+Cu]	100 ± 0.0	85.0 ± 22.0	1.8 ± 0.2*	10.1 ± 0.7$^{\beta\#}$	94.1
FR_FRABCH [+Cu]	95.0 ± 6.4	58.3 ± 30.5*$^{\alpha\partial}$	1.9 ± 0.1*	12.3 ± 2.2	100
FR_FRCP1 [+Cu]	93.3 ± 9.4	0.0 ± 0.0*$^{\alpha\beta\#\partial}$	0.0 ± 0.0*$^{\alpha\beta\#\partial}$	N/A	100
GH_FR1 [+Cu]	100 ± 0.0	96.7 ± 3.8	2.0 ± 0.3	10.6 ±0.3	100
GH_ERC [+Cu]	98.3 ± 3.3	48.3 ± 55.9*$^{\alpha\beta\partial}$	0.8 ± 0.9*	10.2 ± 0.1*$^{\beta\#}$	100
CM_MC2 [+Cu]	100 ± 0.0	90.0 ± 11.6	2.1 ± 0.2	10.0 ± 0.7$^{\beta\#}$	98.2
EV_MC2 [+Cu]	100 ± 0.0	93.3 ± 0.0	2.0 ± 0.2	9.6 ± 0.3*$^{\alpha\beta\#}$	96.4
EV_HC1 [+Cu]	100 ± 0.0	90.0 ± 11.6	1.9 ± 0.1*	9.9 ± 0.3 *$^{\alpha\beta\#}$	94.4
LC_DCDS [+Cu]	100 ± 0.0	95.0 ± 3.3	2.0 ± 0.2*	9.7 ± 0.3 *$^{\alpha\beta\#}$	96.5
LC_LC3 [+Cu]	100 ± 0.0	81.7 ± 3.3	2.1 ± 0.1	10.5 ± 0.2*	100
LC_LCDSSLCC [+Cu]	100 ± 0.0	85.0 ± 13.7	2.0 ± 0.1	9.8 ± 0.3 *$^{\alpha\beta\#}$	98.0
LC_LC5 [+Cu]	100 ± 0.0	68.3 ± 45.7*	1.5 ± 1.0	9.7 ± 0.5 *$^{\alpha\beta\#}$	100

SD = Standard Deviation
* Result was significantly lower than the 10 µg/L copper-treated laboratory control
$^{\alpha}$ Result was significantly lower than the 10 µg/L copper-treated site control FR_UFR1
$^{\beta}$ Result was significantly lower than the 10 µg/L copper-treated site control GH_ER2
$^{\#}$ Result was significantly lower than the 10 µg/L copper-treated site control CM_MC1
$^{\partial}$ Result was significantly lower than the site control LC_SLC

Table 10. Results: *Pimephales promelas* survival and growth test (continued).

Sample ID	(Mean ± SD)				
	Hatch (%)	Survival (%)	Biomass (mg)	Length (mm)	Normal development (%)
Laboratory Control	100 ± 0.0	93.0 ± 9.4	2.0 ± 0.3	10.2 ± 0.7	100
20 µg/L Cu Amendments					
Laboratory Control [+Cu]	96.7 ± 3.8	83.3 ± 15.9	1.6 ± 0.2	10.4 ± 0.5	100
FR_FRCP1 [+Cu]	91.7 ± 8.4	15.0 ± 10.0*	0.8 ± 0.2*	13.4 ± 2.1	93.8*
GH_FR1 [+Cu]	100	88.3 ± 11.4	2.0 ± 0.3	10.2 ± 0.7	94.6*
CM_MC2 [+Cu]	100	81.7 ± 8.4	1.9 ± 0.2	10.0 ± 0.6	97.9
FR_FRABCH [+Cu]	100	65.0 ± 44.4	1.5 ± 1.0	10.2 ± 0.2	97.6

SD = Standard Deviation

* Result was significantly lower than the 20 µg/L copper-treated laboratory control

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the test protocols. Tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocol throughout the tests. There were no deviations from the test methodologies, other than the planned modification to the *H. azteca* method and addition of copper in the *P. promelas* tests, as described in Section 2.0. Uncertainty associated with the test is best described by the standard deviation around the mean and/or the confidence intervals around the point estimates.

The *H. azteca* in the laboratory control were smaller (average dry weight of 0.11mg) than the recommended average of 0.15mg. The results for dry weight in the samples were not significantly different compared to the laboratory control. Also, the result of the reference toxicant test for this species fell within the historical value of laboratory mean and standard deviation, therefore the sensitivity of the organisms used was deemed appropriate.

During the second week of sample receipt, containers for FR_FRABCH and FR_FRCP1 each had two different labels attached identifying the sample as both FR_FRABCH and FR_FRCP1. Conductivity values of the samples were measured and cross-referenced with values from the previous week(s) to determine the correct sample ID (Table 11). It was possible to determine the correct ID using conductivity measurements as the samples were not similar in conductivity.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 12. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate. The reference toxicant tests were performed under the same conditions as those used for the samples.

Table 11. Sample conductivity (used to verify labelling).

	Conductivity (µS)	
Week	**FRCP1**	**FRABCH**
1	3390	1182
2	**3590**	**1185**
3	3500	1199
4	1224	1175

Note: Bolded measurements indicate a labelling discrepancy

Table 12. Reference toxicant test results.

Test species	Endpoint	Historical mean (2 SD Range)	CV (%)	Test date
C. dubia	Survival (LC50): 2.0 g/L NaCl	2.0 (1.8 – 2.2)	5	March 5, 2019
	Reproduction (IC50): 1.8 g/L NaCl	1.5 (1.0 – 2.1)	18	
P. subcapitata	Growth (IC50): 35.0 µg/L Zn	30.8 (25.0 – 38.0)	10	March 6, 2019
H. azteca	Survival (LC50): 5.6 g/L NaCl	5.9 (4.5 – 7.7)	13	March 1, 2019
P. promelas	Survival (LC50): 3.0 g/L NaCl	5.7 (3.0 – 10.7)	21	March 5, 2019
	Biomass (IC25): 2.5 g/L NaCl	3.0 (1.6 – 5.8)	22	

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration

5.0 REFERENCES

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APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: TECK
Work Order No.: 190346

Start Date/Time: Feb 27/19 @ 1200h
Set up by: JB/SSK

Sample Information:

Sample ID: various (see below)
Sample Date: Feb 26/19
Date Received: Feb 27/19
Sample Volume: 1-3 x 20 L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: BB022119B + C
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: ~~SSK~~ 23
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 23-36, 39, 11, 13-20

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd215
Stock Solution ID: 18NaCl05 (100 g/L NaCl)
Date Initiated: Mar 5/19

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCl
7-d IC50 (95% CL): 1.8 (1.4-2.0) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCl CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.0-2.1) g/L NaCl CV (%): 18

Test Results:

Signs below indicate samples that are significantly lower than site controls:-
FR-UFR1 = a
GH-ER2 = b
CM-MC1 = c
LC-SLC = d.

	Survival (%)	Reproduction (Mean ± SD)
Negative Control	100	21.9 ± 3.5
FR_UFR1_MON_2019-02-04_N	100	15.3 ± 3.9 *d
GH_ER2_WS_2019-02-26_N	100	18.2 ± 2.5
CM_MC1_WS_2019-02-26_N	100	19.4 ± 4.6
LC_SLC_WS_2019-02-26_N	100	20.3 ± 2.8
FR_FRCP1_MON_2019-02-04_N	0 abcd*	0.0 ± 0.0 *abcd
FR_FRABCH_MON_2019-02-04_NP	100	12.7 ± 5.3 bcd*
GH_FR1_WS_2019-02-26_N	100	15.8 ± 3.2 *d
GH_ERC_WS_2019-02-26_N	100	19.4 ± 2.8

* indicates sample is significantly lower than lab control.

Reviewed by: JCh
Date reviewed: Mar-12/20

Ceriodaphnia dubia Summary Sheet

Client: TECK
Work Order No.: 190346

Start Date/Time: Feb 27/19 @ 1200h
Set up by: JB/SSK

Sample Information:

Sample ID: various (see below)
Sample Date: Feb 26/19
Date Received: Feb 27/19
Sample Volume: 1-3 X 20 L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: BB022119B+C
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 23
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: #23-36, 39, 11, 13-20.

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd215
Stock Solution ID: isNaCl5 (100g/L NaCl)
Date Initiated: Mar 05/19

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.8 (1.4-2.0) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.0-2.1) g/L NaCL CV (%): 18

Test Results:

	Survival (%)	Reproduction (Mean ± SD)
~~Negative Control~~		±
EV_HC1-WS_2019-02-26-N	100	19.8 ± 3.6
EV_MC2-WS_2019-02-26-N	100	17.0 ± 5.2
CM_MC2-WS_2019-02-26-N	100	10.7 ± 4.0 cbdx
RG_MIDAG_WS_2019-02-26-N	100	17.7 ± 5.8
LC_UDSSLCC_WS_2019-02-25_N	100	20.3 ± 6.5
LC_DCDS_WS_2019-02-26_N	100	19.9 ± 5.0
LC_LC3_WS_2019-02-25_N	100	18.1 ± 4.7
LC_LC5_WS_2019-02-26_N	100	17.2 ± 4.4

Reviewed by: JGu
Date reviewed: Mar. 12/20

pg 1/Rion

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various (see below)
Work Order #: 190346

Start Date & Time: Feb 27/19 @ 1200 h
Stop Date & Time: ~~Feb~~ Mar 06/19 @ 1300 h
CER #: 4
Test Species: *Ceriodaphnia dubia*

% (v/v)

Concentration: Control	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.3	7.0	8.0	7.0	8.0	7.4	8.1	7.3	8.2	7.3	8.0	7.2	8.0	7.2
pH	7.9 ~~8.0~~	8.0	8.2	8.0	8.0	7.9	8.2	7.9	8.2	7.9	8.2	7.9	8.2	7.8
Cond. (µS/cm)	~~226~~	226		227		221		221		221		220		—
Initials	EMM	SSK		SSK						JB		JB		JB

@225

(1) Concentration: FR_UFR1 100	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.2	~~8.0~~ 8.1	7.0	8.1	7.5	8.1	7.4	8.1	~~8.2~~ 8.2	8.3	7.6	8.4	7.4
pH	8.1	8.0	8.1	8.1	8.0	8.1	8.1	8.2	8.2	8.1	7.9	7.9	8.1	7.8
Cond. (µS/cm)	284	308		385		383		384		384		386		—
Initials	EMM	SSK		SSK						JB		SSK		JB

8.2 @ SSK

(6) Concentration: GH_ER2 100	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.4	8.4	7.2	8.2	7.3	8.1	7.2	8.1	8.2	8.3	7.6	8.4	7.2
pH	8.2	8.1	~~8.0~~ 8.1	8.2	7.8	8.1	8.0	8.2	7.9	8.1	7.9	8.0	8.1	7.8
Cond. (µS/cm)	~~325~~	343		340		343		344		342		347		—
Initials	EMM	SSK		SSK						JB		SSK		JB

(8) Concentration: CM_MC1 100	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.6	8.2	7.0	7.9	7.4	8.2	7.5	8.1	8.1	7.6	7.8	8.3	7.4
pH	8.0	8.1	8.0	8.1	7.6	8.2	7.9	8.1	8.0	8.1	7.9	7.9	8.0	7.9
Cond. (µS/cm)	306	308		311		313		315		306		305		—
Initials	EMM	SSK		SSK						JB		JSK		JB

Thermometer: 4 **DO meter/probe:** 1 / 1 **pH meter/probe:** 1 / 1 **Conductivity meter/probe:** 1 / 1

	Control	FR_UFR1	GH_ER2	CM_MC1
Hardness*	100	126	150	220
Alkalinity*	92	142	142	148

* mg/L as CaCO3

Analysts: JB, AWD, SSK, EMM
Reviewed by: JBe
Date reviewed: 4pm 10/19

Sample Description: ① Clear, colourless, odourless, some particulates, ⑥&⑧: Clear, colourless, odourless, no particulates.

Comments: Broodboard Used: BB022119B&C (#23-36, 39, 11, 13-20)

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Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TECK
Sample ID: Various (see below)
Work Order #: 405346

Start Date & Time: Feb 27/19 @ 1200 h
Stop Date & Time: Mar 07/19 @ 1300 h
CER #: 4
Test Species: *Ceriodaphnia dubia*

-10(v/v)

Concentration: Control	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0												
DO (mg/L)	~~7.20~~ 7.2	7.2												
pH	~~7.98~~ 7.9	7.9												
Cond. (µS/cm)	226	221												
Initials	SSK 8.2(1) 8.1(2)	SSK												

Concentration: FR_UFR1	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	~~new init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.3												
pH	7.9	7.8												
Cond. (µS/cm)	391	381												
Initials	SSK	SSK												

Concentration: GH_ER2	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.4												
pH	8.1	8.2												
Cond. (µS/cm)	344	343												
Initials	SSK	SSK												

Concentration: CM_MC1	Days													
	7 ~~0~~ JB	1		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.3												
pH	7.9	8.1												
Cond. (µS/cm)	307	301												
Initials	SSK	SSK												

Thermometer: 4 **DO meter/probe:** 1 / 1 **pH meter/probe:** 1 / 1 **Conductivity meter/probe:** 1 / 1

	Control	FR_UFR1	GH_ER2	CM_MC1
Hardness*	100	126	150	220
Alkalinity*	92	142	142	148

* mg/L as $CaCO_3$

Analysts: JB, ALD, SSK, AC
Reviewed by: JBL
Date reviewed: Apr. 10/19

Sample Description: See page 1

Comments: **Broodboard Used:** See page 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various (see below)
Work Order #: 1903461

Start Date & Time: Feb 27/19 @ 1200 h
Stop Date & Time: ~~Feb~~ Mar 07/19 @ 1300 h
CER #: 4
Test Species: *Ceriodaphnia dubia*

%(v/v)

100 Concentration LC_SLC (16)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.6	8.4	7.4	8.2	7.1	7.2	7.2	7.1	7.8	8.0	7.5	8.4	7.4
pH	8.1	8.1	8.0	8.2	7.7	7.3	7.9	7.1	7.0	8.0	8.1	8.0	8.0	7.9
Cond. (µS/cm)	450	474		460		462		465		461		459		—
Initials	EMM	SSK		SSK		A		A		JB		SSK		JB

100 Concentration FR_FRCP1 (3)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0				
DO (mg/L)	8.2	7.3	~~7.3~~	7.1	8.2	7.4	7.1	7.5	7.0	~~8.2~~				
pH	7.9	8.0	8.0	~~7.2~~	7.4	7.2	7.0	7.1	7.9	7.9				
Cond. (µS/cm)	3350	3530		3554		3555		3555		3310				
Initials	EMM	SSK		SSK		A		A		JB				

8.2 (2) (4) 7.9 — 8.2 (2)

100 Concentration FR_FRABCH (2)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.0	7.4	~~7.4~~	7.2	8.1	7.4	7.1	7.5	7.1	~~8.3~~ (3)	8.3	7.6	8.4	7.2
pH	8.1	8.0	8.0	8.1	7.9	7.2	7.0	7.1	7.9	7.9	7.9	8.0	8.0	8.0
Cond. (µS/cm)	1214	1210		1201		1200		1205		1199		1199		—
Initials	EMM	SSK		SSK		A		A		JB		SSK		JB

8.2 (3) — 8.2 (3)

100 Concentration GH_FR1 (4)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.5	~~7.5~~	7.2	7.9	7.3	7.1	7.4	7.0	7.4	7.4	7.7	8.4	7.2
pH	8.0	8.2	8.1	8.3	7.6	7.3	7.1	7.2	7.2	8.0	7.9	8.1	8.0	7.8
Cond. (µS/cm)	996	1021		1052		1030		1032		1020		1019		—
Initials	EMM	SSK		SSK		A		A		JB		SSK		JB

8.2 (3)

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ LC_SLC	FR_FRCP1	FR_FRABCH	GH_FR1
Hardness*	236	2110	680	590
Alkalinity*	152	380	260	250

* mg/L as CaCO3

Analysts: JB, SSK, AND, EMM
Reviewed by: JCL
Date reviewed: Apr. 10/19

Sample Description: ~~See pg 1~~ (3): clear, colourless, odourless, some precipitate. (16)(4): clear, colourless, odourless, no particulates. (2): clear, colourless, odourless, some particulates.

Comments: **Broodboard Used:** See pg 1

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Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TECK
Sample ID: Various (see below)
Work Order #: 190346

Start Date & Time: Feb 27/19 @ 1200h
Stop Date & Time: Mar 07/19 @ 1300h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(%v/v)

100 Concentration LC-SLC	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.4												
pH	8.1	8.2												
Cond. (µS/cm)	~~485.7~~ SSK (4)	460												
Initials	SSK	SSK												

467 (4)

100 Concentration FR-FRCP1	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

JB

100 Concentration FR-FRABCH	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.3												
pH	8.0	8.2												
Cond. (µS/cm)	1201	1123												
Initials	SSK	SSK												

100 Concentration GH-FR1	Days													
	7 ~~0~~ JB	8 ~~1~~		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.4												
pH	8.0	8.2												
Cond. (µS/cm)	1021	988												
Initials	SSK	SSK												

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	LC-SLC ~~Control~~ JB	FR-FRCP1	FR-FRABCH	GH-FR1
Hardness*	236	210	680	590
Alkalinity*	152	380	260	250

* mg/L as CaCO3

Analysts: JB, SSK, ALD, EMM

Reviewed by: JGL

Date reviewed: Apr. 10/19

Sample Description: ~~see page 3~~ see previous page

Comments: Broodboard Used: see page 1

Pg 7/12 S

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various (see below)
Work Order #: 1903446

Start Date & Time: Feb 27 @ 12:00h
Stop Date & Time: ~~Feb 28 @ 12:00h~~ Mar 07/19 @ 13:00h
CER #: 4
Test Species: *Ceriodaphnia dubia*

%(v/v)

(7) 100 Concentration GH_ERC

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.6	~~8.2~~ 8.2	7.0	8.0	7.5	7.1	7.4	7.4	7.9	8.4	7.6	8.4	7.2
pH	8.1	8.2	8.0	8.2	7.6	7.1	7.0	7.2	7.0	8.0	7.9	8.0	7.9	7.8
Cond. (µS/cm)	343	370		369		364		365		365		365		—
Initials	EMM	SSK		SSK		^		^		JB		SSK		JB

⑦ 8.2

(12) 100 Concentration EV_HCl

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.1	7.6	8.3	7.3	8.1	7.6	7.0	7.5	7.1	8.2	7.4	8.1	8.4	7.1
pH	8.1	8.2	8.1	8.2	7.7	7.1	7.0	7.1	7.0	8.1	7.9	8.0	8.1	8.1
Cond. (µS/cm)	778	793		819		792		795		794		792		—
Initials	EMM	SSK		SSK		^		^		JB		SSK		JB

(11) 100 Concentration EV_MCl

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.8	8.3	7.3	8.1	7.5	7.1	7.4	7.2	8.1	7.4	7.8	8.4	7.1
pH	8.0	8.2	8.0	8.2	7.6	7.1	7.0	7.2	7.0	8.0	7.9	8.1	8.0	7.9
Cond. (µS/cm)	607	654		649		641		645		644		640		—
Initials	EMM	SSK		SSK		^		^		JB		SSK		JB

(9) 100 Concentration CM_MCl

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.6	8.4	7.3	7.4	7.4	7.1	7.5	7.1	8.1	7.9	8.0	8.4	7.4
pH	8.1	8.2	8.1	8.3	7.7	7.1	7.1	7.2	7.0	7.9	7.8	8.1	8.0	8.0
Cond. (µS/cm)	1071	1070		1077		1082		1082		1087		1072		—
Initials	EMM	SSK		SSK		^		^		JB		SSK		JB

Thermometer: 4 **DO meter/probe:** 1 / 1 (GH_ERC / rest) **pH meter/probe:** 1 / 1 **Conductivity meter/probe:** 1 / 1

	~~Control~~	EV_HCl	EV_MCl	CM_MCl
Hardness*	174	660	326	640
Alkalinity*	120	192	120	250

* mg/L as CaCO3

Analysts: JB, SSK, AWP, EMM

Reviewed by: JBK

Date reviewed: Apr. 10/19

Sample Description: ~~Control~~ pg 1 ⑦ ⑫ ⑪, 9: clear, colourless, odourless, no particulates.

Comments: **Broodboard Used:** see pg 1

Pg 6 / 10

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various (see below)
Work Order #: 190346

Start Date & Time: Feb ~~24~~ JB 27/19 @ 1200h
Stop Date & Time: Mar 07/19 @ 1300h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(% v/v)

100 Concentration GH_ERC	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.2												
pH	7.9	8.2												
Cond. (µS/cm)	367	363												
Initials	SSK	SSK												

100 Concentration EV_HC1	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.3												
pH	8.0	8.2												
Cond. (µS/cm)	802	776												
Initials	SSK	SSK												

100 Concentration EV_MC2	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.3												
pH	7.9	8.2												
Cond. (µS/cm)	685	631												
Initials	SSK	SSK												

100 Concentration CM_MC2	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.3												
pH	8.0	8.2												
Cond. (µS/cm)	1086	1048												
Initials	SSK	SSK												

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ GH_ERC	EV_HC1	EV_MC2	CM_MC2
Hardness*	174	660	326	640
Alkalinity*	120	192	120	250

* mg/L as CaCO3

Analysts: SSK, JB, PWD, GMM

Reviewed by: J.Oh

Date reviewed: Apr. 10/19

Sample Description: See previous page

Comments: Broodboard Used: see pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various (see below)
Work Order #: 190346

Start Date & Time: Feb 27/19 @ 1200 h
Stop Date & Time: ~~Feb 11/19 @ 13~~ Mar 07/19 @ 1300 h
CER #: 4
Test Species: *Ceriodaphnia dubia*

%(v/v)

RG_MIDAG

100 Concentration — (10)

	Days														
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.9	8.3	7.3	8.2	7.5	8.1	7.4	8.1	7.8	7.8	7.7	8.4	7.2
pH	7.9	8.2	8.0	8.2	7.5	8.2	7.9	8.1	8.0	8.0	7.7	8.0	7.9	8.0
Cond. (µS/cm)	736	737		764		729		732		735		732		—
Initials	EMM	SSK		SSK		~		~		JB		SSK		JB

100 Concentration LC_LCOSSLCC — (15)

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old	
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	
DO (mg/L)	8.3	7.7	8.4	7.4	8.2	7.4	8.1	7.5	8.1	8.0	8.1	7.6	8.4	7.2	
pH	8.1	8.2	8.1	8.3	7.6	8.1	7.9	8.1	8.0	~~8.1~~ 7.9	8.0	8.1	8.2	7.9	
Cond. (µS/cm)	1015	1083		1056		1050		1051		1050		1045		—	
Initials	EMM	SSK		SSK		~		~		JB		SSK		JB	

100 Concentration LC_DCDS — (13)

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old	
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	
DO (mg/L)	8.3	7.5	8.4	7.0	8.0	7.5	8.1	7.5	8.0	7.9	7.9	7.8	8.4	7.3	
pH	8.1	8.1	8.0	8.2	7.7	8.1	7.9	8.2	7.9	8.1	8.1	8.0	8.1	7.9	
Cond. (µS/cm)	623	616		603		599		601		618		610		—	
Initials	EMM	CSK		CSK		~		~		JB		SSK		JB	

100 Concentration LC_LC3 — (14)

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old	
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	
DO (mg/L)	8.3	7.7	8.4	7.3	8.2	~~7.5~~	8.0	7.4	8.1	~~7.3~~	8.1	7.6	8.4	7.4	
pH	8.1	8.2	8.0	8.2	7.5	8.2	8.0	8.1	8.0	8.2	7.9	8.0	7.9	8.0	
Cond. (µS/cm)	1297	1357		1371		1372		1370		1364		1360		—	
Initials	EMM	SSK		SSK		~		~		JB		SSK		JB	

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

~~CAN_MACS~~ RG_MIDAG

	~~Control~~	LC_LCOSSLCC	LCDCDS	LC_LC3
Hardness*	470	630	314	910
Alkalinity*	178	162	142	170

* mg/L as CaCO3

Analysts: JB, AWD, SSK, EMM

Reviewed by: JB

Date reviewed: Apr 10/19

Sample Description: ~~see pg 1~~ (10) (13) (14): clear, colourless, odourless, some particulates.
(15): clear, colourless, odourless, no particulates.

Comments: Broodboard Used: see pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various (see below)
Work Order #: 1903A6

Start Date & Time: Feb 27/19 @ 1200 h
Stop Date & Time: Mar 07/19 @ 1300 h
CER #: 4
Test Species: *Ceriodaphnia dubia*

%(v/v)

100 Concentration CM-MIDAG	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.3												
pH	7.9	8.2												
Cond. (µS/cm)	732	714 ~~537~~ JB												
Initials	SSK	SSK												

100 Concentration LC-LCDSSLCC	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.3												
pH	7.9	8.2												
Cond. (µS/cm)	1047	1017												
Initials	SSK	SSK												

100 Concentration LC-DCDS	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.3												
pH	8.0	8.2												
Cond. (µS/cm)	609	599												
Initials	SSK	SSK												

100 Concentration LC-LC3	Days													
	7 ~~0~~ JB	8 ~~1~~ JB		2		3		4		5		6		7
	new ~~init.~~ JB	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.3												
pH	7.9	8.2												
Cond. (µS/cm)	1359	1338												
Initials	SSK	SSK												

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ RG-MIDAG	LC-LCDSSLCC	LC-DCDS	LC-LC3
Hardness*	470	630	314	910
Alkalinity*	178	162	142	170

* mg/L as CaCO3

Analysts: JB, SSK, AWD, EMM
Reviewed by: JOH
Date reviewed: AJW. 10/19

Sample Description: See previous page

Comments: Broodboard Used: See pg 1

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Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Tecx
Sample ID: various (see below)
Work Order #: 190346

Start Date & Time: Feb 27/19 @ 1200h
Stop Date & Time: ~~Feb 4/19~~ JB Mar 07/19 @ 1300h
CER #: 4
Test Species: *Ceriodaphnia dubia*

% (v/v)

Concentration LC_UCS	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ dd
Temperature (°C)	24.0	25.0	24.0	25.0	~~25.0~~	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.5	8.2	7.2	8.2	7.4	7.9	7.5	7.9	8.1	8.0	7.7	8.4	7.2
pH	8.2	8.2	8.2	8.3	7.7	8.2	8.1	8.3	8.1	8.0	8.0	7.9	8.1	7.9
Cond. (µS/cm)	842	844		850		840		837		844		840		—
Initials	EMM	SSK		SSK		~		~		JB		SSK		JB

@25.0

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

LC_UCS

	~~Control~~ K			
Hardness*	700			
Alkalinity*	174			

* mg/L as CaCO3

Analysts: AWD, SSK, JB, EMM
Reviewed by: JCL
Date reviewed: Apr. 10/19

Sample Description: ~~see pg 1~~ ⑤: Clear, colourless, odourless, no particulates.

Comments: Broodboard Used: see pg 1

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Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various (see below)
Work Order #: 190346

Start Date & Time: Feb 27/19 @ 1200h
Stop Date & Time: Mar 07/19 @ 1300h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(%eV/v)

100 Concentration LC-LC5	Days													
	7 ~~0~~ init.	8 ~~1~~ old	new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.4	7.3												
pH	8.1	8.2												
Cond. (µS/cm)	839	778												
Initials	SSK	SSK												

Concentration	Days													
	0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1
LC-LC5

	~~Control~~			
Hardness*	700			
Alkalinity*	174			

* mg/L as CaCO3

Analysts: SSK, JB, PLD, EMM
Reviewed by: JDL
Date reviewed: Apr. 10/19

Sample Description: See previous page

Comments: Broodboard Used: See pg 1

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: TECK
Sample ID: Various (see below)
Work Order: 190346

Start Date & Time: Feb. 27/19 @1200h
Stop Date & Time: Mar. 07/19 @1300h
Set up by: JB/SSK

Days	Concentration: CONTROL										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	3	3	4	3	3	6	3	4	3	3	A
4	5	✓	✓	6	✓	✓	6	✓	7	6	~
5	✓	10	✓	✓	8	✓	✓	8	✓	✓	SSK
6	11	15	14	14	13	11	11	13	14	12	SSK
7	14	18	17	13	18	17	11	16	17	15	SSK
8	14	✓	11	14	✓	10	12	✓	15	18	SSK
Total	19	28	18	23	24	17	20	25	24	21	SSK

Days	Concentration: FR-UFR1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	✓	✓	4	✓	✓	✓	6	5	✓	✓	A
4	3	5	✓	6	6	6	✓	✓	4	4	~
5	7	✓	9	✓	✓	✓	✓	✓	✓	7	JB
6	✓	10	7	3	12	10	10	10	9	10	SSK
7	12	9	6	9	11	4	9	8	9	11	JB
8	✓	✓	✓	✓	11	✓	✓	✓	✓	✓	SSK
Total	10	15	20	9	18	16	16	15	13	21	SSK

Days	Concentration: GH-ERZ										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	✓	✓	✓	✓	✓	4	✓	4	4	4	A
4	6	6	7	7	7	✓	6	✓	✓	✓	~
5	✓	✓	✓	✓	✓	6	✓	8	6	✓	JB
6	10	11	11	10	12	11	9	11	10	12	SSK
7	12	✓	8	8	12	12	8	✓	8	12	JB
8	11	✓	✓	✓	8	✓	8	✓	✓	12	SSK
Total	16	17	18	17	19	21	15	23	20	16	SSK

Days	Concentration: CM-MC1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	3	3	4	✓	✓	✓	3	3	✓	3	A
4	✓	6	✓	4	6	35	✓	✓	5	✓	A
5	✓	✓	✓	9	✓	✓	9	✓	7	6	JB
6	12	10	12	12	12	11	13	10	13	13	JB
7	14	13	12	12	13	13	13	13	15	11	SSK
8	✓	✓	✓	X	15	✓	✓	✓	✓	✓	SSK
Total	15	19	16	25	18	16	25	13	25	22	JB SSK

Days	Concentration: CC-3LC										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	✓	4	3	✓	3	✓	✓	3	3	✓	A
4	4	✓	6	5	6	3	4	✓	✓	6	~
5	9	8	✓	✓	✓	7	8	8	7	✓	SSK
6	11	10	10	11	13	7	11	12	9	12	JB
7	12	9	14	17	9	11	7	8	✓	15	SSK
8	✓	✓	13	✓	✓	✓	✓	✓	17	12	SSK
Total	24	22	19	16	22	17	23	23	19	18	JB SSK

Days	Concentration: FR-FRCP1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	X	✓	✓	X	✓	✓	✓	X	✓	✓	A
4	|	X	✓	|	X	X	✓	|	✓	X	A
5	|	|	X	|	|	|	X	|	X	|	JB
6	|	|	|	|	|	|	|	|	|	|	
7	|	|	|	|	|	|	|	|	|	|	
8	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	
Total	0X	0X	0X	0X	0X	0X	0X	0X	0X	0X	

Days	Concentration: FR-FRABCH										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	✓	4	✓	✓	4	4	✓	✓	✓	✓	A
4	5	✓	5	6	✓	✓	5	3	4	5	~
5	✓	✓	✓	✓	3	✓	✓	8	6	✓	JB
6	✓	7	8	6	8	9	7	11	9	✓	SSK
7	✓	6	7	12	SSK 6	12	✓	9	9	12	JB
8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
Total	5	11	13	12	15	13	12	22	19	5	SSK

Days	Concentration: GH-FR1										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	✓	3	✓	3	✓	5	4	5	✓	✓	A
4	5	✓	4	✓	6	✓	✓	✓	5	5	~
5	✓	8	✓	8	✓	✓	✓	✓	✓	✓	JB
6	12	4	10	12	12	9	7	12	9	10	SSK
7	✓	✓	✓	✓	4	✓	12	14	✓	10	JB
8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
Total	17	15	14	23	18	14	11	17	14	15	SSK

Days	Concentration: GH-ERC										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	✓	✓	✓	✓	4	✓	3	✓	5	✓	A
4	7	6	✓	4	✓	6	7	6	✓	6	~
5	✓	✓	6	6	9	✓	✓	✓	✓	✓	JB
6	12	12	10	10	11	11	11	11	9	12	SSK
7	15	16	10	10	11	12	12	13	11	9	JB
8	6	✓	✓	✓	✓	✓	✓	✓	14	✓	SSK
Total	19	18	16	20	24	17	21	17	14	18	SSK

Notes: X = mortality.

Comments: 1. Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

2. Ephippia present in Controls (Y), (N) ?

Reviewed by: JCH

Date reviewed: Mar. 11/20

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: TECK
Sample ID: Various (see below)
Work Order: 190346

Start Date & Time: Feb. 27/19 @ 1200h
Stop Date & Time: February Mar. 07/19 @ 1200h
Set up by: JB / SSK

Days	Concentration: EV-HCl										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	4	✓	5	✓	3	✓	4	✓	3	3	A
4	✓	4	✓	4	6	6	✓	3	6	✓	A
5	✓	✓	6	9	✓	✓	7	9	✓	7	JB
6	9	13	10	9	14	10	12	12	11	9	JB
7	15	13	12	✓	14	17	15	✓	11	12	SSK
8	13	✓	✓	15	✓	✓	✓	✓	✓	✓	SSK
Total	13	17	21	22	23	16	23	24	20	19	SSK

Days	Concentration: EV-MC2										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	✓	✓	✓	3	3	✓	✓	3	✓	4	A
4	3	6	6	✓	✓	3	4	✓	✓	✓	A
5	✓	✓	✓	7	6	7	8	9	2	✓	JB
6	11	10	8	12	12	✓	10	13	8	12	JB
7	8	13	17	✓	12	12	15	17	9	13	SSK
8	✓	14	10	✓	✓	✓	✓	✓	✓	✓	SSK
Total	14	16	14	22	21	10	22	25	10	16	SSK

Days	Concentration: CM-MC2										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	—	—	—	✓	JB
3	3	✓	✓	✓	✓	✓	✓	4	✓	✓	A
4	6	4	3	4	3	✓	4	✓	4	4	A
5	✓	✓	6	✓	7	✓	✓	✓	8	6	JB
6	5	5	9	✓	✓	7	6	5	✓	4	JB
7	9	✓	✓	7	11	11	9	✓	✓	✓	SSK
8	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
Total	14	9	18	4	10	7	10	9	12	14	SSK

Days	Concentration: RG-MIDRG										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	✓	3	5	✓	✓	✓	✓	3	✓	4	A
4	5	✓	✓	3	6	5	5	✓	5	✓	A
5	✓	8	✓	5	✓	✓	7	6	7	✓	JB
6	8	13	9	14	6	9	11	13	12	5	JB
7	7	10	11	11	14	11	12	11	✓	13	SSK
8	10	✓	✓	✓	✓	✓	✓	✓	10	✓	SSK
Total	13	24	14	22	12	14	23	22	24	9	SSK

Days	Concentration: LC-LCDSSLCC										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	5	✓	✓	4	✓	4	4	✓	✓	✓	A
4	✓	4	3	✓	4	✓	✓	6	3	3	A
5	✓	5	9	9	9	9	8	8	4	7	SSK
6	✓	10	12	11	11	12	12	11	7	9	JB
7	15	10	14	14	14	13	✓	15	14	12	SSK
8	14	✓	✓	✓	✓	✓	✓	11	✓	✓	SSK
Total	5	19	24	24	25 24	24 25	24	25	14	19	SSK

Days	Concentration: LC-DCPS										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	4	4	3	5	3	✓	✓	✓	✓	3	A
4	✓	✓	✓	✓	6	4	4	4	6	6	A
5	✓	9	8	✓	✓	8	✓	9	✓	✓	JB
6	9	13	10	9	14	12	11	13	10	12	JB
7	15	15	12	✓	7	8	13	12	✓	15	SSK
8	11	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
Total	13	26	21	14	23	24	15	26	16	21	SSK

Days	Concentration: LC-LC3										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	3	4	3	6	✓	5	✓	3	✓	4	A
4	7	✓	6	✓	3	✓	4	6	4	✓	A
5	✓	✓	✓	✓	6	6	9	✓	7	✓	JB
6	9	9	10	9	10	9	13	10	11	5	JB
7	10	11	14	11	12	13	15	✓	12	15	SSK
8	15	✓	11	✓	✓	✓	✓	✓	✓	✓	SSK
Total	19	13	19	15	19	20	26	19	22	9	SSK

Days	Concentration: LC-LC5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
3	✓	✓	✓	4	✓	✓	✓	✓	3	✓	A
4	4	3	4	✓	5	4	4	6	✓	3	A
5	7	7	✓	✓	✓	7	✓	✓	8	8	JB
6	✓	12	11	9	10	12	12	9	13	7	JB
7	12	13	10	11	10	10	14	12	✓	7	JB
8	12	✓	14	14	✓	✓	✓	10	✓	✓	SSK
Total	11	22	15	13	15	23	16	15	24	18	SSK

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Comments: 1. Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

2. Ephippia present in Controls (Y), (N)?

Reviewed by: JBh

Date reviewed: Mar. 12/20

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	LC_LC5 failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	control failed 6d survival rate	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	EV_MC2 failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	GH_ERC failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	LC_SLC failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	CM_MC2 failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	FR_FRCP1 failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	FR_FRABCH failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	RG_MIDAG failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	FR_UFR1 failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	EV_HC1 failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	LC_DCDS failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	CM_MC1 failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	GH_ER2 failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	LC_LCDSSLCC failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	GH_FR1 failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.1E-05	LC_LC3 failed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 6d survival rate	1
03-5705-8461	6d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 6d survival rate	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	LC_LC3 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	LC_SLC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	EV_HC1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	RG_MIDAG failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	FR_FRCP1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	CM_MC1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	LC_DCDS failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	CM_MC2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	FR_FRABCH failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	LC_LCDSSLCC failed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	GH_ER2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	EV_MC2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	control failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	FR_UFR1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	GH_FR1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	GH_ERC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0051	LC_LC5 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	FR_FRABCH passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	LC_DCDS passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	GH_ERC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	CM_MC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	FR_FRCP1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	CM_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	LC_LC5 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	RG_MIDAG passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	LC_LC3 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	EV_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	LC_SLC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	EV_HC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	control passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	GH_ER2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	LC_LCDSSLCC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	FR_UFR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1999	GH_FR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	LC_DCDS passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	GH_ERC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	RG_MIDAG passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	EV_HC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	LC_LCDSSLCC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	CM_MC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	FR_UFR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	CM_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	GH_ER2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	LC_LC5 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	control passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	LC_SLC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	LC_LC3 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	FR_FRABCH passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	FR_FRCP1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	GH_FR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.4656	EV_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	GH_ERC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	control failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	LC_SLC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	RG_MIDAG failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	CM_MC2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	FR_FRABCH failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	LC_LC5 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	FR_FRCP1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	EV_MC2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	FR_UFR1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	EV_HC1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	LC_DCDS failed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	CM_MC1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	GH_ER2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	LC_LCDSSLCC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	GH_FR1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	6.8E-07	LC_LC3 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	GH_ER2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	LC_LC3 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	LC_SLC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	CM_MC2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	FR_UFR1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	control failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	LC_LC5 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	GH_FR1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	EV_HC1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	GH_ERC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	EV_MC2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	LC_LCDSSLCC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	FR_FRABCH failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	FR_FRCP1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	RG_MIDAG failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	LC_DCDS failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	3.5E-05	CM_MC1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	GH_FR1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	RG_MIDAG failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	FR_UFR1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	LC_LC3 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	EV_MC2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	LC_LC5 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	LC_SLC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	control failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	FR_FRABCH failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	CM_MC1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	GH_ER2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	EV_HC1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	LC_LCDSSLCC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	LC_DCDS failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	CM_MC2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	GH_ERC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0112	FR_FRCP1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	LC_LC3 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	LC_LCDSSLCC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	EV_HC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	LC_LC5 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	GH_ERC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	control passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	GH_FR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	CM_MC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	FR_FRCP1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	RG_MIDAG passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	FR_UFR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	EV_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	CM_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	FR_FRABCH passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	LC_SLC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	LC_DCDS passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.2365	GH_ER2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	CM_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	LC_DCDS passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	LC_LC3 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	LC_LCDSSLCC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	EV_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	LC_LC5 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	RG_MIDAG passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	GH_FR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	GH_ER2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	FR_UFR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	CM_MC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	LC_SLC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	control passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	EV_HC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	FR_FRCP1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	FR_FRABCH passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5673	GH_ERC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	FR_UFR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	FR_FRABCH passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	LC_SLC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	LC_DCDS passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	LC_LC3 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	FR_FRCP1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	CM_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	RG_MIDAG passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	LC_LCDSSLCC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	CM_MC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	GH_ER2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	GH_ERC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	GH_FR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	EV_HC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	LC_LC5 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	control passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0575	EV_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	LC_SLC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	GH_ERC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	LC_LCDSSLCC failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	GH_FR1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	CM_MC2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	EV_HC1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	FR_FRCP1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	GH_ER2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	LC_DCDS failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	FR_UFR1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	LC_LC3 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	control failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	CM_MC1 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	EV_MC2 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	FR_FRABCH failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	RG_MIDAG failed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	9.5E-07	LC_LC5 failed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	LC_SLC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	CM_MC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	GH_ERC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	LC_LC5 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	LC_LCDSSLCC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	GH_FR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	GH_ER2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	EV_HC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	FR_UFR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	FR_FRABCH passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	EV_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	FR_FRCP1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	RG_MIDAG passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	LC_LC3 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	control passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	LC_DCDS passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1249	CM_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	LC_LCDSSLCC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	GH_ER2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	CM_MC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	FR_UFR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	LC_LC3 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	EV_HC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	GH_FR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	LC_DCDS passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	FR_FRABCH passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	control passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	CM_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	FR_FRCP1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	LC_LC5 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	GH_ERC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	LC_SLC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	RG_MIDAG passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.6885	EV_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	GH_ER2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	FR_FRCP1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	EV_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	LC_DCDS passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	FR_UFR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	CM_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	FR_FRABCH passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	RG_MIDAG passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	GH_ERC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	LC_LCDSSLCC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	LC_LC5 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	GH_FR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	LC_SLC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	LC_LC3 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	CM_MC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	EV_HC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.5924	control passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	FR_FRCP1 passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	LC_LC5 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	FR_FRABCH passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	LC_LC3 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	GH_ER2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	CM_MC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	GH_FR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	RG_MIDAG passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	LC_SLC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	LC_LCDSSLCC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	control passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	FR_UFR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	GH_ERC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	EV_HC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	EV_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	LC_DCDS passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.1830	CM_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	GH_ERC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	GH_FR1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	control passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	EV_HC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	LC_LC3 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	LC_LC5 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	FR_FRABCH passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	LC_DCDS passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	CM_MC1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	EV_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	FR_FRCP1 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	GH_ER2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	LC_LCDSSLCC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	CM_MC2 passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	LC_SLC passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	RG_MIDAG passed reproduction	1
13-1806-3335	Reproduction	Dunnett Multiple Comparison Test	0.0727	FR_UFR1 passed reproduction	1

Analyst: SMC QA: JCW Mar. 12/20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

6d Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
control	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_UFR1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
GH_ER2		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
CM_MC1	XC	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_SLC		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_FRCP1		10	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
FR_FRABCH		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
GH_FR1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
GH_ERC		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
EV_HC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
EV_MC2		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
CM_MC2		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
RG_MIDAG		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_LCDSSLCC		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_DCDS		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_LC3		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_LC5		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
control	N	10	21.9	19.41	24.39	17	28	1.1	3.479	15.88%	0.00%
FR_UFR1		10	15.3	12.52	18.08	9	21	1.23	3.889	25.42%	30.14%
GH_ER2		10	18.2	16.39	20.01	15	23	0.8	2.53	13.90%	16.89%
CM_MC1	XC	10	19.4	16.14	22.66	13	25	1.439	4.551	23.46%	11.42%
LC_SLC		10	20.3	18.28	22.32	16	24	0.895	2.83	13.94%	7.31%
FR_FRCP1		10	0	0	0	0	0	0	0		100.00%
FR_FRABCH		10	12.7	8.899	16.5	5	22	1.68	5.314	41.84%	42.01%
GH_FR1		10	15.8	13.49	18.11	11	23	1.02	3.225	20.41%	27.85%
GH_ERC		10	18.4	16.4	20.4	14	24	0.8844	2.797	15.20%	15.98%
EV_HC1		10	19.8	17.26	22.34	13	24	1.123	3.553	17.94%	9.59%
EV_MC2		10	17	13.24	20.76	10	25	1.66	5.249	30.88%	22.37%
CM_MC2		10	10.7	7.858	13.54	4	18	1.257	3.974	37.14%	51.14%
RG_MIDAG		10	17.7	13.56	21.84	9	24	1.832	5.794	32.73%	19.18%
LC_LCDSSLCC		10	20.3	15.68	24.92	5	25	2.044	6.464	31.84%	7.31%
LC_DCDS		10	19.9	16.32	23.48	13	26	1.581	4.999	25.12%	9.13%
LC_LC3		10	18.1	14.7	21.5	9	26	1.501	4.748	26.23%	17.35%
LC_LC5		10	17.2	14.04	20.36	11	24	1.397	4.417	25.68%	21.46%

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

6d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	19	28	18	23	24	17	20	25	24	21
FR_UFR1		10	15	20	9	18	16	16	15	13	21
GH_ER2		16	17	18	17	19	21	15	23	20	16
CM_MC1	XC	15	19	16	25	18	16	25	13	25	22
LC_SLC		24	22	19	16	22	17	23	23	19	18
FR_FRCP1		0	0	0	0	0	0	0	0	0	0
FR_FRABCH		5	11	13	12	15	13	12	22	19	5
GH_FR1		17	15	14	23	18	14	11	17	14	15
GH_ERC		19	18	16	20	24	17	21	17	14	18
EV_HC1		13	17	21	22	23	16	23	24	20	19
EV_MC2		14	16	14	22	21	10	22	25	10	16
CM_MC2		14	9	18	4	10	7	10	9	12	14
RG_MIDAG		13	24	14	22	12	14	23	22	24	9
LC_LCDSSLCC		5	19	24	24	24	25	24	25	14	19
LC_DCDS		13	26	21	14	23	24	15	26	16	21
LC_LC3		19	13	19	15	19	20	26	19	22	9
LC_LC5		11	22	15	13	15	23	16	15	24	18

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

6d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC1	XC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_SLC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	06-8394-3719	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Mar-20 16:02	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
control	21-0529-3942	27 Feb-19	27 Feb-19	12h	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
control	control	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	1.00000	Exact	1.0000	Non-Significant Effect
		GH_ER2	1.00000	Exact	1.0000	Non-Significant Effect
		CM_MC1	1.00000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.00000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1*	0.00001	Exact	8.7E-05	Significant Effect
		FR_FRABCH	1.00000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.00000	Exact	1.0000	Non-Significant Effect
		GH_ERC	1.00000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.00000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.00000	Exact	1.0000	Non-Significant Effect

Analyst: SSK QA: JGH Mar-12/20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 06-8394-3719 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 12 Mar-20 16:02 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		CM_MC2	1.00000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	1.00000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.00000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	1.00000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.00000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.00000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
control	N	10	0	10	1	0	0.0%
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		10	0	10	1	0	0.0%
CM_MC1		10	0	10	1	0	0.0%
LC_SLC		10	0	10	1	0	0.0%
FR_FRCP1		0	10	10	0	1	100.0%
FR_FRABCH		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
EV_MC2		10	0	10	1	0	0.0%
CM_MC2		10	0	10	1	0	0.0%
RG_MIDAG		10	0	10	1	0	0.0%
LC_LCDSSLCC		10	0	10	1	0	0.0%
LC_DCDS		10	0	10	1	0	0.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		10	0	10	1	0	0.0%

6d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
FR_UFR1		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
GH_ER2		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
CM_MC1		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
LC_SLC		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
FR_FRCP1		0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000	0.00000
FR_FRABCH		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
GH_FR1		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
GH_ERC		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
EV_HC1		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
EV_MC2		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
CM_MC2		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
RG_MIDAG		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
LC_LCDSSLCC		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
LC_DCDS		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
LC_LC3		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000
LC_LC5		1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000	1.00000

JGa

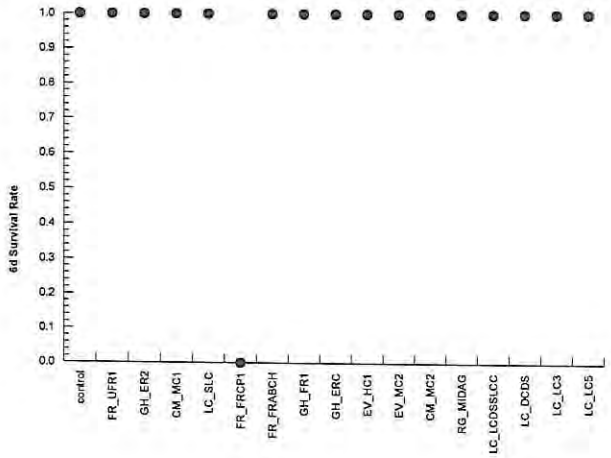
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 06-8394-3719 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 12 Mar-20 16:02 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

6d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_SLC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst: SSK QA: JCu Mar-12/20

CETIS Analytical Report

Test Code/ID: 190346 / 17-1634-5101

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-4034-5669	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Mar-20 16:02	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
control	21-0529-3942	27 Feb-19	27 Feb-19	12h	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
control	control	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Analyst: SSK QA: JGu Mar-12/20

Analysis ID: 12-5805-0075 Endpoint: Reproduction CETIS Version: CETISv1.9.4
Analyzed: 12 Mar-20 16:03 Analysis: Parametric-Control vs Treatments Status Level: 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 failed reproduction	22.65%
		GH_ER2 passed reproduction	22.65%
		CM_MC1 passed reproduction	22.65%
		LC_SLC passed reproduction	22.65%
		FR_FRCP1 failed reproduction	22.65%
		FR_FRABCH failed reproduction	22.65%
		GH_FR1 failed reproduction	22.65%
		GH_ERC passed reproduction	22.65%
		EV_HC1 passed reproduction	22.65%
		EV_MC2 passed reproduction	22.65%
		CM_MC2 failed reproduction	22.65%
		RG_MIDAG passed reproduction	22.65%
		LC_LCDSSLCC passed reproduction	22.65%
		LC_DCDS passed reproduction	22.65%
		LC_LC3 passed reproduction	22.65%
		LC_LC5 passed reproduction	22.65%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1*	3.4719	2.6098	4.961	18	CDF	0.0044	Significant Effect
		GH_ER2	1.9464	2.6098	4.961	18	CDF	0.1953	Non-Significant Effect
		CM_MC1	1.3151	2.6098	4.961	18	CDF	0.4650	Non-Significant Effect
		LC_SLC	0.84167	2.6098	4.961	18	CDF	0.6920	Non-Significant Effect
		FR_FRCP1*	11.52	2.6098	4.961	18	CDF	8.2E-07	Significant Effect
		FR_FRABCH*	4.8396	2.6098	4.961	18	CDF	2.5E-05	Significant Effect
		GH_FR1*	3.2089	2.6098	4.961	18	CDF	0.0099	Significant Effect
		GH_ERC	1.8412	2.6098	4.961	18	CDF	0.2322	Non-Significant Effect
		EV_HC1	1.1047	2.6098	4.961	18	CDF	0.5687	Non-Significant Effect
		EV_MC2	2.5776	2.6098	4.961	18	CDF	0.0540	Non-Significant Effect
		CM_MC2*	5.8917	2.6098	4.961	18	CDF	9.8E-07	Significant Effect
		RG_MIDAG	2.2094	2.6098	4.961	18	CDF	0.1203	Non-Significant Effect
		LC_LCDSSLCC	0.84167	2.6098	4.961	18	CDF	0.6920	Non-Significant Effect
		LC_DCDS	1.0521	2.6098	4.961	18	CDF	0.5943	Non-Significant Effect
		LC_LC3	1.999	2.6098	4.961	18	CDF	0.1783	Non-Significant Effect
		LC_LC5	2.4724	2.6098	4.961	18	CDF	0.0689	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.7829	3.5561	0.0191	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4221.15	263.822	16	14.601	<1.0E-37	Significant Effect
Error	2764.5	18.0686	153			
Total	6985.65		169			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.0615	2.1198	1.7E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1.8039	2.1198	0.0351	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.98827	0.97861	0.1697	Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	12-5805-0075	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Mar-20 16:03	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Reproduction Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
control	N	10	21.9	19.412	24.388	22	17	28	1.1	15.88%	0.00%
FR_UFR1		10	15.3	12.518	18.082	15.5	9	21	1.2297	25.42%	30.14%
GH_ER2		10	18.2	16.39	20.01	17.5	15	23	0.8	13.90%	16.89%
CM_MC1		10	19.4	16.144	22.656	18.5	13	25	1.4391	23.46%	11.42%
LC_SLC		10	20.3	18.275	22.325	20.5	16	24	0.89505	13.94%	7.31%
FR_FRCP1		10	0	0	0	0	0	0	0		100.00%
FR_FRABCH		10	12.7	8.8989	16.501	12.5	5	22	1.6803	41.84%	42.01%
GH_FR1		10	15.8	13.493	18.107	15	11	23	1.0198	20.41%	27.85%
GH_ERC		10	18.4	16.399	20.401	18	14	24	0.88443	15.20%	15.98%
EV_HC1		10	19.8	17.258	22.342	20.5	13	24	1.1235	17.94%	9.59%
EV_MC2		10	17	13.245	20.755	16	10	25	1.66	30.88%	22.37%
CM_MC2		10	10.7	7.8575	13.542	10	4	18	1.2565	37.14%	51.14%
RG_MIDAG		10	17.7	13.555	21.845	18	9	24	1.8321	32.73%	19.18%
LC_LCDSSLCC		10	20.3	15.676	24.924	24	5	25	2.0442	31.84%	7.31%
LC_DCDS		10	19.9	16.324	23.476	21	13	26	1.5808	25.12%	9.13%
LC_LC3		10	18.1	14.703	21.497	19	9	26	1.5015	26.23%	17.35%
LC_LC5		10	17.2	14.04	20.36	15.5	11	24	1.3968	25.68%	21.46%

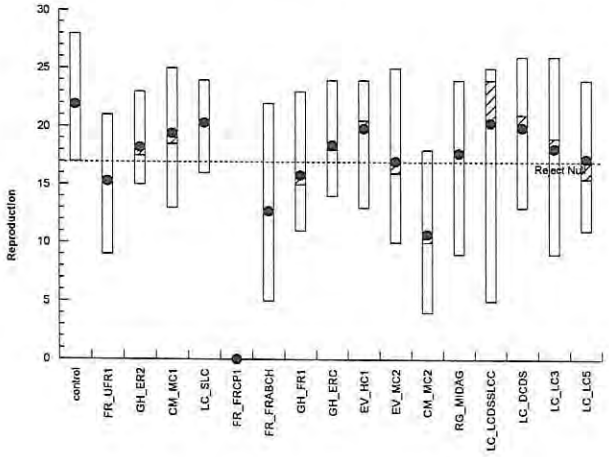
Reproduction Detail

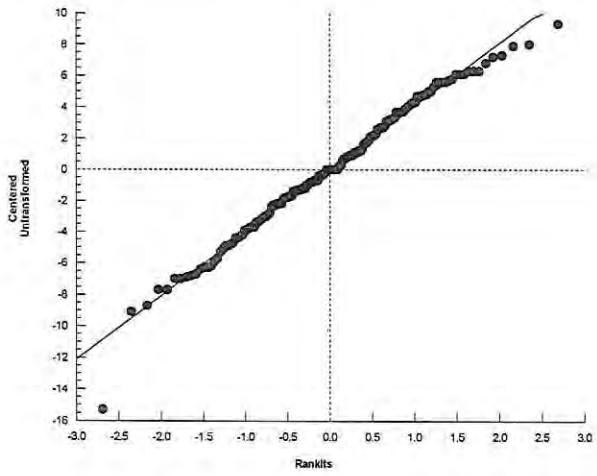
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	19	28	18	23	24	17	20	25	24	21
FR_UFR1		10	15	20	9	18	16	16	15	13	21
GH_ER2		16	17	18	17	19	21	15	23	20	16
CM_MC1		15	19	16	25	18	16	25	13	25	22
LC_SLC		24	22	19	16	22	17	23	23	19	18
FR_FRCP1		0	0	0	0	0	0	0	0	0	0
FR_FRABCH		5	11	13	12	15	13	12	22	19	5
GH_FR1		17	15	14	23	18	14	11	17	14	15
GH_ERC		19	18	16	20	24	17	21	17	14	18
EV_HC1		13	17	21	22	23	16	23	24	20	19
EV_MC2		14	16	14	22	21	10	22	25	10	16
CM_MC2		14	9	18	4	10	7	10	9	12	14
RG_MIDAG		13	24	14	22	12	14	23	22	24	9
LC_LCDSSLCC		5	19	24	24	24	25	24	25	14	19
LC_DCDS		13	26	21	14	23	24	15	26	16	21
LC_LC3		19	13	19	15	19	20	26	19	22	9
LC_LC5		11	22	15	13	15	23	16	15	24	18

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	12-5805-0075	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Mar-20 16:03	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	12-5805-0075	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Mar-20 16:03	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
control	21-0529-3942	27 Feb-19	27 Feb-19	12h	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
control	control	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 19-4034-5669 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 12 Mar-20 16:02 **Analysis:** Nonparametric-Multiple Comparison **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 failed reproduction	22.99%
		GH_ER2 passed reproduction	22.99%
		CM_MC1 passed reproduction	22.99%
		LC_SLC passed reproduction	22.99%
		FR_FRCP1 failed reproduction	22.99%
		FR_FRABCH failed reproduction	22.99%
		GH_FR1 failed reproduction	22.99%
		GH_ERC passed reproduction	22.99%
		EV_HC1 passed reproduction	22.99%
		EV_MC2 passed reproduction	22.99%
		CM_MC2 failed reproduction	22.99%
		RG_MIDAG passed reproduction	22.99%
		LC_LCDSSLCC passed reproduction	22.99%
		LC_DCDS passed reproduction	22.99%
		LC_LC3 passed reproduction	22.99%
		LC_LC5 passed reproduction	22.99%

Wilcoxon/Bonferroni Adj Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1*	64.5	n/a	3	18	Exact	0.0100	Significant Effect
		GH_ER2	73.5	n/a	6	18	Exact	0.1255	Non-Significant Effect
		CM_MC1	89.5	n/a	3	18	Exact	1.0000	Non-Significant Effect
		LC_SLC	90	n/a	5	18	Exact	1.0000	Non-Significant Effect
		FR_FRCP1*	55	n/a	0	18	Exact	8.7E-05	Significant Effect
		FR_FRABCH*	62.5	n/a	1	18	Exact	0.0044	Significant Effect
		GH_FR1*	63	n/a	3	18	Exact	0.0058	Significant Effect
		GH_ERC	76.5	n/a	6	18	Exact	0.2420	Non-Significant Effect
		EV_HC1	89	n/a	6	18	Exact	1.0000	Non-Significant Effect
		EV_MC2	78	n/a	2	18	Exact	0.3297	Non-Significant Effect
		CM_MC2*	56.5	n/a	1	18	Exact	2.6E-04	Significant Effect
		RG_MIDAG	84.5	n/a	2	18	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	95	n/a	3	17	Exact	1.0000	Non-Significant Effect
		LC_DCDS	94.5	n/a	3	18	Exact	1.0000	Non-Significant Effect
		LC_LC3	82.5	n/a	2	18	Exact	0.7192	Non-Significant Effect
		LC_LC5	74	n/a	3	18	Exact	0.1380	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4345.21	271.576	16	16.483	<1.0E-37	Significant Effect
Error	2504.4	16.4763	152			
Total	6849.61		168			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.143	2.1206	1.2E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	2.1508	2.1214	0.0089	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.99288	0.97849	0.5769	Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 19-4034-5669 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 12 Mar-20 16:02 **Analysis:** Nonparametric-Multiple Comparison **Status Level:** 1

Reproduction Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
control	N	10	21.9	19.412	24.388	22	17	28	1.1	15.88%	0.00%
FR_UFR1		10	15.3	12.518	18.082	15.5	9	21	1.2297	25.42%	30.14%
GH_ER2		10	18.2	16.39	20.01	17.5	15	23	0.8	13.90%	16.89%
CM_MC1		10	19.4	16.144	22.656	18.5	13	25	1.4391	23.46%	11.42%
LC_SLC		10	20.3	18.275	22.325	20.5	16	24	0.89505	13.94%	7.31%
FR_FRCP1		10	0	0	0	0	0	0	0		100.00%
FR_FRABCH		10	12.7	8.8989	16.501	12.5	5	22	1.6803	41.84%	42.01%
GH_FR1		10	15.8	13.493	18.107	15	11	23	1.0198	20.41%	27.85%
GH_ERC		10	18.4	16.399	20.401	18	14	24	0.88443	15.20%	15.98%
EV_HC1		10	19.8	17.258	22.342	20.5	13	24	1.1235	17.94%	9.59%
EV_MC2		10	17	13.245	20.755	16	10	25	1.66	30.88%	22.37%
CM_MC2		10	10.7	7.8575	13.542	10	4	18	1.2565	37.14%	51.14%
RG_MIDAG		10	17.7	13.555	21.845	18	9	24	1.8321	32.73%	19.18%
LC_LCDSSLCC		9	22	19.073	24.927	24	14	25	1.2693	17.31%	-0.46%
LC_DCDS		10	19.9	16.324	23.476	21	13	26	1.5808	25.12%	9.13%
LC_LC3		10	18.1	14.703	21.497	19	9	26	1.5015	26.23%	17.35%
LC_LC5		10	17.2	14.04	20.36	15.5	11	24	1.3968	25.68%	21.46%

Reproduction Detail

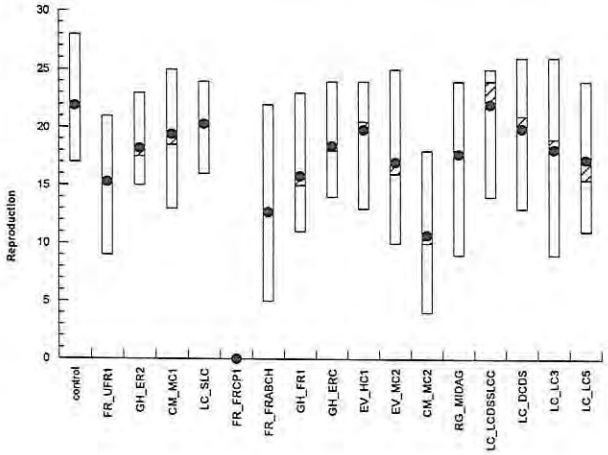
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	19	28	18	23	24	17	20	25	24	21
FR_UFR1		10	15	20	9	18	16	16	15	13	21
GH_ER2		16	17	18	17	19	21	15	23	20	16
CM_MC1		15	19	16	25	18	16	25	13	25	22
LC_SLC		24	22	19	16	22	17	23	23	19	18
FR_FRCP1		0	0	0	0	0	0	0	0	0	0
FR_FRABCH		5	11	13	12	15	13	12	22	19	5
GH_FR1		17	15	14	23	18	14	11	17	14	15
GH_ERC		19	18	16	20	24	17	21	17	14	18
EV_HC1		13	17	21	22	23	16	23	24	20	19
EV_MC2		14	16	14	22	21	10	22	25	10	16
CM_MC2		14	9	18	4	10	7	10	9	12	14
RG_MIDAG		13	24	14	22	12	14	23	22	24	9
LC_LCDSSLCC		Outlier	19	24	24	24	25	24	25	14	19
LC_DCDS		13	26	21	14	23	24	15	26	16	21
LC_LC3		19	13	19	15	19	20	26	19	22	9
LC_LC5		11	22	15	13	15	23	16	15	24	18

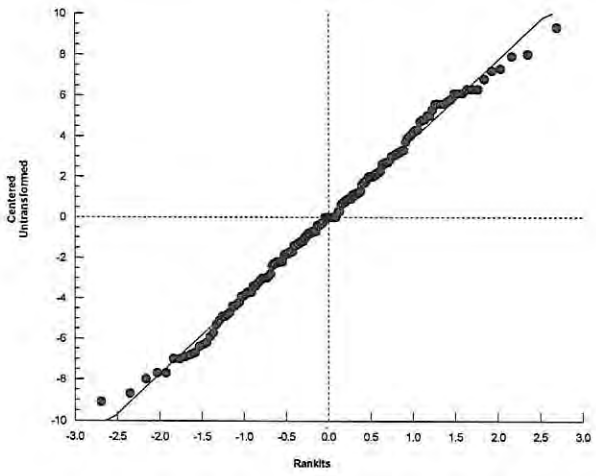
Analyst: SBK QA: Mar-12/20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	19-4034-5669	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Mar-20 16:02	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1

Graphics





Analyst: SSK QA: JDH Mar. 12/20

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	07-3128-9773	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:08	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Upstream Control (FR_UFR1)	GH_ER2	1.0000	Exact	1.0000	Non-Significant Effect
	CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
	LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
	FR_FRCP1*	0.0000	Exact	8.1E-05	Significant Effect
	FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
	GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
	GH_ERC	1.0000	Exact	1.0000	Non-Significant Effect
	EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
	EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
	CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
	RG_MIDAG	1.0000	Exact	1.0000	Non-Significant Effect
	LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 07-3128-9773 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:08 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	U	10	0	10	1	0	0.0%
GH_ER2		10	0	10	1	0	0.0%
CM_MC1		10	0	10	1	0	0.0%
LC_SLC		10	0	10	1	0	0.0%
FR_FRCP1		0	10	10	0	1	100.0%
FR_FRABCH		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
EV_MC2		10	0	10	1	0	0.0%
CM_MC2		10	0	10	1	0	0.0%
RG_MIDAG		10	0	10	1	0	0.0%
LC_LCDSSLCC		10	0	10	1	0	0.0%
LC_DCDS		10	0	10	1	0	0.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		10	0	10	1	0	0.0%

6d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	U	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

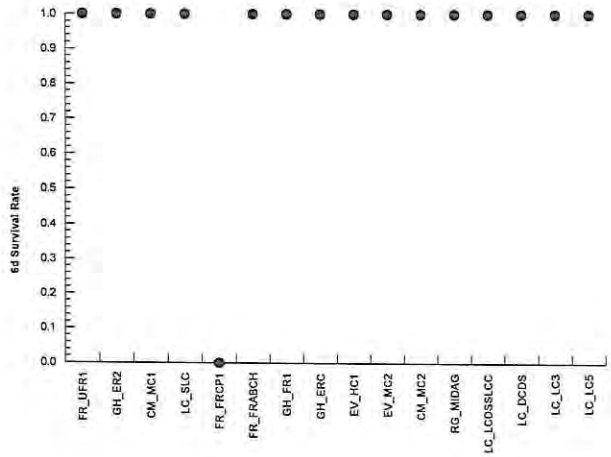
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	07-3128-9773	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:08	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

6d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	U	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_SLC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst: SSF QA: Mar-12/20

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	10-2892-9759	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:09	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 10-2892-9759 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:09 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed reproduction	32.55%
		CM_MC1 passed reproduction	32.55%
		LC_SLC passed reproduction	32.55%
		FR_FRCP1 failed reproduction	32.55%
		FR_FRABCH passed reproduction	32.55%
		GH_FR1 passed reproduction	32.55%
		GH_ERC passed reproduction	32.55%
		EV_HC1 passed reproduction	32.55%
		EV_MC2 passed reproduction	32.55%
		CM_MC2 passed reproduction	32.55%
		RG_MIDAG passed reproduction	32.55%
		LC_LCDSSLCC passed reproduction	32.55%
		LC_DCDS passed reproduction	32.55%
		LC_LC3 passed reproduction	32.55%
		LC_LC5 passed reproduction	32.55%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Upstream Control (FR-UFR1)		GH_ER2	-1.51	2.593	4.98	18	CDF	0.9997	Non-Significant Effect
		CM_MC1	-2.135	2.593	4.98	18	CDF	1.0000	Non-Significant Effect
		LC_SLC	-2.603	2.593	4.98	18	CDF	1.0000	Non-Significant Effect
		FR_FRCP1*	7.967	2.593	4.98	18	CDF	6.8E-07	Significant Effect
		FR_FRABCH	1.354	2.593	4.98	18	CDF	0.4359	Non-Significant Effect
		GH_FR1	-0.2603	2.593	4.98	18	CDF	0.9689	Non-Significant Effect
		GH_ERC	-1.614	2.593	4.98	18	CDF	0.9998	Non-Significant Effect
		EV_HC1	-2.343	2.593	4.98	18	CDF	1.0000	Non-Significant Effect
		EV_MC2	-0.8852	2.593	4.98	18	CDF	0.9960	Non-Significant Effect
		CM_MC2	2.395	2.593	4.98	18	CDF	0.0786	Non-Significant Effect
		RG_MIDAG	-1.25	2.593	4.98	18	CDF	0.9992	Non-Significant Effect
		LC_LCDSSLCC	-2.603	2.593	4.98	18	CDF	1.0000	Non-Significant Effect
		LC_DCDS	-2.395	2.593	4.98	18	CDF	1.0000	Non-Significant Effect
		LC_LC3	-1.458	2.593	4.98	18	CDF	0.9996	Non-Significant Effect
		LC_LC5	-0.9893	2.593	4.98	18	CDF	0.9973	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.744	3.537	0.0209	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3926	261.733	15	14.19	<1.0E-37	Significant Effect
Error	2655.6	18.4417	144			
Total	6581.6		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.163	2.165	1.7E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1.848	2.165	0.0334	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9872	0.9774	0.1510	Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 10-2892-9759 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:09 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

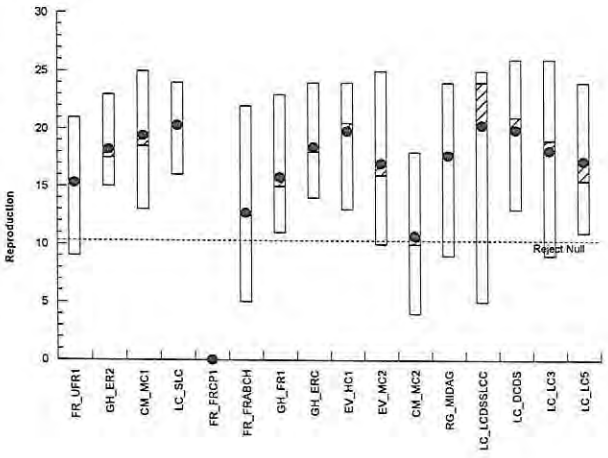
Reproduction Summary

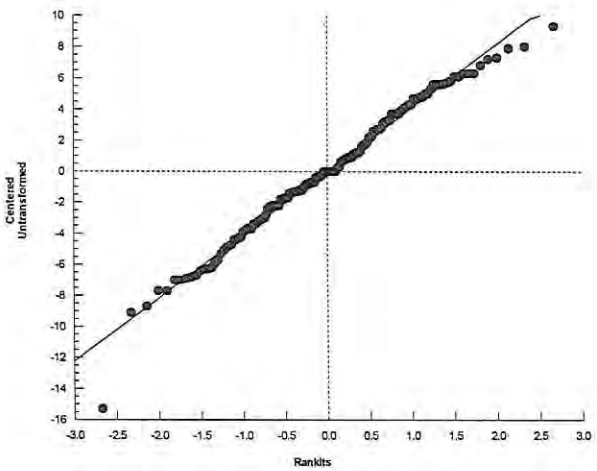
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	U	10	15.3	12.52	18.08	15.5	9	21	1.23	25.42%	0.00%
GH_ER2		10	18.2	16.39	20.01	17.5	15	23	0.8	13.90%	-18.95%
CM_MC1		10	19.4	16.14	22.66	18.5	13	25	1.439	23.46%	-26.80%
LC_SLC		10	20.3	18.28	22.32	20.5	16	24	0.895	13.94%	-32.68%
FR_FRCP1		10	0	0	0	0	0	0	0		100.00%
FR_FRABCH		10	12.7	8.899	16.5	12.5	5	22	1.68	41.84%	16.99%
GH_FR1		10	15.8	13.49	18.11	15	11	23	1.02	20.41%	-3.27%
GH_ERC		10	18.4	16.4	20.4	18	14	24	0.8844	15.20%	-20.26%
EV_HC1		10	19.8	17.26	22.34	20.5	13	24	1.123	17.94%	-29.41%
EV_MC2		10	17	13.24	20.76	16	10	25	1.66	30.88%	-11.11%
CM_MC2		10	10.7	7.858	13.54	10	4	18	1.257	37.14%	30.07%
RG_MIDAG		10	17.7	13.56	21.84	18	9	24	1.832	32.73%	-15.69%
LC_LCDSSLCC		10	20.3	15.68	24.92	24	5	25	2.044	31.84%	-32.68%
LC_DCDS		10	19.9	16.32	23.48	21	13	26	1.581	25.12%	-30.07%
LC_LC3		10	18.1	14.7	21.5	19	9	26	1.501	26.23%	-18.30%
LC_LC5		10	17.2	14.04	20.36	15.5	11	24	1.397	25.68%	-12.42%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	U	10	15	20	9	18	16	16	15	13	21
GH_ER2		16	17	18	17	19	21	15	23	20	16
CM_MC1		15	19	16	25	18	16	25	13	25	22
LC_SLC		24	22	19	16	22	17	23	23	19	18
FR_FRCP1		0	0	0	0	0	0	0	0	0	0
FR_FRABCH		5	11	13	12	15	13	12	22	19	5
GH_FR1		17	15	14	23	18	14	11	17	14	15
GH_ERC		19	18	16	20	24	17	21	17	14	18
EV_HC1		13	17	21	22	23	16	23	24	20	19
EV_MC2		14	16	14	22	21	10	22	25	10	16
CM_MC2		14	9	18	4	10	7	10	9	12	14
RG_MIDAG		13	24	14	22	12	14	23	22	24	9
LC_LCDSSLCC		5	19	24	24	24	25	24	25	14	19
LC_DCDS		13	26	21	14	23	24	15	26	16	21
LC_LC3		19	13	19	15	19	20	26	19	22	9
LC_LC5		11	22	15	13	15	23	16	15	24	18

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	20-6576-5873	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:08	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 20-6576-5873 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:08 **Analysis:** Nonparametric-Multiple Comparison **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed reproduction	32.94%
		CM_MC1 passed reproduction	32.94%
		LC_SLC passed reproduction	32.94%
		FR_FRCP1 failed reproduction	32.94%
		FR_FRABCH passed reproduction	32.94%
		GH_FR1 passed reproduction	32.94%
		GH_ERC passed reproduction	32.94%
		EV_HC1 passed reproduction	32.94%
		EV_MC2 passed reproduction	32.94%
		CM_MC2 passed reproduction	32.94%
		RG_MIDAG passed reproduction	32.94%
		LC_LCDSSLCC passed reproduction	32.94%
		LC_DCDS passed reproduction	32.94%
		LC_LC3 passed reproduction	32.94%
		LC_LC5 passed reproduction	32.94%

Wilcoxon/Bonferroni Adj Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Upstream Control (FR_UFR1)		GH_ER2	128.5	n/a	5	18	Exact	1.0000	Non-Significant Effect
		CM_MC1	129	n/a	4	18	Exact	1.0000	Non-Significant Effect
		LC_SLC	141.5	n/a	2	18	Exact	1.0000	Non-Significant Effect
		FR_FRCP1*	55	n/a	0	18	Exact	8.1E-05	Significant Effect
		FR_FRABCH	88	n/a	2	18	Exact	1.0000	Non-Significant Effect
		GH_FR1	105.5	n/a	2	18	Exact	1.0000	Non-Significant Effect
		GH_ERC	129	n/a	4	18	Exact	1.0000	Non-Significant Effect
		EV_HC1	136.5	n/a	4	18	Exact	1.0000	Non-Significant Effect
		EV_MC2	115.5	n/a	3	18	Exact	1.0000	Non-Significant Effect
		CM_MC2	74.5	n/a	3	18	Exact	0.1456	Non-Significant Effect
		RG_MIDAG	116	n/a	2	18	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	124	n/a	0	17	Exact	1.0000	Non-Significant Effect
		LC_DCDS	129.5	n/a	4	18	Exact	1.0000	Non-Significant Effect
		LC_LC3	122.5	n/a	4	18	Exact	1.0000	Non-Significant Effect
		LC_LC5	115	n/a	4	18	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4057.61	270.507	15	16.15	<1.0E-37	Significant Effect
Error	2395.5	16.7517	143			
Total	6453.11		158			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.269	2.166	1.1E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	2.216	2.167	0.0083	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9923	0.9773	0.5498	Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 20-6576-5873 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:08 **Analysis:** Nonparametric-Multiple Comparison **Status Level:** 1

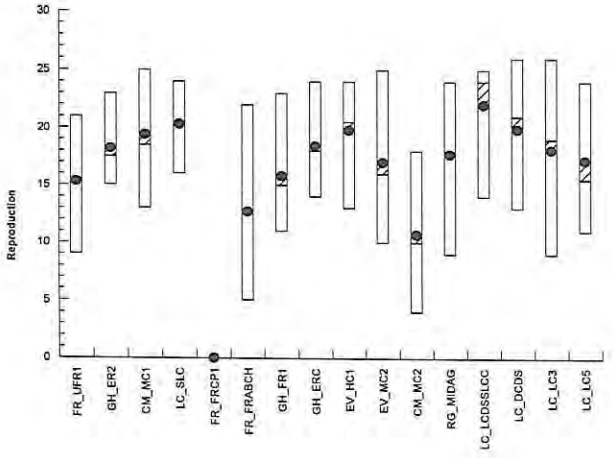
Reproduction Summary

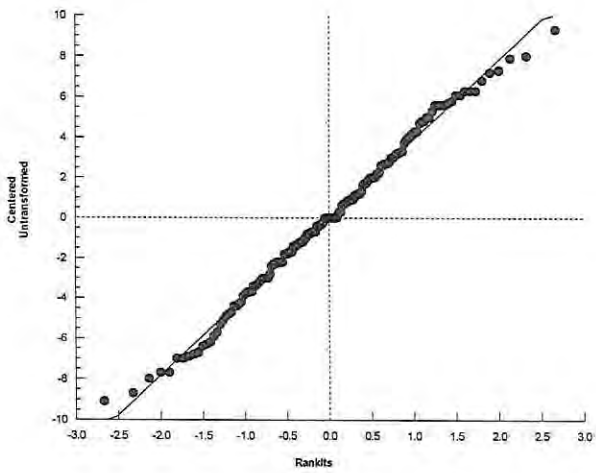
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	U	10	15.3	12.52	18.08	15.5	9	21	1.23	25.42%	0.00%
GH_ER2		10	18.2	16.39	20.01	17.5	15	23	0.8	13.90%	-18.95%
CM_MC1		10	19.4	16.14	22.66	18.5	13	25	1.439	23.46%	-26.80%
LC_SLC		10	20.3	18.28	22.32	20.5	16	24	0.895	13.94%	-32.68%
FR_FRCP1		10	0	0	0	0	0	0	0		100.00%
FR_FRABCH		10	12.7	8.899	16.5	12.5	5	22	1.68	41.84%	16.99%
GH_FR1		10	15.8	13.49	18.11	15	11	23	1.02	20.41%	-3.27%
GH_ERC		10	18.4	16.4	20.4	18	14	24	0.8844	15.20%	-20.26%
EV_HC1		10	19.8	17.26	22.34	20.5	13	24	1.123	17.94%	-29.41%
EV_MC2		10	17	13.24	20.76	16	10	25	1.66	30.88%	-11.11%
CM_MC2		10	10.7	7.858	13.54	10	4	18	1.257	37.14%	30.07%
RG_MIDAG		10	17.7	13.56	21.84	18	9	24	1.832	32.73%	-15.69%
LC_LCDSSLCC		9	22	19.07	24.93	24	14	25	1.269	17.31%	-43.79%
LC_DCDS		10	19.9	16.32	23.48	21	13	26	1.581	25.12%	-30.07%
LC_LC3		10	18.1	14.7	21.5	19	9	26	1.501	26.23%	-18.30%
LC_LC5		10	17.2	14.04	20.36	15.5	11	24	1.397	25.68%	-12.42%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	U	10	15	20	9	18	16	16	15	13	21
GH_ER2		16	17	18	17	19	21	15	23	20	16
CM_MC1		15	19	16	25	18	16	25	13	25	22
LC_SLC		24	22	19	16	22	17	23	23	19	18
FR_FRCP1		0	0	0	0	0	0	0	0	0	0
FR_FRABCH		5	11	13	12	15	13	12	22	19	5
GH_FR1		17	15	14	23	18	14	11	17	14	15
GH_ERC		19	18	16	20	24	17	21	17	14	18
EV_HC1		13	17	21	22	23	16	23	24	20	19
EV_MC2		14	16	14	22	21	10	22	25	10	16
CM_MC2		14	9	18	4	10	7	10	9	12	14
RG_MIDAG		13	24	14	22	12	14	23	22	24	9
LC_LCDSSLCC		Outlier	19	24	24	24	25	24	25	14	19
LC_DCDS		13	26	21	14	23	24	15	26	16	21
LC_LC3		19	13	19	15	19	20	26	19	22	9
LC_LC5		11	22	15	13	15	23	16	15	24	18

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	06-3829-0662	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:12	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Receiving Water (GH_ER2)	FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
	CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
	LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
	FR_FRCP1*	0.0000	Exact	8.1E-05	Significant Effect
	FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
	GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
	GH_ERC	1.0000	Exact	1.0000	Non-Significant Effect
	EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
	EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
	CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
	RG_MIDAG	1.0000	Exact	1.0000	Non-Significant Effect
	LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 06-3829-0662 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:12 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2	R	10	0	10	1	0	0.0%
CM_MC1		10	0	10	1	0	0.0%
LC_SLC		10	0	10	1	0	0.0%
FR_FRCP1		0	10	10	0	1	100.0%
FR_FRABCH		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
EV_MC2		10	0	10	1	0	0.0%
CM_MC2		10	0	10	1	0	0.0%
RG_MIDAG		10	0	10	1	0	0.0%
LC_LCDSSLCC		10	0	10	1	0	0.0%
LC_DCDS		10	0	10	1	0	0.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		10	0	10	1	0	0.0%

6d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2	R	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

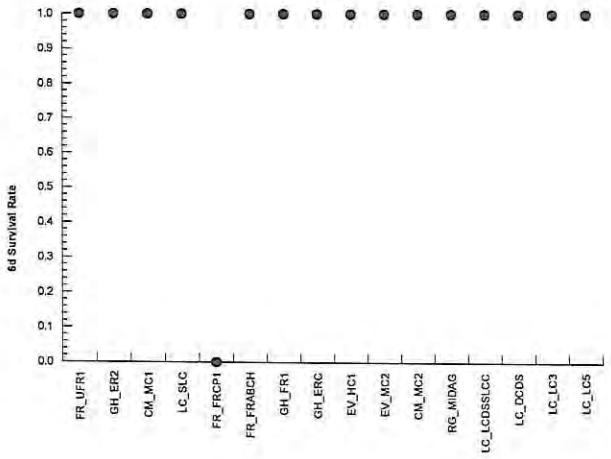
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 06-3829-0662 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:12 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

6d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2	R	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_SLC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Report Date: 10 Mar-20 16:13 (p 1 of 3)
Test Code/ID: 190346 / 17-1634-5101

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-8655-4433	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:12	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh	
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water	
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**		
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Analyst: SOh QA: JGU Mar-12/20

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 00-8655-4433 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:12 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	27.36%
		CM_MC1 passed reproduction	27.36%
		LC_SLC passed reproduction	27.36%
		FR_FRCP1 failed reproduction	27.36%
		FR_FRABCH failed reproduction	27.36%
		GH_FR1 passed reproduction	27.36%
		GH_ERC passed reproduction	27.36%
		EV_HC1 passed reproduction	27.36%
		EV_MC2 passed reproduction	27.36%
		CM_MC2 failed reproduction	27.36%
		RG_MIDAG passed reproduction	27.36%
		LC_LCDSSLCC passed reproduction	27.36%
		LC_DCDS passed reproduction	27.36%
		LC_LC3 passed reproduction	27.36%
		LC_LC5 passed reproduction	27.36%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Receiving Water (GH-ER2)		FR_UFR1	1.51	2.593	4.98	18	CDF	0.3620	Non-Significant Effect
		CM_MC1	-0.6248	2.593	4.98	18	CDF	0.9900	Non-Significant Effect
		LC_SLC	-1.093	2.593	4.98	18	CDF	0.9982	Non-Significant Effect
		FR_FRCP1*	9.477	2.593	4.98	18	CDF	6.8E-07	Significant Effect
		FR_FRABCH*	2.864	2.593	4.98	18	CDF	0.0252	Significant Effect
		GH_FR1	1.25	2.593	4.98	18	CDF	0.4868	Non-Significant Effect
		GH_ERC	-0.1041	2.593	4.98	18	CDF	0.9522	Non-Significant Effect
		EV_HC1	-0.8331	2.593	4.98	18	CDF	0.9952	Non-Significant Effect
		EV_MC2	0.6248	2.593	4.98	18	CDF	0.7720	Non-Significant Effect
		CM_MC2*	3.905	2.593	4.98	18	CDF	9.5E-04	Significant Effect
		RG_MIDAG	0.2603	2.593	4.98	18	CDF	0.8858	Non-Significant Effect
		LC_LCDSSLCC	-1.093	2.593	4.98	18	CDF	0.9982	Non-Significant Effect
		LC_DCDS	-0.8852	2.593	4.98	18	CDF	0.9960	Non-Significant Effect
		LC_LC3	0.05207	2.593	4.98	18	CDF	0.9290	Non-Significant Effect
		LC_LC5	0.5207	2.593	4.98	18	CDF	0.8096	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.744	3.537	0.0209	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3926	261.733	15	14.19	<1.0E-37	Significant Effect
Error	2655.6	18.4417	144			
Total	6581.6		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.163	2.165	1.7E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1.848	2.165	0.0334	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9872	0.9774	0.1510	Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 00-8655-4433 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:12 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

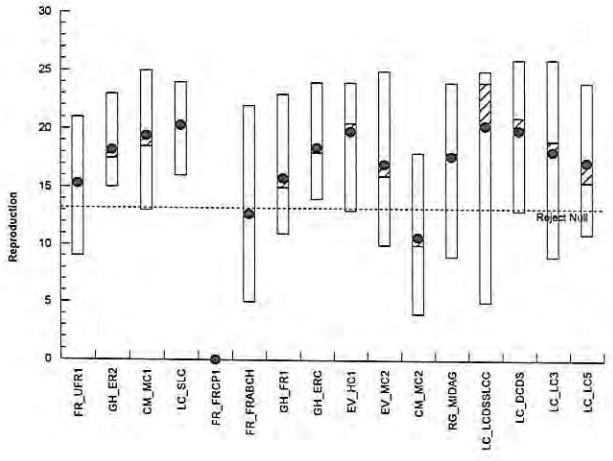
Reproduction Summary

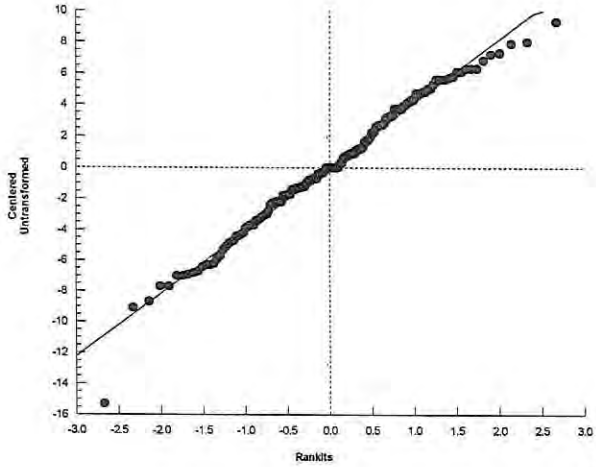
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	15.3	12.52	18.08	15.5	9	21	1.23	25.42%	0.00%
GH_ER2	R	10	18.2	16.39	20.01	17.5	15	23	0.8	13.90%	-18.95%
CM_MC1		10	19.4	16.14	22.66	18.5	13	25	1.439	23.46%	-26.80%
LC_SLC		10	20.3	18.28	22.32	20.5	16	24	0.895	13.94%	-32.68%
FR_FRCP1		10	0	0	0	0	0	0	0		100.00%
FR_FRABCH		10	12.7	8.899	16.5	12.5	5	22	1.68	41.84%	16.99%
GH_FR1		10	15.8	13.49	18.11	15	11	23	1.02	20.41%	-3.27%
GH_ERC		10	18.4	16.4	20.4	18	14	24	0.8844	15.20%	-20.26%
EV_HC1		10	19.8	17.26	22.34	20.5	13	24	1.123	17.94%	-29.41%
EV_MC2		10	17	13.24	20.76	16	10	25	1.66	30.88%	-11.11%
CM_MC2		10	10.7	7.858	13.54	10	4	18	1.257	37.14%	30.07%
RG_MIDAG		10	17.7	13.56	21.84	18	9	24	1.832	32.73%	-15.69%
LC_LCDSSLCC		10	20.3	15.68	24.92	24	5	25	2.044	31.84%	-32.68%
LC_DCDS		10	19.9	16.32	23.48	21	13	26	1.581	25.12%	-30.07%
LC_LC3		10	18.1	14.7	21.5	19	9	26	1.501	26.23%	-18.30%
LC_LC5		10	17.2	14.04	20.36	15.5	11	24	1.397	25.68%	-12.42%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		10	15	20	9	18	16	16	15	13	21
GH_ER2	R	16	17	18	17	19	21	15	23	20	16
CM_MC1		15	19	16	25	18	16	25	13	25	22
LC_SLC		24	22	19	16	22	17	23	23	19	18
FR_FRCP1		0	0	0	0	0	0	0	0	0	0
FR_FRABCH		5	11	13	12	15	13	12	22	19	5
GH_FR1		17	15	14	23	18	14	11	17	14	15
GH_ERC		19	18	16	20	24	17	21	17	14	18
EV_HC1		13	17	21	22	23	16	23	24	20	19
EV_MC2		14	16	14	22	21	10	22	25	10	16
CM_MC2		14	9	18	4	10	7	10	9	12	14
RG_MIDAG		13	24	14	22	12	14	23	22	24	9
LC_LCDSSLCC		5	19	24	24	24	25	24	25	14	19
LC_DCDS		13	26	21	14	23	24	15	26	16	21
LC_LC3		19	13	19	15	19	20	26	19	22	9
LC_LC5		11	22	15	13	15	23	16	15	24	18

Graphics





CETIS Analytical Report

Report Date: 10 Mar-20 16:13 (p 1 of 3)
Test Code/ID: 190346 / 17-1634-5101

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-0972-2407	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:12	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1

Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh	
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water	
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**		
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Analyst: SSK QA: JGb Mar. 12/20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 03-0972-2407 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:12 **Analysis:** Nonparametric-Multiple Comparison **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	27.69%
		CM_MC1 passed reproduction	27.69%
		LC_SLC passed reproduction	27.69%
		FR_FRCP1 failed reproduction	27.69%
		FR_FRABCH passed reproduction	27.69%
		GH_FR1 passed reproduction	27.69%
		GH_ERC passed reproduction	27.69%
		EV_HC1 passed reproduction	27.69%
		EV_MC2 passed reproduction	27.69%
		CM_MC2 failed reproduction	27.69%
		RG_MIDAG passed reproduction	27.69%
		LC_LCDSSLCC passed reproduction	27.69%
		LC_DCDS passed reproduction	27.69%
		LC_LC3 passed reproduction	27.69%
		LC_LC5 passed reproduction	27.69%

Wilcoxon/Bonferroni Adj Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Receiving Water (GH_ER2)		FR_UFR1	81.5	n/a	5	18	Exact	0.5867	Non-Significant Effect
		CM_MC1	110.5	n/a	4	18	Exact	1.0000	Non-Significant Effect
		LC_SLC	126.5	n/a	5	18	Exact	1.0000	Non-Significant Effect
		FR_FRCP1*	55	n/a	0	18	Exact	8.1E-05	Significant Effect
		FR_FRABCH	71	n/a	2	18	Exact	0.0626	Non-Significant Effect
		GH_FR1	79	n/a	4	18	Exact	0.3753	Non-Significant Effect
		GH_ERC	108.5	n/a	6	18	Exact	1.0000	Non-Significant Effect
		EV_HC1	121.5	n/a	6	18	Exact	1.0000	Non-Significant Effect
		EV_MC2	95.5	n/a	2	18	Exact	1.0000	Non-Significant Effect
		CM_MC2*	60.5	n/a	1	18	Exact	0.0015	Significant Effect
		RG_MIDAG	102.5	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	118	n/a	1	17	Exact	1.0000	Non-Significant Effect
		LC_DCDS	114	n/a	4	18	Exact	1.0000	Non-Significant Effect
		LC_LC3	108	n/a	3	18	Exact	1.0000	Non-Significant Effect
		LC_LC5	92.5	n/a	4	18	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4057.61	270.507	15	16.15	<1.0E-37	Significant Effect
Error	2395.5	16.7517	143			
Total	6453.11		158			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.269	2.166	1.1E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	2.216	2.167	0.0083	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9923	0.9773	0.5498	Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 03-0972-2407 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:12 **Analysis:** Nonparametric-Multiple Comparison **Status Level:** 1

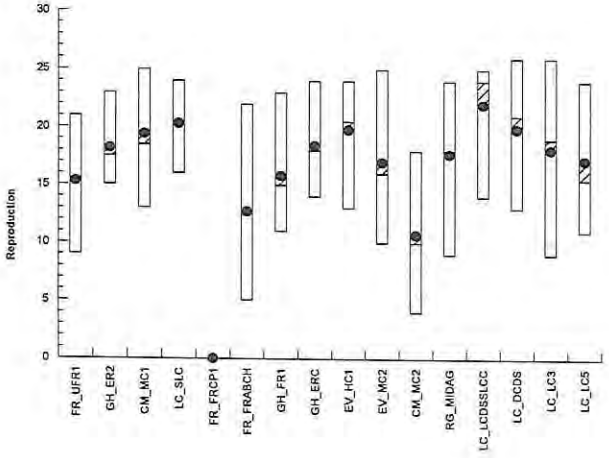
Reproduction Summary

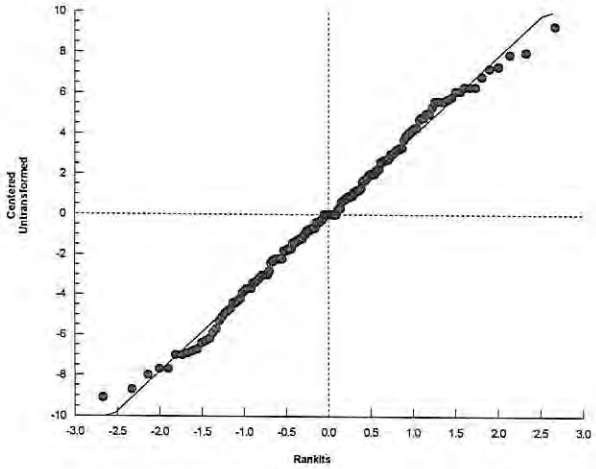
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	15.3	12.52	18.08	15.5	9	21	1.23	25.42%	0.00%
GH_ER2	R	10	18.2	16.39	20.01	17.5	15	23	0.8	13.90%	-18.95%
CM_MC1		10	19.4	16.14	22.66	18.5	13	25	1.439	23.46%	-26.80%
LC_SLC		10	20.3	18.28	22.32	20.5	16	24	0.895	13.94%	-32.68%
FR_FRCP1		10	0	0	0	0	0	0	0		100.00%
FR_FRABCH		10	12.7	8.899	16.5	12.5	5	22	1.68	41.84%	16.99%
GH_FR1		10	15.8	13.49	18.11	15	11	23	1.02	20.41%	-3.27%
GH_ERC		10	18.4	16.4	20.4	18	14	24	0.8844	15.20%	-20.26%
EV_HC1		10	19.8	17.26	22.34	20.5	13	24	1.123	17.94%	-29.41%
EV_MC2		10	17	13.24	20.76	16	10	25	1.66	30.88%	-11.11%
CM_MC2		10	10.7	7.858	13.54	10	4	18	1.257	37.14%	30.07%
RG_MIDAG		10	17.7	13.56	21.84	18	9	24	1.832	32.73%	-15.69%
LC_LCDSSLCC		9	22	19.07	24.93	24	14	25	1.269	17.31%	-43.79%
LC_DCDS		10	19.9	16.32	23.48	21	13	26	1.581	25.12%	-30.07%
LC_LC3		10	18.1	14.7	21.5	19	9	26	1.501	26.23%	-18.30%
LC_LC5		10	17.2	14.04	20.36	15.5	11	24	1.397	25.68%	-12.42%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		10	15	20	9	18	16	16	15	13	21
GH_ER2	R	16	17	18	17	19	21	15	23	20	16
CM_MC1		15	19	16	25	18	16	25	13	25	22
LC_SLC		24	22	19	16	22	17	23	23	19	18
FR_FRCP1		0	0	0	0	0	0	0	0	0	0
FR_FRABCH		5	11	13	12	15	13	12	22	19	5
GH_FR1		17	15	14	23	18	14	11	17	14	15
GH_ERC		19	18	16	20	24	17	21	17	14	18
EV_HC1		13	17	21	22	23	16	23	24	20	19
EV_MC2		14	16	14	22	21	10	22	25	10	16
CM_MC2		14	9	18	4	10	7	10	9	12	14
RG_MIDAG		13	24	14	22	12	14	23	22	24	9
LC_LCDSSLCC		Outlier	19	24	24	24	25	24	25	14	19
LC_DCDS		13	26	21	14	23	24	15	26	16	21
LC_LC3		19	13	19	15	19	20	26	19	22	9
LC_LC5		11	22	15	13	15	23	16	15	24	18

Graphics





Analyst: SMC QA: Mar. 12/20

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-6331-6000	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:15	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (CM-MC1)		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1*	0.0000	Exact	8.1E-05	Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect

Analyst: SSK QA: JCL Mar-12/20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 13-6331-6000 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:15 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		10	0	10	1	0	0.0%
CM_MC1	XC	10	0	10	1	0	0.0%
LC_SLC		10	0	10	1	0	0.0%
FR_FRCP1		0	10	10	0	1	100.0%
FR_FRABCH		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
EV_MC2		10	0	10	1	0	0.0%
CM_MC2		10	0	10	1	0	0.0%
RG_MIDAG		10	0	10	1	0	0.0%
LC_LCDSSLCC		10	0	10	1	0	0.0%
LC_DCDS		10	0	10	1	0	0.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		10	0	10	1	0	0.0%

6d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

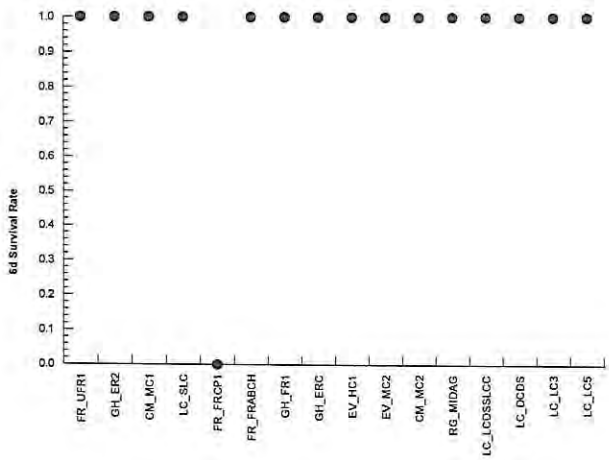
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 13-6331-6000 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:15 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

6d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC1	XC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_SLC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst: SBK QA: Mar. 12/20

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-4815-5815	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:16	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 05-4815-5815 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:16 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	25.67%
		GH_ER2 passed reproduction	25.67%
		LC_SLC passed reproduction	25.67%
		FR_FRCP1 failed reproduction	25.67%
		FR_FRABCH failed reproduction	25.67%
		GH_FR1 passed reproduction	25.67%
		GH_ERC passed reproduction	25.67%
		EV_HC1 passed reproduction	25.67%
		EV_MC2 passed reproduction	25.67%
		CM_MC2 failed reproduction	25.67%
		RG_MIDAG passed reproduction	25.67%
		LC_LCDSSLCC passed reproduction	25.67%
		LC_DCDS passed reproduction	25.67%
		LC_LC3 passed reproduction	25.67%
		LC_LC5 passed reproduction	25.67%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control (CM-MC1)		FR_UFR1	2.135	2.593	4.98	18	CDF	0.1342	Non-Significant Effect
		GH_ER2	0.6248	2.593	4.98	18	CDF	0.7720	Non-Significant Effect
		LC_SLC	-0.4686	2.593	4.98	18	CDF	0.9833	Non-Significant Effect
		FR_FRCP1*	10.1	2.593	4.98	18	CDF	6.8E-07	Significant Effect
		FR_FRABCH*	3.489	2.593	4.98	18	CDF	0.0040	Significant Effect
		GH_FR1	1.875	2.593	4.98	18	CDF	0.2132	Non-Significant Effect
		GH_ERC	0.5207	2.593	4.98	18	CDF	0.8096	Non-Significant Effect
		EV_HC1	-0.2083	2.593	4.98	18	CDF	0.9639	Non-Significant Effect
		EV_MC2	1.25	2.593	4.98	18	CDF	0.4868	Non-Significant Effect
		CM_MC2*	4.53	2.593	4.98	18	CDF	8.8E-05	Significant Effect
		RG_MIDAG	0.8852	2.593	4.98	18	CDF	0.6625	Non-Significant Effect
		LC_LCDSSLCC	-0.4686	2.593	4.98	18	CDF	0.9833	Non-Significant Effect
		LC_DCDS	-0.2603	2.593	4.98	18	CDF	0.9689	Non-Significant Effect
		LC_LC3	0.6769	2.593	4.98	18	CDF	0.7518	Non-Significant Effect
		LC_LC5	1.146	2.593	4.98	18	CDF	0.5381	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.744	3.537	0.0209	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3926	261.733	15	14.19	<1.0E-37	Significant Effect
Error	2655.6	18.4417	144			
Total	6581.6		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.163	2.165	1.7E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1.848	2.165	0.0334	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9872	0.9774	0.1510	Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 05-4815-5815 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:16 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

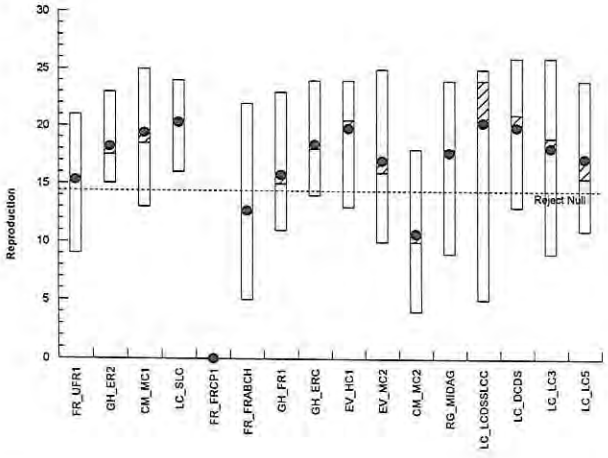
Reproduction Summary

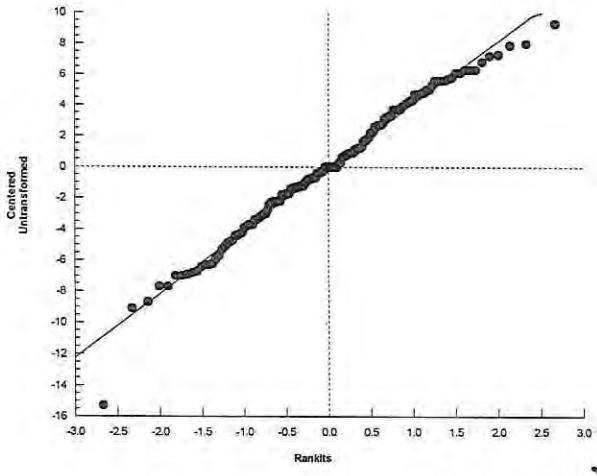
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	15.3	12.52	18.08	15.5	9	21	1.23	25.42%	0.00%
GH_ER2		10	18.2	16.39	20.01	17.5	15	23	0.8	13.90%	-18.95%
CM_MC1	XC	10	19.4	16.14	22.66	18.5	13	25	1.439	23.46%	-26.80%
LC_SLC		10	20.3	18.28	22.32	20.5	16	24	0.895	13.94%	-32.68%
FR_FRCP1		10	0	0	0	0	0	0	0		100.00%
FR_FRABCH		10	12.7	8.899	16.5	12.5	5	22	1.68	41.84%	16.99%
GH_FR1		10	15.8	13.49	18.11	15	11	23	1.02	20.41%	-3.27%
GH_ERC		10	18.4	16.4	20.4	18	14	24	0.8844	15.20%	-20.26%
EV_HC1		10	19.8	17.26	22.34	20.5	13	24	1.123	17.94%	-29.41%
EV_MC2		10	17	13.24	20.76	16	10	25	1.66	30.88%	-11.11%
CM_MC2		10	10.7	7.858	13.54	10	4	18	1.257	37.14%	30.07%
RG_MIDAG		10	17.7	13.56	21.84	18	9	24	1.832	32.73%	-15.69%
LC_LCDSSLCC		10	20.3	15.68	24.92	24	5	25	2.044	31.84%	-32.68%
LC_DCDS		10	19.9	16.32	23.48	21	13	26	1.581	25.12%	-30.07%
LC_LC3		10	18.1	14.7	21.5	19	9	26	1.501	26.23%	-18.30%
LC_LC5		10	17.2	14.04	20.36	15.5	11	24	1.397	25.68%	-12.42%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		10	15	20	9	18	16	16	15	13	21
GH_ER2		16	17	18	17	19	21	15	23	20	16
CM_MC1	XC	15	19	16	25	18	16	25	13	25	22
LC_SLC		24	22	19	16	22	17	23	23	19	18
FR_FRCP1		0	0	0	0	0	0	0	0	0	0
FR_FRABCH		5	11	13	12	15	13	12	22	19	5
GH_FR1		17	15	14	23	18	14	11	17	14	15
GH_ERC		19	18	16	20	24	17	21	17	14	18
EV_HC1		13	17	21	22	23	16	23	24	20	19
EV_MC2		14	16	14	22	21	10	22	25	10	16
CM_MC2		14	9	18	4	10	7	10	9	12	14
RG_MIDAG		13	24	14	22	12	14	23	22	24	9
LC_LCDSSLCC		5	19	24	24	24	25	24	25	14	19
LC_DCDS		13	26	21	14	23	24	15	26	16	21
LC_LC3		19	13	19	15	19	20	26	19	22	9
LC_LC5		11	22	15	13	15	23	16	15	24	18

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-1665-7653	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:15	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 04-1665-7653 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:15 **Analysis:** Nonparametric-Multiple Comparison **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	25.98%
		GH_ER2 passed reproduction	25.98%
		LC_SLC passed reproduction	25.98%
		FR_FRCP1 failed reproduction	25.98%
		FR_FRABCH failed reproduction	25.98%
		GH_FR1 passed reproduction	25.98%
		GH_ERC passed reproduction	25.98%
		EV_HC1 passed reproduction	25.98%
		EV_MC2 passed reproduction	25.98%
		CM_MC2 failed reproduction	25.98%
		RG_MIDAG passed reproduction	25.98%
		LC_LCDSSLCC passed reproduction	25.98%
		LC_DCDS passed reproduction	25.98%
		LC_LC3 passed reproduction	25.98%
		LC_LC5 passed reproduction	25.98%

Wilcoxon/Bonferroni Adj Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control (CM-MCi)		FR_UFR1	81	n/a	4	18	Exact	0.5218	Non-Significant Effect
		GH_ER2	99.5	n/a	4	18	Exact	1.0000	Non-Significant Effect
		LC_SLC	111.5	n/a	4	18	Exact	1.0000	Non-Significant Effect
		FR_FRCP1*	55	n/a	0	18	Exact	8.1E-05	Significant Effect
		FR_FRABCH*	69.5	n/a	4	18	Exact	0.0416	Significant Effect
		GH_FR1	80.5	n/a	2	18	Exact	0.4767	Non-Significant Effect
		GH_ERC	100.5	n/a	3	18	Exact	1.0000	Non-Significant Effect
		EV_HC1	107.5	n/a	4	18	Exact	1.0000	Non-Significant Effect
		EV_MC2	90.5	n/a	3	18	Exact	1.0000	Non-Significant Effect
		CM_MC2*	61.5	n/a	1	18	Exact	0.0026	Significant Effect
		RG_MIDAG	91.5	n/a	2	18	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	102	n/a	2	17	Exact	1.0000	Non-Significant Effect
		LC_DCDS	107	n/a	3	18	Exact	1.0000	Non-Significant Effect
		LC_LC3	101.5	n/a	4	18	Exact	1.0000	Non-Significant Effect
		LC_LC5	88	n/a	5	18	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4057.61	270.507	15	16.15	<1.0E-37	Significant Effect
Error	2395.5	16.7517	143			
Total	6453.11		158			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.269	2.166	1.1E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	2.216	2.167	0.0083	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9923	0.9773	0.5498	Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 04-1665-7653 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:15 **Analysis:** Nonparametric-Multiple Comparison **Status Level:** 1

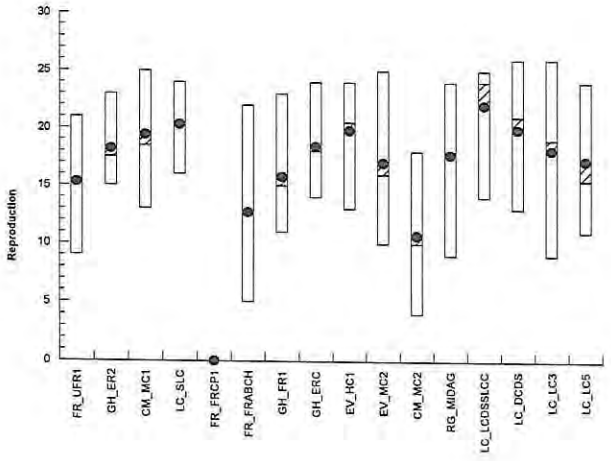
Reproduction Summary

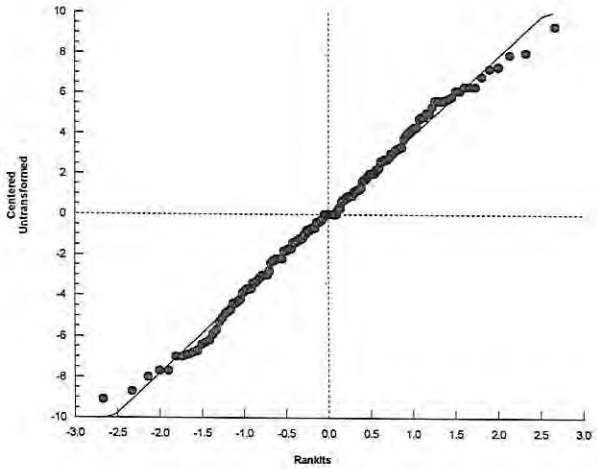
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	15.3	12.52	18.08	15.5	9	21	1.23	25.42%	0.00%
GH_ER2		10	18.2	16.39	20.01	17.5	15	23	0.8	13.90%	-18.95%
CM_MC1	XC	10	19.4	16.14	22.66	18.5	13	25	1.439	23.46%	-26.80%
LC_SLC		10	20.3	18.28	22.32	20.5	16	24	0.895	13.94%	-32.68%
FR_FRCP1		10	0	0	0	0	0	0	0		100.00%
FR_FRABCH		10	12.7	8.899	16.5	12.5	5	22	1.68	41.84%	16.99%
GH_FR1		10	15.8	13.49	18.11	15	11	23	1.02	20.41%	-3.27%
GH_ERC		10	18.4	16.4	20.4	18	14	24	0.8844	15.20%	-20.26%
EV_HC1		10	19.8	17.26	22.34	20.5	13	24	1.123	17.94%	-29.41%
EV_MC2		10	17	13.24	20.76	16	10	25	1.66	30.88%	-11.11%
CM_MC2		10	10.7	7.858	13.54	10	4	18	1.257	37.14%	30.07%
RG_MIDAG		10	17.7	13.56	21.84	18	9	24	1.832	32.73%	-15.69%
LC_LCDSSLCC		9	22	19.07	24.93	24	14	25	1.269	17.31%	-43.79%
LC_DCDS		10	19.9	16.32	23.48	21	13	26	1.581	25.12%	-30.07%
LC_LC3		10	18.1	14.7	21.5	19	9	26	1.501	26.23%	-18.30%
LC_LC5		10	17.2	14.04	20.36	15.5	11	24	1.397	25.68%	-12.42%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		10	15	20	9	18	16	16	15	13	21
GH_ER2		16	17	18	17	19	21	15	23	20	16
CM_MC1	XC	15	19	16	25	18	16	25	13	25	22
LC_SLC		24	22	19	16	22	17	23	23	19	18
FR_FRCP1		0	0	0	0	0	0	0	0	0	0
FR_FRABCH		5	11	13	12	15	13	12	22	19	5
GH_FR1		17	15	14	23	18	14	11	17	14	15
GH_ERC		19	18	16	20	24	17	21	17	14	18
EV_HC1		13	17	21	22	23	16	23	24	20	19
EV_MC2		14	16	14	22	21	10	22	25	10	16
CM_MC2		14	9	18	4	10	7	10	9	12	14
RG_MIDAG		13	24	14	22	12	14	23	22	24	9
LC_LCDSSLCC		Outlier	19	24	24	24	25	24	25	14	19
LC_DCDS		13	26	21	14	23	24	15	26	16	21
LC_LC3		19	13	19	15	19	20	26	19	22	9
LC_LC5		11	22	15	13	15	23	16	15	24	18

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	09-2853-4345	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:04	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Unamended Sample (LC-SLC)		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1*	0.0000	Exact	8.1E-05	Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 09-2853-4345 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:04 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		10	0	10	1	0	0.0%
CM_MC1		10	0	10	1	0	0.0%
LC_SLC	US	10	0	10	1	0	0.0%
FR_FRCP1		0	10	10	0	1	100.0%
FR_FRABCH		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
EV_MC2		10	0	10	1	0	0.0%
CM_MC2		10	0	10	1	0	0.0%
RG_MIDAG		10	0	10	1	0	0.0%
LC_LCDSSLCC		10	0	10	1	0	0.0%
LC_DCDS		10	0	10	1	0	0.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		10	0	10	1	0	0.0%

6d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC	US	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

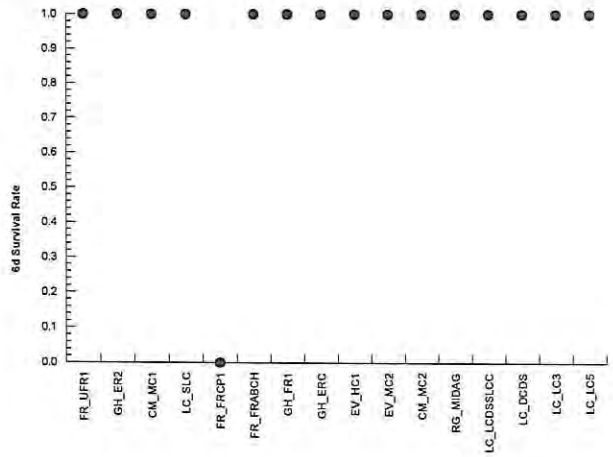
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 09-2853-4345 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:04 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

6d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_SLC	US	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	16-7823-5142	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:05	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Analyst: SK QA: Mar. 12/20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 16-7823-5142 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:05 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 failed reproduction	24.53%
		GH_ER2 passed reproduction	24.53%
		CM_MC1 passed reproduction	24.53%
		FR_FRCP1 failed reproduction	24.53%
		FR_FRABCH failed reproduction	24.53%
		GH_FR1 passed reproduction	24.53%
		GH_ERC passed reproduction	24.53%
		EV_HC1 passed reproduction	24.53%
		EV_MC2 passed reproduction	24.53%
		CM_MC2 failed reproduction	24.53%
		RG_MIDAG passed reproduction	24.53%
		LC_LCDSSLCC passed reproduction	24.53%
		LC_DCDS passed reproduction	24.53%
		LC_LC3 passed reproduction	24.53%
		LC_LC5 passed reproduction	24.53%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Unamended Sampl		FR_UFR1*	2.603	2.593	4.98	18	CDF	0.0488	Significant Effect
(LC-SLC)		GH_ER2	1.093	2.593	4.98	18	CDF	0.5636	Non-Significant Effect
		CM_MC1	0.4686	2.593	4.98	18	CDF	0.8269	Non-Significant Effect
		FR_FRCP1*	10.57	2.593	4.98	18	CDF	6.8E-07	Significant Effect
		FR_FRABCH*	3.957	2.593	4.98	18	CDF	7.9E-04	Significant Effect
		GH_FR1	2.343	2.593	4.98	18	CDF	0.0880	Non-Significant Effect
		GH_ERC	0.9893	2.593	4.98	18	CDF	0.6139	Non-Significant Effect
		EV_HC1	0.2603	2.593	4.98	18	CDF	0.8858	Non-Significant Effect
		EV_MC2	1.718	2.593	4.98	18	CDF	0.2720	Non-Significant Effect
		CM_MC2*	4.999	2.593	4.98	18	CDF	1.3E-05	Significant Effect
		RG_MIDAG	1.354	2.593	4.98	18	CDF	0.4359	Non-Significant Effect
		LC_LCDSSLCC	0	2.593	4.98	18	CDF	0.9375	Non-Significant Effect
		LC_DCDS	0.2083	2.593	4.98	18	CDF	0.8980	Non-Significant Effect
		LC_LC3	1.146	2.593	4.98	18	CDF	0.5381	Non-Significant Effect
		LC_LC5	1.614	2.593	4.98	18	CDF	0.3156	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.744	3.537	0.0209	Outlier Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3926	261.733	15	14.19	<1.0E-37	Significant Effect
Error	2655.6	18.4417	144			
Total	6581.6		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.163	2.165	1.7E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	1.848	2.165	0.0334	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9872	0.9774	0.1510	Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 16-7823-5142 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:05 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

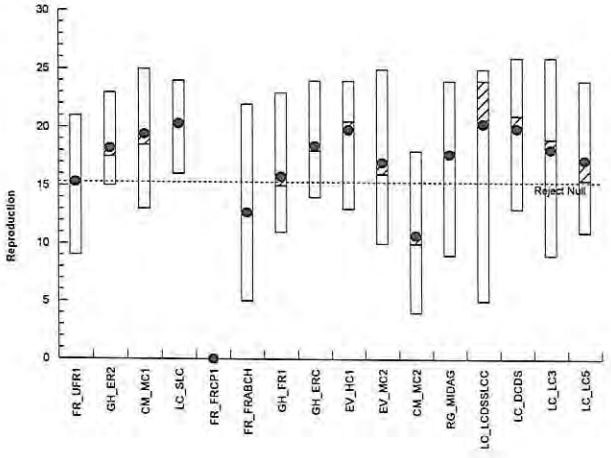
Reproduction Summary

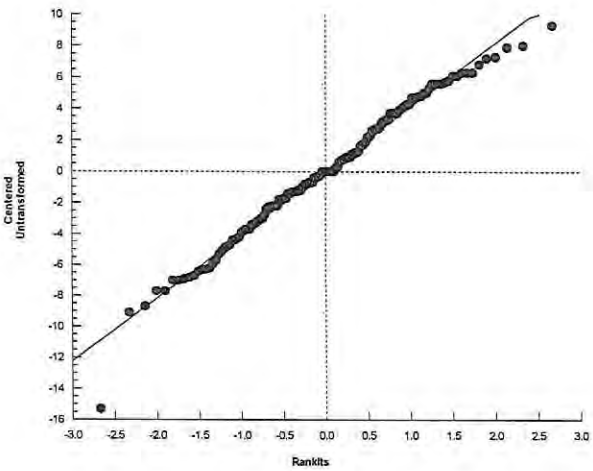
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	15.3	12.52	18.08	15.5	9	21	1.23	25.42%	0.00%
GH_ER2		10	18.2	16.39	20.01	17.5	15	23	0.8	13.90%	-18.95%
CM_MC1		10	19.4	16.14	22.66	18.5	13	25	1.439	23.46%	-26.80%
LC_SLC	US	10	20.3	18.28	22.32	20.5	16	24	0.895	13.94%	-32.68%
FR_FRCP1		10	0	0	0	0	0	0	0		100.00%
FR_FRABCH		10	12.7	8.899	16.5	12.5	5	22	1.68	41.84%	16.99%
GH_FR1		10	15.8	13.49	18.11	15	11	23	1.02	20.41%	-3.27%
GH_ERC		10	18.4	16.4	20.4	18	14	24	0.8844	15.20%	-20.26%
EV_HC1		10	19.8	17.26	22.34	20.5	13	24	1.123	17.94%	-29.41%
EV_MC2		10	17	13.24	20.76	16	10	25	1.66	30.88%	-11.11%
CM_MC2		10	10.7	7.858	13.54	10	4	18	1.257	37.14%	30.07%
RG_MIDAG		10	17.7	13.56	21.84	18	9	24	1.832	32.73%	-15.69%
LC_LCDSSLCC		10	20.3	15.68	24.92	24	5	25	2.044	31.84%	-32.68%
LC_DCDS		10	19.9	16.32	23.48	21	13	26	1.581	25.12%	-30.07%
LC_LC3		10	18.1	14.7	21.5	19	9	26	1.501	26.23%	-18.30%
LC_LC5		10	17.2	14.04	20.36	15.5	11	24	1.397	25.68%	-12.42%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		10	15	20	9	18	16	16	15	13	21
GH_ER2		16	17	18	17	19	21	15	23	20	16
CM_MC1		15	19	16	25	18	16	25	13	25	22
LC_SLC	US	24	22	19	16	22	17	23	23	19	18
FR_FRCP1		0	0	0	0	0	0	0	0	0	0
FR_FRABCH		5	11	13	12	15	13	12	22	19	5
GH_FR1		17	15	14	23	18	14	11	17	14	15
GH_ERC		19	18	16	20	24	17	21	17	14	18
EV_HC1		13	17	21	22	23	16	23	24	20	19
EV_MC2		14	16	14	22	21	10	22	25	10	16
CM_MC2		14	9	18	4	10	7	10	9	12	14
RG_MIDAG		13	24	14	22	12	14	23	22	24	9
LC_LCDSSLCC		5	19	24	24	24	25	24	25	14	19
LC_DCDS		13	26	21	14	23	24	15	26	16	21
LC_LC3		19	13	19	15	19	20	26	19	22	9
LC_LC5		11	22	15	13	15	23	16	15	24	18

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-7862-2604	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	10 Mar-20 16:04	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1
Batch ID:	16-7094-9873	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	27 Feb-19 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 Mar-19 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	23h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	24h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	25h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	27h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	26h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	36h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	25h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	26h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	26h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	24h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Analysis ID: 15-7862-2604 Endpoint: Reproduction CETIS Version: CETISv1.9.4
Analyzed: 10 Mar-20 16:04 Analysis: Nonparametric-Multiple Comparison Status Level: 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 failed reproduction	24.83%
		GH_ER2 passed reproduction	24.83%
		CM_MC1 passed reproduction	24.83%
		FR_FRCP1 failed reproduction	24.83%
		FR_FRABCH failed reproduction	24.83%
		GH_FR1 failed reproduction	24.83%
		GH_ERC passed reproduction	24.83%
		EV_HC1 passed reproduction	24.83%
		EV_MC2 passed reproduction	24.83%
		CM_MC2 failed reproduction	24.83%
		RG_MIDAG passed reproduction	24.83%
		LC_LCDSSLCC passed reproduction	24.83%
		LC_DCDS passed reproduction	24.83%
		LC_LC3 passed reproduction	24.83%
		LC_LC5 passed reproduction	24.83%

Wilcoxon/Bonferroni Adj Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Unamended Sampl		FR_UFR1*	68.5	n/a	2	18	Exact	0.0316	Significant Effect
(LC-SLC)		GH_ER2	83.5	n/a	5	18	Exact	0.8227	Non-Significant Effect
		CM_MC1	98.5	n/a	4	18	Exact	1.0000	Non-Significant Effect
		FR_FRCP1*	55	n/a	0	18	Exact	8.1E-05	Significant Effect
		FR_FRABCH*	65	n/a	2	18	Exact	0.0101	Significant Effect
		GH_FR1*	68.5	n/a	3	18	Exact	0.0320	Significant Effect
		GH_ERC	87	n/a	5	18	Exact	1.0000	Non-Significant Effect
		EV_HC1	102.5	n/a	6	18	Exact	1.0000	Non-Significant Effect
		EV_MC2	83	n/a	2	18	Exact	0.7264	Non-Significant Effect
		CM_MC2*	57.5	n/a	1	18	Exact	4.9E-04	Significant Effect
		RG_MIDAG	94	n/a	3	18	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	111	n/a	2	17	Exact	1.0000	Non-Significant Effect
		LC_DCDS	103	n/a	3	18	Exact	1.0000	Non-Significant Effect
		LC_LC3	92	n/a	2	18	Exact	1.0000	Non-Significant Effect
		LC_LC5	81.5	n/a	5	18	Exact	0.5717	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4057.61	270.507	15	16.15	<1.0E-37	Significant Effect
Error	2395.5	16.7517	143			
Total	6453.11		158			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	3.269	2.166	1.1E-04	Unequal Variances
Variances	Mod Levene Equality of Variance Test	2.216	2.167	0.0083	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9923	0.9773	0.5498	Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 15-7862-2604 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 10 Mar-20 16:04 **Analysis:** Nonparametric-Multiple Comparison **Status Level:** 1

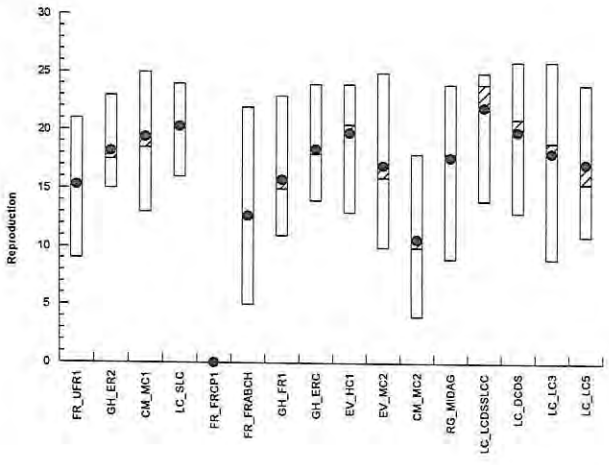
Reproduction Summary

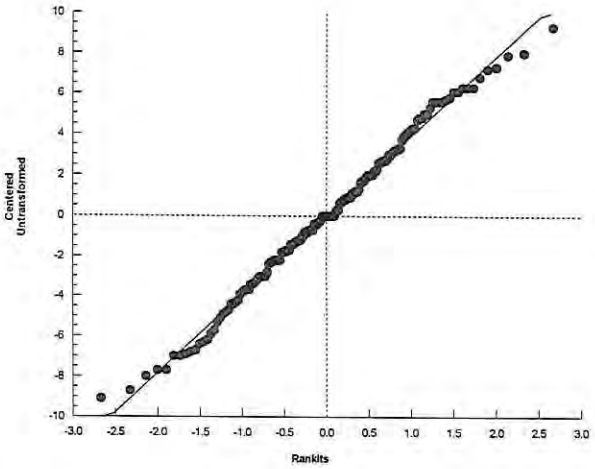
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	15.3	12.52	18.08	15.5	9	21	1.23	25.42%	0.00%
GH_ER2		10	18.2	16.39	20.01	17.5	15	23	0.8	13.90%	-18.95%
CM_MC1		10	19.4	16.14	22.66	18.5	13	25	1.439	23.46%	-26.80%
LC_SLC	US	10	20.3	18.28	22.32	20.5	16	24	0.895	13.94%	-32.68%
FR_FRCP1		10	0	0	0	0	0	0	0		100.00%
FR_FRABCH		10	12.7	8.899	16.5	12.5	5	22	1.68	41.84%	16.99%
GH_FR1		10	15.8	13.49	18.11	15	11	23	1.02	20.41%	-3.27%
GH_ERC		10	18.4	16.4	20.4	18	14	24	0.8844	15.20%	-20.26%
EV_HC1		10	19.8	17.26	22.34	20.5	13	24	1.123	17.94%	-29.41%
EV_MC2		10	17	13.24	20.76	16	10	25	1.66	30.88%	-11.11%
CM_MC2		10	10.7	7.858	13.54	10	4	18	1.257	37.14%	30.07%
RG_MIDAG		10	17.7	13.56	21.84	18	9	24	1.832	32.73%	-15.69%
LC_LCDSSLCC		9	22	19.07	24.93	24	14	25	1.269	17.31%	-43.79%
LC_DCDS		10	19.9	16.32	23.48	21	13	26	1.581	25.12%	-30.07%
LC_LC3		10	18.1	14.7	21.5	19	9	26	1.501	26.23%	-18.30%
LC_LC5		10	17.2	14.04	20.36	15.5	11	24	1.397	25.68%	-12.42%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		10	15	20	9	18	16	16	15	13	21
GH_ER2		16	17	18	17	19	21	15	23	20	16
CM_MC1		15	19	16	25	18	16	25	13	25	22
LC_SLC	US	24	22	19	16	22	17	23	23	19	18
FR_FRCP1		0	0	0	0	0	0	0	0	0	0
FR_FRABCH		5	11	13	12	15	13	12	22	19	5
GH_FR1		17	15	14	23	18	14	11	17	14	15
GH_ERC		19	18	16	20	24	17	21	17	14	18
EV_HC1		13	17	21	22	23	16	23	24	20	19
EV_MC2		14	16	14	22	21	10	22	25	10	16
CM_MC2		14	9	18	4	10	7	10	9	12	14
RG_MIDAG		13	24	14	22	12	14	23	22	24	9
LC_LCDSSLCC		Outlier	19	24	24	24	25	24	25	14	19
LC_DCDS		13	26	21	14	23	24	15	26	16	21
LC_LC3		19	13	19	15	19	20	26	19	22	9
LC_LC5		11	22	15	13	15	23	16	15	24	18

Graphics





APPENDIX B – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck
Work Order No.: 190347
Start Date: March 1/19
Set up by: MM

Sample Information:

Sample ID: various : see results table for IDs
Sample Date: Feb 26/19
Date Received: Feb 27/19
Sample Volume: various

Test Organism Information:

Culture Date: Feb 22/19
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC180
Stock Solution ID: 197n07
Date Initiated: Mar 6/19

72-h IC50 (95% CL): 35.0 (30.5 - 38.3) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.8 (25.0 - 38.0) ug/L Zn CV (%): 10.

Test Results:

① site control

	Cell Yield (Mean± SD)
Negative Control	32.0 ± 2.7
FR_UFR1_MON_2019-02-04_N ①	60.9 ± 5.1 *c
GH_ER2_WS_2019-02-26_N ①	59.1 ± 4.9 *c
CM_MC1_WS_2019-02-26_N ①	72.1 ± 5.5 *b
LC-SLC_WS_2019-02-26_N ①	76.5 ± 5.9 *b
FR_FRABCH_MON_2019-02-04_NP	71.8 ± 3.5 *b
FR_FRCP1_MON_2019-02-04_N	9.5 ± 1.3 a,c.
GH_FR1_WS_2019-02-26_N	71.5 ± 6.5 *b
GH_ER2_WS_2019-02-26_N	63.5 ± 3.9 *c

* indicates cell yield that were significantly greater than the lab control

a. indicates cell yield that is significantly lower than lab control and all site controls

c. indicates cell yield that were significantly lower than site control CM_MC1 and LC-SLC

*b. indicates cell yield that were

b. indicates cell yield that were significantly greater than site control FR_UFR and GH_ER2

Reviewed by: JGu
Date reviewed: Apr. 18/19

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck
Work Order No.: 190347
Start Date: March 1/19
Set up by: ML

Sample Information:

Sample ID: various: see results table for IDs
Sample Date: Feb 26/19
Date Received: Feb 27/19
Sample Volume: various

Test Organism Information:

Culture Date: Feb 22/19
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC180
Stock Solution ID: 192n07
Date Initiated: Mar 6/19

72-h IC50 (95% CL): 35.0 (30.5 - 38.3) mg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.8 (25.0 - 38.0) mg/L Zn CV (%): ID.

Test Results:

	Cell Yield (Mean± SD)
Negative Control	32.0 ± 2.7
CM_MC2_WS_2019-02-26_N	77.5 ± 3.1 *b
EV_MC2_WS_2019-02-26_N	81.5 ± 2.9 *bd
EV_HCl_WS_2019-02-26_N	76.8 ± 6.6 *b
LC_DCDS_WS_2019-02-26_N	82.8 ± 5.0 *bd
LC_LC3_WS_2019-02-25_N	79.5 ± 8.0 *b
LC_LCPSSLCC_WS_2019-02-25_N	81.5 ± 4.5 *bd
LC_LC5_WS_2019-02-26_N	76.8 ± 5.0 *b
	±

* indicates cell yield that were significantly greater than the lab control

b. indicates cell yield that were significantly greater than site control FR_MFR1 and GH_ER2

d. indicates cell yield that were significantly greater than site control CM_MC1

Reviewed by: JGL
Date reviewed: Apr. 18/19

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT

Sample ID: various | Test Date/Time: March 1/19 @ 0730h

Work Order No.: 19034-7 | CER #: 1

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Feb 22/19 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 445 2 400 | Average: 407.5 | Culture Cell Density (c1): 407.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 407.5 x 10^4 cells/ml = 5.40 mL

Time Zero Counts: 1 24 2 22 | Average: 23

No. of Cells/mL: 23 x 10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10455 cells/mL

Concentration %(v/v) 95.2	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control	7.3	23.0	24.0	24.0	24.0	23.7	✓	✓	✓	✓
(2) FR_UFR1 (site)	8.1	23.0					✓	✓	✓	✓
(1) GH_ER2 (site)	8.2	23.0					✓	✓	✓	✓
(1) CM_MC1 (site)	8.2	23.0					✓	✓	✓	✓
(1) LC_SLC (site)	8.3	23.0					✓	✓	✓	✓
(2) FR_FRABCH	8.2	23.0					✓	✓	✓	✓
(3) FR_FRCP1	8.2	23.0					✓	✓	✓	✓
(1) GH_FR1	8.3	23.0					✓	✓	✓	✓
(1) GH_ERC	8.3	23.0					✓	✓	✓	✓
(1) CM_MC2	8.2	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	^	^	MLT	MLT	^	^	MLT

Initial control pH: Well 1: 7.3 | Well 2: 7.3

Final control pH: Well 1: 7.0 | Well 2: 7.0

Light intensity (lux): 3890 | Date measured: March 1/19

Thermometer: 4 | Light meter: 1 | pH meter/probe: 1 / 1

Sample Description: (1) clear, colourless, odourless, no particulates.
(2) clear, colourless, odourless, some particulates.
(3) clear, colourless, odourless, some precipitates

Comments:

Reviewed: JGH | Date reviewed: Apr. 15/19

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck | Setup by: MLJ

Sample ID: various | Test Date/Time: March 1/19 @ 0730h

Work Order No.: 190347 | CER #: 1

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Feb 22/19 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 415 2 400 | Average: 407.5 | Culture Cell Density (c1): 407.5 x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 407.5x10⁴ cells/ml = 5.40mL

Time Zero Counts: 1 24 2 22 | Average: 23

No. of Cells/mL: 23 x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10455 cells/mL

Concentration %(v/v) 95.2	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.3	23.0	24.0	24.0	24.0	25.0	✓	✓	✓	✓
④ EV-MC2	8.3	23.0	↓	↓	↓	↓	✓	✓	✓	✓
① EV-HC1	8.3	23.0					✓	✓	✓	✓
② LC-DCDS	8.3	23.0					✓	✓	✓	✓
② LC-LC3	8.2	23.0					✓	✓	✓	✓
① LC-LCDSLCC.	8.3	23.0					✓	✓	✓	✓
① LC-LC5	8.3	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLJ	MLJ	MLJ	~	~	MLJ	MLJ	~	~	MLJ

Initial control pH: Well 1: 7.3 Well 2: 7.3

Final control pH: Well 1: 7.0 Well 2: 7.0

Light intensity (lux): 3890 Date measured: March 1/19

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1

Sample Description: ① clear, colourless, odourless, no particulates
② clear, colourless, odourless, some particulates

Comments:

Reviewed: JBr Date reviewed: Apr. 4/19

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: March 1/19 @ 0730h
Work Order #: 190347
Termination Date: March 4/19 @ 0730h
Sample ID: various
Test set up by: ML

95.2 %(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	34					ML
	B	28					
	C	35					
	D	33					
	E	30					
	F	36					
	G	35					
	H	33					
FR_UFR1 (site)	A	70					
	B	59					
	C	64					
	D	66					
	E (A ML)	58					
	F (B)	58					
	G (C)	65					
	H (D)	55					
GH_ER2 (site)	A	58					
	B	62					
	C	58					
	D	61					
	E (A ML)	69					
	F (B)	54					
	G (C)	64					
	H (D)	55					
CMMC1 (site)	A	69					
	B	75					
	C	78					
	D	72					
	E (A ML)	80					
	F (B)	79					
	G (C)	71					
	H (D)	63					
	A						
	B						
	C						
	D						

Comments:

Reviewed by: JCh
Date Reviewed: Mar. 15/19

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: March 1/19 @ 0730h
Work Order #: 190347
Termination Date: March 4/19 @ 0730h
Sample ID: various
Test set up by: ML

95.2 %(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A						
	B						
	C						
	D						
	E						
	F						
	G						
	H						
LC_SLC (site)	A	76					ML
	B	79					
	C	83					
	D	80					
	ML A E	85					
	B F	79					
	C G	70					
	D H	68					
FR_FRABCH	A	74					
	B	77					
	C	69					
	D	71					
FR_FRCP1	A	9					
	B	12					
	C	11					
	D	10					
GH_FR1	A	78					
	B	71					
	C	77					
	D	64					
GH_ERC	A	70					
	B	63					
	C	64					
	D	61					
CM_ML2	A	79					
	B	80					
	C	81					
	D	74					

Comments:

Reviewed by: JGn
Date Reviewed: Apr. 15/19

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: March 1/19 @ 0730h
Work Order #: 190347
Termination Date: March 4/19 @ 0730h
Sample ID: various
Test set up by: MLT
95.2%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A						
	B						
	C						
	D						
	E						
	F						
	G						
	H						
EV_MC2	A	83					MLT
	B	79					
	C	86					
	D	82					
EV-HC1	A	81					
	B	85					
	C	75					
	D	70					
LC_DCDS	A	80					
	B	87					
	C	79					
	D	89					
LC_LC3	A	78					
	B	71					
	C	83					
	D	90					
LC_LCDSSLCC	A	82					
	B	79					
	C	89					
	D	80					
LC_LC5	A	77					
	B	74					
	C	85					
	D	75					✓
	A						
	B						
	C						
	D						

Comments:

Reviewed by: JCh
Date Reviewed: Apr. 15/19

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 190347
Sample ID: Teck Coal various samples pass/fail

Start Date/Time: 1-Mar-19 @ 0730h
Termination Date/Time: 4-Mar-19 @ 0730h
Initial Cell Density: 10455 cell/mL

									230000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10454.55
Control	A	34				34	33.0	mean	32.0
Lab Control	B	28				28	27.0	SD	2.725541
	C	35				35	34.0	CV	8.52943
	D	33				33	32.0		
	E	30				30	29.0		
	F	36				36	35.0		
	G	35				35	34.0		
	H	33				33	32.0		
Control	A	70				70	69.0	mean	60.8
Site Water	B	59				59	58.0	SD	5.111262
(FR_UFR1)	C	64				64	63.0	CV	8.402598
95.2% (v/v)	D	66				66	65.0		
	E	58				58	57.0		
	F	58				58	57.0		
	G	65				65	64.0		
	H	55				55	54.0		
Control	A	58				58	57.0	mean	59.1
Site Water	B	62				62	61.0	SD	4.94072
(GH_ER2)	C	58				58	57.0	CV	8.362827
95.2% (v/v)	D	61				61	60.0		
	E	69				69	68.0		
	F	54				54	53.0		
	G	64				64	63.0		
	H	55				55	54.0		
Control	A	69				69	68.0	mean	72.1
Site Water	B	75				75	74.0	SD	5.540436
(CM_MC1)	C	78				78	77.0	CV	7.686558
95.2% (v/v)	D	72				72	71.0		
	E	80				80	79.0		
	F	77				77	76.0		
	G	71				71	70.0		
	H	63				63	62.0		
						#DIV/0!	#DIV/0!		
						#DIV/0!	#DIV/0!		
						#DIV/0!	#DIV/0!		
						#DIV/0!	#DIV/0!		

Reviewed by: JOh

Date reviewed: Apr. 15/19

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 190347
Sample ID: Teck Coal various samples pass/fail

Start Date/Time: 1-Mar-19 @ 0730h
Termination Date/Time: 4-Mar-19 @ 0730h
Initial Cell Density: 10455 cell/mL

									230000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10454.55
Control	A					#DIV/0!	#DIV/0!	mean	#DIV/0!
Lab Control	B					#DIV/0!	#DIV/0!	SD	#DIV/0!
	C					#DIV/0!	#DIV/0!	CV	#DIV/0!
	D					#DIV/0!	#DIV/0!		
	A					#DIV/0!	#DIV/0!		
	B					#DIV/0!	#DIV/0!		
	C					#DIV/0!	#DIV/0!		
	D					#DIV/0!	#DIV/0!		
Site Control	A	76				76	75.0	mean	76.5
(LC_SLC)	B	79				79	78.0	SD	5.928141
95.2% (v/v)	C	83				83	82.0	CV	7.753811
	D	80				80	79.0		
	E	85				85	84.0		
	F	79				79	78.0		
	G	70				70	69.0		
	H	68				68	67.0		
FR_FRABCH	A	74				74	73.0		
95.2% (v/v)	B	77				77	76.0		
	C	69				69	68.0		
	D	71				71	70.0		
FR_FRCP1	A	9				9	8.0		
95.2% (v/v)	B	12				12	11.0		
	C	11				11	10.0		
	D	10				10	9.0		
GH_FR1	A	78				78	77.0		
95.2% (v/v)	B	71				71	70.0		
	C	77				77	76.0		
	D	64				64	63.0		
GH_ERC	A	70				70	69.0		
95.2% (v/v)	B	63				63	62.0		
	C	64				64	63.0		
	D	61				61	60.0		
CM_MC2	A	79				79	78.0		
95.2% (v/v)	B	80				80	79.0		
	C	81				81	80.0		
	D	74				74	73.0		

Reviewed by: JOL

Date reviewed: Apr. 15/19

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 190347
Sample ID: Teck Coal various samples pass/fail

Start Date/Time: 1-Mar-19 @ 0730h
Termination Date/Time: 4-Mar-19 @ 0730h
Initial Cell Density: 10455 cell/mL

									230000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10454.55
Control	A					#DIV/0!	#DIV/0!	mean	#DIV/0!
Lab Control	B					#DIV/0!	#DIV/0!	SD	#DIV/0!
	C					#DIV/0!	#DIV/0!	CV	#DIV/0!
	D					#DIV/0!	#DIV/0!		
	A					#DIV/0!	#DIV/0!		
	B					#DIV/0!	#DIV/0!		
	C					#DIV/0!	#DIV/0!		
	D					#DIV/0!	#DIV/0!		
EV_MC2	A	83				83	82.0		
95.2% (v/v)	B	79				79	78.0		
	C	86				86	85.0		
	D	82				82	81.0		
EV_HC1	A	81				81	80.0		
95.2% (v/v)	B	85				85	84.0		
	C	75				75	74.0		
	D	70				70	69.0		
LC_DCDS	A	80				80	79.0		
95.2% (v/v)	B	87				87	86.0		
	C	79				79	78.0		
	D	89				89	88.0		
LC_LC3	A	78				78	77.0		
95.2% (v/v)	B	71				71	70.0		
	C	83				83	82.0		
	D	90				90	89.0		
LC_LCDSSLC	A	82				82	81.0		
95.2% (v/v)	B	79				79	78.0		
	C	89				89	88.0		
	D	80				80	79.0		
LC_LC5	A	77				77	76.0		
95.2% (v/v)	B	74				74	73.0		
	C	85				85	84.0		
	D	75				75	74.0		
	A					#DIV/0!	#DIV/0!		
	B					#DIV/0!	#DIV/0!		
	C					#DIV/0!	#DIV/0!		
	D					#DIV/0!	#DIV/0!		

Reviewed by: _____

Date reviewed: Apr-15/19

CETIS Summary Report

Test Code/ID: 190347 / 07-1581-3534

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Batch ID:	17-8922-1583	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 Mar-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 Mar-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	15-8664-6659	01 Mar-19	01 Mar-19	8h	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	67h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	68h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	67h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	69h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	71h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	69h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	70h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	69h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	FR_FRABCH failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	CM_MC2 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	GH_ER2 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	LC_DCDS failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	LC_SLC failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	EV_MC2 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	CM_MC1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	EV_HC1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	LC_LC5 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	LC_LC3 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	GH_ERC failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	GH_FR1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	Lab Control failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	LC_LCDSSLCC failed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	FR_FRCP1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	FR_UFR1 failed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	LC_DCDS failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	GH_FR1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	LC_LCDSSLCC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	FR_UFR1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	FR_FRABCH failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	GH_ER2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	LC_LC3 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	Lab Control failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	EV_HC1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	CM_MC2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	GH_ERC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	FR_FRCP1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	LC_LC5 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	EV_MC2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	LC_SLC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	CM_MC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	GH_ER2 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	LC_LC5 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	FR_FRABCH passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	GH_FR1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	CM_MC2 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	LC_SLC passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	CM_MC1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	FR_UFR1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	EV_MC2 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	Lab Control passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	FR_FRCP1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	EV_HC1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	LC_LC3 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	GH_ERC passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	LC_DCDS passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.8183	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	LC_LC3 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	LC_SLC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	EV_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	EV_HC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	CM_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	GH_ER2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9975	FR_UFR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	CM_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	LC_LC5 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	LC_DCDS passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	LC_LCDSSLCC passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	FR_FRCP1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	GH_ER2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.8183	Lab Control passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	LC_DCDS failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	LC_LCDSSLCC failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	FR_FRCP1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	GH_ERC failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	LC_LC3 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	Lab Control failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	FR_FRABCH failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	FR_UFR1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	EV_HC1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	CM_MC2 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	GH_FR1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	EV_MC2 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	LC_SLC failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	LC_LC5 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	CM_MC1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	GH_ER2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	LC_LC3 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	FR_FRCP1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	LC_LCDSSLCC passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	GH_ERC passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	FR_FRABCH passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	GH_ER2 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	LC_DCDS passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	CM_MC1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	Lab Control passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	GH_FR1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	EV_HC1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	LC_LC5 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	CM_MC2 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	LC_SLC passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	FR_UFR1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.9975	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	EV_MC2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	CM_MC2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	EV_HC1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	LC_LC5 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	LC_DCDS failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	GH_FR1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	GH_ER2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	GH_ERC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	Lab Control failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	LC_LC3 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	FR_UFR1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	CM_MC1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	LC_SLC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	FR_FRCP1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	LC_LCDSSLCC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	FR_FRABCH failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	CM_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	FR_FRCP1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	GH_ER2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	LC_LCDSSLCC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	LC_LC3 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	GH_ERC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	EV_HC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	LC_DCDS failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	FR_UFR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	EV_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	FR_FRABCH failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	CM_MC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	LC_SLC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	Lab Control failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	GH_FR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.2E-04	LC_LC5 failed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	EV_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	LC_LCDSSLCC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	LC_LC3 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	LC_SLC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	Lab Control passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	CM_MC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	GH_FR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	FR_FRCP1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	GH_ER2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	FR_FRABCH passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	LC_LC5 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	FR_UFR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	GH_ERC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	LC_DCDS passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	CM_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3248	EV_HC1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	EV_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	LC_LCDSSLCC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	LC_DCDS failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	FR_FRCP1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	EV_HC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	LC_LC3 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	Lab Control failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	GH_ER2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	FR_UFR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	GH_ERC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	LC_SLC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	FR_FRABCH failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	CM_MC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	GH_FR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	LC_LC5 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.9E-05	CM_MC2 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	EV_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	LC_LC3 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	LC_LCDSSLCC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	GH_ER2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	FR_FRCP1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	EV_HC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	GH_ERC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	CM_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	LC_LC5 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	LC_DCDS failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	FR_UFR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	FR_FRABCH failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	Lab Control failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	LC_SLC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	CM_MC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	7.9E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	GH_FR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	LC_LC5 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	LC_DCDS failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	CM_MC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	GH_ER2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	EV_HC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	LC_SLC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	FR_FRABCH failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	EV_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	Lab Control failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	LC_LCDSSLCC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	FR_UFR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	FR_FRCP1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	CM_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	GH_ERC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.3E-07	LC_LC3 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	LC_LC5 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	LC_DCDS passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	LC_LC3 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	GH_FR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	EV_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	Lab Control passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	LC_LCDSSLCC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	FR_FRCP1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	GH_ER2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	FR_FRABCH passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	GH_ERC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	FR_UFR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	LC_SLC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3248	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	GH_ERC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	Lab Control passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	LC_LC3 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	FR_UFR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	LC_DCDS passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	GH_FR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	FR_FRABCH passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	GH_ER2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	EV_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	CM_MC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	LC_LC5 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	LC_SLC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	CM_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	EV_HC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	FR_FRCP1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9546	LC_LCDSSLCC passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	LC_LC5 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	LC_SLC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	CM_MC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	LC_LCDSSLCC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	FR_FRCP1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	GH_FR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	EV_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	FR_FRABCH failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	Lab Control failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	EV_HC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	LC_DCDS failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	LC_LC3 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	CM_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	FR_UFR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	GH_ER2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0063	GH_ERC failed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	EV_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	FR_FRABCH passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	CM_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	Lab Control passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	LC_LC3 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	FR_FRCP1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	CM_MC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	LC_LC5 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	GH_ERC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	GH_ER2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	LC_LCDSSLCC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	LC_DCDS passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	LC_SLC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	EV_HC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	FR_UFR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.4189	GH_FR1 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	Lab Control failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	LC_LCDSSLCC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	LC_SLC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	FR_UFR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	GH_ER2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	FR_FRABCH failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	EV_HC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	CM_MC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	LC_DCDS failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	LC_LC3 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	EV_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	GH_ERC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	FR_FRCP1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	CM_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	LC_LC5 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0011	GH_FR1 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	EV_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	FR_UFR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	LC_LC3 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	GH_ERC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	LC_DCDS passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	LC_LCDSSLCC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	FR_FRCP1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	Lab Control passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	CM_MC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	LC_LC5 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	LC_SLC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	GH_FR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	FR_FRABCH passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	GH_ER2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9786	CM_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_FRCP1 failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_DCDS failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_UFR1 failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_FR1 failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	CM_MC2 failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LCDSSLCC failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	EV_MC2 failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_ERC failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_SLC failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	Lab Control failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LC5 failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_FRABCH failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LC3 failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_ER2 failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	EV_HC1 failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	CM_MC1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_DCDS failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	EV_HC1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_FRCP1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_FRABCH failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_SLC failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	EV_MC2 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_ER2 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	CM_MC2 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LCDSSLCC failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	Lab Control failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_ERC failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	CM_MC1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_FR1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LC3 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LC5 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_UFR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LCDSSLCC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_FRCP1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_ERC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	Lab Control failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	CM_MC1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LC5 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_DCDS failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	EV_MC2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LC3 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_ER2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_FR1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_SLC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_FRABCH failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	CM_MC2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	EV_HC1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_UFR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	EV_MC2 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_SLC failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	CM_MC2 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_UFR1 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LC5 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	CM_MC1 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LC3 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	Lab Control failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_DCDS failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_ER2 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_FRABCH failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LCDSSLCC failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	EV_HC1 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_FR1 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_FRCP1 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_ERC failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	LC_LC3 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	LC_DCDS passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	Lab Control passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	GH_ERC passed cell yield	1

Analyst: MG QA: Apr-15/19

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	FR_UFR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	CM_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	FR_FRCP1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	LC_SLC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	CM_MC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	LC_LCDSSLCC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	GH_FR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	FR_FRABCH passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	GH_ER2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	LC_LC5 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	EV_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.9429	EV_HC1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	LC_DCDS failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	FR_FRABCH failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	LC_SLC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	EV_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	EV_HC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	CM_MC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	LC_LC5 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	CM_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	LC_LC3 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	Lab Control failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	GH_ER2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	GH_ERC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	GH_FR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	FR_UFR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	LC_LCDSSLCC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.0079	FR_FRCP1 failed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	GH_FR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	GH_ER2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	FR_FRABCH passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_DCDS passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	GH_ERC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	EV_HC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_LC5 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	FR_UFR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_LC3 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	CM_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	CM_MC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	EV_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	FR_FRCP1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_SLC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	Lab Control passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_LCDSSLCC passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	LC_LC3 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	LC_DCDS failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	EV_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	FR_FRCP1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	LC_LC5 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	EV_HC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	LC_LCDSSLCC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	CM_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	Lab Control failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	CM_MC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	FR_FRABCH failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	GH_ER2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	FR_UFR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	GH_FR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	LC_SLC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.0014	GH_ERC failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	GH_ER2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	FR_UFR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	EV_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	GH_ERC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	LC_DCDS passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	LC_LC3 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	FR_FRCP1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	LC_LCDSSLCC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	FR_FRABCH passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	Lab Control passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	LC_LC5 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	GH_FR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	CM_MC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.9837	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	LC_LCDSSLCC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	LC_DCDS passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	CM_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	FR_FRCP1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	Lab Control passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	GH_ER2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	0.9988	LC_LC5 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	LC_SLC failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	LC_LC3 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	Lab Control failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	FR_FRCP1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	LC_LCDSSLCC failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	GH_ERC failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	GH_FR1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	LC_LC5 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	CM_MC1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	EV_MC2 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	CM_MC2 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	GH_ER2 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	FR_FRABCH failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	EV_HC1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	FR_UFR1 failed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	0.0432	LC_DCDS failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	EV_HC1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	FR_FRABCH passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	CM_MC1 passed cell yield	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	GH_ER2 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	FR_FRCP1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	LC_LC5 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	GH_FR1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	LC_SLC passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	Lab Control passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	LC_LCDSSLCC passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	GH_ERC passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	CM_MC2 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	LC_DCDS passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	EV_MC2 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	LC_LC3 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	0.7577	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	LC_DCDS failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	FR_FRABCH failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	EV_HC1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	GH_FR1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	Lab Control failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	EV_MC2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	LC_SLC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	LC_LC5 failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	GH_ERC failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	FR_UFR1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	LC_LC3 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	CM_MC2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	FR_FRCP1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	GH_ER2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	CM_MC1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	7.5E-04	LC_LCDSSLCC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	LC_SLC passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	CM_MC2 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	Lab Control passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	LC_LCDSSLCC passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	EV_MC2 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	GH_ER2 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	GH_FR1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	FR_FRABCH passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	GH_ERC passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	LC_LC5 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	CM_MC1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	LC_LC3 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	FR_UFR1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	LC_DCDS passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	FR_FRCP1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	0.4807	EV_HC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	LC_SLC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	GH_ER2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	FR_UFR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	LC_LC3 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	EV_HC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	EV_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	0.9999	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1

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20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	LC_LC3 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	Lab Control failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	FR_FRCP1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	GH_FR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	EV_HC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	LC_LC5 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	LC_DCDS failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	CM_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	EV_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	LC_LCDSSLCC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	FR_UFR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	CM_MC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	GH_ER2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	GH_ERC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	LC_SLC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-05	FR_FRABCH failed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	FR_FRCP1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	CM_MC1 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	LC_LC3 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	LC_DCDS passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	Lab Control passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	LC_SLC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9212	GH_ER2 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	Lab Control passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	LC_LC5 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	GH_FR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	FR_FRABCH passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	LC_SLC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	GH_ERC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	GH_ER2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	FR_UFR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	CM_MC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	LC_LC3 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	EV_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	EV_HC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	LC_DCDS passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	FR_FRCP1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	CM_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9894	LC_LCDSSLCC passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	FR_FRCP1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	FR_FRABCH failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	Lab Control failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	LC_SLC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	GH_FR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	LC_LCDSSLCC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	CM_MC1 failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	LC_LC3 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	GH_ERC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	GH_ER2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	CM_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	LC_DCDS failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	FR_UFR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	EV_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	EV_HC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.7E-06	LC_LC5 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	FR_FRABCH passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	LC_LC5 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	GH_FR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	Lab Control passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	GH_ERC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	LC_DCDS passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	EV_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	FR_UFR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	LC_SLC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	LC_LC3 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	LC_LCDSSLCC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	CM_MC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	GH_ER2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.3223	FR_FRCP1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	CM_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	EV_HC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	LC_SLC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	GH_ERC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	EV_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	FR_FRABCH failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	CM_MC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	GH_FR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	Lab Control failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	LC_DCDS failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	GH_ER2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	FR_FRCP1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	LC_LC3 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	LC_LC5 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	LC_LCDSSLCC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	FR_UFR1 failed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_SLC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_LC3 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	Lab Control passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_DCDS passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	FR_FRCP1 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	LC_LCDSSLCC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	GH_ER2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	CM_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	GH_FR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	FR_FRABCH failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	LC_LC3 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	EV_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	FR_FRCP1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	Lab Control failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	LC_SLC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	CM_MC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	LC_LC5 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	EV_HC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	GH_ERC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	LC_DCDS failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	FR_UFR1 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	LC_LC3 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	LC_DCDS failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	EV_HC1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	LC_LCDSSLCC failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	FR_FRCP1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	EV_MC2 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	GH_FR1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	Lab Control failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	CM_MC2 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	GH_ERC failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	GH_ER2 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	FR_FRABCH failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	LC_LC5 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	LC_SLC failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	CM_MC1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	FR_UFR1 failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	LC_LC5 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	FR_FRABCH failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	Lab Control failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	EV_HC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	LC_LCDSSLCC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	LC_LC3 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	FR_UFR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	FR_FRCP1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	LC_DCDS failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	GH_ER2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	CM_MC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	GH_FR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	EV_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	GH_ERC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	LC_SLC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	CM_MC2 failed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	LC_DCDS passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	LC_SLC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	LC_LC3 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	FR_FRCP1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	Lab Control passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	GH_ER2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	LC_LCDSSLCC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	Lab Control passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	FR_UFR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	GH_FR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	LC_LC3 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	FR_FRCP1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	EV_HC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	CM_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	LC_DCDS passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	EV_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	LC_SLC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	CM_MC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	LC_LC5 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	FR_FRABCH passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	GH_ERC passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	LC_SLC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	CM_MC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	FR_FRCP1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	LC_LC5 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	GH_FR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	LC_LC3 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	CM_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	LC_LCDSSLCC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	GH_ER2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	Lab Control failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	GH_ERC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	FR_UFR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	EV_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	EV_HC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	FR_FRABCH failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	LC_DCDS failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	LC_LCDSSLCC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	EV_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	LC_SLC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	LC_DCDS passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	GH_ER2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	FR_FRABCH passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	FR_FRCP1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	LC_LC3 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	GH_FR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	CM_MC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	LC_LC5 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	Lab Control passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	FR_UFR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	FR_UFR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	LC_SLC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	GH_ER2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	LC_DCDS failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	EV_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	LC_LC3 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	LC_LC5 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	Lab Control failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	LC_LCDSSLCC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	GH_FR1 failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	CM_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	EV_HC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	CM_MC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	GH_ERC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	FR_FRABCH failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.1E-07	FR_FRCP1 failed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	LC_LC3 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	LC_DCDS passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	LC_SLC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	Lab Control passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.2083	FR_FRCP1 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	CM_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_FR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_DCDS failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LC5 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_FRCP1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_ER2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LC3 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	CM_MC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	EV_HC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_FRABCH failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	FR_UFR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	EV_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_LCDSSLCC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	Lab Control failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	LC_SLC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	1.9E-07	GH_ERC failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	CM_MC2 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	LC_SLC failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	EV_HC1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	FR_FRABCH failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	Lab Control failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	FR_FRCP1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	GH_FR1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	LC_LC5 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	LC_DCDS failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	CM_MC1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	GH_ER2 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	LC_LC3 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	EV_MC2 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	LC_LCDSSLCC failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	FR_UFR1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0079	GH_ERC failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	GH_FR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	FR_UFR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	GH_ER2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	Lab Control failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	LC_SLC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	FR_FRABCH failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	CM_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	LC_LC5 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	GH_ERC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	CM_MC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	EV_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	LC_LCDSSLCC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	EV_HC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	FR_FRCP1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	LC_LC3 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	1.3E-06	LC_DCDS failed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	LC_LC3 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	FR_FRCP1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	FR_FRABCH passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	LC_DCDS passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	LC_SLC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.7041	Lab Control passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	LC_SLC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	FR_UFR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	GH_ER2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	CM_MC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	LC_LCDSSLCC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	GH_ERC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	LC_LC3 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	FR_FRABCH passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	EV_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	CM_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	GH_FR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	Lab Control passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	LC_DCDS passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	EV_HC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	LC_LC5 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9993	FR_FRCP1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	LC_LC5 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	CM_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	LC_LCDSSLCC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	GH_ER2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	GH_ERC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	LC_SLC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	LC_LC3 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	FR_FRCP1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	EV_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	FR_UFR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	FR_FRABCH failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	EV_HC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	Lab Control failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	LC_DCDS failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	GH_FR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	3.2E-07	CM_MC1 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	EV_HC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	LC_LCDSSLCC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	Lab Control passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	LC_LC5 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	CM_MC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	FR_UFR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	LC_LC3 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	GH_ERC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	LC_DCDS passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	GH_ER2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	EV_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	FR_FRABCH passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	FR_FRCP1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	LC_SLC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.1058	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	EV_HC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	CM_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	GH_ERC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	LC_LCDSSLCC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	LC_DCDS failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	GH_FR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	FR_FRCP1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	LC_SLC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	EV_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	CM_MC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	FR_FRABCH failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	LC_LC5 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	FR_UFR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	GH_ER2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	LC_LC3 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	2.9E-07	Lab Control failed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_DCDS passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_LC3 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	FR_FRCP1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_SLC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.3791	Lab Control passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	GH_FR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	CM_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	CM_MC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	LC_LCDSSLCC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	GH_ERC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	LC_SLC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	GH_ER2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	LC_LC5 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	FR_FRCP1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	FR_FRABCH failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	LC_DCDS failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	EV_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	Lab Control failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	LC_LC3 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	EV_HC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	2.0E-07	FR_UFR1 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1

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18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	FR_FRCP1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	FR_FRABCH failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	EV_HC1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	LC_SLC failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	GH_ERC failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	CM_MC2 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	LC_LC5 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	LC_LCDSSLCC failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	EV_MC2 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	GH_ER2 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	LC_DCDS failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	CM_MC1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	GH_FR1 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	LC_LC3 failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	Lab Control failed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.0237	FR_UFR1 failed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-4239-4531	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
04-6644-1936	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	EV_HC1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	CM_MC1 failed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	LC_LC3 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	LC_DCDS failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	CM_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	LC_LC5 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	EV_MC2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	GH_FR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	LC_LCDSSLCC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	Lab Control failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	FR_FRCP1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	LC_SLC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	GH_ER2 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	FR_UFR1 failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	GH_ERC failed cell yield	1
06-4958-8271	Cell Yield	Dunnett Multiple Comparison Test	3.1E-05	FR_FRABCH failed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	Lab Control passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	EV_HC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	LC_DCDS passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	LC_LC3 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	LC_LC5 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	LC_LCDSSLCC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	EV_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	GH_FR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	CM_MC2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	FR_FRABCH passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	LC_SLC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	CM_MC1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	GH_ER2 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	FR_UFR1 passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	GH_ERC passed cell yield	1
06-5974-1041	Cell Yield	Dunnett Multiple Comparison Test	0.9597	FR_FRCP1 passed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
10-4005-7303	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	LC_LCDSSLCC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	LC_LC3 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	LC_DCDS passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	GH_ERC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	EV_HC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	FR_UFR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	FR_FRABCH passed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	CM_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	LC_LC5 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	GH_FR1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	GH_ER2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	Lab Control passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	CM_MC1 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	LC_SLC passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	EV_MC2 passed cell yield	1
15-2264-4184	Cell Yield	Dunnett Multiple Comparison Test	0.9756	FR_FRCP1 passed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	LC_LC3 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	GH_ERC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	EV_HC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	GH_FR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	EV_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	FR_UFR1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	CM_MC2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	Lab Control failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	LC_SLC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	GH_ER2 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	FR_FRABCH failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	FR_FRCP1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	LC_LCDSSLCC failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	LC_DCDS failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	CM_MC1 failed cell yield	1
16-7884-6030	Cell Yield	Dunnett Multiple Comparison Test	4.0E-06	LC_LC5 failed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
18-8296-5197	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	LC_LCDSSLCC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	GH_FR1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	CM_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	Lab Control passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	FR_FRCP1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	EV_MC2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	FR_FRABCH passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	LC_DCDS passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	GH_ERC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	LC_SLC passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	CM_MC1 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	FR_UFR1 passed cell yield	1

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	LC_LC3 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	LC_LC5 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	GH_ER2 passed cell yield	1
20-3930-5800	Cell Yield	Dunnett Multiple Comparison Test	0.4393	EV_HC1 passed cell yield	1

Cell Yield Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	N	8	32	29.72	34.28	27	35	0.9636	2.726	8.52%	0.00%
FR_UFR1		8	60.88	56.6	65.15	54	69	1.807	5.111	8.40%	-90.23%
GH_ER2		8	59.12	54.99	63.26	53	68	1.747	4.941	8.36%	-84.77%
CM_MC1		8	72.12	67.49	76.76	62	79	1.959	5.54	7.68%	-125.39%
LC_SLC		8	76.5	71.54	81.46	67	84	2.096	5.928	7.75%	-139.06%
FR_FRABCH		4	71.75	66.18	77.32	68	76	1.75	3.5	4.88%	-124.22%
FR_FRCP1		4	9.5	7.446	11.55	8	11	0.6455	1.291	13.59%	70.31%
GH_FR1		4	71.5	61.23	81.77	63	77	3.227	6.455	9.03%	-123.44%
GH_ERC		4	63.5	57.34	69.66	60	69	1.936	3.873	6.10%	-98.44%
CM_MC2		4	77.5	72.55	82.45	73	80	1.555	3.109	4.01%	-142.19%
EV_MC2		4	81.5	76.91	86.09	78	85	1.443	2.887	3.54%	-154.69%
EV_HC1		4	76.75	66.25	87.25	69	84	3.301	6.602	8.60%	-139.84%
LC_DCDS		4	82.75	74.81	90.69	78	88	2.496	4.992	6.03%	-158.59%
LC_LC3		4	79.5	66.74	92.26	70	89	4.01	8.021	10.09%	-148.44%
LC_LCDSSLCC		4	81.5	74.32	88.68	78	88	2.255	4.509	5.53%	-154.69%
LC_LC5		4	76.75	68.81	84.69	73	84	2.496	4.992	6.50%	-139.84%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	N	33	27	34	32	29	35	34	32
FR_UFR1		69	58	63	65	57	57	64	54
GH_ER2		57	61	57	60	68	53	63	54
CM_MC1		68	74	77	71	79	76	70	62
LC_SLC		75	78	82	79	84	78	69	67
FR_FRABCH		73	76	68	70				
FR_FRCP1		8	11	10	9				
GH_FR1		77	70	76	63				
GH_ERC		69	62	63	60				
CM_MC2		78	79	80	73				
EV_MC2		82	78	85	81				
EV_HC1		80	84	74	69				
LC_DCDS		79	86	78	88				
LC_LC3		77	70	82	89				
LC_LCDSSLCC		81	78	88	79				
LC_LC5		76	73	84	74				

CETIS Analytical Report

Test Code/ID: 190347 / 07-1581-3534

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	11-9797-6139	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	18 Apr-19 11:36	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8922-1583	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 Mar-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 Mar-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	15-8664-6659	01 Mar-19	01 Mar-19	8h	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	67h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	68h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	67h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	69h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	71h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	69h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	70h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	69h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Analyst: MT QA: Apr-18/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 11-9797-6139 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 18 Apr-19 11:36 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed cell yield	25.47%
		GH_ER2 passed cell yield	25.47%
		CM_MC1 passed cell yield	25.47%
		LC_SLC passed cell yield	25.47%
		FR_FRABCH passed cell yield	25.47%
		FR_FRCP1 failed cell yield	25.47%
		GH_FR1 passed cell yield	25.47%
		GH_ERC passed cell yield	25.47%
		CM_MC2 passed cell yield	25.47%
		EV_MC2 passed cell yield	25.47%
		EV_HC1 passed cell yield	25.47%
		LC_DCDS passed cell yield	25.47%
		LC_LC3 passed cell yield	25.47%
		LC_LCDSSLCC passed cell yield	25.47%
		LC_LC5 passed cell yield	25.47%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	-11.67	2.688	6.654	14	CDF	1.0000	Non-Significant Effect
		GH_ER2	-10.96	2.688	6.654	14	CDF	1.0000	Non-Significant Effect
		CM_MC1	-16.21	2.688	6.654	14	CDF	1.0000	Non-Significant Effect
		LC_SLC	-17.98	2.688	6.654	14	CDF	1.0000	Non-Significant Effect
		FR_FRABCH	-13.11	2.688	8.15	10	CDF	1.0000	Non-Significant Effect
		FR_FRCP1*	7.422	2.688	8.15	10	CDF	6.2E-07	Significant Effect
		GH_FR1	-13.03	2.688	8.15	10	CDF	1.0000	Non-Significant Effect
		GH_ERC	-10.39	2.688	8.15	10	CDF	1.0000	Non-Significant Effect
		CM_MC2	-15.01	2.688	8.15	10	CDF	1.0000	Non-Significant Effect
		EV_MC2	-16.33	2.688	8.15	10	CDF	1.0000	Non-Significant Effect
		EV_HC1	-14.76	2.688	8.15	10	CDF	1.0000	Non-Significant Effect
		LC_DCDS	-16.74	2.688	8.15	10	CDF	1.0000	Non-Significant Effect
		LC_LC3	-15.67	2.688	8.15	10	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLCC	-16.33	2.688	8.15	10	CDF	1.0000	Non-Significant Effect
		LC_LC5	-14.76	2.688	8.15	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.9061	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	29263.8	1950.92	15	79.6	<1.0E-37	Significant Effect
Error	1666.62	24.5092	68			
Total	30930.4		83			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	14.34	30.58	0.4999	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9892	0.9596	0.7188	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 11-9797-6139 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 18 Apr-19 11:36 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

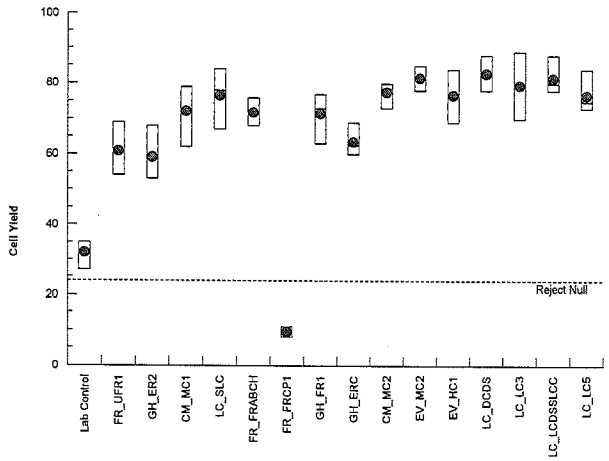
Cell Yield Summary

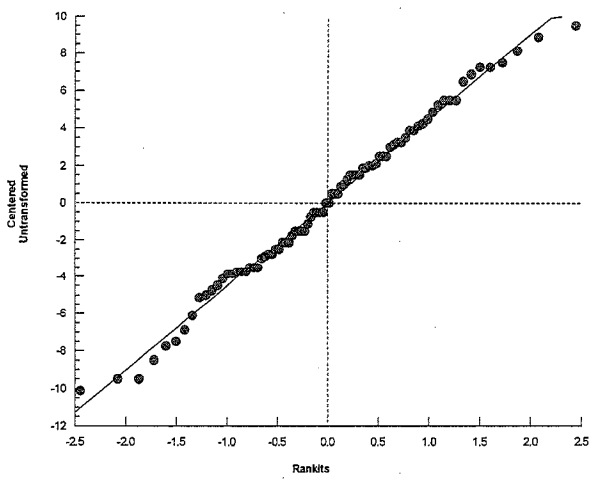
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	N	8	32	29.72	34.28	32.5	27	35	0.9636	8.52%	0.00%
FR_UFR1		8	60.88	56.6	65.15	60.5	54	69	1.807	8.40%	-90.23%
GH_ER2		8	59.12	54.99	63.26	58.5	53	68	1.747	8.36%	-84.77%
CM_MC1		8	72.12	67.49	76.76	72.5	62	79	1.959	7.68%	-125.39%
LC_SLC		8	76.5	71.54	81.46	78	67	84	2.096	7.75%	-139.06%
FR_FRABCH		4	71.75	66.18	77.32	71.5	68	76	1.75	4.88%	-124.22%
FR_FRCP1		4	9.5	7.446	11.55	9.5	8	11	0.6455	13.59%	70.31%
GH_FR1		4	71.5	61.23	81.77	73	63	77	3.227	9.03%	-123.44%
GH_ERC		4	63.5	57.34	69.66	62.5	60	69	1.936	6.10%	-98.44%
CM_MC2		4	77.5	72.55	82.45	78.5	73	80	1.555	4.01%	-142.19%
EV_MC2		4	81.5	76.91	86.09	81.5	78	85	1.443	3.54%	-154.69%
EV_HC1		4	76.75	66.25	87.25	77	69	84	3.301	8.60%	-139.84%
LC_DCDS		4	82.75	74.81	90.69	82.5	78	88	2.496	6.03%	-158.59%
LC_LC3		4	79.5	66.74	92.26	79.5	70	89	4.01	10.09%	-148.44%
LC_LCDSSLCC		4	81.5	74.32	88.68	80	78	88	2.255	5.53%	-154.69%
LC_LC5		4	76.75	68.81	84.69	75	73	84	2.496	6.50%	-139.84%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	N	33	27	34	32	29	35	34	32
FR_UFR1		69	58	63	65	57	57	64	54
GH_ER2		57	61	57	60	68	53	63	54
CM_MC1		68	74	77	71	79	76	70	62
LC_SLC		75	78	82	79	84	78	69	67
FR_FRABCH		73	76	68	70				
FR_FRCP1		8	11	10	9				
GH_FR1		77	70	76	63				
GH_ERC		69	62	63	60				
CM_MC2		78	79	80	73				
EV_MC2		82	78	85	81				
EV_HC1		80	84	74	69				
LC_DCDS		79	86	78	88				
LC_LC3		77	70	82	89				
LC_LCDSSLCC		81	78	88	79				
LC_LC5		76	73	84	74				

Graphics





CETIS Analytical Report

Test Code/ID: 190347 / 07-1581-3534

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-4005-7303	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Mar-19 17:56	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8922-1583	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 Mar-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 Mar-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	15-8664-6659	01 Mar-19	01 Mar-19	8h	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	67h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	68h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	67h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	69h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	71h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	69h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	70h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	69h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

Analyst: MCT QA: JGL 4-Mar-19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 10-4005-7303 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:56 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 failed cell yield	25.47%
		GH_ER2 failed cell yield	25.47%
		CM_MC1 failed cell yield	25.47%
		LC_SLC failed cell yield	25.47%
		FR_FRABCH failed cell yield	25.47%
		FR_FRCP1 passed cell yield	25.47%
		GH_FR1 failed cell yield	25.47%
		GH_ERC failed cell yield	25.47%
		CM_MC2 failed cell yield	25.47%
		EV_MC2 failed cell yield	25.47%
		EV_HC1 failed cell yield	25.47%
		LC_DCDS failed cell yield	25.47%
		LC_LC3 failed cell yield	25.47%
		LC_LCDSSLCC failed cell yield	25.47%
		LC_LC5 failed cell yield	25.47%

Dunnett Multiple Comparison Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control (Lab control)	FR_UFR1*	11.67	2.688	6.654	14	CDF	6.2E-07	Significant Effect
	GH_ER2*	10.96	2.688	6.654	14	CDF	6.2E-07	Significant Effect
	CM_MC1*	16.21	2.688	6.654	14	CDF	6.2E-07	Significant Effect
	LC_SLC*	17.98	2.688	6.654	14	CDF	6.2E-07	Significant Effect
	FR_FRABCH*	13.11	2.688	8.15	10	CDF	6.2E-07	Significant Effect
	FR_FRCP1	-7.422	2.688	8.15	10	CDF	1.0000	Non-Significant Effect
	GH_FR1*	13.03	2.688	8.15	10	CDF	6.2E-07	Significant Effect
	GH_ERC*	10.39	2.688	8.15	10	CDF	6.2E-07	Significant Effect
	CM_MC2*	15.01	2.688	8.15	10	CDF	6.2E-07	Significant Effect
	EV_MC2*	16.33	2.688	8.15	10	CDF	6.2E-07	Significant Effect
	EV_HC1*	14.76	2.688	8.15	10	CDF	6.2E-07	Significant Effect
	LC_DCDS*	16.74	2.688	8.15	10	CDF	6.2E-07	Significant Effect
	LC_LC3*	15.67	2.688	8.15	10	CDF	6.2E-07	Significant Effect
	LC_LCDSSLCC*	16.33	2.688	8.15	10	CDF	6.2E-07	Significant Effect
	LC_LC5*	14.76	2.688	8.15	10	CDF	6.2E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.9061	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	29263.8	1950.92	15	79.6	<1.0E-37	Significant Effect
Error	1666.62	24.5092	68			
Total	30930.4		83			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	14.34	30.58	0.4999	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9892	0.9596	0.7188	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 10-4005-7303 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:56 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

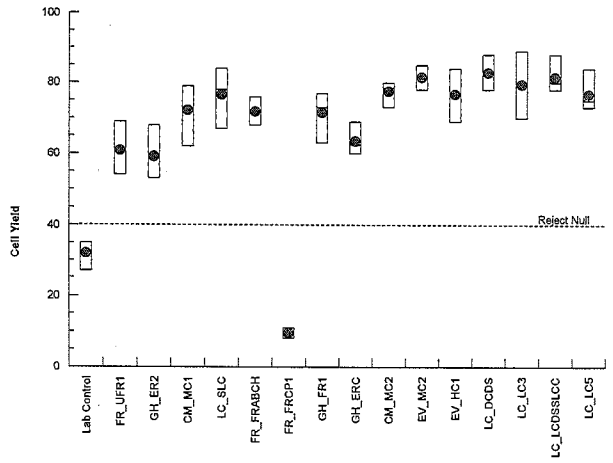
Cell Yield Summary

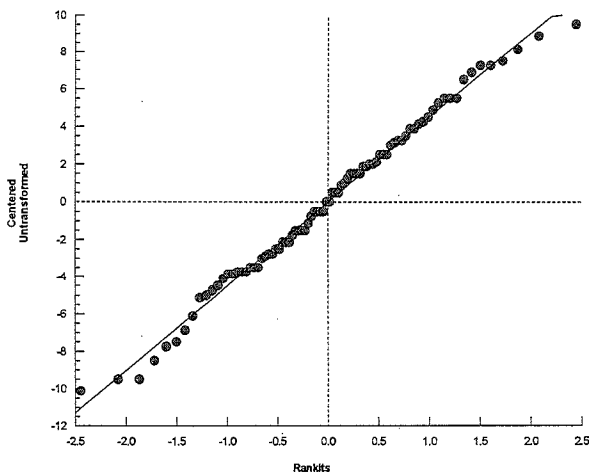
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	N	8	32	29.72	34.28	32.5	27	35	0.9636	8.52%	0.00%
FR_UFR1		8	60.88	56.6	65.15	60.5	54	69	1.807	8.40%	-90.23%
GH_ER2		8	59.12	54.99	63.26	58.5	53	68	1.747	8.36%	-84.77%
CM_MC1		8	72.12	67.49	76.76	72.5	62	79	1.959	7.68%	-125.39%
LC_SLC		8	76.5	71.54	81.46	78	67	84	2.096	7.75%	-139.06%
FR_FRABCH		4	71.75	66.18	77.32	71.5	68	76	1.75	4.88%	-124.22%
FR_FRCP1		4	9.5	7.446	11.55	9.5	8	11	0.6455	13.59%	70.31%
GH_FR1		4	71.5	61.23	81.77	73	63	77	3.227	9.03%	-123.44%
GH_ERC		4	63.5	57.34	69.66	62.5	60	69	1.936	6.10%	-98.44%
CM_MC2		4	77.5	72.55	82.45	78.5	73	80	1.555	4.01%	-142.19%
EV_MC2		4	81.5	76.91	86.09	81.5	78	85	1.443	3.54%	-154.69%
EV_HC1		4	76.75	66.25	87.25	77	69	84	3.301	8.60%	-139.84%
LC_DCDS		4	82.75	74.81	90.69	82.5	78	88	2.496	6.03%	-158.59%
LC_LC3		4	79.5	66.74	92.26	79.5	70	89	4.01	10.09%	-148.44%
LC_LCDSSLCC		4	81.5	74.32	88.68	80	78	88	2.255	5.53%	-154.69%
LC_LC5		4	76.75	68.81	84.69	75	73	84	2.496	6.50%	-139.84%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	N	33	27	34	32	29	35	34	32
FR_UFR1		69	58	63	65	57	57	64	54
GH_ER2		57	61	57	60	68	53	63	54
CM_MC1		68	74	77	71	79	76	70	62
LC_SLC		75	78	82	79	84	78	69	67
FR_FRABCH		73	76	68	70				
FR_FRCP1		8	11	10	9				
GH_FR1		77	70	76	63				
GH_ERC		69	62	63	60				
CM_MC2		78	79	80	73				
EV_MC2		82	78	85	81				
EV_HC1		80	84	74	69				
LC_DCDS		79	86	78	88				
LC_LC3		77	70	82	89				
LC_LCDSSLCC		81	78	88	79				
LC_LC5		76	73	84	74				

Graphics





CETIS Analytical Report

Report Date: 20 Mar-19 17:53 (p 1 of 3)
Test Code/ID: 190347 / 07-1581-3534

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-4239-4531	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Mar-19 17:38	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Batch ID:	17-8922-1583	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran		
Start Date:	01 Mar-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients		
Ending Date:	04 Mar-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**			
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture	**Age:**	7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	67h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	68h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	67h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	69h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	71h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	69h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	70h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	69h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-4239-4531	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Mar-19 17:38	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed cell yield	13.86%
		CM_MC1 passed cell yield	13.86%
		LC_SLC passed cell yield	13.86%
		FR_FRABCH passed cell yield	13.86%
		FR_FRCP1 failed cell yield	13.86%
		GH_FR1 passed cell yield	13.86%
		GH_ERC passed cell yield	13.86%
		CM_MC2 passed cell yield	13.86%
		EV_MC2 passed cell yield	13.86%
		EV_HC1 passed cell yield	13.86%
		LC_DCDS passed cell yield	13.86%
		LC_LC3 passed cell yield	13.86%
		LC_LCDSSLCC passed cell yield	13.86%
		LC_LC5 passed cell yield	13.86%

Dunnett Multiple Comparison Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Upstream Control	GH_ER2	0.6803	2.677	6.887	14	CDF	0.8183	Non-Significant Effect
FR_UFR1	CM_MC1	-4.373	2.677	6.887	14	CDF	1.0000	Non-Significant Effect
	LC_SLC	-6.074	2.677	6.887	14	CDF	1.0000	Non-Significant Effect
	FR_FRABCH	-3.452	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	FR_FRCP1*	16.31	2.677	8.435	10	CDF	1.9E-07	Significant Effect
	GH_FR1	-3.372	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	GH_ERC	-0.8332	2.677	8.435	10	CDF	0.9988	Non-Significant Effect
	CM_MC2	-5.277	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	EV_MC2	-6.546	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	EV_HC1	-5.039	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	LC_DCDS	-6.943	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	LC_LC3	-5.912	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	LC_LCDSSLCC	-6.546	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	LC_LC5	-5.039	2.677	8.435	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.1087	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19390	1385	14	52.32	<1.0E-37	Significant Effect
Error	1614.62	26.4693	61			
Total	21004.7		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.97	29.14	0.6886	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9859	0.9559	0.5632	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-4239-4531	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Mar-19 17:38	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

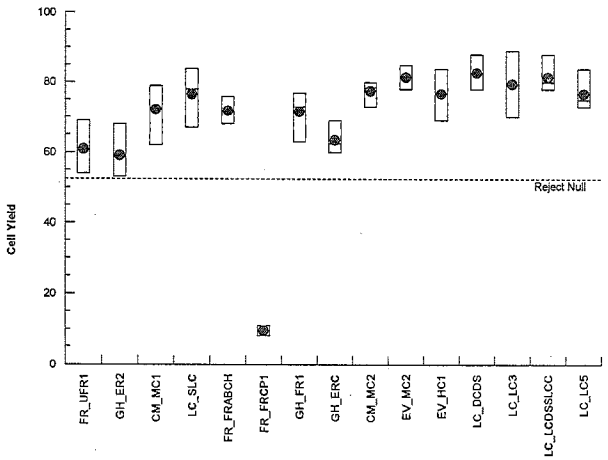
Cell Yield Summary

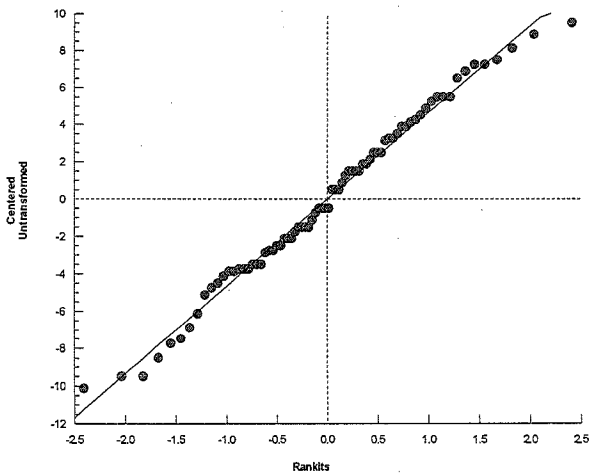
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	U	8	60.88	56.6	65.15	60.5	54	69	1.807	8.40%	0.00%
GH_ER2		8	59.12	54.99	63.26	58.5	53	68	1.747	8.36%	2.87%
CM_MC1		8	72.12	67.49	76.76	72.5	62	79	1.959	7.68%	-18.48%
LC_SLC		8	76.5	71.54	81.46	78	67	84	2.096	7.75%	-25.67%
FR_FRABCH		4	71.75	66.18	77.32	71.5	68	76	1.75	4.88%	-17.86%
FR_FRCP1		4	9.5	7.446	11.55	9.5	8	11	0.6455	13.59%	84.39%
GH_FR1		4	71.5	61.23	81.77	73	63	77	3.227	9.03%	-17.45%
GH_ERC		4	63.5	57.34	69.66	62.5	60	69	1.936	6.10%	-4.31%
CM_MC2		4	77.5	72.55	82.45	78.5	73	80	1.555	4.01%	-27.31%
EV_MC2		4	81.5	76.91	86.09	81.5	78	85	1.443	3.54%	-33.88%
EV_HC1		4	76.75	66.25	87.25	77	69	84	3.301	8.60%	-26.08%
LC_DCDS		4	82.75	74.81	90.69	82.5	78	88	2.496	6.03%	-35.93%
LC_LC3		4	79.5	66.74	92.26	79.5	70	89	4.01	10.09%	-30.60%
LC_LCDSSLCC		4	81.5	74.32	88.68	80	78	88	2.255	5.53%	-33.88%
LC_LC5		4	76.75	68.81	84.69	75	73	84	2.496	6.50%	-26.08%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	U	69	58	63	65	57	57	64	54
GH_ER2		57	61	57	60	68	53	63	54
CM_MC1		68	74	77	71	79	76	70	62
LC_SLC		75	78	82	79	84	78	69	67
FR_FRABCH		73	76	68	70				
FR_FRCP1		8	11	10	9				
GH_FR1		77	70	76	63				
GH_ERC		69	62	63	60				
CM_MC2		78	79	80	73				
EV_MC2		82	78	85	81				
EV_HC1		80	84	74	69				
LC_DCDS		79	86	78	88				
LC_LC3		77	70	82	89				
LC_LCDSSLCC		81	78	88	79				
LC_LC5		76	73	84	74				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-4958-8271	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Mar-19 17:38	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8922-1583	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 Mar-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 Mar-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	67h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	68h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	67h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	69h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	71h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	69h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	70h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	69h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-4958-8271	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Mar-19 17:38	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	GH_ER2 passed cell yield	13.86%
		CM_MC1 failed cell yield	13.86%
		LC_SLC failed cell yield	13.86%
		FR_FRABCH failed cell yield	13.86%
		FR_FRCP1 passed cell yield	13.86%
		GH_FR1 failed cell yield	13.86%
		GH_ERC passed cell yield	13.86%
		CM_MC2 failed cell yield	13.86%
		EV_MC2 failed cell yield	13.86%
		EV_HC1 failed cell yield	13.86%
		LC_DCDS failed cell yield	13.86%
		LC_LC3 failed cell yield	13.86%
		LC_LCDSSLCC failed cell yield	13.86%
		LC_LC5 failed cell yield	13.86%

Dunnett Multiple Comparison Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Upstream Control	GH_ER2	-0.6803	2.677	6.887	14	CDF	0.9975	Non-Significant Effect
FR_UFR1	CM_MC1*	4.373	2.677	6.887	14	CDF	3.2E-04	Significant Effect
	LC_SLC*	6.074	2.677	6.887	14	CDF	7.9E-07	Significant Effect
	FR_FRABCH*	3.452	2.677	8.435	10	CDF	0.0063	Significant Effect
	FR_FRCP1	-16.31	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	GH_FR1*	3.372	2.677	8.435	10	CDF	0.0079	Significant Effect
	GH_ERC	0.8332	2.677	8.435	10	CDF	0.7577	Non-Significant Effect
	CM_MC2*	5.277	2.677	8.435	10	CDF	1.3E-05	Significant Effect
	EV_MC2*	6.546	2.677	8.435	10	CDF	2.9E-07	Significant Effect
	EV_HC1*	5.039	2.677	8.435	10	CDF	3.1E-05	Significant Effect
	LC_DCDS*	6.943	2.677	8.435	10	CDF	2.1E-07	Significant Effect
	LC_LC3*	5.912	2.677	8.435	10	CDF	1.3E-06	Significant Effect
	LC_LCDSSLCC*	6.546	2.677	8.435	10	CDF	2.9E-07	Significant Effect
	LC_LC5*	5.039	2.677	8.435	10	CDF	3.1E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.1087	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19390	1385	14	52.32	<1.0E-37	Significant Effect
Error	1614.62	26.4693	61			
Total	21004.7		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.97	29.14	0.6886	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9859	0.9559	0.5632	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 06-4958-8271 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:38 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

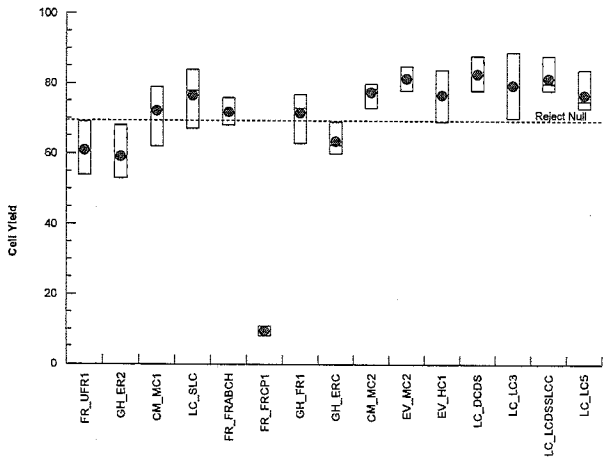
Cell Yield Summary

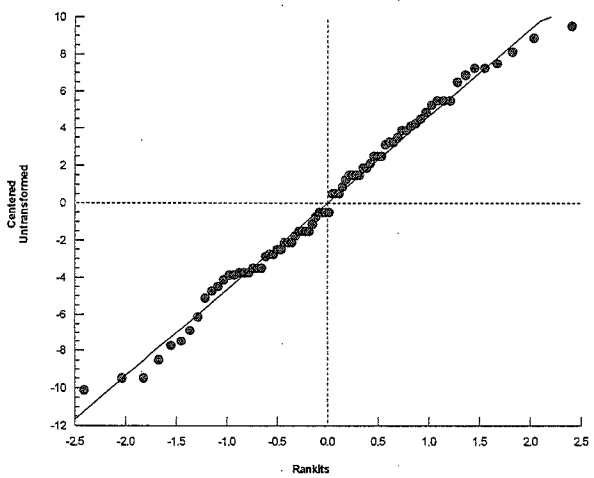
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	U	8	60.88	56.6	65.15	60.5	54	69	1.807	8.40%	0.00%
GH_ER2		8	59.12	54.99	63.26	58.5	53	68	1.747	8.36%	2.87%
CM_MC1		8	72.12	67.49	76.76	72.5	62	79	1.959	7.68%	-18.48%
LC_SLC		8	76.5	71.54	81.46	78	67	84	2.096	7.75%	-25.67%
FR_FRABCH		4	71.75	66.18	77.32	71.5	68	76	1.75	4.88%	-17.86%
FR_FRCP1		4	9.5	7.446	11.55	9.5	8	11	0.6455	13.59%	84.39%
GH_FR1		4	71.5	61.23	81.77	73	63	77	3.227	9.03%	-17.45%
GH_ERC		4	63.5	57.34	69.66	62.5	60	69	1.936	6.10%	-4.31%
CM_MC2		4	77.5	72.55	82.45	78.5	73	80	1.555	4.01%	-27.31%
EV_MC2		4	81.5	76.91	86.09	81.5	78	85	1.443	3.54%	-33.88%
EV_HC1		4	76.75	66.25	87.25	77	69	84	3.301	8.60%	-26.08%
LC_DCDS		4	82.75	74.81	90.69	82.5	78	88	2.496	6.03%	-35.93%
LC_LC3		4	79.5	66.74	92.26	79.5	70	89	4.01	10.09%	-30.60%
LC_LCDSSLCC		4	81.5	74.32	88.68	80	78	88	2.255	5.53%	-33.88%
LC_LC5		4	76.75	68.81	84.69	75	73	84	2.496	6.50%	-26.08%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	U	69	58	63	65	57	57	64	54
GH_ER2		57	61	57	60	68	53	63	54
CM_MC1		68	74	77	71	79	76	70	62
LC_SLC		75	78	82	79	84	78	69	67
FR_FRABCH		73	76	68	70				
FR_FRCP1		8	11	10	9				
GH_FR1		77	70	76	63				
GH_ERC		69	62	63	60				
CM_MC2		78	79	80	73				
EV_MC2		82	78	85	81				
EV_HC1		80	84	74	69				
LC_DCDS		79	86	78	88				
LC_LC3		77	70	82	89				
LC_LCDSSLCC		81	78	88	79				
LC_LC5		76	73	84	74				

Graphics





CETIS Analytical Report

Test Code/ID: 190347 / 07-1581-3534

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	18-8296-5197	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Mar-19 17:39	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8922-1583	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 Mar-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 Mar-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	67h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	68h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	67h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	69h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	71h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	69h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	70h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	69h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 18-8296-5197 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:39 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed cell yield	14.27%
		CM_MC1 passed cell yield	14.27%
		LC_SLC passed cell yield	14.27%
		FR_FRABCH passed cell yield	14.27%
		FR_FRCP1 failed cell yield	14.27%
		GH_FR1 passed cell yield	14.27%
		GH_ERC passed cell yield	14.27%
		CM_MC2 passed cell yield	14.27%
		EV_MC2 passed cell yield	14.27%
		EV_HC1 passed cell yield	14.27%
		LC_DCDS passed cell yield	14.27%
		LC_LC3 passed cell yield	14.27%
		LC_LCDSSLCC passed cell yield	14.27%
		LC_LC5 passed cell yield	14.27%

Dunnett Multiple Comparison Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Receiving Water	FR_UFR1	-0.6803	2.677	6.887	14	CDF	0.9975	Non-Significant Effect
GH_ER2	CM_MC1	-5.054	2.677	6.887	14	CDF	1.0000	Non-Significant Effect
	LC_SLC	-6.754	2.677	6.887	14	CDF	1.0000	Non-Significant Effect
	FR_FRABCH	-4.007	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	FR_FRCP1*	15.75	2.677	8.435	10	CDF	1.9E-07	Significant Effect
	GH_FR1	-3.928	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	GH_ERC	-1.389	2.677	8.435	10	CDF	0.9999	Non-Significant Effect
	CM_MC2	-5.832	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	EV_MC2	-7.102	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	EV_HC1	-5.594	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	LC_DCDS	-7.499	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	LC_LC3	-6.467	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	LC_LCDSSLCC	-7.102	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	LC_LC5	-5.594	2.677	8.435	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.9049	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19390	1385	14	52.32	<1.0E-37	Significant Effect
Error	1614.62	26.4693	61			
Total	21004.7		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.97	29.14	0.6886	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9859	0.9559	0.5632	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 18-8296-5197 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:39 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

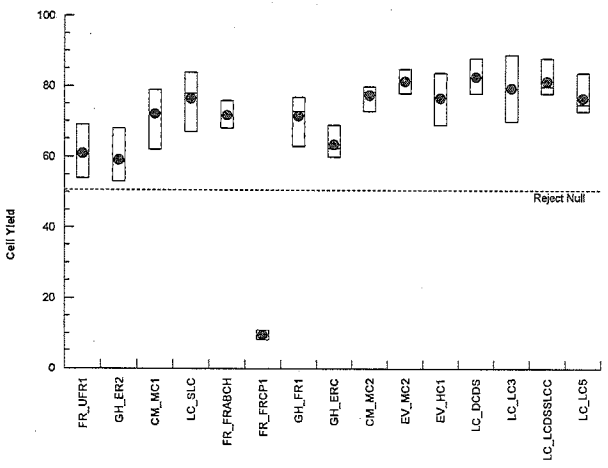
Cell Yield Summary

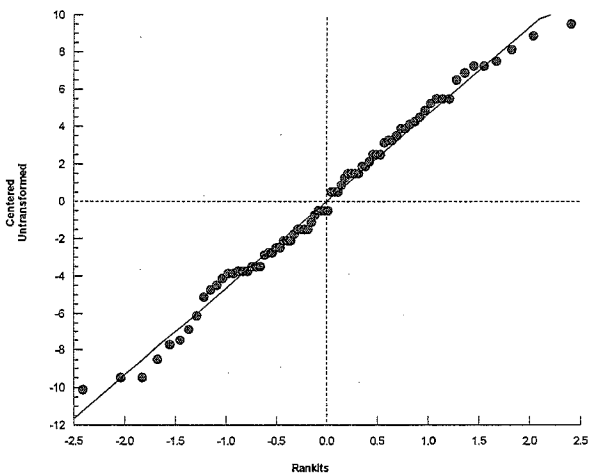
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	60.88	56.6	65.15	60.5	54	69	1.807	8.40%	0.00%
GH_ER2	R	8	59.12	54.99	63.26	58.5	53	68	1.747	8.36%	2.87%
CM_MC1		8	72.12	67.49	76.76	72.5	62	79	1.959	7.68%	-18.48%
LC_SLC		8	76.5	71.54	81.46	78	67	84	2.096	7.75%	-25.67%
FR_FRABCH		4	71.75	66.18	77.32	71.5	68	76	1.75	4.88%	-17.86%
FR_FRCP1		4	9.5	7.446	11.55	9.5	8	11	0.6455	13.59%	84.39%
GH_FR1		4	71.5	61.23	81.77	73	63	77	3.227	9.03%	-17.45%
GH_ERC		4	63.5	57.34	69.66	62.5	60	69	1.936	6.10%	-4.31%
CM_MC2		4	77.5	72.55	82.45	78.5	73	80	1.555	4.01%	-27.31%
EV_MC2		4	81.5	76.91	86.09	81.5	78	85	1.443	3.54%	-33.88%
EV_HC1		4	76.75	66.25	87.25	77	69	84	3.301	8.60%	-26.08%
LC_DCDS		4	82.75	74.81	90.69	82.5	78	88	2.496	6.03%	-35.93%
LC_LC3		4	79.5	66.74	92.26	79.5	70	89	4.01	10.09%	-30.60%
LC_LCDSSLCC		4	81.5	74.32	88.68	80	78	88	2.255	5.53%	-33.88%
LC_LC5		4	76.75	68.81	84.69	75	73	84	2.496	6.50%	-26.08%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		69	58	63	65	57	57	64	54
GH_ER2	R	57	61	57	60	68	53	63	54
CM_MC1		68	74	77	71	79	76	70	62
LC_SLC		75	78	82	79	84	78	69	67
FR_FRABCH		73	76	68	70				
FR_FRCP1		8	11	10	9				
GH_FR1		77	70	76	63				
GH_ERC		69	62	63	60				
CM_MC2		78	79	80	73				
EV_MC2		82	78	85	81				
EV_HC1		80	84	74	69				
LC_DCDS		79	86	78	88				
LC_LC3		77	70	82	89				
LC_LCDSSLCC		81	78	88	79				
LC_LC5		76	73	84	74				

Graphics





CETIS Analytical Report

Test Code/ID: 190347 / 07-1581-3534

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-7884-6030	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Mar-19 17:39	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8922-1583	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 Mar-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 Mar-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	67h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	68h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	67h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	69h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	71h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	69h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	70h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	69h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 16-7884-6030 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:39 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 passed cell yield	14.27%
		CM_MC1 failed cell yield	14.27%
		LC_SLC failed cell yield	14.27%
		FR_FRABCH failed cell yield	14.27%
		FR_FRCP1 passed cell yield	14.27%
		GH_FR1 failed cell yield	14.27%
		GH_ERC passed cell yield	14.27%
		CM_MC2 failed cell yield	14.27%
		EV_MC2 failed cell yield	14.27%
		EV_HC1 failed cell yield	14.27%
		LC_DCDS failed cell yield	14.27%
		LC_LC3 failed cell yield	14.27%
		LC_LCDSSLCC failed cell yield	14.27%
		LC_LC5 failed cell yield	14.27%

Dunnett Multiple Comparison Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Receiving Water	FR_UFR1	0.6803	2.677	6.887	14	CDF	0.8183	Non-Significant Effect
GH_ER2	CM_MC1*	5.054	2.677	6.887	14	CDF	2.9E-05	Significant Effect
	LC_SLC*	6.754	2.677	6.887	14	CDF	2.3E-07	Significant Effect
	FR_FRABCH*	4.007	2.677	8.435	10	CDF	0.0011	Significant Effect
	FR_FRCP1	-15.75	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	GH_FR1*	3.928	2.677	8.435	10	CDF	0.0014	Significant Effect
	GH_ERC	1.389	2.677	8.435	10	CDF	0.4807	Non-Significant Effect
	CM_MC2*	5.832	2.677	8.435	10	CDF	1.7E-06	Significant Effect
	EV_MC2*	7.102	2.677	8.435	10	CDF	2.0E-07	Significant Effect
	EV_HC1*	5.594	2.677	8.435	10	CDF	4.0E-06	Significant Effect
	LC_DCDS*	7.499	2.677	8.435	10	CDF	1.9E-07	Significant Effect
	LC_LC3*	6.467	2.677	8.435	10	CDF	3.2E-07	Significant Effect
	LC_LCDSSLCC*	7.102	2.677	8.435	10	CDF	2.0E-07	Significant Effect
	LC_LC5*	5.594	2.677	8.435	10	CDF	4.0E-06	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.9049	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19390	1385	14	52.32	<1.0E-37	Significant Effect
Error	1614.62	26.4693	61			
Total	21004.7		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.97	29.14	0.6886	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9859	0.9559	0.5632	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 16-7884-6030 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:39 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

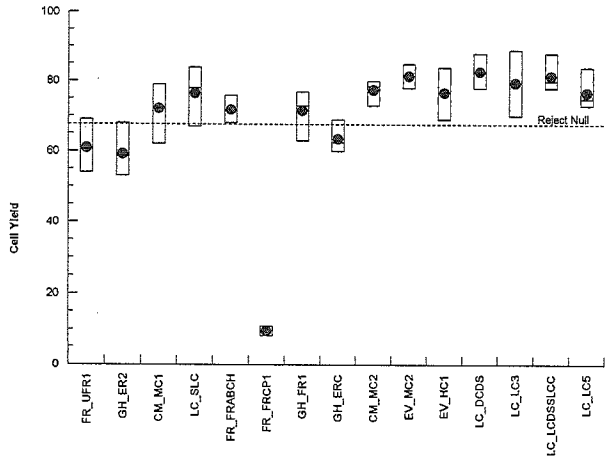
Cell Yield Summary

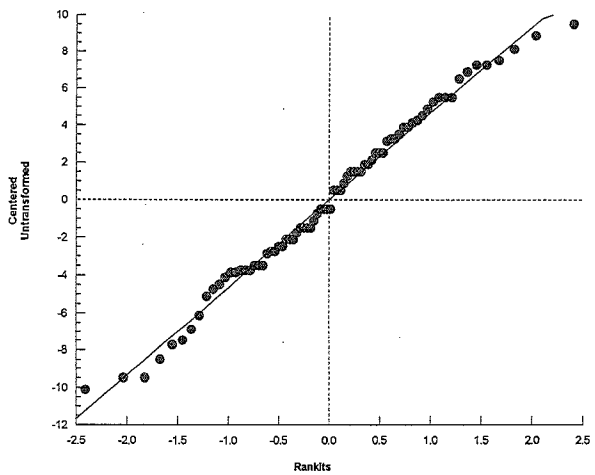
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	60.88	56.6	65.15	60.5	54	69	1.807	8.40%	0.00%
GH_ER2	R	8	59.12	54.99	63.26	58.5	53	68	1.747	8.36%	2.87%
CM_MC1		8	72.12	67.49	76.76	72.5	62	79	1.959	7.68%	-18.48%
LC_SLC		8	76.5	71.54	81.46	78	67	84	2.096	7.75%	-25.67%
FR_FRABCH		4	71.75	66.18	77.32	71.5	68	76	1.75	4.88%	-17.86%
FR_FRCP1		4	9.5	7.446	11.55	9.5	8	11	0.6455	13.59%	84.39%
GH_FR1		4	71.5	61.23	81.77	73	63	77	3.227	9.03%	-17.45%
GH_ERC		4	63.5	57.34	69.66	62.5	60	69	1.936	6.10%	-4.31%
CM_MC2		4	77.5	72.55	82.45	78.5	73	80	1.555	4.01%	-27.31%
EV_MC2		4	81.5	76.91	86.09	81.5	78	85	1.443	3.54%	-33.88%
EV_HC1		4	76.75	66.25	87.25	77	69	84	3.301	8.60%	-26.08%
LC_DCDS		4	82.75	74.81	90.69	82.5	78	88	2.496	6.03%	-35.93%
LC_LC3		4	79.5	66.74	92.26	79.5	70	89	4.01	10.09%	-30.60%
LC_LCDSSLCC		4	81.5	74.32	88.68	80	78	88	2.255	5.53%	-33.88%
LC_LC5		4	76.75	68.81	84.69	75	73	84	2.496	6.50%	-26.08%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		69	58	63	65	57	57	64	54
GH_ER2	R	57	61	57	60	68	53	63	54
CM_MC1		68	74	77	71	79	76	70	62
LC_SLC		75	78	82	79	84	78	69	67
FR_FRABCH		73	76	68	70				
FR_FRCP1		8	11	10	9				
GH_FR1		77	70	76	63				
GH_ERC		69	62	63	60				
CM_MC2		78	79	80	73				
EV_MC2		82	78	85	81				
EV_HC1		80	84	74	69				
LC_DCDS		79	86	78	88				
LC_LC3		77	70	82	89				
LC_LCDSSLCC		81	78	88	79				
LC_LC5		76	73	84	74				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-6644-1936	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Mar-19 17:40	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8922-1583	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 Mar-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 Mar-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	67h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	68h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	67h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	69h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	71h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	69h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	70h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	69h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 04-6644-1936 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:40 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 failed cell yield	11.70%
		GH_ER2 failed cell yield	11.70%
		LC_SLC passed cell yield	11.70%
		FR_FRABCH passed cell yield	11.70%
		FR_FRCP1 failed cell yield	11.70%
		GH_FR1 passed cell yield	11.70%
		GH_ERC failed cell yield	11.70%
		CM_MC2 passed cell yield	11.70%
		EV_MC2 passed cell yield	11.70%
		EV_HC1 passed cell yield	11.70%
		LC_DCDS passed cell yield	11.70%
		LC_LC3 passed cell yield	11.70%
		LC_LCDSSLCC passed cell yield	11.70%
		LC_LC5 passed cell yield	11.70%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1*	4.373	2.677	6.887	14	CDF	3.2E-04	Significant Effect
CM_MC1		GH_ER2*	5.054	2.677	6.887	14	CDF	2.9E-05	Significant Effect
		LC_SLC	-1.701	2.677	6.887	14	CDF	1.0000	Non-Significant Effect
		FR_FRABCH	0.119	2.677	8.435	10	CDF	0.9546	Non-Significant Effect
		FR_FRCP1*	19.88	2.677	8.435	10	CDF	1.9E-07	Significant Effect
		GH_FR1	0.1984	2.677	8.435	10	CDF	0.9429	Non-Significant Effect
		GH_ERC*	2.738	2.677	8.435	10	CDF	0.0432	Significant Effect
		CM_MC2	-1.706	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
		EV_MC2	-2.976	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
		EV_HC1	-1.468	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
		LC_DCDS	-3.372	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
		LC_LC3	-2.341	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLCC	-2.976	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
		LC_LC5	-1.468	2.677	8.435	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.7195	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19390	1385	14	52.32	<1.0E-37	Significant Effect
Error	1614.62	26.4693	61			
Total	21004.7		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.97	29.14	0.6886	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9859	0.9559	0.5632	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 04-6644-1936 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:40 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

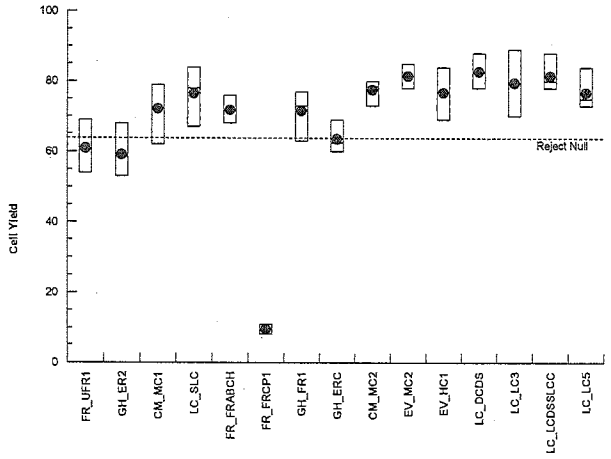
Cell Yield Summary

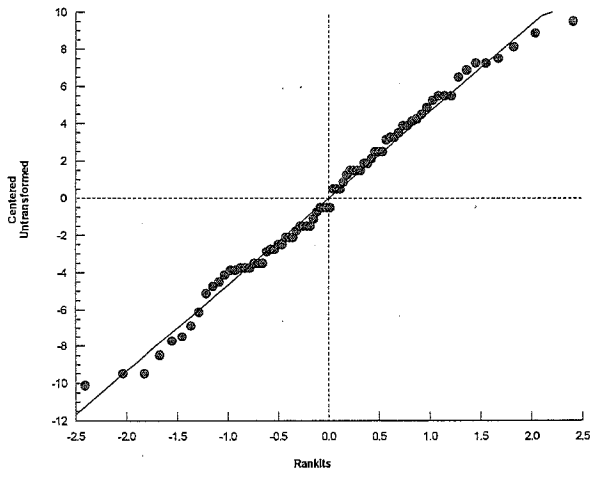
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	60.88	56.6	65.15	60.5	54	69	1.807	8.40%	0.00%
GH_ER2		8	59.12	54.99	63.26	58.5	53	68	1.747	8.36%	2.87%
CM_MC1	XC	8	72.12	67.49	76.76	72.5	62	79	1.959	7.68%	-18.48%
LC_SLC		8	76.5	71.54	81.46	78	67	84	2.096	7.75%	-25.67%
FR_FRABCH		4	71.75	66.18	77.32	71.5	68	76	1.75	4.88%	-17.86%
FR_FRCP1		4	9.5	7.446	11.55	9.5	8	11	0.6455	13.59%	84.39%
GH_FR1		4	71.5	61.23	81.77	73	63	77	3.227	9.03%	-17.45%
GH_ERC		4	63.5	57.34	69.66	62.5	60	69	1.936	6.10%	-4.31%
CM_MC2		4	77.5	72.55	82.45	78.5	73	80	1.555	4.01%	-27.31%
EV_MC2		4	81.5	76.91	86.09	81.5	78	85	1.443	3.54%	-33.88%
EV_HC1		4	76.75	66.25	87.25	77	69	84	3.301	8.60%	-26.08%
LC_DCDS		4	82.75	74.81	90.69	82.5	78	88	2.496	6.03%	-35.93%
LC_LC3		4	79.5	66.74	92.26	79.5	70	89	4.01	10.09%	-30.60%
LC_LCDSSLCC		4	81.5	74.32	88.68	80	78	88	2.255	5.53%	-33.88%
LC_LC5		4	76.75	68.81	84.69	75	73	84	2.496	6.50%	-26.08%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		69	58	63	65	57	57	64	54
GH_ER2		57	61	57	60	68	53	63	54
CM_MC1	XC	68	74	77	71	79	76	70	62
LC_SLC		75	78	82	79	84	78	69	67
FR_FRABCH		73	76	68	70				
FR_FRCP1		8	11	10	9				
GH_FR1		77	70	76	63				
GH_ERC		69	62	63	60				
CM_MC2		78	79	80	73				
EV_MC2		82	78	85	81				
EV_HC1		80	84	74	69				
LC_DCDS		79	86	78	88				
LC_LC3		77	70	82	89				
LC_LCDSSLCC		81	78	88	79				
LC_LC5		76	73	84	74				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	20-3930-5800	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Mar-19 17:40	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8922-1583	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 Mar-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 Mar-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	67h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	68h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	67h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	69h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	71h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	69h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	70h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	69h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 20-3930-5800 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:40 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 passed cell yield	11.70%
		GH_ER2 passed cell yield	11.70%
		LC_SLC passed cell yield	11.70%
		FR_FRABCH passed cell yield	11.70%
		FR_FRCP1 passed cell yield	11.70%
		GH_FR1 passed cell yield	11.70%
		GH_ERC passed cell yield	11.70%
		CM_MC2 passed cell yield	11.70%
		EV_MC2 failed cell yield	11.70%
		EV_HC1 passed cell yield	11.70%
		LC_DCDS failed cell yield	11.70%
		LC_LC3 passed cell yield	11.70%
		LC_LCDSSLCC failed cell yield	11.70%
		LC_LC5 passed cell yield	11.70%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-4.373	2.677	6.887	14	CDF	1.0000	Non-Significant Effect
CM_MC1		GH_ER2	-5.054	2.677	6.887	14	CDF	1.0000	Non-Significant Effect
		LC_SLC	1.701	2.677	6.887	14	CDF	0.3248	Non-Significant Effect
		FR_FRABCH	-0.119	2.677	8.435	10	CDF	0.9786	Non-Significant Effect
		FR_FRCP1	-19.88	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
		GH_FR1	-0.1984	2.677	8.435	10	CDF	0.9837	Non-Significant Effect
		GH_ERC	-2.738	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
		CM_MC2	1.706	2.677	8.435	10	CDF	0.3223	Non-Significant Effect
		EV_MC2*	2.976	2.677	8.435	10	CDF	0.0237	Significant Effect
		EV_HC1	1.468	2.677	8.435	10	CDF	0.4393	Non-Significant Effect
		LC_DCDS*	3.372	2.677	8.435	10	CDF	0.0079	Significant Effect
		LC_LC3	2.341	2.677	8.435	10	CDF	0.1058	Non-Significant Effect
		LC_LCDSSLCC*	2.976	2.677	8.435	10	CDF	0.0237	Significant Effect
		LC_LC5	1.468	2.677	8.435	10	CDF	0.4393	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.7195	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19390	1385	14	52.32	<1.0E-37	Significant Effect
Error	1614.62	26.4693	61			
Total	21004.7		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.97	29.14	0.6886	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9859	0.9559	0.5632	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 20-3930-5800 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:40 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

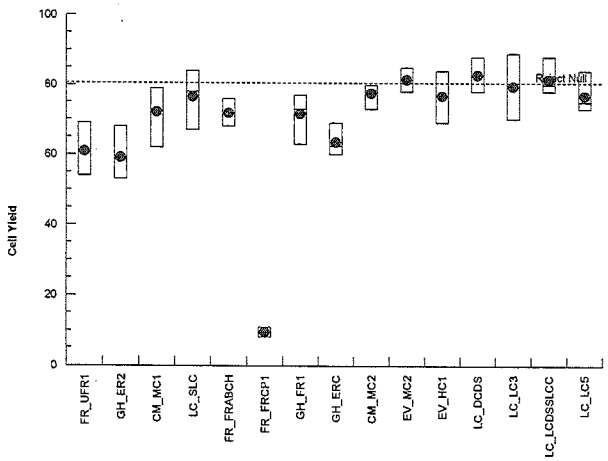
Cell Yield Summary

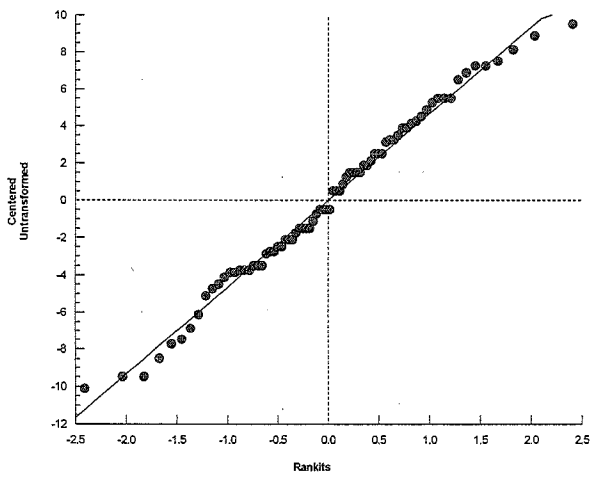
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	60.88	56.6	65.15	60.5	54	69	1.807	8.40%	0.00%
GH_ER2		8	59.12	54.99	63.26	58.5	53	68	1.747	8.36%	2.87%
CM_MC1	XC	8	72.12	67.49	76.76	72.5	62	79	1.959	7.68%	-18.48%
LC_SLC		8	76.5	71.54	81.46	78	67	84	2.096	7.75%	-25.67%
FR_FRABCH		4	71.75	66.18	77.32	71.5	68	76	1.75	4.88%	-17.86%
FR_FRCP1		4	9.5	7.446	11.55	9.5	8	11	0.6455	13.59%	84.39%
GH_FR1		4	71.5	61.23	81.77	73	63	77	3.227	9.03%	-17.45%
GH_ERC		4	63.5	57.34	69.66	62.5	60	69	1.936	6.10%	-4.31%
CM_MC2		4	77.5	72.55	82.45	78.5	73	80	1.555	4.01%	-27.31%
EV_MC2		4	81.5	76.91	86.09	81.5	78	85	1.443	3.54%	-33.88%
EV_HC1		4	76.75	66.25	87.25	77	69	84	3.301	8.60%	-26.08%
LC_DCDS		4	82.75	74.81	90.69	82.5	78	88	2.496	6.03%	-35.93%
LC_LC3		4	79.5	66.74	92.26	79.5	70	89	4.01	10.09%	-30.60%
LC_LCDSSLCC		4	81.5	74.32	88.68	80	78	88	2.255	5.53%	-33.88%
LC_LC5		4	76.75	68.81	84.69	75	73	84	2.496	6.50%	-26.08%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		69	58	63	65	57	57	64	54
GH_ER2		57	61	57	60	68	53	63	54
CM_MC1	XC	68	74	77	71	79	76	70	62
LC_SLC		75	78	82	79	84	78	69	67
FR_FRABCH		73	76	68	70				
FR_FRCP1		8	11	10	9				
GH_FR1		77	70	76	63				
GH_ERC		69	62	63	60				
CM_MC2		78	79	80	73				
EV_MC2		82	78	85	81				
EV_HC1		80	84	74	69				
LC_DCDS		79	86	78	88				
LC_LC3		77	70	82	89				
LC_LCDSSLCC		81	78	88	79				
LC_LC5		76	73	84	74				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-2264-4184	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Mar-19 17:41	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8922-1583	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 Mar-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 Mar-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	67h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	68h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	67h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	69h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	71h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	69h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	70h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	69h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 15-2264-4184 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:41 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 failed cell yield	11.03%
		GH_ER2 failed cell yield	11.03%
		CM_MC1 passed cell yield	11.03%
		FR_FRABCH passed cell yield	11.03%
		FR_FRCP1 failed cell yield	11.03%
		GH_FR1 passed cell yield	11.03%
		GH_ERC failed cell yield	11.03%
		CM_MC2 passed cell yield	11.03%
		EV_MC2 passed cell yield	11.03%
		EV_HC1 passed cell yield	11.03%
		LC_DCDS passed cell yield	11.03%
		LC_LC3 passed cell yield	11.03%
		LC_LCDSSLCC passed cell yield	11.03%
		LC_LC5 passed cell yield	11.03%

Dunnett Multiple Comparison Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Unamended Sampl	FR_UFR1*	6.074	2.677	6.887	14	CDF	7.9E-07	Significant Effect
LC_SLC	GH_ER2*	6.754	2.677	6.887	14	CDF	2.3E-07	Significant Effect
	CM_MC1	1.701	2.677	6.887	14	CDF	0.3248	Non-Significant Effect
	FR_FRABCH	1.508	2.677	8.435	10	CDF	0.4189	Non-Significant Effect
	FR_FRCP1*	21.27	2.677	8.435	10	CDF	1.9E-07	Significant Effect
	GH_FR1	1.587	2.677	8.435	10	CDF	0.3791	Non-Significant Effect
	GH_ERC*	4.126	2.677	8.435	10	CDF	7.5E-04	Significant Effect
	CM_MC2	-0.3174	2.677	8.435	10	CDF	0.9894	Non-Significant Effect
	EV_MC2	-1.587	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	EV_HC1	-0.07935	2.677	8.435	10	CDF	0.9756	Non-Significant Effect
	LC_DCDS	-1.984	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	LC_LC3	-0.9522	2.677	8.435	10	CDF	0.9993	Non-Significant Effect
	LC_LCDSSLCC	-1.587	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	LC_LC5	-0.07935	2.677	8.435	10	CDF	0.9756	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.3987	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19390	1385	14	52.32	<1.0E-37	Significant Effect
Error	1614.62	26.4693	61			
Total	21004.7		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.97	29.14	0.6886	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9859	0.9559	0.5632	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 15-2264-4184 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:41 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

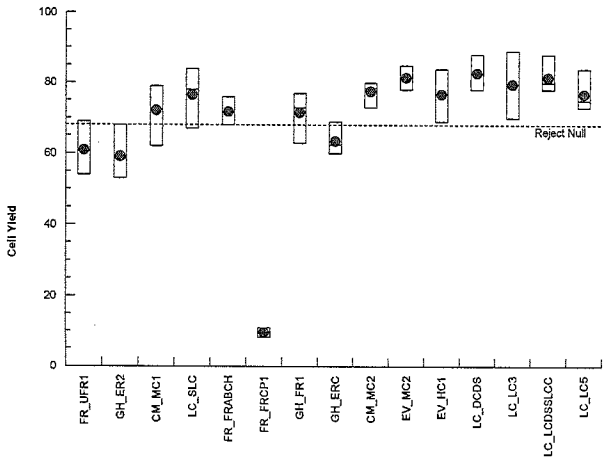
Cell Yield Summary

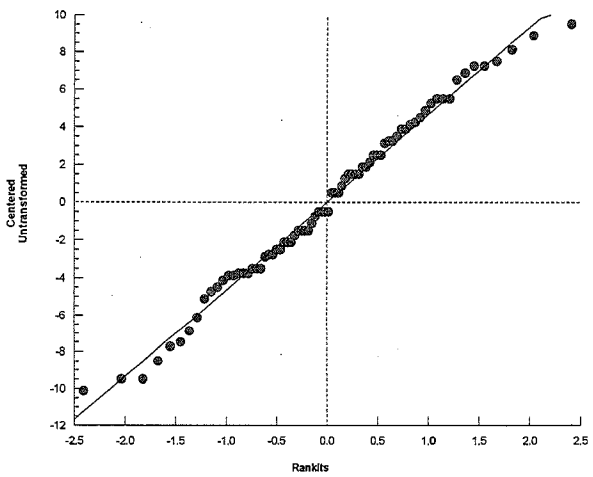
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	60.88	56.6	65.15	60.5	54	69	1.807	8.40%	0.00%
GH_ER2		8	59.12	54.99	63.26	58.5	53	68	1.747	8.36%	2.87%
CM_MC1		8	72.12	67.49	76.76	72.5	62	79	1.959	7.68%	-18.48%
LC_SLC	US	8	76.5	71.54	81.46	78	67	84	2.096	7.75%	-25.67%
FR_FRABCH		4	71.75	66.18	77.32	71.5	68	76	1.75	4.88%	-17.86%
FR_FRCP1		4	9.5	7.446	11.55	9.5	8	11	0.6455	13.59%	84.39%
GH_FR1		4	71.5	61.23	81.77	73	63	77	3.227	9.03%	-17.45%
GH_ERC		4	63.5	57.34	69.66	62.5	60	69	1.936	6.10%	-4.31%
CM_MC2		4	77.5	72.55	82.45	78.5	73	80	1.555	4.01%	-27.31%
EV_MC2		4	81.5	76.91	86.09	81.5	78	85	1.443	3.54%	-33.88%
EV_HC1		4	76.75	66.25	87.25	77	69	84	3.301	8.60%	-26.08%
LC_DCDS		4	82.75	74.81	90.69	82.5	78	88	2.496	6.03%	-35.93%
LC_LC3		4	79.5	66.74	92.26	79.5	70	89	4.01	10.09%	-30.60%
LC_LCDSSLCC		4	81.5	74.32	88.68	80	78	88	2.255	5.53%	-33.88%
LC_LC5		4	76.75	68.81	84.69	75	73	84	2.496	6.50%	-26.08%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		69	58	63	65	57	57	64	54
GH_ER2		57	61	57	60	68	53	63	54
CM_MC1		68	74	77	71	79	76	70	62
LC_SLC	US	75	78	82	79	84	78	69	67
FR_FRABCH		73	76	68	70				
FR_FRCP1		8	11	10	9				
GH_FR1		77	70	76	63				
GH_ERC		69	62	63	60				
CM_MC2		78	79	80	73				
EV_MC2		82	78	85	81				
EV_HC1		80	84	74	69				
LC_DCDS		79	86	78	88				
LC_LC3		77	70	82	89				
LC_LCDSSLCC		81	78	88	79				
LC_LC5		76	73	84	74				

Graphics





CETIS Analytical Report

Test Code/ID: 190347 / 07-1581-3534

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-5974-1041	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Mar-19 17:41	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8922-1583	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 Mar-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 Mar-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	67h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	68h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	67h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	80h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	69h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	71h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	69h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	70h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	69h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	67h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 06-5974-1041 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:41 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 passed cell yield	11.03%
		GH_ER2 passed cell yield	11.03%
		CM_MC1 passed cell yield	11.03%
		FR_FRABCH passed cell yield	11.03%
		FR_FRCP1 passed cell yield	11.03%
		GH_FR1 passed cell yield	11.03%
		GH_ERC passed cell yield	11.03%
		CM_MC2 passed cell yield	11.03%
		EV_MC2 passed cell yield	11.03%
		EV_HC1 passed cell yield	11.03%
		LC_DCDS passed cell yield	11.03%
		LC_LC3 passed cell yield	11.03%
		LC_LCDSSLCC passed cell yield	11.03%
		LC_LC5 passed cell yield	11.03%

Dunnett Multiple Comparison Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Unamended Sampl	FR_UFR1	-6.074	2.677	6.887	14	CDF	1.0000	Non-Significant Effect
LC-SLC	GH_ER2	-6.754	2.677	6.887	14	CDF	1.0000	Non-Significant Effect
	CM_MC1	-1.701	2.677	6.887	14	CDF	1.0000	Non-Significant Effect
	FR_FRABCH	-1.508	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	FR_FRCP1	-21.27	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	GH_FR1	-1.587	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	GH_ERC	-4.126	2.677	8.435	10	CDF	1.0000	Non-Significant Effect
	CM_MC2	0.3174	2.677	8.435	10	CDF	0.9212	Non-Significant Effect
	EV_MC2	1.587	2.677	8.435	10	CDF	0.3791	Non-Significant Effect
	EV_HC1	0.07935	2.677	8.435	10	CDF	0.9597	Non-Significant Effect
	LC_DCDS	1.984	2.677	8.435	10	CDF	0.2083	Non-Significant Effect
	LC_LC3	0.9522	2.677	8.435	10	CDF	0.7041	Non-Significant Effect
	LC_LCDSSLCC	1.587	2.677	8.435	10	CDF	0.3791	Non-Significant Effect
	LC_LC5	0.07935	2.677	8.435	10	CDF	0.9597	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.3987	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19390	1385	14	52.32	<1.0E-37	Significant Effect
Error	1614.62	26.4693	61			
Total	21004.7		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.97	29.14	0.6886	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9859	0.9559	0.5632	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 06-5974-1041 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 20 Mar-19 17:41 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

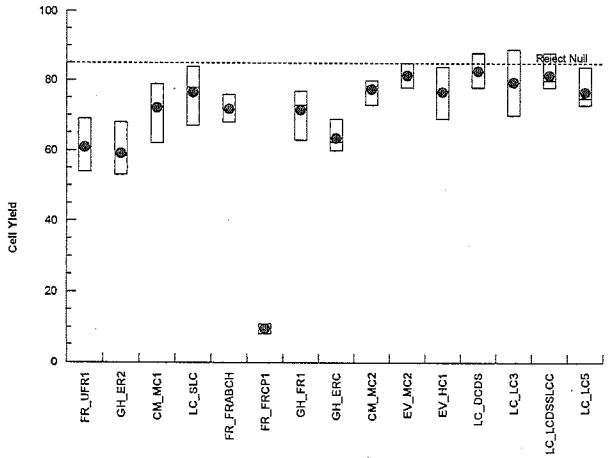
Cell Yield Summary

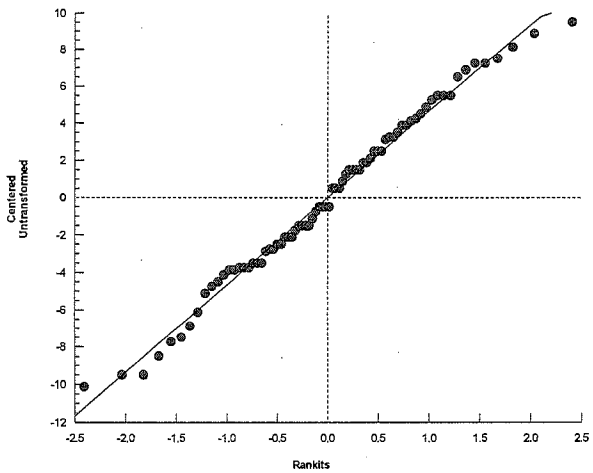
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	60.88	56.6	65.15	60.5	54	69	1.807	8.40%	0.00%
GH_ER2		8	59.12	54.99	63.26	58.5	53	68	1.747	8.36%	2.87%
CM_MC1		8	72.12	67.49	76.76	72.5	62	79	1.959	7.68%	-18.48%
LC_SLC	US	8	76.5	71.54	81.46	78	67	84	2.096	7.75%	-25.67%
FR_FRABCH		4	71.75	66.18	77.32	71.5	68	76	1.75	4.88%	-17.86%
FR_FRCP1		4	9.5	7.446	11.55	9.5	8	11	0.6455	13.59%	84.39%
GH_FR1		4	71.5	61.23	81.77	73	63	77	3.227	9.03%	-17.45%
GH_ERC		4	63.5	57.34	69.66	62.5	60	69	1.936	6.10%	-4.31%
CM_MC2		4	77.5	72.55	82.45	78.5	73	80	1.555	4.01%	-27.31%
EV_MC2		4	81.5	76.91	86.09	81.5	78	85	1.443	3.54%	-33.88%
EV_HC1		4	76.75	66.25	87.25	77	69	84	3.301	8.60%	-26.08%
LC_DCDS		4	82.75	74.81	90.69	82.5	78	88	2.496	6.03%	-35.93%
LC_LC3		4	79.5	66.74	92.26	79.5	70	89	4.01	10.09%	-30.60%
LC_LCDSSLCC		4	81.5	74.32	88.68	80	78	88	2.255	5.53%	-33.88%
LC_LC5		4	76.75	68.81	84.69	75	73	84	2.496	6.50%	-26.08%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		69	58	63	65	57	57	64	54
GH_ER2		57	61	57	60	68	53	63	54
CM_MC1		68	74	77	71	79	76	70	62
LC_SLC	US	75	78	82	79	84	78	69	67
FR_FRABCH		73	76	68	70				
FR_FRCP1		8	11	10	9				
GH_FR1		77	70	76	63				
GH_ERC		69	62	63	60				
CM_MC2		78	79	80	73				
EV_MC2		82	78	85	81				
EV_HC1		80	84	74	69				
LC_DCDS		79	86	78	88				
LC_LC3		77	70	82	89				
LC_LCDSSLCC		81	78	88	79				
LC_LC5		76	73	84	74				

Graphics





APPENDIX C – *Hyalella azteca* Toxicity Test Data

Hyalella azteca Water-only Test Summary Sheet

Client: Teck
Work Order No.: 190349

Start Date: Mar 1/19
Set up by: SSM, KJL, CS

Sample Information:

Sample ID: various - see below
Sample Date: Feb 26, Mar 5, Mar 12, Mar 19, 2019
Date Received: Feb 27, Mar 6, Mar 13, Mar 20, 2019.
Sample Volume: 1-2 x 20L carboys/week per sample

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Biosystems
Date received: Feb 28/19
Age or size (Day 0): 7-8 d

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA 172
Stock Solution ID: n/a
Date Initiated: Mar 1/19

96-h LC50 (95% CL): 5.6 (4.5-6.9) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.9 (4.5-7.7) g/L NaCl CV (%): 13

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
Control	90.0 ± ~~1.9~~ ~~11.1~~ 14.1	0.11 ± 0.03
FR_UFR1 (Site control)	70.0 ± 27.4	0.07 ± 0.04
GH_ER2 (Site control)	60.0 ± 21.2 *α	0.07 ± 0.03
CM_MC1 (Site control)	88.0 ± 8.4	0.11 ± 0.05
FR_FRCP1	70.0 ± 20.0	0.08 ± 0.02
FR_FRARCH	78.0 ± 14.8	0.07 ± 0.05
GH_FR1	82.0 ± 8.4	0.09 ± 0.06
CM_MC2	96.0 ± 5.5	0.07 ± 0.03

* Significantly different compared to control
α Significantly different compared to site control CM_MC1

Reviewed by: JCu
Date reviewed: May 23/19

Hyalella azteca Water-only Test Summary Sheet

Client: Teck
Work Order No.: 190349

Start Date: Mar 1/19
Set up by: SSM, KJL, CS

Sample Information:

Sample ID: Various-see below
Sample Date: Feb 26, Mar 5, Mar 12, Mar 19, 2019
Date Received: Feb 27, Mar 6, Mar 13, Mar 20, 2019.
Sample Volume: 1-2 x 20L carboys/week per sample

Test Organism Information:

Species: *Hyalella azteca*
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Age or size (Day 0): 7-8 d

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA 172
Stock Solution ID: n/a
Date Initiated: Mar 1/19

96-h LC50 (95% CL): 5.6 (4.5-6.9) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.9 (4.5-7.7) g/L NaCl CV (%): 13

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
RGt_MIDAGt	78.0 ± 11.0	0.05 ± 0.03
EDTA Control	66.0 ± 15.2*	0.07 ± 0.02
FR_FRGP1 + EDTA	76.0 ± 15.2	0.08 ± 0.02
GM_MC2 + EDTA	~~68.0 ± 23.9~~ 70.0 ± 25.5	0.08 ± 0.03
	±	±
	±	±
	±	±
	±	±

*Significantly different compared to control

Reviewed by: JGh
Date reviewed: May 23/19

Chronic *H. azteca* ~~Sediment~~ Toxicity Test Data Sheet
Freshwater ~~Sediment~~ Water Quality

Client: Teck
WO #: 190349
Sample ID: Various - see below

Start Date: Mar 1/19
Termination Date: Mar 29/19
CER #: 6
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control water	22.0	23.0	22.5	22.5	22.0	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0
FR-FRCP1	22.0	23.0	22.5	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
FR-FRABCH	22.0	23.0	22.5	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
FR-UFR1	22.0	23.0	22.5	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
GH-FR1	22.0	23.0	22.5	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
GH-ER2	22.0	23.0	23.0	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
CM-MC1	22.0	23.0	22.5	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
CM-MC2	22.0	23.0	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0
RepCM-MIDA01	22.0	23.0	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Technician Initials									SD						

Temperature (°C)

Sample ID	Day 15	16	17	18	19	20	21	22	23	24	25	26	27	28
Control Water	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0
FR-FRCP1	22.0	22.0	22.0	22.0	23.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0
FR-FRABCH	22.0	22.0	22.0	22.0	23.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0
FR-UFR1	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0
GH-FR1	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0
GH-ER2	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0
CM-MC1	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0
CM-MC2	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0
Rep CM-MIDA01	22.0	22.0	22.0	22.0	23.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0
Technician Initials	SD							SD						

Thermometer: 6
Light meter: Lit-1
Light intensity (Lux): 390 - 1020

Comments:

Reviewed by: JDH
Date Reviewed: May 9/19

2/2

Chronic *H. azteca* ~~Sediment~~ Toxicity Test Data Sheet
Freshwater ~~Sediment~~ Water Quality

Client: Teck
WO #: 190349
Sample ID: Various - see below

Start Date: Mar 1/19
Termination Date: Mar 29/19
CER #: 6
Test Organism: *H. azteca*

Temperature (°C)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
EDTA Control	22.0	23.0	23.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
FR-FRCP1 + EDTA	22.0	23.0	23.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
CM-MC2 + EDTA	22.0	23.0	23.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Technician Initials		A	K						JP	MM	CT	CT	CT	CT	CT

Temperature (°C)

Sample ID	Day														
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
EDTA Control	22.0	22.0	22.0	22.0	23.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	
FR-FRCP1 + EDTA	22.0	22.0	22.0	22.0	23.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	
CM-MC2 + EDTA	22.0	22.0	22.0	22.0	23.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	
Technician Initials	JP	MM	CT					JP	MM						

Thermometer: 6 Light meter: Lit-1 Light intensity (Lux): 390 - 1020

Comments:

Reviewed by: JPL Date Reviewed: May 9/19

1/2

Chronic *H. azteca* ~~Sediment~~ Toxicity Test Data Sheet
Freshwater ~~Sediment~~ Water Quality

Client: Teck
WO #: 190349
Sample ID: various - see below

Start Date: Mar 1/19
Termination Date: Mar 29/19
CER #: 6
Test Organism: *H. azteca*

Conductivity (µS)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control Water	451	448	466	467	470	483	479	497	454	459	466	466	479	487	499
FR-FRCPI	3520	3466	3490	3430	3440	3440	3430	3420	3510	3520	3580 3550	3550	3500	3480	3520
FR-FRABCH	1268	1267	1302	1262	1268	1258	1265	1250	1264	1284	1277	1263	1265	1233	1236
FR-UFR1	476	493	490	477	485	490	487	496	504	489	484	490	495	493	504
GH-FR1	1072	1076	1090	1082	1094	1097	1088	1102	1051	1088	1082	1080	1093	1084	1084
GH-ER2	415	422	437	428	436	440	435	450	441	437	432	438	438	437	450
CM-MC1	398	413	404	400	409	414	410	426	418	414	412	415	421	416	430
CM-MC2	1153	1158	1164	1161	1169	1163	1161	1156	1162	1162	1166	1155	1156	1136	1152
Rep CM-MIDAG	819	826	829	828	833	827	829	827	823	835	836	858	857	817	824
Technician Initials															

Conductivity (µS)

Sample ID	Day														
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
Control Water	465	462	470	471	459	470	474	465	463	472	467	476	471	472	
FR-FRCPI 3556	3530	3520	3520	3500	3410	3390	3370	2500	1954	1454	1395	1367	1363	1388	
FR-FRABCH	1253	1272	1268	1272	1230	1226	1215	1213	1269	1262	1243	1239	1240	1225	
FR-UFR1	494	483	486	488	482	485	490	464	440	433	433	436	432	441	
GH-FR1	1078	1074	1080	1081	1061	1065	1061	1696	1094	1102	1089	1107	1099	1112	
GH-ER2	437	438	432	438	434	433	439	436	440	436	437	441	438	444	
CM-MC1	423	413	412	418	414	415	423	424	436	417	417	424	421	435	
CM-MC2	1209	1228	1238	1231	1208	1205	1202	1276	1301	1331	1323	1318	1320	1310	
Rep 2 CM-MIDAG	824	853	851	850	840	844	837	873	902	910	904	909	911	892	
Technician Initials															

Conductivity meter/probe: 3/3

Comments: Mar 23 measurements done using P2, D2, and CP2
① confirmed w/ C-1

Reviewed by: JCM

Date Reviewed: May 9/19

Chronic *H. azteca* Sediment Toxicity Test Data Sheet
Freshwater Sediment Water Quality

2/2

Client: Teck
WO #: 190349
Sample ID: Various - see below

Start Date: Mar 1/19
Termination Date: Mar 29/19
CER #: 6
Test Organism: *H. azteca*

Conductivity (µS)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
EDTA Control	442	450	453	448	459	462	458	477	468	461	455	460	463	463	478
FR_FRCP1 + EDTA	3600	3590	3540	3530	3520	3510	3520	3510	3546	3560	3580	3540	3510	3440	3510
CM_MC2 + EDTA	1154	1152	1165	1173	1172	1177	1170	1172	1167	1207	1175	1170	1166 1161	1144	1153
Technician Initials									JD	MM					

Conductivity (µS)

Sample ID	Day													
	15	16	17	18	19	20	21	22	23	24	25	26	27	28
EDTA Control	467	484	462	469	462	466	472	466	466	463	461	468	469	474
FR_FRCP1 + EDTA	3520	3480	3500	3420	3390	3410	3370	2300	1722	1393	1355	1340	1350	1331
CM_MC2 + EDTA	1186	1228	1249	1250	1222	1223	1224	1288	1337	1341	1332	1326	1320	1318
Technician Initials	JD	MM						JD	MM					

Conductivity meter/probe: 313

Comments: ① continued on C-1

Reviewed by: JD

Date Reviewed: May 9/19

1/2

Chronic *H. azteca* ~~Sediment~~ Toxicity Test Data Sheet
Freshwater ~~Sediment~~ Water Quality

Client: Teck
WO #: 190349
Sample ID: various - see below

Start Date: Mar 1/19
Termination Date: Mar 29/19
CER #: 6
Test Organism: *H. azteca*

Dissolved oxygen (mg/L)

Sample ID	Day 0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control Water	8.1	7.4	6.6	6.2	6.8	6.2	6.3	6.8	5.1	6.4	5.9	6.3	5.3	5.7	5.7
FR-FRCP1	8.5	7.5	6.8	6.8	6.7	6.4	6.5	6.5	5.7	6.5	6.1	6.2	5.4	6.4	5.4
FR-FRABCH	8.4	7.4	6.2	6.7	6.4	6.3	6.4	6.3	5.8	6.1	6.0	5.9	5.5	6.7	6.6
FR-UFR1	8.0	7.4	6.7	6.7	6.7	6.0	6.2	6.1	5.7	6.4	5.9	6.4	5.1	5.8	5.3
GH-FR1	8.1	7.5	6.9	7.0	6.6	6.3	6.4	6.2	5.7	6.4	5.7	5.9	4.7	5.5	5.5
GH-ER2	8.2	7.5	6.9	6.9	6.6	6.2	6.5	6.2	6.0	5.9	5.8	6.0	5.1	5.5	5.3
CM-MC1	8.3	7.4	6.5	6.4	6.5	6.2	6.2	6.1	6.1	6.2	5.8	5.9	5.0	5.9	5.7
CM-MC2	8.1	7.5	6.4	6.4	6.5	6.3	6.3	6.1	5.9	6.2	5.9	5.9	5.1	5.7	5.6
~~CM~~ MIDAG	8.2	7.5	6.7	6.6	6.5	6.3	6.4	6.2	5.6	6.3	6.3	5.9	5.2	5.8	5.6
RG															
Technician Initials	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	JD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Dissolved oxygen (mg/L)

Sample ID	Day 15	16	17	18	19	20	21	22	23	24	25	26	27	28	
Control Water	5.9	6.0	5.5	6.2	5.6	6.2	6.2	6.0	6.1	6.2	6.3	5.8	6.0	5.8	
FR-FRCP1	5.1	5.6	5.7	6.4	5.8	6.7	6.3	5.8	6.4	6.3	6.3	5.8	6.1	5.7	
FR-FRABCH	6.6	6.1	6.2	6.5	6.0	6.5	6.2	5.2	6.1	6.0	6.2	5.7	6.0	5.7	
FR-UFR1	5.9	6.2	5.6	6.0	5.7	6.4	6.0	6.1	6.2	6.0	6.1	5.7	6.1	5.6	
GH-FR1	6.0	6.0	5.8	6.1	5.7	6.5	6.0	5.6	6.3	6.1	6.0	5.6	6.0	5.6	
GH-ER2	5.8	5.8	5.4	6.0	5.5	6.5	6.1	6.2	6.5	6.2	6.1	5.7	6.0	5.6	
CM-MC1	5.8	5.7	5.5	6.0	5.6	6.4	6.0	6.9	6.2	6.0	6.1	5.6	5.9	5.6	
CM-MC2	5.9	5.8	6.0	6.1	5.8	6.3	5.9	6.1	6.0	6.0	6.2	5.8	6.1	5.7	
~~CM~~ MIDAG	5.9	5.5	5.8	6.0	5.7	6.4	6.1	6.4	6.5	6.3	6.2	5.8	6.1	5.7	
RG															
Technician Initials	JD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	JD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

DO meter/probe: 3 B

Comments:

Reviewed by: [illegible]

Date Reviewed: May 9/19

2/2

Chronic *H. azteca* ~~Sediment~~ Toxicity Test Data Sheet
Freshwater ~~Sediment~~ Water Quality

Client: Teck
WO #: 190349
Sample ID: Various - see below

Start Date: Mar 1/19
Termination Date: Mar 29/19
CER #: 6
Test Organism: *H. azteca*

Dissolved oxygen (mg/L)

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
EDTA Control	8.0	7.4	6.4	6.3	6.6	6.2	6.4	6.1	5.7	6.2	5.9	6.2	5.1	5.5	5.9
FR_FRCP1 + EDTA	8.4	7.4	6.5	6.5	6.5	6.3	6.4	6.1	5.4	6.1	6.7	6.1	5.3	6.2	5.9
CM_MC2 + EDTA	8.4	7.3	6.3	6.4	6.5	6.2	6.3	6.0	5.7	6.1	6.1	5.7	4.8	5.7	5.3
Technician Initials	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	JD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Dissolved oxygen (mg/L)

Sample ID	Day														
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
EDTA Control	6.0	5.5	5.8	6.0	5.6	6.3	6.0	6.1	5.9	6.2	6.1	5.7	6.0	5.8	
FR_FRCP1 + EDTA	5.3	5.7	5.5	6.0	5.7	6.4	6.0	6.5	6.3	6.1	6.1	5.7	6.0	5.7	
CM_MC2 + EDTA	5.5	5.6	5.0	5.6	5.2	6.4	6.1	5.0	5.7	5.8	6.0	5.8	6.1	5.8	
Technician Initials	JD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	JD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

DO meter/probe: 3 / 3

Comments:

Reviewed by: [illegible]

Date Reviewed: May 9/19

Chronic *H. azteca* Sediment Toxicity Test Data Sheet

Freshwater Sediment Water Quality

Client: Teck
WO #: 190349
Sample ID: Various - see below

Start Date: Mar 1/19
Termination Date: Mar 29/19
CER #: 6
Test Organism: *H. azteca*

pH

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Control Water	7.4	7.4	7.3	7.4	7.4	7.3	7.4	7.3	7.1	7.3	7.2	7.1	7.1	7.1	7.3
FR_FRCPi	7.8	7.9	7.9	7.9	7.8	7.9	7.8	7.8	8.0	8.0	8.0	7.9	7.9	7.9	7.9
FR_FRABCH	7.7	8.0	8.0	8.0	7.8	7.7	7.8	7.7	8.0	8.0	7.9	7.8	7.8	7.9	8.0
FR_UFR1	7.7	7.9	7.8	7.8	7.9	7.6	7.7	7.7	7.8	7.9	7.7	7.6	7.6	7.6	7.7
GH_FR1	7.8	8.0	8.1	8.0	7.8	7.9	7.8	7.8	8.0	8.0	8.0	7.9	7.8	7.9	7.9
GH_ER2	7.8	7.9	7.8	7.9	7.8	7.6	7.7	7.7	7.9	7.9	7.7	7.6	7.6	7.6	7.6
CM_MC1	7.6	7.8	7.8	7.8	7.9	7.7	7.7	7.7	7.8	7.8	7.7	7.6	7.5	7.6	7.7
CM_MC2	7.8	7.8	8.0	7.9	7.9	7.8	7.8	7.8	8.0	7.9	8.0	7.8	7.8	7.8	7.8
CM_MIDA6 RG	7.7	7.8	7.9	7.8	7.8	7.7	7.7	7.7	7.9	7.9	7.9	7.7	7.7	7.8	7.8
Technician Initials									JD						

② 7.8

pH

Sample ID	Day														
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
Control Water	7.2	7.1	7.2	7.3	7.3	7.3	7.3	7.2	7.3	7.3	7.3	7.3	7.3	7.3	
FR_FRCPi	8.0	7.9	7.9	7.9	7.8	7.8	7.8	8.0	7.8	7.8	7.8	7.8	7.8	7.8	
FR_FRABCH	8.1	8.1	8.0	8.0	7.9	7.9	7.8	7.9	7.8	7.8	7.8	7.7	7.8	7.8	
FR_UFR1	7.8	7.7	7.7	7.8	7.7	7.8	7.8	8.0	7.7	7.8	7.7	7.7	7.8	7.7	
GH_FR1	8.0	8.0	8.0	7.9	7.9	7.8	7.8	8.0	7.9	7.8	7.8	7.7	7.7	7.7	
GH_ER2	7.8	7.6	7.6	7.7	7.7	7.8	7.7	7.9	7.8	7.7	7.7	7.7	7.7	7.7	
CM_MC1	7.7	7.7	7.6	7.7	7.6	7.7	7.7	7.9	7.8	7.7	7.8	7.7	7.7	7.8	
CM_MC2	7.9	7.9	7.9	7.8	7.7	7.8	7.7	8.0	7.8	7.8	7.8	7.8	7.8	7.8	
CM_MIDA6 RG	7.9	7.8	7.8	7.8	7.7	7.7	7.7	8.0	7.9	7.8	7.8	7.8	7.8	7.8	
Technician Initials	JD							JD							

② 7.9

pH meter/probe: 3 / 3

Comments:

Reviewed by: JCM

Date Reviewed: May 22/19

2/2

Chronic *H. azteca* Sediment Toxicity Test Data Sheet

Freshwater Sediment Water Quality

Client: Teck
WO #: 190349
Sample ID: various - see below

Start Date: Mar 1/19
Termination Date: Mar 29/19
CER #: 6
Test Organism: *H. azteca*

pH

Sample ID	Day														
	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14
EDTA Control	7.5	7.8	7.4	7.4	7.5	7.5	7.4	7.4	7.2	7.4	7.2	7.2	7.1	7.2	7.2
FR_FRCP1 + EDTA	7.9	7.7	7.9	7.8	7.8	7.7	7.8	7.7	7.9	8.0	8.0	8.0	7.9	8.0	8.0
CM_MC2 + EDTA	7.8	7.8	8.0	7.9	7.8	7.7	7.7	7.7	7.9	8.0	8.0	7.9	7.8	7.8	7.8
Technician Initials															

pH

Sample ID	Day														
	15	16	17	18	19	20	21	22	23	24	25	26	27	28	
EDTA Control	7.4	7.2	7.2	7.3	7.3	7.4	7.3	7.4	7.3	7.3	7.3	7.3	7.3	7.3	
FR_FRCP1 + EDTA	8.0	7.9	8.0	7.9	7.8	7.8	7.8	8.1	7.9	7.9	7.8	7.7	7.8	7.8	
CM_MC2 + EDTA	7.9	7.8	7.8	7.8	7.8	7.8	7.8	8.0	7.8	7.8	7.8	7.7	7.8	7.8	
Technician Initials															

pH meter/probe: 3 / 3

Comments: Mar 9 readings taken with Cer 2, pit 2, DO2, and Cp 2

Reviewed by: JCh

Date Reviewed: May 9/19

T1 1/4 3

H. azteca Sediment Toxicity Test Data Sheet

Freshwater Sediment 14-d Survival and Weight

Client: Teck
Work Order No: 190349
Sample ID: various - see below

Start Date: Mar 1/19
Termination Date: Mar 29/19
Test Organism: *Hyalella azteca*
Balance: 1

T1 Orange

Sample ID	Pan No.	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Control Sediment	1	A	8①	1	1		1052.56	1053.34	8	
	2	B	10	0	0		1068.04	1069.52	10	
	3	C	10	0	0		1036.43	1037.42	10	
	4	D	10	0	0		1051.77	1053.17	10	
	5	E	7①	3	0		1040.96	1041.40	7	
FR_FRCP1	6	A	8①	0	2		1062.26	1062.96	8	
	7	B	8①	0	2		1054.76	1055.66	8	
	8	C	9	0	1		1058.29	1059.07	9	
	9	D	4③	0	6		1035.96	1036.17	4	
	10	E	6①	0	4		1050.79	1051.28	6	
FR_FRABCH	11	A	8	0	2	CMP	1063.91	1065.08	8	
	12	B	8	0	2		1052.01	1052.47	8	
	13	C	11	0	0		1050.22	1050.99	11	
	14	D	6	0	4		1059.99	1060.18	6	
	15	E	7	0	3		1038.15	1038.45	7	
FR_UFR1	16	A	10	0	0	CMP	1055.09	1056.50	10	
	17	B	3②	3	4		1060.00	1060.20	3	
	18	C	7	1	2		1052.37	1052.73	7	
	19	D	6	0	4		1052.87	1053.16	6	
	20	E	9	0	1		1049.74	1050.23	9	

Comments: ① checked by KJL ② Checked by SSM ③ checked by ML
10% RW: Pan # 4 = 1053.13 Pan # 15 = 1038.40 Pan # 21 = 1074.13, Pan # 29 = 1050.16
Pan # 38 = 1048.32, Pan # 43 = 1029.89, Pan # 52 = 1056.44

Reviewed by: JCL
Date Reviewed: May 9/19

T1 2/4

H. azteca ~~Sediment~~ Toxicity Test Data Sheet

Freshwater ~~Sediment~~ 14-d Survival and Weight

Client: Teck

Work Order No: 190349

Sample ID: various - see below

Start Date: Mar 1/19

Termination Date: Mar 29/19

Test Organism: *Hyalella azteca*

Balance: 1

T1

Sample ID	Orange Pan No.	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control Sediment~~	21	A	9	0	1	CMP	1073.22	1074.10	9	
GH-FR1	22	B	8	0	2		1029.86	1030.33	8	
	23	C	8	0	2		1057.62	1058.00	8	
	24	D	9	0	~~0~~ 1		1044.26	1046.01	9	
	25	E	7	0	3		1078.69	1079.13	7	
GH-ER2	26	A	9	0	1	CMP	1068.87	1069.92	9	
	27	B	6	0	4		1044.64	1044.93	6	
	28	C	10	0	6		1100.96	1101.29	4	
	29	D	7	0	3		1049.85	1050.15	7	
	30	E	10	0	6		1071.34	1071.58	4	
CM-MC1	31	A	8	0	2	CMP	1063.11	1064.28	8	
	32	B	10	0	0		1047.37	1049.67	10	
	33	C	9	0	1		1062.90	1063.77	9	
	34	D	9	0	1		1075.17	1075.56	9	
	35	E	8	0	2		1043.92	1044.49	8	
CM-MC2	36	A	9	0	1	CMP	1047.45	1047.78	9	
	37	B	10	0	0		1064.87	1065.94	10	
	38	C	9	0	1		1047.61	1048.30	9	
	39	D	10	0	0		1062.07	1062.97	10	
	40	E	10	0	0		1058.48	1059.05	10	

Comments: ①Checked by KSL

Reviewed by: JCL

Date Reviewed: May 9/19

Ti 314
3

H. azteca Sediment Toxicity Test Data Sheet

Freshwater Sediment 14-d Survival and Weight

Client: Teck
Work Order No: 190349
Sample ID: various - see below

Start Date: Mar 1/19
Termination Date: Mar 29/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Ti Organic Pan No.	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control Sediment~~	41	A	7	0	3	CMP	1048.71	1049.40	7	
CM-MIDAG	42	B	9	0	1		1057.24	1057.73	9	
Rep	43	C	7	0	3		1029.70	1029.87	7	
	44	D	7	0	3		1056.20	1056.35	7	
	45	E	9	0	1		1048.99	1049.57	9	
EDTA Control	46	A	9	0	1		1065.81	1066.60	9	
	47	B	5 ①	0	5		1056.89	1057.22	5	
	48	C	6 ①	0	4		1047.10	1047.35	6	
	49	D	7 ①	0	3		1055.65	1056.21	7	
	50	E	6 ①	0	4		1039.42	1039.74	6	
FR-FRCP1 + EDTA	51	A	6 ③	0	4		1046.46	1046.91	6	
	52	B	~~8~~ 8	0	~~2~~ 2		1056.03	1056.41	8	
	53	C	7	0	3	CMP	1051.56	1052.06	7	
	54	D	7	0	3	CMP	1082.02	1082.77	7	
	55	E	10	0	0	CMP	1051.02	1051.80	10	
CM-MC2 + EDTA	56	A	~~9~~ 9	0	1	CMP	1047.92	1048.27	~~9~~ 8 ④	
	57	B	12	0	0		1067.08	1068.60	12	
	58	C	7	0	3		1059.41	1059.79	7	
	59	D	4 ②	0	6		1066.66	1067.06	4	
	60	E	5 ②	0	5		1047.59	1047.95	5	

Comments: ① checked by KJL ②Checked by SSM ③ checked by JW.
④ 1 lost in transfer

Reviewed by: JGL

Date Reviewed: May 9/19

CETIS Summary Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	18-4281-6600	01 Mar-19	01 Mar-19	n/a	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	59h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	61h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
EDTA Control	21-0198-8366	01 Mar-19	01 Mar-19	n/a		
FR_FRCP1+EDTA	15-4192-1325	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
CM_MC2 + EDTA	01-6715-5254	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1+EDTA	Water Sample	Teck Coal	FR_FRCP1+EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2858	FR_FRCP1+EDTA passed mean dry weig	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2858	RG_MIDAG passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2858	CM_MC2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2858	GH_FR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2858	EDTA Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2858	FR_FRCP1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2858	FR_FRABCH passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2858	CM_MC1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2858	GH_ER2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2858	FR_UFR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2858	Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2858	CM_MC2 + EDTA passed mean dry weight	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2479	CM_MC1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2479	GH_ER2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2479	FR_UFR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2479	FR_FRABCH passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2479	GH_FR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2479	CM_MC2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2479	Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2479	RG_MIDAG passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2479	EDTA Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2479	FR_FRCP1 passed mean dry weight-mg	1

CETIS Analytical Report

Test Code/ID: 190349 / 06-3070-1793

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	13-3093-0306	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)	Teck Coal	
FR_FRCP1+EDTA	15-4192-1325	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRCP1+EDTA	Water Sample	Teck Coal	FR_FRCP1+EDTA	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRCP1+EDTA passed mean dry weight-	29.79%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		FR_FRCP1+EDTA	0.6193	1.86	0.025	8	CDF	0.2765	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0001743	0.0001743	1	0.3836	0.5529	Non-Significant Effect
Error	0.0036358	0.0004545	8			
Total	0.0038101		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.011	23.15	0.9917	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8984	0.7411	0.2103	Normal Distribution

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_FRCP1	LC	5	0.08417	0.05762	0.1107	0.08666	0.05252	0.1125	0.00956	25.40%	0.00%
FR_FRCP1+EDTA		5	0.07582	0.04942	0.1022	0.07501	0.0475	0.1071	0.009507	28.04%	9.92%

Mean Dry Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_FRCP1	LC	0.08749	0.1125	0.08666	0.05252	0.08167
FR_FRCP1+EDTA		0.07501	0.0475	0.07143	0.1071	0.078

Analyst: QA: May 9/19

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2479	CM_MC2 + EDTA passed mean dry weight	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2479	FR_FRCP1+EDTA passed mean dry weig	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.8790	CM_MC2 + EDTA passed mean dry weight	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.8790	GH_ER2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.8790	FR_FRCP1+EDTA passed mean dry weig	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.8790	CM_MC2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.8790	Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.8790	RG_MIDAG passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.8790	FR_FRCP1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.8790	CM_MC1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.8790	FR_UFR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.8790	GH_FR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.8790	EDTA Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.8790	FR_FRABCH passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.5157	FR_FRCP1+EDTA passed mean dry weig	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.5157	CM_MC1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.5157	FR_FRCP1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.5157	CM_MC2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.5157	GH_FR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.5157	FR_FRABCH passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.5157	Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.5157	EDTA Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.5157	GH_ER2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.5157	RG_MIDAG passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.5157	FR_UFR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.5157	CM_MC2 + EDTA passed mean dry weight	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2412	FR_FRCP1+EDTA passed mean dry weig	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2412	EDTA Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2412	Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2412	GH_FR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2412	FR_UFR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2412	CM_MC1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2412	CM_MC2 + EDTA passed mean dry weight	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2412	FR_FRABCH passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2412	FR_FRCP1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2412	CM_MC2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2412	RG_MIDAG passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.2412	GH_ER2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6789	GH_ER2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6789	FR_FRCP1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6789	Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6789	FR_FRABCH passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6789	CM_MC1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6789	FR_UFR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6789	CM_MC2 + EDTA passed mean dry weight	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6789	RG_MIDAG passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6789	EDTA Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6789	FR_FRCP1+EDTA passed mean dry weig	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6789	GH_FR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6789	CM_MC2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3049	CM_MC2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3049	CM_MC2 + EDTA passed mean dry weight	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3049	RG_MIDAG passed mean dry weight-mg	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3049	FR_FRABCH passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3049	Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3049	FR_FRCP1+EDTA passed mean dry weig	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3049	GH_ER2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3049	FR_FRCP1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3049	CM_MC1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3049	EDTA Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3049	FR_UFR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3049	GH_FR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.0635	RG_MIDAG passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.0635	FR_UFR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.0635	CM_MC1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.0635	GH_FR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.0635	FR_FRABCH passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.0635	FR_FRCP1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.0635	FR_FRCP1+EDTA passed mean dry weig	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.0635	CM_MC2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.0635	Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.0635	GH_ER2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.0635	CM_MC2 + EDTA passed mean dry weight	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.0635	EDTA Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.1851	GH_ER2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.1851	EDTA Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.1851	FR_FRCP1+EDTA passed mean dry weig	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.1851	FR_UFR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.1851	CM_MC2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.1851	CM_MC1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.1851	Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.1851	CM_MC2 + EDTA passed mean dry weight	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.1851	GH_FR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.1851	FR_FRCP1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.1851	RG_MIDAG passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.1851	FR_FRABCH passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3478	Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3478	GH_FR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3478	FR_FRCP1+EDTA passed mean dry weig	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3478	FR_UFR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3478	FR_FRABCH passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3478	RG_MIDAG passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3478	EDTA Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3478	GH_ER2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3478	FR_FRCP1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3478	CM_MC2 + EDTA passed mean dry weight	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3478	CM_MC1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.3478	CM_MC2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.4166	FR_UFR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.4166	GH_ER2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.4166	CM_MC1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.4166	FR_FRCP1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.4166	GH_FR1 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.4166	FR_FRABCH passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.4166	FR_FRCP1+EDTA passed mean dry weig	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.4166	Control passed mean dry weight-mg	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.4166	CM_MC2 passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.4166	RG_MIDAG passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.4166	EDTA Control passed mean dry weight-mg	1
03-7293-0836	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.4166	CM_MC2 + EDTA passed mean dry weight	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	FR_FRCP1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	RG_MIDAG passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	CM_MC2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	GH_FR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	EDTA Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	FR_FRCP1+EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	FR_FRABCH passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	CM_MC1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	GH_ER2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	FR_UFR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	CM_MC2 + EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0053	CM_MC1 failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0053	FR_FRCP1 failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0053	GH_ER2 failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0053	FR_FRABCH failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0053	GH_FR1 failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0053	FR_UFR1 failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0053	CM_MC2 failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0053	RG_MIDAG failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0053	Control failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0053	EDTA Control failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0053	FR_FRCP1+EDTA failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0053	CM_MC2 + EDTA failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1+EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	FR_FRCP1+EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	CM_MC1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	FR_FRCP1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	CM_MC2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	GH_FR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	FR_FRABCH passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	CM_MC2 + EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	EDTA Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	GH_ER2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	RG_MIDAG passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1028	FR_UFR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3716	EDTA Control passed survival rate	1

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3716	Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3716	GH_FR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3716	FR_UFR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3716	CM_MC1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3716	CM_MC2 + EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3716	FR_FRABCH passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3716	GH_ER2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3716	FR_FRCP1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3716	CM_MC2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3716	RG_MIDAG passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3716	FR_FRCP1+EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5821	GH_ER2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5821	FR_FRCP1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5821	Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5821	FR_FRABCH passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5821	CM_MC2 + EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5821	CM_MC1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5821	FR_UFR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5821	RG_MIDAG passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5821	EDTA Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5821	FR_FRCP1+EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5821	CM_MC2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5821	GH_FR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.9441	CM_MC2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.9441	RG_MIDAG passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.9441	FR_FRABCH passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.9441	Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.9441	FR_FRCP1+EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.9441	GH_ER2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.9441	CM_MC2 + EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.9441	FR_FRCP1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.9441	CM_MC1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.9441	EDTA Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.9441	FR_UFR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.9441	GH_FR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4284	RG_MIDAG passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4284	FR_UFR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4284	CM_MC1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4284	FR_FRCP1+EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4284	GH_FR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4284	FR_FRCP1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4284	CM_MC2 + EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4284	CM_MC2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4284	EDTA Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4284	GH_ER2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4284	Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4284	FR_FRABCH passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0350	FR_FRCP1+EDTA failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0350	EDTA Control failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0350	FR_UFR1 failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0350	GH_ER2 failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0350	CM_MC1 failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0350	Control failed survival rate	1

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0350	CM_MC2 + EDTA failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0350	GH_FR1 failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0350	FR_FRCP1 failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0350	CM_MC2 failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0350	RG_MIDAG failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0350	FR_FRABCH failed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3251	Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3251	GH_FR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3251	CM_MC2 + EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3251	FR_FRCP1+EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3251	FR_UFR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3251	FR_FRABCH passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3251	RG_MIDAG passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3251	EDTA Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3251	GH_ER2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3251	FR_FRCP1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3251	CM_MC1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3251	CM_MC2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1041	FR_UFR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1041	GH_ER2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1041	CM_MC1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1041	FR_FRCP1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1041	GH_FR1 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1041	FR_FRABCH passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1041	FR_FRCP1+EDTA passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1041	Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1041	CM_MC2 passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1041	RG_MIDAG passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1041	EDTA Control passed survival rate	1
19-4426-4222	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1041	CM_MC2 + EDTA passed survival rate	1

Test Acceptability

				TAC Limits			
Analysis ID	Endpoint	Attribute	Test Stat	Lower	Upper	Overlap	Decision
19-4426-4222	Survival Rate	Control Resp	0.9	0.8	>>	Yes	Passes Criteria

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	N	5	0.1095	0.06627	0.1527	0.06287	0.148	0.01556	0.03479	31.78%	0.00%
FR_UFR1		5	0.07237	0.02396	0.1208	0.04834	0.141	0.01744	0.03899	53.87%	33.89%
GH_ER2		5	0.07008	0.03262	0.1075	0.04286	0.1167	0.01349	0.03017	43.05%	35.98%
CM_MC1		5	0.1055	0.04057	0.1704	0.04333	0.17	0.02338	0.05229	49.56%	3.63%
FR_FRCP1		5	0.08417	0.05762	0.1107	0.05252	0.1125	0.00956	0.02138	25.40%	23.11%
FR_FRABCH		5	0.06965	0.01352	0.1258	0.03168	0.1462	0.02022	0.04521	64.90%	36.37%
GH_FR1		5	0.09227	0.01761	0.1669	0.0475	0.1944	0.02689	0.06013	65.17%	15.72%
CM_MC2		5	0.07347	0.03928	0.1077	0.03668	0.107	0.01231	0.02753	37.48%	32.89%
RG_MIDAG		5	0.05264	0.01322	0.09205	0.02143	0.09858	0.0142	0.03174	60.31%	51.92%
EDTA Control		5	0.06575	0.04234	0.08916	0.04167	0.08777	0.008432	0.01886	28.68%	39.94%
FR_FRCP1+EDTA		5	0.07582	0.04942	0.1022	0.0475	0.1071	0.009507	0.02126	28.04%	30.74%
CM_MC2 + EDTA		5	0.07934	0.03716	0.1215	0.04375	0.1267	0.01519	0.03397	42.81%	27.52%

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	N	5	0.9000	0.7244	1.0000	0.7000	1.0000	0.0633	0.1414	15.71%	0.00%
FR_UFR1		5	0.7000	0.3600	1.0000	0.3000	1.0000	0.1225	0.2739	39.12%	22.22%
GH_ER2		5	0.6000	0.3366	0.8634	0.4000	0.9000	0.0949	0.2121	35.36%	33.33%
CM_MC1		5	0.8800	0.7761	0.9839	0.8000	1.0000	0.0374	0.0837	9.51%	2.22%
FR_FRCP1		5	0.7000	0.4517	0.9483	0.4000	0.9000	0.0894	0.2000	28.57%	22.22%
FR_FRABCH		5	0.7800	0.5958	0.9642	0.6000	1.0000	0.0663	0.1483	19.02%	13.33%
GH_FR1		5	0.8200	0.7161	0.9239	0.7000	0.9000	0.0374	0.0837	10.20%	8.89%
CM_MC2		5	0.9600	0.8920	1.0000	0.9000	1.0000	0.0245	0.0548	5.71%	-6.67%
RG_MIDAG		5	0.7800	0.6440	0.9160	0.7000	0.9000	0.0490	0.1095	14.04%	13.33%
EDTA Control		5	0.6600	0.4717	0.8483	0.5000	0.9000	0.0678	0.1517	22.98%	26.67%
FR_FRCP1+EDTA		5	0.7600	0.5717	0.9483	0.6000	1.0000	0.0678	0.1517	19.95%	15.56%
CM_MC2 + EDTA		5	0.7000	0.3834	1.0000	0.4000	1.0000	0.1140	0.2550	36.42%	22.22%

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Mean Dry Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	N	0.09749	0.148	0.099	0.14	0.06287
FR_UFR1		0.141	0.06665	0.05143	0.04834	0.05444
GH_ER2		0.1167	0.04834	0.08252	0.04286	0.06
CM_MC1		0.1463	0.17	0.09667	0.04333	0.07124
FR_FRCP1		0.08749	0.1125	0.08666	0.05252	0.08167
FR_FRABCH		0.1462	0.0575	0.07	0.03168	0.04285
GH_FR1		0.09778	0.05875	0.0475	0.1944	0.06287
CM_MC2		0.03668	0.107	0.07667	0.09	0.05701
RG_MIDAG		0.09858	0.05444	0.02429	0.02143	0.06444
EDTA Control		0.08777	0.06599	0.04167	0.07999	0.05332
FR_FRCP1+EDTA		0.07501	0.0475	0.07143	0.1071	0.078
CM_MC2 + EDTA		0.04375	0.1267	0.05429	0.1	0.072

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	N	0.8000	1.0000	1.0000	1.0000	0.7000
FR_UFR1		1.0000	0.3000	0.7000	0.6000	0.9000
GH_ER2		0.9000	0.6000	0.4000	0.7000	0.4000
CM_MC1		0.8000	1.0000	0.9000	0.9000	0.8000
FR_FRCP1		0.8000	0.8000	0.9000	0.4000	0.6000
FR_FRABCH		0.8000	0.8000	1.0000	0.6000	0.7000
GH_FR1		0.9000	0.8000	0.8000	0.9000	0.7000
CM_MC2		0.9000	1.0000	0.9000	1.0000	1.0000
RG_MIDAG		0.7000	0.9000	0.7000	0.7000	0.9000
EDTA Control		0.9000	0.5000	0.6000	0.7000	0.6000
FR_FRCP1+EDTA		0.6000	0.8000	0.7000	0.7000	1.0000
CM_MC2 + EDTA		0.9000	1.0000	0.7000	0.4000	0.5000

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	N	8/10	10/10	10/10	10/10	7/10
FR_UFR1		10/10	3/10	7/10	6/10	9/10
GH_ER2		9/10	6/10	4/10	7/10	4/10
CM_MC1		8/10	10/10	9/10	9/10	8/10
FR_FRCP1		8/10	8/10	9/10	4/10	6/10
FR_FRABCH		8/10	8/10	11/11	6/10	7/10
GH_FR1		9/10	8/10	8/10	9/10	7/10
CM_MC2		9/10	10/10	9/10	10/10	10/10
RG_MIDAG		7/10	9/10	7/10	7/10	9/10
EDTA Control		9/10	5/10	6/10	7/10	6/10
FR_FRCP1+EDTA		6/10	8/10	7/10	7/10	10/10
CM_MC2 + EDTA		9/10	12/12	7/10	4/10	5/10

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	19-4426-4222	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	13 May-19 12:50	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	18-4281-6600	01 Mar-19	01 Mar-19	n/a	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	59h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	61h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
EDTA Control	21-0198-8366	01 Mar-19	01 Mar-19	n/a		
FR_FRCP1+EDTA	15-4192-1325	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
CM_MC2 + EDTA	01-6715-5254	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1+EDTA	Water Sample	Teck Coal	FR_FRCP1+EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	0.0114	Exact	0.1028	Non-Significant Effect
		GH_ER2*	0.0005	Exact	0.0053	Significant Effect
		CM_MC1	0.5000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.0114	Exact	0.1028	Non-Significant Effect
		FR_FRABCH	0.0929	Exact	0.3716	Non-Significant Effect
		GH_FR1	0.1940	Exact	0.5821	Non-Significant Effect
		CM_MC2	0.9441	Exact	0.9441	Non-Significant Effect
		RG_MIDAG	0.0857	Exact	0.4284	Non-Significant Effect
		EDTA Control*	0.0035	Exact	0.0350	Significant Effect
		FR_FRCP1+EDTA	0.0542	Exact	0.3251	Non-Significant Effect
		CM_MC2 + EDTA	0.0149	Exact	0.1041	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.9	0.8	>>	Yes	Passes Criteria

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 19-4426-4222 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 13 May-19 12:50 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control	N	45	5	50	0.9	0.1	-26.49%
FR_UFR1		35	15	50	0.7	0.3	1.62%
GH_ER2		30	20	50	0.6	0.4	15.68%
CM_MC1		44	6	50	0.88	0.12	-23.68%
FR_FRCP1		35	15	50	0.7	0.3	1.62%
FR_FRABCH		40	11	51	0.7843	0.2157	-10.23%
GH_FR1		41	9	50	0.82	0.18	-15.24%
CM_MC2		48	2	50	0.96	0.04	-34.92%
RG_MIDAG		39	11	50	0.78	0.22	-9.62%
EDTA Control		33	17	50	0.66	0.34	7.24%
FR_FRCP1+EDTA		38	12	50	0.76	0.24	-6.81%
CM_MC2 + EDTA		37	15	52	0.7115	0.2885	0.0%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	N	0.8000	1.0000	1.0000	1.0000	0.7000
FR_UFR1		1.0000	0.3000	0.7000	0.6000	0.9000
GH_ER2		0.9000	0.6000	0.4000	0.7000	0.4000
CM_MC1		0.8000	1.0000	0.9000	0.9000	0.8000
FR_FRCP1		0.8000	0.8000	0.9000	0.4000	0.6000
FR_FRABCH		0.8000	0.8000	1.0000	0.6000	0.7000
GH_FR1		0.9000	0.8000	0.8000	0.9000	0.7000
CM_MC2		0.9000	1.0000	0.9000	1.0000	1.0000
RG_MIDAG		0.7000	0.9000	0.7000	0.7000	0.9000
EDTA Control		0.9000	0.5000	0.6000	0.7000	0.6000
FR_FRCP1+EDTA		0.6000	0.8000	0.7000	0.7000	1.0000
CM_MC2 + EDTA		0.9000	1.0000	0.7000	0.4000	0.5000

Survival Rate Binomials

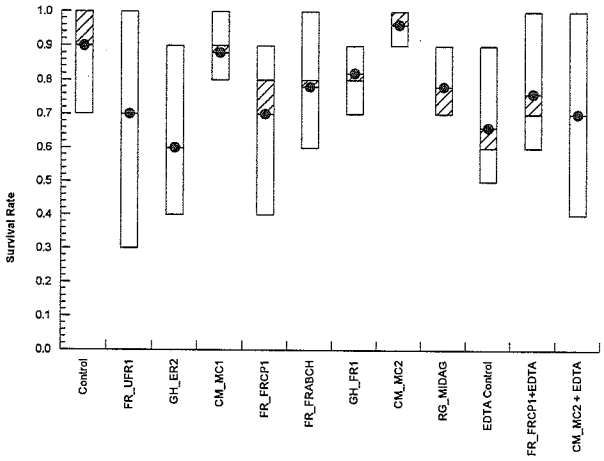
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	N	8/10	10/10	10/10	10/10	7/10
FR_UFR1		10/10	3/10	7/10	6/10	9/10
GH_ER2		9/10	6/10	4/10	7/10	4/10
CM_MC1		8/10	10/10	9/10	9/10	8/10
FR_FRCP1		8/10	8/10	9/10	4/10	6/10
FR_FRABCH		8/10	8/10	11/11	6/10	7/10
GH_FR1		9/10	8/10	8/10	9/10	7/10
CM_MC2		9/10	10/10	9/10	10/10	10/10
RG_MIDAG		7/10	9/10	7/10	7/10	9/10
EDTA Control		9/10	5/10	6/10	7/10	6/10
FR_FRCP1+EDTA		6/10	8/10	7/10	7/10	10/10
CM_MC2 + EDTA		9/10	12/12	7/10	4/10	5/10

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	19-4426-4222	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	13 May-19 12:50	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	03-7293-0836	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:16	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (Modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	18-4281-6600	01 Mar-19	01 Mar-19	n/a	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	59h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	61h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
EDTA Control	21-0198-8366	01 Mar-19	01 Mar-19	n/a		
FR_FRCP1+EDTA	15-4192-1325	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
CM_MC2 + EDTA	01-6715-5254	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1+EDTA	Water Sample	Teck Coal	FR_FRCP1+EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 03-7293-0836 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 30 Apr-19 12:16 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	54.25%
		GH_ER2 passed mean dry weight-mg	54.25%
		CM_MC1 passed mean dry weight-mg	54.25%
		FR_FRCP1 passed mean dry weight-mg	54.25%
		FR_FRABCH passed mean dry weight-mg	54.25%
		GH_FR1 passed mean dry weight-mg	54.25%
		CM_MC2 passed mean dry weight-mg	54.25%
		RG_MIDAG passed mean dry weight-mg	54.25%
		EDTA Control passed mean dry weight-mg	54.25%
		FR_FRCP1+EDTA passed mean dry weight-	54.25%
		CM_MC2 + EDTA passed mean dry weight-m	54.25%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	1.596	2.554	0.059	8	CDF	0.2858	Non-Significant Effect
		GH_ER2	1.694	2.554	0.059	8	CDF	0.2479	Non-Significant Effect
		CM_MC1	0.1708	2.554	0.059	8	CDF	0.8790	Non-Significant Effect
		FR_FRCP1	1.088	2.554	0.059	8	CDF	0.5157	Non-Significant Effect
		FR_FRABCH	1.713	2.554	0.059	8	CDF	0.2412	Non-Significant Effect
		GH_FR1	0.7399	2.554	0.059	8	CDF	0.6789	Non-Significant Effect
		CM_MC2	1.548	2.554	0.059	8	CDF	0.3049	Non-Significant Effect
		RG_MIDAG	2.444	2.554	0.059	8	CDF	0.0635	Non-Significant Effect
		EDTA Control	1.88	2.554	0.059	8	CDF	0.1851	Non-Significant Effect
		FR_FRCP1+EDTA	1.447	2.554	0.059	8	CDF	0.3478	Non-Significant Effect
		CM_MC2 + EDTA	1.296	2.554	0.059	8	CDF	0.4166	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0147758	0.0013433	11	0.9939	0.4655	Non-Significant Effect
Error	0.0648729	0.0013515	48			
Total	0.0796487		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.39	24.72	0.4960	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9509	0.9459	0.0171	Normal Distribution

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	N	5	0.1095	0.06627	0.1527	0.099	0.06287	0.148	0.01556	31.78%	0.00%
FR_UFR1		5	0.07237	0.02396	0.1208	0.05444	0.04834	0.141	0.01744	53.87%	33.89%
GH_ER2		5	0.07008	0.03262	0.1075	0.06	0.04286	0.1167	0.01349	43.05%	35.98%
CM_MC1		5	0.1055	0.04057	0.1704	0.09667	0.04333	0.17	0.02338	49.56%	3.63%
FR_FRCP1		5	0.08417	0.05762	0.1107	0.08666	0.05252	0.1125	0.00956	25.40%	23.11%
FR_FRABCH		5	0.06965	0.01352	0.1258	0.0575	0.03168	0.1462	0.02022	64.90%	36.37%
GH_FR1		5	0.09227	0.01761	0.1669	0.06287	0.0475	0.1944	0.02689	65.17%	15.72%
CM_MC2		5	0.07347	0.03928	0.1077	0.07667	0.03668	0.107	0.01231	37.48%	32.89%
RG_MIDAG		5	0.05264	0.01322	0.09205	0.05444	0.02143	0.09858	0.0142	60.31%	51.92%
EDTA Control		5	0.06575	0.04234	0.08916	0.06599	0.04167	0.08777	0.008432	28.68%	39.94%
FR_FRCP1+EDTA		5	0.07582	0.04942	0.1022	0.07501	0.0475	0.1071	0.009507	28.04%	30.74%
CM_MC2 + EDTA		5	0.07934	0.03716	0.1215	0.072	0.04375	0.1267	0.01519	42.81%	27.52%

Hyalella 28-d Survival and Growth Sediment Test

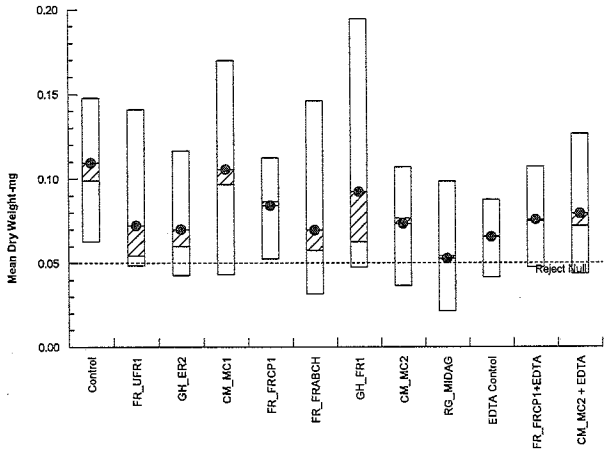
Nautilus Environmental

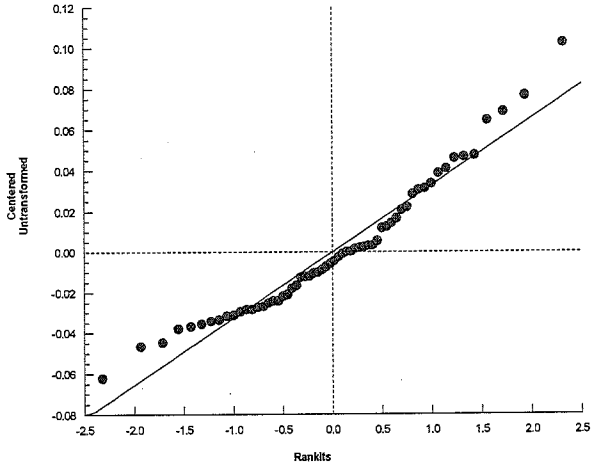
Analysis ID: 03-7293-0836 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 30 Apr-19 12:16 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Mean Dry Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	N	0.09749	0.148	0.099	0.14	0.06287
FR_UFR1		0.141	0.06665	0.05143	0.04834	0.05444
GH_ER2		0.1167	0.04834	0.08252	0.04286	0.06
CM_MC1		0.1463	0.17	0.09667	0.04333	0.07124
FR_FRCP1		0.08749	0.1125	0.08666	0.05252	0.08167
FR_FRABCH		0.1462	0.0575	0.07	0.03168	0.04285
GH_FR1		0.09778	0.05875	0.0475	0.1944	0.06287
CM_MC2		0.03668	0.107	0.07667	0.09	0.05701
RG_MIDAG		0.09858	0.05444	0.02429	0.02143	0.06444
EDTA Control		0.08777	0.06599	0.04167	0.07999	0.05332
FR_FRCP1+EDTA		0.07501	0.0475	0.07143	0.1071	0.078
CM_MC2 + EDTA		0.04375	0.1267	0.05429	0.1	0.072

Graphics





CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	09-1830-3810	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	13 May-19 14:18	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (Modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	59h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	61h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
EDTA Control	21-0198-8366	01 Mar-19	01 Mar-19	n/a		
FR_FRCP1+EDTA	15-4192-1325	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
CM_MC2 + EDTA	01-6715-5254	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1+EDTA	Water Sample	Teck Coal	FR_FRCP1+EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2	0.2009	Exact	1.0000	Non-Significant Effect
FR-UFR1		CM_MC1	0.9936	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.5862	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.8844	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.9500	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.8729	Exact	1.0000	Non-Significant Effect
		EDTA Control	0.4152	Exact	1.0000	Non-Significant Effect
		FR_FRCP1+EDTA	0.8161	Exact	1.0000	Non-Significant Effect
		CM_MC2 + EDTA	0.6350	Exact	1.0000	Non-Significant Effect

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 09-1830-3810 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 13 May-19 14:18 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	XC	35	15	50	0.7	0.3	1.62%
GH_ER2		30	20	50	0.6	0.4	15.68%
CM_MC1		44	6	50	0.88	0.12	-23.68%
FR_FRCP1		35	15	50	0.7	0.3	1.62%
FR_FRABCH		40	11	51	0.7843	0.2157	-10.23%
GH_FR1		41	9	50	0.82	0.18	-15.24%
CM_MC2		48	2	50	0.96	0.04	-34.92%
RG_MIDAG		39	11	50	0.78	0.22	-9.62%
EDTA Control		33	17	50	0.66	0.34	7.24%
FR_FRCP1+EDTA		38	12	50	0.76	0.24	-6.81%
CM_MC2 + EDTA		37	15	52	0.7115	0.2885	0.0%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	XC	1.0000	0.3000	0.7000	0.6000	0.9000
GH_ER2		0.9000	0.6000	0.4000	0.7000	0.4000
CM_MC1		0.8000	1.0000	0.9000	0.9000	0.8000
FR_FRCP1		0.8000	0.8000	0.9000	0.4000	0.6000
FR_FRABCH		0.8000	0.8000	1.0000	0.6000	0.7000
GH_FR1		0.9000	0.8000	0.8000	0.9000	0.7000
CM_MC2		0.9000	1.0000	0.9000	1.0000	1.0000
RG_MIDAG		0.7000	0.9000	0.7000	0.7000	0.9000
EDTA Control		0.9000	0.5000	0.6000	0.7000	0.6000
FR_FRCP1+EDTA		0.6000	0.8000	0.7000	0.7000	1.0000
CM_MC2 + EDTA		0.9000	1.0000	0.7000	0.4000	0.5000

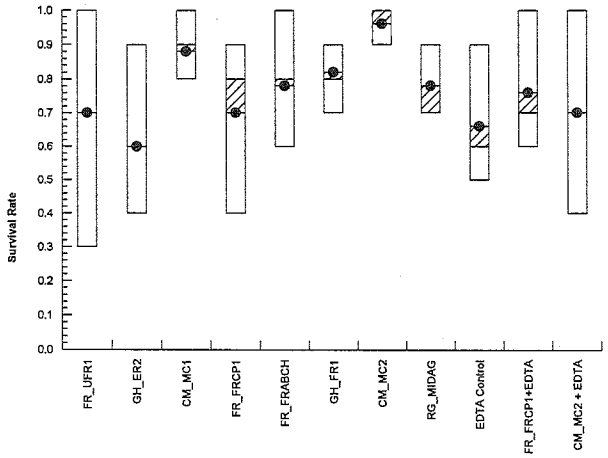
Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	XC	10/10	3/10	7/10	6/10	9/10
GH_ER2		9/10	6/10	4/10	7/10	4/10
CM_MC1		8/10	10/10	9/10	9/10	8/10
FR_FRCP1		8/10	8/10	9/10	4/10	6/10
FR_FRABCH		8/10	8/10	11/11	6/10	7/10
GH_FR1		9/10	8/10	8/10	9/10	7/10
CM_MC2		9/10	10/10	9/10	10/10	10/10
RG_MIDAG		7/10	9/10	7/10	7/10	9/10
EDTA Control		9/10	5/10	6/10	7/10	6/10
FR_FRCP1+EDTA		6/10	8/10	7/10	7/10	10/10
CM_MC2 + EDTA		9/10	12/12	7/10	4/10	5/10

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	09-1830-3810	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	13 May-19 14:18	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: _____ QA: May 22/19

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	12-0789-3952	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:29	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	59h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	61h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
EDTA Control	21-0198-8366	01 Mar-19	01 Mar-19	n/a		
FR_FRCP1+EDTA	15-4192-1325	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
CM_MC2 + EDTA	01-6715-5254	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1+EDTA	Water Sample	Teck Coal	FR_FRCP1+EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed mean dry weight-mg	86.90%
		CM_MC1 passed mean dry weight-mg	86.90%
		FR_FRCP1 passed mean dry weight-mg	86.90%
		FR_FRABCH passed mean dry weight-mg	86.90%
		GH_FR1 passed mean dry weight-mg	86.90%
		CM_MC2 passed mean dry weight-mg	86.90%
		RG_MIDAG passed mean dry weight-mg	86.90%
		EDTA Control passed mean dry weight-mg	86.90%
		FR_FRCP1+EDTA passed mean dry weight-	86.90%
		CM_MC2 + EDTA passed mean dry weight-m	86.90%

Wilcoxon/Bonferroni-Holm Test

Sample I vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control	GH_ER2	26.5	n/a	1	8	Exact	1.0000	Non-Significant Effect
FR_UFR1	CM_MC1	33	n/a	0	8	Exact	1.0000	Non-Significant Effect
	FR_FRCP1	33	n/a	0	8	Exact	1.0000	Non-Significant Effect
	FR_FRABCH	27	n/a	0	8	Exact	1.0000	Non-Significant Effect
	GH_FR1	30	n/a	0	8	Exact	1.0000	Non-Significant Effect
	CM_MC2	30	n/a	0	8	Exact	1.0000	Non-Significant Effect
	RG_MIDAG	24.5	n/a	1	8	Exact	1.0000	Non-Significant Effect
	EDTA Control	28	n/a	0	8	Exact	1.0000	Non-Significant Effect
	FR_FRCP1+EDTA	31	n/a	0	8	Exact	1.0000	Non-Significant Effect
	CM_MC2 + EDTA	29	n/a	0	8	Exact	1.0000	Non-Significant Effect

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 12-0789-3952 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 30 Apr-19 12:29 **Analysis:** Nonparametric-Multiple Comparison **Status Level:** 1

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0097811	0.0009781	10	0.7169	0.7040	Non-Significant Effect
Error	0.0600312	0.0013643	44			
Total	0.0698123		54			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.36	23.21	0.4098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9407	0.9417	0.0091	Non-Normal Distribution

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	5	0.07237	0.02396	0.1208	0.05444	0.04834	0.141	0.01744	53.87%	0.00%
GH_ER2		5	0.07008	0.03262	0.1075	0.06	0.04286	0.1167	0.01349	43.05%	3.17%
CM_MC1		5	0.1055	0.04057	0.1704	0.09667	0.04333	0.17	0.02338	49.56%	-45.77%
FR_FRCP1		5	0.08417	0.05762	0.1107	0.08666	0.05252	0.1125	0.00956	25.40%	-16.30%
FR_FRABCH		5	0.06965	0.01352	0.1258	0.0575	0.03168	0.1462	0.02022	64.90%	3.76%
GH_FR1		5	0.09227	0.01761	0.1669	0.06287	0.0475	0.1944	0.02689	65.17%	-27.49%
CM_MC2		5	0.07347	0.03928	0.1077	0.07667	0.03668	0.107	0.01231	37.48%	-1.52%
RG_MIDAG		5	0.05264	0.01322	0.09205	0.05444	0.02143	0.09858	0.0142	60.31%	27.27%
EDTA Control		5	0.06575	0.04234	0.08916	0.06599	0.04167	0.08777	0.008432	28.68%	9.15%
FR_FRCP1+EDTA		5	0.07582	0.04942	0.1022	0.07501	0.0475	0.1071	0.009507	28.04%	-4.76%
CM_MC2 + EDTA		5	0.07934	0.03716	0.1215	0.072	0.04375	0.1267	0.01519	42.81%	-9.63%

Mean Dry Weight-mg Detail

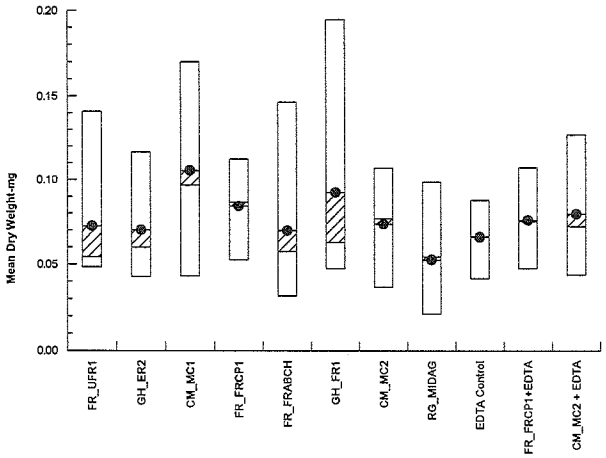
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	XC	0.141	0.06665	0.05143	0.04834	0.05444
GH_ER2		0.1167	0.04834	0.08252	0.04286	0.06
CM_MC1		0.1463	0.17	0.09667	0.04333	0.07124
FR_FRCP1		0.08749	0.1125	0.08666	0.05252	0.08167
FR_FRABCH		0.1462	0.0575	0.07	0.03168	0.04285
GH_FR1		0.09778	0.05875	0.0475	0.1944	0.06287
CM_MC2		0.03668	0.107	0.07667	0.09	0.05701
RG_MIDAG		0.09858	0.05444	0.02429	0.02143	0.06444
EDTA Control		0.08777	0.06599	0.04167	0.07999	0.05332
FR_FRCP1+EDTA		0.07501	0.0475	0.07143	0.1071	0.078
CM_MC2 + EDTA		0.04375	0.1267	0.05429	0.1	0.072

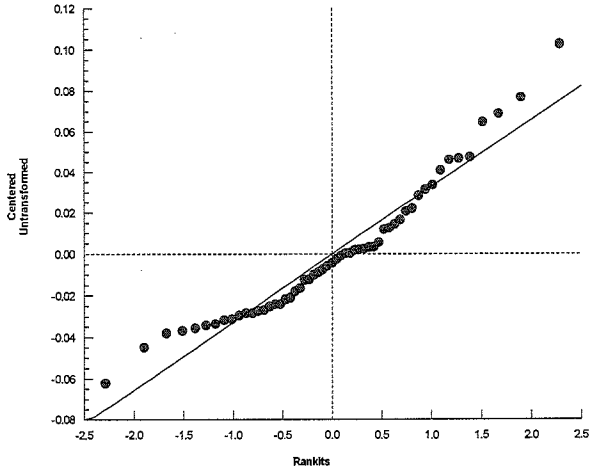
Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	12-0789-3952	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:29	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1

Graphics





Analyst: _____ QA: May 9/19

CETIS Analytical Report

Test Code/ID: 190349 / 06-3070-1793

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	07-0253-5882	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	13 May-19 14:31	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	59h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	61h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
EDTA Control	21-0198-8366	01 Mar-19	01 Mar-19	n/a		
FR_FRCP1+EDTA	15-4192-1325	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
CM_MC2 + EDTA	01-6715-5254	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1+EDTA	Water Sample	Teck Coal	FR_FRCP1+EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	0.8959	Exact	1.0000	Non-Significant Effect
GH_ER2		CM_MC1	0.9998	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.8959	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.9873	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.9962	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.9851	Exact	1.0000	Non-Significant Effect
		EDTA Control	0.7962	Exact	1.0000	Non-Significant Effect
		FR_FRCP1+EDTA	0.9736	Exact	1.0000	Non-Significant Effect
		CM_MC2 + EDTA	0.9186	Exact	1.0000	Non-Significant Effect

Analyst: QA: May 22/19

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID: 07-0253-5882 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 13 May-19 14:31 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		35	15	50	0.7	0.3	1.62%
GH_ER2	XC	30	20	50	0.6	0.4	15.68%
CM_MC1		44	6	50	0.88	0.12	-23.68%
FR_FRCP1		35	15	50	0.7	0.3	1.62%
FR_FRABCH		40	11	51	0.7843	0.2157	-10.23%
GH_FR1		41	9	50	0.82	0.18	-15.24%
CM_MC2		48	2	50	0.96	0.04	-34.92%
RG_MIDAG		39	11	50	0.78	0.22	-9.62%
EDTA Control		33	17	50	0.66	0.34	7.24%
FR_FRCP1+EDTA		38	12	50	0.76	0.24	-6.81%
CM_MC2 + EDTA		37	15	52	0.7115	0.2885	0.0%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		1.0000	0.3000	0.7000	0.6000	0.9000
GH_ER2	XC	0.9000	0.6000	0.4000	0.7000	0.4000
CM_MC1		0.8000	1.0000	0.9000	0.9000	0.8000
FR_FRCP1		0.8000	0.8000	0.9000	0.4000	0.6000
FR_FRABCH		0.8000	0.8000	1.0000	0.6000	0.7000
GH_FR1		0.9000	0.8000	0.8000	0.9000	0.7000
CM_MC2		0.9000	1.0000	0.9000	1.0000	1.0000
RG_MIDAG		0.7000	0.9000	0.7000	0.7000	0.9000
EDTA Control		0.9000	0.5000	0.6000	0.7000	0.6000
FR_FRCP1+EDTA		0.6000	0.8000	0.7000	0.7000	1.0000
CM_MC2 + EDTA		0.9000	1.0000	0.7000	0.4000	0.5000

Survival Rate Binomials

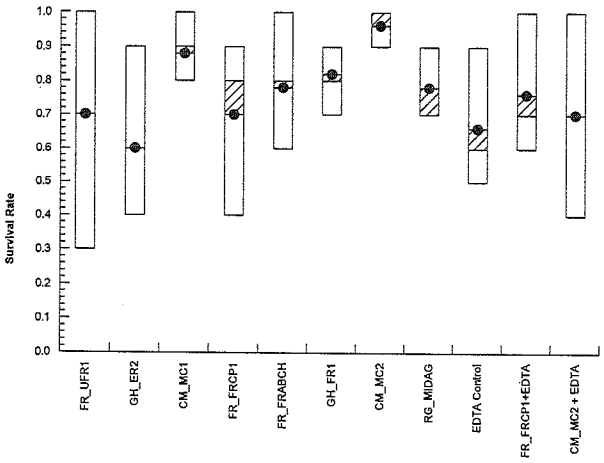
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		10/10	3/10	7/10	6/10	9/10
GH_ER2	XC	9/10	6/10	4/10	7/10	4/10
CM_MC1		8/10	10/10	9/10	9/10	8/10
FR_FRCP1		8/10	8/10	9/10	4/10	6/10
FR_FRABCH		8/10	8/10	11/11	6/10	7/10
GH_FR1		9/10	8/10	8/10	9/10	7/10
CM_MC2		9/10	10/10	9/10	10/10	10/10
RG_MIDAG		7/10	9/10	7/10	7/10	9/10
EDTA Control		9/10	5/10	6/10	7/10	6/10
FR_FRCP1+EDTA		6/10	8/10	7/10	7/10	10/10
CM_MC2 + EDTA		9/10	12/12	7/10	4/10	5/10

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	07-0253-5882	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	13 May-19 14:31	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: QA: May 22/19

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	01-8703-4196	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:33	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	59h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	61h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
EDTA Control	21-0198-8366	01 Mar-19	01 Mar-19	n/a		
FR_FRCP1+EDTA	15-4192-1325	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
CM_MC2 + EDTA	01-6715-5254	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1+EDTA	Water Sample	Teck Coal	FR_FRCP1+EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	89.75%
		CM_MC1 passed mean dry weight-mg	89.75%
		FR_FRCP1 passed mean dry weight-mg	89.75%
		FR_FRABCH passed mean dry weight-mg	89.75%
		GH_FR1 passed mean dry weight-mg	89.75%
		CM_MC2 passed mean dry weight-mg	89.75%
		RG_MIDAG passed mean dry weight-mg	89.75%
		EDTA Control passed mean dry weight-mg	89.75%
		FR_FRCP1+EDTA passed mean dry weight-	89.75%
		CM_MC2 + EDTA passed mean dry weight-m	89.75%

Wilcoxon/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	28.5	n/a	1	8	Exact	1.0000	Non-Significant Effect
GH_ER2		CM_MC1	33	n/a	0	8	Exact	0.8889	Non-Significant Effect
		FR_FRCP1	32	n/a	0	8	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	25	n/a	0	8	Exact	1.0000	Non-Significant Effect
		GH_FR1	30	n/a	0	8	Exact	1.0000	Non-Significant Effect
		CM_MC2	28	n/a	0	8	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	24	n/a	0	8	Exact	1.0000	Non-Significant Effect
		EDTA Control	27	n/a	0	8	Exact	1.0000	Non-Significant Effect
		FR_FRCP1+EDTA	29	n/a	0	8	Exact	1.0000	Non-Significant Effect
		CM_MC2 + EDTA	30	n/a	0	8	Exact	1.0000	Non-Significant Effect

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 01-8703-4196 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 30 Apr-19 12:33 **Analysis:** Nonparametric-Multiple Comparison **Status Level:** 1

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0097811	0.0009781	10	0.7169	0.7040	Non-Significant Effect
Error	0.0600312	0.0013643	44			
Total	0.0698123		54			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.36	23.21	0.4098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9407	0.9417	0.0091	Non-Normal Distribution

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		5	0.07237	0.02396	0.1208	0.05444	0.04834	0.141	0.01744	53.87%	0.00%
GH_ER2	XC	5	0.07008	0.03262	0.1075	0.06	0.04286	0.1167	0.01349	43.05%	3.17%
CM_MC1		5	0.1055	0.04057	0.1704	0.09667	0.04333	0.17	0.02338	49.56%	-45.77%
FR_FRCP1		5	0.08417	0.05762	0.1107	0.08666	0.05252	0.1125	0.00956	25.40%	-16.30%
FR_FRABCH		5	0.06965	0.01352	0.1258	0.0575	0.03168	0.1462	0.02022	64.90%	3.76%
GH_FR1		5	0.09227	0.01761	0.1669	0.06287	0.0475	0.1944	0.02689	65.17%	-27.49%
CM_MC2		5	0.07347	0.03928	0.1077	0.07667	0.03668	0.107	0.01231	37.48%	-1.52%
RG_MIDAG		5	0.05264	0.01322	0.09205	0.05444	0.02143	0.09858	0.0142	60.31%	27.27%
EDTA Control		5	0.06575	0.04234	0.08916	0.06599	0.04167	0.08777	0.008432	28.68%	9.15%
FR_FRCP1+EDTA		5	0.07582	0.04942	0.1022	0.07501	0.0475	0.1071	0.009507	28.04%	-4.76%
CM_MC2 + EDTA		5	0.07934	0.03716	0.1215	0.072	0.04375	0.1267	0.01519	42.81%	-9.63%

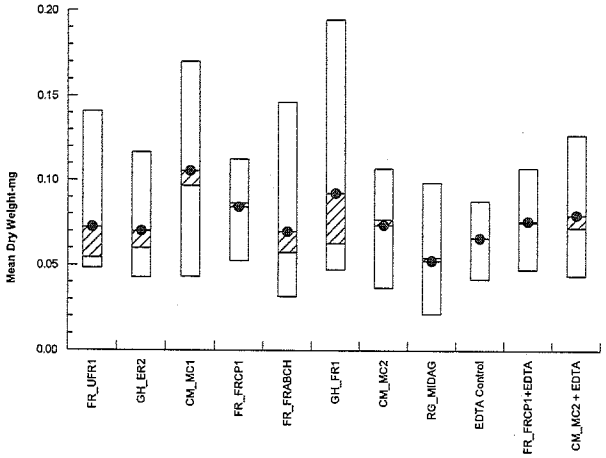
Mean Dry Weight-mg Detail

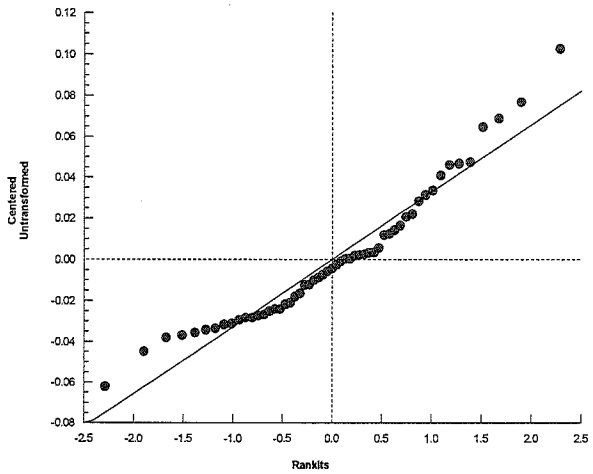
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.141	0.06665	0.05143	0.04834	0.05444
GH_ER2	XC	0.1167	0.04834	0.08252	0.04286	0.06
CM_MC1		0.1463	0.17	0.09667	0.04333	0.07124
FR_FRCP1		0.08749	0.1125	0.08666	0.05252	0.08167
FR_FRABCH		0.1462	0.0575	0.07	0.03168	0.04285
GH_FR1		0.09778	0.05875	0.0475	0.1944	0.06287
CM_MC2		0.03668	0.107	0.07667	0.09	0.05701
RG_MIDAG		0.09858	0.05444	0.02429	0.02143	0.06444
EDTA Control		0.08777	0.06599	0.04167	0.07999	0.05332
FR_FRCP1+EDTA		0.07501	0.0475	0.07143	0.1071	0.078
CM_MC2 + EDTA		0.04375	0.1267	0.05429	0.1	0.072

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	01-8703-4196	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:33	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1

Graphics





CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	06-5430-6706	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	13 May-19 14:34	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	59h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	61h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
EDTA Control	21-0198-8366	01 Mar-19	01 Mar-19	n/a		
FR_FRCP1+EDTA	15-4192-1325	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
CM_MC2 + EDTA	01-6715-5254	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1+EDTA	Water Sample	Teck Coal	FR_FRCP1+EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	0.0239	Exact	0.1914	Non-Significant Effect
CM_MC1		GH_ER2*	0.0013	Exact	0.0131	Significant Effect
		FR_FRCP1	0.0239	Exact	0.1914	Non-Significant Effect
		FR_FRABCH	0.1541	Exact	0.4624	Non-Significant Effect
		GH_FR1	0.2883	Exact	0.5766	Non-Significant Effect
		CM_MC2	0.9703	Exact	0.9703	Non-Significant Effect
		RG_MIDAG	0.1434	Exact	0.5738	Non-Significant Effect
		EDTA Control	0.0082	Exact	0.0734	Non-Significant Effect
		FR_FRCP1+EDTA	0.0961	Exact	0.4806	Non-Significant Effect
		CM_MC2 + EDTA	0.0305	Exact	0.1833	Non-Significant Effect

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 06-5430-6706 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 13 May-19 14:34 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		35	15	50	0.7	0.3	1.62%
GH_ER2		30	20	50	0.6	0.4	15.68%
CM_MC1	XC	44	6	50	0.88	0.12	-23.68%
FR_FRCP1		35	15	50	0.7	0.3	1.62%
FR_FRABCH		40	11	51	0.7843	0.2157	-10.23%
GH_FR1		41	9	50	0.82	0.18	-15.24%
CM_MC2		48	2	50	0.96	0.04	-34.92%
RG_MIDAG		39	11	50	0.78	0.22	-9.62%
EDTA Control		33	17	50	0.66	0.34	7.24%
FR_FRCP1+EDTA		38	12	50	0.76	0.24	-6.81%
CM_MC2 + EDTA		37	15	52	0.7115	0.2885	0.0%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		1.0000	0.3000	0.7000	0.6000	0.9000
GH_ER2		0.9000	0.6000	0.4000	0.7000	0.4000
CM_MC1	XC	0.8000	1.0000	0.9000	0.9000	0.8000
FR_FRCP1		0.8000	0.8000	0.9000	0.4000	0.6000
FR_FRABCH		0.8000	0.8000	1.0000	0.6000	0.7000
GH_FR1		0.9000	0.8000	0.8000	0.9000	0.7000
CM_MC2		0.9000	1.0000	0.9000	1.0000	1.0000
RG_MIDAG		0.7000	0.9000	0.7000	0.7000	0.9000
EDTA Control		0.9000	0.5000	0.6000	0.7000	0.6000
FR_FRCP1+EDTA		0.6000	0.8000	0.7000	0.7000	1.0000
CM_MC2 + EDTA		0.9000	1.0000	0.7000	0.4000	0.5000

Survival Rate Binomials

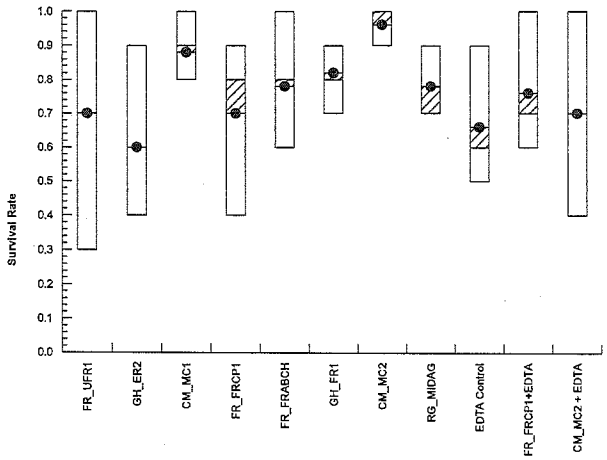
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		10/10	3/10	7/10	6/10	9/10
GH_ER2		9/10	6/10	4/10	7/10	4/10
CM_MC1	XC	8/10	10/10	9/10	9/10	8/10
FR_FRCP1		8/10	8/10	9/10	4/10	6/10
FR_FRABCH		8/10	8/10	11/11	6/10	7/10
GH_FR1		9/10	8/10	8/10	9/10	7/10
CM_MC2		9/10	10/10	9/10	10/10	10/10
RG_MIDAG		7/10	9/10	7/10	7/10	9/10
EDTA Control		9/10	5/10	6/10	7/10	6/10
FR_FRCP1+EDTA		6/10	8/10	7/10	7/10	10/10
CM_MC2 + EDTA		9/10	12/12	7/10	4/10	5/10

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	06-5430-6706	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	13 May-19 14:34	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: QA: May 22/19

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	05-0651-5298	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:35	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	59h (0 °C)	Teck Coal	
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	61h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
RG_MIDAG	05-6382-9525	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		
EDTA Control	21-0198-8366	01 Mar-19	01 Mar-19	n/a		
FR_FRCP1+EDTA	15-4192-1325	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		
CM_MC2 + EDTA	01-6715-5254	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-02-	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1+EDTA	Water Sample	Teck Coal	FR_FRCP1+EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	59.62%
		GH_ER2 passed mean dry weight-mg	59.62%
		FR_FRCP1 passed mean dry weight-mg	59.62%
		FR_FRABCH passed mean dry weight-mg	59.62%
		GH_FR1 passed mean dry weight-mg	59.62%
		CM_MC2 passed mean dry weight-mg	59.62%
		RG_MIDAG passed mean dry weight-mg	59.62%
		EDTA Control passed mean dry weight-mg	59.62%
		FR_FRCP1+EDTA passed mean dry weight-	59.62%
		CM_MC2 + EDTA passed mean dry weight-m	59.62%

Wilcoxon/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	22	n/a	0	8	Exact	1.0000	Non-Significant Effect
CM_MC1		GH_ER2	22	n/a	0	8	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	25	n/a	0	8	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	20	n/a	0	8	Exact	0.7540	Non-Significant Effect
		GH_FR1	26	n/a	0	8	Exact	0.4206	Non-Significant Effect
		CM_MC2	23	n/a	0	8	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	20	n/a	0	8	Exact	0.7540	Non-Significant Effect
		EDTA Control	21	n/a	0	8	Exact	0.8889	Non-Significant Effect
		FR_FRCP1+EDTA	25	n/a	0	8	Exact	1.0000	Non-Significant Effect
		CM_MC2 + EDTA	25	n/a	0	8	Exact	1.0000	Non-Significant Effect

Analyst: QA: May 9/19

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 05-0651-5298 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 30 Apr-19 12:35 **Analysis:** Nonparametric-Multiple Comparison **Status Level:** 1

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0097811	0.0009781	10	0.7169	0.7040	Non-Significant Effect
Error	0.0600312	0.0013643	44			
Total	0.0698123		54			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.36	23.21	0.4098	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9407	0.9417	0.0091	Non-Normal Distribution

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		5	0.07237	0.02396	0.1208	0.05444	0.04834	0.141	0.01744	53.87%	0.00%
GH_ER2		5	0.07008	0.03262	0.1075	0.06	0.04286	0.1167	0.01349	43.05%	3.17%
CM_MC1	XC	5	0.1055	0.04057	0.1704	0.09667	0.04333	0.17	0.02338	49.56%	-45.77%
FR_FRCP1		5	0.08417	0.05762	0.1107	0.08666	0.05252	0.1125	0.00956	25.40%	-16.30%
FR_FRABCH		5	0.06965	0.01352	0.1258	0.0575	0.03168	0.1462	0.02022	64.90%	3.76%
GH_FR1		5	0.09227	0.01761	0.1669	0.06287	0.0475	0.1944	0.02689	65.17%	-27.49%
CM_MC2		5	0.07347	0.03928	0.1077	0.07667	0.03668	0.107	0.01231	37.48%	-1.52%
RG_MIDAG		5	0.05264	0.01322	0.09205	0.05444	0.02143	0.09858	0.0142	60.31%	27.27%
EDTA Control		5	0.06575	0.04234	0.08916	0.06599	0.04167	0.08777	0.008432	28.68%	9.15%
FR_FRCP1+EDTA		5	0.07582	0.04942	0.1022	0.07501	0.0475	0.1071	0.009507	28.04%	-4.76%
CM_MC2 + EDTA		5	0.07934	0.03716	0.1215	0.072	0.04375	0.1267	0.01519	42.81%	-9.63%

Mean Dry Weight-mg Detail

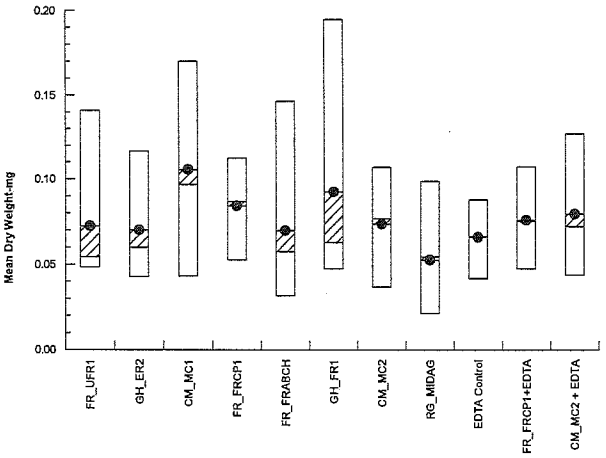
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.141	0.06665	0.05143	0.04834	0.05444
GH_ER2		0.1167	0.04834	0.08252	0.04286	0.06
CM_MC1	XC	0.1463	0.17	0.09667	0.04333	0.07124
FR_FRCP1		0.08749	0.1125	0.08666	0.05252	0.08167
FR_FRABCH		0.1462	0.0575	0.07	0.03168	0.04285
GH_FR1		0.09778	0.05875	0.0475	0.1944	0.06287
CM_MC2		0.03668	0.107	0.07667	0.09	0.05701
RG_MIDAG		0.09858	0.05444	0.02429	0.02143	0.06444
EDTA Control		0.08777	0.06599	0.04167	0.07999	0.05332
FR_FRCP1+EDTA		0.07501	0.0475	0.07143	0.1071	0.078
CM_MC2 + EDTA		0.04375	0.1267	0.05429	0.1	0.072

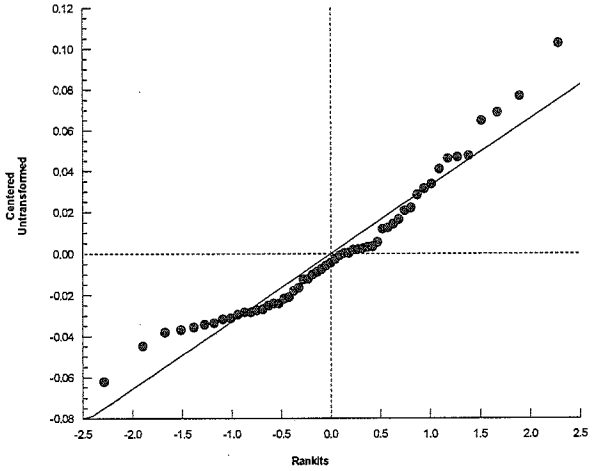
Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	05-0651-5298	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:35	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1

Graphics





CETIS Analytical Report

Test Code/ID: 190349 / 06-3070-1793

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	01-7066-9384	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:43	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (Modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	18-4281-6600	01 Mar-19	01 Mar-19	n/a	Teck Coal	
EDTA Control	21-0198-8366	01 Mar-19	01 Mar-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal	Control	
EDTA Control	Water Sample	Teck Coal	EDTA control	

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		EDTA Control*	0.0035	Exact	0.0035	Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	Test Stat	Lower	Upper	Overlap	Decision
Control Resp	0.9	0.8	>>	Yes	Passes Criteria

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control	N	45	5	50	0.9	0.1	0.0%
EDTA Control		33	17	50	0.66	0.34	26.67%

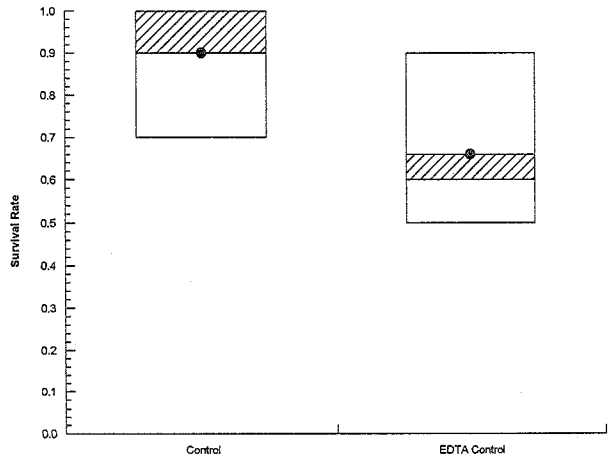
Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	N	0.8000	1.0000	1.0000	1.0000	0.7000
EDTA Control		0.9000	0.5000	0.6000	0.7000	0.6000

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	N	8/10	10/10	10/10	10/10	7/10
EDTA Control		9/10	5/10	6/10	7/10	6/10

Graphics



Analyst: QA: May 22/19

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	18-1426-4590	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:46	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	18-4281-6600	01 Mar-19	01 Mar-19	n/a	Teck Coal	
EDTA Control	21-0198-8366	01 Mar-19	01 Mar-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal	Control	
EDTA Control	Water Sample	Teck Coal	EDTA control	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	EDTA Control failed mean dry weight-mg	30.06%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		EDTA Control*	2.471	1.86	0.033	8	CDF	0.0193	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0047791	0.0047791	1	6.104	0.0387	Significant Effect
Error	0.0062638	0.000783	8			
Total	0.011043		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.405	23.15	0.2624	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9673	0.7411	0.8649	Normal Distribution

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	N	5	0.1095	0.06627	0.1527	0.099	0.06287	0.148	0.01556	31.78%	0.00%
EDTA Control		5	0.06575	0.04234	0.08916	0.06599	0.04167	0.08777	0.008432	28.68%	39.94%

Mean Dry Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Control	N	0.09749	0.148	0.099	0.14	0.06287
EDTA Control		0.08777	0.06599	0.04167	0.07999	0.05332

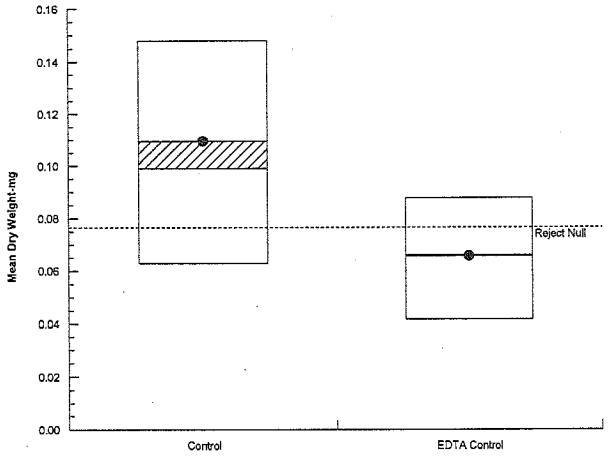
Analyst: QA: May 23/19

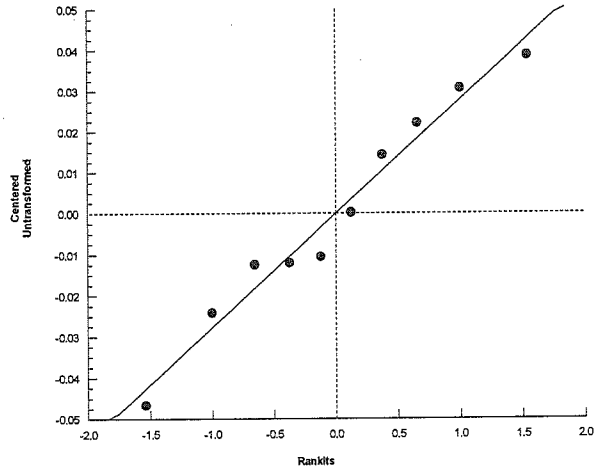
Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	18-1426-4590	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:46	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





CETIS Analytical Report

Test Code/ID: 190349 / 06-3070-1793

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	19-5080-3151	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:48	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)	Teck Coal	
FR_FRCP1+EDTA	15-4192-1325	26 Feb-19 12:05	27 Feb-19 11:02	60h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRCP1+EDTA	Water Sample	Teck Coal	FR_FRCP1+EDTA	

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		FR_FRCP1+EDTA	0.8161	Exact	0.8161	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_FRCP1	LC	35	15	50	0.7	0.3	0.0%
FR_FRCP1+EDTA		38	12	50	0.76	0.24	-8.57%

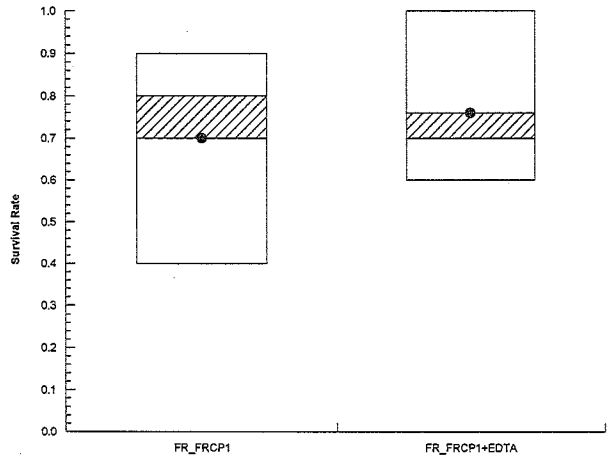
Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_FRCP1	LC	0.8000	0.8000	0.9000	0.4000	0.6000
FR_FRCP1+EDTA		0.6000	0.8000	0.7000	0.7000	1.0000

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_FRCP1	LC	8/10	8/10	9/10	4/10	6/10
FR_FRCP1+EDTA		6/10	8/10	7/10	7/10	10/10

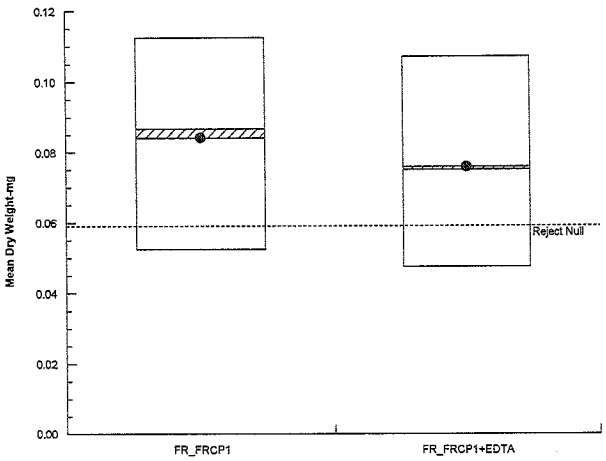
Graphics

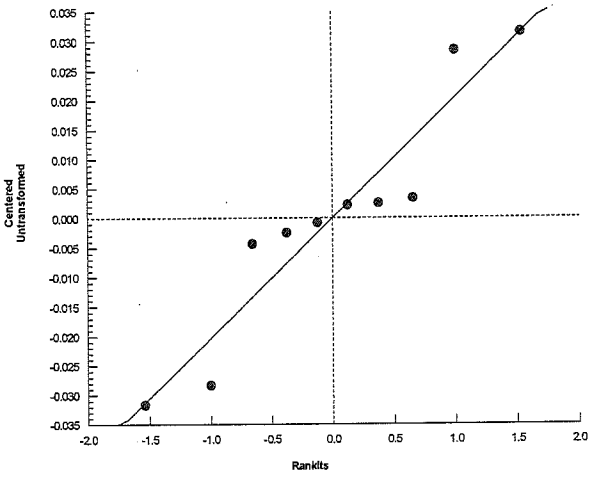


Analyst: QA: May 9/19

Analysis ID: 13-3093-0306 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 30 Apr-19 12:50 **Analysis:** Parametric-Two Sample **Status Level:** 1

Graphics





CETIS Analytical Report

Test Code/ID: 190349 / 06-3070-1793

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	08-9429-9052	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	13 May-19 14:37	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	72h (0 °C)	Teck Coal	
CM_MC2 + EDTA	01-6715-5254	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		CM_MC2 + EDTA*	0.0006	Exact	6.3E-04	Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
CM_MC2	LC	48	2	50	0.96	0.04	-34.92%
CM_MC2 + EDTA		37	15	52	0.7115	0.2885	0.0%

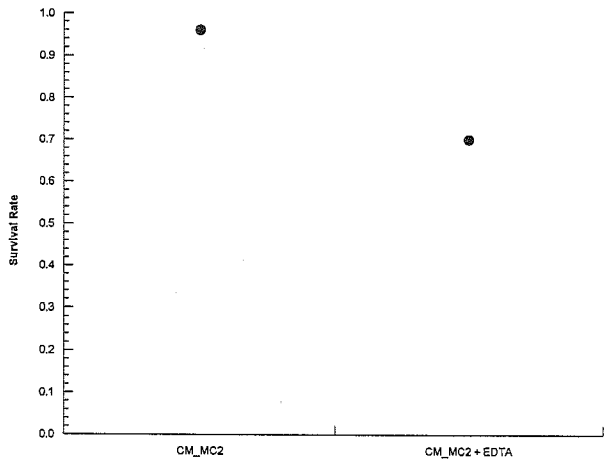
Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CM_MC2	LC	0.9000	1.0000	0.9000	1.0000	1.0000
CM_MC2 + EDTA		0.9000	1.0000	0.7000	0.4000	0.5000

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CM_MC2	LC	9/10	10/10	9/10	10/10	10/10
CM_MC2 + EDTA		9/10	12/12	7/10	4/10	5/10

Graphics



Analyst: QA: May 22/19

CETIS Analytical Report

Report Date: 30 Apr-19 12:54 (p 1 of 2)
Test Code/ID: 190349 / 06-3070-1793

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	16-4487-5680	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Batch ID:	09-8408-2941	**Test Type:**	Survival-Growth	**Analyst:**	Supreet Malhi
Start Date:	01 Mar-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	29 Mar-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	72h (0 °C)	Teck Coal	
CM_MC2 + EDTA	01-6715-5254	26 Feb-19	27 Feb-19 11:02	72h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	CM_MC2 + EDTA passed mean dry weight-m	49.49%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		CM_MC2 + EDTA	-0.3002	1.86	0.036	8	CDF	0.6142	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.615E-05	8.615E-05	1	0.09012	0.7717	Non-Significant Effect
Error	0.0076479	0.000956	8			
Total	0.0077340		9			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.522	23.15	0.6939	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9508	0.7411	0.6782	Normal Distribution

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CM_MC2	LC	5	0.07347	0.03928	0.1077	0.07667	0.03668	0.107	0.01231	37.48%	0.00%
CM_MC2 + EDTA		5	0.07934	0.03716	0.1215	0.072	0.04375	0.1267	0.01519	42.81%	-7.99%

Mean Dry Weight-mg Detail

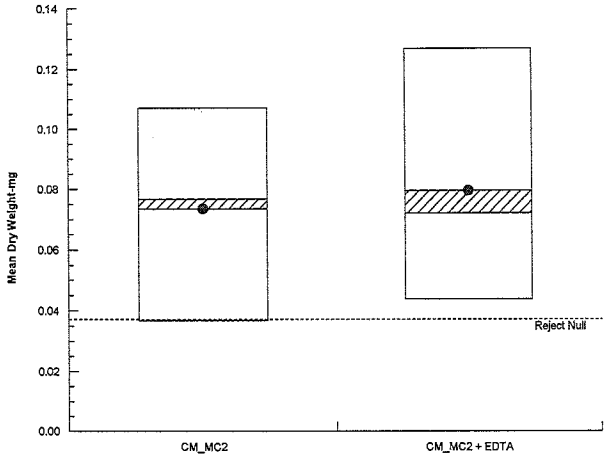
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
CM_MC2	LC	0.03668	0.107	0.07667	0.09	0.05701
CM_MC2 + EDTA		0.04375	0.1267	0.05429	0.1	0.072

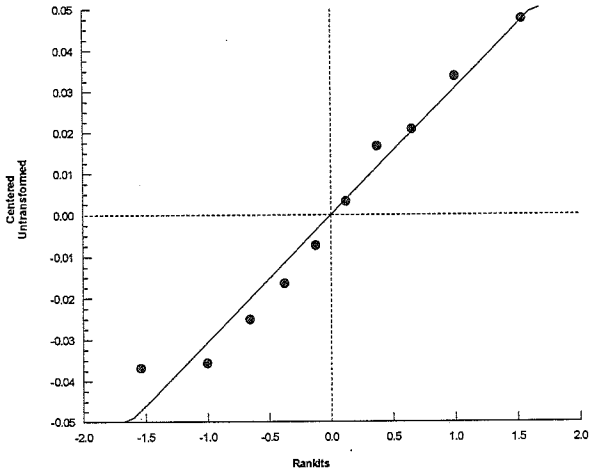
Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	16-4487-5680	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Apr-19 12:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





APPENDIX D – *Pimephales promelas* Toxicity Test Data

Pans labelled + put in oven 20191031125-CB

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

1819-0813 to 1819-0819
10ug/L

Method: FMD 32 Day ELS | Client: TEC164 | Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Organism Information

Source: Aquatox | Batch: 20190301FM-ELS | Egg Stage: 13 Atomites | Organisms Received in Good Condition: Yes or No

Test Log

Date	Day	Time	Technicians	Chem Cart Used	Fed AM	Fed PM	Sample Pre-Aeration Time	Bench Sheet Review First
20191031 20191101	0	1500	CB/ST/LF	2	—	—	60 mins	
20191101	1	1150	ML/LF	2	—	—	60 mins	MW
20191102	2	1100	CB/SS	2	—	—	60 mins	ST
20191103	3	1135	CB	2	—	—	60 mins	ST
20191104	4	1205	CB	2	—	✓	60 mins	MW
20191105	5	1120	CB	2	✓	✓	60 mins	LF
20191106	6	1030	CB	2	✓	✓	60 mins	ST
20191107	7	1135	ST	2	✓	✓	60 mins	LF
20191108	8	1030	KK	2	✓	✓	60 mins	ML
20191109	9	0920	SS	2	✓	✓	60 mins	LF
20191110	10	1100	SS	2	✓	✓	60 mins	LF
20191111	11	1035	KK	2	✓	✓	60 mins	ST
20191112	12	1000	ST	2	✓	✓	60 mins	KK
20191113	13	1130	CB	2	✓	✓	60 mins	SS
20191114	14	1035	CB	2	✓	✓	60 mins	ST
20191115	15	1030	KK	2	✓	✓	60 mins	MW
20191116	16	1030	CB	2	✓	✓	60 mins	SS
20191117	17	1025	CB	2	✓	✓	60 mins	LF
20191118	18	1000	CB	2	✓	✓	60 mins	MW
20191119	19	1025	CB	2	✓	✓	60 mins	LF
20191120	20	1050	CB	2	✓	✓	60 mins	ML
20191121	21	1140	LF	2	✓	✓	60 min	ML
20191122	22	1030	ML/MW	2	✓	✓	60 mins	ST
20191123	23	1020	CB	2	✓	✓	60 mins	SS
20191124	24	1025	CB	2	✓	✓	60 mins	LF
20191125	25	1015	CB	2	✓	✓	60 mins	ST
20191126	26	1030	CB	2	✓	✓	60 mins	LF
20191127	27	1040	CB	2	✓	✓	60 mins	KK
20191128	28	1020	LF	2	✓	✓	60 mins	ST
20191129	29	1100	KK	2	✓	✓	60 mins	ML
20191130	30	1100	ST	2	✓	✓	60 mins	MW
20191201	31	1000	ML	2	✓	✓	60 mins	ST
20191202	32	0910	LF	2	~~✓~~ LF	~~✓~~ LF	—	CB

Reviewed By: ML | Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Control hatching success must be >66% (≥ 10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

replicate	0813-10 Day 1 Alive Embryos	0813-10 Day 1 Dead Embryos	0814-10 Day 1 Alive Embryos	0814-10 Day 1 Dead Embryos	0815-10 Day 1 Alive Embryos	0815-10 Day 1 Dead Embryos	0816-10 Day 1 Alive Embryos	0816-10 Day 1 Dead Embryos	0817-10 Day 1 Alive Embryos	0817-10 Day 1 Dead Embryos	0818-10 Day 1 Alive Embryos	0818-10 Day 1 Dead Embryos	0819-10 Day 1 Alive Embryos	0819-10 Day 1 Dead Embryos
a	14	1	15	0	15	0	15	0	14	1	15	0	15	0
b	14	1	15	0	15	0	15	0	15	0	15	0	15	0
c	15	0	15	0	14	1	15	0	14	1	15	0	15	0
d	14	1	15	0	15	0	15	0	14	1	14	1	15	0
e	30	0	30	0	30	0	30	0	28	2	30	0	29	1
f	29	1	30	0	29	1	29	1	30	0	29	1	29	1

Comments/Observations:

0815 had precipitate

Number of Alive Embryos and Hatched Organisms

~~CH~~ 0813-10

replicate	Day 2 Alive Embryos	Day 2 Dead Embryos	Cull to 15
a	14	0	15
b	14	0	15
c	14	1	15
d	13	1	15
e	30	0	
f	29	0	

0814-10

Day 2 Alive Embryos	Day 2 Dead Embryos	Cull to 15
14	1	15
14	1	15
15	0	Ø15
15	0	Ø15
30	0	
30	0	

0815-10

Day 2 Alive Embryos	Day 2 Dead Embryos	Cull to 15
15	0	15
14	1	15
13	1	15
13	2	15
30	0	
29	0	

0816-10

Day 2 Alive Embryos	Day 2 Dead Embryos	Cull to 15
14	1	15
15	0	15
15	0	15
12	3	15
30	0	
29	0	

0817-10

replicate	Day 2 Alive Embryos	Day 2 Dead Embryos	Cull to 15
a	12	2	15
b	14	1	15
c	14	0	15
d	14	0	15
e	28	0	
f	28	2	

0818-10

Day 2 Alive Embryos	Day 2 Dead Embryos	Cull to 15
15	0	15
15	0	15
15	0	15
13	1	15
28	2	
28	1	

0819-10

Day 2 Alive Embryos	Day 2 Dead Embryos	Cull to 15
15	0	15
15	0	15
15	0	15
15	0	15
28	1	
29	0	

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Comments/Observations:

0815-10 → ↑ precipitate — ML

Reviewed By: ML Date Reviewed: 2019/04/14

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

0813-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	15	0	0	0
b	13	0	2	0
c	15 14	0	0	1 0
d	14	6	0	0

ML 15 0

0814-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	11	0	3	1
b	15	0	0	0
c	10	0	5	0
d	10	2	3	0

0815-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	8	1	6	0
b	14	0	1	0
c	13	0	1	1
d	7	0	8	0

0816-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	14	0	1	0
b	13	0	2	0
c	13	0	2	0
d	11	0	4	0

0817-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	15	0	0	0
b	15	0	0	0
c	15	0	0	0
d	13	0	1	1

0818-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	15	0	0	0
b	14	0	1	0
c	15	0	0	0
d	13	1	1	0

0819-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	15	0	0	0
b	15	0	0	0
c	15	0	0	0
d	15	0	0	0

[redacted]

0813-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	5	0	10	0
b	3	0	11	1
c	3 6	0	9	1 0
d	0	0	15	0

0814-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	1	0	12	1
b	0	0	15	0
c	1	0	14	0
d	0	0	13	0

0815-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	12	2
b	0	3	9	3
c	0	0	13	1
d	0	0	11	4

0816-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	1	0	14	0
b	0	0	15	0
c	1	0	14	0
d	6	0	9	0

0817-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	5	0	10	0
d	7	0	7	0

0818-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	3	0	11	0

0819-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	1	0	14	0
b	2	0	13	0
c	7	0	8	0
d	2	0	12	1 0

ML 1

Comments/Observations

Reviewed By: ML Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

0813-10 Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	14	0
c	0	0	14(1)	0
d	0	0	15	0

→ LS ML

0814-10 Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	13	0
b	0	0	15	0
c	1	0	14	0
d	0	0	12	1

0815-10 Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	7	5
b	0	0	4	5
c	0	0	5	8
d	0	0	9	2

0816-10 Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0817-10 Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	13	1

0818-10 Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	14	0

0819-10 Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	14	0

[redacted]

0813-10 Day 6

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	12	3 ML

~~0814-10~~ 0815-10

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	3	4
b	0	0	4	0
c	0	0	1	4
d	0	0	4	5

~~0815-10~~ 0814-10

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14	0
b	0	0	14(5)	0
c	0	1	14(1)	0 ML
d	0	0	~~15~~ 12	3

0816-10 Day 6

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0817-10 Day 6

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	13(1)	0

0818-10 Day 6

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	14	0

0819-10 Day 6

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	14	0

Comments/Observations

Reviewed By: 2019/04/11 Date Reviewed: ML

ML

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Number of Alive Embryos and Hatched Organisms

replicate	0813-10 Day 7 Alive Hatched	0814-10 Day 7 Alive Hatched	0815-10 Day 7 Alive Hatched	0816-10 Day 7 Alive Hatched	0817-10 Day 7 Alive Hatched	0818-10 Day 7 Alive Hatched	0819-10 Day 7 Alive Hatched
a	13 14	13(2)	0	15	15	15(1)	15
b	13 14	15(2)	2	15	15	15(1)	14 15
c	15(1)	14 15(3)	0	15	15	15	15
d	12	12	2(1)	14(1)	12(1)	14(1)	14

Comments/Observations:

replicate	0813-10 Day 8 Alive Hatched	0814-10 Day 8 Alive Hatched	0815-10 Day 8 Alive Hatched	0816-10 Day 8 Alive Hatched	0817-10 Day 8 Alive Hatched	0818-10 Day 8 Alive Hatched	0819-10 Day 8 Alive Hatched
a	13 14	12(3)	0	15	15	15(1)	15
b	13 14	15(1)	0	15	15	15(1)	15
c	15(1)	14(2)	0	15	15(2)	15	15
d	12	12(1)	2(1)	14	11(1)	14	14

Comments/Observations:

replicate	0813-10 Day 9 Alive Hatched	0814-10 Day 9 Alive Hatched	0815-10 Day 9 Alive Hatched	0816-10 Day 9 Alive Hatched	0817-10 Day 9 Alive Hatched	0818-10 Day 9 Alive Hatched	0819-10 Day 9 Alive Hatched
a	13 14	12(3)	0	15	15(1)	15(1)	15
b	13(1)	15(1)	0	15	15	15(1)	14
c	15(1)	14(2)	0	15	15(2)	15	15
d	12	12(1)	2(1)	14	11(1)	14	14

Comments/Observations:

replicate	0813-10 Day 10 Alive Hatched	0814-10 Day 10 Alive Hatched	0815-10 Day 10 Alive Hatched	0816-10 Day 10 Alive Hatched	0817-10 Day 10 Alive Hatched	0818-10 Day 10 Alive Hatched	0819-10 Day 10 Alive Hatched
a	14	11(2)	0	15	14	15	15
b	14(1)	15(1)	0	15	15	15(1)	14
c	14	14(2)	0	15(1)	15(2)	15	15
d	12	12	2(1)	14	11(1)	14	14

Comments/Observations:

Reviewed By: [signature] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Number of Alive Embryos and Hatched Organisms

	0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
	Day 11	Day 11	Day 11	Day 11	Day 11	Day 11	Day 11
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	9(2)*	0	15	14	15	15
b	14(1)	15(1)	0	15	15	15(1)	14
c	14(1)	14(3)	0	14	15	15	15
d	12	12	0	14	11(2)	14	14

Comments/Observations: * Microbial Death.

	0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
	Day 12	Day 12	Day 12	Day 12	Day 12	Day 12	Day 12
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	8(1)	0	15	14	15	15(1)
b	14(1)	15(2)	0	15	15	15(1)	14(1)
c	14(1)	14(3)	0	14	15(1)	15(1)	15
d	12	12	0	14	10(1)	14	14

Comments/Observations:

	0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
	Day 13	Day 13	Day 13	Day 13	Day 13	Day 13	Day 13
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	5*	0	15	14	15	15
b	13	15	0	15	15	15(1)	14
c	14(1)	14(2)	0	14	15(1)	15(1)	15
d	12	12	0	14	10(1)	14	14

Comments/Observations: * Microbial death

	0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
	Day 14	Day 14	Day 14	Day 14	Day 14	Day 14	Day 14
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	4*	0	15	14	15	15
b	13	15	↓	15	15	15(1)	14
c	14	14(2)		14	15(1)	15(1)	14
d	12	10*		14	10(1)	14	13

Comments/Observations: * Microbial death

Reviewed By: [signature] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Number of Alive Embryos and Hatched Organisms

replicate	0813-10 Day 15 Alive Hatched	0814-10 Day 15 Alive Hatched	0815-10 Day 15 Alive Hatched	0816-10 Day 15 Alive Hatched	0817-10 Day 15 Alive Hatched	0818-10 Day 15 Alive Hatched	0819-10 Day 15 Alive Hatched
a	14	4	0	15	14	15	15
b	12	15	↓	15	15	15(1)	14
c	14(1)	13(1)	↓	14	15(1)	15	13
d	12	0 ✱	↓	14	9	14	13

Comments/Observations: ✱ Microbial Death

replicate	0813-10 Day 16 Alive Hatched	0814-10 Day 16 Alive Hatched	0815-10 Day 16 Alive Hatched	0816-10 Day 16 Alive Hatched	0817-10 Day 16 Alive Hatched	0818-10 Day 16 Alive Hatched	0819-10 Day 16 Alive Hatched
a	14	4	0	15	14	15	14
b	11	15	↓	15	15	15(1)	14
c	14(1)	13(1)	↓	14	14	15	13
d	12	7 ✱	↓	14	9	14	10

Comments/Observations: ✱ Microbial death

replicate	0813-10 Day 17 Alive Hatched	0814-10 Day 17 Alive Hatched	0815-10 Day 17 Alive Hatched	0816-10 Day 17 Alive Hatched	0817-10 Day 17 Alive Hatched	0818-10 Day 17 Alive Hatched	0819-10 Day 17 Alive Hatched
a	14	4	0	15	14	15	14
b	11	15	↓	15	15	15(1)	14
c	13	12	↓	14	14	15	12
d	12	6 ✱	↓	14	9	7(1)	8

Comments/Observations: ✱ Microbial death

replicate	0813-10 Day 18 Alive Hatched	0814-10 Day 18 Alive Hatched	0815-10 Day 18 Alive Hatched	0816-10 Day 18 Alive Hatched	0817-10 Day 18 Alive Hatched	0818-10 Day 18 Alive Hatched	0819-10 Day 18 Alive Hatched
a	14	4	0	15	14	15	14
b	11	14	↓	15	15	~~15~~ 14	14
c	13	12	↓	14	14	15	12
d	12	6	↓	14	9	0	7

Comments/Observations:

Reviewed By: [signature] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Number of Alive Embryos and Hatched Organisms

replicate	0813-10 Day 19 Alive Hatched	0814-10 Day 19 Alive Hatched	0815-10 Day 19 Alive Hatched	0816-10 Day 19 Alive Hatched	0817-10 Day 19 Alive Hatched	0818-10 Day 19 Alive Hatched	0819-10 Day 19 Alive Hatched
a	14	4	0	15	14	15	14
b	11	14	↓	15	15	14	14
c	13	12		14	14	15	12
d	12	6		14	9	0	6

Comments/Observations:

replicate	0813-10 Day 20 Alive Hatched	0814-10 Day 20 Alive Hatched	0815-10 Day 20 Alive Hatched	0816-10 Day 20 Alive Hatched	0817-10 Day 20 Alive Hatched	0818-10 Day 20 Alive Hatched	0819-10 Day 20 Alive Hatched
a	14	4	0	15	14	~~14~~ 15	14
b	11	14	↓	15	~~14~~ 15	4	14
c	13	12		14	14	15	12
d	12	6		14	9	0	6

Comments/Observations:

replicate	0813-10 Day 21 Alive Hatched	0814-10 Day 21 Alive Hatched	0815-10 Day 21 Alive Hatched	0816-10 Day 21 Alive Hatched	0817-10 Day 21 Alive Hatched	0818-10 Day 21 Alive Hatched	0819-10 Day 21 Alive Hatched
a	14	4	0	15	14	15	14
b	11	14	↓	15	15	0	14
c	13	12		14	14	15	12
d	12	6		14	9	0	6

Comments/Observations:

replicate	0813-10 Day 22 Alive Hatched	0814-10 Day 22 Alive Hatched	0815-10 Day 22 Alive Hatched	0816-10 Day 22 Alive Hatched	0817-10 Day 22 Alive Hatched	0818-10 Day 22 Alive Hatched	0819-10 Day 22 Alive Hatched
a	14	4	0	15	14	15	14
b	11	14(C)	↓	15	15	0	14
c	13	12		14	14(C)	15	12
d	12	6		14	9	0	6

Comments/Observations:

Reviewed By: [signature] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Number of Alive Embryos and Hatched Organisms

replicate	0813-10 Day 23 Alive Hatched	0814-10 Day 23 Alive Hatched	0815-10 Day 23 Alive Hatched	0816-10 Day 23 Alive Hatched	0817-10 Day 23 Alive Hatched	0818-10 Day 23 Alive Hatched	0819-10 Day 23 Alive Hatched
a	14	4	0	15	14	15	14
b	11	14	↓	15	15	0	14
c	13	12		14	14	15	12
d	12	6		14	9	0	6

Comments/Observations:

replicate	0813-10 Day 24 Alive Hatched	0814-10 Day 24 Alive Hatched	0815-10 Day 24 Alive Hatched	0816-10 Day 24 Alive Hatched	0817-10 Day 24 Alive Hatched	0818-10 Day 24 Alive Hatched	0819-10 Day 24 Alive Hatched
a	14	4	0	15	14	15	14
b	11	14	↓	15	15	0	14
c	13	12		14	13	15	9
d	12	6		14	9	0	6

Comments/Observations:

replicate	0813-10 Day 25 Alive Hatched	0814-10 Day 25 Alive Hatched	0815-10 Day 25 Alive Hatched	0816-10 Day 25 Alive Hatched	0817-10 Day 25 Alive Hatched	0818-10 Day 25 Alive Hatched	0819-10 Day 25 Alive Hatched
a	14	4	0	15	14	15	14
b	11	14	↓	15	13	0	13
c	13	12		14	12	15	9
d	12	6		14	9	0	6

Comments/Observations:

replicate	0813-10 Day 26 Alive Hatched	0814-10 Day 26 Alive Hatched	0815-10 Day 26 Alive Hatched	0816-10 Day 26 Alive Hatched	0817-10 Day 26 Alive Hatched	0818-10 Day 26 Alive Hatched	0819-10 Day 26 Alive Hatched
a	14	4	0	15	14	15	13
b	11	14	↓	15	13	0	13
c	13	12		14	12	15	9
d	12	6		14	9	0	6

Comments/Observations:

Reviewed By: NL Date Reviewed: 2019/01/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Number of Alive Embryos and Hatched Organisms

replicate	0813-10 Day 27 Alive Hatched	0814-10 Day 27 Alive Hatched	0815-10 Day 27 Alive Hatched	0816-10 Day 27 Alive Hatched	0817-10 Day 27 Alive Hatched	0818-10 Day 27 Alive Hatched	0819-10 Day 27 Alive Hatched
a	14	4	0	15	14	15	11
b	11	14	↓	15	13	0	13
c	13	12	↓	14	12	15	9
d	12	6	↓	14	9	0	6

Comments/Observations:

replicate	0813-10 Day 28 Alive Hatched	0814-10 Day 28 Alive Hatched	0815-10 Day 28 Alive Hatched	0816-10 Day 28 Alive Hatched	0817-10 Day 28 Alive Hatched	0818-10 Day 28 Alive Hatched	0819-10 Day 28 Alive Hatched
a	14	4	0	15	14	15	10*
b	11	14	↓	15	13	0	13
c	13	12	↓	14	12	15	9
d	12	6	↓	14	9	0	6

Comments/Observations: *small fish dead, appeared to have been bullied/eaten

replicate	0813-10 Day 29 Alive Hatched	0814-10 Day 29 Alive Hatched	0815-10 Day 29 Alive Hatched	0816-10 Day 29 Alive Hatched	0817-10 Day 29 Alive Hatched	0818-10 Day 29 Alive Hatched	0819-10 Day 29 Alive Hatched
a	14	4	0	Ecn	14	15	9
b	11	14	↓	15	13	0	13
c	13	11	↓	14	12	15	9
d	12	6	↓	14	9	0	6

Comments/Observations:

replicate	0813-10 Day 30 Alive Hatched	0814-10 Day 30 Alive Hatched	0815-10 Day 30 Alive Hatched	0816-10 Day 30 Alive Hatched	0817-10 Day 30 Alive Hatched	0818-10 Day 30 Alive Hatched	0819-10 Day 30 Alive Hatched
a	14	4	0	15	13*	15(1)	8*
b	11	14	↓	15	13	0	11*
c	13	11	↓	14	12	15	9
d	12	6	↓	14	9	0	6

Comments/Observations: 0817A + 0819- RepA - appears to be bullied + eaten RepB- one bullied and death

Reviewed By: [signature] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Number of Alive Embryos and Hatched Organisms

	0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
	Day 31	Day 31	Day 31	Day 31	Day 31	Day 31	Day 31
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	4	0	15	13	14	8
b	10	14	↓	15	13	0	11
c	13	11		14	12	15	9
d	12	6		14	9	0	6

Comments/Observations:

	0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
	Day 32	Day 32	Day 32	Day 32	Day 32	Day 32	Day 32
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	4	0	15	13	14	8
b	10	14	↓	15	13	0	11
c	13	11		14	12	15	9
d	12	6		14	9	0	6

Comments/Observations:

Reviewed By: NL Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method: FMD 32 Day ELS Client: TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

New Solutions

pH (units)

Conc. (%) / Day	0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
0	8.3	8.3	8.2	8.3	8.3	8.3	8.3
1	8.2	8.0	8.1	8.4	8.4	8.4	8.4
2	8.3	8.2	8.1	8.3	8.4	8.3	8.3
3	8.3	8.2	8.0	8.3	8.3	8.0	8.3
4	8.0	8.2	8.1	8.3	8.3	8.3	8.3
5	8.3	8.1	7.9	8.3	8.3	8.3	8.3
6	8.1	8.1	8.1	8.3	8.2	8.2	8.2
7	8.3	8.1	8.0	8.3	8.3	8.4	8.3
8	8.2	8.1	8.0	8.3	8.3	8.2	8.2

Conductance (µS/cm)

Day							
0	398	1116	3300	997	335	359	316
1	406	1121	3320	1010	365	372	331
2	404	1126	3310	1001	351	370	327
3	390	1132	3320	994	341	375	320
4	352	1118	3290	935	330	358	314
5	390	1131	3240	974	340	354	309
6	387	1093	3230	962	334	349	307
7	378	1069	3190	936	338	348	327
8	392	1076	3210	984	350	356	308

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day							
0	7.3	7.3	7.3	7.3	7.3	7.3	7.3
1	7.3	7.2	7.2	7.3	7.3	7.3	7.3
2	7.3	7.3	7.3	7.3	7.3	7.3	7.3
3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
4	7.3	7.3	7.3	7.3	7.3	7.3	7.3
5	7.2	7.3	7.3	7.3	7.2	7.2	7.3
6	7.3	7.3	7.3	7.3	7.3	7.3	7.3
7	7.1	7.1	7.1	7.1	7.1	7.2	7.2
8	7.2	7.3	7.3	7.3	7.3	7.3	7.3

Temperature (°C)

Day							
0	24	24	24	24	24	24	24
1	24	25	25	24	24	24	24
2	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24
4	24	24	24	24	24	24	24
5	25	25	24	24	25	25	24
6	24	24	24	24	24	24	24
7	26	26	26	26	26	26	25
8	24	24	24	24	24	24	24

Old Solutions

pH (units)

Day	0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
0							
1	8.1	8.0	8.0	8.3	8.3	8.3	8.3
2	8.2	8.0	7.9	8.2	8.3	8.3	8.3
3	8.3	8.0	7.7	8.1	8.3	8.2	8.3
4	8.3	7.9	7.8	8.1	8.3	8.2	8.2
5	8.1	7.9	7.8	8.1	8.1	8.1	8.2
6	8.3	8.0	7.8	8.1	8.2	8.2	8.2
7	8.2	8.0	7.7	8.1	8.3	8.2	8.2
8	8.1	8.0	7.6	8.1	8.1	8.2	8.2

Conductance (µS/cm)

Day							
0							
1	369	1121	3230	1163	422	396	354
2	416	1120	3290	1240	449	409	354
3	385	1110	3240	1184	425	393	339
4	416	1081	3160	1173	418	388	338
5	384	1082	3220	1204	455	388	346
6	403	1094	3180	1153	414	394	335
7	373	1082	3100	1177	457	405	352
8	365	1057	3150	1187	433	373	339

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day							
0							
1	7.0	7.1	7.0	7.1	7.0	7.0	7.0
2	7.1	7.1	7.0	7.0	7.1	7.1	7.1
3	7.1	7.2	7.2	7.2	7.3	7.3	7.3
4	7.1	7.2	7.1	7.1	7.1	7.2	7.1
5	7.1	7.2	7.1	7.1	7.1	7.0	7.1
6	7.2	7.1	7.1	7.0	7.0	6.9	6.8
7	7.2	7.1	7.0	7.1	7.0	6.9	7.0
8	6.2	6.3	6.5	6.4	6.4	6.2	6.2

Temperature (°C)

Day							
0							
1	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24
4	24	24	24	24	25	25	25
5	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24
7	24	24	24	24	24	24	24
8	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: [signature] Date Reviewed: 2018/07/12

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

New Solutions

pH (units)

Conc. (%) / Day	0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
9	8.2	8.2	8.1	8.4	8.4	8.3	8.4
10	8.3	8.2	8.0	8.3	8.4	8.3	8.3
11	8.2	8.1	8.0	8.4	8.3	8.2	8.2
12	8.0	8.1		8.3	8.3	8.3	8.2
13	8.2	8.2		8.3	8.3	8.3	8.3
14	8.2	8.2		8.3	8.3	8.3	8.2
15	8.3	8.1		8.3	8.3	8.2	8.2
16	8.3	8.1		8.3	8.3	8.3	8.3
17	8.3	8.2		8.3	8.3	8.3	8.3

Conductance (µS/cm)

9	380	1136	3180	1020	360	356	316
10	394	1079	3200	944	403	359	312
11	372	1065	3240	972	330	351	309
12	363	974		863	298	308	275
13	342	964		833	298	318	293
14	327	950		815	287	332	276
15	368	983		851	366	340	294
16	323	970		817	289	312	285
17	326	959		832	301	318	283

Dissolved Oxygen (mg/L) (**40-100% saturation**)

9	7.3	7.3	7.3	7.3	7.3	7.3	7.3
10	7.3	7.3	7.2	7.2	7.2	7.3	7.3
11	7.3	7.3	7.3	7.3	7.3	7.3	7.3
12	7.3	7.3		7.2	7.3	7.3	7.3
13	7.3	7.3		7.3	7.3	7.3	7.3
14	7.3	7.3		7.3	7.3	7.3	7.3
15	7.3	7.3		7.3	7.3	7.3	7.3
16	7.3	7.3		7.3	7.3	7.3	7.3
17	7.3	7.3		7.3	7.3	7.3	7.3

Temperature (°C)

9	24	24	24	24	24	24	24
10	24	24	25	25	24	24	24
11	24	24	24	24	24	24	24
12	24	24		25	24	24	24
13	24	24		24	24	24	24
14	24	24		24	24	24	24
15	24	24		24	24	24	24
16	24	24		24	24	24	24
17	24	24		24	24	24	24

Old Solutions

pH (units)

	0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
9	8.4	8.1	7.8	8.2	8.4	8.3	8.4
10	8.2	7.9	7.7	8.0	8.2	8.2	8.2
11	7.9	7.8	7.9	8.0	8.2	8.1	8.1
12	8.2	8.0		8.1	8.2	8.2	8.1
13	8.2	7.9		8.1	8.2	8.2	8.2
14	8.2	7.9		8.1	8.2	8.2	8.2
15	8.2	7.9		8.1	8.2	8.2	8.2
16	8.2	7.9		8.1	8.2	8.2	8.2
17	8.2	7.9		8.1	8.2	8.2	8.2

Conductance (µS/cm)

9	428	1062	3180	1072	455	408	336
10	429	1061	3090	1087	437	405	343
11	411	1001	3090	1154	436	402	345
12	343	964		907	341	336	315
13	347	970		880	361	354	310
14	350	984		876	379	352	307
15	376	971		877	382	357	325
16	316	970		851	340	345	301
17	325	953		854	348	343	298

Dissolved Oxygen (mg/L) (**40-100% saturation**)

9	7.2	7.2	7.2	7.1	7.1	7.2	7.1
10	6.9	7.0	7.0	7.1	7.0	6.9	6.9
11	6.2	6.2	6.4	6.3	6.3	6.4	6.4
12	6.9	7.0		7.0	7.1	7.0	6.9
13	6.8	6.8		6.6	6.4	6.6	6.7
14	6.9	6.7		6.5	6.4	6.5	6.5
15	6.5	6.6		6.5	6.5	6.6	6.5
16	6.9	6.9		6.7	6.7	6.7	6.7
17	7.0	6.8		6.7	6.7	6.8	6.8

Temperature (°C)

9	24	24	24	24	24	24	24
10	24	24	24	24	24	24	24
11	24	24	24	24	24	24	24
12	24	24		24	24	24	24
13	24	24		24	24	24	24
14	24	24		24	24	24	24
15	24	24		24	24	24	24
16	24	24		24	24	24	24
17	24	24		24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: ME Date Reviewed: 2019/04/12

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

14-10 day 21
LF ~~DO~~ EC=1060

pH (units)

Conc. (%) / Day	New Solutions 0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10	Old Solutions 0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
18	8.2	8.2		8.2	8.3	8.2	8.3	8.0	7.9		8.1	8.1	8.1	8.1
19	8.1	8.0		8.1	8.2	8.1	8.2	7.9	7.8		8.0	8.0	8.0	8.0
20	8.2	8.2		8.3	8.2	8.2	8.3	8.1	7.9		8.1	8.2	8.1	8.1
21	8.1	8.2		8.2	8.3	8.2	8.3	8.0	7.9		8.0	8.1	8.1	8.1
22	8.2	8.1		8.2	8.3	8.2	8.3	7.8	7.7		8.0	8.1	8.0	8.0
23	8.2	8.1		8.3	8.3	8.1	8.3	8.0	7.9		8.2	8.3	8.2	8.2
24	8.2	8.2		8.3	8.3	8.3	8.3	8.1	7.8		8.2	8.2	8.1	8.1
25	8.1	8.1		8.2	8.2	8.2	8.2	7.9	7.8		8.1	8.1	8.0	8.0
26	8.1	8.1		8.2	8.2	8.2	8.2	7.9	7.8		8.1	8.2	8.1	8.1

Conductance (µS/cm)

Day	0813-10	0814-10		0815-10	0816-10	0817-10	0818-10	0819-10	0813-10	0814-10		0815-10	0816-10	0817-10	0818-10	0819-10
18	330	1024			806	302	310	283	338	972			863	355	341	300
19	360	1022			864	298	323	297	381	1007			910	360	350	318
20	300	1060			887	292	340	295	396	1012			921	373	374	328
21	319	~~1060~~			921	345	354	311	388	1081			946	364	368	332
22	314	1048			892	333	347	299	312	1040			937	366	365	319
23	298	1024			885	309	338	300	302	1016			930	362	361	317
24	302	1028			896	319	349	291	348	1009			929	371	368	346
25	304	1021			912	315	340	300	343	992			931	379	369	322
26	260	909			770	262	304	253	301	889			825	334	332	285

Dissolved Oxygen (mg/L) (40-100% saturation)

Day	0813-10	0814-10		0815-10	0816-10	0817-10	0818-10	0819-10	0813-10	0814-10		0815-10	0816-10	0817-10	0818-10	0819-10
18	7.3	7.3			7.3	7.3	7.3	7.3	6.7	6.5			6.4	6.0	6.0	6.3
19	7.3	7.3			7.3	7.3	7.3	7.3	6.2	6.2			6.2	6.1	6.1	6.2
20	7.3	7.3			7.3	7.3	7.3	7.3	6.4	6.3			6.3	6.2	6.1	6.2
21	7.3	7.3			7.3	7.3	7.3	7.3	6.0	6.1			6.1	6.1	6.0	6.3
22	7.2	7.2			7.3	7.2	7.2	7.2	6.3	6.3			6.2	5.9	6.0	6.3
23	7.3	7.3			7.3	7.3	7.3	7.3	6.3	6.3			6.3	6.3	6.4	6.2
24	7.3	7.3			7.3	7.3	7.3	7.3	6.4	6.5			6.4	6.3	6.3	6.3
25	7.3	7.3			7.3	7.3	7.3	7.3	5.6	5.7			5.8	5.8	5.6	5.9
26	7.3	7.3			7.3	7.3	7.3	7.3	5.5	5.6			5.6	5.6	5.7	5.9

Temperature (°C)

Day	0813-10	0814-10		0815-10	0816-10	0817-10	0818-10	0819-10	0813-10	0814-10		0815-10	0816-10	0817-10	0818-10	0819-10
18	~~24~~ 23	23			~~24~~ 23	23	23	23	24	24			24	24	24	24
19	24	24			24	24	24	24	24	24			24	24	24	24
20	24	24			24	24	24	24	24	24			24	24	24	24
21	24	24			24	24	24	24	24	24			24	24	24	24
22	25	25			24	25	25	25	24	24			24	24	24	24
23	24	24			24	24	24	24	24	24			24	24	24	24
24	24	24			24	24	24	24	24	24			24	24	24	24
25	24	24			24	24	24	24	24	24			24	24	24	24
26	24	24			24	24	24	24	24	24			24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: [signature] Date Reviewed: 2019/04/12

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

New Solutions

Conc. (%) / Day	0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
pH (units)							
27	8.1	8.1		8.3	8.1	8.2	8.2
28	8.2	8.2		8.3	8.1	8.3	8.3
29	8.1	8.2		8.1	8.3	8.3	8.2
30	8.2	8.1		8.3	8.2	8.2	8.3
31	8.0	8.1		8.2	8.1	8.2	8.2
32							
Conductance (µS/cm)							
27	267	928		740	268	291	258
28	265	889		760	274	319	299
29	295	864		737	306	357	295
30	256	876		716	269	293	264
31	243	879		759	266	295	288
32							
Dissolved Oxygen (mg/L) (40-100% saturation)							
27	7.3	7.3		7.3	7.3	7.3	7.3
28	7.3	7.3		7.3	7.3	7.3	7.3
29	7.3	7.3		7.3	7.3	7.3	7.3
30	7.3	7.3		7.3	7.3	7.3	7.3
31	7.3	7.3		7.3	7.3	7.3	7.3
32							
Temperature (°C)							
27	24	24		24	24	24	24
28	24	24		24	24	24	24
29	24	24		24	24	24	24
30	24	24		24	24	24	24
31	24	24		24	24	24	24
32	24	24					

Old Solutions

Conc. (%) / Day	0813-10	0814-10	0815-10	0816-10	0817-10	0818-10	0819-10
pH (units)							
27	7.8	7.8		8.1	8.0	8.0	8.0
28	7.8	8.0		8.1	8.0	8.0	8.1
29	7.9	7.8		8.1	8.1	8.1	8.0
30	7.8	7.8		8.1	8.0	8.0	8.0
31	7.8	7.8		8.0	8.1	8.0	8.0
32	7.7	7.9		8.0	8.0	8.0	8.0
Conductance (µS/cm)							
27	305	908		839	334	334	291
28	300	934		794	339	331	288
29	284	836		774	312	323	294
30	237	839		768	336	330	292
31	254	835		769	330	333	292
32	249	870		782	343	332	292
Dissolved Oxygen (mg/L) (40-100% saturation)							
27	5.2	5.4		5.5	5.4	5.4	5.5
28	6.3	6.0		5.7	5.7	5.7	5.8
29	6.0	6.0		6.0	5.9	5.9	5.9
30	5.9	6.0		6.0	5.9	5.9	5.9
31	6.4	6.4		6.5	6.1	6.5	6.4
32	6.3	6.5		6.5	6.4	6.4	6.4
Temperature (°C)							
27	24	24	24	24	24	24	24
28	24	24		24	24	24	24
29	24	24		24	24	24	24
30	24	24		24	24	24	24
31	24	24		24	24	24	24
32	24	24		24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: [signature] Date Reviewed: 2019/04/12

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. 0813-10

Fish	Replicate # A Length (mm)	Normal/ Abnormal	Replicate # B Length (mm)	Normal/ Abnormal	Replicate # C Length (mm)	Normal/ Abnormal	Replicate # D Length (mm)	Normal/ Abnormal
1	13	N	13	N	11	N	12	N
2	9		9		10		9	
3	9		13		13		10	
4	11		10		11		13	
5	9		11		9		13	
6	9		13		9		13	
7	14		9		11		13	
8	12		7		8		12	
9	10		7		9		11	
10	11		9		10		7	
11	8		-	-	14		8	
12	12		-	-	10		11	
13	12		-	-	9		-	-
14	10		-	-	-	-	-	-
15	-	-	-	-	-	-	-	-

Comments

10.64 10.10 10.31 11.00

Conc. 0814-10

Fish	Replicate # A Length (mm)	Normal/ Abnormal	Replicate # B Length (mm)	Normal/ Abnormal	Replicate # C Length (mm)	Normal/ Abnormal	Replicate # D Length (mm)	Normal/ Abnormal
1	15	N	7	N	15	N	12	N
2	16		12		9		13	
3	15		12		13		15	
4	14		9		8		12	
5	-	-	13		11		11	
6	-	-	8		11		15	
7	-	-	12		12		-	-
8	-	-	12		8		-	-
9	-	-	13		11		-	-
10	-	-	11		11		-	-
11	-	-	6		13		-	-
12	-	-	7		-	-	-	-
13	-	-	10		-	-	-	-
14	-	-	10		-	-	-	-
15	-	-	-	-	-	-	-	-

Comments

15.00 10.14 11.09 13.00

Reviewed By: [illegible] Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. 0815-10

Replicate #			Replicate #			Replicate #			Replicate #		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1			1			1			1		
2			2			2			2		
3			3			3			3		
4			4			4			4		
5			5			5			5		
6			6			6			6		
7			7			7			7		
8			8			8			8		
9			9			9			9		
10			10			10			10		
11			11			11			11		
12			12			12			12		
13			13			13			13		
14			14			14			14		
15			15			15			15		

LF

Comments

NO fish alive.

0816-10

Replicate # A			Replicate # B			Replicate # C			Replicate # D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	14	N	1	10	N	1	10	N	1	11	N
2	13		2	10		2	12		2	15	
3	13		3	11		3	10		3	13	
4	9		4	11		4	10		4	15	
5	12		5	9		5	13		5	13	
6	9		6	10		6	10		6	8	
7	10		7	12		7	11		7	8	
8	10		8	8		8	10		8	9	
9	8		9	12		9	9		9	10	
10	10		10	11		10	11		10	11	
11	11		11	11		11	10		11	10	
12	11		12	9		12	10		12	16	
13	12		13	9		13	9		13	10	
14	9		14	10		14	9		14	11	
15	10		15	11		15	—	—	15	—	—

Comments

10.67 10.27 10.89 11.00

Reviewed By: [signature] Date Reviewed: 2017/09/12

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **0817-10**

Replicate # A		
Fish	Length (mm)	Normal/ Abnormal
1	11	N
2	13	↓
3	11	
4	12	
5	14	
6	14	
7	10	
8	8	
9	9	
10	10	
11	7	
12	8	
13	10	
14	–	–
15	–	–

Replicate # B		
Fish	Length (mm)	Normal/ Abnormal
1	9	N
2	10	↓
3	12	
4	12	
5	11	
6	12	
7	10	
8	10	
9	12	
10	13	
11	10	
12	11	
13	10	↓
14	–	–
15	–	–

Replicate # C		
Fish	Length (mm)	Normal/ Abnormal
1	11	N
2	11	↓
3	14	
4	11	
5	11	
6	12	
7	10	
8	13	
9	12	
10	9	
11	12	
12	10	↓
13	–	–
14	–	–
15	–	–

Replicate # D		
Fish	Length (mm)	Normal/ Abnormal
1	12	N
2	10	↓
3	15	
4	10	
5	12	
6	11	
7	8	
8	14	
9	15	↓
10	–	–
11	–	–
12	–	–
13	–	–
14	–	–
15	–	–

Comments 10.54 10.92 11.33 11.89

0818-10

Replicate # A		
Fish	Length (mm)	Normal/ Abnormal
1	12	N
2	12	↓
3	10	
4	8	
5	10	
6	9	
7	13	
8	7	
9	11	
10	12	
11	9	
12	11	
13	9	
14	10	↓
15	–	–

Replicate #		
Fish	Length (mm)	Normal/ Abnormal
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Replicate # C		
Fish	Length (mm)	Normal/ Abnormal
1	11	N
2	10	↓
3	10	
4	9	
5	10	
6	12	
7	10	
8	12	
9	9	
10	12	
11	11	
12	8	
13	8	
14	9	
15	11	↓

Replicate #		
Fish	Length (mm)	Normal/ Abnormal
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		

Comments 10.21 10.13

Reviewed By: [illegible] Date Reviewed: [illegible]

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0813, 1819-0814, 1819-0815, 1819-0816, 1819-0817, 1819-0818, 1819-0819

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. 0819-10

Replicate # A			Replicate # B			Replicate # C			Replicate # D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	10	N	1	12	N	1	12	N	1	11	N
2	12		2	10		2	13		2	11	
3	13		3	9		3	11		3	10	
4	12		4	10		4	10		4	12	
5	12		5	11		5	11		5	12	
6	11		6	10		6	13		6	10	
7	12		7	10		7	12		7	—	—
8	10		8	10		8	8		8	—	—
9	—	—	9	10		9	13		9	—	—
10	—	—	10	12		10	—	—	10	—	—
11	—	—	11	11		11	—	—	11	—	—
12	—	—	12	—	—	12	—	—	12	—	—
13	—	—	13	—	—	13	—	—	13	—	—
14	—	—	14	—	—	14	—	—	14	—	—
15	—	—	15	—	—	15	—	—	15	—	—

Comments

11.50 10.46 11.44 11.00

Reviewed By: AH Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Organism Weights Bench Sheet

Client TEC1164 Sample 1819-0813-10, 1819-0814-10, 1819-0815-10, 1819-0816-10, 1819-0817-10, 1819-0818-10, 1819-0819-10 Organism 32 day FM ELS Batch 20191031/11 FM ELS

	Item Weighed	Date	Initials	Balance*
Initial Weight (mg):	dried pan	2019/03/27	CB	Mettler #1
Final Weight (mg):	dried pan + organisms	2019/04/04	MP	Mettler 1

* same balance must be used for initial and final weights
* for FM/HA/CT, must use scale with 0.01 mg accuracy

Concentration

Replicate	1819-0813 Initial	1819-0813 Final	1819-0814-10 Initial	1819-0814-10 Final	1819-0815-10 Initial	1819-0815-10 Final	1819-0816-10 Initial	1819-0816-10 Final	1819-0817-10 Initial	1819-0817-10 Final	1819-0818-10 Initial	1819-0818-10 Final
a	1045.24	1073.61	1033.28	1063.42			1032.04	1063.19	1023.29	1050.88	1014.78	~~1035.~~ 1038.99 MP
b	993.81	1014.20	1020.06	1048.82			1011.83	1037.23	995.66	1021.80	1006.99	~~1037.24~~ GB
c	1038.93	1067.28	1013.41	1043.11			1030.44	1057.04	1000.35	1031.17	1017.01	1041.16
d	1009.92	1042.63	1019.77	1045.64			1029.05	1063.40	1008.37	1038.62	1016.33	—
e												

Concentration

Replicate	1819-0819-10 Initial	1819-0819-10 Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
a	1029.15	1051.30										
b	1065.12	1084.13										
c	1006.45	1030.16										
d	1040.19	1055.72										
e												

Balance Calibration Check:

	Initial	Final
first pan weighed:	1819-0813-10 D	0817-10 B
weight of first pan:	1009.92	1021.80
first pan after all other pans weighed:	1009.93	1021.81
% difference <5%:	**Yes/No**	**Yes/No**

Test Validity Met: **Yes/No/NA**

Results are Logical:** **Yes/No**

** no negative numbers, consistent values across replicates

% difference = $\frac{\text{(initial weight - reweight)}}{\text{(initial weight + reweight) / 2)}} \times 100\%$

If "no" is circled for any parameter, notify Lab Supervisor/ QA Group to determine appropriate action

Reviewed By: _____ Date Reviewed: 2019/04/12

Pans labelled + in oven - 20190325 - CB

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

1819-0820 to 1819-0827
10ug/L

Method: FMD 32 Day ELS Client: TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

Organism Information
Source: Aquatox Batch: 20190301 FM-ELS Egg Stage: Beamites Organisms Received in Good Condition: Yes or No

Test Log

Date	Day	Time	Technicians	Chem Cart Used	Fed AM	Fed PM	Sample Pre-Aeration Time	Bench Sheet Review First
03/01 20190228	0	1500	CB/ST/LF	2	—	—	60 mins	
20190302	1	1110	CB/LF	2	—	—	60 mins.	MW
20190303	2	1030	CB/SS	2	—	—	60 mins	ST
20190304	3	1210	CB	2	—	—	60 mins	ST
20190305	4	1100	CB	2	—	✓	60 mins	MW
20190306	5	1210	CB	2	✓	✓	60 mins	ES
20190307	6	1030	CB	2	✓	✓	60 mins	ST
20190308	7	1050	ST	2	✓	✓	60 mins	LF
20190309	8	1100	KL	2	✓	✓	60 mins	KL
20190310	9	1015	SS	2	✓	✓	60 mins	ST
20190311	10	1130	SS	2	✓	✓	60 mins	SS
20190312	11	1105	KL	2	✓	✓	60 mins	ST
20190313	12	1010	ST	2	✓	✓	60 mins	KL
20190314	13	1200	CB	2	✓	✓	60 mins	SS
20190315	14	1100	CB	2	✓	✓	60 mins	ST
20190316	15	1000	KL	2	✓	✓	60 mins	MW
20190317	16	1050	CB	2	✓	✓	60 mins	SS
20190318	17	1055	CB	2	✓	✓	60 mins	LF
20190319	18	1030	CB	2	✓	✓	60 mins	MW
20190320	19	1040	CB	2	✓	✓	60 mins	ES
20190321	20	1110	CB	2	✓	✓	60 mins	KL
20190322	21	1215	LF	2	✓	✓	60 min	ST
20190323	22	1030	KL	2	✓	✓	60 min	SS
20190324	23	1035	CB	2	✓	✓	60 mins	ES
20190325	24	1045	CB	2	✓	✓	60 mins	ST
20190326	25	1040	CB	2	✓	✓	60 mins	LF
20190327	26	1040	CB	2	✓	✓	60 mins	KL
20190328	27	1105	CB	2	✓	✓	60 mins	ST
20190329	28	1100	LF	2	✓	✓	60 mins	MW
20190330	29	1030	KL	2	✓	✓	60 mins	SS
20190331	30	1130	LF	2	✓	✓	60 min	ST
20190401	31	1000	KL	2	✓	✓	60 min	LF
20190402	32	1030	CB/ST	2	—	—		

Reviewed By: [signature] Date Reviewed: 20190410

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

replicate	0820-10 Day 1 Alive Embryos	0820-10 Day 1 Dead Embryos	0821-10 Day 1 Alive Embryos	0821-10 Day 1 Dead Embryos	0822-10 Day 1 Alive Embryos	0822-10 Day 1 Dead Embryos	0823-10 Day 1 Alive Embryos	0823-10 Day 1 Dead Embryos	0824-10 Day 1 Alive Embryos	0824-10 Day 1 Dead Embryos	0825-10 Day 1 Alive Embryos	0825-10 Day 1 Dead Embryos	0826-10 Day 1 Alive Embryos	0826-10 Day 1 Dead Embryos	0827-10 Day 1 Alive Embryos	0827-10 Day 1 Dead Embryos
a	15	0	15	0	15	0	14	1	15	0	15	0	13	2	15	0
b	15	0	15	0	15	0	15	0	14	1	15	0	15	0	14	1
c	15	0	15	0	14	1	14	1	15	0	15	0	15	0	14	1
d	15	0	15	0	14	1	15	0	15	0	15	0	15	0	15	0
e	30	0	30	0	30	0	30	0	25	5	30	0	26	4	30	0
f	30	0	30	0	28	2	28	2	28	2	30	0	30	0	29	1

Comments/Observations:

Number of Alive Embryos and Hatched Organisms

replicate	0820-10 CTL Day 2 Alive Embryos	0820-10 CTL Day 2 Dead Embryos	0820-10 CTL Day 2 Cull to 15	0821-10 Day 2 Alive Embryos	0821-10 Day 2 Dead Embryos	0821-10 Day 2 Cull to 15	0822-10 Day 2 Alive Embryos	0822-10 Day 2 Dead Embryos	0822-10 Day 2 Cull to 15	0823-10 Day 2 Alive Embryos	0823-10 Day 2 Dead Embryos	0823-10 Day 2 Cull to 15
a	15	0	15	15	0	15	15	0	15	14	0	15
b	14	1	15	15	0	15	15	0	15	15	0	15
c	15	0	15	15	0	15	14	0	15	14	0	15
d	15	0	15	15	0	15	15	0	15	15	0	15
e	30	0		29	1		30	0		30	0	
f	30	0		30	0		28	0		28	0	

replicate	0824-10 Day 2 Alive Embryos	0824-10 Day 2 Dead Embryos	0824-10 Day 2 Cull to 15	0825-10 Day 2 Alive Embryos	0825-10 Day 2 Dead Embryos	0825-10 Day 2 Cull to 15	0826-10 Day 2 Alive Embryos	0826-10 Day 2 Dead Embryos	0826-10 Day 2 Cull to 15	0827-10 Day 2 Alive Embryos	0827-10 Day 2 Dead Embryos	0827-10 Day 2 Cull to 15
a	15	0	15	14	1	15	13	0	15	11	4	15
b	12	2	15	14	1	15	15	0	15	14	0	15
c	15	0	15	15	0	15	15	0	15	10	4	15
d	13	2	15	15	0	15	15	0	15	15	0	15
e	25	0		29	1		26	0		27	3	
f	28	0		30	0		30	0		27	2	

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Comments/Observations:

Reviewed By: _____ Date Reviewed: 2018/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

0820-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	6	0	9	0
b	6	0	9	0
c	6	0	9	0
d	9	0	6	0

0821-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	12	0	3	0
b	14	0	1	0
c	13	0	2	0
d	10	0	5	0

0822-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	12	0	3	0
b	12	0	3	0
c	14	0	1	0
d	14	0	1	0

0823-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	12	0	3	0
b	14	0	1	0
c	12	0	3	0
d	12	0	3	0

0824-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	15	0	0	0
b	10	0	5	0
c	15	0	0	0
d	14	0	1	0

0825-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	12	0	3	0
b	14	0	1	0
c	14	0	1	0
d	12	0	3	0

0826-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	15	0	0	0
b	14	0	1	0
c	15	0	0	0
d	12	0	3	0

0827-10

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	13	0	2	0
b	11	0	4	0
c	13	0	2	0
d	13	0	2	0

0820-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	15	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0821-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	4	0	11	0
b	4	0	11	0
c	3	0	12	0
d	5	0	10	0

0822-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	1	0	14	0
b	1	0	14	0
c	4	0	11	0
d	3	0	12	0

0823-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	1	0	14	0
d	0	0	15	0

0824-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	5	0	10	0
c	6	0	9	0
d	0	0	15	0

0825-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	2	0	13	0
d	2	0	13	0

0826-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	3	0	12	0
b	3	0	12	0
c	3	0	12	0
d	1	0	14	0

Reviewed By: [signature] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

0827-10

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	2	0	13	0
b	2	0	13	0
c	1	0	14	0
d	1	0	14	0

0820-10

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14	1
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0821-10

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0822-10

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0823-10

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0824-10

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14	1
b	0	0	15	0
c	1	0	14	0
d	0	0	15	0

0825-10

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0826-10

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0827-10%

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

Reviewed By: NL Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client Tec164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

0820-10

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	8	14	6
b	0	8	15	0
c	0	0	15	0
d	0	0	15	0

0821-10

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	6	8	14	6
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0822-10

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14	1
b	0	0	15	0
c	0	0	14	1
d	0	0	15	0

0823-10

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0824-10

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

NC 15

0825-10

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0826-10

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	14	1
d	0	0	15	0

0827-10

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	8	0	15	0
b		0	15	0
c	8	0	15	0
d	8	0	15	0

Reviewed by: Date Reviewed: 20190411

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

Number of Alive Embryos and Hatched Organisms

replicate	0820-10 Day 7 Alive Hatched	0821-10 Day 7 Alive Hatched	0822-10 Day 7 Alive Hatched	0823-10 Day 7 Alive Hatched	0824-10 Day 7 Alive Hatched	0825-10 Day 7 Alive Hatched	0826-10 Day 7 Alive Hatched	0827-10 Day 7 Alive Hatched
a	14	14	14	14	14(2)	15	14	15
b	15	15	15	15	15	15	15	15
c	15(1)	15(1)	14	15	15	15	~~15~~ 14	15
d	15	15(2)	15	15	15(2)	15(2)	15	15

Comments/Observations:

replicate	0820-10 Day 8 Alive Hatched	0821-10 Day 8 Alive Hatched	0822-10 Day 8 Alive Hatched	0823-10 Day 8 Alive Hatched	0824-10 Day 8 Alive Hatched	0825-10 Day 8 Alive Hatched	0826-10 Day 8 Alive Hatched	0827-10 Day 8 Alive Hatched
a	14(1)~~14(2)~~	14	14	14	14(2)	15	14(2)	15
b	15	15(1)	15	~~14~~ 15	15	15	15(3)	15
c	15(1)	15(1)	14	15	14	15	14	15(1)
d	15	15(2)	15	15	14(1)	14(1)*	15(1)	15

Comments/Observations: ~~*~~ Death By Microbial)

replicate	0820-10 Day 9 Alive Hatched	0821-10 Day 9 Alive Hatched	0822-10 Day 9 Alive Hatched	0823-10 Day 9 Alive Hatched	0824-10 Day 9 Alive Hatched	0825-10 Day 9 Alive Hatched	0826-10 Day 9 Alive Hatched	0827-10 Day 9 Alive Hatched
a	14(1)	14	14	14(1)	13(1)	15	~~14~~ 13(2)**	15
b	15	14	15	15	14	15	~~11~~ 10(1)*	15
c	15(2)	15(1)	14	15	14	15	14	15(1)
d	15	15(1)	15	15	14(1)	7*	15	15

Comments/Observations: * Microbial death
* 0826-10 - 1 microbial death
~~** count 15 in jar~~

replicate	0820-10 Day 10 Alive Hatched	0821-10 Day 10 Alive Hatched	0822-10 Day 10 Alive Hatched	0823-10 Day 10 Alive Hatched	0824-10 Day 10 Alive Hatched	0825-10 Day 10 Alive Hatched	0826-10 Day 10 Alive Hatched	0827-10 Day 10 Alive Hatched
a	14(2)	14	14	14(1)	13(1)	15	13(1)	15
b	15	14	15	15	14	15	11(1)	15
c	15(2)	15(1)	14	15	14(1)	15(1)	14	15(1)
d	15	15(1)	15	15	14(1)	0*	15	15

Comments/Observations: *microbial death

Reviewed By: [illegible] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

Number of Alive Embryos and Hatched Organisms

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
	Day 11	Day 11	Day 11	Day 11	Day 11	Day 11	Day 11	Day 11
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14(2)	14	14	14	13(1)	15	13(1)	15
b	15	14	15	15	14	15	11(1)	15
c	15(2)	15(1)	14	15	13	15(1)	14	14
d	15	15	15	15	14(1)	0	15	15

Comments/Observations:

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
	Day 12	Day 12	Day 12	Day 12	Day 12	Day 12	Day 12	Day 12
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14(2)	14	14	14	13(1)	15	12	15
b	15	14	15	15	14	15	11	15
c	15(2)	15(1)	14	15	13	15(1)	14	14
d	15	15	15	15	13	0	15	15

Comments/Observations:

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
	Day 13	Day 13	Day 13	Day 13	Day 13	Day 13	Day 13	Day 13
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14(2)	14	14	14	13(1)	15	11	15
b	15	14	15	15	14	15(1)	11	15
c	14(1)	14	14	15	13	14	14	14
d	15	15	15	15	13	0	15	15

Comments/Observations:

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
	Day 14	Day 14	Day 14	Day 14	Day 14	Day 14	Day 14	Day 14
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14(2)	14	14	14	13(1)	15	11	15
b	15	14	15	15	14	15	11	15
c	13	14	14	15	13	14	14	14
d	15	15	15	15	13	0	15	15

Comments/Observations:

Reviewed By: [illegible] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

Number of Alive Embryos and Hatched Organisms

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
	Day 15	Day 15	Day 15	Day 15	Day 15	Day 15	Day 15	Day 15
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14(2)	14	14	14	13(1)	15	11	15
b	15	14	15	15	14	15	11	15
c	13	14	14	15	13	14	14	14(1)
d	15	15	15	15	13	0	15	15

Comments/Observations:

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
	Day 16	Day 16	Day 16	Day 16	Day 16	Day 16	Day 16	Day 16
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14(2)	14	14	14	13(1)	15	11	15
b	15	14	15	15	14	15	11	15
c	13	14	14	15	13	13	14	14
d	15	15	15	15	13	0	15	15

Comments/Observations:

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
	Day 17	Day 17	Day 17	Day 17	Day 17	Day 17	Day 17	Day 17
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14(2)	14	14	14	13(1)	15	11	15
b	15	14	15	15	13	15	11	15
c	13	14	14	15	13	13	14	14
d	15	15	15	15	13	0	15	15

Comments/Observations:

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
	Day 18	Day 18	Day 18	Day 18	Day 18	Day 18	Day 18	Day 18
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13(1)	14	14	14	13(1)	15	11	15
b	15	14	15	15	13	15	11	15
c	13	14	14	15	13	13	14	14
d	15	15	15	15	13	0	15	15

Comments/Observations:

Reviewed By: [signature] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

Number of Alive Embryos and Hatched Organisms

replicate	0820-10 Day 19 Alive Hatched	0821-10 Day 19 Alive Hatched	0822-10 Day 19 Alive Hatched	0823-10 Day 19 Alive Hatched	0824-10 Day 19 Alive Hatched	0825-10 Day 19 Alive Hatched	0826-10 Day 19 Alive Hatched	0827-10 Day 19 Alive Hatched
a	12	14	~~15~~ 14 CB	14	13(1)	15	11	15
b	15	14	15	15	13	15	11	~~14~~ 15 CB
c	13	14	14	15	13	13	14	13
d	15	15	15	15	13	0	15	15

Comments/Observations:

replicate	0820-10 Day 20 Alive Hatched	0821-10 Day 20 Alive Hatched	0822-10 Day 20 Alive Hatched	0823-10 Day 20 Alive Hatched	0824-10 Day 20 Alive Hatched	0825-10 Day 20 Alive Hatched	0826-10 Day 20 Alive Hatched	0827-10 Day 20 Alive Hatched
a	12	14	14	14	13(1)	15	11	15
b	15	14	15	15	13	15	11	15
c	13	14	14	15	13	13	14	12
d	15	15	15	15	13	0	15	15

Comments/Observations:

replicate	0820-10 Day 21 Alive Hatched	0821-10 Day 21 Alive Hatched	0822-10 Day 21 Alive Hatched	0823-10 Day 21 Alive Hatched	0824-10 Day 21 Alive Hatched	0825-10 Day 21 Alive Hatched	0826-10 Day 21 Alive Hatched	0827-10 Day 21 Alive Hatched
a	12	14	14	14	12	15	11	15
b	15	14	15	15	13	15	11	15
c	13	14	14	15	13	13	14	9
d	15	15	15	15	13	0	15	15

Comments/Observations:

replicate	0820-10 Day 22 Alive Hatched	0821-10 Day 22 Alive Hatched	0822-10 Day 22 Alive Hatched	0823-10 Day 22 Alive Hatched	0824-10 Day 22 Alive Hatched	0825-10 Day 22 Alive Hatched	0826-10 Day 22 Alive Hatched	0827-10 Day 22 Alive Hatched	0822-10
a	12	14	14	14	12	15	11	15	14
b	15	14	~~14~~ 15 CB	15(1)	13	15	11	15	14
c	13	14	14	15	13	13	14	8	14
d	15	15(1)	14	~~14~~ 15	13	0	15	15	15

Comments/Observations:

Reviewed By: [signature] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

Number of Alive Embryos and Hatched Organisms

replicate	0820-10 Day 23 Alive Hatched	0821-10 Day 23 Alive Hatched	0822-10 Day 23 Alive Hatched	0823-10 Day 23 Alive Hatched	0824-10 Day 23 Alive Hatched	0825-10 Day 23 Alive Hatched	0826-10 Day 23 Alive Hatched	0827-10 Day 23 Alive Hatched
a	12	14	14	14	12	15	11	15
b	15	14	14 15 UF	15	13	15	11	15
c	13	14	14	15	13	13	14	8
d	15	15	15 14 UF	15	13	0	15	15

Comments/Observations:

replicate	0820-10 Day 24 Alive Hatched	0821-10 Day 24 Alive Hatched	0822-10 Day 24 Alive Hatched	0823-10 Day 24 Alive Hatched	0824-10 Day 24 Alive Hatched	0825-10 Day 24 Alive Hatched	0826-10 Day 24 Alive Hatched	0827-10 Day 24 Alive Hatched
a	12	14	14	14	12	15	11	15
b	15	14	14 15 UF	15	13(1)	15	11	15
c	13	14	14	15	13	13	14	8
d	15	15	15 14 UF	15	13	0	15	15

Comments/Observations:

replicate	0820-10 Day 25 Alive Hatched	0821-10 Day 25 Alive Hatched	0822-10 Day 25 Alive Hatched	0823-10 Day 25 Alive Hatched	0824-10 Day 25 Alive Hatched	0825-10 Day 25 Alive Hatched	0826-10 Day 25 Alive Hatched	0827-10 Day 25 Alive Hatched
a	12	14	14	14	12	15	11	15
b	15	14	14 15 UF	15	12	15	11	15
c	13	14	14	15	13	13	14	8
d	15	15(1)	15 14 UF	15	13	0	15	15

Comments/Observations:

replicate	0820-10 Day 26 Alive Hatched	0821-10 Day 26 Alive Hatched	0822-10 Day 26 Alive Hatched	0823-10 Day 26 Alive Hatched	0824-10 Day 26 Alive Hatched	0825-10 Day 26 Alive Hatched	0826-10 Day 26 Alive Hatched	0827-10 Day 26 Alive Hatched
a	12	14	13	14	12	15	11	15
b	15	14	15	15	12	15	11	15
c	13	14	14	15	13	13	14	8
d	15	15(1)	14	15	13	0	15	15

UF

0822-10
14
14
13
15

Comments/Observations:

Reviewed By: [illegible] Date Reviewed: 2018/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

Number of Alive Embryos and Hatched Organisms

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
	Day 27	Day 27	Day 27	Day 27	Day 27	Day 27	Day 27	Day 27
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	12	14	13	14	12	15	11	15
b	15	14	~~14~~ 15	15	12	15	11	15
c	13	14	~~14~~	15	12	13	14	8
d	15	14	~~14~~	15	13	0	15	15

* 0822-L
14
14
13
15

Comments/Observations:

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
	Day 28	Day 28	Day 28	Day 28	Day 28	Day 28	Day 28	Day 28
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	12	14(1)	~~14~~ 13 UF	14	12	15	11	15
b	15	14	14	15	12	13	11	14
c	13	14	13	15	12	13	14	8
d	15	14	15	15	13	0	15	15

Comments/Observations:

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
	Day 29	Day 29	Day 29	Day 29	Day 29	Day 29	Day 29	Day 29
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	12	14(1)	14	14	12	14	11	15
b	15	14	~~14~~	15	12	15(1)	11	14
c	12	14	~~12~~	15	12	13	14	8
d	15	14	15	15	13	0	15	15

Comments/Observations:

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
	Day 30	Day 30	Day 30	Day 30	Day 30	Day 30	Day 30	Day 30
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	12	14(1)	14	14	12	14	11	15
b	15	14	14	15	12	15(1)	11	14
c	12	14	* 11	* 14	12	13	14	~~8~~
d	15	14	15	* 14	13	0	15	15

Comments/Observations: * small fish dead, appears to have been killed/eaten

Reviewed By: AH Date Reviewed: 2019/04/12

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

Number of Alive Embryos and Hatched Organisms

replicate	0820-10 Day 31 Alive Hatched	0821-10 Day 31 Alive Hatched	0822-10 Day 31 Alive Hatched	0823-10 Day 31 Alive Hatched	0824-10 Day 31 Alive Hatched	0825-10 Day 31 Alive Hatched	0826-10 Day 31 Alive Hatched	0827-10 Day 31 Alive Hatched
a	12	14	14	14	12	14	11	15
b	15	14	14	15	12	15	11	13
c	12	14	11	14	13	13	14	8
d	15	14	15	14		0	15	15

Comments/Observations:

replicate	0820-10 Day 32 Alive Hatched	0821-10 Day 32 Alive Hatched	0822-10 Day 32 Alive Hatched	0823-10 Day 32 Alive Hatched	0824-10 Day 32 Alive Hatched	0825-10 Day 32 Alive Hatched	0826-10 Day 32 Alive Hatched	0827-10 Day 32 Alive Hatched
a	12	14	14	14	~~12~~ 12	14	11	15
b	15	14	14	15	12	14	11	13
c	12	14	11	14	12	13	14	8
d	15	14	15	14	15	0	15	15

Comments/Observations:

Reviewed By: [signature] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

New Solutions

pH (units)

Conc. (%) / Day	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
0	8.3	8.4	8.4	8.3	8.3	8.3	8.4	8.4
1	8.3	8.3	8.3	8.3	8.3	8.3	8.4	8.4
2	8.2	8.3	8.2	8.2	8.3	8.1	8.3	8.3
3	8.3	8.3	8.4	8.3	8.4	8.3	8.3	8.3
4	8.2	8.2	8.2	8.2	8.4	8.3	8.3	8.3
5	8.2	8.3	8.3	8.3	8.4	8.3	8.3	8.3
6	8.2	8.3	8.2	8.2	8.3	8.2	8.3	8.2
7	8.2	8.3	8.3	8.2	8.4	8.2	8.3	8.4
8	8.2	8.2	8.3	8.3	8.3	8.4	8.3	8.4

Conductance (µS/cm)

Conc. (%) / Day	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
0	1023	673	962	606	1276	822	982	598
1	1052	650	809	617	1346	865	1020	663
2	1040	633	783	612	1277	826	981	619
3	1023	635	790	609	1301	813	993	613
4	999	604	786	610	1282	801	977	598
5	1000	611	776	596	1263	787	1004	610
6	1038	654	788	602	1203	805	999	644
7	1005	675	766	584	1123	778	947	663
8	1015	673	784	607	1144	838	1015	645

Dissolved Oxygen (mg/L) (40-100% saturation)

Conc. (%) / Day	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
0	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
1	7.2	7.2	7.3	7.2	7.3	7.3	7.3	7.3
2	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
4	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
5	7.3	7.2	7.2	7.2	7.3	7.3	7.3	7.3
6	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
7	7.1	7.1	7.1	7.1	7.1	7.1	7.2	7.1
8	7.3	7.3	7.3	7.3	7.3	7.2	7.3	7.3

Temperature (°C)

Conc. (%) / Day	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
0	24	24	24	24	24	24	24	24
1	25	25	24	25	24	24	24	24
2	24	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24	24
4	24	24	24	24	24	24	24	24
5	24	24	25	25	24	24	24	24
6	24	24	24	24	24	24	24	24
7	26	26	26	26	26	26	25	26
8	24	24	24	24	24	24	24	24

Old Solutions

pH (units)

Day	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0817-10
0								
1	8.2	8.3	8.4	8.3	8.4	8.4	8.3	8.3
2	8.2	8.3	8.3	8.4	8.4	8.2	8.1	8.3
3	8.1	8.1	8.2	8.2	8.3	8.0	8.0	8.3
4	8.2	8.1	8.3	8.3	8.4	8.1	8.1	8.3
5	8.0	8.1	8.2	8.2	8.3	8.0	8.1	8.2
6	8.0	8.2	8.2	8.2	8.3	8.0	8.1	8.2
7	8.1	8.1	8.2	8.2	8.3	8.1	8.1	8.2
8	8.0	8.1	8.2	8.2	8.3	8.2	8.0	8.3

Conductance (µS/cm)

Day	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0817-10
0								
1	996	661	782	640	1358	960	915	700
2	1039	674	813	650	M81	996	1142	799
3	1020	661	793	631	1372	886	1025	691
4	1019	655	773	621	1275	827	993	657
5	1000	658	789	635	1358	848	1019	671
6	1014	647	782	631	1304	824	991	645
7	1047	691	743	595	1196	772	996	627
8	1037	700	742	635	1146	859	1018	505

Dissolved Oxygen (mg/L) (40-100% saturation)

Day	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0817-10
0								
1	7.0	7.0	6.9	6.9	7.0	7.1	7.0	7.0
2	6.9	7.0	7.0	7.2	7.0	7.1	7.1	7.1
3	7.2	7.3	7.2	7.2	7.2	7.3	7.3	7.3
4	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
5	7.0	7.0	7.2	7.1	7.1	7.1	7.0	7.0
6	6.9	7.0	6.9	6.9	6.9	6.8	6.9	6.9
7	6.6	6.9	7.0	7.3	6.9	7.0	7.3	6.9
8	6.8	6.8	6.7	6.7	6.7	6.7	6.5	6.6

Temperature (°C)

Day	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0817-10
0								
1	24	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24	24
4	24	24	24	24	24	24	24	24
5	24	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24	24
7	24	24	24	24	24	24	24	24
8	24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: _____ Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

New Solutions

Conc. (%) / Day	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
pH (units)								
9	8.2	8.4	8.2	8.3	8.4	8.3	8.4	8.4
10	8.2	8.3	8.2	8.2	8.4	8.2	8.3	8.3
11	8.0	8.3	8.2	8.2	8.3	8.2	8.1	8.2
12	8.1	8.3	8.2	8.2	8.3	8.2	8.1	8.2
13	8.2	8.3	8.2	8.3	8.3	8.2	8.3	8.0
14	8.1	8.3	8.2	8.2	8.4	8.2	8.3	8.2
15	8.1	8.3	8.2	8.2	8.3	8.1	8.3	8.0
16	8.1	8.3	8.2	8.2	8.3	8.3	8.3	8.2
17	8.2	8.3	8.2	8.3	8.3	8.2	8.3	8.2
Conductance (µS/cm)								
9	1087	687	781	600	1083	822	997	460
10	986	657	767	601	1136	798	982	459
11	1009	655	753	581	1110	789	957	435
12	959	614	711	542	1061	733	924	400
13	948	567	659	520	1116	705	881	397
14	944	582	683	509	1129	697	853	394
15	1005	633	673	580	1145	693	899	397
16	969	593	673	498	1152	692	888	397
17	962	566	654	551	1126	677	853	385
Dissolved Oxygen (mg/L) (40-100% saturation)								
9	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
10	7.3	7.3	7.3	7.2	7.3	7.3	7.3	7.2
11	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
12	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2
13	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
14	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
15	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
16	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
17	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Temperature (°C)								
9	24	24	24	24	24	24	24	24
10	24	24	24	25	24	24	24	25
11	24	24	24	24	24	24	24	24
12	25	25	25	25	25	25	25	25
13	24	24	24	24	24	24	24	24
14	24	24	24	24	24	24	24	24
15	24	24	24	24	24	24	24	24
16	24	24	24	24	24	24	24	24
17	24	24	24	24	24	24	24	24

Old Solutions

	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
pH (units)								
9	8.1	8.2	8.3	8.3	8.3	8.1	8.1	8.3
10	7.9	8.0	8.1	8.2	8.1	8.0	8.0	8.2
11	7.9	8.0	8.1	8.2	8.2	8.1	8.0	8.2
12	8.0	8.1	8.2	8.2	8.2	8.1	8.1	8.2
13	8.0	8.1	8.2	8.2	8.2	8.1	8.1	8.2
14	8.0	8.1	8.2	8.2	8.2	8.2	8.1	8.1
15	8.0	8.1	8.2	8.2	8.2	8.1	8.1	8.2
16	7.8	8.1	8.1	8.1	8.2	8.1	8.0	8.1
17	7.7	8.0	8.1	8.1	8.1	8.0	8.0	8.1
Conductance (µS/cm)								
9	992	678	795	620	1156	836	1005	512
10	1002	698	785	631	1142	837	1008	503
11	986	703	795	635	1150	834	1017	513
12	899	636	740	565	1044	753	912	460
13	919	655	715	517	1091	761	929	466
14	956	645	700	563	1119	740	896	465
15	946	657	721	573	1066	732	950	500
16	958	631	701	561	1147	771	880	455
17	1026	648	703	564	1128	779	884	460
Dissolved Oxygen (mg/L) (40-100% saturation)								
9	7.1	7.0	7.1	7.1	7.0	7.0	6.9	6.9
10	7.0	7.1	7.1	7.0	6.9	6.8	6.8	6.8
11	6.3	6.4	6.4	6.4	6.5	6.5	6.5	6.5
12	6.9	6.8	6.6	6.5	6.6	6.6	6.5	6.5
13	6.5	6.4	6.3	6.3	6.3	6.2	6.3	6.4
14	6.1	6.1	6.1	6.3	6.3	6.3	6.4	6.4
15	6.2	6.1	6.2	6.3	6.4	6.2	6.3	6.3
16	6.9	6.9	6.9	6.8	6.6	6.6	6.6	6.6
17	6.8	6.9	6.8	6.6	6.6	6.6	6.6	6.7
Temperature (°C)								
9	24	24	24	24	24	24	24	24
10	24	24	24	24	24	24	24	24
11	24	24	24	24	24	24	24	24
12	24	24	24	24	24	24	24	24
13	24	24	24	24	24	24	24	24
14	24	24	24	24	24	24	24	24
15	24	24	24	24	24	24	24	24
16	24	24	24	24	24	24	24	24
17	24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: [signature] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

New Solutions

Conc. (%) / Day	0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
pH (units)								
18	8.0	8.3	8.2	8.1	8.3	8.2	8.3	8.2
19	8.0	8.2	8.1	8.1	8.2	8.1	8.2	8.1
20	8.2	8.3	8.2	8.1	8.3	8.2	8.3	8.3
21	8.0	8.2	8.1	8.1	8.2	8.1	8.2	8.2
22	8.0	8.2	8.1	8.2	8.2	8.2	8.2	8.2
23	8.1	8.3	8.1	8.2	8.2	8.2	8.2	8.3
24	8.1	8.3	8.2	8.2	8.3	8.2	8.2	8.2
25	7.8	8.2	8.2	8.2	8.2	8.1	8.2	8.2
26	8.1	8.2	8.2	8.2	8.3	8.1	8.3	8.2
Conductance (µS/cm)								
18	968	581	662	508	1142	686	857	373
19	1000	625	698	527	1187	746	920	418
20	1096	640	662	558	992	719	846	409
21	1171	686	706	566	1028	758	881	429
22	1126	655	689	544	1016	733	862	415
23	1087	644	676	535	984	730	836	399
24	1086	649	676	535	981	733	858	398
25	1119	671	670	543	978	735	839	401
26	968	570	617	498	898	700	839	336
Dissolved Oxygen (mg/L) (40-100% saturation)								
18	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
19	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
20	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
21	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
22	7.2	7.2	7.2	7.2	7.2	7.3	7.1	7.2
23	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
24	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
25	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
26	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Temperature (°C)								
18	24	24	24	24	24	24	24	24
19	24	24	24	24	24	24	24	24
20	24	24	24	24	24	24	24	24
21	24	24	24	24	24	24	24	24
22	25	25	25	25	25	24	25	25
23	24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24	24
25	24	24	24	24	24	24	24	24
26	24	24	24	24	24	24	24	24

Old Solutions

0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
pH (units)							
18	7.8	8.0	8.1	8.0	8.1	8.0	7.9	8.0
19	7.8	8.0	8.0	7.9	8.0	8.0	7.9	8.0
20	7.9	8.1	8.1	8.1	8.1	8.0	8.0	8.1
21	7.8	8.0	8.0	8.0	8.0	8.0	7.9	8.0
22	7.8	7.9	7.9	7.9	8.1	8.0	8.0	8.0
23	8.0	8.1	8.2	8.2	8.1	8.1	8.0	8.2
24	7.8	8.0	8.1	8.1	8.0	8.0	7.9	8.1
25	7.9	7.9	8.0	8.0	7.9	7.9	7.9	8.1
26	7.9	8.0	8.1	8.1	8.0	8.0	7.9	8.0
Conductance (µS/cm)								
18	960	640	705	563	1153	764	892	457
19	1053	676	736	590	1191	800	944	473
20	1026	691	757	594	1213	804	955	488
21	1104	686	694	582	1187	816	898	436
22	1116	713	700	592	1091	705	869	468
23	1105	734	728	594	1209	775	879	472
24	1081	709	717	585	1012	773	869	468
25	908	702	711	585	1055	774	886	461
26	1000	641	643	526	998	697	790	417
Dissolved Oxygen (mg/L) (40-100% saturation)								
18	6.1	6.0	6.0	5.8	5.6	5.7	5.8	5.9
19	6.3	6.3	6.7	6.1	5.8	5.8	5.8	5.8
20	6.1	6.0	5.9	5.9	5.9	5.8	5.8	5.7
21	6.0	5.9	5.9	5.9	5.8	5.8	5.8	5.8
22	5.9	5.9	5.5	5.4	5.6	5.5	5.9	5.9
23	6.4	6.4	6.3	6.3	6.3	6.3	6.3	6.2
24	6.3	6.2	6.1	5.9	5.9	5.9	5.8	5.8
25	6.3	5.1	5.3	5.3	5.2	5.0	5.0	5.0
26	5.9	6.0	5.8	5.7	5.7	5.3	5.1	5.1
Temperature (°C)								
18	24	24	24	24	24	24	24	24
19	24	24	24	24	24	24	24	24
20	24	24	24	24	24	24	24	24
21	24	24	24	24	24	24	24	24
22	24	24	24	24	24	24	24	24
23	24	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24	24
25	24	24	24	24	24	24	24	24
26	24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: [signature] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164

Sample 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

pH (units)

Conc. (%) / Day	New Solutions 0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10	Old Solutions 0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
27	8.1	8.2	8.2	8.1	8.3	8.2	8.2	8.2	7.8	7.9	8.0	7.9	8.0	7.9	7.9	7.9
28	8.1	8.3	8.2	8.1	8.3	8.2	8.3	8.2	7.9	7.9	8.0	8.0	8.0	8.0	7.9	7.9
29	8.2	8.2	8.2	8.0	8.0	8.3	8.0	8.3	7.9	8.0	8.1	8.1	8.0	8.0	8.0	8.0
30	7.8	7.9	7.9	7.8	7.9	7.9	8.0	8.0	8.2	8.2	8.2	8.1	8.2	8.2	8.3	8.3
31	8.1	8.2	8.2	8.1	8.2	8.2	8.0	8.2	7.9	7.9	8.0	7.9	7.9	8.0	7.9	8.0
32									7.9	7.9	7.9	7.9	7.9	8.0	7.9	8.0

Conductance (µS/cm)

	New Solutions 0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10	Old Solutions 0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
27	827	454	527	393	847	634	743	318	1001	647	642	532	907	696	793	423
28	839	485	535	413	900	661	774	331	996	592	658	443	928	684	788	408
29	821	500	540	421	880	675	760	343	846	500	560	469	897	676	756	360
30	833	468	522	395	861	638	749	327	883	468	555	434	908	646	784	395
31	842	469	559	420	849	698	753	360	847	514	561	433	816	701	783	384
32									838	520	562	430	909	706	786	388

Dissolved Oxygen (mg/L) (**40-100% saturation**)

	New Solutions 0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10	Old Solutions 0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
27	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	5.3	5.5	5.0	4.9	5.0	4.7	4.7	4.9
28	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	5.1	5.1	5.1	5.6	5.6	5.5	5.5	5.5
29	7.3	7.3	7.3	7.0	7.3	7.3	7.3	7.3	5.7	5.7	5.9	5.9	5.5	5.6	5.8	5.7
30	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	6.0	5.8	5.7	5.7	5.6	5.6	5.5	5.6
31	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	6.0	6.0	6.0	5.6	5.6	5.5	5.5	6.0
32									6.7	6.4	6.2	6.1	6.3	6.1	6.3	6.4

Temperature (°C)

	New Solutions 0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10	Old Solutions 0820-10	0821-10	0822-10	0823-10	0824-10	0825-10	0826-10	0827-10
27	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
28	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
29	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
30	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
31	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
32									24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:
★ day 30 old & new pH swapped

Reviewed By: ML Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **0820-10**

Replicate # A			Replicate # B			Replicate # C			Replicate # D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	10	N	1	9	N	1	10	9 N	1	9	10
2	11		2	12		2	14		2	12	
3	11		3	12		3	10		3	11	
4	12		4	11		4	8		4	10	
5	9		5	11		5	11		5	10	
6	12		6	9		6	10		6	10	
7	10		7	7		7	12		7	10	A-S
8	12		8	7		8	11		8	12	N
9	11		9	7		9	11		9	10	
10	10		10	7		10	11		10	8	
11	10		11	8		11	9		11	10	
12	12		12	9		12	11		12	11	
13	—	—	13	9		13	—	—	13	8	
14	—	—	14	11		14	—	—	14	8	
15	—	—	15	9		15	—	—	15	9	

Comments

Avg = ~~9.58~~ NM 10.83 | 9.87 NM 9.13 | 10.2 NM 10.33 | 11.7 NM 9.87

0821-10

Replicate # A			Replicate # B			Replicate # C			Replicate # D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	9	N	1	8	N	1	10	N	1	9	N
2	8		2	8		2	12		2	8	
3	9		3	11		3	9		3	13	
4	11		4	9		4	9		4	9	
5	13		5	9		5	11		5	8	
6	9	A-S	6	10		6	8		6	12	
7	9	N	7	8		7	8		7	12	
8	8		8	11		8	12		8	11	
9	8		9	10		9	7		9	10	
10	8		10	13		10	8		10	10	
11	11		11	8		11	8		11	8	
12	10	A-S	12	7		12	17		12	8	
13	10	N	13	11		13	11		13	12	
14	10	N	14	8		14	8		14	11	
15	—	—	15	8		15	—	—	15	—	—

Comments

9.50 | 9.36 | 9.50 | 10.07

Reviewed By: NL Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. 0822-10

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	10	N	9	A-S	8	N	10	A-S
2	9	↓	9	N	9	↓	9	N
3	10	↓	10	↓	11	↓	8	↓
4	10	A-S	12	↓	10	↓	11	↓
5	11	N	10	↓	10	↓	10	↓
6	11	↓	12	↓	9	↓	8	↓
7	9	↓	8	↓	11	↓	11	↓
8	11	↓	11	↓	12	↓	10	↓
9	6	↓	10	↓	12	↓	11	↓
10	10	↓	9	↓	10	↓	11	↓
11	8	↓	11	↓	10	↓	12	↓
12	11	↓	10	↓	–	–	8	↓
13	11	↓	8	↓	–	–	11	↓
14	10	↓	9	↓	–	–	9	↓
15	–	–	–	–	–	–	7	↓
Comments	9.79		9.86		10.36		9.73	

0823-10

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	7	A-S	7	N	7	N	11	A-S
2	12	N	9	↓	9	↓	8	N
3	11	↓	12	↓	12	↓	10	↓
4	11	↓	8	↓	11	↓	10	↓
5	11	↓	9	↓	7	↓	11	↓
6	8	↓	8	↓	9	↓	11	↓
7	8	↓	11	↓	8	↓	10	↓
8	10	↓	7	↓	14	↓	10	↓
9	8	↓	11	↓	7	↓	10	↓
10	9	↓	12	↓	7	↓	13	↓
11	10	↓	12	↓	8	↓	8	↓
12	8	↓	9	↓	11	↓	9	↓
13	8	↓	11	↓	10	↓	12	↓
14	13	↓	9	↓	12	↓	8	↓
15	–	–	7	↓	–	–	2	–
Comments	9.57		9.47		9.43		10.14	

Reviewed By: MK Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. 0824-10

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	13	N	11	N	14	N	9	N
2	9		10		11		12	
3	11		11		10		13	
4	14		11		12		10	
5	9		10		13		9	
6	11		7		10		11	
7	8		8		10		8	
8	9		13		9		14	
9	10		12		10		10	
10	11		11		10		9	
11	11		13		8		12	
12	10 ~~10~~	N	10		12		8	
13	–	–	–	–	–	–	10	
14	–	–	–	–	–	–	–	–
15	–	–	–	–	–	–	–	–

Comments: 10.50 | 10.80 | 10.75 | 10.39

0825-10

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep Length (mm)	Rep Normal/ Abnormal
1	8	N	7	N	9	N		
2	11		8		9			
3	12		10		12			
4	7		12		9			
5	12		10		10			
6	12		11		11			
7	11		11		12			
8	9		8		10			
9	7		10		10			
10	7		8		10			
11	11		9		11			
12	9		7		8			
13	9		10		12			
14	8		10		–			
15	–		–	–	–	–		

Comments: 9.50 | 9.36 | 10.23

None alive

Reviewed By: NL Date Reviewed: 2019/04/04

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **0826-10**

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	14	N	13	N	8	N	9	N
2	9		9		11		11	
3	10		7		9		9	
4	10		9		9		8	
5	7		13		7		10	
6	7		13		13		9	
7	8		12		9		13	
8	12		8		10		10	
9	7		8		9		11	
10	13		11	A-S	7		9	
11	10		9	N	9		9	
12	–	–	–	–	9		14	
13	–	–	–	–	12		8	
14	–	–	–	–	11		9	
15	–	–	–	–	–	–	9	

Comments

Rep A: 9.73 Rep B: 10.18 Rep C: 9.50 Rep D: 9.80

Conc. **0827-10**

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	7	N	8	N	8	N	8	N
2	10		9	N	13		10	N
3	8		9	A-S	14		10	A-S
4	9		13	N	12		9	N
5	12		9		13		11	
6	9		8		8		9	
7	12		10		11		12	
8	12		12		10		12	
9	11		7		–	–	9	
10	8	A-S	11		–	–	11	
11	8	N	12		–	–	12	
12	10		9		–	–	11	
13	10		8		–	–	9	
14	9		–	–	–	–	10	
15	8		–	–	–	–	7	

Comments

Rep A: 9.60 Rep B: 9.42 Rep C: 11.13 Rep D: 10.00

Reviewed By: [illegible] Date Reviewed: 2019/04/11

NAUTILUS ENVIRONMENTAL

Organism Weights Bench Sheet

Client TEC164 Sample 1819-0820-10, 1819-0821-10, 1819-0822-10, 1819-0823-10, 1819-0824-10, 1819-0825-10, 1819-0826-10, 1819-0827-10 Organism 32day FM ELS Batch 20190311FMELS

	Item Weighed	Date	Initials	Balance*
Initial Weight (mg):	dried pan	20190327	LS	Mettler #1
Final Weight (mg):	dried pan + organisms	2019/04/04	MP	Mettler 1

* same balance must be used for initial and final weights
* for FM/HA/CT, must use scale with 0.01 mg accuracy

Concentration

Replicate	1819-0820-10 Initial	1819-0820-10 Final	1819-0821-10 Initial	1819-0821-10 Final	1819-0822-10 Initial	1819-0822-10 Final	1819-0825-10 Initial	1819-0825-10 Final	1819-0824-10 Initial	1819-0824-10 Final	1819-0823-10 Initial	1819-0823-10 Final
a	984.28	1019.65	1068.21	1100.08	1024.05	1053.72	1012.13	1040.47	974.95	1004.90	1092.23	1122.18
b	~~999.96~~	~~1019.53~~	~~1036.92~~	~~1086.55~~	1002.09	1031.82	1008.19	1037.51	1004.55	1034.27	1092.22	1119.09
c	1012.48	1043.09	1038.25	1067.54	1015.81	1042.89	1000.86	1029.01	1090.09	1122.07	1070.30	1100.81
d	1048.33	1080.89	~~1819-08~~	1073.26	999.98	1028.77	1028.55	1061.84	1095.30	1127.98	1096.88	—
e	991.19		1058.65									

* 1038.70

Concentration

Replicate	1819-0826-10 Initial	1819-0826-10 Final	1819-0827-10 Initial	1819-0827-10 Final								
a	1099.35	1130.52	1038.93	1066.45								
b	1077.50	1105.65	1065.78	1090.22								
c	1100.14	1129.15	1082.57	1110.06								
d	1050.16	1083.10	1063.35	1093.32								
e												

Balance Calibration Check:

	Initial	Final
first pan weighed:	1819-0822-10 D	0820-10 C
weight of first pan:	999.98	1129.15
first pan after all other pans weighed:	999.97	1129.19
% difference <5%:	Yes/No	Yes/No

% difference = $\frac{\text{(initial weight - reweight)}}{\text{(initial weight + reweight) / 2}} \times 100\%$

Test Validity Met: Yes/No/NA

Results are Logical:** Yes/No

** no negative numbers, consistent values across replicates

If "no" is circled for any parameter, notify Lab Supervisor/ QA Group to determine appropriate action

Reviewed By: ML Date Reviewed: 2019/04/11

CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	14-6759-0916	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 2.1		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 1.8		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.1		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) ~~2.8~~ 4.0 SW		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.0		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1

June 28/19

Fathead Minnow 32-d Survival and Growth Test
Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8904	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1

Single Comparison Summary

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04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1

Fathead Minnow 32-d Survival and Growth Test
Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatched rate	1
04-6975-0798	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatched rate	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	LC_LC5 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	GH_FR1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	LC_DCDS passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	CM_MC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	Control 10 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	GH_ER2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	LC_LC3 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	LC_SLC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	Lab Control passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	FR_FRCP1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	EV_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	CM_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	FR_UFR1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	LC_LCDSSLCC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	GH_ERC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	EV_HC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0740	FR_FRABCH passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	EV_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	CM_MC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	LC_DCDS passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	LC_SLC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	LC_LCDSSLCC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	EV_HC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	GH_FR1 passed length-mm	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	CM_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	FR_UFR1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	GH_ER2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	Control 10 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	FR_FRABCH passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	LC_LC5 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	GH_ERC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	Lab Control passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	LC_LC3 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.8554	FR_FRCP1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	EV_HC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	GH_ER2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	CM_MC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	LC_LC3 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	GH_FR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	LC_SLC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	LC_LC5 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	CM_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	FR_FRABCH failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	Lab Control failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	Control 10 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	LC_DCDS failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	LC_LCDSSLCC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	EV_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	GH_ERC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	FR_UFR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	1.2E-06	FR_FRCP1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	GH_ER2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	GH_ERC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	EV_HC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	Lab Control passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	FR_UFR1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	FR_FRABCH passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	LC_DCDS passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	LC_LC3 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	CM_MC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	LC_LCDSSLCC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	GH_FR1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	EV_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	FR_FRCP1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	Control 10 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	LC_SLC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	CM_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0709	LC_LC5 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	LC_DCDS passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	Lab Control passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	LC_LC3 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	LC_LCDSSLCC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	LC_LC5 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	CM_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	Control 10 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	FR_FRABCH passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	GH_ERC passed length-mm	1

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	FR_FRCP1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	CM_MC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	EV_HC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	FR_UFR1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	LC_SLC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	GH_FR1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	GH_ER2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7626	EV_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	GH_ERC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	EV_HC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	CM_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	FR_FRABCH failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	LC_LCDSSLCC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	LC_LC5 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	LC_LC3 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	GH_FR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	Lab Control failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	FR_UFR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	CM_MC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	Control 10 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	EV_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	FR_FRCP1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	GH_ER2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	LC_SLC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0040	LC_DCDS failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	CM_MC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	EV_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	LC_LCDSSLCC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	LC_SLC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	LC_LC5 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	FR_FRABCH passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	CM_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	EV_HC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	GH_FR1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	LC_DCDS passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	GH_ERC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	FR_FRCP1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	Control 10 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	GH_ER2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	FR_UFR1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	LC_LC3 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.7354	Lab Control passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	Control 10 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	FR_FRCP1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	FR_UFR1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	LC_SLC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	CM_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	LC_LCDSSLCC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	LC_LC3 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	FR_FRABCH passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	GH_ERC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	LC_DCDS passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	GH_FR1 passed length-mm	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	Lab Control passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	GH_ER2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	EV_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	CM_MC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	EV_HC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0515	LC_LC5 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	GH_ER2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	FR_UFR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	LC_SLC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	EV_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	Control 10 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	LC_LC5 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	GH_ERC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	Lab Control failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	LC_LC3 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	CM_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	LC_LCDSSLCC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	CM_MC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	EV_HC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	FR_FRABCH failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	GH_FR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	FR_FRCP1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	5.3E-04	LC_DCDS failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	LC_DCDS failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	GH_ERC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	EV_HC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	EV_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	FR_UFR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	CM_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	Lab Control failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	LC_LC5 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	CM_MC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	Control 10 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	GH_FR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	LC_LCDSSLCC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	LC_LC3 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	FR_FRCP1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	LC_SLC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	GH_ER2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0015	FR_FRABCH failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	LC_LC5 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	LC_DCDS failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	Lab Control failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	CM_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	FR_FRCP1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	FR_FRABCH failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	EV_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	GH_ER2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	GH_ERC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	GH_FR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	Control 10 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	LC_LC3 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	FR_UFR1 failed length-mm	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	LC_LCDSSLCC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	LC_SLC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	EV_HC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	7.2E-04	CM_MC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	LC_LC5 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	GH_FR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	GH_ERC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	LC_LC3 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	EV_HC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	FR_FRABCH failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	CM_MC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	LC_SLC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	LC_LCDSSLCC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	FR_UFR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	Control 10 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	GH_ER2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	LC_DCDS failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	Lab Control failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	EV_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	FR_FRCP1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0183	CM_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	FR_FRABCH failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	GH_ERC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	CM_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	Control 10 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	LC_LC3 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	FR_UFR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	LC_DCDS failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	EV_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	LC_LCDSSLCC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	CM_MC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	Lab Control failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	LC_LC5 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	GH_ER2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	GH_FR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	FR_FRCP1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	LC_SLC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0263	EV_HC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	LC_LC5 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	LC_LCDSSLCC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	Control 10 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	LC_DCDS failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	CM_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	FR_FRCP1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	GH_ERC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	EV_HC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	CM_MC1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	Lab Control failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	GH_ER2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	LC_LC3 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	LC_SLC failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	GH_FR1 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	FR_UFR1 failed length-mm	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	FR_FRABCH failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	8.0E-04	EV_MC2 failed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	CM_MC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	EV_HC1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	Control 10 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	FR_UFR1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	LC_LCDSSLCC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	LC_SLC passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	CM_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	LC_DCDS passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	Lab Control passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	LC_LC5 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	EV_MC2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	LC_LC3 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	GH_ER2 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	GH_FR1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	FR_FRCP1 passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	FR_FRABCH passed length-mm	1
13-0570-8901	Length-mm	Unequal Variance t Two-Sample Test	0.0573	GH_ERC passed length-mm	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	LC_LCDSSLCC passed mean dry biomass	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	CM_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	LC_DCDS passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	FR_FRABCH passed mean dry biomass-m	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	LC_LC5 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	GH_FR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	EV_HC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	GH_ER2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	LC_LC3 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	FR_UFR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	FR_FRCP1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	LC_SLC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	EV_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	Lab Control passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	Control 10 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	GH_ERC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0654	CM_MC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	FR_FRCP1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	CM_MC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	LC_DCDS failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	LC_LC3 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	GH_ER2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	GH_FR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	EV_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	EV_HC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	Lab Control failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	LC_SLC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	FR_UFR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	CM_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	GH_ERC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	Control 10 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	LC_LCDSSLCC failed mean dry biomass-	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	LC_LC5 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0106	FR_FRABCH failed mean dry biomass-mg	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	EV_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	CM_MC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	CM_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	GH_ERC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	LC_LC3 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	LC_SLC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	Lab Control failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	Control 10 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	GH_ER2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	LC_LCDSSLCC failed mean dry biomass-	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	FR_FRCP1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	LC_DCDS failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	FR_UFR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	EV_HC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	GH_FR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	LC_LC5 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	2.7E-05	FR_FRABCH failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	LC_DCDS passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	EV_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	LC_SLC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	LC_LC3 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	LC_LC5 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	GH_ERC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	EV_HC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	LC_LCDSSLCC passed mean dry biomass	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	GH_ER2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	FR_UFR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	GH_FR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	CM_MC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	FR_FRCP1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	Control 10 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	CM_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	FR_FRABCH passed mean dry biomass-m	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0882	Lab Control passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	FR_FRCP1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	FR_UFR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	EV_HC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	LC_LC5 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	GH_ERC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	FR_FRABCH failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	EV_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	Control 10 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	CM_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	Lab Control failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	GH_FR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	GH_ER2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	LC_LCDSSLCC failed mean dry biomass-	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	LC_LC3 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	CM_MC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	LC_SLC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0148	LC_DCDS failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	LC_LC3 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	FR_UFR1 failed mean dry biomass-mg	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	Control 10 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	LC_DCDS failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	LC_LCDSSLCC failed mean dry biomass-	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	CM_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	GH_ERC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	LC_LC5 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	EV_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	FR_FRABCH failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	CM_MC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	FR_FRCP1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	Lab Control failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	EV_HC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	GH_FR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	LC_SLC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0292	GH_ER2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	GH_ERC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	Lab Control failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	GH_ER2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	CM_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	LC_LCDSSLCC failed mean dry biomass-	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	LC_SLC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	LC_DCDS failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	EV_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	CM_MC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	Control 10 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	LC_LC5 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	FR_FRCP1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	EV_HC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	FR_UFR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	LC_LC3 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	FR_FRABCH failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0180	GH_FR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	Control 10 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	FR_UFR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	GH_ERC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	LC_LCDSSLCC passed mean dry biomass	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	CM_MC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	LC_LC3 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	CM_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	LC_SLC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	Lab Control passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	FR_FRCP1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	GH_ER2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	LC_DCDS passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	EV_HC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	LC_LC5 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	GH_FR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	FR_FRABCH passed mean dry biomass-m	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.2334	EV_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	FR_FRABCH passed mean dry biomass-m	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	LC_LC3 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	LC_LCDSSLCC passed mean dry biomass	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	Lab Control passed mean dry biomass-mg	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	GH_ER2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	GH_FR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	FR_FRCP1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	LC_DCDS passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	CM_MC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	LC_LC5 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	LC_SLC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	CM_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	FR_UFR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	GH_ERC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	EV_HC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	EV_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1159	Control 10 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	EV_HC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	EV_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	GH_ER2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	CM_MC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	LC_SLC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	LC_LC5 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	Lab Control failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	LC_LC3 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	LC_DCDS failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	GH_ERC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	LC_LCDSSLCC failed mean dry biomass-	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	FR_FRCP1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	FR_UFR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	FR_FRABCH failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	CM_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	Control 10 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0066	GH_FR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	Control 10 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	LC_DCDS failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	GH_ERC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	FR_FRABCH failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	FR_UFR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	GH_FR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	LC_LCDSSLCC failed mean dry biomass-	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	EV_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	CM_MC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	LC_SLC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	CM_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	EV_HC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	LC_LC5 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	GH_ER2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	LC_LC3 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	Lab Control failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0409	FR_FRCP1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	LC_LCDSSLCC passed mean dry biomass	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	EV_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	CM_MC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	GH_ERC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	Lab Control passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	LC_LC5 passed mean dry biomass-mg	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	Control 10 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	GH_ER2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	LC_SLC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	EV_HC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	FR_FRABCH passed mean dry biomass-m	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	LC_LC3 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	LC_DCDS passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	FR_UFR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	GH_FR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	CM_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0770	FR_FRCP1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	EV_HC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	GH_ERC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	LC_LCDSSLCC passed mean dry biomass	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	LC_LC3 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	LC_LC5 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	LC_DCDS passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	CM_MC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	GH_ER2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	FR_FRCP1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	Lab Control passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	FR_FRABCH passed mean dry biomass-m	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	FR_UFR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	GH_FR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	LC_SLC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	Control 10 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	EV_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.1120	CM_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	LC_LCDSSLCC passed mean dry biomass	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	Control 10 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	GH_FR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	FR_FRABCH passed mean dry biomass-m	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	CM_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	LC_LC5 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	GH_ERC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	FR_FRCP1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	CM_MC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	FR_UFR1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	LC_DCDS passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	EV_MC2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	LC_LC3 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	GH_ER2 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	EV_HC1 passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	Lab Control passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0554	LC_SLC passed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	GH_ERC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	EV_HC1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	CM_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	LC_SLC failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	Control 10 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	LC_LCDSSLCC failed mean dry biomass-	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	FR_FRCP1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	LC_DCDS failed mean dry biomass-mg	1

Fathead Minnow 32-d Survival and Growth Test
Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	EV_MC2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	FR_UFR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	Lab Control failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	FR_FRABCH failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	LC_LC5 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	GH_ER2 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	LC_LC3 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	GH_FR1 failed mean dry biomass-mg	1
14-6886-6834	Mean Dry Biomass-mg	Unequal Variance t Two-Sample Test	0.0058	CM_MC1 failed mean dry biomass-mg	1

Hatched Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	LC	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
Control 10	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_UFR1	XC	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_FRABCH		4	0.9500	0.8484	1.0000	0.8667	1.0000	0.0319	0.0638	6.72%	5.00%
FR_FRCP1		4	0.9333	0.7833	1.0000	0.8000	1.0000	0.0471	0.0943	10.10%	6.67%
GH_FR1		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
GH_ER2		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
GH_ERC		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
CM_MC1		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
CM_MC2		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
EV_MC2		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
EV_HC1		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_DCDS		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_LC3		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_LC5		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_LCDSSLCC		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_SLC		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	LC	4	10.2	9.127	11.27	9.58	11.13	0.3364	0.6729	6.60%	0.00%
Control 10	N	4	10.92	10.56	11.27	10.67	11.21	0.1115	0.2229	2.04%	-7.06%
FR_UFR1	XC	4	10.51	9.886	11.14	10.1	11	0.1969	0.3937	3.75%	-3.09%
FR_FRABCH		4	12.31	8.881	15.73	10.14	15	1.077	2.153	17.50%	-20.69%
FR_FRCP1		4	0	0	0	0	0	0	0		100.00%
GH_FR1		4	10.56	10	11.11	10.27	11	0.1738	0.3477	3.29%	-3.53%
GH_ER2		4	11.17	10.25	12.09	10.54	11.89	0.2892	0.5783	5.18%	-9.54%
GH_ERC		2	10.17	9.662	10.68	10.13	10.21	0.04	0.05657	0.56%	0.27%
CM_MC1		4	11.1	10.33	11.87	10.46	11.5	0.2407	0.4814	4.34%	-8.85%
CM_MC2		4	10.04	8.891	11.19	9.13	10.83	0.3612	0.7223	7.19%	1.54%
EV_MC2		4	9.607	9.106	10.11	9.36	10.07	0.1577	0.3153	3.28%	5.79%
EV_HC1		4	9.935	9.476	10.39	9.73	10.36	0.1441	0.2883	2.90%	2.57%
LC_DCDS		4	9.653	9.127	10.18	9.43	10.14	0.1651	0.3303	3.42%	5.34%
LC_LC3		4	10.54	10.29	10.78	10.39	10.75	0.07621	0.1524	1.45%	-3.31%
LC_LC5		3	9.697	8.536	10.86	9.36	10.23	0.2697	0.4672	4.82%	4.91%
LC_LCDSSLCC		4	9.803	9.353	10.25	9.5	10.18	0.1412	0.2824	2.88%	3.87%
LC_SLC		4	10.09	8.943	11.23	9.6	11.13	0.3595	0.719	7.13%	1.08%

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	LC	4	2.011	1.587	2.436	1.825	2.404	0.1335	0.267	13.27%	0.00%
Control 10	N	4	2.208	2.003	2.412	2.089	2.357	0.06422	0.1284	5.82%	-9.77%
FR_UFR1	XC	4	1.828	1.281	2.376	1.355	2.181	0.1721	0.3441	18.82%	9.09%
FR_FRABCH		4	1.908	1.704	2.112	1.725	2.009	0.064	0.128	6.71%	5.15%
FR_FRCP1		4	0	0	0	0	0	0	0		100.00%
GH_FR1		4	1.958	1.519	2.397	1.693	2.29	0.138	0.276	14.09%	2.64%
GH_ER2		4	1.913	1.679	2.148	1.743	2.055	0.07374	0.1475	7.71%	4.87%
GH_ERC		4	0.806	-0.6749	2.287	0	1.614	0.4653	0.9307	115.47%	59.93%
CM_MC1		4	1.44	0.7987	2.081	1.035	1.981	0.2015	0.403	27.99%	28.41%
CM_MC2		4	2.115	1.798	2.431	1.889	2.358	0.09941	0.1988	9.40%	-5.14%
EV_MC2		4	2.05	1.744	2.357	1.86	2.304	0.0963	0.1926	9.39%	-1.94%
EV_HC1		4	1.921	1.79	2.052	1.805	1.982	0.04118	0.08236	4.29%	4.48%
LC_DCDS		4	1.985	1.731	2.239	1.877	2.219	0.07996	0.1599	8.06%	1.31%
LC_LC3		4	2.072	1.916	2.228	1.981	2.179	0.04905	0.0981	4.73%	-3.02%
LC_LC5		4	1.456	-0.09782	3.009	0	2.034	0.4881	0.9762	67.07%	27.63%
LC_LCDSSLCC		4	2.021	1.792	2.25	1.877	2.196	0.07204	0.1441	7.13%	-0.49%
LC_SLC		4	1.824	1.583	2.064	1.629	1.998	0.07548	0.151	8.28%	9.33%

Fathead Minnow 32-d Survival and Growth Test
Nautilus Environmental

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	1.0000	1.0000	1.0000	1.0000
Control 10	N	1.0000	1.0000	1.0000	1.0000
FR_UFR1	XC	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	0.9333	0.8667
FR_FRCP1		0.9333	0.8000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	0.9333
CM_MC1		1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	9.58	9.87	10.21	11.13
Control 10	N	11.21	10.92	10.87	10.67
FR_UFR1	XC	10.64	10.1	10.31	11
FR_FRABCH		15	10.14	11.09	13
FR_FRCP1		0	0	0	0
GH_FR1		10.67	10.27	10.29	11
GH_ER2		10.54	10.92	11.33	11.89
GH_ERC		10.21		10.13	
CM_MC1		11.5	10.46	11.44	11
CM_MC2		10.83	9.13	10.33	9.87
EV_MC2		9.5	9.36	9.5	10.07
EV_HC1		9.79	9.86	10.36	9.73
LC_DCDS		9.57	9.47	9.43	10.14
LC_LC3		10.5	10.5	10.75	10.39
LC_LC5		9.5	9.36	10.23	
LC_LCDSSLCC		9.73	10.18	9.5	9.8
LC_SLC		9.6	9.62	11.13	10

Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	1.951	1.825	1.866	2.404
Control 10	N	2.113	2.089	2.273	2.357
FR_UFR1	XC	1.891	1.355	1.887	2.181
FR_FRABCH		2.009	1.917	1.98	1.725
FR_FRCP1		0	0	0	0
GH_FR1		2.077	1.693	1.773	2.29
GH_ER2		1.839	1.743	2.055	2.017
GH_ERC		1.614	0	1.61	0
CM_MC1		1.477	1.267	1.981	1.035
CM_MC2		2.358	1.889	2.041	2.171
EV_MC2		2.085	1.86	1.953	2.304
EV_HC1		1.978	1.982	1.805	1.919
LC_DCDS		1.889	1.955	1.877	2.219
LC_LC3		1.997	1.981	2.132	2.179
LC_LC5		1.997	1.791	2.034	0
LC_LCDSSLCC		2.078	1.877	1.934	2.196
LC_SLC		1.835	1.629	1.833	1.998

Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	15/15	15/15	15/15	15/15
Control 10	N	15/15	15/15	15/15	15/15
FR_UFR1	XC	15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	14/15	13/15
FR_FRCP1		14/15	12/15	15/15	15/15
GH_FR1		15/15	15/15	15/15	15/15
GH_ER2		15/15	15/15	15/15	15/15
GH_ERC		15/15	15/15	15/15	14/15
CM_MC1		15/15	15/15	15/15	15/15
CM_MC2		15/15	15/15	15/15	15/15
EV_MC2		15/15	15/15	15/15	15/15
EV_HC1		15/15	15/15	15/15	15/15
LC_DCDS		15/15	15/15	15/15	15/15
LC_LC3		15/15	15/15	15/15	15/15
LC_LC5		15/15	15/15	15/15	15/15
LC_LCDSSLCC		15/15	15/15	15/15	15/15
LC_SLC		15/15	15/15	15/15	15/15

June 28/19

CETIS Summary Report

32-d fathead minnow

Test Code/ID: 190359-1 / 19-3065-2902

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JW JW Nautilus Environmental

Batch ID:	18-9476-8345	**Test Type:**	Growth-Survival ~~(10d)~~ 32-d	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h (0 °C) (°C)	Teck Coal	Teck Coal Q1
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 2.1		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 1.8		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.1		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.0		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.0		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0572-0857	7d Survival Rate 32-d	Fisher Exact/Bonferroni-Holm Test	0.1954	EV_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	FR_FRCP1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	GH_FR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	GH_ER2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	Control 10 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	CM_MC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	CM_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	FR_FRABCH passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	FR_UFR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	LC_SLC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	EV_HC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	LC_DCDS passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	LC_LC3 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	LC_LC5 passed 7d survival rate	1

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Single Comparison Summary JW

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0572-0857	7d Survival Rate 32-d JW	Fisher Exact/Bonferroni-Holm Test	0.1954	LC_LCDSSLCC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	GH_ERC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	LC_LC5 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	GH_ERC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	EV_MC2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	FR_FRCP1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	CM_MC2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	LC_LC3 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	FR_UFR1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	GH_ER2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	GH_FR1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	LC_DCDS failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	FR_FRABCH failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	LC_LCDSSLCC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	EV_HC1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	LC_SLC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	CM_MC1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.3E-05	Control 10 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	LC_LC5 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	GH_ERC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	LC_DCDS failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	CM_MC1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	LC_LC3 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	EV_MC2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	GH_FR1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	Control 10 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	GH_ER2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	EV_HC1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	LC_SLC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	FR_FRCP1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	FR_FRABCH failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	CM_MC2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	LC_LCDSSLCC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.2E-30	FR_UFR1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	CM_MC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	LC_LC5 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	LC_LCDSSLCC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	GH_FR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	LC_DCDS passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	GH_ERC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	FR_FRABCH passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	Control 10 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	CM_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	EV_HC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	LC_SLC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	FR_UFR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	LC_LC3 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	EV_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	FR_FRCP1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8178	GH_ER2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	GH_FR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	LC_LC5 passed 7d survival rate	1
12-0572-0857	7d Survival Rate JW	Fisher Exact/Bonferroni-Holm Test	0.0679	Control 10 passed 7d survival rate	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0572-0857	7d Survival Rate 32-d	Fisher Exact/Bonferroni-Holm Test	0.0679	CM_MC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	FR_FRABCH passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	GH_ERC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	GH_ER2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	EV_HC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	CM_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	LC_DCDS passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	FR_UFR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	LC_SLC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	LC_LCDSSLCC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	LC_LC3 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	EV_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0679	FR_FRCP1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	FR_UFR1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	Control 10 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	LC_SLC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	GH_ERC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	CM_MC1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	EV_MC2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	LC_LC5 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	EV_HC1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	GH_FR1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	FR_FRCP1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	LC_DCDS failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	LC_LC3 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	CM_MC2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	LC_LCDSSLCC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	FR_FRABCH failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.1E-08	GH_ER2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	LC_LC5 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	FR_FRCP1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	CM_MC1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	CM_MC2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	LC_LCDSSLCC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	GH_ERC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	FR_FRABCH failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	GH_ER2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	LC_LC3 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	GH_FR1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	EV_MC2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	EV_HC1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	LC_SLC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	FR_UFR1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	LC_DCDS failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	5.9E-06	Control 10 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
12-0572-0857	7d Survival Rate JW	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0572-0857	7d Survival Rate 32-d	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0572-0857	7d Survival Rate 32-d	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	LC_LC5 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	LC_LC3 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	LC_LCDSSLCC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	FR_FRCP1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	FR_FRABCH passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	CM_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	Control 10 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	GH_ERC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	FR_UFR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	EV_HC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	GH_ER2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	LC_DCDS passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	LC_SLC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	GH_FR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	CM_MC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1954	EV_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	LC_SLC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	CM_MC2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	EV_MC2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	LC_LC5 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	Control 10 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	CM_MC1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	LC_LCDSSLCC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	FR_FRABCH failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	FR_UFR1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	EV_HC1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	GH_ER2 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	LC_LC3 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	GH_FR1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	LC_DCDS failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	GH_ERC failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0014	FR_FRCP1 failed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	CM_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	FR_UFR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	Control 10 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	LC_DCDS passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	LC_LC3 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	LC_SLC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	CM_MC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	EV_HC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	LC_LC5 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	EV_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	GH_ER2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	LC_LCDSSLCC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	GH_FR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	FR_FRCP1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	GH_ERC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	FR_FRABCH passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	LC_LCDSSLCC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	LC_LC3 passed 7d survival rate	1

JW

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0572-0857	7d Survival Rate 32d	Fisher Exact/Bonferroni-Holm Test	0.4391	LC_DCDS passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	EV_HC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	LC_LC5 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	EV_MC2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	CM_MC1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	LC_SLC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	FR_UFR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	GH_ERC passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	Control 10 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	GH_ER2 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	GH_FR1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	FR_FRCP1 passed 7d survival rate	1
12-0572-0857	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4391	FR_FRABCH passed 7d survival rate	1
12-0572-0857	7d Survival Rate JW	Fisher Exact/Bonferroni-Holm Test	0.4391	CM_MC2 passed 7d survival rate	1

~~7d~~ JW Survival Rate Summary 32-d

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control 10	N	4	0.9500	0.8484	1.0000	0.8667	1.0000	0.0319	0.0638	6.72%	0.00%
FR_UFR1		4	0.8167	0.6355	0.9978	0.6667	0.9333	0.0569	0.1139	13.94%	14.04%
FR_FRABCH		4	0.5833	0.0982	1.0000	0.2667	0.9333	0.1524	0.3049	52.27%	38.60%
FR_FRCP1		4	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		100.00%
GH_FR1		4	0.9667	0.9054	1.0000	0.9333	1.0000	0.0193	0.0385	3.98%	-1.75%
GH_ER2		4	0.7833	0.5825	0.9841	0.6000	0.8667	0.0631	0.1262	16.11%	17.54%
GH_ERC		4	0.4833	0.0000	1.0000	0.0000	1.0000	0.2794	0.5588	115.61%	49.12%
CM_MC1		4	0.5667	0.3458	0.7875	0.4000	0.7333	0.0694	0.1388	24.49%	40.35%
CM_MC2		4	0.9000	0.7163	1.0000	0.8000	1.0000	0.0577	0.1155	12.83%	5.26%
EV_MC2		4	0.9333	0.9333	0.9333	0.9333	0.9333	0.0000	0.0000	0.00%	1.75%
EV_HC1		4	0.9000	0.7163	1.0000	0.7333	1.0000	0.0577	0.1155	12.83%	5.26%
LC_DCDS		4	0.9500	0.8970	1.0000	0.9333	1.0000	0.0167	0.0333	3.51%	0.00%
LC_LC3		4	0.8167	0.7636	0.8697	0.8000	0.8667	0.0167	0.0333	4.08%	14.04%
LC_LC5		4	0.6833	0.0000	1.0000	0.0000	0.9333	0.2283	0.4566	66.83%	28.07%
LC_LCDSSLCC		4	0.8500	0.6313	1.0000	0.7333	1.0000	0.0687	0.1374	16.17%	10.53%
LC_SLC	XC	4	0.8500	0.4995	1.0000	0.5333	1.0000	0.1101	0.2203	25.91%	10.53%

~~7d~~ JW Survival Rate Detail 32-d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	0.9333	0.8667	1.0000	1.0000
FR_UFR1		0.9333	0.6667	0.8667	0.8000
FR_FRABCH		0.2667	0.9333	0.7333	0.4000
FR_FRCP1		0.0000	0.0000	0.0000	0.0000
GH_FR1		1.0000	1.0000	0.9333	0.9333
GH_ER2		0.8667	0.8667	0.8000	0.6000
GH_ERC		0.9333	0.0000	1.0000	0.0000
CM_MC1		0.5333	0.7333	0.6000	0.4000
CM_MC2		0.8000	1.0000	0.8000	1.0000
EV_MC2		0.9333	0.9333	0.9333	0.9333
EV_HC1		0.9333	0.9333	0.7333	1.0000
LC_DCDS		0.9333	1.0000	0.9333	0.9333
LC_LC3		0.8000	0.8000	0.8000	0.8667
LC_LC5		0.9333	0.9333	0.8667	0.0000
LC_LCDSSLCC		0.7333	0.7333	0.9333	1.0000
LC_SLC	XC	1.0000	0.8667	0.5333	1.0000

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JW

Nautilus Environmental

JW ~~7d~~ Survival Rate Binomials 32-d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	14/15	13/15	15/15	15/15
FR_UFR1		14/15	10/15	13/15	12/15
FR_FRABCH		4/15	14/15	11/15	6/15
FR_FRCP1		0/15	0/15	0/15	0/15
GH_FR1		15/15	15/15	14/15	14/15
GH_ER2		13/15	13/15	12/15	9/15
GH_ERC		14/15	0/15	15/15	0/15
CM_MC1		8/15	11/15	9/15	6/15
CM_MC2		12/15	15/15	12/15	15/15
EV_MC2		14/15	14/15	14/15	14/15
EV_HC1		14/15	14/15	11/15	15/15
LC_DCDS		14/15	15/15	14/15	14/15
LC_LC3		12/15	12/15	12/15	13/15
LC_LC5		14/15	14/15	13/15	0/15
LC_LCDSSLCC		11/15	11/15	14/15	15/15
LC_SLC	XC	15/15	13/15	8/15	15/15

CETIS Analytical Report

32-d fathead minnow

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment Test~~ JW

Nautilus Environmental

Analysis ID:	12-0572-0857	**Endpoint:**	7d Survival Rate 32 d	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 11:16	**Analysis:**	JW STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	18-9476-8345	**Test Type:**	Growth-Survival (10d)	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h JW (°C)	Teck Coal	Teck Coal Q1
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 2.1		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 1.8		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.1		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.0		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.0		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control	FR_UFR1	0.0217	Exact	0.1954	Non-Significant Effect
(10 µg/L Cu)	FR_FRABCH*	0.0000	Exact	1.3E-05	Significant Effect
	FR_FRCP1*	0.0000	Exact	6.2E-30	Significant Effect
	GH_FR1	0.8178	Exact	0.8178	Non-Significant Effect
	GH_ER2	0.0068	Exact	0.0679	Non-Significant Effect
	GH_ERC*	0.0000	Exact	6.1E-08	Significant Effect
	CM_MC1*	0.0000	Exact	5.9E-06	Significant Effect
	CM_MC2	0.2453	Exact	1.0000	Non-Significant Effect
	EV_MC2	0.5000	Exact	1.0000	Non-Significant Effect
	EV_HC1	0.2453	Exact	1.0000	Non-Significant Effect
	LC_DCDS	0.6603	Exact	1.0000	Non-Significant Effect
	LC_LC3	0.0217	Exact	0.1954	Non-Significant Effect

June 27/19

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test (JW)

Nautilus Environmental

Analysis ID: 12-0572-0857 Endpoint: ~~7d~~ Survival Rate 32-d JW CETIS Version: CETISv1.9.4
Analyzed: 27 Jun-19 11:16 Analysis: STP 2xK Contingency Tables Status Level: 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5*	0.0001	Exact	0.0014	Significant Effect
		LC_LCDSSLCC	0.0627	Exact	0.4391	Non-Significant Effect
		LC_SLC	0.0627	Exact	0.4391	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 10	N	57	3	60	0.95	0.05	0.0%
FR_UFR1		49	11	60	0.8167	0.1833	14.04%
FR_FRABCH		35	25	60	0.5833	0.4167	38.6%
FR_FRCP1		0	60	60	0	1	100.0%
GH_FR1		58	2	60	0.9667	0.03333	-1.75%
GH_ER2		47	13	60	0.7833	0.2167	17.54%
GH_ERC		29	31	60	0.4833	0.5167	49.12%
CM_MC1		34	26	60	0.5667	0.4333	40.35%
CM_MC2		54	6	60	0.9	0.1	5.26%
EV_MC2		56	4	60	0.9333	0.06667	1.75%
EV_HC1		54	6	60	0.9	0.1	5.26%
LC_DCDS		57	3	60	0.95	0.05	0.0%
LC_LC3		49	11	60	0.8167	0.1833	14.04%
LC_LC5		41	19	60	0.6833	0.3167	28.07%
LC_LCDSSLCC		51	9	60	0.85	0.15	10.53%
LC_SLC		51	9	60	0.85	0.15	10.53%

JW ~~7d~~ Survival Rate Detail 32-d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	0.9333	0.8667	1.0000	1.0000
FR_UFR1		0.9333	0.6667	0.8667	0.8000
FR_FRABCH		0.2667	0.9333	0.7333	0.4000
FR_FRCP1		0.0000	0.0000	0.0000	0.0000
GH_FR1		1.0000	1.0000	0.9333	0.9333
GH_ER2		0.8667	0.8667	0.8000	0.6000
GH_ERC		0.9333	0.0000	1.0000	0.0000
CM_MC1		0.5333	0.7333	0.6000	0.4000
CM_MC2		0.8000	1.0000	0.8000	1.0000
EV_MC2		0.9333	0.9333	0.9333	0.9333
EV_HC1		0.9333	0.9333	0.7333	1.0000
LC_DCDS		0.9333	1.0000	0.9333	0.9333
LC_LC3		0.8000	0.8000	0.8000	0.8667
LC_LC5		0.9333	0.9333	0.8667	0.0000
LC_LCDSSLCC		0.7333	0.7333	0.9333	1.0000
LC_SLC		1.0000	0.8667	0.5333	1.0000

June 27/19

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test

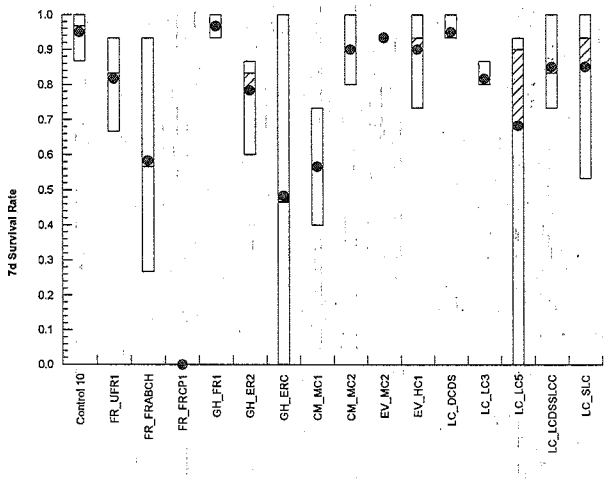
Nautilus Environmental

Analysis ID: 12-0572-0857 **Endpoint:** ~~7d~~ Survival Rate 32-d JW **CETIS Version:** CETISv1.9.4
Analyzed: 27 Jun-19 11:16 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

JW ~~7d~~ Survival Rate Binomials 32-d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	14/15	13/15	15/15	15/15
FR_FRABCH		4/15	14/15	11/15	6/15
FR_FRCP1		0/15	0/15	0/15	0/15
GH_FR1		15/15	15/15	14/15	14/15
GH_ER2		13/15	13/15	12/15	9/15
GH_ERC		14/15	0/15	15/15	0/15
CM_MC1		8/15	11/15	9/15	6/15
CM_MC2		12/15	15/15	12/15	15/15
EV_MC2		14/15	14/15	14/15	14/15
EV_HC1		14/15	14/15	11/15	15/15
LC_DCDS		14/15	15/15	14/15	14/15
LC_LC3		12/15	12/15	12/15	13/15
LC_LC5		14/15	14/15	13/15	0/15
LC_LCDSSLCC		11/15	11/15	14/15	15/15
LC_SLC		15/15	13/15	8/15	15/15

Graphics



Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	04-6975-0798	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	18 Jun-19 13:08	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	14-6759-0916	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C)		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control	FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
(10 µg/L Cu)	FR_FRABCH	0.1218	Exact	1.0000	Non-Significant Effect
	FR_FRCP1	0.0594	Exact	0.8904	Non-Significant Effect
	GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
	GH_ER2	1.0000	Exact	1.0000	Non-Significant Effect
	GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
	CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
	CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
	EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
	EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
	LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
	LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect

Analysis ID: 04-6975-0798 **Endpoint:** Hatched Rate **CETIS Version:** CETISv1.9.4
Analyzed: 18 Jun-19 13:08 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			1.0000	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 10	N	60	0	60	1	0	0.0%
FR_UFR1		60	0	60	1	0	0.0%
FR_FRABCH		57	3	60	0.95	0.05	5.0%
FR_FRCP1		56	4	60	0.9333	0.06667	6.67%
GH_FR1		60	0	60	1	0	0.0%
GH_ER2		60	0	60	1	0	0.0%
GH_ERC		59	1	60	0.9833	0.01667	1.67%
CM_MC1		60	0	60	1	0	0.0%
CM_MC2		60	0	60	1	0	0.0%
EV_MC2		60	0	60	1	0	0.0%
EV_HC1		60	0	60	1	0	0.0%
LC_DCDS		60	0	60	1	0	0.0%
LC_LC3		60	0	60	1	0	0.0%
LC_LC5		60	0	60	1	0	0.0%
LC_LCDSSLCC		60	0	60	1	0	0.0%
LC_SLC		60	0	60	1	0	0.0%

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	0.9333	0.8667
FR_FRCP1		0.9333	0.8000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	0.9333
CM_MC1		1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000

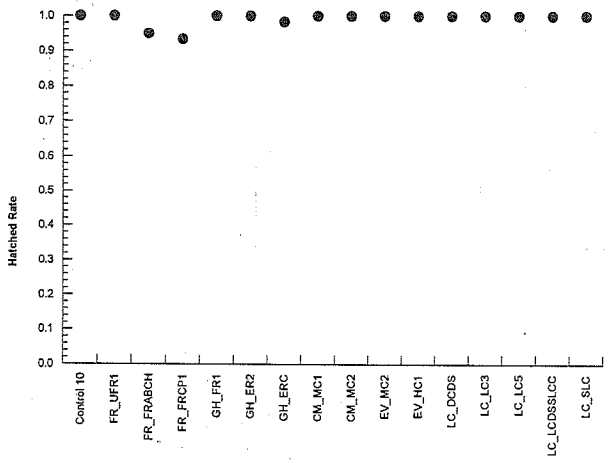
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 04-6975-0798 **Endpoint:** Hatched Rate **CETIS Version:** CETISv1.9.4
Analyzed: 18 Jun-19 13:08 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	15/15	15/15	15/15	15/15
FR_UFR1		15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	14/15	13/15
FR_FRCP1		14/15	12/15	15/15	15/15
GH_FR1		15/15	15/15	15/15	15/15
GH_ER2		15/15	15/15	15/15	15/15
GH_ERC		15/15	15/15	15/15	14/15
CM_MC1		15/15	15/15	15/15	15/15
CM_MC2		15/15	15/15	15/15	15/15
EV_MC2		15/15	15/15	15/15	15/15
EV_HC1		15/15	15/15	15/15	15/15
LC_DCDS		15/15	15/15	15/15	15/15
LC_LC3		15/15	15/15	15/15	15/15
LC_LC5		15/15	15/15	15/15	15/15
LC_LCDSSLCC		15/15	15/15	15/15	15/15
LC_SLC		15/15	15/15	15/15	15/15

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — Nautilus Environmental

Analysis ID:	14-6886-6834	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 17:25	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	14-6759-0916	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h (°C) JW	Teck Coal	Teck Coal Q1
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 2.1		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 1.8		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.1		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.0		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.0		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Analyst: JW QA: June 28/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 14-6886-6834 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 26 Jun-19 17:25 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry biomass-mg	9.04%
		FR_FRABCH failed mean dry biomass-mg	9.04%
		FR_FRCP1 failed mean dry biomass-mg	9.04%
		GH_FR1 passed mean dry biomass-mg	9.04%
		GH_ER2 failed mean dry biomass-mg	9.04%
		GH_ERC failed mean dry biomass-mg	9.04%
		CM_MC1 failed mean dry biomass-mg	9.04%
		CM_MC2 passed mean dry biomass-mg	9.04%
		EV_MC2 passed mean dry biomass-mg	9.04%
		EV_HC1 failed mean dry biomass-mg	9.04%
		LC_DCDS failed mean dry biomass-mg	9.04%
		LC_LC3 passed mean dry biomass-mg	9.04%
		LC_LC5 passed mean dry biomass-mg	9.04%
		LC_LCDSSLCC passed mean dry biomass-m	9.04%
		LC_SLC failed mean dry biomass-mg	9.04%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	2.066	2.353	0.432	3	CDF	0.0654	Non-Significant Effect
		FR_FRABCH*	3.309	2.015	0.183	5	CDF	0.0106	Significant Effect
		FR_FRCP1*	34.38	2.353	0.151	3	CDF	2.7E-05	Significant Effect
		GH_FR1	1.639	2.132	0.324	4	CDF	0.0882	Non-Significant Effect
		GH_ER2*	3.012	2.015	0.197	5	CDF	0.0148	Significant Effect
		GH_ERC*	2.984	2.353	1.106	3	CDF	0.0292	Significant Effect
		CM_MC1*	3.631	2.353	0.498	3	CDF	0.0180	Significant Effect
		CM_MC2	0.7872	2.015	0.239	5	CDF	0.2334	Non-Significant Effect
		EV_MC2	1.361	2.015	0.233	5	CDF	0.1159	Non-Significant Effect
		EV_HC1*	3.758	2.015	0.154	5	CDF	0.0066	Significant Effect
		LC_DCDS*	2.173	2.015	0.207	5	CDF	0.0409	Significant Effect
		LC_LC3	1.679	2.015	0.163	5	CDF	0.0770	Non-Significant Effect
		LC_LC5	1.528	2.353	1.159	3	CDF	0.1120	Non-Significant Effect
		LC_LCDSSLCC	1.934	2.015	0.195	5	CDF	0.0554	Non-Significant Effect
		LC_SLC*	3.877	2.015	0.2	5	CDF	0.0058	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	19.6896	1.31264	15	8.777	<1.0E-37	Significant Effect
Error	7.17862	0.149555	48			
Total	26.8682		63			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	8.346	2.436	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	2.75	2.436	0.0040	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.867	0.9488	5.6E-06	Non-Normal Distribution

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 14-6886-6834 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 26 Jun-19 17:25 **Analysis:** Parametric-Two Sample **Status Level:** 1

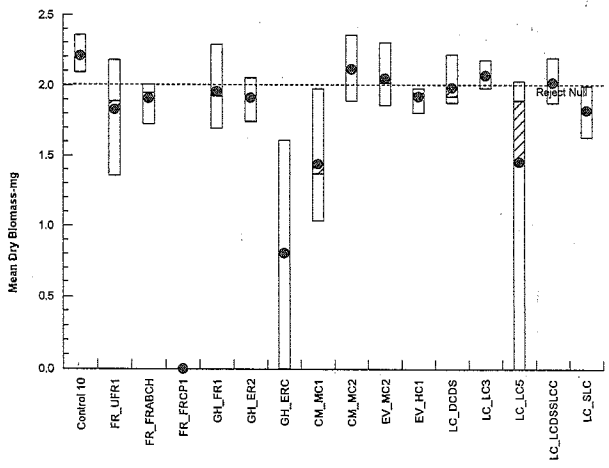
Mean Dry Biomass-mg Summary

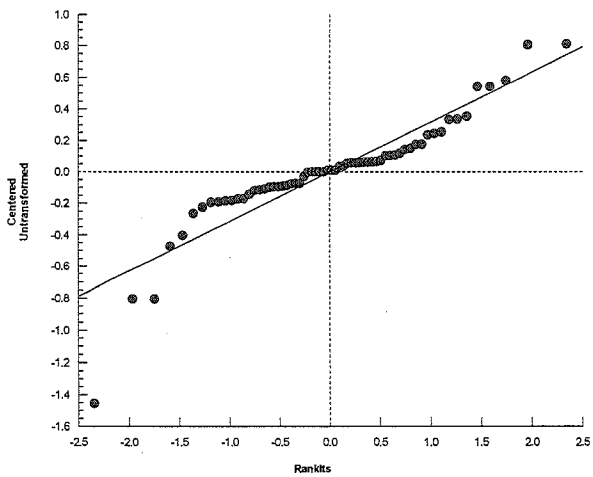
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 10	N	4	2.208	2.003	2.412	2.193	2.089	2.357	0.06422	5.82%	0.00%
FR_UFR1		4	1.828	1.281	2.376	1.889	1.355	2.181	0.1721	18.82%	17.18%
FR_FRABCH		4	1.908	1.704	2.112	1.949	1.725	2.009	0.064	6.71%	13.59%
FR_FRCP1		4	0	0	0	0	0	0	0		100.00%
GH_FR1		4	1.958	1.519	2.397	1.925	1.693	2.29	0.138	14.09%	11.30%
GH_ER2		4	1.913	1.679	2.148	1.928	1.743	2.055	0.07374	7.71%	13.34%
GH_ERC		4	0.806	-0.6749	2.287	0.805	0	1.614	0.4653	115.47%	63.49%
CM_MC1		4	1.44	0.7987	2.081	1.372	1.035	1.981	0.2015	27.99%	34.78%
CM_MC2		4	2.115	1.798	2.431	2.106	1.889	2.358	0.09941	9.40%	4.22%
EV_MC2		4	2.05	1.744	2.357	2.019	1.86	2.304	0.0963	9.39%	7.13%
EV_HC1		4	1.921	1.79	2.052	1.949	1.805	1.982	0.04118	4.29%	12.98%
LC_DCDS		4	1.985	1.731	2.239	1.922	1.877	2.219	0.07996	8.06%	10.09%
LC_LC3		4	2.072	1.916	2.228	2.064	1.981	2.179	0.04905	4.73%	6.14%
LC_LC5		4	1.456	-0.09782	3.009	1.894	0	2.034	0.4881	67.07%	34.08%
LC_LCDSSLCC		4	2.021	1.792	2.25	2.006	1.877	2.196	0.07204	7.13%	8.45%
LC_SLC		4	1.824	1.583	2.064	1.834	1.629	1.998	0.07548	8.28%	17.40%

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	2.113	2.089	2.273	2.357
FR_UFR1		1.891	1.355	1.887	2.181
FR_FRABCH		2.009	1.917	1.98	1.725
FR_FRCP1		0	0	0	0
GH_FR1		2.077	1.693	1.773	2.29
GH_ER2		1.839	1.743	2.055	2.017
GH_ERC		1.614	0	1.61	0
CM_MC1		1.477	1.267	1.981	1.035
CM_MC2		2.358	1.889	2.041	2.171
EV_MC2		2.085	1.86	1.953	2.304
EV_HC1		1.978	1.982	1.805	1.919
LC_DCDS		1.889	1.955	1.877	2.219
LC_LC3		1.997	1.981	2.132	2.179
LC_LC5		1.997	1.791	2.034	0
LC_LCDSSLCC		2.078	1.877	1.934	2.196
LC_SLC		1.835	1.629	1.833	1.998

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	13-0570-8901	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jun-19 11:53	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	14-6759-0916	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h (°C)	Teck Coal	Teck Coal Q1
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 2.1		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 1.8		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.1		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.0		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.0		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

June 28/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 13-0570-8901 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jun-19 11:53 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed length-mm	8.11%
		FR_FRABCH passed length-mm	8.11%
		FR_FRCP1 failed length-mm	8.11%
		GH_FR1 passed length-mm	8.11%
		GH_ER2 passed length-mm	8.11%
		GH_ERC failed length-mm	8.11%
		CM_MC1 passed length-mm	8.11%
		CM_MC2 passed length-mm	8.11%
		EV_MC2 failed length-mm	8.11%
		EV_HC1 failed length-mm	8.11%
		LC_DCDS failed length-mm	8.11%
		LC_LC3 failed length-mm	8.11%
		LC_LC5 failed length-mm	8.11%
		LC_LCDSSLCC failed length-mm	8.11%
		LC_SLC passed length-mm	8.11%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	1.79	2.132	0.482	4	CDF	0.0740	Non-Significant Effect
		FR_FRABCH	-1.284	2.353	2.547	3	CDF	0.8554	Non-Significant Effect
		FR_FRCP1*	97.95	2.353	0.262	3	CDF	1.2E-06	Significant Effect
		GH_FR1	1.743	2.015	0.416	5	CDF	0.0709	Non-Significant Effect
		GH_ER2	-0.8148	2.353	0.729	3	CDF	0.7626	Non-Significant Effect
		GH_ERC*	6.312	2.353	0.279	3	CDF	0.0040	Significant Effect
		CM_MC1	-0.688	2.132	0.566	4	CDF	0.7354	Non-Significant Effect
		CM_MC2	2.322	2.353	0.89	3	CDF	0.0515	Non-Significant Effect
		EV_MC2*	6.785	2.015	0.389	5	CDF	5.3E-04	Significant Effect
		EV_HC1*	5.392	2.015	0.367	5	CDF	0.0015	Significant Effect
		LC_DCDS*	6.349	2.015	0.402	5	CDF	7.2E-04	Significant Effect
		LC_LC3*	2.833	2.015	0.272	5	CDF	0.0183	Significant Effect
		LC_LC5*	4.183	2.92	0.852	2	CDF	0.0263	Significant Effect
		LC_LCDSSLCC*	6.198	2.015	0.363	5	CDF	8.0E-04	Significant Effect
		LC_SLC	2.205	2.353	0.886	3	CDF	0.0573	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	436.037	29.0692	15	61.34	<1.0E-37	Significant Effect
Error	21.3243	0.473873	45			
Total	457.362		60			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.176	2.464	9.2E-07	Unequal Variances
Variances	Mod Levene Equality of Variance Test	4.645	2.475	3.3E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8399	0.9466	1.3E-06	Non-Normal Distribution

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 13-0570-8901 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jun-19 11:53 **Analysis:** Parametric-Two Sample **Status Level:** 1

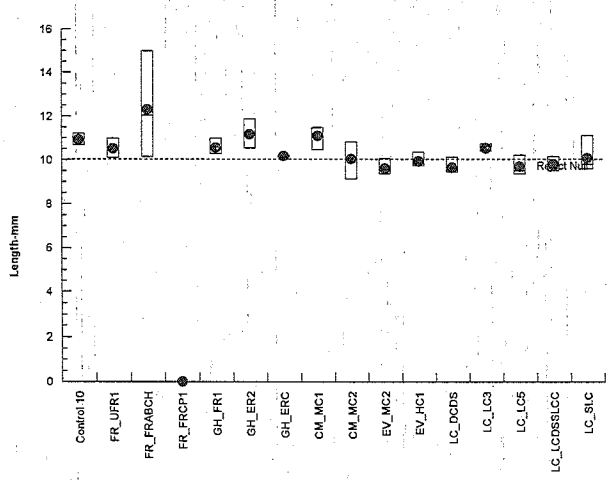
Length-mm Summary

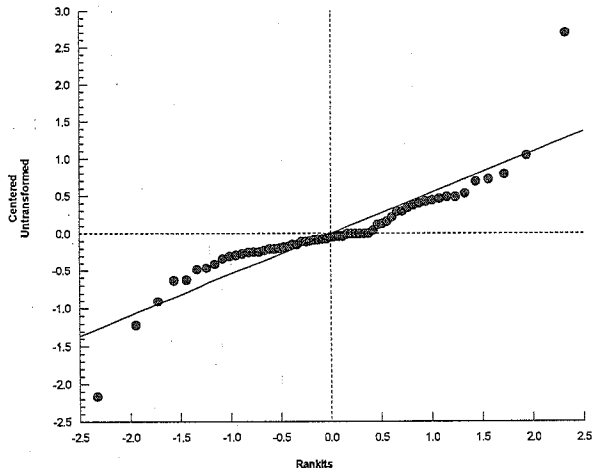
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 10	N	4	10.92	10.56	11.27	10.9	10.67	11.21	0.1115	2.04%	0.00%
FR_UFR1		4	10.51	9.886	11.14	10.48	10.1	11	0.1969	3.75%	3.71%
FR_FRABCH		4	12.31	8.881	15.73	12.05	10.14	15	1.077	17.50%	-12.73%
FR_FRCP1		4	0	0	0	0	0	0	0		100.00%
GH_FR1		4	10.56	10	11.11	10.48	10.27	11	0.1738	3.29%	3.30%
GH_ER2		4	11.17	10.25	12.09	11.12	10.54	11.89	0.2892	5.18%	-2.31%
GH_ERC		2	10.17	9.661	10.68	10.17	10.13	10.21	0.04003	0.56%	6.85%
CM_MC1		4	11.1	10.33	11.87	11.22	10.46	11.5	0.2407	4.34%	-1.67%
CM_MC2		4	10.04	8.891	11.19	10.1	9.13	10.83	0.3612	7.19%	8.04%
EV_MC2		4	9.607	9.106	10.11	9.5	9.36	10.07	0.1577	3.28%	12.00%
EV_HC1		4	9.935	9.476	10.39	9.825	9.73	10.36	0.1441	2.90%	9.00%
LC_DCDS		4	9.653	9.127	10.18	9.52	9.43	10.14	0.1651	3.42%	11.59%
LC_LC3		4	10.54	10.29	10.78	10.5	10.39	10.75	0.07621	1.45%	3.50%
LC_LC5		3	9.697	8.536	10.86	9.5	9.36	10.23	0.2697	4.82%	11.18%
LC_LCDSSLCC		4	9.803	9.353	10.25	9.765	9.5	10.18	0.1412	2.88%	10.21%
LC_SLC		4	10.09	8.943	11.23	9.81	9.6	11.13	0.3595	7.13%	7.60%

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	11.21	10.92	10.87	10.67
FR_UFR1		10.64	10.1	10.31	11
FR_FRABCH		15	10.14	11.09	13
FR_FRCP1		0	0	0	0
GH_FR1		10.67	10.27	10.29	11
GH_ER2		10.54	10.92	11.33	11.89
GH_ERC		10.21	10.13		
CM_MC1		11.5	10.46	11.44	11
CM_MC2		10.83	9.13	10.33	9.87
EV_MC2		9.5	9.36	9.5	10.07
EV_HC1		9.79	9.86	10.36	9.73
LC_DCDS		9.57	9.47	9.43	10.14
LC_LC3		10.5	10.5	10.75	10.39
LC_LC5		9.5	9.36	10.23	
LC_LCDSSLCC		9.73	10.18	9.5	9.8
LC_SLC		9.6	9.62	11.13	10

Graphics





CETIS Analytical Report

32-d fathead minnow JW

Report Date: 27 Jun-19 11:20 (p 1 of 3)
Test Code/ID: 190359-1 / 19-3065-2902

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JW

Nautilus Environmental

Analysis ID:	06-2933-0349	**Endpoint:**	~~7d~~ Survival Rate 32d	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 11:19	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	18-9476-8345	**Test Type:**	Growth-Survival (10d)	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 2.1	Teck Coal	
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 1.8		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.1		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.6		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.0		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control	FR_FRABCH*	0.0045	Exact	0.0500	Significant Effect
(FR_UFR 1)	FR_FRCP1*	0.0000	Exact	3.7E-22	Significant Effect
	GH_FR1	0.9990	Exact	0.9990	Non-Significant Effect
	GH_ER2	0.4099	Exact	1.0000	Non-Significant Effect
	GH_ERC*	0.0001	Exact	0.0015	Significant Effect
	CM_MC1*	0.0026	Exact	0.0316	Significant Effect
	CM_MC2	0.9428	Exact	1.0000	Non-Significant Effect
	EV_MC2	0.9877	Exact	1.0000	Non-Significant Effect
	EV_HC1	0.9428	Exact	1.0000	Non-Significant Effect
	LC_DCDS	0.9958	Exact	1.0000	Non-Significant Effect
	LC_LC3	0.5930	Exact	1.0000	Non-Significant Effect
	LC_LC5	0.0696	Exact	0.6965	Non-Significant Effect
	LC_LCDSSLCC	0.7684	Exact	1.0000	Non-Significant Effect
	LC_SLC	0.7684	Exact	1.0000	Non-Significant Effect

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JW

Nautilus Environmental

Analysis ID: 06-2933-0349 **Endpoint:** 7d Survival Rate 32d **CETIS Version:** CETISv1.9.4
Analyzed: 27 Jun-19 11:19 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	XC	49	11	60	0.8167	0.1833	14.04%
FR_FRABCH		35	25	60	0.5833	0.4167	38.6%
FR_FRCP1		0	60	60	0	1	100.0%
GH_FR1		58	2	60	0.9667	0.03333	-1.75%
GH_ER2		47	13	60	0.7833	0.2167	17.54%
GH_ERC		29	31	60	0.4833	0.5167	49.12%
CM_MC1		34	26	60	0.5667	0.4333	40.35%
CM_MC2		54	6	60	0.9	0.1	5.26%
EV_MC2		56	4	60	0.9333	0.06667	1.75%
EV_HC1		54	6	60	0.9	0.1	5.26%
LC_DCDS		57	3	60	0.95	0.05	0.0%
LC_LC3		49	11	60	0.8167	0.1833	14.04%
LC_LC5		41	19	60	0.6833	0.3167	28.07%
LC_LCDSSLCC		51	9	60	0.85	0.15	10.53%
LC_SLC		51	9	60	0.85	0.15	10.53%

JW ~~7d~~ Survival Rate Detail 32-d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	XC	0.9333	0.6667	0.8667	0.8000
FR_FRABCH		0.2667	0.9333	0.7333	0.4000
FR_FRCP1		0.0000	0.0000	0.0000	0.0000
GH_FR1		1.0000	1.0000	0.9333	0.9333
GH_ER2		0.8667	0.8667	0.8000	0.6000
GH_ERC		0.9333	0.0000	1.0000	0.0000
CM_MC1		0.5333	0.7333	0.6000	0.4000
CM_MC2		0.8000	1.0000	0.8000	1.0000
EV_MC2		0.9333	0.9333	0.9333	0.9333
EV_HC1		0.9333	0.9333	0.7333	1.0000
LC_DCDS		0.9333	1.0000	0.9333	0.9333
LC_LC3		0.8000	0.8000	0.8000	0.8667
LC_LC5		0.9333	0.9333	0.8667	0.0000
LC_LCDSSLCC		0.7333	0.7333	0.9333	1.0000
LC_SLC		1.0000	0.8667	0.5333	1.0000

JW ~~7d~~ Survival Rate Binomials 32-d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	XC	14/15	10/15	13/15	12/15
FR_FRABCH		4/15	14/15	11/15	6/15
FR_FRCP1		0/15	0/15	0/15	0/15
GH_FR1		15/15	15/15	14/15	14/15
GH_ER2		13/15	13/15	12/15	9/15
GH_ERC		14/15	0/15	15/15	0/15
CM_MC1		8/15	11/15	9/15	6/15
CM_MC2		12/15	15/15	12/15	15/15
EV_MC2		14/15	14/15	14/15	14/15
EV_HC1		14/15	14/15	11/15	15/15
LC_DCDS		14/15	15/15	14/15	14/15
LC_LC3		12/15	12/15	12/15	13/15
LC_LC5		14/15	14/15	13/15	0/15
LC_LCDSSLCC		11/15	11/15	14/15	15/15
LC_SLC		15/15	13/15	8/15	15/15

June 27/19

CETIS Analytical Report

32-d fathead minnow JW

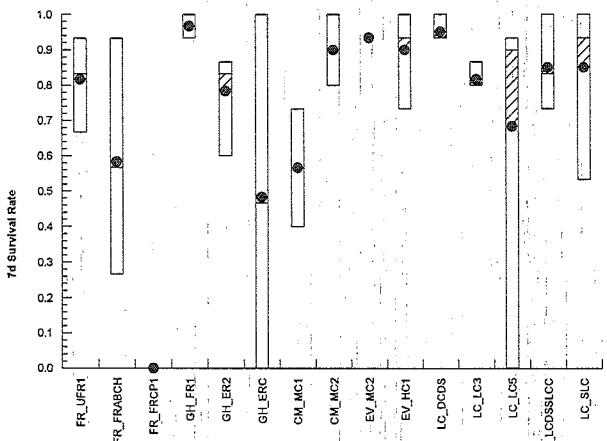
Report Date:	27 Jun-19 11:20 (p 3 of 3)
Test Code/ID:	190359-1 / 19-3065-2902

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JW

Nautilus Environmental

Analysis ID:	06-2933-0349	**Endpoint:**	~~7d~~ Survival Rate 32-d	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 11:19	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



June 27/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	14-9425-1860	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 0:01	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	14-6759-0916	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C)	Teck Coal	
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C)		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRABCH	0.1218	Exact	1.0000	Non-Significant Effect
FR_UFR1		FR_FRCP1	0.0594	Exact	0.8311	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect

Jun 27/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 14-9425-1860 **Endpoint:** Hatched Rate **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 0:01 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	XC	60	0	60	1	0	0.0%
FR_FRABCH		57	3	60	0.95	0.05	5.0%
FR_FRCP1		56	4	60	0.9333	0.06667	6.67%
GH_FR1		60	0	60	1	0	0.0%
GH_ER2		60	0	60	1	0	0.0%
GH_ERC		59	1	60	0.9833	0.01667	1.67%
CM_MC1		60	0	60	1	0	0.0%
CM_MC2		60	0	60	1	0	0.0%
EV_MC2		60	0	60	1	0	0.0%
EV_HC1		60	0	60	1	0	0.0%
LC_DCDS		60	0	60	1	0	0.0%
LC_LC3		60	0	60	1	0	0.0%
LC_LC5		60	0	60	1	0	0.0%
LC_LCDSSLCC		60	0	60	1	0	0.0%
LC_SLC		60	0	60	1	0	0.0%

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	XC	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	0.9333	0.8667
FR_FRCP1		0.9333	0.8000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	0.9333
CM_MC1		1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000

Hatched Rate Binomials

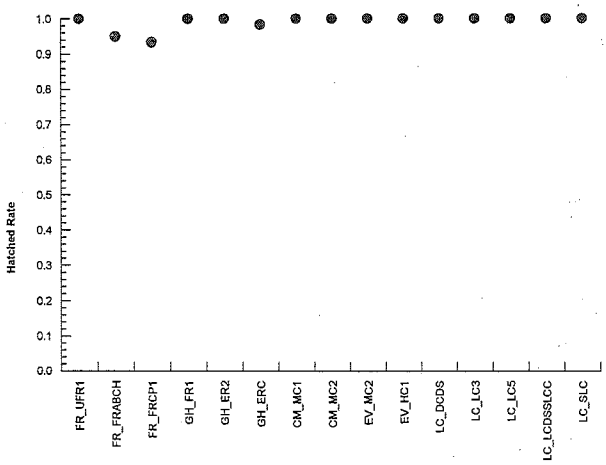
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	XC	15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	14/15	13/15
FR_FRCP1		14/15	12/15	15/15	15/15
GH_FR1		15/15	15/15	15/15	15/15
GH_ER2		15/15	15/15	15/15	15/15
GH_ERC		15/15	15/15	15/15	14/15
CM_MC1		15/15	15/15	15/15	15/15
CM_MC2		15/15	15/15	15/15	15/15
EV_MC2		15/15	15/15	15/15	15/15
EV_HC1		15/15	15/15	15/15	15/15
LC_DCDS		15/15	15/15	15/15	15/15
LC_LC3		15/15	15/15	15/15	15/15
LC_LC5		15/15	15/15	15/15	15/15
LC_LCDSSLCC		15/15	15/15	15/15	15/15
LC_SLC		15/15	15/15	15/15	15/15

Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	14-9425-1860	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 0:01	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	15-0136-5146	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 17:39	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	14-6759-0916	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C)	Teck Coal	
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C)		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 15-0136-5146 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 26 Jun-19 17:39 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRABCH passed mean dry biomass-mg	21.91%
		FR_FRCP1 failed mean dry biomass-mg	21.91%
		GH_FR1 passed mean dry biomass-mg	21.91%
		GH_ER2 passed mean dry biomass-mg	21.91%
		GH_ERC passed mean dry biomass-mg	21.91%
		CM_MC1 passed mean dry biomass-mg	21.91%
		CM_MC2 passed mean dry biomass-mg	21.91%
		EV_MC2 passed mean dry biomass-mg	21.91%
		EV_HC1 passed mean dry biomass-mg	21.91%
		LC_DCDS passed mean dry biomass-mg	21.91%
		LC_LC3 passed mean dry biomass-mg	21.91%
		LC_LC5 passed mean dry biomass-mg	21.91%
		LC_LCDSSLCC passed mean dry biomass-m	21.91%
		LC_SLC passed mean dry biomass-mg	21.91%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRABCH	-0.4322	2.353	0.432	3	CDF	0.6526	Non-Significant Effect
		FR_FRCP1*	10.63	2.353	0.405	3	CDF	8.9E-04	Significant Effect
		GH_FR1	-0.5887	2.015	0.444	5	CDF	0.7092	Non-Significant Effect
		GH_ER2	-0.4532	2.132	0.399	4	CDF	0.6630	Non-Significant Effect
		GH_ERC	2.061	2.353	1.168	3	CDF	0.0657	Non-Significant Effect
		CM_MC1	1.466	2.015	0.534	5	CDF	0.1012	Non-Significant Effect
		CM_MC2	-1.44	2.132	0.424	4	CDF	0.8884	Non-Significant Effect
		EV_MC2	-1.125	2.132	0.420	4	CDF	0.8382	Non-Significant Effect
		EV_HC1	-0.5238	2.353	0.416	3	CDF	0.6817	Non-Significant Effect
		LC_DCDS	-0.8249	2.132	0.405	4	CDF	0.7721	Non-Significant Effect
		LC_LC3	-1.362	2.353	0.421	3	CDF	0.8668	Non-Significant Effect
		LC_LC5	0.7207	2.353	1.218	3	CDF	0.2616	Non-Significant Effect
		LC_LCDSSLCC	-1.033	2.132	0.398	4	CDF	0.8200	Non-Significant Effect
		LC_SLC	0.02573	2.132	0.401	4	CDF	0.4904	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	18.6704	1.3336	14	8.418	<1.0E-37	Significant Effect
Error	7.12914	0.158425	45			
Total	25.7996		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	8.286	2.506	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	2.73	2.506	0.0054	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8735	0.9459	1.6E-05	Non-Normal Distribution

June 28/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 15-0136-5146 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 26 Jun-19 17:39 **Analysis:** Parametric-Two Sample **Status Level:** 1

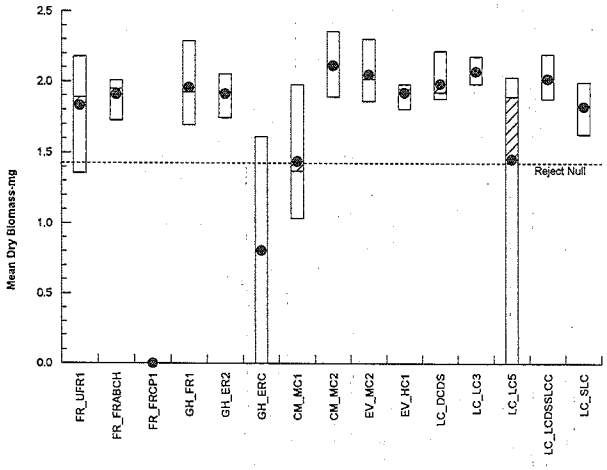
Mean Dry Biomass-mg Summary

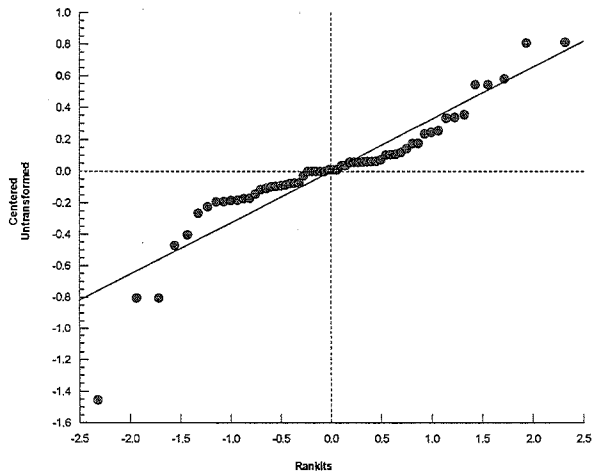
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	4	1.828	1.281	2.376	1.889	1.355	2.181	0.1721	18.82%	0.00%
FR_FRABCH		4	1.908	1.704	2.112	1.949	1.725	2.009	0.064	6.71%	-4.34%
FR_FRCP1		4	0	0	0	0	0	0	0		100.00%
GH_FR1		4	1.958	1.519	2.397	1.925	1.693	2.29	0.138	14.09%	-7.10%
GH_ER2		4	1.913	1.679	2.148	1.928	1.743	2.055	0.07374	7.71%	-4.64%
GH_ERC		4	0.806	-0.6749	2.287	0.805	0	1.614	0.4653	115.47%	55.92%
CM_MC1		4	1.44	0.7987	2.081	1.372	1.035	1.981	0.2015	27.99%	21.25%
CM_MC2		4	2.115	1.798	2.431	2.106	1.889	2.358	0.09941	9.40%	-15.65%
EV_MC2		4	2.05	1.744	2.357	2.019	1.86	2.304	0.0963	9.39%	-12.13%
EV_HC1		4	1.921	1.79	2.052	1.949	1.805	1.982	0.04118	4.29%	-5.07%
LC_DCDS		4	1.985	1.731	2.239	1.922	1.877	2.219	0.07996	8.06%	-8.56%
LC_LC3		4	2.072	1.916	2.228	2.064	1.981	2.179	0.04905	4.73%	-13.33%
LC_LC5		4	1.456	-0.09782	3.009	1.894	0	2.034	0.4881	67.07%	20.40%
LC_LCDSSLCC		4	2.021	1.792	2.25	2.006	1.877	2.196	0.07204	7.13%	-10.54%
LC_SLC		4	1.824	1.583	2.064	1.834	1.629	1.998	0.07548	8.28%	0.26%

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	XC	1.891	1.355	1.887	2.181
FR_FRABCH		2.009	1.917	1.98	1.725
FR_FRCP1		0	0	0	0
GH_FR1		2.077	1.693	1.773	2.29
GH_ER2		1.839	1.743	2.055	2.017
GH_ERC		1.614	0	1.61	0
CM_MC1		1.477	1.267	1.981	1.035
CM_MC2		2.358	1.889	2.041	2.171
EV_MC2		2.085	1.86	1.953	2.304
EV_HC1		1.978	1.982	1.805	1.919
LC_DCDS		1.889	1.955	1.877	2.219
LC_LC3		1.997	1.981	2.132	2.179
LC_LC5		1.997	1.791	2.034	0
LC_LCDSSLCC		2.078	1.877	1.934	2.196
LC_SLC		1.835	1.629	1.833	1.998

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	05-9353-5261	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jun-19 12:00	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	14-6759-0916	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 2.1	Teck Coal	
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 1.8		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.1		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.0		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.0		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

JW

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

June 28/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 05-9353-5261 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jun-19 12:00 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp
Untransformed	C > T

Comparison Result	PMSD
FR_FRABCH passed length-mm	8.31%
FR_FRCP1 failed length-mm	8.31%
GH_FR1 passed length-mm	8.31%
GH_ER2 passed length-mm	8.31%
GH_ERC passed length-mm	8.31%
CM_MC1 passed length-mm	8.31%
CM_MC2 passed length-mm	8.31%
EV_MC2 failed length-mm	8.31%
EV_HC1 failed length-mm	8.31%
LC_DCDS failed length-mm	8.31%
LC_LC3 passed length-mm	8.31%
LC_LC5 failed length-mm	8.31%
LC_LCDSSLCC failed length-mm	8.31%
LC_SLC passed length-mm	8.31%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRABCH	-1.64	2.353	2.576	3	CDF	0.9002	Non-Significant Effect
(FR_UFR 1)		FR_FRCP1*	53.4	2.353	0.463	3	CDF	7.2E-06	Significant Effect
		GH_FR1	-0.1713	2.015	0.529	5	CDF	0.5647	Non-Significant Effect
		GH_ER2	-1.88	2.015	0.705	5	CDF	0.9405	Non-Significant Effect
		GH_ERC	1.705	2.353	0.473	3	CDF	0.0934	Non-Significant Effect
		CM_MC1	-1.889	2.015	0.627	5	CDF	0.9413	Non-Significant Effect
		CM_MC2	1.149	2.132	0.877	4	CDF	0.1573	Non-Significant Effect
		EV_MC2*	3.588	2.015	0.508	5	CDF	0.0079	Significant Effect
		EV_HC1*	2.367	2.015	0.492	5	CDF	0.0321	Significant Effect
		LC_DCDS*	3.347	2.015	0.518	5	CDF	0.0102	Significant Effect
		LC_LC3	-0.1066	2.353	0.497	3	CDF	0.5391	Non-Significant Effect
		LC_LC5*	2.443	2.353	0.786	3	CDF	0.0461	Significant Effect
		LC_LCDSSLCC*	2.931	2.015	0.488	5	CDF	0.0163	Significant Effect
		LC_SLC	1.037	2.132	0.874	4	CDF	0.1792	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	430.134	30.7238	14	60.94	<1.0E-37	Significant Effect
Error	21.1752	0.504171	42			
Total	451.309		56			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.124	2.539	2.2E-06	Unequal Variances
Variances	Mod Levene Equality of Variance Test	4.594	2.551	6.5E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8475	0.9434	4.2E-06	Non-Normal Distribution

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 05-9353-5261 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jun-19 12:00 **Analysis:** Parametric-Two Sample **Status Level:** 1

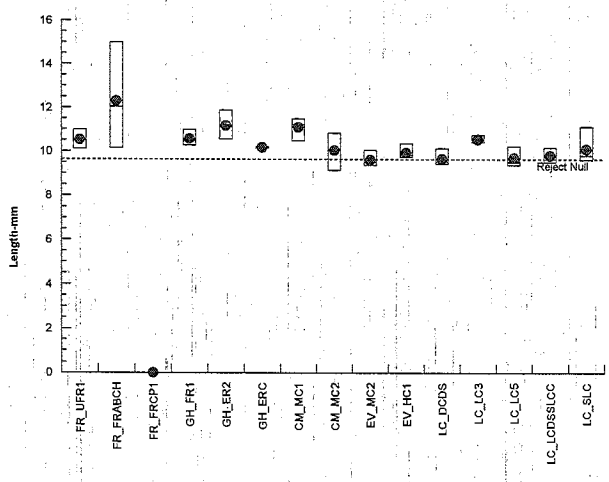
Length-mm Summary

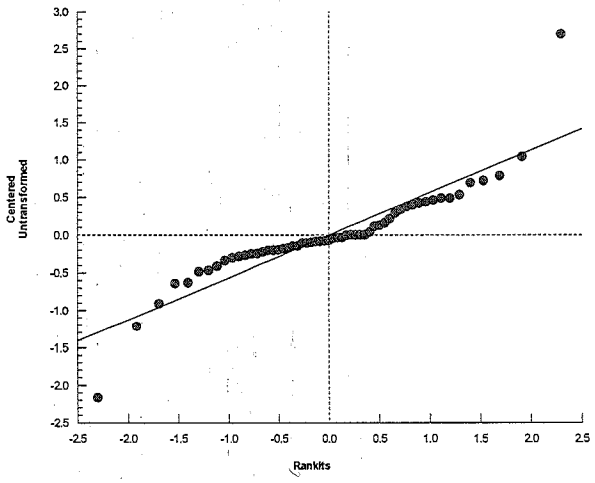
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	4	10.51	9.886	11.14	10.48	10.1	11	0.1969	3.75%	0.00%
FR_FRABCH		4	12.31	8.881	15.73	12.05	10.14	15	1.077	17.50%	-17.07%
FR_FRCP1		4	0	0	0	0	0	0	0		100.00%
GH_FR1		4	10.56	10	11.11	10.48	10.27	11	0.1738	3.29%	-0.43%
GH_ER2		4	11.17	10.25	12.09	11.12	10.54	11.89	0.2892	5.18%	-6.25%
GH_ERC		2	10.17	9.661	10.68	10.17	10.13	10.21	0.04003	0.56%	3.26%
CM_MC1		4	11.1	10.33	11.87	11.22	10.46	11.5	0.2407	4.34%	-5.59%
CM_MC2		4	10.04	8.891	11.19	10.1	9.13	10.83	0.3612	7.19%	4.49%
EV_MC2		4	9.607	9.106	10.11	9.5	9.36	10.07	0.1577	3.28%	8.61%
EV_HC1		4	9.935	9.476	10.39	9.825	9.73	10.36	0.1441	2.90%	5.49%
LC_DCDS		4	9.653	9.127	10.18	9.52	9.43	10.14	0.1651	3.42%	8.18%
LC_LC3		4	10.54	10.29	10.78	10.5	10.39	10.75	0.07621	1.45%	-0.21%
LC_LC5		3	9.697	8.536	10.86	9.5	9.36	10.23	0.2697	4.82%	7.76%
LC_LCDSSLCC		4	9.803	9.353	10.25	9.765	9.5	10.18	0.1412	2.88%	6.75%
LC_SLC		4	10.09	8.943	11.23	9.81	9.6	11.13	0.3595	7.13%	4.04%

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	XC	10.64	10.1	10.31	11
FR_FRABCH		15	10.14	11.09	13
FR_FRCP1		0	0	0	0
GH_FR1		10.67	10.27	10.29	11
GH_ER2		10.54	10.92	11.33	11.89
GH_ERC		10.21	10.13		
CM_MC1		11.5	10.46	11.44	11
CM_MC2		10.83	9.13	10.33	9.87
EV_MC2		9.5	9.36	9.5	10.07
EV_HC1		9.79	9.86	10.36	9.73
LC_DCDS		9.57	9.47	9.43	10.14
LC_LC3		10.5	10.5	10.75	10.39
LC_LC5		9.5	9.36	10.23	
LC_LCDSSLCC		9.73	10.18	9.5	9.8
LC_SLC		9.6	9.62	11.13	10

Graphics





CETIS Analytical Report

32-d fathead minnow

Test Code/ID: 190359-1 / 19-3065-2902

~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JN

Nautilus Environmental

Analysis ID:	07-9193-2152	**Endpoint:**	~~7-d~~ Survival Rate 32-d	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 12:13	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	18-9476-8345	**Test Type:**	Growth-Survival (10d)	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 2.1	Teck Coal	
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 1.8		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.1		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.0		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 3.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.0		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control	FR_UFR1	0.7529	Exact	1.0000	Non-Significant Effect
(~~GH~~-ER 2)	FR_FRABCH	0.0151	Exact	0.1660	Non-Significant Effect
	FR_FRCP1*	0.0000	Exact	1.3E-20	Significant Effect
	GH_FR1	0.9998	Exact	0.9998	Non-Significant Effect
	GH_ERC*	0.0006	Exact	0.0075	Significant Effect
	CM_MC1	0.0094	Exact	0.1125	Non-Significant Effect
	CM_MC2	0.9783	Exact	1.0000	Non-Significant Effect
	EV_MC2	0.9963	Exact	1.0000	Non-Significant Effect
	EV_HC1	0.9783	Exact	1.0000	Non-Significant Effect
	LC_DCDS	0.9989	Exact	1.0000	Non-Significant Effect
	LC_LC3	0.7529	Exact	1.0000	Non-Significant Effect
	LC_LC5	0.1510	Exact	1.0000	Non-Significant Effect
	LC_LCDSSLCC	0.8811	Exact	1.0000	Non-Significant Effect
	LC_SLC	0.8811	Exact	1.0000	Non-Significant Effect

June 27/19

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JW Nautilus Environmental

Analysis ID:	07-9193-2152	**Endpoint:**	~~7d~~ Survival Rate 32 d	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 12:13	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		49	11	60	0.8167	0.1833	14.04%
FR_FRABCH		35	25	60	0.5833	0.4167	38.6%
FR_FRCP1		0	60	60	0	1	100.0%
GH_FR1		58	2	60	0.9667	0.03333	-1.75%
GH_ER2	XC	47	13	60	0.7833	0.2167	17.54%
GH_ERC		29	31	60	0.4833	0.5167	49.12%
CM_MC1		34	26	60	0.5667	0.4333	40.35%
CM_MC2		54	6	60	0.9	0.1	5.26%
EV_MC2		56	4	60	0.9333	0.06667	1.75%
EV_HC1		54	6	60	0.9	0.1	5.26%
LC_DCDS		57	3	60	0.95	0.05	0.0%
LC_LC3		49	11	60	0.8167	0.1833	14.04%
LC_LC5		41	19	60	0.6833	0.3167	28.07%
LC_LCDSSLCC		51	9	60	0.85	0.15	10.53%
LC_SLC		51	9	60	0.85	0.15	10.53%

JW ~~7d~~ Survival Rate Detail 32 d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1		0.9333	0.6667	0.8667	0.8000
FR_FRABCH		0.2667	0.9333	0.7333	0.4000
FR_FRCP1		0.0000	0.0000	0.0000	0.0000
GH_FR1		1.0000	1.0000	0.9333	0.9333
GH_ER2	XC	0.8667	0.8667	0.8000	0.6000
GH_ERC		0.9333	0.0000	1.0000	0.0000
CM_MC1		0.5333	0.7333	0.6000	0.4000
CM_MC2		0.8000	1.0000	0.8000	1.0000
EV_MC2		0.9333	0.9333	0.9333	0.9333
EV_HC1		0.9333	0.9333	0.7333	1.0000
LC_DCDS		0.9333	1.0000	0.9333	0.9333
LC_LC3		0.8000	0.8000	0.8000	0.8667
LC_LC5		0.9333	0.9333	0.8667	0.0000
LC_LCDSSLCC		0.7333	0.7333	0.9333	1.0000
LC_SLC		1.0000	0.8667	0.5333	1.0000

JW ~~7d~~ Survival Rate Binomials 32d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1		14/15	10/15	13/15	12/15
FR_FRABCH		4/15	14/15	11/15	6/15
FR_FRCP1		0/15	0/15	0/15	0/15
GH_FR1		15/15	15/15	14/15	14/15
GH_ERC		14/15	0/15	15/15	0/15
CM_MC1		8/15	11/15	9/15	6/15
CM_MC2		12/15	15/15	12/15	15/15
EV_MC2		14/15	14/15	14/15	14/15
EV_HC1		14/15	14/15	11/15	15/15
LC_DCDS		14/15	15/15	14/15	14/15
LC_LC3		12/15	12/15	12/15	13/15
LC_LC5		14/15	14/15	13/15	0/15
LC_LCDSSLCC		11/15	11/15	14/15	15/15

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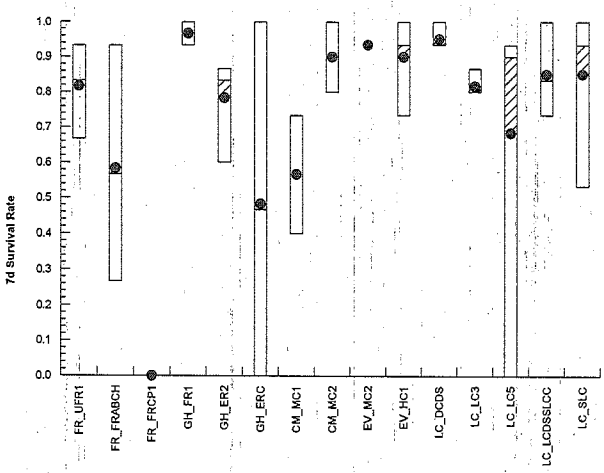
JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JW Nautilus Environmental

Analysis ID:	07-9193-2152	**Endpoint:**	~~7d~~ Survival Rate 32d	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 12:13	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



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Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	09-4383-9807	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Jun-19 12:09	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	13-2481-0964	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 2.1	Teck Coal	
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 1.8		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.1		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.0		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.0		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 1.8		
LC_LCDSSLCC	14-7074-7315	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2016-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
GH - ER 2		FR_FRABCH	0.1218	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.0594	Exact	0.8311	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 09-4383-9807 **Endpoint:** Hatched Rate **CETIS Version:** CETISv1.9.4
Analyzed: 14 Jun-19 12:09 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		60	0	60	1	0	0.0%
FR_FRABCH		57	3	60	0.95	0.05	5.0%
FR_FRCP1		56	4	60	0.9333	0.06667	6.67%
GH_FR1		60	0	60	1	0	0.0%
GH_ER2	XC	60	0	60	1	0	0.0%
GH_ERC		59	1	60	0.9833	0.01667	1.67%
CM_MC1		60	0	60	1	0	0.0%
CM_MC2		60	0	60	1	0	0.0%
EV_MC2		60	0	60	1	0	0.0%
EV_HC1		60	0	60	1	0	0.0%
LC_DCDS		60	0	60	1	0	0.0%
LC_LC3		60	0	60	1	0	0.0%
LC_LC5		60	0	60	1	0	0.0%
LC_LCDSSLCC		60	0	60	1	0	0.0%
LC_SLC		60	0	60	1	0	0.0%

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1		1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	0.9333	0.8667
FR_FRCP1		0.9333	0.8000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000
GH_ER2	XC	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	0.9333
CM_MC1		1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000

Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1		15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	14/15	13/15
FR_FRCP1		14/15	12/15	15/15	15/15
GH_FR1		15/15	15/15	15/15	15/15
GH_ER2	XC	15/15	15/15	15/15	15/15
GH_ERC		15/15	15/15	15/15	14/15
CM_MC1		15/15	15/15	15/15	15/15
CM_MC2		15/15	15/15	15/15	15/15
EV_MC2		15/15	15/15	15/15	15/15
EV_HC1		15/15	15/15	15/15	15/15
LC_DCDS		15/15	15/15	15/15	15/15
LC_LC3		15/15	15/15	15/15	15/15
LC_LC5		15/15	15/15	15/15	15/15
LC_LCDSSLCC		15/15	15/15	15/15	15/15
LC_SLC		15/15	15/15	15/15	15/15

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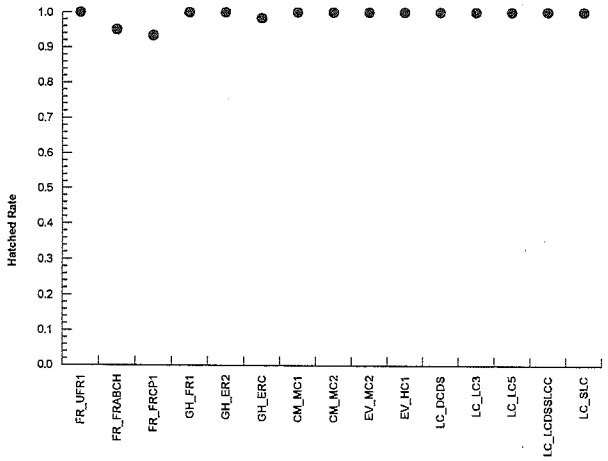
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	09-4383-9807	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Jun-19 12:09	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



June 27/19

CETIS Analytical Report

Test Code/ID: 190359a / 02-2206-5424

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	09-1895-0335	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 17:50	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	13-2481-0964	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C)	Teck Coal	
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C)		
LC_LCDSSLCC	14-7074-7315	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2016-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 09-1895-0335 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 26 Jun-19 17:50 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry biomass-mg	11.11%
		FR_FRABCH passed mean dry biomass-mg	11.11%
		FR_FRCP1 failed mean dry biomass-mg	11.11%
		GH_FR1 passed mean dry biomass-mg	11.11%
		GH_ERC passed mean dry biomass-mg	11.11%
		CM_MC1 passed mean dry biomass-mg	11.11%
		CM_MC2 passed mean dry biomass-mg	11.11%
		EV_MC2 passed mean dry biomass-mg	11.11%
		EV_HC1 passed mean dry biomass-mg	11.11%
		LC_DCDS passed mean dry biomass-mg	11.11%
		LC_LC3 passed mean dry biomass-mg	11.11%
		LC_LC5 passed mean dry biomass-mg	11.11%
		LC_LCDSSLCC passed mean dry biomass-m	11.11%
		LC_SLC passed mean dry biomass-mg	11.11%

Unequal Variance t Two-Sample Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control	FR_UFR1	0.4532	2.132	0.399	4	CDF	0.3370	Non-Significant Effect
(GH - ER2)	FR_FRABCH	0.05635	2.015	0.197	5	CDF	0.4786	Non-Significant Effect
	FR_FRCP1*	25.95	2.353	0.174	3	CDF	6.3E-05	Significant Effect
	GH_FR1	-0.2876	2.132	0.334	4	CDF	0.6060	Non-Significant Effect
	GH_ERC	2.35	2.353	1.109	3	CDF	0.0501	Non-Significant Effect
	CM_MC1	2.206	2.353	0.505	3	CDF	0.0573	Non-Significant Effect
	CM_MC2	-1.627	2.015	0.249	5	CDF	0.9176	Non-Significant Effect
	EV_MC2	-1.129	2.015	0.244	5	CDF	0.8450	Non-Significant Effect
	EV_HC1	-0.0927	2.132	0.180	4	CDF	0.5347	Non-Significant Effect
	LC_DCDS	-0.6588	2.015	0.219	5	CDF	0.7304	Non-Significant Effect
	LC_LC3	-1.793	2.015	0.179	5	CDF	0.9336	Non-Significant Effect
	LC_LC5	0.9275	2.353	1.162	3	CDF	0.2110	Non-Significant Effect
	LC_LCDSSLCC	-1.046	2.015	0.208	5	CDF	0.8283	Non-Significant Effect
	LC_SLC	0.8498	2.015	0.213	5	CDF	0.2171	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	18.6704	1.3336	14	8.418	<1.0E-37	Significant Effect
Error	7.12914	0.158425	45			
Total	25.7996		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	8.286	2.506	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	2.73	2.506	0.0054	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8735	0.9459	1.6E-05	Non-Normal Distribution

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Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 09-1895-0335 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 26 Jun-19 17:50 **Analysis:** Parametric-Two Sample **Status Level:** 1

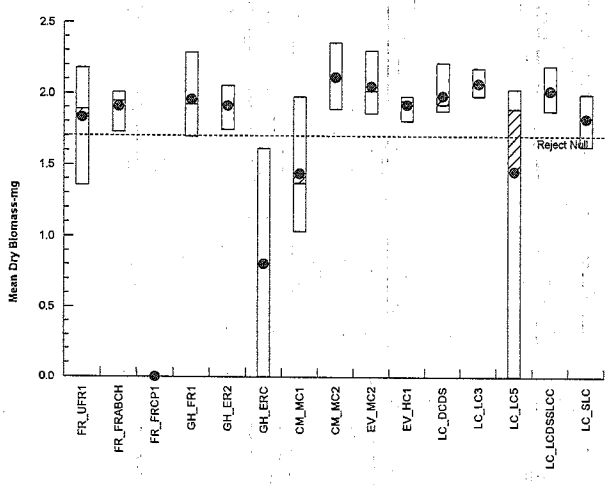
Mean Dry Biomass-mg Summary

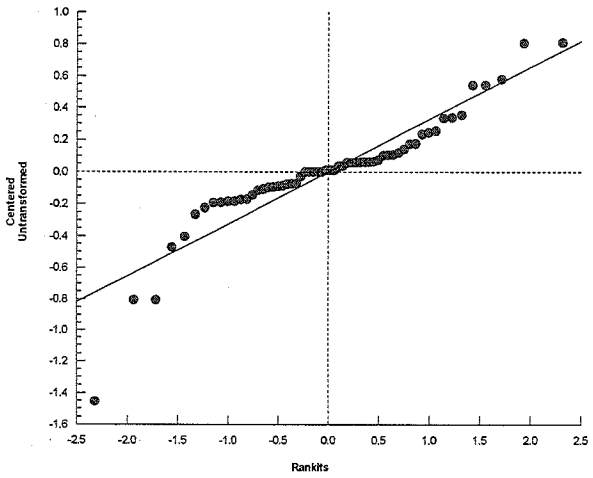
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		4	1.828	1.281	2.376	1.889	1.355	2.181	0.1721	18.82%	0.00%
FR_FRABCH		4	1.908	1.704	2.112	1.949	1.725	2.009	0.064	6.71%	-4.34%
FR_FRCP1		4	0	0	0	0	0	0	0		100.00%
GH_FR1		4	1.958	1.519	2.397	1.925	1.693	2.29	0.138	14.09%	-7.10%
GH_ER2	XC	4	1.913	1.679	2.148	1.928	1.743	2.055	0.07374	7.71%	-4.64%
GH_ERC		4	0.806	-0.6749	2.287	0.805	0	1.614	0.4653	115.47%	55.92%
CM_MC1		4	1.44	0.7987	2.081	1.372	1.035	1.981	0.2015	27.99%	21.25%
CM_MC2		4	2.115	1.798	2.431	2.106	1.889	2.358	0.09941	9.40%	-15.65%
EV_MC2		4	2.05	1.744	2.357	2.019	1.86	2.304	0.0963	9.39%	-12.13%
EV_HC1		4	1.921	1.79	2.052	1.949	1.805	1.982	0.04118	4.29%	-5.07%
LC_DCDS		4	1.985	1.731	2.239	1.922	1.877	2.219	0.07996	8.06%	-8.56%
LC_LC3		4	2.072	1.916	2.228	2.064	1.981	2.179	0.04905	4.73%	-13.33%
LC_LC5		4	1.456	-0.09782	3.009	1.894	0	2.034	0.4881	67.07%	20.40%
LC_LCDSSLCC		4	2.021	1.792	2.25	2.006	1.877	2.196	0.07204	7.13%	-10.54%
LC_SLC		4	1.824	1.583	2.064	1.834	1.629	1.998	0.07548	8.28%	0.26%

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1		1.891	1.355	1.887	2.181
FR_FRABCH		2.009	1.917	1.98	1.725
FR_FRCP1		0	0	0	0
GH_FR1		2.077	1.693	1.773	2.29
GH_ER2	XC	1.839	1.743	2.055	2.017
GH_ERC		1.614	0	1.61	0
CM_MC1		1.477	1.267	1.981	1.035
CM_MC2		2.358	1.889	2.041	2.171
EV_MC2		2.085	1.86	1.953	2.304
EV_HC1		1.978	1.982	1.805	1.919
LC_DCDS		1.889	1.955	1.877	2.219
LC_LC3		1.997	1.981	2.132	2.179
LC_LC5		1.997	1.791	2.034	0
LC_LCDSSLCC		2.078	1.877	1.934	2.196
LC_SLC		1.835	1.629	1.833	1.998

Graphics





CETIS Analytical Report

Test Code/ID: 190359a / 02-2206-5424

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	14-0454-8727	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jun-19 12:07	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	13-2481-0964	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 2.1	Teck Coal	
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 1.8		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.1		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.0		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) ~~2.0~~ 1.0		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 1.8		
LC_LCDSSLCC	14-7074-7315	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2016-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

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Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 14-0454-8727 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jun-19 12:07 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed length-mm	8.32%
		FR_FRABCH passed length-mm	8.32%
		FR_FRCP1 failed length-mm	8.32%
		GH_FR1 passed length-mm	8.32%
		GH_ERC failed length-mm	8.32%
		CM_MC1 passed length-mm	8.32%
		CM_MC2 failed length-mm	8.32%
		EV_MC2 failed length-mm	8.32%
		EV_HC1 failed length-mm	8.32%
		LC_DCDS failed length-mm	8.32%
		LC_LC3 passed length-mm	8.32%
		LC_LC5 failed length-mm	8.32%
		LC_LCDSSLCC failed length-mm	8.32%
		LC_SLC failed length-mm	8.32%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	1.88	2.015	0.705	5	CDF	0.0595	Non-Significant Effect
(GH-ER2)		FR_FRABCH	-1.02	2.353	2.623	3	CDF	0.8087	Non-Significant Effect
		FR_FRCP1*	38.63	2.353	0.681	3	CDF	1.9E-05	Significant Effect
		GH_FR1	1.815	2.132	0.719	4	CDF	0.0718	Non-Significant Effect
		GH_ERC*	3.426	2.353	0.687	3	CDF	0.0208	Significant Effect
		CM_MC1	0.1861	2.015	0.758	5	CDF	0.4299	Non-Significant Effect
		CM_MC2*	2.442	2.015	0.932	5	CDF	0.0292	Significant Effect
		EV_MC2*	4.744	2.132	0.702	4	CDF	0.0045	Significant Effect
		EV_HC1*	3.822	2.132	0.689	4	CDF	0.0094	Significant Effect
		LC_DCDS*	4.557	2.132	0.71	4	CDF	0.0052	Significant Effect
		LC_LC3	2.123	2.353	0.704	3	CDF	0.0619	Non-Significant Effect
		LC_LC5*	3.726	2.132	0.843	4	CDF	0.0102	Significant Effect
		LC_LCDSSLCC*	4.25	2.132	0.686	4	CDF	0.0066	Significant Effect
		LC_SLC*	2.346	2.015	0.93	5	CDF	0.0329	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	430.134	30.7238	14	60.94	<1.0E-37	Significant Effect
Error	21.1752	0.504171	42			
Total	451.309		56			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.124	2.539	2.2E-06	Unequal Variances
Variances	Mod Levene Equality of Variance Test	4.594	2.551	6.5E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8475	0.9434	4.2E-06	Non-Normal Distribution

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 14-0454-8727 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jun-19 12:07 **Analysis:** Parametric-Two Sample **Status Level:** 1

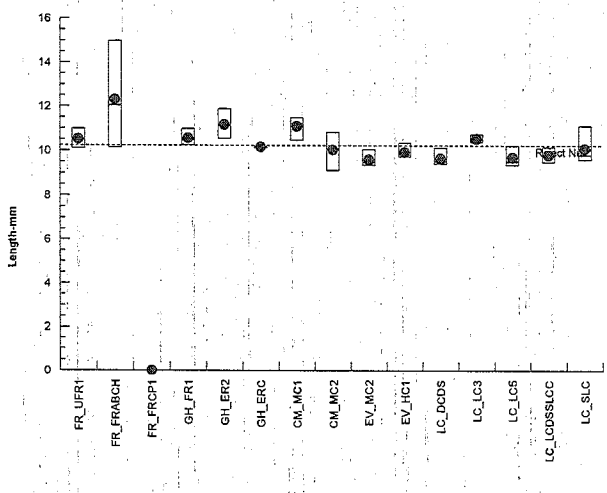
Length-mm Summary

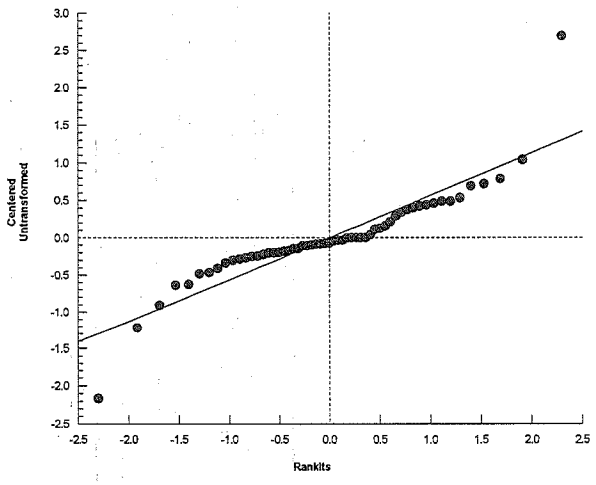
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		4	10.51	9.886	11.14	10.48	10.1	11	0.1969	3.75%	0.00%
FR_FRABCH		4	12.31	8.881	15.73	12.05	10.14	15	1.077	17.50%	-17.07%
FR_FRCP1		4	0	0	0	0	0	0	0		100.00%
GH_FR1		4	10.56	10	11.11	10.48	10.27	11	0.1738	3.29%	-0.43%
GH_ER2	XC	4	11.17	10.25	12.09	11.12	10.54	11.89	0.2892	5.18%	-6.25%
GH_ERC		2	10.17	9.661	10.68	10.17	10.13	10.21	0.04003	0.56%	3.26%
CM_MC1		4	11.1	10.33	11.87	11.22	10.46	11.5	0.2407	4.34%	-5.59%
CM_MC2		4	10.04	8.891	11.19	10.1	9.13	10.83	0.3612	7.19%	4.49%
EV_MC2		4	9.607	9.106	10.11	9.5	9.36	10.07	0.1577	3.28%	8.61%
EV_HC1		4	9.935	9.476	10.39	9.825	9.73	10.36	0.1441	2.90%	5.49%
LC_DCDS		4	9.653	9.127	10.18	9.52	9.43	10.14	0.1651	3.42%	8.18%
LC_LC3		4	10.54	10.29	10.78	10.5	10.39	10.75	0.07621	1.45%	-0.21%
LC_LC5		3	9.697	8.536	10.86	9.5	9.36	10.23	0.2697	4.82%	7.76%
LC_LCDSSLCC		4	9.803	9.353	10.25	9.765	9.5	10.18	0.1412	2.88%	6.75%
LC_SLC		4	10.09	8.943	11.23	9.81	9.6	11.13	0.3595	7.13%	4.04%

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1		10.64	10.1	10.31	11
FR_FRABCH		15	10.14	11.09	13
FR_FRCP1		0	0	0	0
GH_FR1		10.67	10.27	10.29	11
GH_ER2	XC	10.54	10.92	11.33	11.89
GH_ERC		10.21	10.13		
CM_MC1		11.5	10.46	11.44	11
CM_MC2		10.83	9.13	10.33	9.87
EV_MC2		9.5	9.36	9.5	10.07
EV_HC1		9.79	9.86	10.36	9.73
LC_DCDS		9.57	9.47	9.43	10.14
LC_LC3		10.5	10.5	10.75	10.39
LC_LC5		9.5	9.36	10.23	
LC_LCDSSLCC		9.73	10.18	9.5	9.8
LC_SLC		9.6	9.62	11.13	10

Graphics





June 28/19

CETIS Analytical Report

32-d fathead minnow JW

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JW

Nautilus Environmental

Analysis ID:	07-7853-9840	**Endpoint:**	~~7d~~ Survival Rate 32d	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 12:15	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	18-9476-8345	**Test Type:**	Growth-Survival (10d)	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 2.1	Teck Coal	
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 1.8		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.1		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.0		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) ≠ 1.0 JW		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6 JW		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	0.9993	Exact	1.0000	Non-Significant Effect
(CM_MC1)		FR_FRABCH	0.6440	Exact	1.0000	Non-Significant Effect
		FR_FRCP1*	0.0000	Exact	1.0E-12	Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.9970	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.2324	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.9993	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.9345	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.9999	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.9999	Exact	1.0000	Non-Significant Effect

June 27/19

JW ~~Hyalella 14 d~~ Survival and Growth ~~Sediment~~ Test JW Nautilus Environmental

Analysis ID:	07-7853-9840	**Endpoint:**	~~7d~~ Survival Rate 32 d
Analyzed:	27 Jun-19 12:15	**Analysis:**	STP 2xK Contingency Tables
CETIS Version:	CETISv1.9.4		
Status Level:	1		

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		49	11	60	0.8167	0.1833	14.04%
FR_FRABCH		35	25	60	0.5833	0.4167	38.6%
FR_FRCP1		0	60	60	0	1	100.0%
GH_FR1		58	2	60	0.9667	0.03333	-1.75%
GH_ER2		47	13	60	0.7833	0.2167	17.54%
GH_ERC		29	31	60	0.4833	0.5167	49.12%
CM_MC1	XC	34	26	60	0.5667	0.4333	40.35%
CM_MC2		54	6	60	0.9	0.1	5.26%
EV_MC2		56	4	60	0.9333	0.06667	1.75%
EV_HC1		54	6	60	0.9	0.1	5.26%
LC_DCDS		57	3	60	0.95	0.05	0.0%
LC_LC3		49	11	60	0.8167	0.1833	14.04%
LC_LC5		41	19	60	0.6833	0.3167	28.07%
LC_LCDSSLCC		51	9	60	0.85	0.15	10.53%
LC_SLC		51	9	60	0.85	0.15	10.53%

JW **~~7d~~ Survival Rate Detail** 32d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1		0.9333	0.6667	0.8667	0.8000
FR_FRABCH		0.2667	0.9333	0.7333	0.4000
FR_FRCP1		0.0000	0.0000	0.0000	0.0000
GH_FR1		1.0000	1.0000	0.9333	0.9333
GH_ER2		0.8667	0.8667	0.8000	0.6000
GH_ERC		0.9333	0.0000	1.0000	0.0000
CM_MC1	XC	0.5333	0.7333	0.6000	0.4000
CM_MC2		0.8000	1.0000	0.8000	1.0000
EV_MC2		0.9333	0.9333	0.9333	0.9333
EV_HC1		0.9333	0.9333	0.7333	1.0000
LC_DCDS		0.9333	1.0000	0.9333	0.9333
LC_LC3		0.8000	0.8000	0.8000	0.8667
LC_LC5		0.9333	0.9333	0.8667	0.0000
LC_LCDSSLCC		0.7333	0.7333	0.9333	1.0000
LC_SLC		1.0000	0.8667	0.5333	1.0000

JW **~~7d~~ Survival Rate Binomials** 32d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1		14/15	10/15	13/15	12/15
FR_FRABCH		4/15	14/15	11/15	6/15
FR_FRCP1		0/15	0/15	0/15	0/15
GH_FR1		15/15	15/15	14/15	14/15
GH_ER2		13/15	13/15	12/15	9/15
GH_ERC		14/15	0/15	15/15	0/15
CM_MC2		12/15	15/15	12/15	15/15
EV_MC2		14/15	14/15	14/15	14/15
EV_HC1		14/15	14/15	11/15	15/15
LC_DCDS		14/15	15/15	14/15	14/15
LC_LC3		12/15	12/15	12/15	13/15
LC_LC5		14/15	14/15	13/15	0/15
LC_LCDSSLCC		11/15	11/15	14/15	15/15

June 27/19

32 fathead minnow JW

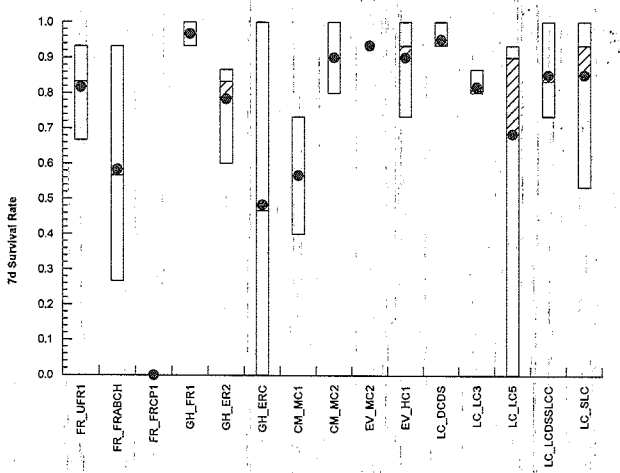
Report Date: 27 Jun-19 12:22 (p 3 of 3)
Test Code/ID: 190359-1 / 19-3065-2902

JW ~~Hyalella 14-d~~ **Survival and Growth** ~~**Sediment**~~ **Test** JW

Nautilus Environmental

Analysis ID:	07-7853-9840	**Endpoint:**	7d Survival Rate 32 d	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 12:15	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



June 27/19

CETIS Analytical Report

Test Code/ID: 190359b / 05-5991-6206

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	20-2463-6771	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	16 Jun-19 22:31	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	10-8669-8641	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C)	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C)		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
CM_MC1		FR_FRABCH	0.1218	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.0594	Exact	0.8311	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 20-2463-6771 **Endpoint:** Hatched Rate **CETIS Version:** CETISv1.9.4
Analyzed: 16 Jun-19 22:31 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
CM_MC1	XC	60	0	60	1	0	0.0%
FR_UFR1		60	0	60	1	0	0.0%
FR_FRABCH		57	3	60	0.95	0.05	5.0%
FR_FRCP1		56	4	60	0.9333	0.06667	6.67%
GH_FR1		60	0	60	1	0	0.0%
GH_ER2		60	0	60	1	0	0.0%
GH_ERC		59	1	60	0.9833	0.01667	1.67%
CM_MC2		60	0	60	1	0	0.0%
EV_MC2		60	0	60	1	0	0.0%
EV_HC1		60	0	60	1	0	0.0%
LC_DCDS		60	0	60	1	0	0.0%
LC_LC3		60	0	60	1	0	0.0%
LC_LC5		60	0	60	1	0	0.0%
LC_LCDSSLCC		60	0	60	1	0	0.0%
LC_SLC		60	0	60	1	0	0.0%

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC1	XC	1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	0.9333	0.8667
FR_FRCP1		0.9333	0.8000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	0.9333
CM_MC2		1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000

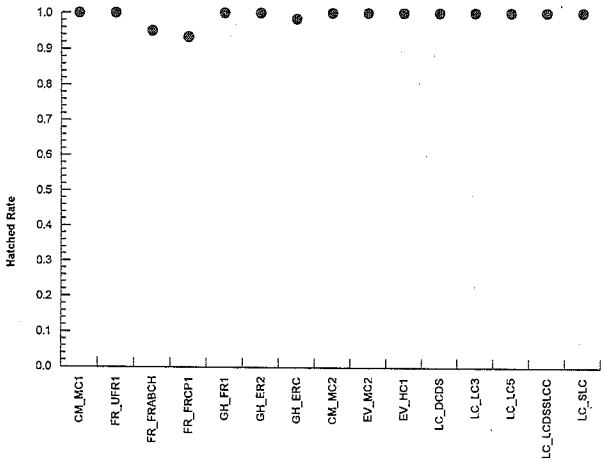
Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC1	XC	15/15	15/15	15/15	15/15
FR_UFR1		15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	14/15	13/15
FR_FRCP1		14/15	12/15	15/15	15/15
GH_FR1		15/15	15/15	15/15	15/15
GH_ER2		15/15	15/15	15/15	15/15
GH_ERC		15/15	15/15	15/15	14/15
CM_MC2		15/15	15/15	15/15	15/15
EV_MC2		15/15	15/15	15/15	15/15
EV_HC1		15/15	15/15	15/15	15/15
LC_DCDS		15/15	15/15	15/15	15/15
LC_LC3		15/15	15/15	15/15	15/15
LC_LC5		15/15	15/15	15/15	15/15
LC_LCDSSLCC		15/15	15/15	15/15	15/15
LC_SLC		15/15	15/15	15/15	15/15

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	20-2463-6771	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	16 Jun-19 22:31	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	09-8458-9224	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 17:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	10-8669-8641	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

JW

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.1	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 1.8		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 3.1		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.0		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.0		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 09-8458-9224 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 26 Jun-19 17:54 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry biomass-mg	35.17%
		FR_FRABCH passed mean dry biomass-mg	35.17%
		FR_FRCP1 failed mean dry biomass-mg	35.17%
		GH_FR1 passed mean dry biomass-mg	35.17%
		GH_ER2 passed mean dry biomass-mg	35.17%
		GH_ERC passed mean dry biomass-mg	35.17%
		CM_MC2 passed mean dry biomass-mg	35.17%
		EV_MC2 passed mean dry biomass-mg	35.17%
		EV_HC1 passed mean dry biomass-mg	35.17%
		LC_DCDS passed mean dry biomass-mg	35.17%
		LC_LC3 passed mean dry biomass-mg	35.17%
		LC_LC5 passed mean dry biomass-mg	35.17%
		LC_LCDSSLCC passed mean dry biomass-m	35.17%
		LC_SLC passed mean dry biomass-mg	35.17%

Unequal Variance t Two-Sample Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control (CM - MC1)	FR_UFR1	-1.466	2.015	0.534	5	CDF	0.8988	Non-Significant Effect
	FR_FRABCH	-2.213	2.353	0.498	3	CDF	0.9431	Non-Significant Effect
	FR_FRCP1*	7.146	2.353	0.474	3	CDF	0.0028	Significant Effect
	GH_FR1	-2.122	2.015	0.492	5	CDF	0.9564	Non-Significant Effect
	GH_ER2	-2.206	2.353	0.505	3	CDF	0.9427	Non-Significant Effect
	GH_ERC	1.25	2.132	1.081	4	CDF	0.1397	Non-Significant Effect
	CM_MC2	-3.003	2.132	0.479	4	CDF	0.9801	Non-Significant Effect
	EV_MC2	-2.733	2.132	0.476	4	CDF	0.9739	Non-Significant Effect
	EV_HC1	-2.34	2.353	0.484	3	CDF	0.9494	Non-Significant Effect
	LC_DCDS	-2.514	2.353	0.510	3	CDF	0.9567	Non-Significant Effect
	LC_LC3	-3.048	2.353	0.488	3	CDF	0.9722	Non-Significant Effect
	LC_LC5	-0.02935	2.353	1.243	3	CDF	0.5108	Non-Significant Effect
	LC_LCDSSLCC	-2.716	2.353	0.504	3	CDF	0.9636	Non-Significant Effect
	LC_SLC	-1.783	2.353	0.506	3	CDF	0.9137	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	18.6704	1.3336	14	8.418	<1.0E-37	Significant Effect
Error	7.12914	0.158425	45			
Total	25.7996		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	8.286	2.506	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	2.73	2.506	0.0054	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8735	0.9459	1.6E-05	Non-Normal Distribution

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 09-8458-9224 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 26 Jun-19 17:54 **Analysis:** Parametric-Two Sample **Status Level:** 1

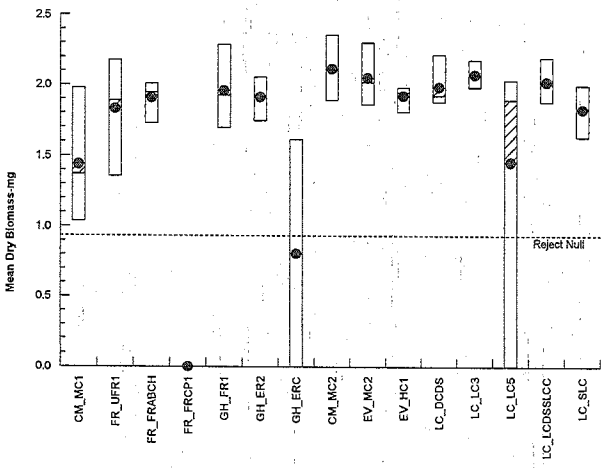
Mean Dry Biomass-mg Summary

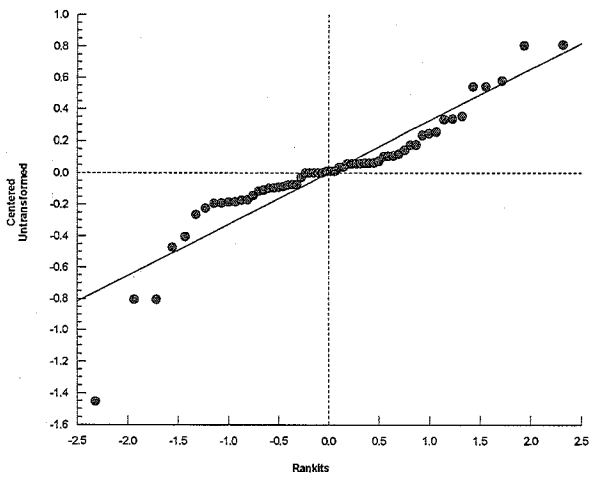
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CM_MC1	XC	4	1.44	0.7987	2.081	1.372	1.035	1.981	0.2015	27.99%	0.00%
FR_UFR1		4	1.828	1.281	2.376	1.889	1.355	2.181	0.1721	18.82%	-26.98%
FR_FRABCH		4	1.908	1.704	2.112	1.949	1.725	2.009	0.064	6.71%	-32.49%
FR_FRCP1		4	0	0	0	0	0	0	0		100.00%
GH_FR1		4	1.958	1.519	2.397	1.925	1.693	2.29	0.138	14.09%	-36.00%
GH_ER2		4	1.913	1.679	2.148	1.928	1.743	2.055	0.07374	7.71%	-32.87%
GH_ERC		4	0.806	-0.6749	2.287	0.805	0	1.614	0.4653	115.47%	44.03%
CM_MC2		4	2.115	1.798	2.431	2.106	1.889	2.358	0.09941	9.40%	-46.85%
EV_MC2		4	2.05	1.744	2.357	2.019	1.86	2.304	0.0963	9.39%	-42.38%
EV_HC1		4	1.921	1.79	2.052	1.949	1.805	1.982	0.04118	4.29%	-33.41%
LC_DCDS		4	1.985	1.731	2.239	1.922	1.877	2.219	0.07996	8.06%	-37.85%
LC_LC3		4	2.072	1.916	2.228	2.064	1.981	2.179	0.04905	4.73%	-43.90%
LC_LC5		4	1.456	-0.09782	3.009	1.894	0	2.034	0.4881	67.07%	-1.08%
LC_LCDSSLCC		4	2.021	1.792	2.25	2.006	1.877	2.196	0.07204	7.13%	-40.36%
LC_SLC		4	1.824	1.583	2.064	1.834	1.629	1.998	0.07548	8.28%	-26.64%

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC1	XC	1.477	1.267	1.981	1.035
FR_UFR1		1.891	1.355	1.887	2.181
FR_FRABCH		2.009	1.917	1.98	1.725
FR_FRCP1		0	0	0	0
GH_FR1		2.077	1.693	1.773	2.29
GH_ER2		1.839	1.743	2.055	2.017
GH_ERC		1.614	0	1.61	0
CM_MC2		2.358	1.889	2.041	2.171
EV_MC2		2.085	1.86	1.953	2.304
EV_HC1		1.978	1.982	1.805	1.919
LC_DCDS		1.889	1.955	1.877	2.219
LC_LC3		1.997	1.981	2.132	2.179
LC_LC5		1.997	1.791	2.034	0
LC_LCDSSLCC		2.078	1.877	1.934	2.196
LC_SLC		1.835	1.629	1.833	1.998

Graphics





Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	12-9041-9967	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jun-19 12:12	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	10-8669-8641	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.1	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 1.8		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 3.1		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.0		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) ~~2.0~~ 1.0 JW		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 12-9041-9967 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jun-19 12:12 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed length-mm	7.85%
		FR_FRABCH passed length-mm	7.85%
		FR_FRCP1 failed length-mm	7.85%
		GH_FR1 passed length-mm	7.85%
		GH_ER2 passed length-mm	7.85%
		GH_ERC failed length-mm	7.85%
		CM_MC2 failed length-mm	7.85%
		EV_MC2 failed length-mm	7.85%
		EV_HC1 failed length-mm	7.85%
		LC_DCDS failed length-mm	7.85%
		LC_LC3 passed length-mm	7.85%
		LC_LC5 failed length-mm	7.85%
		LC_LCDSSLCC failed length-mm	7.85%
		LC_SLC failed length-mm	7.85%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control (CM - MC1)		FR_UFR1	1.889	2.015	0.627	5	CDF	0.0587	Non-Significant Effect
		FR_FRABCH	-1.095	2.353	2.596	3	CDF	0.8231	Non-Significant Effect
		FR_FRCP1*	46.12	2.353	0.566	3	CDF	1.1E-05	Significant Effect
		GH_FR1	1.827	2.015	0.598	5	CDF	0.0636	Non-Significant Effect
		GH_ER2	-0.1861	2.015	0.758	5	CDF	0.5701	Non-Significant Effect
		GH_ERC*	3.812	2.353	0.574	3	CDF	0.0159	Significant Effect
		CM_MC2*	2.442	2.015	0.875	5	CDF	0.0292	Significant Effect
		EV_MC2*	5.187	2.015	0.58	5	CDF	0.0018	Significant Effect
		EV_HC1*	4.153	2.132	0.598	4	CDF	0.0071	Significant Effect
		LC_DCDS*	4.959	2.015	0.588	5	CDF	0.0021	Significant Effect
		LC_LC3	2.238	2.353	0.594	3	CDF	0.0556	Non-Significant Effect
		LC_LC5*	3.882	2.132	0.771	4	CDF	0.0089	Significant Effect
		LC_LCDSSLCC*	4.65	2.132	0.595	4	CDF	0.0048	Significant Effect
		LC_SLC*	2.34	2.015	0.872	5	CDF	0.0332	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	430.134	30.7238	14	60.94	<1.0E-37	Significant Effect
Error	21.1752	0.504171	42			
Total	451.309		56			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.124	2.539	2.2E-06	Unequal Variances
Variances	Mod Levene Equality of Variance Test	4.594	2.551	6.5E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8475	0.9434	4.2E-06	Non-Normal Distribution

Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID: 12-9041-9967 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jun-19 12:12 **Analysis:** Parametric-Two Sample **Status Level:** 1

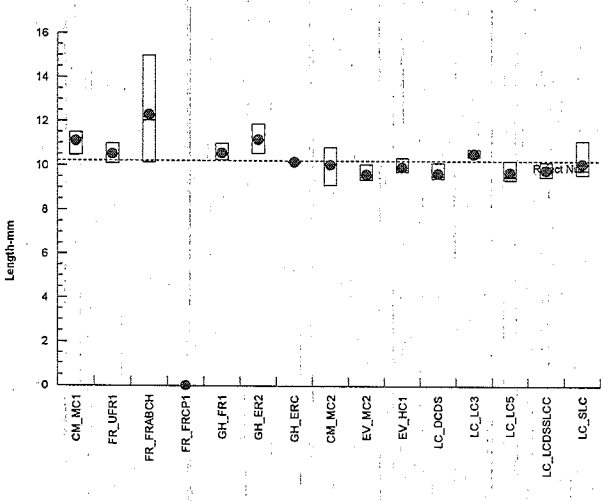
Length-mm Summary

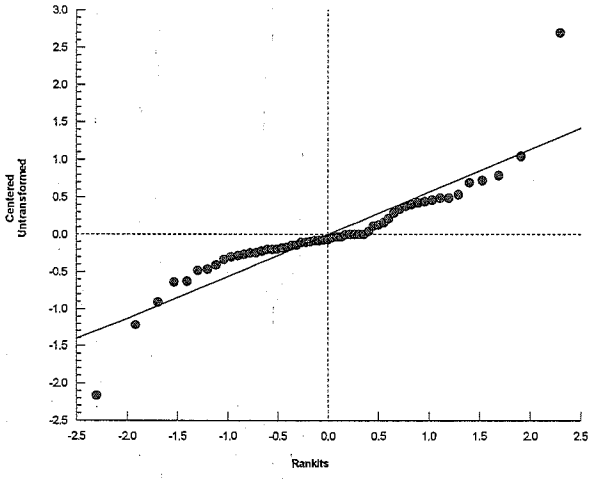
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CM_MC1	XC	4	11.1	10.33	11.87	11.22	10.46	11.5	0.2407	4.34%	0.00%
FR_UFR1		4	10.51	9.886	11.14	10.48	10.1	11	0.1969	3.75%	5.29%
FR_FRABCH		4	12.31	8.881	15.73	12.05	10.14	15	1.077	17.50%	-10.88%
FR_FRCP1		4	0	0	0	0	0	0	0		100.00%
GH_FR1		4	10.56	10	11.11	10.48	10.27	11	0.1738	3.29%	4.89%
GH_ER2		4	11.17	10.25	12.09	11.12	10.54	11.89	0.2892	5.18%	-0.63%
GH_ERC		2	10.17	9.661	10.68	10.17	10.13	10.21	0.04003	0.56%	8.38%
CM_MC2		4	10.04	8.891	11.19	10.1	9.13	10.83	0.3612	7.19%	9.55%
EV_MC2		4	9.607	9.106	10.11	9.5	9.36	10.07	0.1577	3.28%	13.45%
EV_HC1		4	9.935	9.476	10.39	9.825	9.73	10.36	0.1441	2.90%	10.50%
LC_DCDS		4	9.653	9.127	10.18	9.52	9.43	10.14	0.1651	3.42%	13.04%
LC_LC3		4	10.54	10.29	10.78	10.5	10.39	10.75	0.07621	1.45%	5.09%
LC_LC5		3	9.697	8.536	10.86	9.5	9.36	10.23	0.2697	4.82%	12.64%
LC_LCDSSLCC		4	9.803	9.353	10.25	9.765	9.5	10.18	0.1412	2.88%	11.69%
LC_SLC		4	10.09	8.943	11.23	9.81	9.6	11.13	0.3595	7.13%	9.12%

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC1	XC	11.5	10.46	11.44	11
FR_UFR1		10.64	10.1	10.31	11
FR_FRABCH		15	10.14	11.09	13
FR_FRCP1		0	0	0	0
GH_FR1		10.67	10.27	10.29	11
GH_ER2		10.54	10.92	11.33	11.89
GH_ERC		10.21	10.13		
CM_MC2		10.83	9.13	10.33	9.87
EV_MC2		9.5	9.36	9.5	10.07
EV_HC1		9.79	9.86	10.36	9.73
LC_DCDS		9.57	9.47	9.43	10.14
LC_LC3		10.5	10.5	10.75	10.39
LC_LC5		9.5	9.36	10.23	
LC_LCDSSLCC		9.73	10.18	9.5	9.8
LC_SLC		9.6	9.62	11.13	10

Graphics





CETIS Analytical Report

32 fathead minnow JW

Report Date: 27 Jun-19 12:22 (p 1 of 3)
Test Code/ID: 190359-1 / 19-3065-2902

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JW

Nautilus Environmental

Analysis ID:	13-1893-0251	**Endpoint:**	7d Survival Rate 32d	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 12:18	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	18-9476-8345	**Test Type:**	Growth-Survival (10d)	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 2.1	Teck Coal	
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 1.8		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.1		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 4.0		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 2.1		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.0		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 1.6		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control	FR_UFR1	0.4035	Exact	1.0000	Non-Significant Effect
(LC - SLC)	FR_FRABCH*	0.0011	Exact	0.0116	Significant Effect
	FR_FRCP1*	0.0000	Exact	8.2E-24	Significant Effect
	GH_FR1	0.9958	Exact	0.9958	Non-Significant Effect
	GH_ER2	0.2399	Exact	1.0000	Non-Significant Effect
	GH_ERC*	0.0000	Exact	2.3E-04	Significant Effect
	CM_MC1*	0.0006	Exact	0.0068	Significant Effect
	CM_MC2	0.8653	Exact	1.0000	Non-Significant Effect
	EV_MC2	0.9626	Exact	1.0000	Non-Significant Effect
	EV_HC1	0.8653	Exact	1.0000	Non-Significant Effect
	LC_DCDS	0.9853	Exact	1.0000	Non-Significant Effect
	LC_LC3	0.4035	Exact	1.0000	Non-Significant Effect
	LC_LC5	0.0255	Exact	0.2545	Non-Significant Effect
	LC_LCDSSLCC	0.6005	Exact	1.0000	Non-Significant Effect

June 27/19

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JW Nautilus Environmental

Analysis ID:	13-1893-0251	**Endpoint:**	7d Survival Rate 32d
Analyzed:	27 Jun-19 12:18	**Analysis:**	STP 2xK Contingency Tables
CETIS Version:	CETISv1.9.4		
Status Level:	1		

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		49	11	60	0.8167	0.1833	14.04%
FR_FRABCH		35	25	60	0.5833	0.4167	38.6%
FR_FRCP1		0	60	60	0	1	100.0%
GH_FR1		58	2	60	0.9667	0.03333	-1.75%
GH_ER2		47	13	60	0.7833	0.2167	17.54%
GH_ERC		29	31	60	0.4833	0.5167	49.12%
CM_MC1		34	26	60	0.5667	0.4333	40.35%
CM_MC2		54	6	60	0.9	0.1	5.26%
EV_MC2		56	4	60	0.9333	0.06667	1.75%
EV_HC1		54	6	60	0.9	0.1	5.26%
LC_DCDS		57	3	60	0.95	0.05	0.0%
LC_LC3		49	11	60	0.8167	0.1833	14.04%
LC_LC5		41	19	60	0.6833	0.3167	28.07%
LC_LCDSSLCC		51	9	60	0.85	0.15	10.53%
LC_SLC	XC	51	9	60	0.85	0.15	10.53%

JW 7d Survival Rate Detail 32d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1		0.9333	0.6667	0.8667	0.8000
FR_FRABCH		0.2667	0.9333	0.7333	0.4000
FR_FRCP1		0.0000	0.0000	0.0000	0.0000
GH_FR1		1.0000	1.0000	0.9333	0.9333
GH_ER2		0.8667	0.8667	0.8000	0.6000
GH_ERC		0.9333	0.0000	1.0000	0.0000
CM_MC1		0.5333	0.7333	0.6000	0.4000
CM_MC2		0.8000	1.0000	0.8000	1.0000
EV_MC2		0.9333	0.9333	0.9333	0.9333
EV_HC1		0.9333	0.9333	0.7333	1.0000
LC_DCDS		0.9333	1.0000	0.9333	0.9333
LC_LC3		0.8000	0.8000	0.8000	0.8667
LC_LC5		0.9333	0.9333	0.8667	0.0000
LC_LCDSSLCC		0.7333	0.7333	0.9333	1.0000
LC_SLC	XC	1.0000	0.8667	0.5333	1.0000

JW 7d Survival Rate Binomials 32 d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1		14/15	10/15	13/15	12/15
FR_FRABCH		4/15	14/15	11/15	6/15
FR_FRCP1		0/15	0/15	0/15	0/15
GH_FR1		15/15	15/15	14/15	14/15
GH_ER2		13/15	13/15	12/15	9/15
GH_ERC		14/15	0/15	15/15	0/15
CM_MC1		8/15	11/15	9/15	6/15
CM_MC2		12/15	15/15	12/15	15/15
EV_MC2		14/15	14/15	14/15	14/15
EV_HC1		14/15	14/15	11/15	15/15
LC_DCDS		14/15	15/15	14/15	14/15
LC_LC3		12/15	12/15	12/15	13/15
LC_LC5		14/15	14/15	13/15	0/15
LC_LCDSSLCC		11/15	11/15	14/15	15/15
LC_SLC	XC	15/15	13/15	8/15	15/15

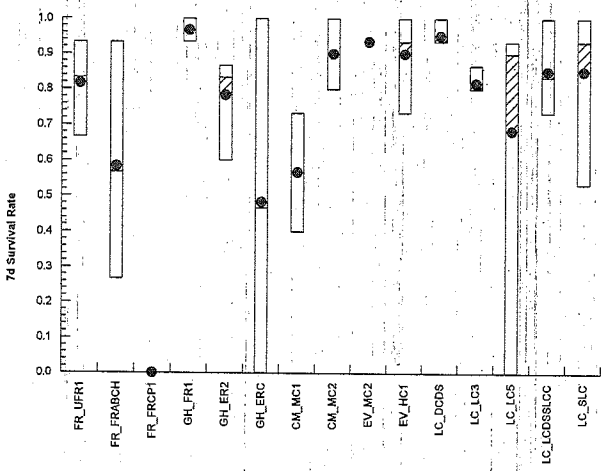
June 27/19

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test

Nautilus Environmental

Analysis ID:	13-1893-0251	**Endpoint:**	7d Survival Rate 32d	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 12:18	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



June 27/19

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	16-2718-5344	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Jun-19 13:03	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	18-8592-5293	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 2.1	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 1.8		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 3.1		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 4.0		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 2.1		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 1.0		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 1.6		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 0.6 JW		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
LC - SLC		FR_FRABCH	0.1218	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.0594	Exact	0.8311	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 16-2718-5344 **Endpoint:** Hatched Rate **CETIS Version:** CETISv1.9.4
Analyzed: 14 Jun-19 13:03 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
LC_SLC	XC	60	0	60	1	0	0.0%
FR_UFR1		60	0	60	1	0	0.0%
FR_FRABCH		57	3	60	0.95	0.05	5.0%
FR_FRCP1		56	4	60	0.9333	0.06667	6.67%
GH_FR1		60	0	60	1	0	0.0%
GH_ER2		60	0	60	1	0	0.0%
GH_ERC		59	1	60	0.9833	0.01667	1.67%
CM_MC1		60	0	60	1	0	0.0%
CM_MC2		60	0	60	1	0	0.0%
EV_MC2		60	0	60	1	0	0.0%
EV_HC1		60	0	60	1	0	0.0%
LC_DCDS		60	0	60	1	0	0.0%
LC_LC3		60	0	60	1	0	0.0%
LC_LC5		60	0	60	1	0	0.0%
LC_LCDSSLCC		60	0	60	1	0	0.0%

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
LC_SLC	XC	1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	0.9333	0.8667
FR_FRCP1		0.9333	0.8000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	0.9333
CM_MC1		1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000

Hatched Rate Binomials

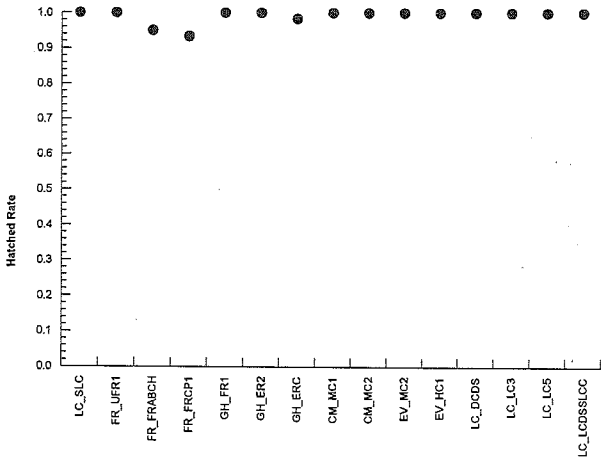
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
LC_SLC	XC	15/15	15/15	15/15	15/15
FR_UFR1		15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	14/15	13/15
FR_FRCP1		14/15	12/15	15/15	15/15
GH_FR1		15/15	15/15	15/15	15/15
GH_ER2		15/15	15/15	15/15	15/15
GH_ERC		15/15	15/15	15/15	14/15
CM_MC1		15/15	15/15	15/15	15/15
CM_MC2		15/15	15/15	15/15	15/15
EV_MC2		15/15	15/15	15/15	15/15
EV_HC1		15/15	15/15	15/15	15/15
LC_DCDS		15/15	15/15	15/15	15/15
LC_LC3		15/15	15/15	15/15	15/15
LC_LC5		15/15	15/15	15/15	15/15
LC_LCDSSLCC		15/15	15/15	15/15	15/15

Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	16-2718-5344	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Jun-19 13:03	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



June 27/19

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	02-0446-3129	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 18:15	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	18-8592-5293	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C)	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C)		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C)		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

June 28/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 02-0446-3129 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 26 Jun-19 18:15 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry biomass-mg	11.53%
		FR_FRABCH passed mean dry biomass-mg	11.53%
		FR_FRCP1 failed mean dry biomass-mg	11.53%
		GH_FR1 passed mean dry biomass-mg	11.53%
		GH_ER2 passed mean dry biomass-mg	11.53%
		GH_ERC passed mean dry biomass-mg	11.53%
		CM_MC1 passed mean dry biomass-mg	11.53%
		CM_MC2 passed mean dry biomass-mg	11.53%
		EV_MC2 passed mean dry biomass-mg	11.53%
		EV_HC1 passed mean dry biomass-mg	11.53%
		LC_DCDS passed mean dry biomass-mg	11.53%
		LC_LC3 passed mean dry biomass-mg	11.53%
		LC_LC5 passed mean dry biomass-mg	11.53%
		LC_LCDSSLCC passed mean dry biomass-m	11.53%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-0.02573	2.132	0.401	4	CDF	0.5096	Non-Significant Effect
(LC - SLC)		FR_FRABCH	-0.8505	2.015	0.199	5	CDF	0.7831	Non-Significant Effect
		FR_FRCP1*	24.16	2.353	0.178	3	CDF	7.8E-05	Significant Effect
		GH_FR1	-0.8563	2.132	0.335	4	CDF	0.7799	Non-Significant Effect
		GH_ER2	-0.8498	2.015	0.213	5	CDF	0.7829	Non-Significant Effect
		GH_ERC	2.159	2.353	1.109	3	CDF	0.0599	Non-Significant Effect
		CM_MC1	1.783	2.353	0.506	3	CDF	0.0863	Non-Significant Effect
		CM_MC2	-2.331	2.015	0.252	5	CDF	0.9665	Non-Significant Effect
		EV_MC2	-1.853	2.015	0.247	5	CDF	0.9384	Non-Significant Effect
		EV_HC1	-1.134	2.132	0.183	4	CDF	0.8399	Non-Significant Effect
		LC_DCDS	-1.467	2.015	0.222	5	CDF	0.8989	Non-Significant Effect
		LC_LC3	-2.761	2.015	0.181	5	CDF	0.9801	Non-Significant Effect
		LC_LC5	0.7454	2.353	1.162	3	CDF	0.2550	Non-Significant Effect
		LC_LCDSSLCC	-1.893	2.015	0.210	5	CDF	0.9415	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	18.6704	1.3336	14	8.418	<1.0E-37	Significant Effect
Error	7.12914	0.158425	45			
Total	25.7996		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	8.286	2.506	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	2.73	2.506	0.0054	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8735	0.9459	1.6E-05	Non-Normal Distribution

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 02-0446-3129 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 26 Jun-19 18:15 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LC_SLC	XC	4	1.824	1.583	2.064	1.834	1.629	1.998	0.07548	8.28%	0.00%
FR_UFR1		4	1.828	1.281	2.376	1.889	1.355	2.181	0.1721	18.82%	-0.27%
FR_FRABCH		4	1.908	1.704	2.112	1.949	1.725	2.009	0.064	6.71%	-4.62%
FR_FRCP1		4	0	0	0	0	0	0	0		100.00%
GH_FR1		4	1.958	1.519	2.397	1.925	1.693	2.29	0.138	14.09%	-7.38%
GH_ER2		4	1.913	1.679	2.148	1.928	1.743	2.055	0.07374	7.71%	-4.92%
GH_ERC		4	0.806	-0.6749	2.287	0.805	0	1.614	0.4653	115.47%	55.80%
CM_MC1		4	1.44	0.7987	2.081	1.372	1.035	1.981	0.2015	27.99%	21.04%
CM_MC2		4	2.115	1.798	2.431	2.106	1.889	2.358	0.09941	9.40%	-15.96%
EV_MC2		4	2.05	1.744	2.357	2.019	1.86	2.304	0.0963	9.39%	-12.43%
EV_HC1		4	1.921	1.79	2.052	1.949	1.805	1.982	0.04118	4.29%	-5.35%
LC_DCDS		4	1.985	1.731	2.239	1.922	1.877	2.219	0.07996	8.06%	-8.85%
LC_LC3		4	2.072	1.916	2.228	2.064	1.981	2.179	0.04905	4.73%	-13.63%
LC_LC5		4	1.456	-0.09782	3.009	1.894	0	2.034	0.4881	67.07%	20.19%
LC_LCDSSLCC		4	2.021	1.792	2.25	2.006	1.877	2.196	0.07204	7.13%	-10.83%

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
LC_SLC	XC	1.835	1.629	1.833	1.998
FR_UFR1		1.891	1.355	1.887	2.181
FR_FRABCH		2.009	1.917	1.98	1.725
FR_FRCP1		0	0	0	0
GH_FR1		2.077	1.693	1.773	2.29
GH_ER2		1.839	1.743	2.055	2.017
GH_ERC		1.614	0	1.61	0
CM_MC1		1.477	1.267	1.981	1.035
CM_MC2		2.358	1.889	2.041	2.171
EV_MC2		2.085	1.86	1.953	2.304
EV_HC1		1.978	1.982	1.805	1.919
LC_DCDS		1.889	1.955	1.877	2.219
LC_LC3		1.997	1.981	2.132	2.179
LC_LC5		1.997	1.791	2.034	0
LC_LCDSSLCC		2.078	1.877	1.934	2.196

CETIS Analytical Report

Test Code/ID: 190359c / 15-9815-0826

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	02-3323-5775	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jun-19 12:16	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	18-8592-5293	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 2.1	Teck Coal	
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 1.8		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C) 1.8		
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C) 3.1		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 3.5		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 2.7		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.5		
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 1.4		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C) 4.0		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C) 2.1		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C) 1.0		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C) 0.8		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C) 1.8		
LC_LC5	05-0168-1718	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C) 1.6		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C) 0.6		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

June 28/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 02-3323-5775 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jun-19 12:16 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed length-mm	9.01%
		FR_FRABCH passed length-mm	9.01%
		FR_FRCP1 failed length-mm	9.01%
		GH_FR1 passed length-mm	9.01%
		GH_ER2 passed length-mm	9.01%
		GH_ERC passed length-mm	9.01%
		CM_MC1 passed length-mm	9.01%
		CM_MC2 passed length-mm	9.01%
		EV_MC2 passed length-mm	9.01%
		EV_HC1 passed length-mm	9.01%
		LC_DCDS passed length-mm	9.01%
		LC_LC3 passed length-mm	9.01%
		LC_LC5 passed length-mm	9.01%
		LC_LCDSSLCC passed length-mm	9.01%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-1.037	2.132	0.874	4	CDF	0.8208	Non-Significant Effect
(LC - SLC)		FR_FRABCH	-1.956	2.353	2.671	3	CDF	0.9273	Non-Significant Effect
		FR_FRCP1*	28.06	2.353	0.846	3	CDF	5.0E-05	Significant Effect
		GH_FR1	-1.177	2.132	0.851	4	CDF	0.8478	Non-Significant Effect
		GH_ER2	-2.346	2.015	0.93	5	CDF	0.9671	Non-Significant Effect
		GH_ERC	-0.2281	2.353	0.851	3	CDF	0.5829	Non-Significant Effect
		CM_MC1	-2.34	2.015	0.872	5	CDF	0.9668	Non-Significant Effect
		CM_MC2	0.09322	2.015	1.027	5	CDF	0.4647	Non-Significant Effect
		EV_MC2	1.223	2.132	0.837	4	CDF	0.1443	Non-Significant Effect
		EV_HC1	0.3938	2.353	0.911	3	CDF	0.3600	Non-Significant Effect
		LC_DCDS	1.1	2.132	0.843	4	CDF	0.1666	Non-Significant Effect
		LC_LC3	-1.218	2.353	0.865	3	CDF	0.8448	Non-Significant Effect
		LC_LC5	0.8697	2.132	0.958	4	CDF	0.2168	Non-Significant Effect
		LC_LCDSSLCC	0.7379	2.353	0.909	3	CDF	0.2570	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	430.134	30.7238	14	60.94	<1.0E-37	Significant Effect
Error	21.1752	0.504171	42			
Total	451.309		56			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	6.124	2.539	2.2E-06	Unequal Variances
Variances	Mod Levene Equality of Variance Test	4.594	2.551	6.5E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8475	0.9434	4.2E-06	Non-Normal Distribution

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	02-3323-5775	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jun-19 12:16	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

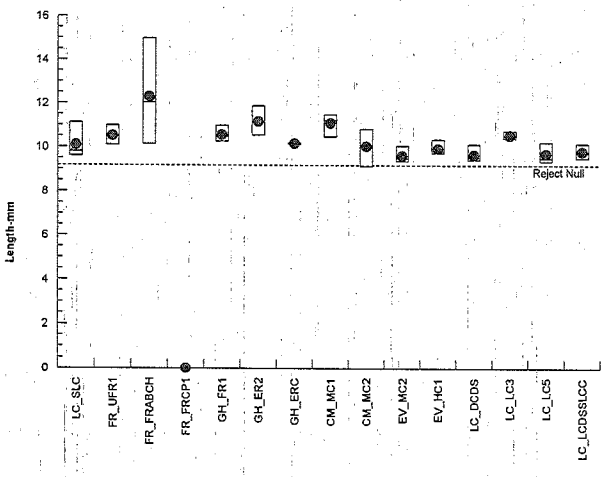
Length-mm Summary

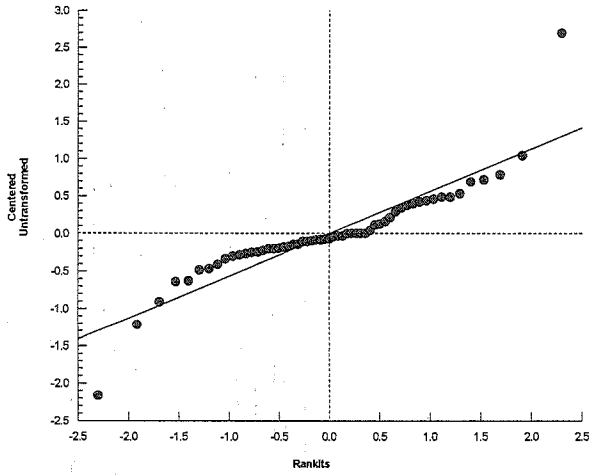
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LC_SLC	XC	4	10.09	8.943	11.23	9.81	9.6	11.13	0.3595	7.13%	0.00%
FR_UFR1		4	10.51	9.886	11.14	10.48	10.1	11	0.1969	3.75%	-4.21%
FR_FRABCH		4	12.31	8.881	15.73	12.05	10.14	15	1.077	17.50%	-22.01%
FR_FRCP1		4	0	0	0	0	0	0	0		100.00%
GH_FR1		4	10.56	10	11.11	10.48	10.27	11	0.1738	3.29%	-4.66%
GH_ER2		4	11.17	10.25	12.09	11.12	10.54	11.89	0.2892	5.18%	-10.73%
GH_ERC		2	10.17	9.661	10.68	10.17	10.13	10.21	0.04003	0.56%	-0.82%
CM_MC1		4	11.1	10.33	11.87	11.22	10.46	11.5	0.2407	4.34%	-10.04%
CM_MC2		4	10.04	8.891	11.19	10.1	9.13	10.83	0.3612	7.19%	0.47%
EV_MC2		4	9.607	9.106	10.11	9.5	9.36	10.07	0.1577	3.28%	4.76%
EV_HC1		4	9.935	9.476	10.39	9.825	9.73	10.36	0.1441	2.90%	1.51%
LC_DCDS		4	9.653	9.127	10.18	9.52	9.43	10.14	0.1651	3.42%	4.31%
LC_LC3		4	10.54	10.29	10.78	10.5	10.39	10.75	0.07621	1.45%	-4.44%
LC_LC5		3	9.697	8.536	10.86	9.5	9.36	10.23	0.2697	4.82%	3.87%
LC_LCDSSLCC		4	9.803	9.353	10.25	9.765	9.5	10.18	0.1412	2.88%	2.83%

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
LC_SLC	XC	9.6	9.62	11.13	10
FR_UFR1		10.64	10.1	10.31	11
FR_FRABCH		15	10.14	11.09	13
FR_FRCP1		0	0	0	0
GH_FR1		10.67	10.27	10.29	11
GH_ER2		10.54	10.92	11.33	11.89
GH_ERC		10.21	10.13		
CM_MC1		11.5	10.46	11.44	11
CM_MC2		10.83	9.13	10.33	9.87
EV_MC2		9.5	9.36	9.5	10.07
EV_HC1		9.79	9.86	10.36	9.73
LC_DCDS		9.57	9.47	9.43	10.14
LC_LC3		10.5	10.5	10.75	10.39
LC_LC5		9.5	9.36	10.23	
LC_LCDSSLCC		9.73	10.18	9.5	9.8

Graphics





Jun-28/19

Pans labelled + put in oven 2019/03/25 -CB

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Controls + 20ug/L.

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Organism Information

Source: Aquatox Batch: 20190301FM-ELS Egg Stage: 13 somites Organisms Received in Good Condition: Yes or No

Test Log

Date	Day	Time	Technicians	Chem Cart Used	Fed AM	Fed PM	Sample Pre-Aeration Time	Bench Sheet Review First
2019/03/01 LF ~~2019/02/28~~	0	1500	CB/ST/CQ	2	—	—	60 mins	
2019/03/02	1	1100	ML/LF	2	—	—	60 90 min	MW
2019/03/03	2	1030	CB/SS	2	—	—	60 mins	ST
2019/03/04	3	1100	CB	2	—	—	60 mins	ST
2019/03/05	4	1100	CB	2	—	✓	60 mins	MW
2019/03/06	5	1020	CB	2	✓	✓	60 mins	ED
2019/03/07	6	0940	CB	2	✓	✓	60 mins	ST
2019/03/08	7	1050	ST	2	✓	✓	60 mins	LF
2019/03/09	8	1000	KK	2	✓	✓	60 mins	ML
2019/03/10	9	0945	SS	2	✓	✓	60 mins	ED
2019/03/11	10	0930	SS	2/3	✓	✓	60 mins.	LF
2019/03/12	11	1010	KK	2	✓	✓	60 mins	ST
2019/03/13	12	1040	ST	2	✓	—	60 mins	KK
2019/03/14	13	1055	CB	2	✓	✓	60 mins	SS
2019/03/14	14	1000	CB	2	✓	✓	60 mins	ST
2019/03/16	15	1145	KK	2	✓	✓	60 mins	MW
2019/03/17	16	1005	CB	2	✓	✓	60 mins	SS
2019/03/18	17	1000	CB	2	✓	✓	60 mins	LF
2019/03/19	18	0930	CB	2	✓	✓	60 mins	MW
2019/03/20	19	0945	CB	2	✓	✓	60 mins	ED
2019/03/21	20	1030	CB	2	✓	✓	60 mins	ML
2019/03/22	21	1100	LF	2	✓	✓	60 min	ML
2019/03/23	22	1050	ML/KK	2	✓	✓	60 min	ST
2019/03/24	23	1000	CB	2	✓	✓	60 mins	SS
2019/03/25	24	1000	CB	2	✓	✓	60 mins	ED
2019/03/26	25	0950	CB	2	✓	✓	60 mins	ST
2019/03/27	26	1000	CB	2	✓	✓	60 mins	LF
2019/03/28	27	1020	CB	2	✓	✓	60 mins	KK
2019/03/29	28	1045	LF	2	✓	✓	60 min	ST
2019/03/30	29	1145	KK	2	✓	✓	60 min.	ML
2019/03/31	30	1155	LF	2	✓	✓	60 min	ST
2019/04/01	31	1045	ML	2	✓	✓	60 min	ST
2019/04/02	32	0830	CB	2	—	—	—	LF

Reviewed By: ML Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

0820-20 0816-20

replicate	CTL Day 1 Alive	CTL Day 1 Dead	CTL 10 Day 1 Alive	CTL 10 Day 1 Dead	CTL 20 Day 1 Alive	CTL 20 Day 1 Dead	0814-20 Day 1 Alive	0814-20 Day 1 Dead	0815-20 Day 1 Alive	0815-20 Day 1 Dead	0816-20 Day 1 Alive	0816-20 Day 1 Dead	0820-20 Day 1 Alive	0820-20 Day 1 Dead
a	14	1	15	0	15	0	14	1	15	0	15	0	14	1
b	15	0	15	0	15	0	15	0	15	0	15	0	15	0
c	15	0	15	0	15	0	15	0	15	0	15	0	15	0
d	15	0	15	0	15	0	29	1	28	2	29	1	15	0
e	30	0	30	0	30	0	30	0	29	1	30	0	30	0
f	30	0	30	0	30	0							29	1

Comments/Observations:
+PP present in all jars for 0815-20

Number of Alive Embryos and Hatched Organisms

replicate	CTL Day 2 Alive	CTL Day 2 Dead	CTL Day 2 Cull to 15	CTL 10 Day 2 Alive	CTL 10 Day 2 Dead	CTL 10 Day 2 Cull to 15	CTL 20 Day 2 Alive	CTL 20 Day 2 Dead	CTL 20 Day 2 Cull to 15	0814-20 Day 2 Alive	0814-20 Day 2 Dead	0814-20 Day 2 Cull to 15
a	15	0	15	15	0	15	15	0	15	12	2	15
b	15	0	15	14	1	15	15	0	15	15	0	15
c	15	0	15	15	0	15	15	0	15	15	0	15
d	15	0	15	15	0	15	15	0	15	15	0	15
e	30	0		30	0		30	0		28	1	
f	30	0		30	0		30	0		30	0	

replicate	0815-20 Day 2 Alive	0815-20 Day 2 Dead	0815-20 Day 2 Cull to 15	0816-20 Day 2 Alive	0816-20 Day 2 Dead	0816-20 Day 2 Cull to 15	0820-20 Day 2 Alive	0820-20 Day 2 Dead	0820-20 Day 2 Cull to 15
a	15	0	15	14	0	15	15	0	15
b	15	0	15	15	0	15	14	1	15
c	15	0	15	15	0	15	15	0	15
d	15	0	15	15	0	15	15	0	15
e	27	1		30	0		28 29	1	
f	29	0		29	0		29	1	

NL LS

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Comments/Observations:

Reviewed By: NL Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

CTL — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	12	0	3	0
b	11	0	4	0
c	12	0	3	0
d	8	0	7	0

CTL 10 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	14	0	1	0
b	12	0	3	0
c	7	0	8	0
d	9	0	6	0

CTL 20 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	13	0	2	0
b	10	0	5	0
c	7 (6 DS)	0	8	0
d	13	0	2	0

0814-20 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	12	0	3	0
b	8	0	7	0
c	7	0	8	0
d	8	0	7	0

0815-20 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	12	0	3	0
b	6	3	4	12 (8 DS)
c	8	1	5	1
d	8	1	6	0

0816-20 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	12	0	3	0
b	12	0	3	0
c	7	0	8	0
d	8	0	7	0

0820-20 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	14	0	1	0
b	8	0	7	0
c	14	0	1	0
d	10	0	5	0

[redacted]

CTL — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

CTL 10 — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	4	0	11	0
b	4	0	11	0
c	3	0	12	0
d	5	0	10	0

CTL 20 — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	1	13	1
d	0	1	14	0

0814-20 — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	1	0	13	1
b	0	0	15	0
c	0	0	15	0
d	2	0	13	0

0815-20 — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	1	0	8	6
b	1	0	6	3
c	1	0	7 (9 DS)	9 3
d	2	0	6 (8 DS) 12	0

0816-20 — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	2	0	13	0
c	0	0	15	0
d	3	0	12	0

0820-20 — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	1	0	14	0
c	3	0	12	0
d	2	0	13	0

Comments/Observations

Reviewed By: [redacted] Date Reviewed: 2019/10/11

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

CTL

Day 5	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

CTL 10

Day 5	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	1	0	14	0

CTL 20

Day 5	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	12	1
d	0	0	14	0

0814-20

Day 5	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0815-20

Day 5	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	8	1
b	0	0	6	1
c	0	0	5	5
d	0	0	9	5

0816-20

Day 5	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

0820-20

Day 5	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

CTL

Day 6	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

CTL 10

Day 6	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

CTL 20

Day 6	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	12	0
d	0	0	14	0

0814-20

Day 6	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14	0
b	0	0	15	0
c	0	0	14	1
d	0	0	15	0

0815-20

Day 6	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	3	5
b	0	0	3	3
c	0	0	4	1
d	0	0	6	3

0816-20

Day 6	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15 ~~14~~	0 ~~1~~ NL
d	0	0	~~15~~ 14	~~0~~ 1 NL

0820-20

Day 6	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15(2)	0
d	0	0	14	1

Comments/Observations

Reviewed By: NL Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Number of Alive Embryos and Hatched Organisms

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 7	Day 7	Day 7	Day 7	Day 7	Day 7	Day 7
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	15(1)	15(1)	15	14(2)	2(1)	15	14
b	15	15	15(1)	15(1)	1	15	15(1)
c	14 ~~13~~ 14	15	11	14	3	15	14(1)
d	15	15	14	15(1)	~~3~~ 4 ST	14(4)	14

Comments/Observations:

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 8	Day 8	Day 8	Day 8	Day 8	Day 8	Day 8
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14	14	15	12(1)	1	15	14
b	15	15	15(1)	15(2)	1	15	~~13~~ 14 15(1)
c	14	15	11	14	3	15	13
d	15	15	14	15(1)	4(2)	14(4)	14

Comments/Observations:

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 9	Day 9	Day 9	Day 9	Day 9	Day 9	Day 9
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14(1)	14	15	9(1)*	1	15	14(1)
b	15	15	15(1)	15(2)	1	15(1)	14(~~1~~) SS
c	14	15	11	13	3	15(1)	13
d	15	15	14	15	4(2)	14(3)	14(1)

Comments/Observations: * microbial death

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 10	Day 10	Day 10	Day 10	Day 10	Day 10	Day 10
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	14(1)	14	15	3(1)*	1	15	14(1)
b	15	15	15(1)	15(2)	1	15(1)	14
c	14	15	10	13(2)	3	15(1)	13
d	15	15	14	15	4(2)	14(2)	14(1)

Comments/Observations: *microbial death

Reviewed By: [signature] Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Number of Alive Embryos and Hatched Organisms

replicate	CTL Day 11 Alive Hatched	CTL 10 Day 11 Alive Hatched	CTL 20 Day 11 Alive Hatched	0814-20 Day 11 Alive Hatched	0815-20 Day 11 Alive Hatched	0816-20 Day 11 Alive Hatched	0820-20 Day 11 Alive Hatched
a	14	14	15	0*	1	15	13
b	15	15	15(1)	15(2)	1	15(1)	14
c	14	15	10	13(2)	3	15	13
d	15	15	14	15	4(1)	14(2)	14(1)

Comments/Observations: * Microbial Death

replicate	CTL Day 12 Alive Hatched	CTL 10 Day 12 Alive Hatched	CTL 20 Day 12 Alive Hatched	0814-20 Day 12 Alive Hatched	0815-20 Day 12 Alive Hatched	0816-20 Day 12 Alive Hatched	0820-20 Day 12 Alive Hatched
a	14(1)	14	15	0	1	15	13
b	15	15	15(1)	15(1)	1	15(1)	14
c	14	15	10	13(2)	3	15	13
d	15	15	14	14	4(1)	14(2)	13

Comments/Observations:

replicate	CTL Day 13 Alive Hatched	CTL 10 Day 13 Alive Hatched	CTL 20 Day 13 Alive Hatched	0814-20 Day 13 Alive Hatched	0815-20 Day 13 Alive Hatched	0816-20 Day 13 Alive Hatched	0820-20 Day 13 Alive Hatched
a	14(1)	14	15	0	1	15	13
b	15	15	14	15(1)	1	15(1)	14
c	14	15	10	13(2)*	3	15	13
d	15	15	14	14	4	14(2)	12

Comments/Observations: * Microbial growth

replicate	CTL Day 14 Alive Hatched	CTL 10 Day 14 Alive Hatched	CTL 20 Day 14 Alive Hatched	0814-20 Day 14 Alive Hatched	0815-20 Day 14 Alive Hatched	0816-20 Day 14 Alive Hatched	0820-20 Day 14 Alive Hatched
a	13	14	15	0	1	15	13
b	15	15	14	15(1)	1	14	14
c	14	15	10	11*	3	15	13
d	15	15	14	14	4	14(1)	12

Comments/Observations: * microbial death

Reviewed By: ML Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Number of Alive Embryos and Hatched Organisms

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 15	Day 15	Day 15	Day 15	Day 15	Day 15	Day 15
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	14	15	0	1	15	13
b	15	15	14	15(1)	1	14(1)	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	13	12

Comments/Observations:

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 16	Day 16	Day 16	Day 16	Day 16	Day 16	Day 16
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	14	15	0	1	15	13
b	15	15	14	14	1	13	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	13	12

Comments/Observations:

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 17	Day 17	Day 17	Day 17	Day 17	Day 17	Day 17
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	14	15	0	1	15	13
b	15	15	14	14	1	13	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	12	12

Comments/Observations:

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 18	Day 18	Day 18	Day 18	Day 18	Day 18	Day 18
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	14	15	0	1	15	13
b	15	15	14	14	1	13	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	12	12

Comments/Observations:

Reviewed By: [signature] Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Number of Alive Embryos and Hatched Organisms

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 19	Day 19	Day 19	Day 19	Day 19	Day 19	Day 19
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	14	15	0	1	15	13
b	15	15(1)	14	14	1	13	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	12	12

Comments/Observations:

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 20	Day 20	Day 20	Day 20	Day 20	Day 20	Day 20
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	14	15	0	1	15	13
b	15	15	14	14	1	13	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	12	12

Comments/Observations:

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 21	Day 21	Day 21	Day 21	Day 21	Day 21	Day 21
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13	14	15	0	1	15	13
b	15	15	14	14	1	13	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	12	12

Comments/Observations:

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 22	Day 22	Day 22	Day 22	Day 22	Day 22	Day 22
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	13(1)	14	15	0	1	15	13
b	15	15	14	14	1	13	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	11	12

Comments/Observations:

Reviewed By: ML Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Number of Alive Embryos and Hatched Organisms

replicate	CTL Day 23 Alive Hatched	CTL 10 Day 23 Alive Hatched	CTL 20 Day 23 Alive Hatched	0814-20 Day 23 Alive Hatched	0815-20 Day 23 Alive Hatched	0816-20 Day 23 Alive Hatched	0820-20 Day 23 Alive Hatched
a	13(1)	14	15	0	1	15	13
b	15	15	14	14	1	13	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	11	12

Comments/Observations:

replicate	CTL Day 24 Alive Hatched	CTL 10 Day 24 Alive Hatched	CTL 20 Day 24 Alive Hatched	0814-20 Day 24 Alive Hatched	0815-20 Day 24 Alive Hatched	0816-20 Day 24 Alive Hatched	0820-20 Day 24 Alive Hatched
a	13(1)	14	15	0	1	15	12
b	15	15	14	14	1	13	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	11	12

Comments/Observations:

replicate	CTL Day 25 Alive Hatched	CTL 10 Day 25 Alive Hatched	CTL 20 Day 25 Alive Hatched	0814-20 Day 25 Alive Hatched	0815-20 Day 25 Alive Hatched	0816-20 Day 25 Alive Hatched	0820-20 Day 25 Alive Hatched
a	12	14	14	0	1	15	12
b	15	15	14	14	1	13	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	11	12

Comments/Observations:

replicate	CTL Day 26 Alive Hatched	CTL 10 Day 26 Alive Hatched	CTL 20 Day 26 Alive Hatched	0814-20 Day 26 Alive Hatched	0815-20 Day 26 Alive Hatched	0816-20 Day 26 Alive Hatched	0820-20 Day 26 Alive Hatched
a	12	14	14	0	1	15	12
b	15	15	14	14	1	13	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	11	12

Comments/Observations:

Reviewed By: ML Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Number of Alive Embryos and Hatched Organisms

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 27	Day 27	Day 27	Day 27	Day 27	Day 27	Day 27
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	12	14	14	0 (B)	1	15	12
b	15	15	14	14	1	13	14
c	14	15	10	11	3	15	13
d	15	15	14	14	4	11	12

Comments/Observations:

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 28	Day 28	Day 28	Day 28	Day 28	Day 28	Day 28
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	12	14	14	0	1	15(1)	12
b	15	14	14	14(1)	1	13	14
c	14	15	10	11	3	15	13(1)
d	15	15	14	14	4	11	12

Comments/Observations:

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 29	Day 29	Day 29	Day 29	Day 29	Day 29	Day 29
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	12	14	14	0	1	15(1)	12
b	15	14	14	14(1)	1	13	14
c	14	15	10	11	3	15	12
d	15	15(1)	14	14	4(1)	11	12

Comments/Observations:

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 30	Day 30	Day 30	Day 30	Day 30	Day 30	Day 30
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	12	14	14	0	1	15(1)	12
b	15	14	14	14(1)	1	13	14
c	14	15	9	11	3	15	12
d	15	15	14	14	4(1)	11	12

Comments/Observations:

Reviewed By: [signature] Date Reviewed: 2019/01/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Number of Alive Embryos and Hatched Organisms

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 31	Day 31	Day 31	Day 31	Day 31	Day 31	Day 31
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	12	14	14	0	1	15 (1)	12
b	15	13	14	14	1	13	14
c	14	15	9	11	3	14	12
d	15	15	14	14	4	11	12

Comments/Observations:

	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
	Day 32	Day 32	Day 32	Day 32	Day 32	Day 32	Day 32
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	12	14	13	0	1	15	12
b	15	13	14	14	1	13	14
c	14	15	9	11	3	14	12
d	15	15	14	14	4	11	11

Comments/Observations:

Reviewed By: [signature] Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method: FMD 32 Day ELS Client: TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

New Solutions

Conc. (%) / Day	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
pH (units)							
0	8.1	8.2	8.3	8.3	8.2	8.4	8.3
1	8.2	8.2	8.2	8.2	8.1	8.4	8.2
2	8.1	8.3	8.3	8.3	8.1	8.2	8.3
3	8.0	8.2	8.3	8.2	7.9	8.3	8.3
4	8.0	8.3	8.3	8.3	8.1	8.3	8.3
5	8.0	8.3	8.3	8.2	8.0	8.3	8.2
6	8.1	8.2	8.3	8.2	8.1	8.3	8.2
7	7.8	8.2	8.2	8.2	8.0	8.3	8.2
8	7.8	7.9	8.2	8.0	7.9	8.3	8.3
Conductance (µS/cm)							
0	398	425	416	1143	3390	1001	1023
1	404	428	431	1189	3240	1010	1038
2	382	438	438	1118	3280	1056	1051
3	353	430	442	1140	3420	989	1045
4	360	430	440	1131	3370	977	1034
5	384	416	460	1178	3340	985	1023
6	365	435	474	1140	3350	973	1043
7	373	454	436	1082	3260	984	1051
8	380	425	451	1063	3240	979	1001
Dissolved Oxygen (mg/L) (40-100% saturation)							
0	7.3	7.3	7.3	7.3	7.3	7.3	7.3
1	7.3	7.3	7.3	7.3	7.3	7.3	7.3
2	7.3	7.3	7.3	7.3	7.3	7.3	7.3
3	7.2	7.3	7.3	7.3	7.3	7.3	7.3
4	7.3	7.3	7.3	7.3	7.3	7.3	7.3
5	7.3	7.3	7.3	7.2	7.3	7.3	7.3
6	7.3	7.3	7.3	7.3	7.3	7.3	7.3
7	7.1	7.2	7.1	7.2	7.1	7.1	7.1
8	7.3	7.3	7.3	7.3	7.3	7.2	7.2
Temperature (°C)							
0	24	24	24	24	24	24	24
1	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24
4	24	24	24	24	24	24	24
5	24	24	24	25	24	24	25
6	24	24	24	24	24	24	24
7	24	24	24	25	26	26	26
8	24	24	24	24	24	24	24

Old Solutions

Day	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
pH (units)							
0							
1	8.1	8.3	8.4	8.2	8.0	8.4	8.3
2	8.2	8.3	8.3	8.1	7.9	8.3	8.2
3	8.2	8.3	8.3	8.0	7.7	8.1	8.0
4	7.9	8.3	8.3	7.9	7.7	8.2	8.0
5	7.9	8.0	8.0	7.9	7.7	8.1	8.0
6	7.7	8.0	8.0	7.9	7.8	8.1	8.0
7	8.1	8.2	8.2	8.1	7.9	7.9	8.0
8	7.9	7.9	8.0	8.0	7.7	8.1	8.0
Conductance (µS/cm)							
0							
1	374	426	430	1134	3280	1119	1114
2	363	438	449	1162	3410	1301	1129
3	353	431	438	1072	3290	1085	1057
4	350	419	433	1083	3310	1138	1085
5	351	422	453	1055	3230	1138	1058
6	339	417	437	1055	3120	1071	1026
7	344	434	465	1067	3150	1145	1062
8	361	420	460	1060	3270	1140	1069
Dissolved Oxygen (mg/L) (40-100% saturation)							
0							
1	7.0	7.0	7.0	7.0	6.9	6.9	6.9
2	7.2	7.1	7.1	7.0	7.0	7.1	7.1
3	7.2	7.3	7.3	7.3	7.3	7.3	7.3
4	7.3	7.3	7.3	7.3	7.2	7.2	7.1
5	7.1	7.1	7.1	7.1	7.1	7.1	7.1
6	7.0	7.0	6.9	6.9	6.9	6.9	6.9
7	7.2	7.2	7.2	7.1	7.1	7.1	7.1
8	6.9	6.8	6.8	6.5	6.6	6.4	6.4
Temperature (°C)							
0							
1	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24
4	24	24	24	24	24	24	24
5	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24
7	24	24	24	24	24	24	24
8	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: _____ Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

New Solutions

Conc. (%) / Day	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
pH (units)							
9	7.9	8.1	8.2	8.2	8.1	8.2	8.2
10	7.9	8.1	8.2	8.1	8.1	8.4	8.2
11	8.0	8.0	8.1	8.0	8.0	8.3	8.2
12	8.0	8.3	8.2	8.1	8.1	8.3	8.2
13	8.2	8.2	8.2	8.2	8.1	8.3	8.2
14	8.2	8.2	8.2	8.2	8.1	8.3	8.3
15	8.1	8.1	8.1	8.2	8.0	8.3	8.2
16	8.2	8.2	8.2	8.2	8.1	8.2	8.2
17	8.2	8.2	8.2	8.2	8.2	8.3	8.2
Conductance (µS/cm)							
9	318	418	441	1048	3290	960	1153
10	326	401	411	1106	2950	887	890
11	330	410	421	1105	3260	969	996
12	372	402	386	1023	2820	872	932
13	327	366	362	1016	2880	855	995
14	319	350	350	1000	2810	855	988
15	325	347	354	1105	2890	895	969
16	369	347	348	1014	2860	857	1002
17	347	338	350	1002	2800	858	995
Dissolved Oxygen (mg/L) (40-100% saturation)							
9	7.3	7.3	7.3	7.3	7.3	7.3	7.3
10	7.3	7.2	7.3	7.3	7.3	7.3	7.3
11	7.3	7.3	7.3	7.3	7.3	7.3	7.3
12	7.3	7.3	7.3	7.3	7.3	7.2	7.2
13	7.3	7.3	7.3	7.3	7.3	7.3	7.3
14	7.3	7.3	7.3	7.3	7.3	7.3	7.3
15	7.3	7.3	7.3	7.3	7.3	7.3	7.3
16	7.3	7.3	7.3	7.3	7.3	7.3	7.3
17	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Temperature (°C)							
9	24	24	24	24	24	24	24
10	24	24	24	24	24	24	24
11	24	24	24	24	24	24	24
12	24	24	24	24	24	25	25
13	24	24	24	24	24	24	24
14	24	24	24	24	24	24	24
15	24	24	24	24	24	24	24
16	24	24	24	24	24	24	24
17	24	24	24	24	24	24	24

Old Solutions

CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
pH (units)						
8.2	8.2	8.2	8.0	7.8	8.1	8.1
8.0	8.0	8.0	7.9	7.7	8.0	7.9
7.7	7.7	7.8	7.8	7.7	7.9	7.9
7.8	7.9	7.9	7.8	7.6	7.1	8.0
8.0	8.0	8.1	8.0	7.7	8.1	8.0
8.1	8.0	8.0	7.9	7.7	8.2	8.0
8.1	8.0	8.0	8.0	7.8	8.1	8.0
8.1	7.9	7.9	7.9	7.7	8.2	8.0
8.1	8.08.0		7.9	7.78	2	8.1
Conductance (µS/cm)						
369	451	452	1055	3170	1130	1059
359	424	445	1065	3030	1137	1075
363	422	442	1075	3140	1121	1054
307	382	377	950	2850	853	892
340	402	398	965	2850	1019	959
354	388	376	950	2770	925	1006
347	361	379	983	2840	1015	969
362	420	429	941	2750	936	1012
349	354	377	931	2800	900	1027
Dissolved Oxygen (mg/L) (40-100% saturation)						
7.0	7.0	7.0	7.1	7.0	7.0	6.9
7.1	7.0	7.0	6.9	6.9	7.0	6.9
6.7	6.4	6.2	6.4	6.4	6.3	6.2
6.8	6.7	6.7	6.4	6.5	6.7	6.8
7.2	7.1	6.9	6.9	6.8	6.7	6.6
6.9	6.7	6.6	6.6	6.4	6.4	6.4
6.6	6.4	6.4	6.5	6.5	6.4	6.4
7.0	6.9	6.7	6.6	6.8	7.0	6.9
7.1	7.0	6.8	6.8	6.9	6.8	6.8
Temperature (°C)						
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: NL Date Reviewed: 2019/04/11/16

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method: FMD 32 Day ELS Client: TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

New Solutions

Conc. (%)	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
Day							
pH (units)							
18	8.1	8.1	8.1	8.1	8.1	8.2	8.2
19	8.1	8.1	8.1	8.1	8.0	8.1	8.2
20	8.2	8.2	8.2	8.2	8.3	8.3	8.2
21	8.1	8.1	8.2	8.2	8.2	8.2	8.2
22	8.0	8.2	8.2	8.1	8.2	8.1	8.2
23	8.2	8.2	8.3	8.2	8.3	8.2	8.2
24	8.2	8.2	8.2	8.2	8.3	8.3	8.2
25	8.1	8.2	8.2	8.2	8.2	8.2	8.2
26	8.1	8.2	8.2	8.2	8.2	8.3	8.2
Conductance (µS/cm)							
18	332	352	362	962	2780	862	998
19	422	442	438	1068	3000	904	1045
20	400	422	422	1072	1065	992	1134
21	418	416	404	1196	1621	937	1192
22	431	402	390	1015	1695	925	1134
23	405	396	393	1064	1067	924	1116
24	410	403	399	1057	1027	923	1126
25	418	423	413	1099	1057	922	1120
26	353	396	407	941	935	818	999
Dissolved Oxygen (mg/L) (40-100% saturation)							
18	7.3	7.3	7.3	7.3	7.3	7.3	7.3
19	7.3	7.3	7.3	7.3	7.3	7.3	7.3
20	7.3	7.3	7.3	7.3	7.3	7.3	7.3
21	7.3	7.3	7.3	7.3	7.3	7.3	7.3
22	7.3	7.3	7.3	7.3	7.3	7.2	7.2
23	7.3	7.3	7.3	7.3	7.3	7.3	7.3
24	7.3	7.3	7.3	7.3	7.3	7.3	7.3
25	7.3	7.3	7.3	7.3	7.3	7.3	7.3
26	7.3	7.3	7.3	7.3	7.3	7.3	7.3
Temperature (°C)							
18	24	24	24	24	24	24	24
19	24	24	24	24	24	24	24
20	24	24	24	24	24	24	24
21	24	24	24	24	24	24	24
22	24	24	24	24	24	24	24
23	24	24	24	24	24	24	24
24	24	24	24	24	24	24	24
25	24	24	24	24	24	24	24
26	24	24	24	24	24	24	24

Old Solutions

CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
pH (units)						
8.2	8.2	8.2	7.9	7.7	8.2	8.0
7.8	7.7	7.7	7.7	7.6	8.0	7.9
7.9	7.8	7.8	7.8	7.7	8.2	8.0
7.8	8.0	8.0	8.0	7.8	8.0	7.9
7.8	7.8	7.8	7.8	7.9	8.1	7.9
8.0	7.9	7.9	7.8	8.0	8.2	8.0
8.0	7.9	7.8	7.8	8.0	8.2	8.0
7.8	7.8	7.8	7.7	7.9	8.1	8.0
7.8	7.8	7.9	7.8	7.9	8.2	8.0
Conductance (µS/cm)						
331	427	452	1443	2860	1026	1046
343	376	386	1108	2000	1089	1103
428	436	444	1087	2910	1105	1123
426	434	438	1106	1918	1116	1118
337	423	418	1000	1177	959	1120
441	414	407	1002	1093	948	1119
417	408	401	995	1077	957	1127
415	411	410	970	1079	953	1133
369	412	418	911	988	850	1007
Dissolved Oxygen (mg/L) (40-100% saturation)						
7.0	7.0	7.0	7.1	7.0	6.9	6.8
6.8	6.3	6.3	6.3	6.5	6.6	6.5
6.5	6.2	6.0	6.0	6.2	6.3	6.3
6.0	6.0	6.0	5.9	5.9	5.9	5.9
6.4	6.3	5.8	5.8	6.0	5.9	5.7
6.3	6.2	6.2	6.2	6.2	6.6	6.5
6.6	6.4	6.3	6.3	6.5	6.7	6.5
6.0	6.0	5.9	5.9	6.1	6.2	6.2
6.3	6.3	6.2	6.2	6.2	6.2	6.3
Temperature (°C)						
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24
24	24	24	24	24	24	24

0814-20-8020 ✓25

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:
0815 week 4 and 5 H2O = much lower EC than weeks 1-3

Reviewed By: [signature] Date Reviewed: 2019/04/16

Fathead Minnow Bench Sheet

NAUTILUS ENVIRONMENTAL

Method: FMD 32 Day ELS Client: TEC164

Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

New Solutions

Conc. (%)	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
Day							

pH (units)

Day	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
27	7.7	8.2	8.2	8.1	8.2	8.2	8.2
28	7.9	8.1	8.1	8.1	8.1	8.2	8.2
29	8.2	8.2	8.2	8.2	8.3	8.2	8.2
30	7.9	8.0	8.1	8.2	8.3	8.2	8.1
31	7.9	7.9	8.0	8.1	8.2	8.2	8.1
32							

Conductance (µS/cm)

Day	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
27	393	381	389	944	933	758	845
28	396	392	387	938	941	761	880
29	387	375	380	917	892	744	841
30	431	358	372	844	823	736	841
31	420	340	389	903	797	766	861
32							

* 4130
D 70

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
27	7.3	7.3	7.3	7.3	7.3	7.3	7.3
28	7.3	7.3	7.3	7.3	7.3	7.3	7.3
29	7.3	7.3	7.3	7.3	7.3	7.3	7.3
30	7.3	7.2	7.3	7.3	7.3	7.3	7.3
31	7.3	7.3	7.3	7.3	7.3	7.3	7.3
32							

Temperature (°C)

Day	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
27	24	24	24	24	24	24	24
28	24	24	24	24	24	24	24
29	24	24	24	24	24	24	24
30	24	24	24	24	24	24	24
31	24	24	24	24	24	24	24
32							

Old Solutions

pH (units)

Day	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
27	7.6	7.8	7.8	7.8	7.9	8.1	7.9
28	7.8	7.8	7.8	7.8	7.9	8.1	8.0
29	7.9	7.8	7.8	7.8	8.0	8.1	7.9
30	7.8	7.9	7.8	7.8	8.0	8.1	7.9
31	7.8	7.8	7.8	7.7	8.0	8.0	8.0
32	7.8	7.7	7.7	7.8	8.0	8.0	7.9

Conductance (µS/cm)

Day	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
27	372	412	418	878	968	852	1008
28	401	404	401	908	972	812	945
29	401	398	401	824	833	779	880
30	381	387	383	853	750	765	860
31	425	392	394	870	757	791	800
32	400	389	391	854	758	780	867

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
27	5.5	5.5	5.4	5.1	5.4	5.7	5.5
28	5.6	5.6	5.7	6.1	6.2	6.2	5.9
29	5.9	5.9	5.7	4.8	5.6	5.6	5.7
30	7.2	6.8	6.6	6.2	6.6	6.7	6.4
31	6.4	6.4	6.2	6.2	6.2	6.3	6.2
32	6.2	6.2	6.2	5.9	5.9	6.3	5.8

Temperature (°C)

Day	CTL	CTL 10	CTL 20	0814-20	0815-20	0816-20	0820-20
27	24	24	24	24	24	24	24
28	24	24	24	24	24	24	24
29	24	24	24	24	24	24	24
30	24	24	24	24	24	24	24
31	24	24	24	24	24	24	24
32	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: ML Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc.

CTL

Replicate # CTL A			Replicate # B			Replicate # C			Replicate # D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	9	N	1	12	N	1	10	N	1	11	N
2	10	N	2	10		2	10		2	13	
3	9	N	3	9		3	8		3	10	
4	9	N	4	10		4	11		4	12	
5	10	N	5	10		5	10		5	14	
6	13	N	6	11		6	11		6	10	
7	11	N	7	14		7	10		7	10	
8	14	N	8	8		8	10		8	13	
9	10	N	9	8		9	10		9	10	
10	11	N	10	11		10	11		10	11	
11	6	N	11	10		11	12		11	11	
12	9	N	12	11		12	8		12	11	
13	–	–	13	9		13	13		13	11	
14	–	–	14	7		14	9		14	11	
15	–	–	15	11		15	–	–	15	9	

Comments

Avg=9.58 9.87 10.21 11.13

CTL 10

Replicate # A			Replicate # B			Replicate # C			Replicate # D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	12	N	1	10	N	1	11	N	1	10	N
2	12		2	12		2	11		2	11	
3	14		3	11		3	11		3	11	
4	13		4	11		4	12		4	14	
5	9		5	10		5	10		5	12	
6	12		6	10		6	12		6	12	
7	10		7	12		7	11		7	10	
8	9		8	11		8	13		8	12	
9	13		9	11		9	12		9	10	
10	9		10	10		10	12		10	14	
11	10		11	12		11	10		11	8	
12	11		12	9		12	11		12	10	
13	9		13	13		13	9		13	9	
14	14		14	–	–	14	8		14	9	
15	–	–	15	–	–	15	10		15	8	

Comments

Ag=11.21 10.92 10.87 10.67

Reviewed By: NL Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

CTL 20

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	12	N	12	N	12	N	10	N
2	11		12		13		12	
3	10		11		11		12	
4	10		10		10		8	
5	10		9		12		12	
6	12		11		9		10	
7	10		8		12		12	
8	9		8		12		11	
9	8		12		8		11	
10	8		9		—		8	
11	7		10		—		11	
12	12		11		—		10	
13	11		8		—		10	
14	—	—	9		—	—	12	
15	—	—	—	—	—	—	—	—

Comments: Avg = 10.58 | 10.00 | 11.00 | 10.64

0814-20

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1			8	N	10	N	12	N
2			11		9		12	
3			10		8		9	
4			9		11		7	
5			9		13		9	
6			11	A-S	12		9	
7			10	N	10		8	
8			9		9		11	
9			8		10		11	
10			13		11		13	
11			13		9		13	
12			11		—		13	
13			9		—		10	
14			10		—		9	
15			—	—	—	—	—	—

NO FISH left

CB

Comments: Avg = 10.07 | 10.18 | 10.43

Reviewed By: NL Date Reviewed: 2019/04/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc.

0815-20

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	15	N	15	N	13	N	12	A-S
2	—	—	—	—	13	↓	10	N
3	↓	↓	↓	↓	12	↓	13	↓
4					—	—	8	
5					↓	↓	—	—
6							↓	↓
7								
8								
9								
10								
11								
12								
13								
14								
15	↓	↓	↓	↓	↓	↓	↓	↓
Comments	15.00		15.00		12.0		10.75	

0816-20

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	12	A-S	11	A-S	11	A-S	10	N
2	11	N	9	N	9	N	9	↓
3	9	↓	9	↓	10	↓	12	
4	9		11		10		9	
5	9		12		11		10	
6	8		12		10		13	
7	9		10		7		12	
8	12		11		11		12	
9	9		11		11		14	
10	11		12		13		11	
11	8		12		10		9	↓
12	8		9		5		—	—
13	12		8	↓	8	↓	—	—
14	10		—	—	8		—	—
15	10	↓	—	—	—	—	—	—
Comments	9.80		10.54		9.57		11.00	

Reviewed By: NL Date Reviewed: 2019/09/10

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL 10, CTL 20, 1819-0814 (20 ug/L), 1819-0815 (20 ug/L), 1819-0816 (20 ug/L), 1819-0820 (20 ug/L)

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **0820-20**

Replicate # A			Replicate # B			Replicate # C			Replicate # D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	10	N	1	9	N	1	10	N	1	13	N
2	10		2	8		2	10		2	9	
3	9		3	10		3	6		3	11	
4	8		4	13		4	11		4	9	
5	12		5	9		5	14		5	10	
6	10		6	9		6			6	10	
7	8		7	10		7	11		7	10	
8	12		8	7		8	9		8	9	
9	12		9	9		9	8		9	13	
10	8		10	10		10	14		10	9	
11	11		11	10		11	8		11	15	
12	14		12	11		12	10	A-S	12	—	—
13	—	—	13	10		13	—	—	13	—	—
14	—	—	14	9		14	—	—	14	—	—
15	—	—	15	—	—	15	—	—	15	—	—
Comments	10.33			9.57			9.58			10.73	

Reviewed By: NL Date Reviewed: 20191104/10

NAUTILUS ENVIRONMENTAL

Organism Weights
Bench Sheet

Client TEC164 Sample 1819-0814-20, 1819-0815-20, 1819-0816-20, 1819-0820-20, CTL, CTL10, CTL20 Organism 32 day FM ELS Batch 20191031111FMELS

	Item Weighed	Date	Initials	Balance*
Initial Weight (mg):	dried pan	2019/03/27	CB	Mettler #1
Final Weight (mg):	dried pan + organisms	2019/04/04	MP	Mettler #1

* same balance must be used for initial and final weights
* for FM/HA/CT, must use scale with 0.01 mg accuracy

Concentration

Replicate	CTL		CTL10		CTL20		1819-0814-20		1819-0815-20		1819-0816-20	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final MP	Initial	Final
a	1007.69	1030.95	979.00	1010.70	1010.33	1033.27	1052.82 CB loss	—	978.39	999.90 *	1024.00	1051.73
b	1050.07	1077.44	1006.15	1037.48	953.68	976.68	1021.12	1051.20	1014.96	1023.93	980.01	1008.87
c	972.46	1000.45	1017.09	1051.18	1018.23	1038.98	979.65	1006.62	984.62	999.99	992.22	1019.93
d	983.28	1019.34	1039.78	1075.13	1001.62	1029.87	985.28	1016.19	1022.68	1035.01	1004.42	1040.22
e										* 988.32		

Concentration

Replicate	1819-0820-20											
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
a	1019.99	1049.37										
b	1022.09	1048.62										
c	1041.33	1068.51										
d	1036.92 CB	1068.47										
e												

Balance Calibration Check:

	Initial	Final
first pan weighed:	CTLD	0820-20D
weight of first pan:	983.28	1068.47
first pan after all other pans weighed:	983.34	1068.50

% difference <5%: Yes/No Yes/No

Test Validity Met: Yes/No/NA

Results are Logical:** Yes/No

** no negative numbers, consistent values across replicates

$$\% \text{ difference} = \frac{(\text{initial weight} - \text{reweight})}{(\text{initial weight} + \text{reweight}) / 2} \times 100\%$$

If "no" is circled for any parameter, notify Lab Supervisor/ QA Group to determine appropriate action

Reviewed By: ML Date Reviewed: 2019/04/10

CETIS Summary Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8780	CM_MC2 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8780	GH_FR1 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8780	FR_FRCP1 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8780	FR_FRABCH passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8780	Control 20 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8780	Control 10 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	0.8780	Lab Control passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 10 passed hatched rate	1
16-3026-4371	Hatched Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed hatched rate	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.2605	Lab Control passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.2605	CM_MC2 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.2605	FR_FRABCH passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.2605	Control 20 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.2605	GH_FR1 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.2605	FR_FRCP1 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.2605	Control 10 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.9839	Lab Control passed length-mm	1

Fathead Minnow 32-d Survival and Growth Test
Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.9839	FR_FRCP1 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.9839	FR_FRABCH passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.9839	Control 10 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.9839	CM_MC2 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.9839	GH_FR1 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.9839	Control 20 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.3182	GH_FR1 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.3182	FR_FRCP1 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.3182	Control 20 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.3182	Control 10 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.3182	FR_FRABCH passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.3182	Lab Control passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.3182	CM_MC2 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.1752	Control 10 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.1752	Control 20 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.1752	FR_FRABCH passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.1752	CM_MC2 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.1752	GH_FR1 passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.1752	Lab Control passed length-mm	1
05-4567-6562	Length-mm	Equal Variance t Two-Sample Test	0.1752	FR_FRCP1 passed length-mm	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9690	GH_FR1 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9690	FR_FRABCH passed mean dry biomass-m	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9690	FR_FRCP1 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9690	Control 20 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9690	Control 10 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9690	Lab Control passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9690	CM_MC2 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.0350	CM_MC2 failed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.0350	GH_FR1 failed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.0350	Control 20 failed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.0350	Lab Control failed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.0350	FR_FRCP1 failed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.0350	FR_FRABCH failed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.0350	Control 10 failed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	CM_MC2 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	GH_FR1 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	FR_FRCP1 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	FR_FRABCH passed mean dry biomass-m	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	Control 20 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	Control 10 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	Lab Control passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	FR_FRCP1 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	FR_FRABCH passed mean dry biomass-m	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	GH_FR1 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	Control 20 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	CM_MC2 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	Control 10 passed mean dry biomass-mg	1
17-2758-1758	Mean Dry Biomass-mg	Steel Many-One Rank Sum Test	0.9981	Lab Control passed mean dry biomass-mg	1

Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Hatched Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	LC	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
Control 10	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
Control 20	MC	4	0.9667	0.9054	1.0000	0.9333	1.0000	0.0193	0.0385	3.98%	3.33%
FR_FRABCH		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_FRCP1		4	0.9167	0.7832	1.0000	0.8000	1.0000	0.0419	0.0839	9.15%	8.33%
GH_FR1		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
CM_MC2		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	LC	4	10.2	9.127	11.27	9.58	11.13	0.3364	0.6729	6.60%	0.00%
Control 10	N	4	10.92	10.56	11.27	10.67	11.21	0.1115	0.2229	2.04%	-7.06%
Control 20	MC	4	10.43	9.674	11.19	10	11	0.2374	0.4748	4.55%	-2.28%
FR_FRABCH		3	10.23	9.768	10.68	10.07	10.43	0.1065	0.1845	1.80%	-0.29%
FR_FRCP1		4	13.36	10.09	16.62	10.75	15	1.027	2.055	15.39%	-30.96%
GH_FR1		4	10.23	9.176	11.28	9.57	11	0.3303	0.6607	6.46%	-0.29%
CM_MC2		4	10.05	9.137	10.97	9.57	10.73	0.2875	0.5751	5.72%	1.42%

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	LC	4	2.011	1.587	2.436	1.825	2.404	0.1335	0.267	13.27%	0.00%
Control 10	N	4	2.208	2.003	2.412	2.089	2.357	0.06422	0.1284	5.82%	-9.77%
Control 20	MC	4	1.582	1.244	1.92	1.383	1.883	0.1062	0.2125	13.43%	21.33%
FR_FRABCH		4	1.465	-0.09931	3.029	0	2.061	0.4914	0.9829	67.11%	27.18%
FR_FRCP1		4	0.7783	0.4776	1.079	0.598	1.025	0.09449	0.189	24.28%	61.30%
GH_FR1		4	2.002	1.589	2.414	1.847	2.387	0.1296	0.2592	12.95%	0.48%
CM_MC2		4	1.927	1.639	2.215	1.769	2.17	0.09053	0.1811	9.39%	4.18%

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	1.0000	1.0000	1.0000	1.0000
Control 10	N	1.0000	1.0000	1.0000	1.0000
Control 20	MC	1.0000	1.0000	0.9333	0.9333
FR_FRABCH		1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	0.8000	0.9333	0.9333
GH_FR1		1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	9.58	9.87	10.21	11.13
Control 10	N	11.21	10.92	10.87	10.67
Control 20	MC	10.08	10	11	10.64
FR_FRABCH			10.07	10.18	10.43
FR_FRCP1		15	15	12.67	10.75
GH_FR1		9.8	10.54	9.57	11
CM_MC2		10.33	9.57	9.58	10.73

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	1.951	1.825	1.866	2.404
Control 10	N	2.113	2.089	2.273	2.357
Control 20	MC	1.529	1.533	1.383	1.883
FR_FRABCH		0	2	1.798	2.061
FR_FRCP1		0.6687	0.598	1.025	0.822
GH_FR1		1.849	1.924	1.847	2.387
CM_MC2		1.959	1.769	1.812	2.17

Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	15/15	15/15	15/15	15/15
Control 10	N	15/15	15/15	15/15	15/15
Control 20	MC	15/15	15/15	14/15	14/15
FR_FRABCH		15/15	15/15	15/15	15/15
FR_FRCP1		15/15	12/15	14/15	14/15
GH_FR1		15/15	15/15	15/15	15/15
CM_MC2		15/15	15/15	15/15	15/15

CETIS Summary Report

32 d fathead minnow JW

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JW

Nautilus Environmental

Batch ID:	13-7605-9306	**Test Type:**	Growth-Survival (~~10d~~ 32-d	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-5940-0569	7d Survival Rate 32d	Fisher Exact/Bonferroni-Holm Test	0.0541	FR_FRCP1 passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0541	GH_FR1 passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0541	Control 20 passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0541	CM_MC2 passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0541	FR_FRABCH passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.9E-14	CM_MC2 failed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.9E-14	GH_FR1 failed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.9E-14	FR_FRCP1 failed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.9E-14	FR_FRABCH failed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.9E-14	Control 20 failed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8525	FR_FRABCH passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8525	GH_FR1 passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8525	CM_MC2 passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8525	Control 20 passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8525	FR_FRCP1 passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
02-5940-0569	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1

~~7d~~ Survival Rate Summary 32d

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control 20	N	4	0.8333	0.5808	1.0000	0.6000	0.9333	0.0794	0.1587	19.04%	0.00%
FR_FRABCH		4	0.6500	0.0000	1.0000	0.0000	0.9333	0.2217	0.4435	68.23%	22.00%
FR_FRCP1		4	0.1500	0.0000	0.3091	0.0667	0.2667	0.0500	0.1000	66.67%	82.00%
GH_FR1		4	0.8833	0.7022	1.0000	0.7333	1.0000	0.0569	0.1139	12.89%	-6.00%
CM_MC2		4	0.8167	0.6832	0.9501	0.7333	0.9333	0.0419	0.0839	10.27%	2.00%

~~7d~~ Survival Rate Detail 32d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	N	0.8667	0.9333	0.6000	0.9333
FR_FRABCH		0.0000	0.9333	0.7333	0.9333
FR_FRCP1		0.0667	0.0667	0.2000	0.2667
GH_FR1		1.0000	0.8667	0.9333	0.7333
CM_MC2		0.8000	0.9333	0.8000	0.7333

Analyst: JW QA: June 28/19

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test
Nautilus Environmental

JW ~~7d~~ Survival Rate Binomials 32 d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	N	13/15	14/15	9/15	14/15
FR_FRABCH		0/15	14/15	11/15	14/15
FR_FRCP1		1/15	1/15	3/15	4/15
GH_FR1		15/15	13/15	14/15	11/15
CM_MC2		12/15	14/15	12/15	11/15

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	19-6603-1253	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 0:16	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	15-8664-6659	01 Mar-19	01 Mar-19	15h	Teck Coal	
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h		Teck Coal Q1
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	0.7805	Exact	1.0000	Non-Significant Effect
		Method Control	0.0766	Exact	0.0766	Non-Significant Effect

C > T

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	LC	56	4	60	0.9333	0.06667	1.75%
Control 10	N	57	3	60	0.95	0.05	0.0%
Control 20	MC	50	10	60	0.8333	0.1667	12.28%

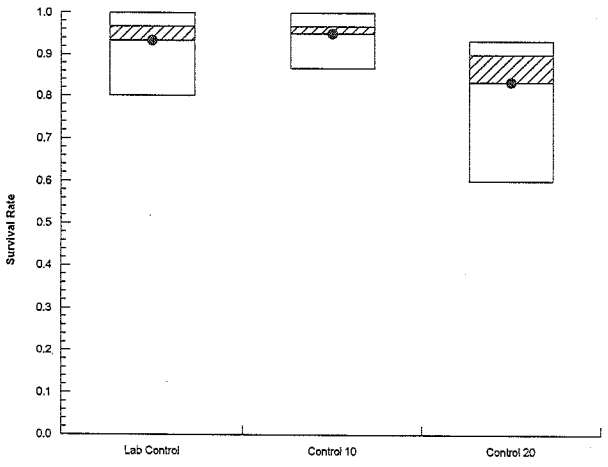
Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	0.8000	1.0000	0.9333	1.0000
Control 10	N	0.9333	0.8667	1.0000	1.0000
Control 20	MC	0.8667	0.9333	0.6000	0.9333

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	12/15	15/15	14/15	15/15
Control 10	N	14/15	13/15	15/15	15/15
Control 20	MC	13/15	14/15	9/15	14/15

Graphics



CETIS Analytical Report

Report Date: 18 Jun-19 10:18 (p 1 of 1)
Test Code/ID: 190360 / 16-8146-8021

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	00-4028-3532	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 0:16	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	15-8664-6659	01 Mar-19	01 Mar-19	15h	Teck Coal	
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h		Teck Coal Q1
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	1.0000	Exact	1.0000	Non-Significant Effect
		Method Control	0.2479	Exact	0.2479	Non-Significant Effect

C > T

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	LC	60	0	60	1	0	0.0%
Control 10	N	60	0	60	1	0	0.0%
Control 20	MC	58	2	60	0.9667	0.03333	3.33%

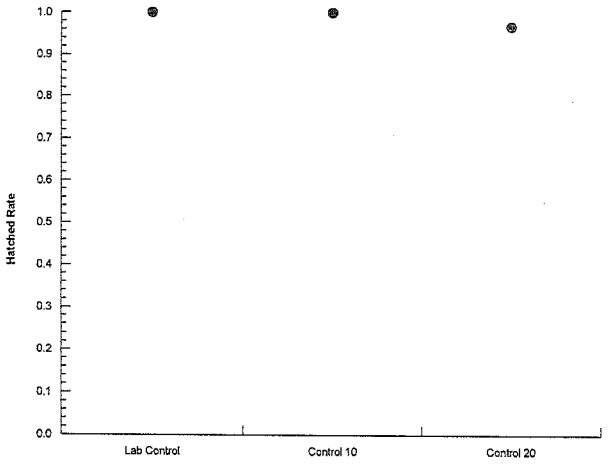
Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	1.0000	1.0000	1.0000	1.0000
Control 10	N	1.0000	1.0000	1.0000	1.0000
Control 20	MC	1.0000	1.0000	0.9333	0.9333

Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	15/15	15/15	15/15	15/15
Control 10	N	15/15	15/15	15/15	15/15
Control 20	MC	15/15	15/15	14/15	14/15

Graphics



CETIS Analytical Report

Test Code/ID: 190360 / 16-8146-8021

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	05-5433-0418	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 17:09	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	15-8664-6659	01 Mar-19	01 Mar-19	15h	Teck Coal	
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h		Teck Coal Q1
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	Control 10 passed mean dry biomass-mg	16.48%
		Control 20 failed mean dry biomass-mg	16.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	-1.327	1.943	0.288	6	CDF	0.8835	Non-Significant Effect
		Method Control*	2.515	1.943	0.332	6	CDF	0.0228	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.818536	0.409268	2	9.238	0.0066	Significant Effect
Error	0.398732	0.0443036	9			
Total	1.21727		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	1.29	9.21	0.5246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8693	0.8025	0.0641	Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	LC	4	2.011	1.587	2.436	1.908	1.825	2.404	0.1335	13.27%	0.00%
Control 10	N	4	2.208	2.003	2.412	2.193	2.089	2.357	0.06422	5.82%	-9.77%
Control 20	MC	4	1.582	1.244	1.92	1.531	1.383	1.883	0.1062	13.43%	21.33%

Mean Dry Biomass-mg Detail

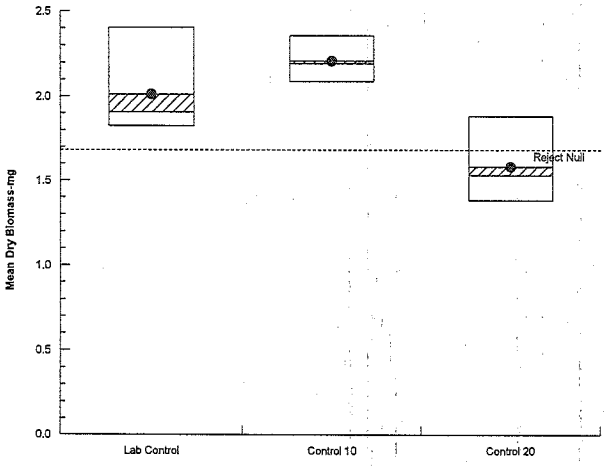
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	1.951	1.825	1.866	2.404
Control 10	N	2.113	2.089	2.273	2.357
Control 20	MC	1.529	1.533	1.383	1.883

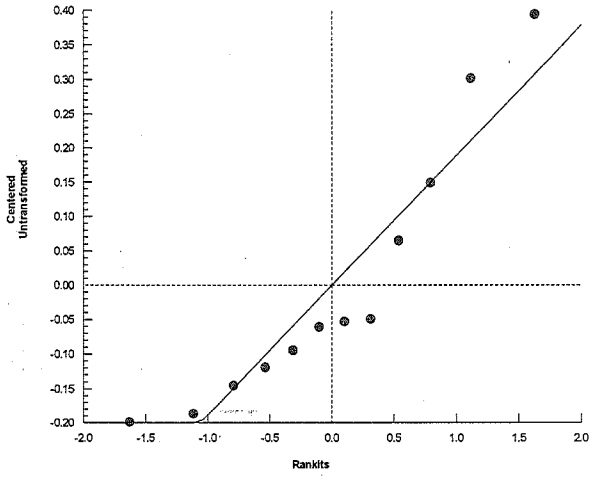
June 27/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	05-5433-0418	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 17:09	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





June 27/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	14-9373-2752	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 17:09	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	15-8664-6659	01 Mar-19	01 Mar-19	15h	Teck Coal	
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h		Teck Coal Q1
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	Control 10 passed length-mm	7.85%
		Control 20 passed length-mm	7.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	-2.031	1.943	0.689	6	CDF	0.9558	Non-Significant Effect
		Method Control	-0.5646	1.943	0.800	6	CDF	0.7036	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.08015	0.540075	2	2.226	0.1639	Non-Significant Effect
Error	2.18375	0.242639	9			
Total	3.2639		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	2.705	9.21	0.2586	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9532	0.8025	0.6835	Normal Distribution

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	LC	4	10.2	9.127	11.27	10.04	9.58	11.13	0.3364	6.60%	0.00%
Control 10	N	4	10.92	10.56	11.27	10.9	10.67	11.21	0.1115	2.04%	-7.06%
Control 20	MC	4	10.43	9.674	11.19	10.36	10	11	0.2374	4.55%	-2.28%

Length-mm Detail

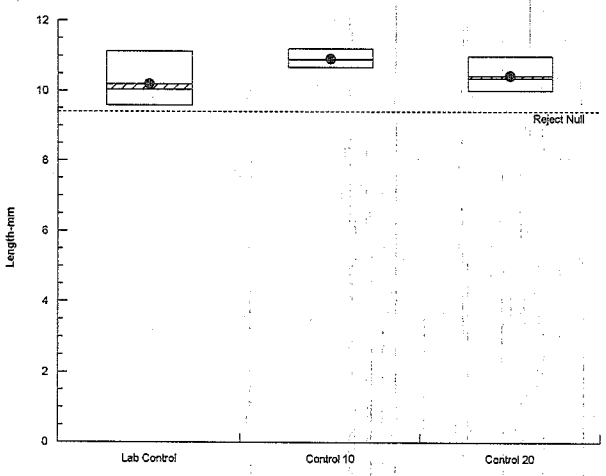
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	9.58	9.87	10.21	11.13
Control 10	N	11.21	10.92	10.87	10.67
Control 20	MC	10.08	10	11	10.64

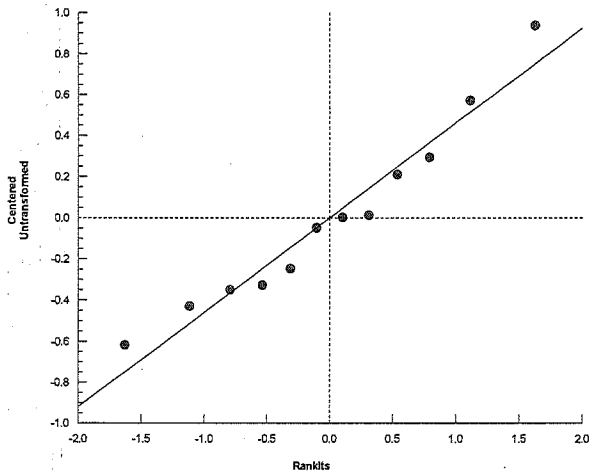
June 27/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	14-9373-2752	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 17:09	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





June 27/19

Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	04-2880-2074	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	18 Jun-19 10:23	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	15-8664-6659	01 Mar-19	01 Mar-19	15h	Teck Coal	
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h		Teck Coal Q1
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	0.5000	Exact	1.0000	Non-Significant Effect
		Method Control	0.9783	Exact	0.9783	Non-Significant Effect

C < T

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.7391	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	LC	56	4	60	0.9333	0.06667	1.75%
Control 10	N	57	3	60	0.95	0.05	0.0%
Control 20	MC	50	10	60	0.8333	0.1667	12.28%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	0.8000	1.0000	0.9333	1.0000
Control 10	N	0.9333	0.8667	1.0000	1.0000
Control 20	MC	0.8667	0.9333	0.6000	0.9333

Survival Rate Binomials

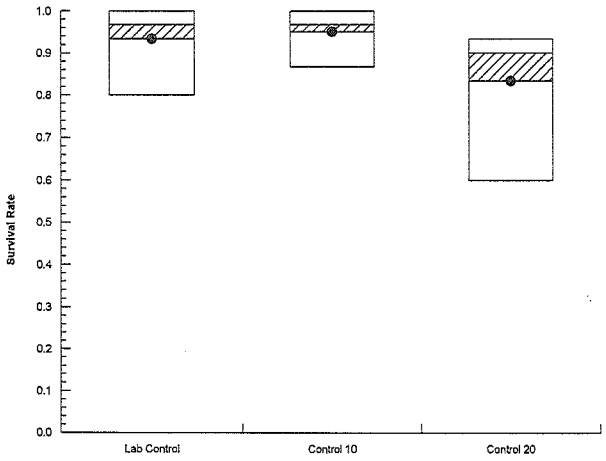
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	12/15	15/15	14/15	15/15
Control 10	N	14/15	13/15	15/15	15/15
Control 20	MC	13/15	14/15	9/15	14/15

June 19/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	04-2880-2074	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	18 Jun-19 10:23	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	08-6085-0776	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	18 Jun-19 10:24	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	15-8664-6659	01 Mar-19	01 Mar-19	15h	Teck Coal	
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h		Teck Coal Q1
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	1.0000	Exact	1.0000	Non-Significant Effect
		Method Control	1.0000	Exact	1.0000	Non-Significant Effect

C < T

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			1.0000	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	LC	60	0	60	1	0	0.0%
Control 10	N	60	0	60	1	0	0.0%
Control 20	MC	58	2	60	0.9667	0.03333	3.33%

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	1.0000	1.0000	1.0000	1.0000
Control 10	N	1.0000	1.0000	1.0000	1.0000
Control 20	MC	1.0000	1.0000	0.9333	0.9333

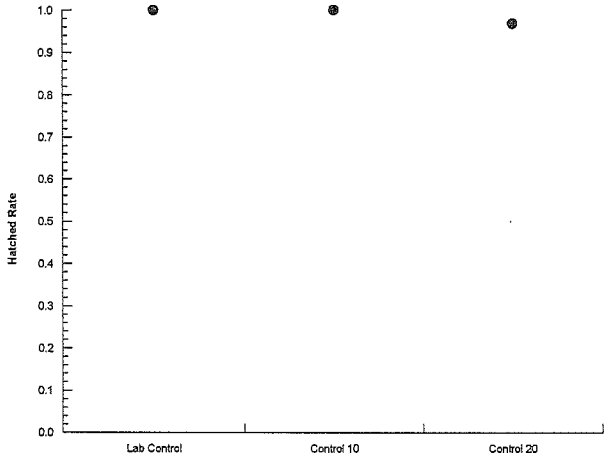
Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	15/15	15/15	15/15	15/15
Control 10	N	15/15	15/15	15/15	15/15
Control 20	MC	15/15	15/15	14/15	14/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	08-6085-0776	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	18 Jun-19 10:24	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



CETIS Analytical Report

Test Code/ID: 190360 / 16-8146-8021

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	20-2689-3029	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 17:10	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	15-8664-6659	01 Mar-19	01 Mar-19	15h	Teck Coal	
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h		Teck Coal Q1
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	Control 10 passed mean dry biomass-mg	16.48%
		Control 20 passed mean dry biomass-mg	16.48%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	1.327	1.943	0.288	6	CDF	0.1165	Non-Significant Effect
		Method Control	-2.515	1.943	0.332	6	CDF	0.9772	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.818536	0.409268	2	9.238	0.0066	Significant Effect
Error	0.398732	0.0443036	9			
Total	1.21727		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	1.29	9.21	0.5246	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8693	0.8025	0.0641	Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	LC	4	2.011	1.587	2.436	1.908	1.825	2.404	0.1335	13.27%	0.00%
Control 10	N	4	2.208	2.003	2.412	2.193	2.089	2.357	0.06422	5.82%	-9.77%
Control 20	MC	4	1.582	1.244	1.92	1.531	1.383	1.883	0.1062	13.43%	21.33%

Mean Dry Biomass-mg Detail

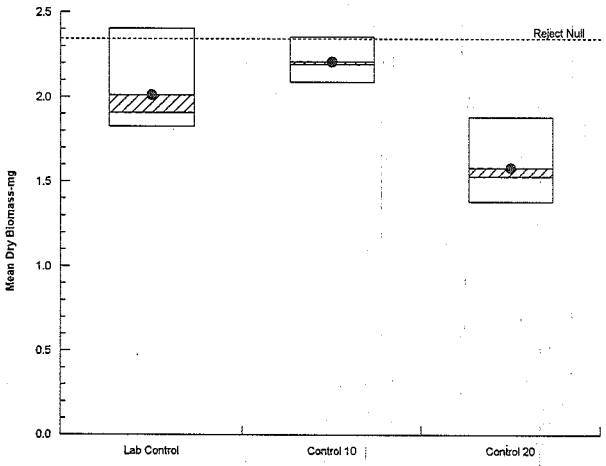
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	1.951	1.825	1.866	2.404
Control 10	N	2.113	2.089	2.273	2.357
Control 20	MC	1.529	1.533	1.383	1.883

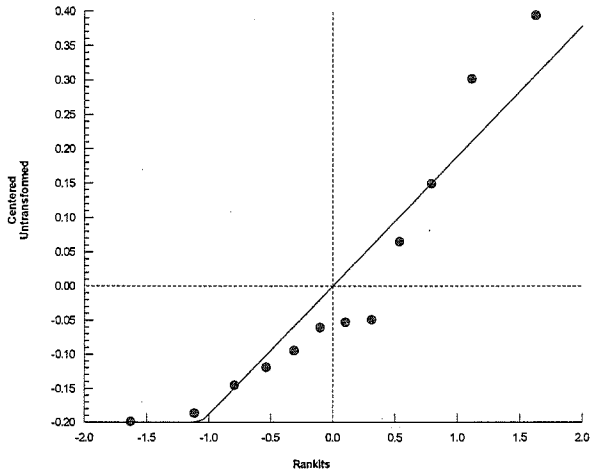
June 27/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	20-2689-3029	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 17:10	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





June 27/19

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	05-1058-5255	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 17:11	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	15-8664-6659	01 Mar-19	01 Mar-19	15h	Teck Coal	
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h		Teck Coal Q1
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	Control 10 failed length-mm	7.85%
		Control 20 passed length-mm	7.85%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control*	2.031	1.943	0.689	6	CDF	0.0442	Significant Effect
		Method Control	0.5646	1.943	0.800	6	CDF	0.2964	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.08015	0.540075	2	2.226	0.1639	Non-Significant Effect
Error	2.18375	0.242639	9			
Total	3.2639		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	2.705	9.21	0.2586	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9532	0.8025	0.6835	Normal Distribution

Length-mm Summary

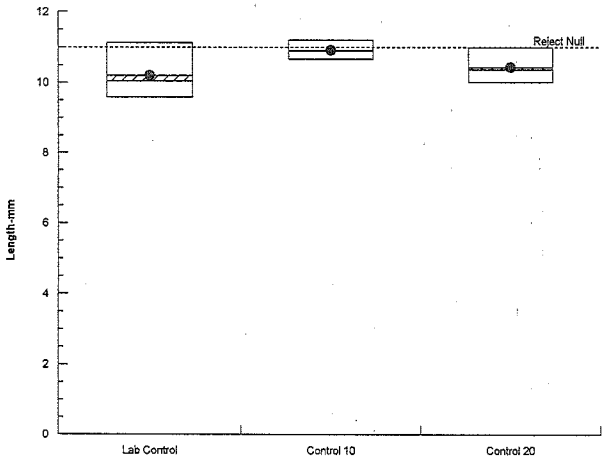
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	LC	4	10.2	9.127	11.27	10.04	9.58	11.13	0.3364	6.60%	0.00%
Control 10	N	4	10.92	10.56	11.27	10.9	10.67	11.21	0.1115	2.04%	-7.06%
Control 20	MC	4	10.43	9.674	11.19	10.36	10	11	0.2374	4.55%	-2.28%

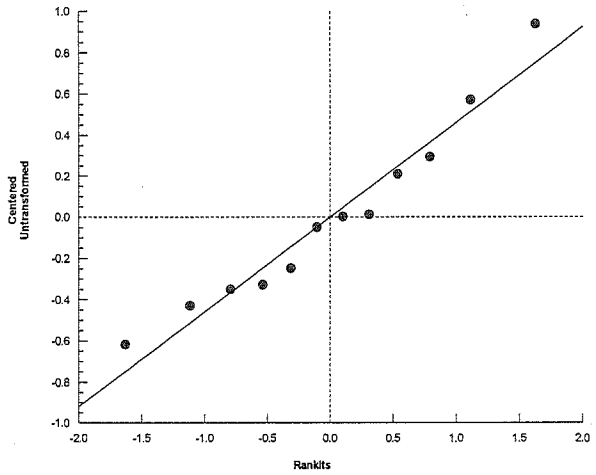
Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Lab Control	LC	9.58	9.87	10.21	11.13
Control 10	N	11.21	10.92	10.87	10.67
Control 20	MC	10.08	10	11	10.64

Analysis ID:	05-1058-5255	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	26 Jun-19 17:11	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





CETIS Analytical Report

fathead minnow 32-d JW

Report Date: 04 Jul-19 12:05 (p 1 of 2)
Test Code/ID: 190360-1 / 01-9296-5013

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test

Nautilus Environmental

Analysis ID:	02-5940-0569	**Endpoint:**	~~7d~~ Survival Rate 32 d JW	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 16:53	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	13-7605-9306	**Test Type:**	Growth-Survival (10d)	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Fisher Exact/Bonferroni-Holm Test

Sample I vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control (20 µg/L)	FR_FRABCH	0.0180	Exact	0.0541	Non-Significant Effect
	FR_FRCP1*	0.0000	Exact	4.9E-14	Significant Effect
	GH_FR1	0.8525	Exact	0.8525	Non-Significant Effect
	CM_MC2	0.5000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 20	N	50	10	60	0.8333	0.1667	5.66%
FR_FRABCH		39	21	60	0.65	0.35	26.42%
FR_FRCP1		9	51	60	0.15	0.85	83.02%
GH_FR1		53	7	60	0.8833	0.1167	0.0%
CM_MC2		49	11	60	0.8167	0.1833	7.55%

JW ~~7d~~ Survival Rate Detail 32 d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	N	0.8667	0.9333	0.6000	0.9333
FR_FRABCH		0.0000	0.9333	0.7333	0.9333
FR_FRCP1		0.0667	0.0667	0.2000	0.2667
GH_FR1		1.0000	0.8667	0.9333	0.7333
CM_MC2		0.8000	0.9333	0.8000	0.7333

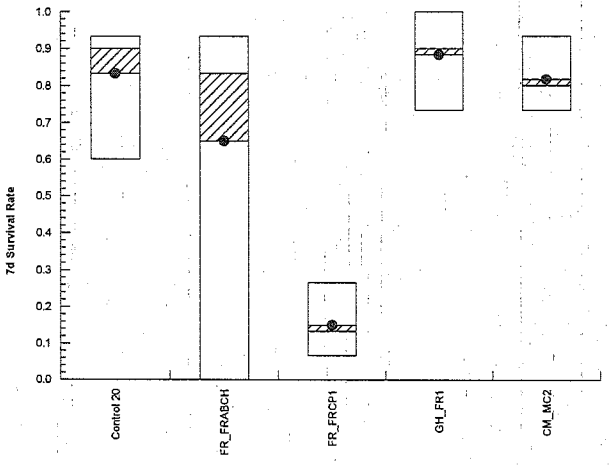
JW ~~7d~~ Survival Rate Binomials 32d

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	N	13/15	14/15	9/15	14/15
FR_FRABCH		0/15	14/15	11/15	14/15
FR_FRCP1		1/15	1/15	3/15	4/15
GH_FR1		15/15	13/15	14/15	11/15
CM_MC2		12/15	14/15	12/15	11/15

JW ~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test — Nautilus Environmental

Analysis ID:	02-5940-0569	**Endpoint:**	~~7d~~ Survival Rate 32 d JW	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 16:53	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	16-3026-4371	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 0:13	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Method Control (20 µg/L)		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.2195	Exact	0.8780	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect

All samples are amended with 20 µg/L Cu.

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 20	MC	58	2	60	0.9667	0.03333	3.33%
FR_FRABCH		60	0	60	1	0	0.0%
FR_FRCP1		55	5	60	0.9167	0.08333	8.33%
GH_FR1		60	0	60	1	0	0.0%
CM_MC2		60	0	60	1	0	0.0%

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	MC	1.0000	1.0000	0.9333	0.9333
FR_FRABCH		1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	0.8000	0.9333	0.9333
GH_FR1		1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000

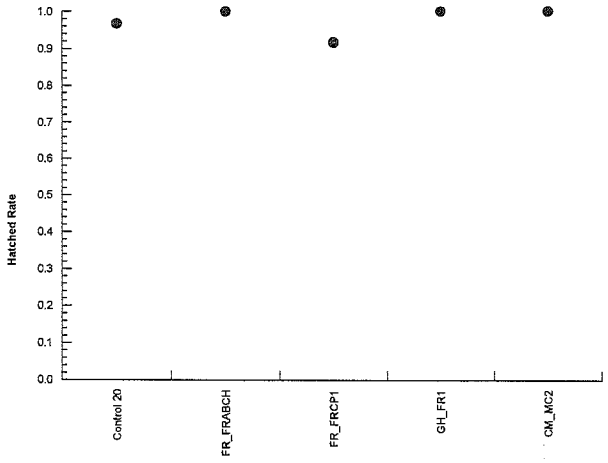
Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	MC	15/15	15/15	14/15	14/15
FR_FRABCH		15/15	15/15	15/15	15/15
FR_FRCP1		15/15	12/15	14/15	14/15
GH_FR1		15/15	15/15	15/15	15/15
CM_MC2		15/15	15/15	15/15	15/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	16-3026-4371	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 0:13	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	17-2758-1758	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 0:13	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

All samples are amended w/ 20 µg/L Cu.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRABCH passed mean dry biomass-mg	50.43%
		FR_FRCP1 failed mean dry biomass-mg	50.43%
		GH_FR1 passed mean dry biomass-mg	50.43%
		CM_MC2 passed mean dry biomass-mg	50.43%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Method Control (20 µg/L Cu)		FR_FRABCH	21	10	0	6	CDF	0.9690	Non-Significant Effect
		FR_FRCP1*	10	10	0	6	CDF	0.0350	Significant Effect
		GH_FR1	24	10	0	6	CDF	0.9981	Non-Significant Effect
		CM_MC2	24	10	0	6	CDF	0.9981	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.8007	0.950175	4	4.143	0.0186	Significant Effect
Error	3.44052	0.229368	15			
Total	7.24122		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	13.82	13.28	0.0079	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7825	0.866	4.8E-04	Non-Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 20	MC	4	1.582	1.244	1.92	1.531	1.383	1.883	0.1062	13.43%	0.00%
FR_FRABCH		4	1.465	-0.09931	3.029	1.899	0	2.061	0.4914	67.11%	7.44%
FR_FRCP1		4	0.7783	0.4776	1.079	0.7453	0.598	1.025	0.09449	24.28%	50.81%
GH_FR1		4	2.002	1.589	2.414	1.886	1.847	2.387	0.1296	12.95%	-26.50%
CM_MC2		4	1.927	1.639	2.215	1.885	1.769	2.17	0.09053	9.39%	-21.80%

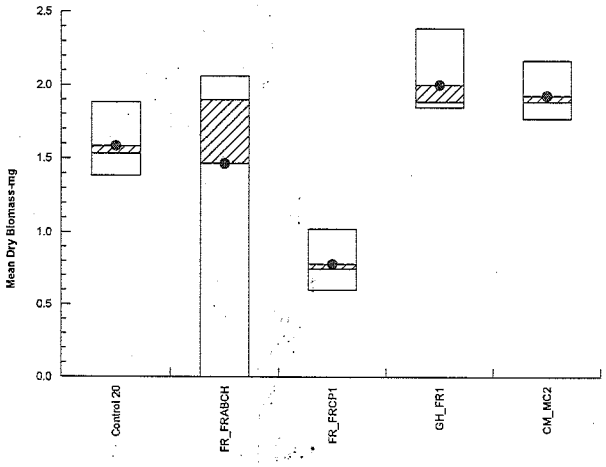
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

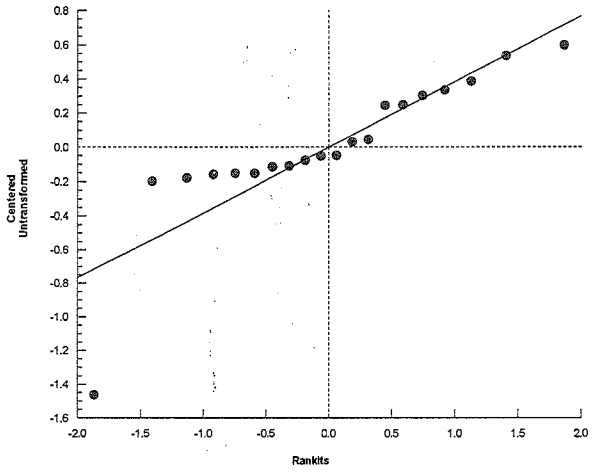
Analysis ID:	17-2758-1758	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 0:13	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	MC	1.529	1.533	1.383	1.883
FR_FRABCH		0	2	1.798	2.061
FR_FRCP1		0.6687	0.598	1.025	0.822
GH_FR1		1.849	1.924	1.847	2.387
CM_MC2		1.959	1.769	1.812	2.17

Graphics





CETIS Analytical Report

Test Code/ID: 190360 / 16-8146-8021

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	05-4567-6562	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 17:00	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRABCH passed length-mm	6.95%
		FR_FRCP1 passed length-mm	6.95%
		GH_FR1 passed length-mm	6.95%
		CM_MC2 passed length-mm	6.95%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Method Control (20µg/L)	FR_FRABCH	0.6899	2.015	0.594	5	CDF	0.2605	Non-Significant Effect
	FR_FRCP1	-2.774	1.943	2.049	6	CDF	0.9839	Non-Significant Effect
	GH_FR1	0.4978	1.943	0.791	6	CDF	0.3182	Non-Significant Effect
	CM_MC2	1.012	1.943	0.725	6	CDF	0.1752	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	31.0325	7.75813	4	6.912	0.0027	Significant Effect
Error	15.7133	1.12238	14			
Total	46.7459		18			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	12.5	13.28	0.0140	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9084	0.8605	0.0691	Normal Distribution

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 20	MC	4	10.43	9.674	11.19	10.36	10	11	0.2374	4.55%	0.00%
FR_FRABCH		3	10.23	9.768	10.68	10.18	10.07	10.43	0.1065	1.80%	1.95%
FR_FRCP1		4	13.36	10.09	16.62	13.84	10.75	15	1.027	15.39%	-28.04%
GH_FR1		4	10.23	9.176	11.28	10.17	9.57	11	0.3303	6.46%	1.94%
CM_MC2		4	10.05	9.137	10.97	9.955	9.57	10.73	0.2875	5.72%	3.62%

June 28/19

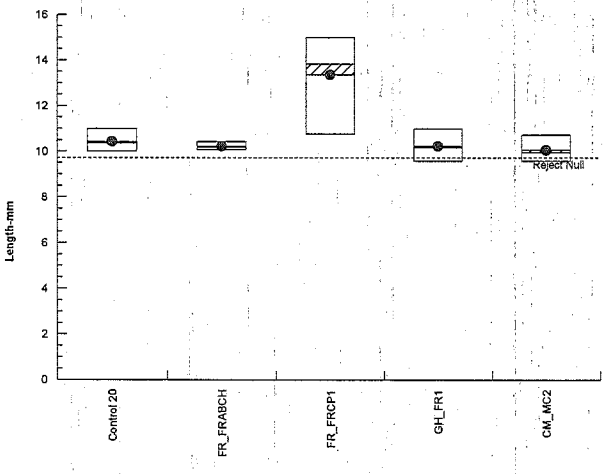
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

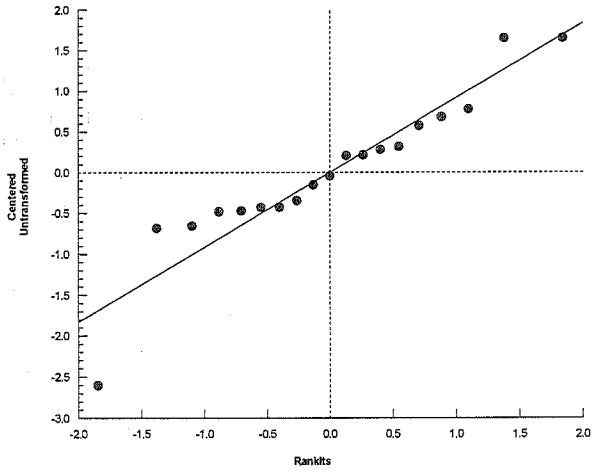
Analysis ID: 05-4567-6562 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 27 Jun-19 17:00 **Analysis:** Parametric-Two Sample **Status Level:** 1

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	MC	10.08	10	11	10.64
FR_FRABCH		10.07	10.18	10.43	
FR_FRCP1		15	15	12.67	10.75
GH_FR1		9.8	10.54	9.57	11
CM_MC2		10.33	9.57	9.58	10.73

Graphics





CETIS Analytical Report

Test Code/ID: 190360 / 16-8146-8021

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	19-5717-5842	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Jul-19 11:48	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L - Negative control	
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L - Method control	

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		Method Control*	0.0374	Exact	0.0374	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.7391	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 10	N	57	3	60	0.95	0.05	0.0%
Control 20	MC	50	10	60	0.8333	0.1667	12.28%

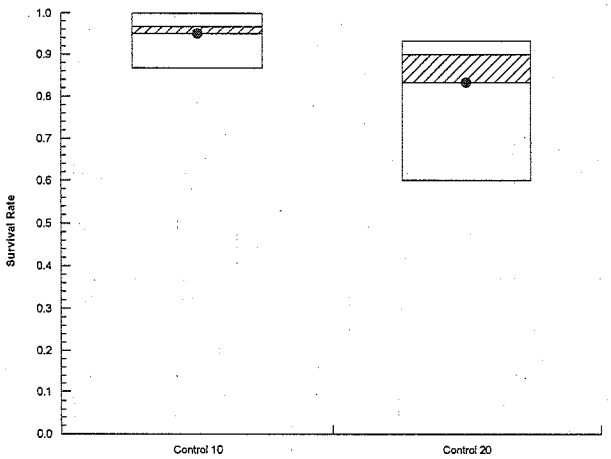
Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	0.9333	0.8667	1.0000	1.0000
Control 20	MC	0.8667	0.9333	0.6000	0.9333

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	14/15	13/15	15/15	15/15
Control 20	MC	13/15	14/15	9/15	14/15

Graphics



Analyst: JW QA: July 5/19

CETIS Analytical Report

Test Code/ID: 190360 / 16-8146-8021

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	05-9755-9879	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Jul-19 11:49	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L - negative control	
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L - method control	

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		Method Control	0.2479	Exact	0.2479	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			1.0000	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 10	N	60	0	60	1	0	0.0%
Control 20	MC	58	2	60	0.9667	0.03333	3.33%

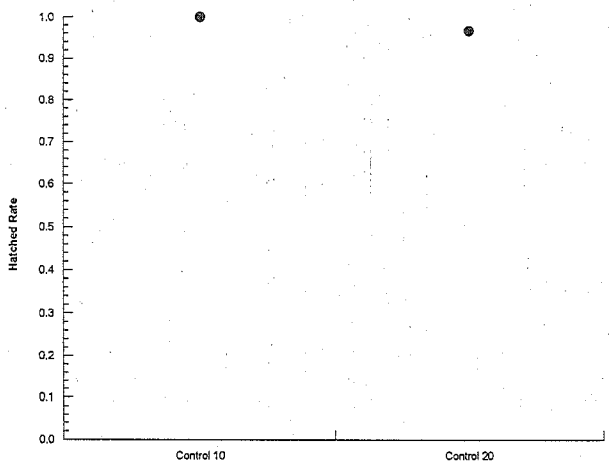
Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	1.0000	1.0000	1.0000	1.0000
Control 20	MC	1.0000	1.0000	0.9333	0.9333

Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	15/15	15/15	15/15	15/15
Control 20	MC	15/15	15/15	14/15	14/15

Graphics



Analyst: JW QA: 5/19

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	02-4547-9784	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Jul-19 11:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	negative control
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	method control

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	Control 20 failed mean dry biomass-mg	10.93%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		Method Control*	5.039	1.943	0.241	6	CDF	0.0012	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.3043	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.782499	0.782499	1	25.39	0.0024	Significant Effect
Error	0.184898	0.0308163	6			
Total	0.967397		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.736	47.47	0.4303	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9334	0.6451	0.5473	Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 10	N	4	2.208	2.003	2.412	2.193	2.089	2.357	0.06422	5.82%	0.00%
Control 20	MC	4	1.582	1.244	1.92	1.531	1.383	1.883	0.1062	13.43%	28.33%

Mean Dry Biomass-mg Detail

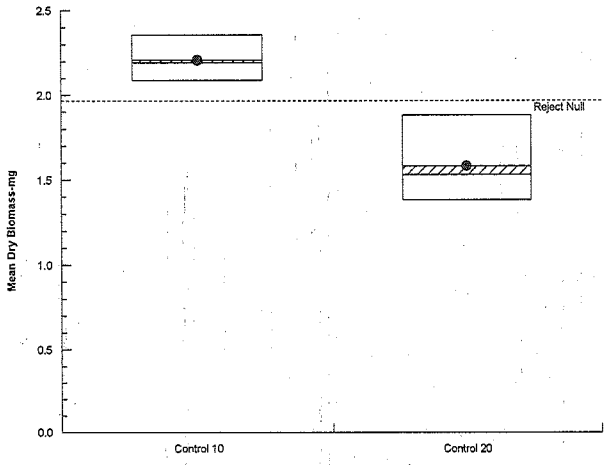
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	2.113	2.089	2.273	2.357
Control 20	MC	1.529	1.533	1.383	1.883

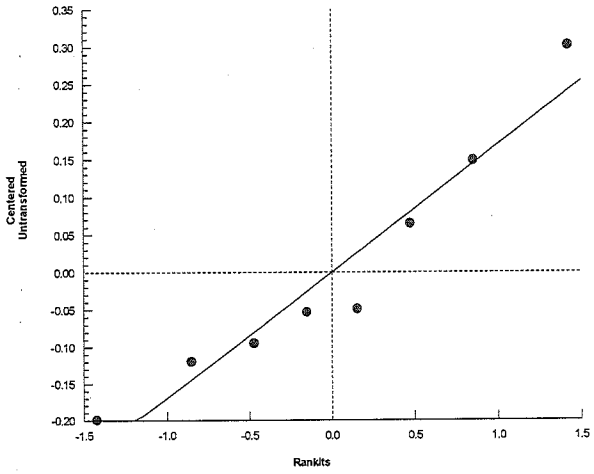
Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	02-4547-9784	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Jul-19 11:48	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Analyst: JW QA: 5/19

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	21-4561-2456	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Jul-19 11:49	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	04-6679-9186	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
Control 20	07-3092-5707	01 Mar-19	01 Mar-19	15h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	negative control
Control 20	Water Sample	Teck Coal	Cu Control 20µg/L	method control

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	Control 20 passed length-mm	4.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		Method Control	1.859	1.943	0.51	6	CDF	0.0562	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.0435	Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.475312	0.475312	1	3.455	0.1124	Non-Significant Effect
Error	0.825475	0.137579	6			
Total	1.30079		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	4.537	47.47	0.2460	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9622	0.6451	0.8308	Normal Distribution

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 10	N	4	10.92	10.56	11.27	10.9	10.67	11.21	0.1115	2.04%	0.00%
Control 20	MC	4	10.43	9.674	11.19	10.36	10	11	0.2374	4.55%	4.47%

Length-mm Detail

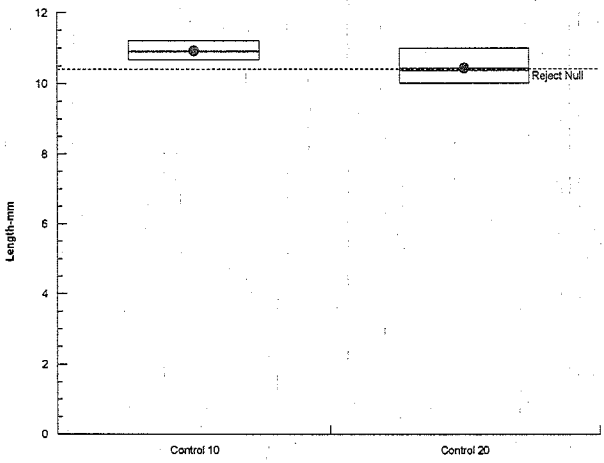
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	11.21	10.92	10.87	10.67
Control 20	MC	10.08	10	11	10.64

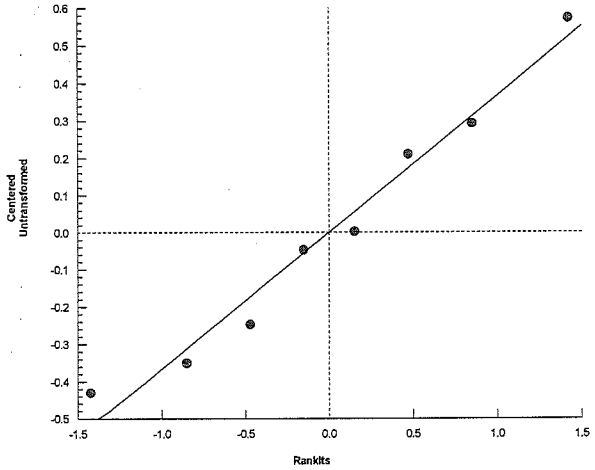
Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	21-4561-2456	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Jul-19 11:49	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





CETIS Analytical Report

32 d fathead minnow JW

Report Date: 27 Jun-19 17:06 (p 1 of 1)
Test Code/ID: 190360-1a / 02-7153-4748

~~Hyalella 14-d~~ Survival and Growth ~~Sediment~~ Test JW

Nautilus Environmental

Analysis ID:	14-4453-2069	**Endpoint:**	~~7d~~ Survival Rate 32 d	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 17:05	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Batch ID:	21-2532-1110	**Test Type:**	Growth-Survival (10d)	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C)	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Sample		FR_FRABCH	0.8260	Exact	0.8260	Non-Significant Effect

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_FRABCH	SS	35	25	60	0.5833	0.4167	0.0%
FR_FRABCH		39	21	60	0.65	0.35	-11.43%

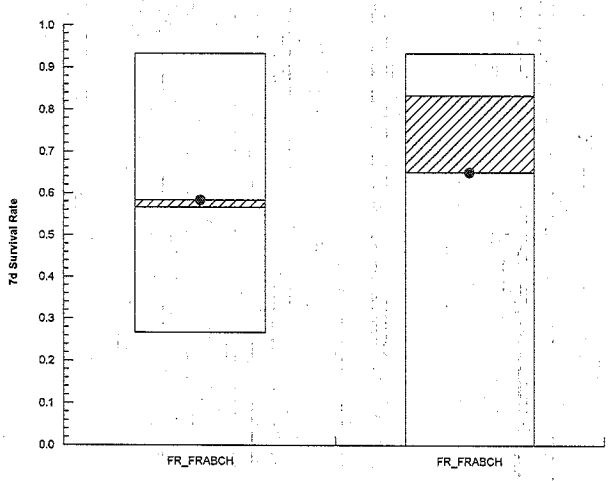
7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRABCH	SS	0.2667	0.9333	0.7333	0.4000
FR_FRABCH		0.0000	0.9333	0.7333	0.9333

7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRABCH	SS	4/15	14/15	11/15	6/15
FR_FRABCH		0/15	14/15	11/15	14/15

Graphics



June 28/19

CETIS Analytical Report

Test Code/ID: 190360a / 18-3998-5166

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	01-8662-0143	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 0:42	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C)	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Sample		FR_FRABCH	0.2437	Exact	0.2437	Non-Significant Effect

Data Summary (20 µg/L)

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_FRABCH	SS	57	3	60	0.95	0.05	0.0%
FR_FRABCH	(20 µg/L)	60	0	60	1	0	-5.26%

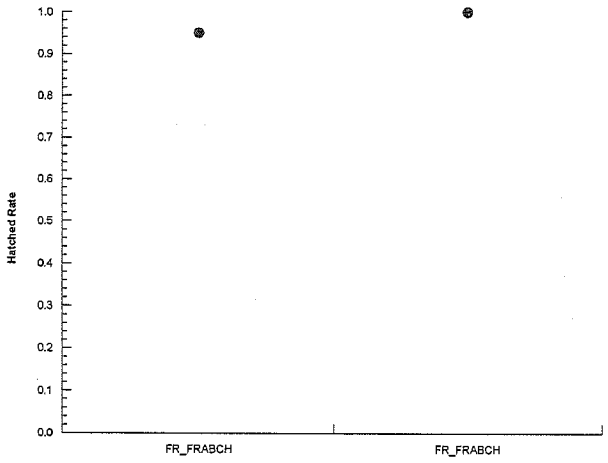
Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRABCH	SS	1.0000	1.0000	0.9333	0.8667
FR_FRABCH	(20 µg/L)	1.0000	1.0000	1.0000	1.0000

Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRABCH	SS	15/15	15/15	14/15	13/15
FR_FRABCH	(20 µg/L)	15/15	15/15	15/15	15/15

Graphics



 Analyst: JW QA: June 19/19

CETIS Analytical Report

Test Code/ID: 190360a / 18-3998-5166

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	16-2931-1377	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 0:42	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C)	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C <> T	FR_FRABCH passed mean dry biomass-mg	82.67%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Sample		FR_FRABCH	0.8942	3.182	1.577	3	CDF	0.4371	Non-Significant Effect

ANOVA Table (20 µg/L)

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.392796	0.392796	1	0.7996	0.4056	Non-Significant Effect
Error	2.9473	0.491217	6			
Total	3.3401		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	58.96	47.47	0.0073	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7968	0.6451	0.0265	Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_FRABCH	SS	4	1.908	1.704	2.112	1.949	1.725	2.009	0.064	6.71%	0.00%
FR_FRABCH	(20 µg/L)	4	1.465	-0.09931	3.029	1.899	0	2.061	0.4914	67.11%	23.23%

Mean Dry Biomass-mg Detail

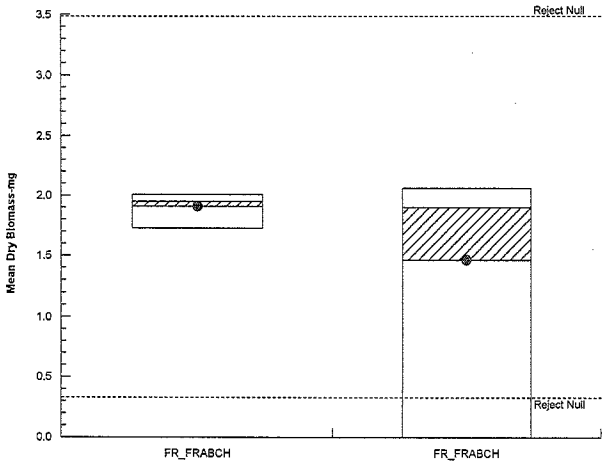
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRABCH	SS	2.009	1.917	1.98	1.725
FR_FRABCH	(20 µg/L)	0	2	1.798	2.061

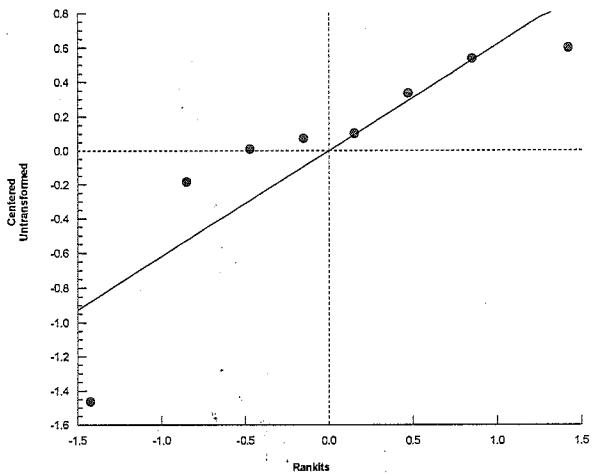
June 19/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	16-2931-1377	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 0:42	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





CETIS Analytical Report

Test Code/ID: 190360a / 18-3998-5166

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	19-6586-5968	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 17:07	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C)	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRABCH passed length-mm	20.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Sample		FR_FRABCH	1.629	2.015	2.573	5	CDF	0.0821	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.42263	7.42263	1	2.655	0.1641	Non-Significant Effect
Error	13.9775	2.79551	5			
Total	21.4002		6			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	136.2	199.2	0.0146	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9573	0.5629	0.7948	Normal Distribution

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_FRABCH	SS	4	12.31	8.881	15.73	12.05	10.14	15	1.077	17.50%	0.00%
FR_FRABCH	(20µg/L)	3	10.23	9.768	10.68	10.18	10.07	10.43	0.1065	1.80%	16.91%

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRABCH	SS	15	10.14	11.09	13
FR_FRABCH	(20µg/L)	10.07	10.18	10.43	

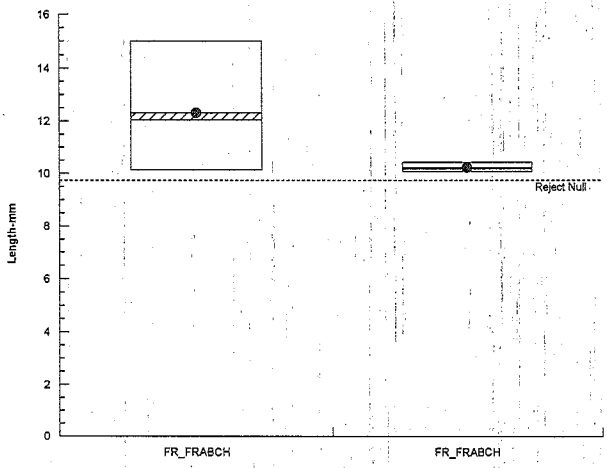
June 28/19

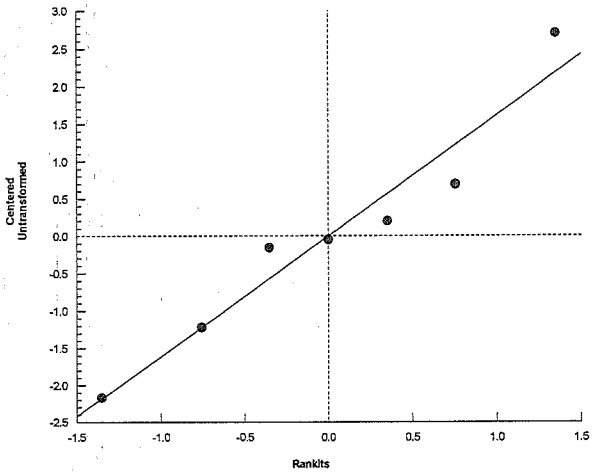
Analyst: JW QA:

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	19-6586-5968	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Jun-19 17:07	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





June 28/19

CETIS Analytical Report

Test Code/ID: 190360b / 15-2034-5333

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	11-9120-6572	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	18 Jun-19 11:55	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	14-1564-6927	26 Feb-19 12:05	27 Feb-19 11:02	75h (0 °C)	Teck Coal	
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		Teck Coal Q1

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Sample		FR_FRCP1	0.5000	Exact	0.5000	Non-Significant Effect

Auxiliary Tests (20 µg/L)

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.7391	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_FRCP1	SS	56	4	60	0.9333	0.06667	-1.82%
FR_FRCP1	(20 µg/L)	55	5	60	0.9167	0.08333	0.0%

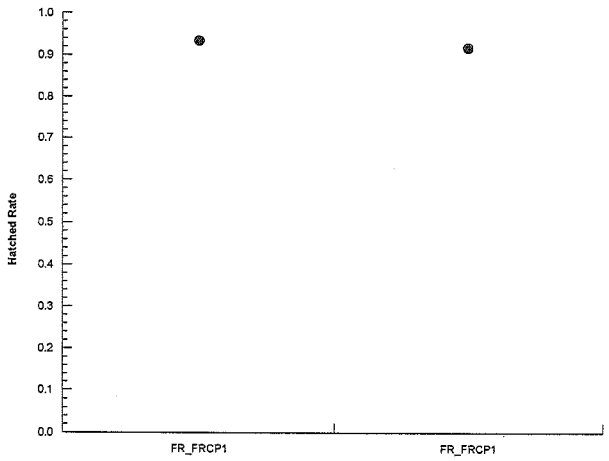
Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1	SS	0.9333	0.8000	1.0000	1.0000
FR_FRCP1	(20 µg/L)	1.0000	0.8000	0.9333	0.9333

Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1	SS	14/15	12/15	15/15	15/15
FR_FRCP1	(20 µg/L)	15/15	12/15	14/15	14/15

Graphics



June 19/19

CETIS Analytical Report

Test Code/ID: 190360c / 11-5196-1930

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	03-5491-5739	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 1:02	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C)	Teck Coal	
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		Teck Coal Q1

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Sample		GH_FR1	0.1629	Exact	0.1629	Non-Significant Effect

Data Summary (20 µg/L)

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
GH_FR1	SS	58	2	60	0.9667	0.03333	-9.43%
GH_FR1 (20 µg/L)		53	7	60	0.8833	0.1167	0.0%

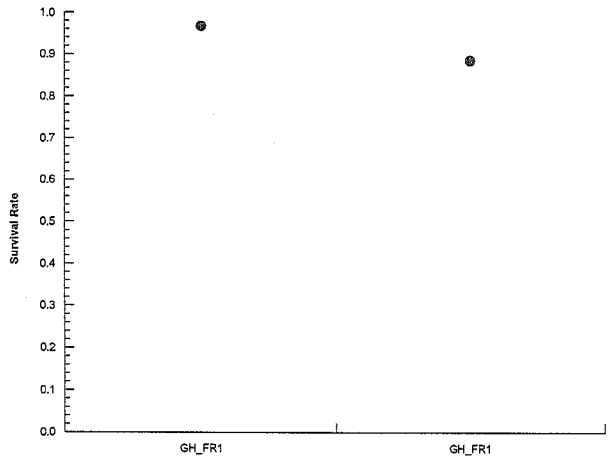
Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_FR1	SS	1.0000	1.0000	0.9333	0.9333
GH_FR1 (20 µg/L)		1.0000	0.8667	0.9333	0.7333

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_FR1	SS	15/15	15/15	14/15	14/15
GH_FR1 (20 µg/L)		15/15	13/15	14/15	11/15

Graphics



Analyst: JW QA: June 19/19

CETIS Analytical Report

Test Code/ID: 190360c / 11-5196-1930

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	00-7806-1611	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 1:02	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C)	Teck Coal	
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		Teck Coal Q1

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Sample		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
GH_FR1	SS	60	0	60	1	0	0.0%
GH_FR1 (20 µg/L)		60	0	60	1	0	0.0%

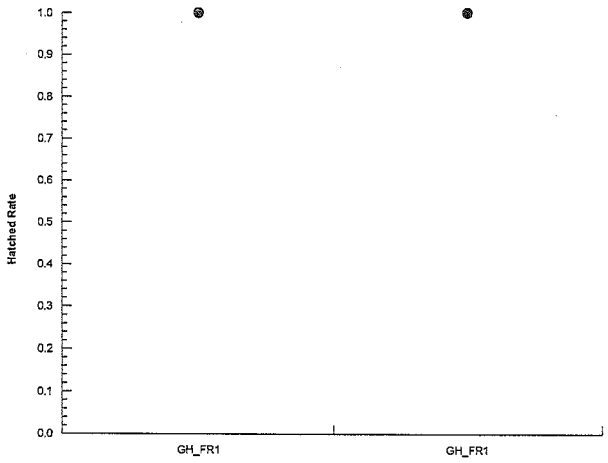
Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_FR1	SS	1.0000	1.0000	1.0000	1.0000
GH_FR1 (20 µg/L)		1.0000	1.0000	1.0000	1.0000

Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_FR1	SS	15/15	15/15	15/15	15/15
GH_FR1 (20 µg/L)		15/15	15/15	15/15	15/15

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	20-1134-9092	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 1:02	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C)	Teck Coal	
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		Teck Coal Q1

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C <> T	GH_FR1 passed mean dry biomass-mg	23.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Sample		GH_FR1	0.2289	2.447	0.463	6	CDF	0.8265	Non-Significant Effect

ANOVA Table (20 µg/L)

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0037557	0.0037557	1	0.05241	0.8265	Non-Significant Effect
Error	0.429936	0.071656	6			
Total	0.433692		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.134	47.47	0.9202	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8618	0.6451	0.1252	Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_FR1	SS	4	1.958	1.519	2.397	1.925	1.693	2.29	0.138	14.09%	0.00%
GH_FR1 (20 µg/L)		4	2.002	1.589	2.414	1.886	1.847	2.387	0.1296	12.95%	-2.21%

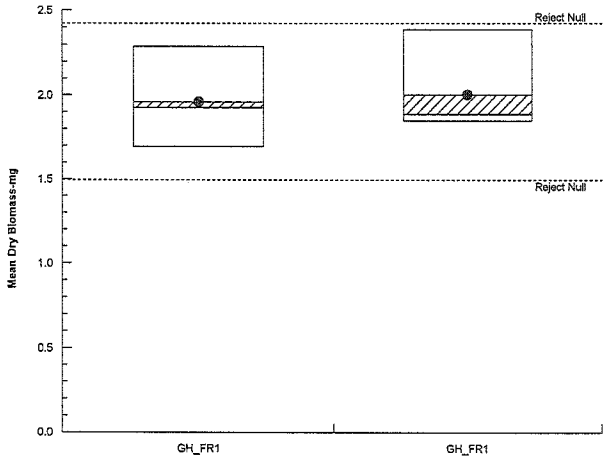
Mean Dry Biomass-mg Detail

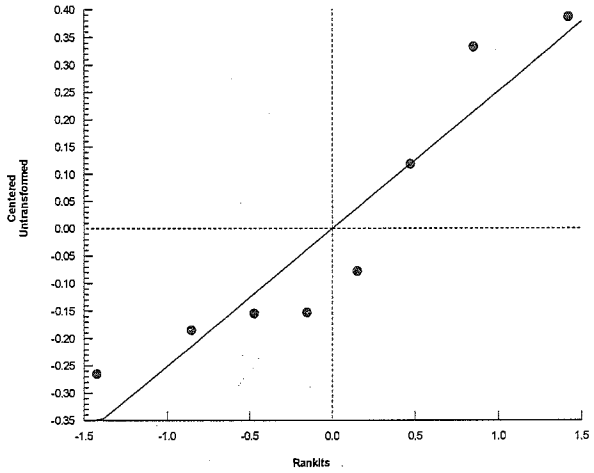
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_FR1	SS	2.077	1.693	1.773	2.29
GH_FR1 (20 µg/L)		1.849	1.924	1.847	2.387

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	20-1134-9092	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 1:02	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Analyst: JW QA: June 19/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	16-6144-6204	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 1:02	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C)	Teck Coal	
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		Teck Coal Q1

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C <> T	GH_FR1 passed length-mm	8.65%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Sample		GH_FR1	0.884	2.447	0.913	6	CDF	0.4107	Non-Significant Effect

ANOVA Table (20 µg/L)

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.2178	0.2178	1	0.7815	0.4107	Non-Significant Effect
Error	1.67215	0.278692	6			
Total	1.88995		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	3.611	47.47	0.3197	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9599	0.6451	0.8095	Normal Distribution

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_FR1	SS	4	10.56	10	11.11	10.48	10.27	11	0.1738	3.29%	0.00%
GH_FR1 (20 µg/L)		4	10.23	9.176	11.28	10.17	9.57	11	0.3303	6.46%	3.13%

Length-mm Detail

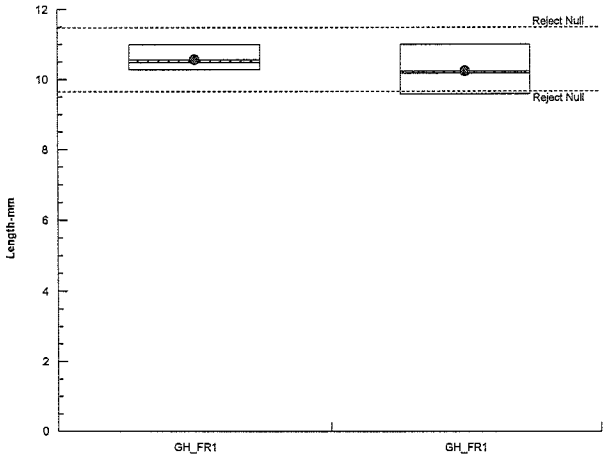
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_FR1	SS	10.67	10.27	10.29	11
GH_FR1 (20 µg/L)		9.8	10.54	9.57	11

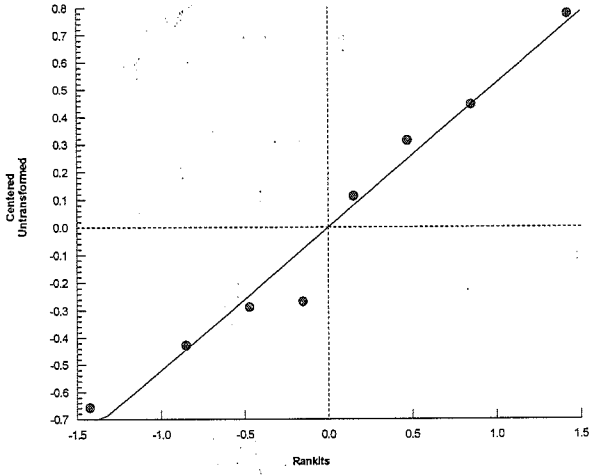
June 19/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	16-6144-6204	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 1:02	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





CETIS Analytical Report

Test Code/ID: 190360d / 11-7103-9009

Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	03-0132-2935	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 1:06	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C)	Teck Coal	
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Sample		CM_MC2	0.2950	Exact	0.2950	Non-Significant Effect

Data Summary (20 µg/L)

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
CM_MC2	SS	54	6	60	0.9	0.1	0.0%
CM_MC2 (20 µg/L)		49	11	60	0.8167	0.1833	9.26%

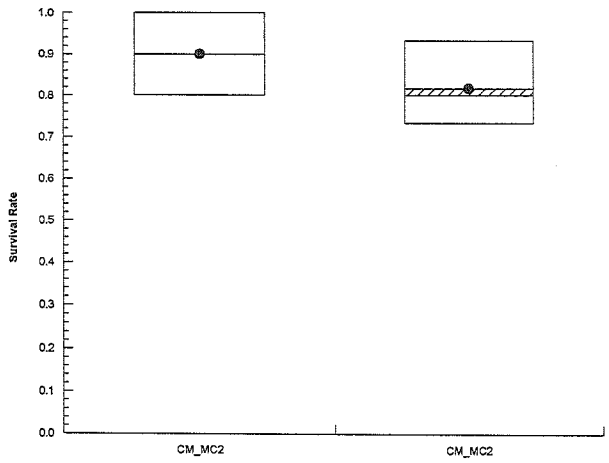
Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC2	SS	0.8000	1.0000	0.8000	1.0000
CM_MC2 (20 µg/L)		0.8000	0.9333	0.8000	0.7333

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC2	SS	12/15	15/15	12/15	15/15
CM_MC2 (20 µg/L)		12/15	14/15	12/15	11/15

Graphics



CETIS Analytical Report

Test Code/ID: 190360d / 11-7103-9009

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	19-7596-4155	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 1:06	**Analysis:**	Single 2x2 Contingency Table	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C)	Teck Coal	
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Fisher Exact Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Sample		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary (20µg/L)

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
CM_MC2	SS	60	0	60	1	0	0.0%
CM_MC2 (20µg/L)		60	0	60	1	0	0.0%

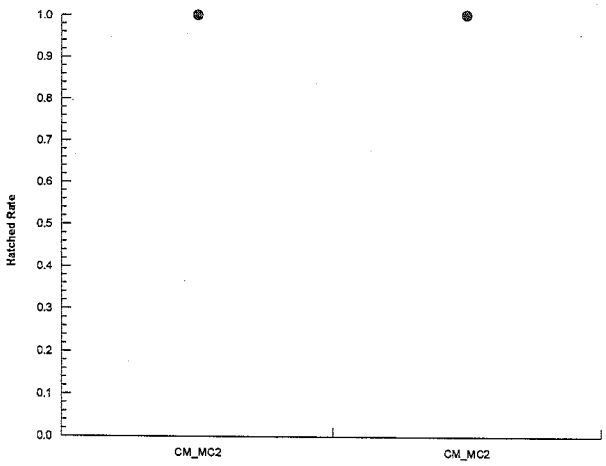
Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC2	SS	1.0000	1.0000	1.0000	1.0000
CM_MC2 (20µg/L)		1.0000	1.0000	1.0000	1.0000

Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC2	SS	15/15	15/15	15/15	15/15
CM_MC2 (20 µg/L)		15/15	15/15	15/15	15/15

Graphics



Analyst: JW QA: June 19/19

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	21-3792-2225	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 1:06	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C)	Teck Coal	
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C <> T	CM_MC2 passed mean dry biomass-mg	15.56%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Sample		CM_MC2	1.393	2.447	0.329	6	CDF	0.2130	Non-Significant Effect

ANOVA Table (20 µg/L)

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0701889	0.0701889	1	1.941	0.2130	Non-Significant Effect
Error	0.216941	0.0361568	6			
Total	0.28713		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.206	47.47	0.8813	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9188	0.6451	0.4204	Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CM_MC2	SS	4	2.115	1.798	2.431	2.106	1.889	2.358	0.09941	9.40%	0.00%
CM_MC2 (20 µg/L)		4	1.927	1.639	2.215	1.885	1.769	2.17	0.09053	9.39%	8.86%

Mean Dry Biomass-mg Detail

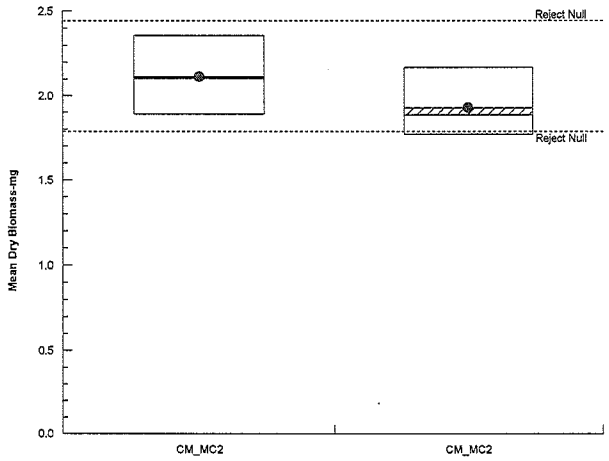
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC2	SS	2.358	1.889	2.041	2.171
CM_MC2 (20 µg/L)		1.959	1.769	1.812	2.17

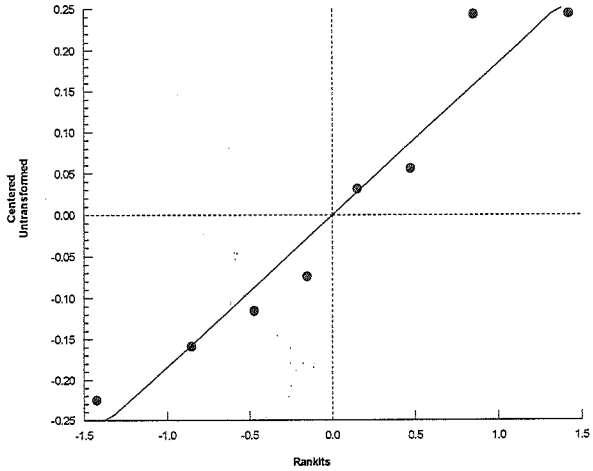
Analyst: JW QA: June 19/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	21-3792-2225	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 1:06	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	08-6122-9664	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 1:06	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C)	Teck Coal	
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C <> T	CM_MC2 passed length-mm	11.25%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Sample		CM_MC2	0.02708	2.447	1.13	6	CDF	0.9793	Non-Significant Effect

ANOVA Table (20 µg/L)

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0003125	0.0003125	1	0.0007332	0.9793	Non-Significant Effect
Error	2.55727	0.426212	6			
Total	2.55759		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.578	47.47	0.7171	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9447	0.6451	0.6579	Normal Distribution

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CM_MC2	SS	4	10.04	8.891	11.19	10.1	9.13	10.83	0.3612	7.19%	0.00%
CM_MC2 (20 µg/L)		4	10.05	9.137	10.97	9.955	9.57	10.73	0.2875	5.72%	-0.12%

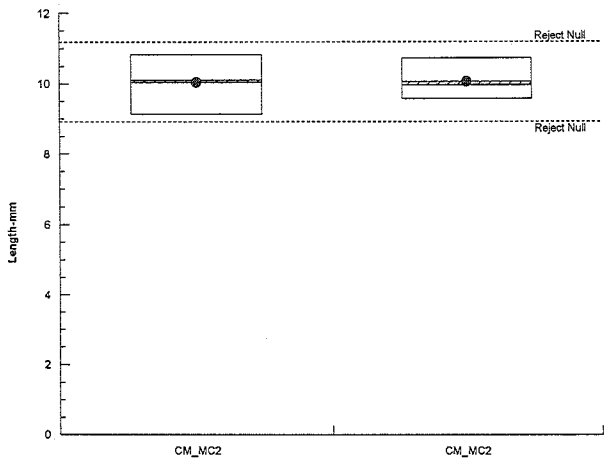
Length-mm Detail

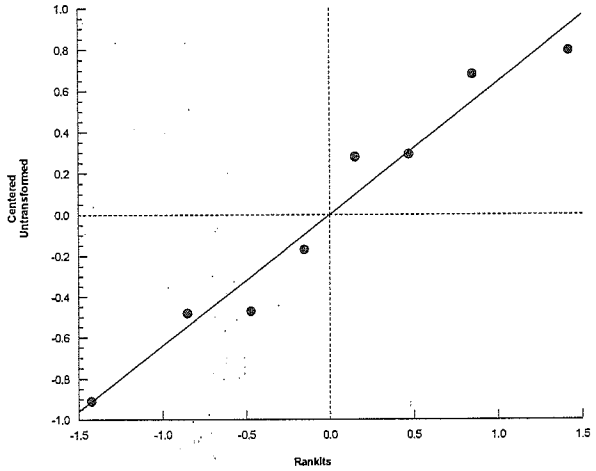
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC2	SS	10.83	9.13	10.33	9.87
CM_MC2 (20 µg/L)		10.33	9.57	9.58	10.73

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	08-6122-9664	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 1:06	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





CETIS Analytical Report

Fathead minnow 32-d

Test Code/ID: 190360-2 / 10-2108-2146

~~Hyalella 14-d~~ Survival and Growth ~~Sediment Test~~ SW — Nautilus Environmental

Analysis ID:	20-6240-2760	**Endpoint:**	~~7d~~ Survival Rate 32d	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:48	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	13-7605-9306	**Test Type:**	Growth-Survival (10d)	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox

Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h ~~(0 °C)~~ 1.8 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Fisher Exact/Bonferroni-Holm Test

Sample I vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (FR_UFR1)	FR_FRABCH	0.0311	Exact	0.0934	Non-Significant Effect
	FR_FRCP1*	0.0000	Exact	2.3E-13	Significant Effect
	GH_FR1	0.8998	Exact	0.8998	Non-Significant Effect
	CM_MC2	0.5930	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	XC	49	11	60	0.8167	0.1833	7.55%
FR_FRABCH		39	21	60	0.65	0.35	26.42%
FR_FRCP1		9	51	60	0.15	0.85	83.02%
GH_FR1		53	7	60	0.8833	0.1167	0.0%
CM_MC2		49	11	60	0.8167	0.1833	7.55%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	XC	0.9333	0.6667	0.8667	0.8000
FR_FRABCH		0.0000	0.9333	0.7333	0.9333
FR_FRCP1		0.0667	0.0667	0.2000	0.2667
GH_FR1		1.0000	0.8667	0.9333	0.7333
CM_MC2		0.8000	0.9333	0.8000	0.7333

7d Survival Rate Binomials

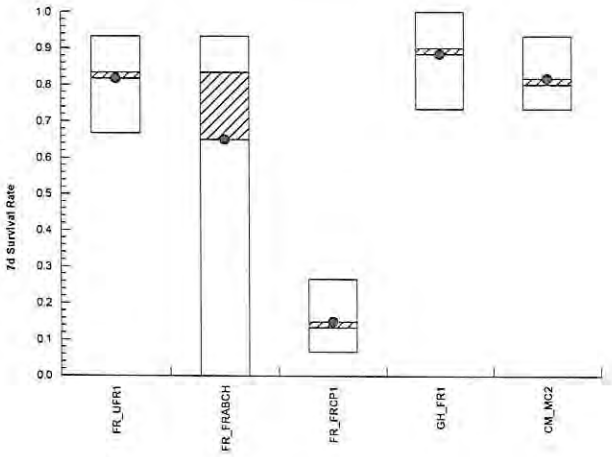
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	XC	14/15	10/15	13/15	12/15
FR_FRABCH		0/15	14/15	11/15	14/15
FR_FRCP1		1/15	1/15	3/15	4/15
GH_FR1		15/15	13/15	14/15	11/15
CM_MC2		12/15	14/15	12/15	11/15

Analyst: JW QA: July 30/19

~~Hyalella 14-d~~ Survival and Growth ~~Sediment Test~~ JW Nautilus Environmental

Analysis ID:	20-6240-2760	**Endpoint:**	~~7d~~ Survival Rate 32d	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:48	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test

Nautilus Environmental

Analysis ID:	03-6540-5943	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:29	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C) 1.8 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
(FR_UFR1)		FR_FRCP1	0.0287	Exact	0.1146	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	XC	60	0	60	1	0	0.0%
FR_FRABCH		60	0	60	1	0	0.0%
FR_FRCP1		55	5	60	0.9167	0.08333	8.33%
GH_FR1		60	0	60	1	0	0.0%
CM_MC2		60	0	60	1	0	0.0%

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	XC	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	0.8000	0.9333	0.9333
GH_FR1		1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000

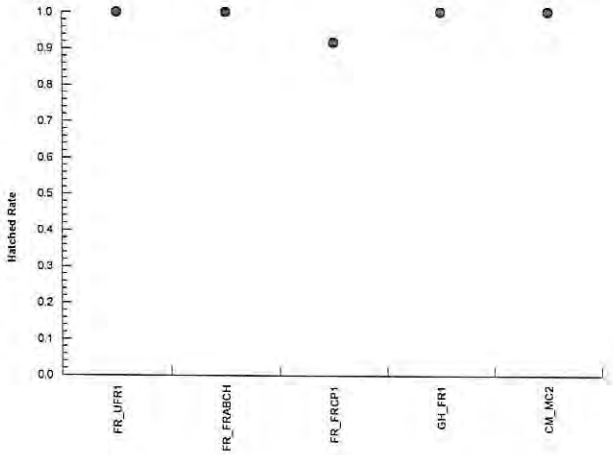
Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	XC	15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	15/15	15/15
FR_FRCP1		15/15	12/15	14/15	14/15
GH_FR1		15/15	15/15	15/15	15/15
CM_MC2		15/15	15/15	15/15	15/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	03-6540-5943	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:29	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: JW QA: July 30/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	16-7140-9170	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 11:32	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (~~0 °C~~) 1.8 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRABCH passed length-mm	6.68%
		FR_FRCP1 passed length-mm	6.68%
		GH_FR1 passed length-mm	6.68%
		CM_MC2 passed length-mm	6.68%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRABCH	1.277	2.132	0.477	4	CDF	0.1353	Non-Significant Effect
FR_UFR1		FR_FRCP1	-2.717	2.353	2.462	3	CDF	0.9636	Non-Significant Effect
		GH_FR1	0.7411	2.132	0.82	4	CDF	0.2499	Non-Significant Effect
		CM_MC2	1.32	2.015	0.702	5	CDF	0.1220	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	30.7494	7.68735	4	6.943	0.0027	Significant Effect
Error	15.502	1.10729	14			
Total	46.2514		18			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	13.31	13.28	0.0099	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9076	0.8605	0.0670	Normal Distribution

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	4	10.51	9.886	11.14	10.48	10.1	11	0.1969	3.75%	0.00%
FR_FRABCH		3	10.23	9.768	10.68	10.18	10.07	10.43	0.1065	1.80%	2.72%
FR_FRCP1		4	13.36	10.09	16.62	13.84	10.75	15	1.027	15.39%	-27.04%
GH_FR1		4	10.23	9.176	11.28	10.17	9.57	11	0.3303	6.46%	2.71%
CM_MC2		4	10.05	9.137	10.97	9.955	9.57	10.73	0.2875	5.72%	4.38%

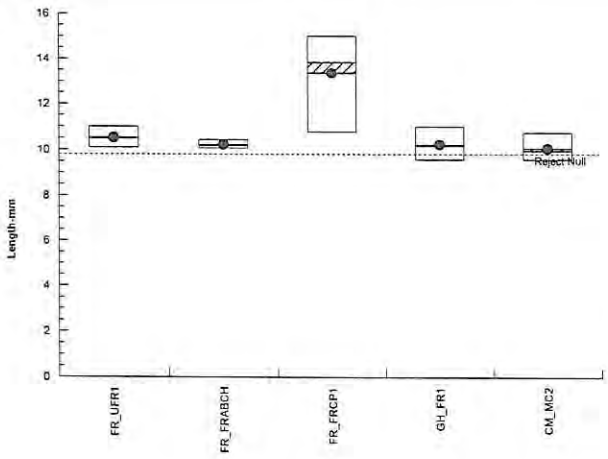
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

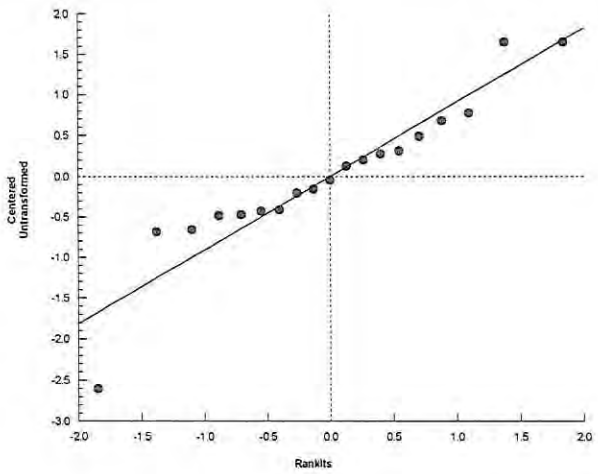
Analysis ID:	16-7140-9170	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 11:32	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	XC	10.64	10.1	10.31	11
FR_FRABCH		10.07	10.18	10.43	
FR_FRCP1		15	15	12.67	10.75
GH_FR1		9.8	10.54	9.57	11
CM_MC2		10.33	9.57	9.58	10.73

Graphics





Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	16-9117-5861	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:29	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (~~0 °C~~) 1.8 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRABCH passed mean dry biomass-mg	22.67%
		FR_FRCP1 failed mean dry biomass-mg	22.67%
		GH_FR1 passed mean dry biomass-mg	22.67%
		CM_MC2 passed mean dry biomass-mg	22.67%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control (FR_UFR 1)		FR_FRABCH	0.6988	2.353	1.225	3	CDF	0.2675	Non-Significant Effect
		FR_FRCP1*	5.35	2.132	0.419	4	CDF	0.0029	Significant Effect
		GH_FR1	-0.804	2.015	0.434	5	CDF	0.7710	Non-Significant Effect
		CM_MC2	-0.5084	2.132	0.415	4	CDF	0.6810	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.05658	1.01415	4	4.156	0.0184	Significant Effect
Error	3.66035	0.244023	15			
Total	7.71693		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	12.09	13.28	0.0167	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8281	0.866	0.0023	Non-Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	4	1.828	1.281	2.376	1.889	1.355	2.181	0.1721	18.82%	0.00%
FR_FRABCH		4	1.465	-0.09931	3.029	1.899	0	2.061	0.4914	67.11%	19.90%
FR_FRCP1		4	0.7783	0.4776	1.079	0.7453	0.598	1.025	0.09449	24.28%	57.43%
GH_FR1		4	2.002	1.589	2.414	1.886	1.847	2.387	0.1296	12.95%	-9.47%
CM_MC2		4	1.927	1.639	2.215	1.885	1.769	2.17	0.09053	9.39%	-5.41%

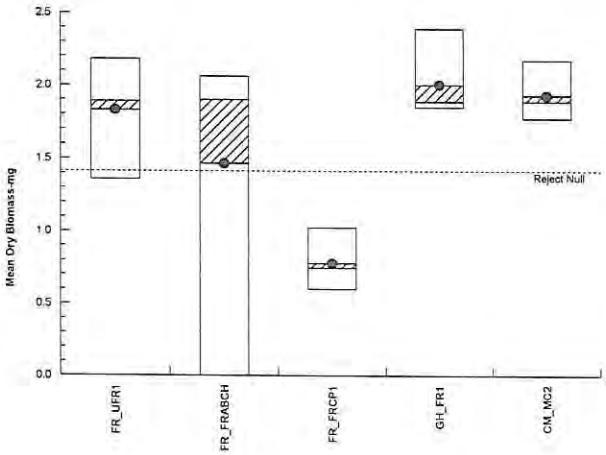
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

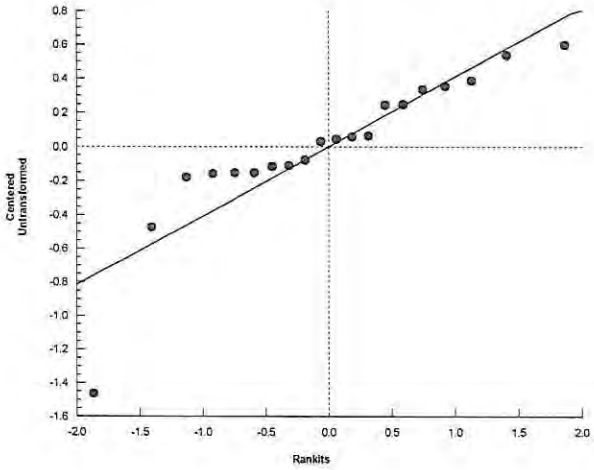
Analysis ID: 16-9117-5861 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 30 Jul-19 10:29 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	XC	1.891	1.355	1.887	2.181
FR_FRABCH		0	2	1.798	2.061
FR_FRCP1		0.6687	0.598	1.025	0.822
GH_FR1		1.849	1.924	1.847	2.387
CM_MC2		1.959	1.769	1.812	2.17

Graphics





CETIS Analytical Report

Fathead Minnow 32-d

~~Hyalella 14-d~~ Survival and Growth ~~Sediment Test~~ JW

Nautilus Environmental

Analysis ID:	18-0847-0340	**Endpoint:**	~~7d~~ Survival Rate 32 d	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:49	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	13-7605-9306	**Test Type:**	Growth-Survival (10d)	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (~~0 °C~~) 2.7 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
JW ~~Method Control~~ GH_ER2		FR_FRABCH	0.0778	Exact	0.2335	Non-Significant Effect
		FR_FRCP1*	0.0000	Exact	4.3E-12	Significant Effect
		GH_FR1	0.9577	Exact	0.9577	Non-Significant Effect
		CM_MC2	0.7529	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
GH_ER2	MC	47	13	60	0.7833	0.2167	11.32%
FR_FRABCH		39	21	60	0.65	0.35	26.42%
FR_FRCP1		9	51	60	0.15	0.85	83.02%
GH_FR1		53	7	60	0.8833	0.1167	0.0%
CM_MC2		49	11	60	0.8167	0.1833	7.55%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	MC	0.8667	0.8667	0.8000	0.6000
FR_FRABCH		0.0000	0.9333	0.7333	0.9333
FR_FRCP1		0.0667	0.0667	0.2000	0.2667
GH_FR1		1.0000	0.8667	0.9333	0.7333
CM_MC2		0.8000	0.9333	0.8000	0.7333

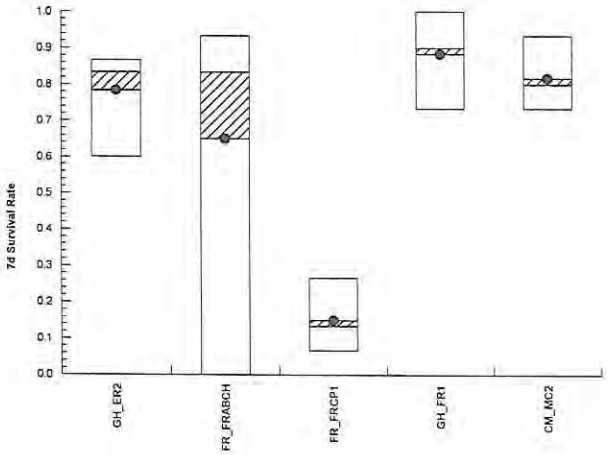
7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	MC	13/15	13/15	12/15	9/15
FR_FRABCH		0/15	14/15	11/15	14/15
FR_FRCP1		1/15	1/15	3/15	4/15
GH_FR1		15/15	13/15	14/15	11/15
CM_MC2		12/15	14/15	12/15	11/15

~~Hyalella 14-d~~ Survival and Growth ~~Sediment Test~~ JW Nautilus Environmental

Analysis ID:	18-0847-0340	**Endpoint:**	~~7d~~ Survival Rate 32 d	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:49	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: JW QA: July 30/19

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	05-6360-2264	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:29	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (~~0 °C~~) 2.7 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
~~Method Control~~ GH_ER2		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.0287	Exact	0.1146	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
GH_ER2	MC	60	0	60	1	0	0.0%
FR_FRABCH		60	0	60	1	0	0.0%
FR_FRCP1		55	5	60	0.9167	0.08333	8.33%
GH_FR1		60	0	60	1	0	0.0%
CM_MC2		60	0	60	1	0	0.0%

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	MC	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	0.8000	0.9333	0.9333
GH_FR1		1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000

Hatched Rate Binomials

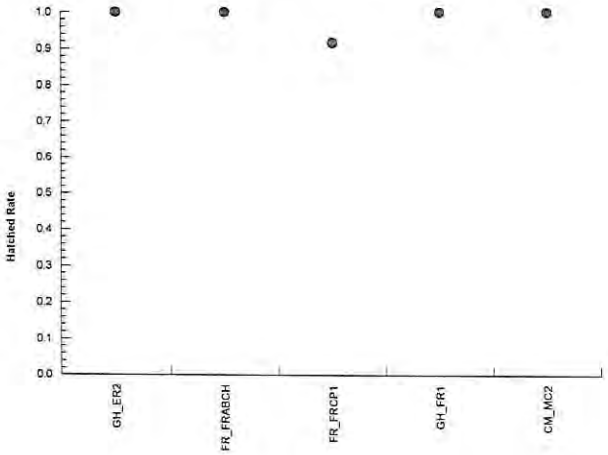
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	MC	15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	15/15	15/15
FR_FRCP1		15/15	12/15	14/15	14/15
GH_FR1		15/15	15/15	15/15	15/15
CM_MC2		15/15	15/15	15/15	15/15

Analyst: JW QA: 30/7/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	05-6360-2264	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:29	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	06-4873-1866	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 11:33	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h ~~(0 °C)~~ 2.7 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRABCH failed length-mm	7.09%
		FR_FRCP1 passed length-mm	7.09%
		GH_FR1 failed length-mm	7.09%
		CM_MC2 failed length-mm	7.09%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
~~Method Control~~ GH-ER2		FR_FRABCH*	2.668	2.015	0.712	5	CDF	0.0222	Significant Effect
		FR_FRCP1	-2.047	1.943	2.074	6	CDF	0.9567	Non-Significant Effect
		GH_FR1*	2.147	1.943	0.853	6	CDF	0.0377	Significant Effect
		CM_MC2*	2.74	1.943	0.792	6	CDF	0.0169	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	30.0293	7.50731	4	6.552	0.0035	Significant Effect
Error	16.0403	1.14574	14			
Total	46.0696		18			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	11.72	13.28	0.0196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9164	0.8605	0.0971	Normal Distribution

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_ER2	MC	4	11.17	10.25	12.09	11.12	10.54	11.89	0.2892	5.18%	0.00%
FR_FRABCH		3	10.23	9.768	10.68	10.18	10.07	10.43	0.1065	1.80%	8.45%
FR_FRCP1		4	13.36	10.09	16.62	13.84	10.75	15	1.027	15.39%	-19.56%
GH_FR1		4	10.23	9.176	11.28	10.17	9.57	11	0.3303	6.46%	8.44%
CM_MC2		4	10.05	9.137	10.97	9.955	9.57	10.73	0.2875	5.72%	10.00%

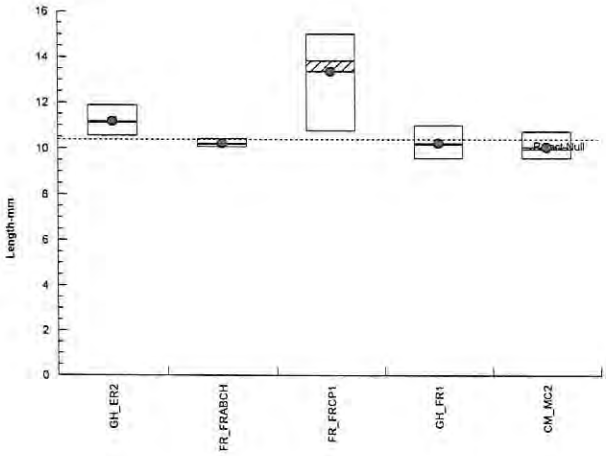
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

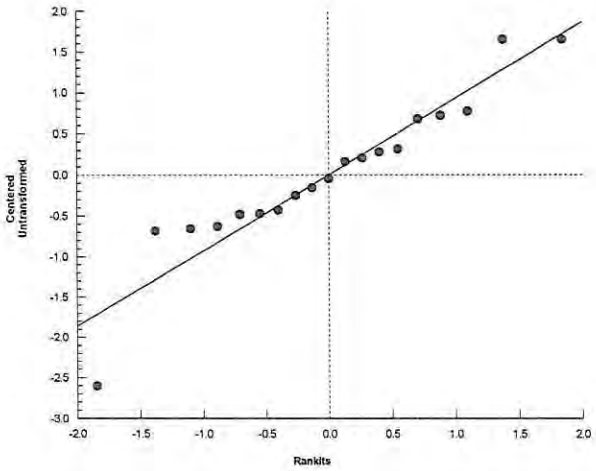
Analysis ID: 06-4873-1866 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 30 Jul-19 11:33 **Analysis:** Parametric-Two Sample **Status Level:** 1

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	MC	10.54	10.92	11.33	11.89
FR_FRABCH		10.07	10.18	10.43	
FR_FRCP1		15	15	12.67	10.75
GH_FR1		9.8	10.54	9.57	11
CM_MC2		10.33	9.57	9.58	10.73

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	00-4205-6203	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:30	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (~~0 °C~~) 2.7 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRABCH passed mean dry biomass-mg	12.30%
		FR_FRCP1 failed mean dry biomass-mg	12.30%
		GH_FR1 passed mean dry biomass-mg	12.30%
		CM_MC2 passed mean dry biomass-mg	12.30%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
~~Method Control~~ GH-ER2 JW		FR_FRABCH	0.9029	2.353	1.169	3	CDF	0.2166	Non-Significant Effect
		FR_FRCP1*	9.47	2.015	0.242	5	CDF	1.1E-04	Significant Effect
		GH_FR1	-0.5925	2.132	0.318	4	CDF	0.7073	Non-Significant Effect
		CM_MC2	-0.1199	2.015	0.235	5	CDF	0.5454	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.23463	1.05866	4	4.712	0.0116	Significant Effect
Error	3.37037	0.224691	15			
Total	7.60499		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	15.48	13.28	0.0038	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7773	0.866	4.0E-04	Non-Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
GH_ER2	MC	4	1.913	1.679	2.148	1.928	1.743	2.055	0.07374	7.71%	0.00%
FR_FRABCH		4	1.465	-0.09931	3.029	1.899	0	2.061	0.4914	67.11%	23.45%
FR_FRCP1		4	0.7783	0.4776	1.079	0.7453	0.598	1.025	0.09449	24.28%	59.32%
GH_FR1		4	2.002	1.589	2.414	1.886	1.847	2.387	0.1296	12.95%	-4.62%
CM_MC2		4	1.927	1.639	2.215	1.885	1.769	2.17	0.09053	9.39%	-0.73%

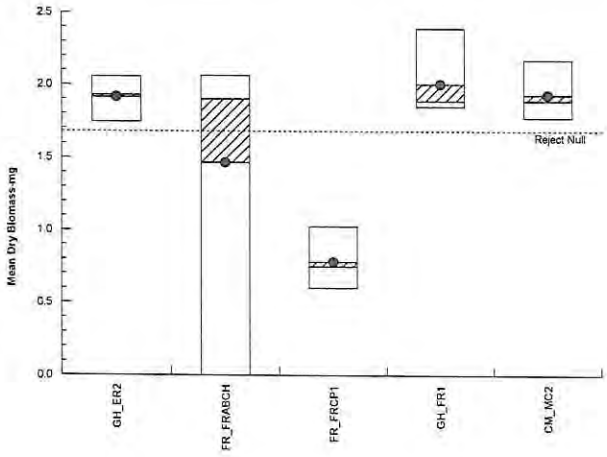
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

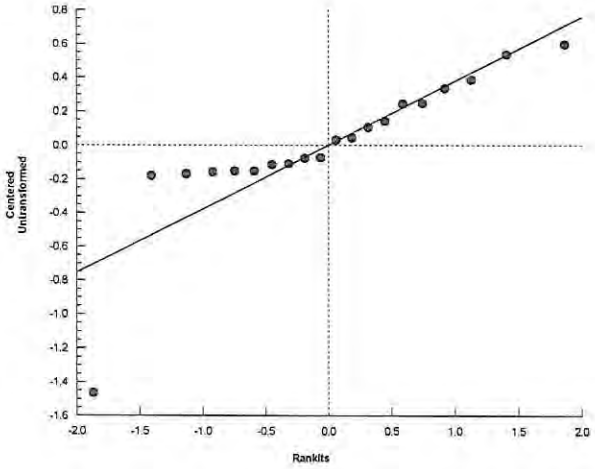
Analysis ID: 00-4205-6203 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 30 Jul-19 10:30 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
GH_ER2	MC	1.839	1.743	2.055	2.017
FR_FRABCH		0	2	1.798	2.061
FR_FRCP1		0.6687	0.598	1.025	0.822
GH_FR1		1.849	1.924	1.847	2.387
CM_MC2		1.959	1.769	1.812	2.17

Graphics





CETIS Analytical Report

Fathead minnow 32-d

~~Hyalella 14-d~~ Survival and Growth ~~Sediment Test~~ — Nautilus Environmental

Analysis ID:	04-0568-9939	**Endpoint:**	7d Survival Rate 32 d	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:49	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	13-7605-9306	**Test Type:**	Growth-Survival (10d)	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (~~0 °C~~) 1.4 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
JW ~~Negative Control~~ CM_MC1		FR_FRABCH	0.8691	Exact	1.0000	Non-Significant Effect
		FR_FRCP1*	0.0000	Exact	6.2E-06	Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.9993	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
CM_MC1	N	34	26	60	0.5667	0.4333	35.85%
FR_FRABCH		39	21	60	0.65	0.35	26.42%
FR_FRCP1		9	51	60	0.15	0.85	83.02%
GH_FR1		53	7	60	0.8833	0.1167	0.0%
CM_MC2		49	11	60	0.8167	0.1833	7.55%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC1	N	0.5333	0.7333	0.6000	0.4000
FR_FRABCH		0.0000	0.9333	0.7333	0.9333
FR_FRCP1		0.0667	0.0667	0.2000	0.2667
GH_FR1		1.0000	0.8667	0.9333	0.7333
CM_MC2		0.8000	0.9333	0.8000	0.7333

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC1	N	8/15	11/15	9/15	6/15
FR_FRABCH		0/15	14/15	11/15	14/15
FR_FRCP1		1/15	1/15	3/15	4/15
GH_FR1		15/15	13/15	14/15	11/15
CM_MC2		12/15	14/15	12/15	11/15

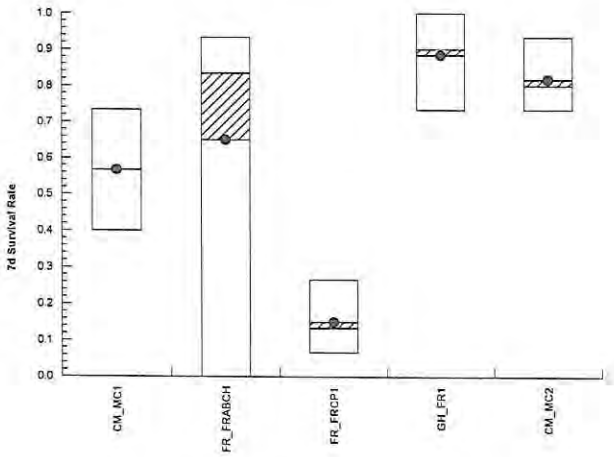
Analyst: JW QA: July 30/19

~~Hyalella 14-d~~ Survival and Growth ~~Sediment Test~~ JW

Nautilus Environmental

Analysis ID:	04-0568-9939	**Endpoint:**	~~7d~~ Survival Rate 32-d	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:49	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: JW QA: July 30/19

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	13-8169-3948	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:29	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h ~~(0 °C)~~ 1.4 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Fisher Exact/Bonferroni-Holm Test

Sample I vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
~~Negative Control~~ CM_MC1	FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
	FR_FRCP1	0.0287	Exact	0.1146	Non-Significant Effect
	GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
	CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
CM_MC1	N	60	0	60	1	0	0.0%
FR_FRABCH		60	0	60	1	0	0.0%
FR_FRCP1		55	5	60	0.9167	0.08333	8.33%
GH_FR1		60	0	60	1	0	0.0%
CM_MC2		60	0	60	1	0	0.0%

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC1	N	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	0.8000	0.9333	0.9333
GH_FR1		1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000

Hatched Rate Binomials

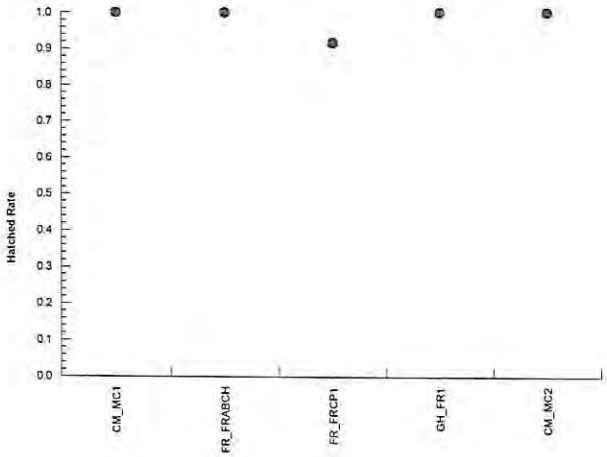
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC1	N	15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	15/15	15/15
FR_FRCP1		15/15	12/15	14/15	14/15
GH_FR1		15/15	15/15	15/15	15/15
CM_MC2		15/15	15/15	15/15	15/15

Analyst: JW QA: July 30/19

Fathead Minnow 32-d Survival and Growth Test **Nautilus Environmental**

Analysis ID:	13-8169-3948	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:29	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: JW QA: 30/19

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	19-6098-8554	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 11:33	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C)	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRABCH failed length-mm	6.56%
		FR_FRCP1 passed length-mm	6.56%
		GH_FR1 failed length-mm	6.56%
		CM_MC2 failed length-mm	6.56%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
~~Negative Control~~ CM_MC1		FR_FRABCH*	2.927	2.015	0.601	5	CDF	0.0164	Significant Effect
		FR_FRCP1	-2.137	1.943	2.051	6	CDF	0.9618	Non-Significant Effect
		GH_FR1*	2.135	1.943	0.794	6	CDF	0.0384	Significant Effect
		CM_MC2*	2.794	1.943	0.729	6	CDF	0.0157	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	29.9761	7.49401	4	6.669	0.0032	Significant Effect
Error	15.7321	1.12372	14			
Total	45.7082		18			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	12.44	13.28	0.0144	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9116	0.8605	0.0791	Normal Distribution

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CM_MC1	N	4	11.1	10.33	11.87	11.22	10.46	11.5	0.2407	4.34%	0.00%
FR_FRABCH		3	10.23	9.768	10.68	10.18	10.07	10.43	0.1065	1.80%	7.87%
FR_FRCP1		4	13.36	10.09	16.62	13.84	10.75	15	1.027	15.39%	-20.32%
GH_FR1		4	10.23	9.176	11.28	10.17	9.57	11	0.3303	6.46%	7.86%
CM_MC2		4	10.05	9.137	10.97	9.955	9.57	10.73	0.2875	5.72%	9.44%

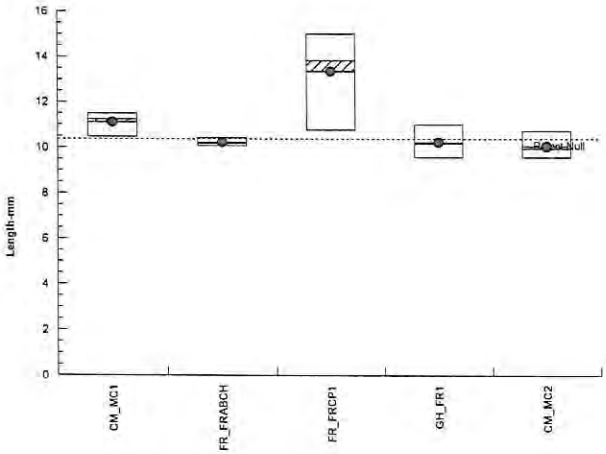
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

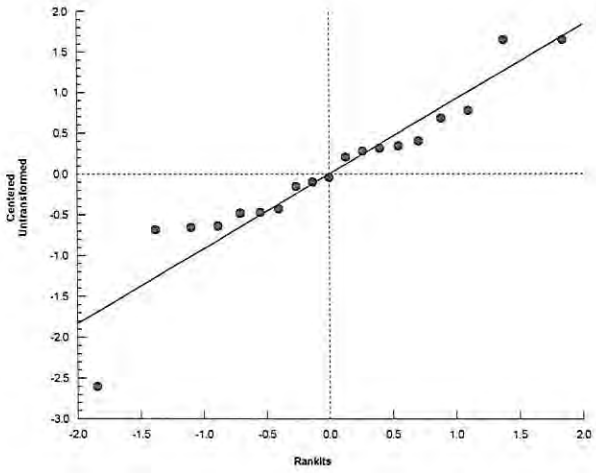
Analysis ID: 19-6098-8554 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 30 Jul-19 11:33 **Analysis:** Parametric-Two Sample **Status Level:** 1

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC1	N	11.5	10.46	11.44	11
FR_FRABCH		10.07	10.18	10.43	
FR_FRCP1		15	15	12.67	10.75
GH_FR1		9.8	10.54	9.57	11
CM_MC2		10.33	9.57	9.58	10.73

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	15-6278-2878	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:30	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h ~~(0 °C)~~ 1.4°C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRABCH passed mean dry biomass-mg	32.70%
		FR_FRCP1 failed mean dry biomass-mg	32.70%
		GH_FR1 passed mean dry biomass-mg	32.70%
		CM_MC2 passed mean dry biomass-mg	32.70%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
~~Negative Control~~ CM_MC1 JW		FR_FRABCH	-0.04643	2.353	1.25	3	CDF	0.5171	Non-Significant Effect
		FR_FRCP1*	2.973	2.132	0.475	4	CDF	0.0205	Significant Effect
		GH_FR1	-2.344	2.015	0.483	5	CDF	0.9670	Non-Significant Effect
		CM_MC2	-2.206	2.132	0.471	4	CDF	0.9540	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.8297	0.957424	4	3.787	0.0254	Significant Effect
Error	3.79234	0.252823	15			
Total	7.62204		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	11.72	13.28	0.0196	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8303	0.866	0.0025	Non-Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
CM_MC1	N	4	1.44	0.7987	2.081	1.372	1.035	1.981	0.2015	27.99%	0.00%
FR_FRABCH		4	1.465	-0.09931	3.029	1.899	0	2.061	0.4914	67.11%	-1.71%
FR_FRCP1		4	0.7783	0.4776	1.079	0.7453	0.598	1.025	0.09449	24.28%	45.95%
GH_FR1		4	2.002	1.589	2.414	1.886	1.847	2.387	0.1296	12.95%	-39.00%
CM_MC2		4	1.927	1.639	2.215	1.885	1.769	2.17	0.09053	9.39%	-33.84%

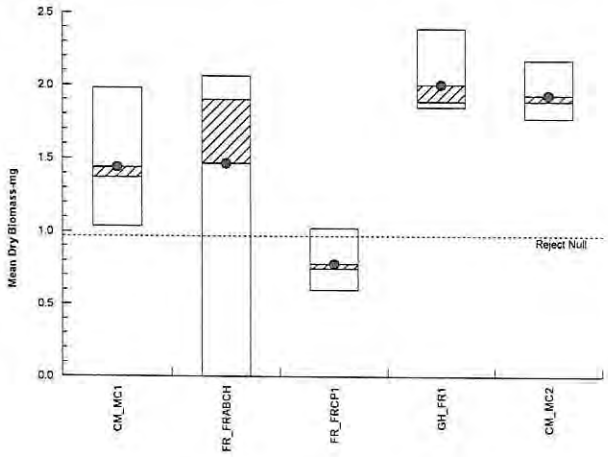
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

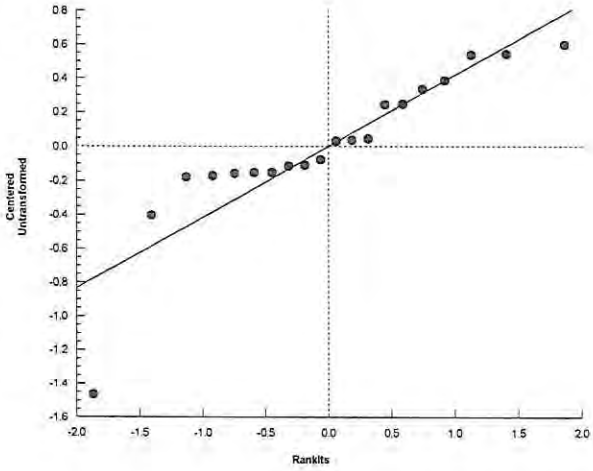
Analysis ID: 15-6278-2878 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 30 Jul-19 10:30 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
CM_MC1	N	1.477	1.267	1.981	1.035
FR_FRABCH		0	2	1.798	2.061
FR_FRCP1		0.6687	0.598	1.025	0.822
GH_FR1		1.849	1.924	1.847	2.387
CM_MC2		1.959	1.769	1.812	2.17

Graphics





CETIS Analytical Report

fathead minnow 32d

~~Hyalella 14-d~~ Survival and Growth ~~Sediment Test~~ JW

Nautilus Environmental

Analysis ID:	21-3699-6525	**Endpoint:**	~~7d~~ Survival Rate 32d	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:49	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	13-7605-9306	**Test Type:**	Growth-Survival (10d)	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (~~0 °C~~) 2.1 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
JW ~~Upstream Control~~ LC_SLC		FR_FRABCH*	0.0097	Exact	0.0292	Significant Effect
		FR_FRCP1*	0.0000	Exact	9.3E-15	Significant Effect
		GH_FR1	0.7894	Exact	0.7894	Non-Significant Effect
		CM_MC2	0.4035	Exact	0.8071	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
LC_SLC	U	51	9	60	0.85	0.15	3.77%
FR_FRABCH		39	21	60	0.65	0.35	26.42%
FR_FRCP1		9	51	60	0.15	0.85	83.02%
GH_FR1		53	7	60	0.8833	0.1167	0.0%
CM_MC2		49	11	60	0.8167	0.1833	7.55%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
LC_SLC	U	1.0000	0.8667	0.5333	1.0000
FR_FRABCH		0.0000	0.9333	0.7333	0.9333
FR_FRCP1		0.0667	0.0667	0.2000	0.2667
GH_FR1		1.0000	0.8667	0.9333	0.7333
CM_MC2		0.8000	0.9333	0.8000	0.7333

7d Survival Rate Binomials

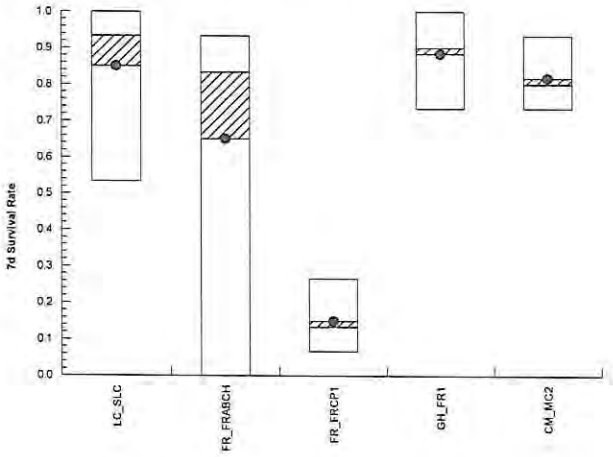
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
LC_SLC	U	15/15	13/15	8/15	15/15
FR_FRABCH		0/15	14/15	11/15	14/15
FR_FRCP1		1/15	1/15	3/15	4/15
GH_FR1		15/15	13/15	14/15	11/15
CM_MC2		12/15	14/15	12/15	11/15

Analyst: JW QA: July 30/19

~~Hyalella 14-d~~ Survival and Growth ~~Sediment Test~~ DW Nautilus Environmental

Analysis ID:	21-3699-6525	**Endpoint:**	~~7d~~ Survival Rate 32 d	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:49	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: DW QA: July 22/19

CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	19-4384-9756	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:29	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h ~~(0 °C)~~ 21 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C) JW		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
JW ~~Upstream Control~~		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
LC - SLC		FR_FRCP1	0.0287	Exact	0.1146	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
LC_SLC	U	60	0	60	1	0	0.0%
FR_FRABCH		60	0	60	1	0	0.0%
FR_FRCP1		55	5	60	0.9167	0.08333	8.33%
GH_FR1		60	0	60	1	0	0.0%
CM_MC2		60	0	60	1	0	0.0%

Hatched Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
LC_SLC	U	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	0.8000	0.9333	0.9333
GH_FR1		1.0000	1.0000	1.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000

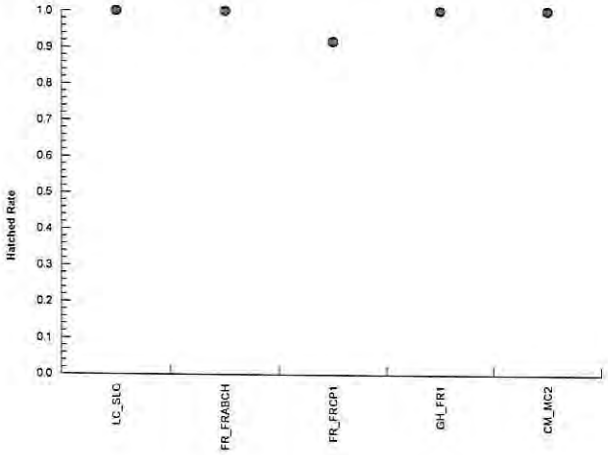
Hatched Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
LC_SLC	U	15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	15/15	15/15
FR_FRCP1		15/15	12/15	14/15	14/15
GH_FR1		15/15	15/15	15/15	15/15
CM_MC2		15/15	15/15	15/15	15/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	19-4384-9756	**Endpoint:**	Hatched Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:29	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	03-6613-9438	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 11:33	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (~~0 °C~~) 2.1 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRABCH passed length-mm	8.87%
		FR_FRCP1 passed length-mm	8.87%
		GH_FR1 passed length-mm	8.87%
		CM_MC2 passed length-mm	8.87%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
~~Upstream Control~~ LC - SLC	FR_FRABCH	-0.3202	2.015	0.876	5	CDF	0.6191	Non-Significant Effect
	FR_FRCP1	-3.002	1.943	2.115	6	CDF	0.9880	Non-Significant Effect
	GH_FR1	-0.2868	1.943	0.949	6	CDF	0.6080	Non-Significant Effect
	CM_MC2	0.07603	1.943	0.895	6	CDF	0.4709	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	32.6677	8.16693	4	6.893	0.0028	Significant Effect
Error	16.5876	1.18483	14			
Total	49.2553		18			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	10.99	13.28	0.0267	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9135	0.8605	0.0859	Normal Distribution

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LC_SLC	U	4	10.09	8.943	11.23	9.81	9.6	11.13	0.3595	7.13%	0.00%
FR_FRABCH		3	10.23	9.768	10.68	10.18	10.07	10.43	0.1065	1.80%	-1.38%
FR_FRCP1		4	13.36	10.09	16.62	13.84	10.75	15	1.027	15.39%	-32.39%
GH_FR1		4	10.23	9.176	11.28	10.17	9.57	11	0.3303	6.46%	-1.39%
CM_MC2		4	10.05	9.137	10.97	9.955	9.57	10.73	0.2875	5.72%	0.35%

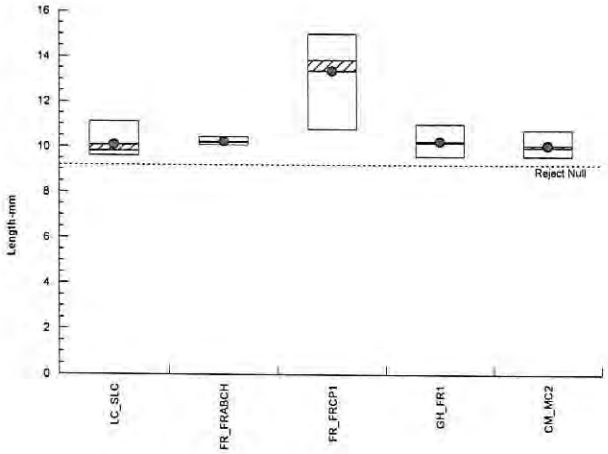
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

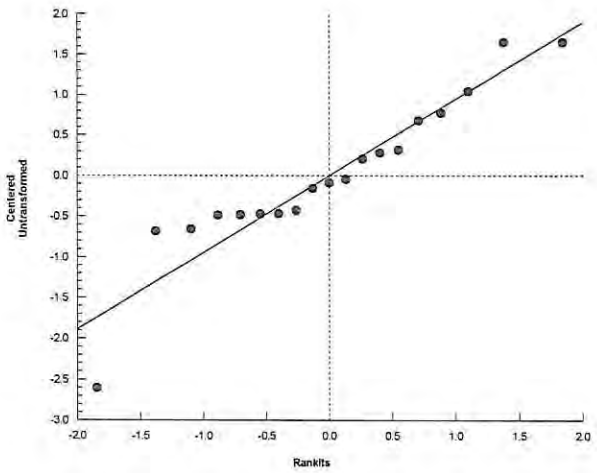
Analysis ID: 03-6613-9438 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 30 Jul-19 11:33 **Analysis:** Parametric-Two Sample **Status Level:** 1

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
LC_SLC	U	9.6	9.62	11.13	10
FR_FRABCH		10.07	10.18	10.43	
FR_FRCP1		15	15	12.67	10.75
GH_FR1		9.8	10.54	9.57	11
CM_MC2		10.33	9.57	9.58	10.73

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	01-1621-4953	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	30 Jul-19 10:30	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-6469-8914	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	02 Apr-19 08:30	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 17h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (~~0 °C~~) 2.1 °C	Teck Coal	
FR_FRABCH	08-3275-9977	26 Feb-19 11:00	27 Feb-19 10:00	76h (1.8 °C)		Teck Coal Q1
FR_FRCP1	07-9395-3788	26 Feb-19 12:05	27 Feb-19 10:00	75h (1.8 °C)		
GH_FR1	04-4612-6412	26 Feb-19	27 Feb-19	87h (3.1 °C)		
CM_MC2	15-2114-4248	26 Feb-19	27 Feb-19 10:00	87h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH (20 µg/L)	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1 (20 µg/L)	
GH_FR1	Water Sample	Teck Coal	GH_FR1 (20 µg/L)	
CM_MC2	Water Sample	Teck Coal	CM_MC2 (20 µg/L)	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRABCH passed mean dry biomass-mg	13.02%
		FR_FRCP1 failed mean dry biomass-mg	13.02%
		GH_FR1 passed mean dry biomass-mg	13.02%
		CM_MC2 passed mean dry biomass-mg	13.02%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
JW ~~Upstream Control~~		FR_FRABCH	0.722	2.353	1.17	3	CDF	0.2612	Non-Significant Effect
LC - SLC		FR_FRCP1*	8.644	2.015	0.244	5	CDF	1.7E-04	Significant Effect
		GH_FR1	-1.187	2.132	0.32	4	CDF	0.8496	Non-Significant Effect
		CM_MC2	-0.8795	2.015	0.238	5	CDF	0.7903	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.04782	1.01196	4	4.5	0.0138	Significant Effect
Error	3.37347	0.224898	15			
Total	7.4213		19			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	15.37	13.28	0.0040	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.7805	0.866	4.5E-04	Non-Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
LC_SLC	U	4	1.824	1.583	2.064	1.834	1.629	1.998	0.07548	8.28%	0.00%
FR_FRABCH		4	1.465	-0.09931	3.029	1.899	0	2.061	0.4914	67.11%	19.69%
FR_FRCP1		4	0.7783	0.4776	1.079	0.7453	0.598	1.025	0.09449	24.28%	57.32%
GH_FR1		4	2.002	1.589	2.414	1.886	1.847	2.387	0.1296	12.95%	-9.76%
CM_MC2		4	1.927	1.639	2.215	1.885	1.769	2.17	0.09053	9.39%	-5.68%

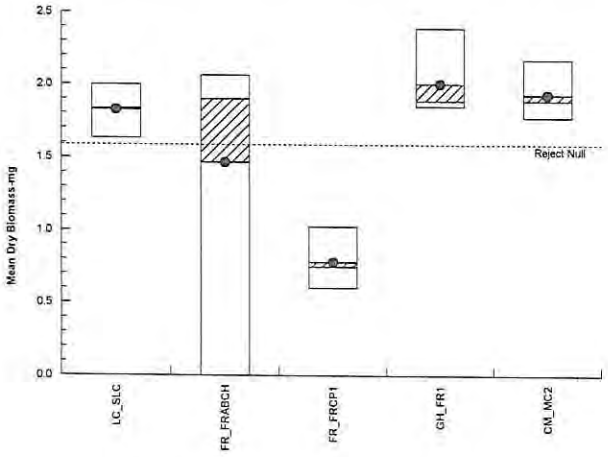
Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

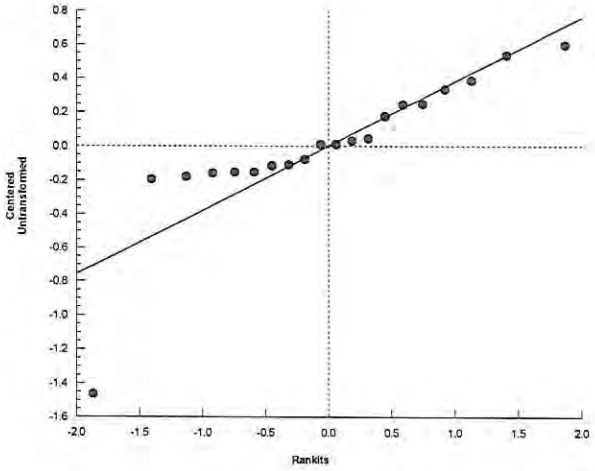
Analysis ID: 01-1621-4953 **Endpoint:** Mean Dry Biomass-mg **CETIS Version:** CETISv1.9.4
Analyzed: 30 Jul-19 10:30 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
LC_SLC	U	1.835	1.629	1.833	1.998
FR_FRABCH		0	2	1.798	2.061
FR_FRCP1		0.6687	0.598	1.025	0.822
GH_FR1		1.849	1.924	1.847	2.387
CM_MC2		1.959	1.769	1.812	2.17

Graphics





CETIS Analytical Report

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	12-7829-2596	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Feb-20 15:00	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	10-8669-8641	**Test Type:**	Survival-Development-Growth	**Analyst:**	Jeslin Wijaya
Start Date:	01 Mar-19 15:00	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	~~Mod-Hard Synthetic Water~~ MH Dechlorinated tap water
Ending Date:	02 Apr-19 09:10	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	31d 18h	**Taxon:**	Actinopterygii	**Source:**	Aquatox **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 10	02-3018-2396	01 Mar-19	01 Mar-19	15h	Teck Coal	Teck Coal Q1
CM_MC1	14-6390-3619	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
FR_UFR1	17-0681-5389	26 Feb-19 12:41	27 Feb-19 11:02	74h (0 °C)		
FR_FRABCH	04-0284-1769	26 Feb-19 11:00	27 Feb-19 11:02	76h (0 °C)		
GH_FR1	09-9383-8599	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ER2	05-3894-0987	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
GH_ERC	06-3698-7323	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
CM_MC2	13-4150-2504	26 Feb-19	27 Feb-19 11:02	87h (0 °C)		
EV_MC2	06-4014-0031	26 Feb-19 10:15	27 Feb-19 11:02	77h (0 °C)		
EV_HC1	18-0023-2176	26 Feb-19 08:45	27 Feb-19 11:02	78h (0 °C)		
LC_DCDS	00-9153-8052	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C)		
LC_LC3	21-3423-1296	26 Feb-19 09:40	27 Feb-19 11:02	77h (0 °C)		
LC_LC5	17-3175-4754	26 Feb-19 10:10	27 Feb-19 11:02	77h (0 °C)		
LC_LCDSSLCC	19-7955-1985	26 Feb-19 10:46	27 Feb-19 11:02	76h (0 °C)		
LC_SLC	09-0001-4776	26 Feb-19 12:10	27 Feb-19 11:02	75h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 10	Water Sample	Teck Coal	Cu Control 10 µg/L	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-02-26	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-02-0	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-02-26_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-02-26	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-02-26_	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-02-26_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-02-26	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-02-25_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-02-26_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-02-26_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.4865	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.2434	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.1118	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.2478	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.4722	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.1020	Exact	1.0000	Non-Significant Effect

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID: 12-7829-2596 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.9.4
Analyzed: 12 Feb-20 15:00 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 10	N	57	0	57	1	0	-3.64%
CM_MC1		34	0	34	1	0	-3.64%
FR_UFR1		49	0	49	1	0	-3.64%
FR_FRABCH		35	0	35	1	0	-3.64%
GH_FR1		58	0	58	1	0	-3.64%
GH_ER2		47	0	47	1	0	-3.64%
GH_ERC		29	0	29	1	0	-3.64%
CM_MC2		53	1	54	0.9815	0.01852	-1.72%
EV_MC2		54	2	56	0.9643	0.03571	0.06%
EV_HC1		51	3	54	0.9444	0.05556	2.12%
LC_DCDS		55	2	57	0.9649	0.03509	0.0%
LC_LC3		49	0	49	1	0	-3.64%
LC_LC5		41	0	41	1	0	-3.64%
LC_LCDSSLCC		50	1	51	0.9804	0.01961	-1.6%
LC_SLC		48	3	51	0.9412	0.05882	2.46%

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000		
CM_MC2		1.0000	1.0000	1.0000	0.9333
EV_MC2		0.8571	1.0000	1.0000	1.0000
EV_HC1		0.9286	0.9286	1.0000	0.9333
LC_DCDS		0.9286	1.0000	1.0000	0.9286
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	
LC_LCDSSLCC		1.0000	0.9091	1.0000	1.0000
LC_SLC		0.9333	0.9231	1.0000	0.9333

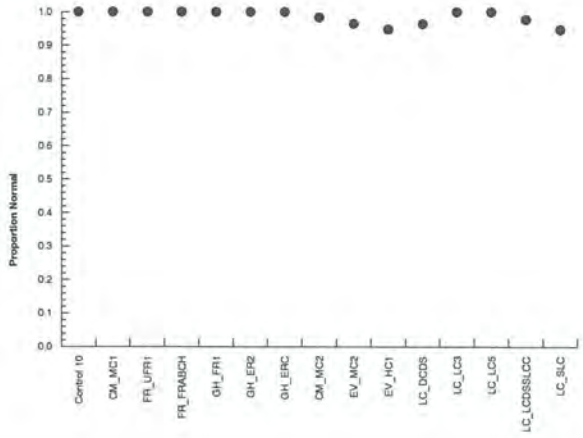
Proportion Normal Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 10	N	14/14	13/13	15/15	15/15
CM_MC1		8/8	11/11	9/9	6/6
FR_UFR1		14/14	10/10	13/13	12/12
FR_FRABCH		4/4	14/14	11/11	6/6
GH_FR1		15/15	15/15	14/14	14/14
GH_ER2		13/13	13/13	12/12	9/9
GH_ERC		14/14	15/15		
CM_MC2		12/12	15/15	12/12	14/15
EV_MC2		12/14	14/14	14/14	14/14
EV_HC1		13/14	13/14	11/11	14/15
LC_DCDS		13/14	15/15	14/14	13/14
LC_LC3		12/12	12/12	12/12	13/13
LC_LC5		14/14	14/14	13/13	
LC_LCDSSLCC		11/11	10/11	14/14	15/15
LC_SLC		14/15	12/13	8/8	14/15

Fathead Minnow 32-d Survival and Growth Test — **Nautilus Environmental**

Analysis ID:	12-7829-2596	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Feb-20 15:00	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: JW QA: MG Feb 12, 2020

Fathead minnow 32-d (Pimephales promelas) survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	02-8342-8556	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	07 Feb-20 15:21	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	17-2979-0773	**Test Type:**	32 Day Fathead Minnow Test	**Analyst:**	Stephanie Schiffer
Start Date:	01 Mar-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Dechlorinated Tap Water
Ending Date:	02 Apr-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatox, AR **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Ctl 20	18-9952-2751	26 Feb-19	27 Feb-19	72h	Teck Coal	Teck Coal Q1
FR_FRABCH 20Cu	03-6462-2686	26 Feb-19	27 Feb-19	72h (1.6 °C)		
FR_FRCP1 20Cu	08-3517-5105	26 Feb-19	27 Feb-19	72h (1.8 °C)		
GH_FR1 20Cu	10-0402-2766	26 Feb-19	27 Feb-19	72h (3.1 °C)		
CM_MC2 20Cu	15-9790-3438	26 Feb-19	27 Feb-19	72h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Ctl 20	Water Sample	Teck Coal	Cu Control 10ug/L	
FR_FRABCH 20Cu	Water Sample	Teck Coal	FR_FRABCH_MON_2019-02-04_NP	
FR_FRCP1 20Cu	Water Sample	Teck Coal	FR_FRCP1_MON_2019-02-04_N	
GH_FR1 20Cu	Water Sample	Teck Coal	GH_FR1_WS_2019-02-26_N	
CM_MC2 20Cu	Water Sample	Teck Coal	CM_MC2_WS_2019-02-26_N	

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	FR_FRABCH 20Cu passed proportion normal	4.69%
		FR_FRCP1 20Cu failed proportion normal	4.69%
		GH_FR1 20Cu failed proportion normal	4.69%
		CM_MC2 20Cu passed proportion normal	4.69%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_FRABCH 20Cu	1.121	2.015	0.075	5	CDF	0.1565	Non-Significant Effect
		FR_FRCP1 20Cu*	5.533	1.943	0.113	6	CDF	7.3E-04	Significant Effect
		GH_FR1 20Cu*	3.119	1.943	0.061	6	CDF	0.0103	Significant Effect
		CM_MC2 20Cu	0.9668	1.943	0.075	6	CDF	0.1855	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.603	2.681	0.0725	No Outliers Detected

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.263508	0.065877	4	11.59	2.3E-04	Significant Effect
Error	0.0795825	0.0056845	14			
Total	0.343091		18			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	7.109	13.28	0.1302	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.959	0.8605	0.5536	Normal Distribution

Proportion Normal Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Ctl 20	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
FR_FRABCH 20Cu		3	0.9762	0.8737	1.0000	1.0000	0.9286	1.0000	0.0238	4.22%	2.38%
FR_FRCP1 20Cu		4	0.9375	0.7386	1.0000	1.0000	0.7500	1.0000	0.0625	13.33%	6.25%
GH_FR1 20Cu		4	0.9462	0.8888	1.0000	0.9310	0.9231	1.0000	0.0180	3.81%	5.38%
CM_MC2 20Cu		4	0.9792	0.9129	1.0000	1.0000	0.9167	1.0000	0.0208	4.26%	2.08%

Fathead minnow 32-d (Pimephales promelas) survival and growth test — **Nautilus Environmental Calgary**

Analysis ID: 02-8342-8556 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.9.4
Analyzed: 07 Feb-20 15:21 **Analysis:** Parametric-Two Sample **Status Level:** 1

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Ctl 20	N	4	1.427	1.402	1.453	1.434	1.403	1.437	0.008021	1.12%	0.00%
FR_FRABCH 20Cu		3	1.385	1.201	1.57	1.419	1.3	1.437	0.04291	5.36%	2.92%
FR_FRCP1 20Cu		4	1.105	0.9213	1.288	1.047	1.047	1.278	0.05769	10.44%	22.58%
GH_FR1 20Cu		4	1.33	1.234	1.426	1.305	1.29	1.419	0.03017	4.54%	6.82%
CM_MC2 20Cu		4	1.39	1.271	1.509	1.423	1.278	1.437	0.03753	5.40%	2.60%

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Ctl 20	N	1.0000	1.0000	1.0000	1.0000
FR_FRABCH 20Cu		0.9286	1.0000	1.0000	
FR_FRCP1 20Cu		1.0000	1.0000	1.0000	0.7500
GH_FR1 20Cu		0.9333	0.9231	0.9286	1.0000
CM_MC2 20Cu		1.0000	1.0000	0.9167	1.0000

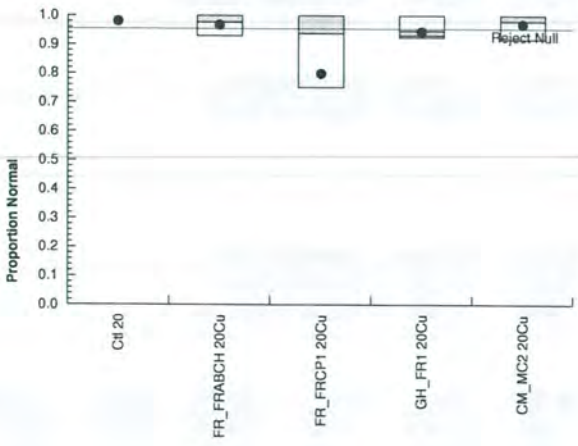
Angular (Corrected) Transformed Detail

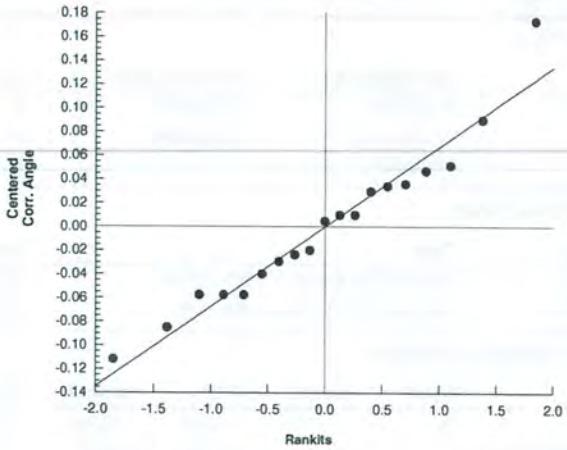
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Ctl 20	N	1.432	1.437	1.403	1.437
FR_FRABCH 20Cu		1.3	1.419	1.437	
FR_FRCP1 20Cu		1.047	1.047	1.278	1.047
GH_FR1 20Cu		1.31	1.29	1.3	1.419
CM_MC2 20Cu		1.426	1.437	1.278	1.419

Proportion Normal Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Ctl 20	N	13/13	14/14	9/9	14/14
FR_FRABCH 20Cu		13/14	11/11	14/14	
FR_FRCP1 20Cu		1/1	1/1	3/3	3/4
GH_FR1 20Cu		14/15	12/13	13/14	11/11
CM_MC2 20Cu		12/12	14/14	11/12	11/11

Graphics





APPENDIX E - Chain-of-Custody Forms

Teck

COC ID:	WEEKLY_CHRONIC_02262019_1	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Emma Marus			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	emma@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 5:	Jay.Jones@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 7-d C.dubia P/F	7-d C.dubia P/F (EDTA)	72-hr P. subcapitata P/F	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)						Temp °C
											190346	190348	190347	190349	190350						
(1)	CM_MC1_WS_2019-02-26_N	CM_MC1	WS	n	2/26/2019		G	2			X		X	X							0.0
(3)	CM_MC2_WS_2019-02-26_N	CM_MC2	WS	n	2/26/2019		G	3			X	X	X	X	X						0.0
(2)	RG_MIDAG_WS_2019-02-26_N	RG_MIDAG	WS	n	2/26/2019		G	2			X			X							0.0
	↳ carboys were labelled CM-MIDAG.																				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
One carboy for CM-MC1 is deflated (1) Clear, colourless, odourless, no particulates (3) Clear, colourless, odourless, some particulates.			Tyrone Hamilton Burnaby - Nautilus	Feb. 27/19 @ 11:02 TH - Week 1 Q1

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	SH/DS	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	2/26/2019 14:00:00
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190226-1323 | **TURNAROUND TIME:** | **RUSH:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	chelsea.jensen@teck.com	X	X	X
								Email 4:	jared.cayenne@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	scott.roughead@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 6:	teckcoal@equisonline.com			X
Phone Number	1-250-865-5204			Phone Number	604-420-8773			PO number				

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS											
									N	NONE	7-d C.dubia P/F 190346	7-d C.dubia P/F (EDTA) 190348	72-hr P. subcapitata P/F 190347	28-d Hyalella P/F 190349	28-d Hyalella P/F (EDTA) 190350							Temp °C
(1)	FR_FRABCH_MON_2019-02-04_NP	FR_FRABCH	WS		2019/02/26	11:00	G	2			X		X	X								0.0
(2)	FR_FRCP1_MON_2019-02-04_N	FR_FRCP1	WS		2019/02/26	12:05	G	3			X	X	X	X	X							0.0
(1)	FR_UFR1_MON_2019-02-04_N	FR_UFR1	WS		2019/02/26	12:41	G	2			X		X	X								0.0

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
(1) clear, colourless, odourless, some particulates.	Jared Cayenne	02/2019/26	Tyrone Hamilton	Feb. 27/19 @ 11:02
(2) clear, colourless, odourless, some precipitates.			Nautilus - Burnaby	Q1 - Week 1

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jared Cayenne	Mobile #	250-421-9457
Sampler's Signature		Date/Time	February 26, 2019

Teck

COC ID:	Q1 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO

Facility Name	Greenhills Operations		
Project Manager	Leigh Stickney		
Email	leigh.stickney@teck.com		
Address	PO Box 5000		
City	Elkford	Province	BC
Postal Code	V0B 1H0	Country	Canada
Phone Number	250 865 3274		

LABORATORY

Lab Name	Nautilus Environmental		
Lab Contact	Emma Marus		
Email			
Address	8664 Commerce Court		
City	Burnaby	Province	BC
Postal Code	V5A 4N7	Country	Can
Phone Number			

OTHER INFO

EDD delivery: Site: leigh.stickney@teck.com EQuIS: GHO

Report Format / Distribution: Yes PDF Yes Excel

Email 1:	leigh.stickney@teck.com
Email 2:	jennifer.kropp@teck.com
Email 3:	DL-Equis-GHO-Field@teck.com
PO number	610307

SAMPLE DETAILS / ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
									190347 72h P. subcapitata P/F	190346 7d C.dubia P/F	190349 28-d Hyallella P/F									Temp °C
(1)	GH_FR1_WS_2019-02-26_N	GH_FR1	WS	N	26-Feb-19		G	2	x	x	x									0.0
(2)	GH_ER2_WS_2019-02-26_N	GH_ER2	WS	N	26-Feb-19		G	2	x	x										0.0
(3)	GH_ERC_WS_2019-02-26_N	GH_ERC	WS	N	26-Feb-19		G	1	x	x	x									0.0

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
Ocean, colourless, odourless, no particulates.				Tyrone Hamilton	Feb. 27/19	11:02
				Nautilus - Burnaby	Q1 - Week	1

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID:	20190226CRN1B	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q1 Chronic Sampling			Lab Contact	Emma Marus			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email	emma@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	8664 Commerce Court			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3				Imperial Square Lake City			Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00610856			
Postal Code	V1C 4C3	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F; Field, L; Lab, FL; Field & Lab, N; None)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: FILTERED	ANALYSIS: PRESERVED	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	28-d H. azteca	7-d C.dubia P/F 190346	72-hr P. subcapitata P/F 190347					Temp °C
									FILTERED	No	No	No							
									PRESERVED	No	No	No							
① EV_HC1_WS_2019-02-26_N	EV_HC1	WS	N	2/26/2019	8:45	G	1						1						0.0
② EV_MC2_WS_2019-02-26_N	EV_MC2	WS	N	2/26/2019	10:15	G	1						1						0.0
					Total		2												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphinia testing to occur at 20 degrees)	Kimberley Hackett	26-Feb-19	Tyrone Blandford, Nautilus - Burnaby	Feb 27/19 @ 11:02
Ocean, colourless, odourless, no particulates.				Q1 - Week 1

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Kimberley Hackett	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	February 26, 2019
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190226 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	Chris.Blurton@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPM000608134			
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS — **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 190376 7-d C.dubia P/F	ANALYSIS: 190347 72-hr P. subcapitata P/F									Temp °C
2	LC_LCDSSLCC_WS_2019-02-25_N	LC_LCDSSLCC	WS	N	26-Feb	10:46	G	1			X	X									0.0
2	LC_SLC_WS_2019-02-26_N	LC_SLC	WS	N	26-Feb	12:10	G	1			X	X									0.0
1	LC_LC3_WS_2019-02-25_N	LC_LC3	WS	N	26-Feb	9:40	G	1			X	X									0.0
2	LC_LC5_WS_2019-02-26_N	LC_LC5	WS	N	26-Feb	12:10	G	1			X	X									0.0
1	LC_DCDS_WS_2019-02-26_N	LC_DCDS	WS	N	26-Feb	10:10	G	1			X	X									0.0

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	26-Feb	Tyrone Nowlan	Feb 27/19 @ 11:02
(1) clear, colourless, odourless, some particulates.			Nautilus - Burnaby	Q1 - Week 1
(2) clear, colourless, odourless, no particulates.				

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	February 26, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

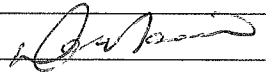
Teck

COC ID:	WEEKLY_CHRONIC_03052019_1	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Emma Marus			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	emma@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 5:	Jay.jones@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED										Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
							Filt.											
							PRESERV.											
							ANALYSIS	28-d Hyalella P/F 190349	28-d Hyalella P/F (EDTA) 190350									
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.											Temp °C
CM_MC1_WS_2019-03-05_N	CM_MC1	WS	n	3/5/2019	12:37	G	1	X										6.6
CM_MC2_WS_2019-03-05_N	CM_MC2	WS	n	3/5/2019	10:47	G	2	X	X									6.4
RG_MIDAG_WS_2019-03-05_N	RG_MIDAG	WS	n	3/5/2019	10:07	G	1	X										5.3
4 carboys were labelled CM_MIDAG																		

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Tyrone Hamilton	Mar. 6/19 @ 09:50
			NautNus - Burnaby	Q1 - Week 2

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	DS/DR	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	3/5/2019 14:00:00
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190305-1334	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	chelsea.jensen@teck.com	X	X	X
								Email 4:	jared.cayenne@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	scott.roughead@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 6:	teckcoal@equisonline.com			X
Phone Number	1-250-865-5204			Phone Number	604-420-8773			PO number				

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL.	PRESERV.	ANALYSIS: 28 d- Hyalella P/F 190349	ANALYSIS: 28 d- Hyalella P/F (EDTA) 190350									Temp d'out
FR_FRABCH_MON_2019-03-04_NP	FR_FRABCH	WS		2019/03/05	11:02	G	1			x										5.0
FR_FRCP1_MON_2019-03-04_N	FR_FRCP1	WS		2019/03/05	10:02	G	2			x	x									6.5
FR_UFR1_MON_2019-03-04_N	FR_UFR1	WS		2019/03/05	11:39	G	1			x										6.2

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
All metals samples must be shipped to ALS Burnaby for analysis	Chelsea Jensen		Tyrone Hamilton	Mar 6/19 @ 09:50
			Nautilus - Burnaby	Q1 - Week 2

SERVICE REQUEST (rush - subject to availability)	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Chelsea Jensen	Mobile #	250 425 4729
Sampler's Signature		Date/Time	

Teck

COC ID:	Q1 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Emma Marus			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commerce Court				*Yes* PDF	*Yes* Excel	
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 1:	leigh.stickney@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 2:	jennifer.kropp@teck.com		
Phone Number	250 865 3274			Phone Number				Email 3:	DL-Equis-GHO-Field@teck.com		
								PO number	610307		

SAMPLE DETAILS

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.
GH_FR1_WS_2019-03-05_N	GH_FR1	WS	N	5-Mar-19	12:20	G	1
GH_ER2_WS_2019-03-05_N	GH_ER2	WS	N	5-Mar-19	10:20	G	1

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
72h P. subcapitata P/F	7d C.dubia P/F	28-d Hyallella P/F	190319						Temp °C	
		x							5.6	
		x							5.1	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION

Date	Time	Accepted By/Affiliation	Date	Ti
		Tyrone Hamilton	Mar. 6/19	@ 09:5
		Nautilus - Burnaby	Q1 - week 2	

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID:	WEEKLY_CHRONIC_03122019_1	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Emma Marus			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	emma@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 5:	Jay.jones@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED											Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								FILT.											
								PRESERV.											
								ANALYSIS	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)									Temp °C
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.												
CM_MC1_WS_2019-03-12_N	CM_MC1	WS	n	3/12/2019	12:13	G	1		X										5.1
CM_MC2_WS_2019-03-12_N	CM_MC2	WS	n	3/12/2019	11:10	G	2		X	X									2.6
RG_MIDAG_WS_2019-03-12_N	RG_MIDAG	WS	n	3/12/2019	10:35	G	1		X										3.6
↳ carboys were labelled CM-MIDAG																			
									190349	190350									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Tyrone Hamilton	Mar. 13/19 @ 12:26
			Nautilus - Burnaby	01 - Week 3

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	SH/DS	Mobile #	250 425 7518
Sampler's Signature		Date/Time	3/12/2019 14:00:00

Teck

COC ID: 20190312-1351 | **TURNAROUND TIME:** | **RUSH:**

PROJECT/CLIENT INFO

Facility Name / Job#	Fording River Operation		
Project Manager	Neil MacDonald		
Email	Neil.MacDonald@teck.com		
Address	PO Box 100		
City	Elkford	Province	BC
Postal Code	V0B 1H0	Country	Canada
Phone Number	1-250-865-5204		

LABORATORY

Lab Name	Nautilus Environmental - BC		
Lab Contact			
Email	BCinfo@nautilusenvironmental.ca		
Address	8664 Commerce Court		
City	Burnaby	Province	BC
Postal Code	V5A 4N7	Country	Canada
Phone Number	604-420-8773		

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	neil.macdonald@teck.com	X	X	X
Email 2:	dylan.begin@teck.com	X	X	X
Email 3:	chelsea.jensen@teck.com	X	X	X
Email 4:	jared.cayenne@teck.com	X	X	X
Email 5:	scott.roughead@teck.com	X	X	X
Email 6:	teckcoal@equisonline.com			X
PO number				

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILT.	PRESERV.	ANALYSIS: 28 d- Hyalella P/F	ANALYSIS: 28 d- Hyalella P/F (EDTA)	Temp °C
FR_FRCP1_WS_2019-03-12_N_16	FR_FRCP1	WS		12-Mar-19	12:35	G	2			x	x	0.6
FR_FRABCH_WS_2019-03-12_NP_5	FR_FRABCH	WS		12-Mar-19	11:36	G	1			x		0.4
FR_UFR1_WS_2019-03-12_N_15	FR_UFR1	WS		12-Mar-19	11:35	G	1			x		1.0
										190349	190350	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

All metals samples must be shipped to ALS Burnaby for analysis

RELINQUISHED BY/AFFILIATION / DATE/TIME / ACCEPTED BY/AFFILIATION / DATE/TIME

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Chelsea Jensen		Tyrone Hamilton	Mar. 13/19 @ 12:26
		Nautilus - Burnaby	Q1 - Week 3

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Chelsea Jensen	Mobile #	250 425 4729
Sampler's Signature		Date/Time	

Teck

COC ID:	Q1 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Emma Marus			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commerce Court				*Yes* PDF	*Yes* Excel	
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	610307		

SAMPLE DETAILS

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 72h P. subcapitata P/F	7d C.dubia P/F	28-d Hyallella P/F	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Temp °C
GH_FR1_WS_2019-03-12_N	GH_FR1	WS	N	12-Mar-19		G	1			x												2.4
GH_ER2_WS_2019-03-12_N	GH_ER2	WS	N	12-Mar-19		G	1			x												2.6
										19-03-19												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				Tyrone Hamilton	Mar. 13/19	12:26
				Nautilus - Burnaby	Q1-Week	3

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	**Sampler's Name**		**Mobile #**	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		**Sampler's Signature**		**Date/Time**	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	WEEKLY_CHRONIC_03192019_1	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Emma Marus			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	emma@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 5:	Jay.jones@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED											Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
							FIL.												
							PRESERV.												
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS 28-d Hyalella P/F	28-d Hyalella P/F (EDTA)										Temp °C
CM_MC1_WS_2019-03-19_N	CM_MC1	WS	n	3/19/2019	12:44	G	1x20L	X											2.8
CM_MC2_WS_2019-03-19_N	CM_MC2	WS	n	3/19/2019	11:54	G	2x20L	X	X										4.9
RG_MIDAG_WS_2019-03-19_N	RG_MIDAG	WS	n	3/19/2019	11:18	G	1x20L	X											0.9
↳ carboys were labelled CM_MIDAG																			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Tyrone Hamilton	Mar. 20/19 @ 13:01
			Nautilus - Burnaby	Q1 - Week 4

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	SH/DS	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	3/19/2019 14:00:00
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190319-1354 | **TURNAROUND TIME:** | **RUSH:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	chelsea.jensen@teck.com	X	X	X
								Email 4:	jared.cayenne@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	scott.roughead@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 6:	teckcoal@equisonline.com			X
Phone Number	1-250-865-5204			Phone Number	604-420-8773			PO number				

SAMPLE DETAILS | **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Fil.	N	N									
								PRESERV.	NONE	NONE									
								ANALYSIS	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)									Temp °C
FR_FRABCH_WEK_2019-03-18_NP	FR_FRABCH	WS		2019/03/19	11:25	G	1x20L		X										3.6
FR_FRCP1_WEK_2019-03-18_N	FR_FRCP1	WS		2019/03/19	12:20	G	2x20L		X	X									0.0
FR_UFR1_WS_2019-03-19_N_13	FR_UFR1	WS		2019/03/19	09:39	G	1x20L		X										0.5

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Jared Cayenne	March 19, 2019	Tyrone Hamilton	Mar. 20/19 @13:01
			Nautilus - Burnaby	Q1 - Week 4

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jared Cayenne	Mobile #	250-421-9457
Sampler's Signature		Date/Time	March 19, 2019

Teck

COC ID:	Q1 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Emma Marus			Site: leigh.stickney@teck.com	EQuIS:	GHO	
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commerce Court				*Yes* PDF	*Yes* Excel	
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 1:	leigh.stickney@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 2:	jennifer.kropp@teck.com		
Phone Number	250 865 3274			Phone Number				Email 3:	DL-Equis-GHO-Field@teck.com		
								PO number	610307		

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A 72h P. subcapitata P/F	#N/A 7d C.dubia P/F	#N/A 28-d Hyallella P/F	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A Temp °C
GH_FR1_WS_2019-03-19_N	GH_FR1	WS	N	19-Mar-19	10:40	G	1x20L				x									0.6
GH_ER2_WS_2019-03-19_N	GH_ER2	WS	N	19-Mar-19	13:00	G	1x20L				x									0.4

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				Tyrone Hamilton	Mar. 20/19	13:01
				Nautilus - Burnaby	Q1 - Week 4	

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		**Mobile #**	
Sampler's Signature		**Date/Time**	

Teck

COC ID: 20190226-1344

TURNAROUND TIME:

RUSH:

PROJECT/CLIENT INFO

Facility Name / Job#	Fording River Operation
Project Manager	Neil MacDonald
Email	Neil.MacDonald@teck.com
Address	PO Box 100
City	Elkford
Province	BC
Postal Code	V0B 1H0
Country	Canada
Phone Number	1-250-865-5204

LABORATORY

Lab Name	Nautilus Environmental - AB
Lab Contact	
Email	ABinfo@nautilusenvironmental.ca
Address	#4, 6125 12 Street SE
City	Calgary
Province	AB
Postal Code	T2H 2K1
Country	Canada
Phone Number	403-253-7121

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	neil.macdonald@teck.com	X	X	X
Email 2:	dylan.begin@teck.com	X	X	X
Email 3:	chelsea.jensen@teck.com	X	X	X
Email 4:	jared.cayenne@teck.com	X	X	X
Email 5:	scott.roughead@teck.com	X	X	X
Email 6:	teckcoal@equisonline.com			X
PO number				

SAMPLE DETAILS

2019/02/27
@ 10:00
Poor Rain
5°C
3x20L carboys.
VOS/No2
Good Condition
Week 1

ANALYSIS REQUESTED

Filtered - F, Field - L, Lab - FL, Field & Lab - S, None

| Sample ID | Sample Location (sys_loc_code) | Field Matrix | Hazardous Material (Yes/No) | Date | Time (24hr) | G=Grab C=Comp | # Of Cont. | ANALYSIS: 30-d fathead minnow P/F (10 ug/l Cu Treated) | 30-d fathead minnow P/F (20 ug/l Cu Treated) | | | |

Teck

COC ID:	WEEKLY_CHRONIC_02262019_2	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Coal Mountain Operations		
Project Manager	Jay Jones		
Email	Jay.Jones@teck.com		
Address	PO Box 3000	Province	BC
City	Sparwood	Country	Canada
Postal Code	V0B 2G0		
Phone Number	1-250-425-7321		

LABORATORY

Lab Name	Hydroqual Laboratories		
Lab Contact	Claudio Quinteros		
	Jessica Wang		
Email	claudio@nautilusenvironmental.ca		
	jessica@nautilusenvironmental.ca		
Address	#4, 6125-12th Street S.E.		
City	Calgary	Province	AB
Postal Code	T2H 2K1	Country	Canada
Phone Number	403-253-7121		

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Scott.Holmgren@teck.com	X	X	X
Email 2:	teckcoal@equisonline.com			X
Email 3:	Jay.jones@teck.com	X	X	X
Email 4	Don.Sacino@teck.com	X	X	X
Email 5:				
PO number				

2019/02/27
~10:00
Bear Paw
3 C
8x 20L carboys
N6S/N6I
Good Condition

Week 1

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Filtered: F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV.	FIL.	ANALYSE: 30 d fathead minnow P/F (10 ng/l CU Treated)		30 d fathead minnow P/F (20 ng/l CU Treated)											
CM_MC1_WS_2019-02-26_N 1819-0820-19	CM_MC1	WS	n	2/26/2019		G	3			X	1.5°C												
CM_MC2_WS_2019-02-26_N 1819-0820	CM_MC2	WS	n	2/26/2019		G	5			X	1.4°C	X											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	SH/DS	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	2/26/2019 14:00:00
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190226CRN1C	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations
Job Description	Q1 Chronic Sampling
Project Manager	Cam Griffin
Email	Cameron.Griffin@teck.com
Address	RR#1 HWY# 3
City	Sparwood
Province	BC
Postal Code	V0B 2G1
Country	Canada
Phone Number	1-250-425-8137

LABORATORY

Lab Name	Nautilus Environmental
Lab Contact	Tamara McClure
Email	
Address	#4, 6125-12th Street S.E
City	Calgary
Province	AB
Postal Code	T2H 2K1
Country	Canada
Phone Number	403 253 7121

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Bryan.Ogden@teck.com	X	X	X
Email 2:	teckeoal@equisonline.com			X
Email 3:	Kimberley.Hackett@teck.com	X	X	X
Email 4:	Cameron.Griffin@teck.com	X	X	X
Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
PO number	VPO00610856			

SAMPLE DETAILS

2019/02/27
18:00
Bear Paw
J.C.
~~6x2~~ 6x 20L carboys
NoS/NoI
1819-0822

Good Condition
Week1

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILTERED / PRESERVED / ANALYZED	30-d fathead minnow P/F (10 ug/l Cu Treated)	No	No								
EV_HC1_WS_2019-02-26_N	EV_HC1	WS	N	2/26/2019	8:45	G	3		3	2.1°C									
EV_MC2_WS_2019-02-26_N	EV_MC2	WS	N	2/26/2019	10:15	G	3		3	4.0°C									
1819-0821																			
					Total		6												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Kimberley Hackett	February 26, 2019		

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	X
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Kimberley Hackett	Mobile #	
Sampler's Signature	[signature]	Date/Time	February 26, 2019

Teck

COC ID: 20190226 Chronic tox

TURNAROUND TIME:

RUSH:

PROJECT/CLIENT INFO

Facility Name / Job#	Line Creek Operation
Project Manager	Chris Blurton
Email	Chris.Blurton@teck.com
Address	Box 2003
	15km North Hwy 43
City	Sparwood
Province	BC
Postal Code	V0B 2G0
Country	Canada
Phone Number	250-425-3196

LABORATORY

Lab Name	Nautilus Environmental - Calgary
Lab Contact	
Email	
Address	6125 12 St NE
City	Calgary
Province	AB
Postal Code	T2H 2K1
Country	Canada
Phone Number	403-253-7121

OTHER INFO

Report Format / Distribution	Excel	PDF	EDD
Email 1: drake.tymstra@teck.com			
Email 2: chris.blurton@teck.com			
Email 3: kirsten.campbell@teck.com			
Email 4: teckcoal@equisonline.com			
PO number			

SAMPLE DETAILS

2019/02/27
10:00
Bear Pou
J.C.
15x 20L carboy
No3/No2
Good Condition

2/7
Veen1

ANALYSIS REQUESTED

Filtered (F), Lab (L), Field & Lab (N), None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30-d fathead minnow P/F (LD ug/l Cu Treated)	FIELD	LAB
LC_LCDSSLCC_WS_2019-02-25_N	LC_LCDSSLCC	WS	N	26-Feb	10:46	G	3	X	1819-0826	1.6°C
LC_SLC_WS_2019-02-25_N	LC_SLC	WS	N	26-Feb	12:10	G	3	X	1819-0827	0.6°C
LC_LC3_WS_2019-02-25_N	LC_LC3	WS	N	26-Feb	9:40	G	3	X	1819-0824	-0.8°C
LC_LC5_WS_2019-02-25_N	LC_LC5	WS	N	26-Feb		G	3	X	1819-0825	#1.3°C
LC_DCDS_WS_2019-02-25_N	LC_DCDS	WS	N	26-Feb		G	3	X	1819-0823	-1.0°C

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Please provide prelimnary update as results are available

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
K. Cambell/D.Tymstra	26-Feb		

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	February 26, 2019

Teck

COC ID:	20190226 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com			
Email	Chris.Blurton@teck.com			Email				Email 2:	chris.blurton@teck.com			
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com			
	15km North Hwy 43							Email 4:	teckcoal@aquisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS

Week 1
3/7

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow P/F (10 ug/l Cu Treated)
LC_LCDSSLCC_WS_2019-02-25_N	LC_LCDSSLCC	WS	N	26-Feb	10:46	G	3	X
LC_SLC_WS_2019-02-25_N	LC_SLC	WS	N	26-Feb	2:10	G	3	X
LC_LC3_WS_2019-02-25_N	LC_LC3	WS	N	26-Feb	7:40	G	3	X
LC_LC5_WS_2019-02-25_N	LC_LC5	WS	N	26-Feb		G	3	X
LC_DCDS_WS_2019-02-25_N	LC_DCDS	WS	N	26-Feb		G	3	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide preliminary update as results are available	K. Cambell/D.Tymstra	26-Feb		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	February 26, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190226 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution	Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1: drake.tymstra@teck.com			
Email	Chris.Blurton@teck.com			Email				Email 2: chris.blurton@teck.com			
Address	Box 2003			Address	6125 12 St NE			Email 3: kirsten.campbell@teck.com			
	15km North Hwy 43							Email 4: teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada				
Phone Number	250-425-3196			Phone Number	403-253-7121						

SAMPLE DETAILS								ANALYSIS REQUESTED																Filtered - F; Lab - L; Lab, Field - FL; Lab, Nitric - N
	Week 1 4/7																							
Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	SNAL-SNS	PHENRA	SAL	30-d fathead minnow P/F (10 ug/l Cu Treated)													
LC_LCDSSLCC_WS_2019-02-25_N	LC_LCDSSLCC	WS	N	26-Feb	10:46	G	3				X													
LC_SLC_WS_2019-02-25_N	LC_SLC	WS	N	26-Feb	12:10	G	3				X													
LC_LC3_WS_2019-02-25_N	LC_LC3	WS	N	26-Feb	9:40	G	3				X													
LC_LC5_WS_2019-02-25_N	LC_LC5	WS	N	26-Feb		G	3				X													
LC_DCDS_WS_2019-02-25_N	LC_DCDS	WS	N	26-Feb		G	3				X													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide preliminary update as results are available	K. Cambell/D.Tymstra	26-Feb		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	February 26, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190226 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com			
Email	Chris.Blurton@teck.com			Email				Email 2:	chris.blurton@teck.com			
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com			
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS

Week 1
5/7

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow P/F (10 ug/l Cu Treated)
LC_LCDSSLCC_WS_2019-02-25_N	LC_LCDSSLCC	WS	N	26-Feb	10:46	G	3	X
LC_SLC_WS_2019-02-25_N	LC_SLC	WS	N	26-Feb	12:10	G	3	X
LC_LC3_WS_2019-02-25_N	LC_LC3	WS	N	26-Feb	9:48	G	3	X
LC_LC5_WS_2019-02-25_N	LC_LC5	WS	N	26-Feb		G	3	X
LC_DCDS_WS_2019-02-25_N	LC_DCDS	WS	N	26-Feb		G	3	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	26-Feb		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	February 26, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190226 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com			
Email	Chris.Blurton@teck.com			Email				Email 2:	chris.blurton@teck.com			
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com			
	15km North Hwy 43							Email 4:	teckcoa@equikonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS

Week 1
6/7

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow P/F (10 ug/l Cu Treated)
LC_LCDSSLCC_WS_2019-02-25_N	LC_LCDSSLCC	WS	N	26-Feb		G	3	X
LC_SLC_WS_2019-02-25_N	LC_SLC	WS	N	26-Feb		G	3	X
LC_LC3_WS_2019-02-25_N	LC_LC3	WS	N	26-Feb		G	3	X
LC_LC5_WS_2019-02-25_N	LC_LC5	WS	N	26-Feb	12:10	G	3	X
LC_DCDS_WS_2019-02-25_N	LC_DCDS	WS	N	26-Feb	10:40	G	3	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	26-Feb		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	February 26, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190226 Chronic tox

TURNAROUND TIME: RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution	Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com		
Email	Chris.Blurton@teck.com			Email				Email 2:	chris.blurton@teck.com		
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com		
	15km North Hwy 43							Email 4:	teckcoal@equisonet		
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada				
Phone Number	250-425-3196			Phone Number	403-253-7121						

SAMPLE DETAILS — ANALYSIS REQUESTED

Filtered - F; Field F; Lab FL; Field & Lab N; None

Week 1
7/7

Sample ID	Sample Location (sys loc code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30-d fathead minnow P/F (10 ug/l Ca Treated)
LC_LCDSSLCC_WS_2019-02-25_N	LC_LCDSSLCC	WS	N	26-Feb		G	3	X
LC_SLC_WS_2019-02-25_N	LC_SLC	WS	N	26-Feb		G	3	X
LC_LC3_WS_2019-02-25_N	LC_LC3	WS	N	26-Feb		G	3	X
LC_LC5_WS_2019-02-25_N	LC_LC5	WS	N	26-Feb	12:10	G	3	X
LC_DCDS_WS_2019-02-25_N	LC_DCDS	WS	N	26-Feb	10:30	G	3	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide preliminary update as results are available	K. Cambell/D.Tymstra	26-Feb		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	February 26, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				Yes PDF	Yes Excel	
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610013		

SAMPLE DETAILS

2019/02/27 10:00 Week 1 1/6
Bear Paw
D.C.
11x20L carboys
Nos/No I
Good Condition

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 d early life stage fathead minnow P/F (10 ug/l CU Treated) #N/A	30 d early life stage fathead minnow P/F (20 ug/l CU Treated) #N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_FR1_WS_2019-02-26_N 1819-0816	GH_FR1	WS	N	25-Feb-19		G	5	x	x	3.1°C									
GH_ER2_WS_2019-02-26_N 1819-0817	GH_ER2	WS	N	25-Feb-19		G	3	x		3.5°C									
GH_ERC_WS_2019-02-26_N 1819-0818	GH_ERC	WS	N	25-Feb-19		G	3	x		2.7°C									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				Yes PDF	Yes Excel	
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610013		

SAMPLE DETAILS

2/C
Weekly

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_FR1_WS_2019-02-26_N	GH_FR1	WS	N	25-Feb-19		G	5	x	x											
GH_ER2_WS_2019-02-26_N	GH_ER2	WS	N	25-Feb-19		G	3	x												
GH_ERC_WS_2019-02-26_N	GH_ERC	WS	N	25-Feb-19		G	3	x												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				*Yes* PDF	*Yes*	Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	GL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610013		

SAMPLE DETAILS

3/6
Week 1

ANALYSIS REQUESTED

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
								30d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)										
GH_FR1_WS_2019-02-26_N	GH_FR1	WS	N	25-Feb-19		G	5	x	x										
GH_ER2_WS_2019-02-26_N	GH_ER2	WS	N	25-Feb-19		G	3	x											
GH_ERC_WS_2019-02-26_N	GH_ERC	WS	N	25-Feb-19		G	3	x											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:	
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site: leigh.stickney@teck.com	EQuIS: GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution	
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.			Yes PDF	Yes Excel
								Email 1:	leigh.stickney@teck.com
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610013

SAMPLE DETAILS

4/6 Week 1

ANALYSIS REQUESTED

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
								ANALYSIS: 30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (25 ug/l CU Treated)										
GH_FR1_WS_2019-02-26_N	GH_FR1	WS	N	25-Feb-19		G	5	x	x										
GH_ER2_WS_2019-02-26_N	GH_ER2	WS	N	25-Feb-19		G	3	x											
GH_ERC_WS_2019-02-26_N	GH_ERC	WS	N	25-Feb-19		G	3	x											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				*Yes* PDF	*Yes*	Excel
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 1:	leigh.stickney@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 2:	jennifer.kropp@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			Email 3:	DL-Equis-GHO-Field@teck.com		
								PO number	610013		

SAMPLE DETAILS

5/6 Week 1

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
										Please indicate below Filtered, Perserved or both (F, P, F/P)											
GH_FR1_WS_2019-02-26_N	GH_FR1	WS	N	25-Feb-19		G	5	x	x												
GH_ER2_WS_2019-02-26_N	GH_ER2	WS	N	25-Feb-19		G	3	x													
GH_ERC_WS_2019-02-26_N	GH_ERC	WS	N	25-Feb-19		G	3	x													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:	
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site: leigh.stickney@teck.com	EQuIS: GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution	
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.			Yes PDF	Yes Excel
								Email 1:	leigh.stickney@teck.com
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	GHO-EQuIS-Field@teck.com
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610013

SAMPLE DETAILS

Week 1 6/C

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_FR1_WS_2019-02-26_N	GH_FR1	WS	N	25-Feb-19		G	5	x	x												
GH_ER2_WS_2019-02-26_N	GH_ER2	WS	N	25-Feb-19		G	3	x													
GH_ERC_WS_2019-02-26_N	GH_ERC	WS	N	25-Feb-19		G	3	x													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190305-1329 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - AB			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	ABinfo@nautilusenvironmental.ca			Email 2:	dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	#4, 6125 12 Street SE			Email 3:	chelsea.jensen@teck.com	X	X	X
								Email 4:	jared.cayenne@teck.com	X	X	X
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 5:	scott.roughead@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Canada	Email 6:	teckcoal@equisonline.com			X
Phone Number	1-250-865-5204			Phone Number	403-253-7121			PO number				

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F, Field; L, Lab; FL, Field & Lab; N, None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	PRESERV	ANALYSIS: NAUT_30d_FHM_P/F (10ug/l CU Treated)	NAUT_30d_FHM_P/F (20ug/l CU Treated)	
FR_FRABCH_MON_2019-03-04_NP 1819-0814	FR_FRABCH	WS		2019/03/05	11:02	G	4			x	x	1.6°C
FR_FRCP1_MON_2019-03-04_N 1819-0815	FR_FRCP1	WS		2019/03/05	10:02	G	4			x	x	2.1°C
FR_UFR1_MON_2019-03-04_N 1819-0813	FR_UFR1	WS		2019/03/05	11:39	G	2			x		1.8°C
2019/03/05 Week 2												
11:00												
Bear Paw												
J.C.												
10x 20L carboys												
NaS/NaZ												
Good Condition												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
All metals samples must be shipped to ALS Burnaby for analysis	Chelsea Jensen			

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Chelsea Jensen	Mobile #	250 425 4729
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: WEEKLY_CHRONIC_03052019_2 | TURNAROUND TIME: Regular | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Coal Mountain Operations			Lab Name	Hydroqual Laboratories			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Claudio Quinteros			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com				Jessica Wang			Email 2:	teckcoal@equisonline.com			X
				Email	claudio@nautilusenvironmental.ca			Email 3:	Jay.jones@teck.com	X	X	X
					jessica@nautilusenvironmental.ca			Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	#4, 6125-12th Street S.E.			Email 5:				
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	403-253-7121							

SAMPLE DETAILS | ANALYSIS REQUESTED (Filtered: F-Field, L-Lab; FL-Field & Lab, N-None)

2019/03/05 Week 2
11:00
Bear Paw
J.C.
6x20L carboy
NO5/NO2
Good Condition

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Preserv	Analysis: 30 d fathead minnow P/F (10 ug/l CU Treated)		Analysis: 30 d fathead minnow P/F (20 ug/l CU Treated)								
CM_MC1_WS_2019-03-05_N 1819-0819	CM_MC1	WS	n	3/5/2019	12:37	G	2		X		3.0°C								
CM_MC2_WS_2019-03-05_N 1819-0820	CM_MC2	WS	n	3/5/2019	12:47	G	4		X		1.7°C		X						

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default) X	Sampler's Name	SH/DS	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge				
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	3/5/2019 14:00:00
For Emergency <1 Day, ASAP or Weekend - Contact ALS				

Teck

COC ID:	20190305CRN2	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations
Job Description	Q1 Chronic Sampling
Project Manager	Cam Griffin
Email	Cameron.Griffin@teck.com
Address	RR#1 HWY# 3
City	Sparwood
Province	BC
Postal Code	V0B 2G1
Country	Canada
Phone Number	1-250-425-8137

LABORATORY

Lab Name	Nautilus Environmental
Lab Contact	Tamara McClure
Email	
Address	#4, 6125-12th Street S.E
City	Calgary
Province	AB
Postal Code	T2H 2K1
Country	Canada
Phone Number	403 253 7121

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Bryan.Ogden@teck.com	X	X	X
Email 2:	teckcoal@equisonline.com			X
Email 3:	Kimberley.Hackett@teck.com	X	X	X
Email 4:	Cameron.Griffin@teck.com	X	X	X
Email 5:	Teck.LabResults@sharepoint.teck.com	X	X	X
PO number	VPO00610856			

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-d fulhead minnow P/F (10 ug/l Cu Treated)									
								TILTERED	No	No								
								PRESERVED										
EV_HC1_WS_2019-03_MON_N	EV_HC1	WS	N	3/5/2019	9:15	G	2		2	1819-0822			2.4°C					
EV_MC2_WS_2019-03_MON_N	EV_MC2	WS	N	3/5/2019	10:25	G	2		2	1819-0821			1.0°C					
					Total		4											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Kimberley Hackett	March 5 2019		

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	X
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Kimberley Hackett	Mobile #	
Sampler's Signature	[signature]	Date/Time	March 5 2019

2019/03/05 Week 2
11:00
Bear Paw
J.C.
4x 20L carboys
NoS/NoI
Good Condition

Teck

COC ID:	20190305 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com			
Email	Chris.Blurton@teck.com			Email				Email 2:	chris.blurton@teck.com			
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com			
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS

2019/03/06 Week 2
11:00 1/5
Bear Paw
J.C.
10x20L carboys
NoS/NoZ
Good Condition

ANALYSIS REQUESTED

Filtered: F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow P/F (10 ug/l Cu Treated)		
LC_LCDSSLCC_WS_2019-03-05_N	LC_LCDSSLCC	WS	N	Mar 5	11:15	G	2	X	1819-0826	0.7°C
LC_SLC_WS_2019-03-05_N	LC_SLC	WS	N		13:00	G	2	X	1819-0827	1.3°C
LC_LC3_WS_2019-03-05_N	LC_LC3	WS	N		11:57	G	2	X	1819-0829	4.5°C
LC_LC5_WS_2019-03-05_N	LC_LC5	WS	N		10:30	G	2	X	1819-0825	-0.1°C
LC_DCDS_WS_2019-03-05_N	LC_DCDS	WS	N			G	2	X	1819-0823	-1.0°C

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide preliminary update as results are available	K. Cambell/D.Tymstra	5-Mar		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	March 5, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190305 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution	Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1: drake.tymstra@teck.com			
Email	Chris.Blurton@teck.com			Email				Email 2: chris.blurton@teck.com			
Address	Box 2003			Address	6125 12 St NE			Email 3: kirsten.campbell@teck.com			
	15km North Hwy 43							Email 4: teckcoal@equisonline.com			
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada				
Phone Number	250-425-3196			Phone Number	403-253-7121						

| SAMPLE DETAILS | | | | | | | | ANALYSIS REQUESTED | | | | | | | |

Teck

COC ID: 20190305 Chronic tox | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution	Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1: drake.tymstra@teck.com	x	x	
Email	Chris.Blurton@teck.com			Email				Email 2: chris.blurton@teck.com	x	x	
Address	Box 2003			Address	6125 12 St NE			Email 3: kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4: teckcal@nautilus.com	x	x	
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada				
Phone Number	250-425-3196			Phone Number	403-253-7121						

SAMPLE DETAILS — ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Week 2
3/5

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV.	ANALYSIS: 30-d fathead minnow P/F (30 ug/l CuTreated)
LC_LCDSSLCC_WS_2019-03-05_N	LC_LCDSSLCC	WS	N	Mar 5	11:15	G	2		X
LC_SLC_WS_2019-03-05_N	LC_SLC	WS	N		13:00	G	2		X
LC_LC3_WS_2019-03-05_N	LC_LC3	WS	N		11:57	G	2		X
LC_LC5_WS_2019-03-05_N	LC_LC5	WS	N		10:30	G	2		X
LC_DCDS_WS_2019-03-05_N	LC_DCDS	WS	N			G	2		X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide preliminary update as results are available	K. Cambell/D.Tymstra	5-Mar		

SERVICE REQUEST (rush - subject to availability)

Regular (default) X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge				
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	March 5, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS				

Teck

COC ID:	20190305 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com			
Email	Chris.Blurton@teck.com			Email				Email 2:	chris.blurton@teck.com			
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com			
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS

Week 2
4/5

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow P/F (10 ug/l Cu Treated)
LC_LCDSSLCC_WS_2019-03-05_N	LC_LCDSSLCC	WS	N	Mar 5	11:15	G	2	X
LC_SLC_WS_2019-03-05_N	LC_SLC	WS	N		13:00	G	2	X
LC_LC3_WS_2019-03-05_N	LC_LC3	WS	N		11:57	G	2	X
LC_LC5_WS_2019-03-05_N	LC_LC5	WS	N		10:50	G	2	X
LC_DCDS_WS_2019-03-05_N	LC_DCDS	WS	N			G	2	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	5-Mar		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	March 5, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190305 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com			
Email	Chris.Blurton@teck.com			Email				Email 2:	chris.blurton@teck.com			
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com			
	15km North Hwy 43							Email 4:	teckcos@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS — ANALYSIS REQUESTED (Filtered - F; Field; L: Lab; FL: Field & Lab; N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	Preserv.	Analysis: 96-d fathead minnow P/F (10 ug/l Cu Treated)
	Week 2 5/5									
LC_LCDSSLCC_WS_2019-03-05_N	LC_LCDSSLCC	WS	N			G	2			X
LC_SLC_WS_2019-03-05_N	LC_SLC	WS	N			G	2			X
LC_LC3_WS_2019-03-05_N	LC_LC3	WS	N			G	2			X
LC_LC5_WS_2019-03-05_N	LC_LC5	WS	N			G	2			X
LC_DCDS_WS_2019-03-05_N	LC_DCDS	WS	N	March 5	10:40	G	2			X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide preliminary update as results are available	K. Cambell/D.Tymstra	5-Mar		

SERVICE REQUEST (rush - subject to availability)				
Regular (default) X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge				
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	March 5, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS				

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				*Yes* PDF	*Yes*	Excel
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 1:	leigh.stickney@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 2:	jennifer.kropp@teck.com		
								Email 3:	DI-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610307		

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Preserved or both (F, P, F/P)											
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d early life stage fathead minnow F/F (10 ug/l CU Treated)	30 d early life stage fathead minnow F/F (20 ug/l CU Treated)										
GH_FR1_WS_2019-03-05_N 1819-0816	GH_FR1	WS	N	5-Mar-19	12:20	G	4	x	x	0.6°C									
GH_ER2_WS_2019-03-05_N 1819-0817	GH_ER2	WS	N	5-Mar-19	10:20	G	2	x		4.1°C									
GH_ERC_WS_2019-03-05_N 1819-0818	GH_ERC	WS	N	5-Mar-19		G	2	x		1.9°C									
6x 20L carboys Week 2																			
2019/03/05																			
11:00	1/3																		
Bear Paw																			
B.C.																			
NaS/NaI																			
Good Condition.																			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				Yes PDF	Yes	Excel
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 1:	leigh.stickney@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 2:	jennifer.kropp@teck.com		
								Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610307		

SAMPLE DETAILS

ANALYSIS REQUESTED

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 96 d early life stage fathead minnow P/F (10 ug/l CU Treated)	96 d early life stage fathead minnow P/F (20 ug/l CU Treated)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_FR1_WS_2019-03-05_N	GH_FR1	WS	N	5-Mar-19	12:20	G	4	x	x												
GH_ER2_WS_2019-03-05_N	GH_ER2	WS	N	5-Mar-19	10:30	G	2	x													
GH_ERC_WS_2019-03-05_N	GH_ERC	WS	N	5-Mar-19		G	2	x													
Week 2 2/3																					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO	
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:	
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site: leigh.stickney@teck.com	EQuIS: GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution	
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.			*Yes* PDF	*Yes* Excel
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 1:	leigh.stickney@teck.com
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 2:	jennifer.kropp@teck.com
								Email 3:	DL-Equis-GHO-Field@teck.com
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610307

SAMPLE DETAILS / ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 d early life stage fathead minnow F/P (10 ug/l CU Treated)	30 d early life stage fathead minnow F/P (20 ug/l CU Treated)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_FR1_WS_2019-03-05_N	GH_FR1	WS	N	5-Mar-19		G	4	x	x												
GH_ER2_WS_2019-03-05_N	GH_ER2	WS	N	5-Mar-19		G	2	x													
GH_ERC_WS_2019-03-05_N	GH_ERC	WS	N	5-Mar-19	14:00	G	2	x													
Vee/12 3/3																					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default) X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge				
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS				

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				*Yes* PDF	*Yes*	Excel
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 1:	leigh.stickney@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 2:	jennifer.kropp@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			Email 3:	EQuIS-GHO-Field@teck.com		
								PO number	610307		

SAMPLE DETAILS								ANALYSIS REQUESTED													
								Please indicate below Filtered, Perserved or both (F, P, F/P)													
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d early life stage fathead minnow F/P (10 ug/l CU Treated)	30 d early life stage fathead minnow F/P (20 ug/l CU Treated)												
GH_FR1_WS_2019-03-05_N	GH_FR1	WS	N	5-Mar-19	12:20	G	4	x	x												
GH_ER2_WS_2019-03-05_N	GH_ER2	WS	N	5-Mar-19	10:20	G	2	x													
GH_ERC_WS_2019-03-05_N	GH_ERC	WS	N	5-Mar-19		G	2	x													
	Week 2 4/3																				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190312-1351	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - AB			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	ABinfo@nautilusenvironmental.ca			Email 2:	dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	#4, 6125 12 Street SE			Email 3:	chelsea.jensen@teck.com	X	X	X
								Email 4:	jared.cayenne@teck.com	X	X	X
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 5:	scott.roughead@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	9T2H 2K1	Country	Canada	Email 6:	teckcoal@equisonline.com			X
Phone Number	1-250-865-5204			Phone Number	403-253-7121			PO number				

SAMPLE DETAILS — ANALYSIS REQUESTED (Filtered - F, Field - L, Lab - FL, Field & Lab - N, None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	PRESERV	ANALYSIS: NAUT_30d_FHM_P/F (10ug/l CU Treated)	ANALYSIS: NAUT_30d_FHM_P/F (20ug/l CU Treated)
FR_FRCP1_WS_2019-03-12_N_16 1819-0815	FR_FRCP1	WS		12-Mar-19	12:35	G	4			x	x
FR_FRABCH_WS_2019-03-12_NP_5 1819-0814	FR_FRABCH	WS		12-Mar-19	11:36	G	4			x	x
FR_UFR1_WS_2019-03-12_N_15 1819-0813	FR_UFR1	WS		12-Mar-19	11:35	G	2			x	
2019/03/13 Week 3											
11:40											
Bear Paw											
J.C.											
10x 20L carboys/6											
N65/N63											
Good Condition											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
All metals samples must be shipped to ALS Burnaby for analysis	Chelsea Jensen			

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Chelsea Jensen	Mobile #	250 425 4729
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: WEEKLY_CHRONIC_03122019_2 | TURNAROUND TIME: Regular | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Coal Mountain Operations			Lab Name	Hydroqual Laboratories			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Claudio Quinteros			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com				Jessica Wang			Email 2:	teckcoal@equisonline.com			X
				Email	claudio@nautilusenvironmental.ca			Email 3:	Jay.jones@teck.com	X	X	X
					jessica@nautilusenvironmental.ca			Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	#4, 6125-12th Street S.E.			Email 5:				
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	403-253-7121							

SAMPLE DETAILS

2019/03/13 Week 3
11:40
Bear Paw
J.C.
6x 20L carboys
NOS/NOI
Good Condition

ANALYSIS REQUESTED

Filtered: F, Field, L, Lab, FL, Field & Lab, N, None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIELD FILT.	PRESERV.	ANALYSIS: 30 d fathead minnow P/F (10 ug/l CU Treated)	ANALYSIS: 30 d fathead minnow P/F (20 ug/l CU Treated)
CM_MC1_WS_2019-03-12_N 1819 to 0819	CM_MC1	WS	n	3/12/2019	12:13	G	2			X	
CM_MC2_WS_2019-03-12_N 1819 to 0820	CM_MC2	WS	n	3/12/2019	11:10	G	4			X	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	SH/DS	Mobile #	250 425 7518
Sampler's Signature		Date/Time	3/12/2019 14:00:00

Teck

COC ID:	20190312CRN3	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations		
Job Description	Q1 Chronic Sampling		
Project Manager	Cam Griffin		
Email	Cameron.Griffin@teck.com		
Address	RR#1 HWY# 3		
City	Sparwood	Province	BC
Postal Code	V0B 2G1	Country	Canada
Phone Number	1-250-425-8137		

LABORATORY

Lab Name	Nautilus Environmental		
Lab Contact	Tamara McClure		
Email			
Address	#4, 6125-12th Street S.E		
City	Calgary	Province	AB
Postal Code	T2H 2K1	Country	Canada
Phone Number	403 253 7121		

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Bryan.Ogden@teck.com	X	X	X
Email 2:	teckcoal@equisonline.com			X
Email 3:	Kimberley.Hackett@teck.com	X	X	X
Email 4:	Cameron.Griffin@teck.com	X	X	X
Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
PO number	VPO00610856			

SAMPLE DETAILS

2019/03/13 11:40 Bear Paw S.C. 4x20L car boys NOS/NOI 1819-0822

Good Condition Week 3

ANALYSIS REQUESTED

Filtered - F, Field, L, Lab, FL, Field & Lab, N, None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-d fathead minnow P/F (10 ug/l Cu Treated)									
								FILTERED	No	No								
								PRESERVED										
EV_HC1_WS_2019-03-12_N	EV_HC1	WS	N	3/12/2019	9:10	G	2		2									
EV_MC2_WS_2019-03-12_N	EV_MC2	WS	N	3/12/2019	10:15	G	2		2									
1819-0821																		
					Total		4											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Jason Gravelle	12-Mar-19		

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jaosn Gravelle	Mobile #	
Sampler's Signature	[signature]	Date/Time	March 12, 2019

Teck

COC ID: 20190312 Chronic tox

TURNAROUND TIME: RUSH:

PROJECT/CLIENT INFO			
Facility Name / Job#	Line Creek Operation		
Project Manager	Chris Blurton		
Email	Chris.Blurton@teck.com		
Address	Box 2003		
	15km North Hwy 43		
City	Sparwood	Province	BC
Postal Code	V0B 2G0	Country	Canada
Phone Number	250-425-3196		

LABORATORY			
Lab Name	Nautilus Environmental - Calgary		
Lab Contact			
Email			
Address	6125 12 St NE		
City	Calgary	Province	AB
Postal Code	T2H 2K1	Country	Canada
Phone Number	403-253-7121		

OTHER INFO				
Report Format / Distribution		Excel	PDF	EDD
Email 1:	drake.tymstra@teck.com		X	
Email 2:	chris.blurton@teck.com		X	
Email 3:	kirsten.campbell@teck.com		X	
Email 4:	teckcoal@equisonline.com			X
PO number				

SAMPLE DETAILS

2019/03/13
11:40
Bear Paw
J.C.
10x20L carboys
NoS/NoI
Good Condition
Week 3 COC V3

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS REQUESTED: 30-d fathead minnow P/F (10 ug/L Cu Treated)
LC_LCDSSLCC_WS_2019-03-12_N 0826	LC_LCDSSLCC	WS	N	12-Mar	11:10	G	2	X
LC_SLC_WS_2019-03-12_N 1819-0827	LC_SLC	WS	N	12-Mar	10:30	G	2	X
LC_LC3_WS_2019-03-12_N 1819-0824	LC_LC3	WS	N	12-Mar	11:45	G	2	X
LC_LC5_WS_2019-03-12_N 1819-0825	LC_LC5	WS	N	12-Mar		G	2	X
LC_DCDS_WS_2019-03-12_N 1819-0823	LC_DCDS	WS	N	12-Mar		G	2	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide preliminary update as results are available	K. Cambell/D.Tymstra	12-Mar		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	March 12, 2019
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190312 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution	Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com		
Email	Chris.Blurton@teck.com			Email				Email 2:	chris.blurton@teck.com		
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com		
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com		
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada				
Phone Number	250-425-3196			Phone Number	403-253-7121						

| SAMPLE DETAILS | | | | | | | | ANALYSIS REQUESTED | | | | | | | |

Teck

COC ID:	20190312 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution	Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1: drake.tymstra@teck.com			
Email	Chris.Blurton@teck.com			Email				Email 2: chris.blurton@teck.com			
Address	Box 2003			Address	6125 12 St NE			Email 3: kirsten.campbell@teck.com			
	15km North Hwy 43							Email 4: teckcoal@equisonline.com			
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada				
Phone Number	250-425-3196			Phone Number	403-253-7121						

SAMPLE DETAILS / ANALYSIS REQUESTED

Week 3 COC 3/3

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30-d fathead minnow F/F (10 ug/l Cu Treated)	PRESERV.	TAT
LC_LCDSSLCC_WS_2019-03-12_N	LC_LCDSSLCC	WS	N	12-Mar	11:10	G	2	X		
LC_SLC_WS_2019-03-12_N	LC_SLC	WS	N	12-Mar	10:30	G	2	X		
LC_LC3_WS_2019-03-12_N	LC_LC3	WS	N	12-Mar	11:45	G	2	X		
LC_LC5_WS_2019-03-12_N	LC_LC5	WS	N	12-Mar		G	2	X		
LC_DCDS_WS_2019-03-12_N	LC_DCDS	WS	N	12-Mar		G	2	X		

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide preliminary update as results are available	K. Cambell/D.Tymstra	12-Mar		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	March 12, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO

Facility Name	Greenhills Operations		
Project Manager	Leigh Stickney		
Email	leigh.stickney@teck.com		
Address	PO Box 5000		
City	Elkford	Province	BC
Postal Code	V0B 1H0	Country	Canada
Phone Number	250 865 3274		

LABORATORY

Lab Name	Hydroqual Laboratories Ltd		
Lab Contact	Jacklyn Pool		
Email			
Address	#4, 6125 - 12th Street S.E.		
City	Calgary	Province	AB
Postal Code	T2H 2K1	Country	Can
Phone Number	403.253.7121		

OTHER INFO

EDD delivery:

Site: leigh.stickney@teck.com EQuIS: GHO

Report Format / Distribution

Yes PDF Yes Excel

Email 1: leigh.stickney@teck.com

Email 2: jennifer.kropp@teck.com

Email 3: DL-Equis-GHO-Field@teck.com

PO number: 610307

SAMPLE DETAILS

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
									30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)										
GH_FR1_WS_2019-03-12_N	1819-0816 GH_FR1	WS	N	12-Mar-19		G	4		x	x										
GH_ER2_WS_2019-03-12_N	1819-0817 GH_ER2	WS	N	12-Mar-19		G	2		x											
GH_ERC_WS_2019-03-12_N	1819-0818 GH_ERC	WS	N	12-Mar-19		G	2		x											
2019/03/13 Week 3																				
11:40																				
Bear Paw Coc 1/4																				
S.C																				
8x 20L carboys																				
NoS/No2																				
Good Condition																				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID: Q1 Chronic TOX_Hyd | **TURNAROUND TIME:** regular | **RUSH:**

PROJECT/CLIENT INFO

Facility Name	Greenhills Operations		
Project Manager	Leigh Stickney		
Email	leigh.stickney@teck.com		
Address	PO Box 5000		
City	Elkford	Province	BC
Postal Code	V0B 1H0	Country	Canada
Phone Number	250 865 3274		

LABORATORY

Lab Name	Hydroqual Laboratories Ltd		
Lab Contact	Jacklyn Pool		
Email			
Address	#4, 6125 - 12th Street S.E.		
City	Calgary	Province	AB
Postal Code	T2H 2K1	Country	Can
Phone Number	403.253.7121		

OTHER INFO

EDD delivery:
Site: leigh.stickney@teck.com | EQuIS: GHO

Report Format / Distribution
Yes PDF | Yes Excel

Email 1: leigh.stickney@teck.com
Email 2: jennifer.kropp@teck.com
Email 3: DL-Equis-GHO-Field@teck.com

PO number: 610307

SAMPLE DETAILS / ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_FR1_WS_2019-03-12_N	GH_FR1	WS	N	12-Mar-19	10:35	G	4	x	x												
GH_ER2_WS_2019-03-12_N	GH_ER2	WS	N	12-Mar-19		G	2	x													
GH_ERC_WS_2019-03-12_N	GH_ERC	WS	N	12-Mar-19		G	2	x													
Week 3 COC 2/4																					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION

Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO

Facility Name	Greenhills Operations		
Project Manager	Leigh Stickney		
Email	leigh.stickney@teck.com		
Address	PO Box 5000		
City	Elkford	Province	BC
Postal Code	V0B 1H0	Country	Canada
Phone Number	250 865 3274		

LABORATORY

Lab Name	Hydroqual Laboratories Ltd		
Lab Contact	Jacklyn Pool		
Email			
Address	#4, 6125 - 12th Street S.E.		
City	Calgary	Province	AB
Postal Code	T2H 2K1	Country	Can
Phone Number	403.253.7121		

OTHER INFO

EDD delivery:
Site: leigh.stickney@teck.com EQuIS: GHO
Report Format / Distribution
Yes PDF Yes Excel
Email 1: leigh.stickney@teck.com
Email 2: jennifer.kropp@teck.com
Email 3: DL-Equis-GHO-Field@teck.com
PO number: 610307

SAMPLE DETAILS

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30-d early life stage fathead minnow P/F (10 ug/l CU Treated)	30-d early life stage fathead minnow P/F (20 ug/l CU Treated)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_FR1_WS_2019-03-12_N	GH_FR1	WS	N	12-Mar-19	10:35	G	4	x	x												
GH_ER2_WS_2019-03-12_N	GH_ER2	WS	N	12-Mar-19		G	2	x													
GH_ERC_WS_2019-03-12_N	GH_ERC	WS	N	12-Mar-19		G	2	x													
	Week 3 COC 3/4																				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				*Yes* PDF	*Yes* Excel	
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.krepp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number		610307	

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Perserved or both (F, P, F/P)											
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)										
GH_FR1_WS_2019-03-12_N	GH_FR1	WS	N	12-Mar-19		G	4	x	x										
GH_ER2_WS_2019-03-12_N	GH_ER2	WS	N	12-Mar-19		G	2	x											
GH_ERC_WS_2019-03-12_N	GH_ERC	WS	N	12-Mar-19		G	2	x											
	Week 3 COC 4/4																		

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)					
Regular (default) X	Sampler's Name		Mobile #		
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time		
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190319-1343 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - AB			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	ABinfo@nautilusenvironmental.ca			Email 2:	dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	#4, 6125 12 Street SE			Email 3:	chelsea.jensen@teck.com	X	X	X
								Email 4:	jared.cayenne@teck.com	X	X	X
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 5:	scott.roughead@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Canada	Email 6:	teckcoal@equisonline.com			X
Phone Number	1-250-865-5204			Phone Number	403-253-7121			PO number				

SAMPLE DETAILS | ANALYSIS REQUESTED (Filtered F, Field, L Lab, G Field & Lab, N None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont	FIL	N	N										
								PRESERV	NONE	NONE										
								ANALYSIS	30-d fathead minnow P/F (10 ug/l CU Treated)	30-d fathead minnow P/F (20 ug/l CU Treated)										
FR_FRABCH_WEK_2019-03-18_NP 1819-0814	FR_FRABCH	WS		2019/03/19	11:25	G	4		X	X										
FR_FRCP1_WEK_2019-03-18_N 1819-0815	FR_FRCP1	WS		2019/03/19	12:20	G	4		X	X										
FR_UFR1_WS_2019-03-19_N_13 1819-0813	FR_UFR1	WS		2019/03/19	09:39	G	2		X	X										
2019/03/20 Week4																				
11:00																				
Bear Paw																				
J.C.																				
10 x 20L carboys																				
NoS/NoT																				
Good Condition																				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Jared Cayenne	March 19, 2019		

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jared Cayenne	Mobile #	250-421-9457
Sampler's Signature		Date/Time	March 19, 2019

Teck

COC ID:	WEEKLY_CHRONIC_03192019_2	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Hydroqual Laboratories			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Claudio Quinteros			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com				Jessica Wang			Email 2:	teckcoal@equisonline.com			X
				Email	claudio@nautilusenvironmental.ca			Email 3:	Jay.jones@teck.com	X	X	X
					jessica@nautilusenvironmental.ca			Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	#4, 6125-12th Street S.E.			Email 5:				
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	403-253-7121							

SAMPLE DETAILS

2019/03/20
11:00
Bear Paw
J.C.
Box 20L carboys
NoS/NoI
Good Condition
Week 4

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d fathead minnow P/F (10 ug/l CU Treated)		30 d fathead minnow P/F (20 ug/l CU Treated)							
CM_MC1_WS_2019-03-19_N 1819-0819	CM_MC1	WS	n	3/19/2019	12:44	G	2	X									
CM_MC2_WS_2019-03-19_N 1819-0820	CM_MC2	WS	n	3/19/2019	11:54	G	4	X		X							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	SH/DS	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	[signature]	Date/Time	3/19/2019 14:00:00
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190319CRN4	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations		
Job Description	Q1 Chronic Sampling		
Project Manager	Cam Griffin		
Email	Cameron.Griffin@teck.com		
Address	RR#1 HWY# 3		
City	Sparwood	Province	BC
Postal Code	V0B 2G1	Country	Canada
Phone Number	1-250-425-8137		

LABORATORY

Lab Name	Nautilus Environmental		
Lab Contact	Tamara McClure		
Email			
Address	#4, 6125-12th Street S.E		
City	Calgary	Province	AB
Postal Code	T2H 2K1	Country	Canada
Phone Number	403 253 7121		

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Bryan.Ogden@teck.com	X	X	X
Email 2:	teckcoal@equisonline.com			X
Email 3:	Kimberley.Hackett@teck.com	X	X	X
Email 4:	Cameron.Griffin@teck.com	X	X	X
Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
PO number	VPO00610856			

SAMPLE DETAILS

2019/03/20
11:00 Week 4
Bear Paw
J.C.
4x20L carboys
NoS/No1
Good Condition

ANALYSIS REQUESTED

Filtered - F, Field, L, Lab, FL, Field & Lab, N, None

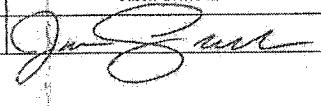
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-d fathead minnow P/F (10 ug/l Cu Treated)									
								FILTERED	No	No								
								PRESERVED										
EV_HC1_WS_2019-03_WK3_N	EV_HC1	WS	N	3/19/2019	10:15	G	2		2	1819-08232								
EV_MC2_WS_2019-03_WK3_N	EV_MC2	WS	N	3/19/2019	12:05	G	2		2	1819-0821								
					Total		4											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Jason Gravelle	19-Mar-19		

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jason Gravelle	Mobile #	
Sampler's Signature	[signature]	Date/Time	March 19, 2019



Teck

COC ID:	20190319 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact	Jeslin Wijaya			Email 1:	drake.tymstra@teck.com	x	x	
Email	Chris.Blurton@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	x	x	
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number	[illegible]			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS

2019/03/20
11:00
Bear Paw
J.C.
8x 20L carboys
NoS/NoI
LC_DCDS missing
COC 1/4

Veel/4

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow P/F (10 ug/l Cu Treated)
LC_LCDSSLCC_WS_2019-03-19_N 1819-0826	LC_LCDSSLCC	WS	N	19-Mar	11:50	G	2	X
LC_SLC_WS_2019-03-19_N 1819-0827	LC_SLC	WS	N	19-Mar	10:25	G	2	X
LC_LC3_WS_2019-03-19_N 1819-0824	LC_LC3	WS	N	19-Mar	10:55	G	2	X
LC_LC5_WS_2019-03-19_N 1819-0825	LC_LC5	WS	N	19-Mar	12:45	G	2	X
LC_DCDS_WS_2019-03-19_N 1819-0823	LC_DCDS	WS	N	19-Mar		G	2	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	19-Mar		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	March 19, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

Page 1 of 1

COC ID:	20190319 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact	Jeslin Wijnya			Email 1:	drake.tymstra@teck.com			
Email	Chris.Blurton@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com			
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com			
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F, Field, L - Lab, FL - Field & Lab, N - None

COC 2/4
Week 4

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filtered	ANALYSIS: 30-d fathead minnow P/F (10 ug/l Cu Treated)										
LC_LCDSSLCC_WS_2019-03-19_N	LC_LCDSSLCC	WS	N	19-Mar	11:50	G	2		X										
LC_SLC_WS_2019-03-19_N	LC_SLC	WS	N	19-Mar	10:25	G	2		X										
LC_LC3_WS_2019-03-19_N	LC_LC3	WS	N	19-Mar	10:55	G	2		X										
LC_LC5_WS_2019-03-19_N	LC_LC5	WS	N	19-Mar	12:45	G	2		X										
LC_DCDS_WS_2019-03-19_N	LC_DCDS	WS	N	19-Mar		G	2		X										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	19-Mar		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	March 19, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

Page 1 of 1

COC ID:	20190319 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact	Jeslin Wijaya			Email 1:	drake.tymstra@teck.com		X	
Email	Chris.Blurton@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com		X	
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com		X	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS								ANALYSIS REQUESTED (Filtered - F; Field, L - Lab, FL- Field & Lab, N - None)											
								FIELD												
								PRESERV.												
COC 3/4 Week 4 Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-d fathead minnow P/F (10 ug/l Cu Treated)											
LC_LCDSSLCC_WS_2019-03-19_N	LC_LCDSSLCC	WS	N	19-Mar	11:50	G	2		X											
LC_SLC_WS_2019-03-19_N	LC_SLC	WS	N	19-Mar	10:25	G	2		X											
LC_LC3_WS_2019-03-19_N	LC_LC3	WS	N	19-Mar	10:55	G	2		X											
LC_LC5_WS_2019-03-19_N	LC_LC5	WS	N	19-Mar	12:45	G	2		X											
LC_DCDS_WS_2019-03-19_N	LC_DCDS	WS	N	19-Mar		G	2		X											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	19-Mar		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	March 19, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190319 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact	Jeslin Wijaya			Email 1:	drake.tymstra@teck.com			
Email	Chris.Blurton@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com			
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com			
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS

ANALYSIS REQUESTED (Filtered - F; Field, L; Lab, FL; Field & Lab, N; None)

COC 4/4
Week 4

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	EXD/SSS	FRSSSRO	Ion	30-d fathead minnow P/F (10 ug/l Cu Treated)									
LC_LCDSSLCC_WS_2019-03-19_N	LC_LCDSSLCC	WS	N	19-Mar	11:50	G	2				X									
LC_SLC_WS_2019-03-19_N	LC_SLC	WS	N	19-Mar	10:25	G	2				X									
LC_LC3_WS_2019-03-19_N	LC_LC3	WS	N	19-Mar	10:05	G	2				X									
LC_LC5_WS_2019-03-19_N	LC_LC5	WS	N	19-Mar	12:45	G	2				X									
LC_DCDS_WS_2019-03-19_N	LC_DCDS	WS	N	19-Mar		G	2				X									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	19-Mar		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	March 19, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: Q1 Chronic TOX_Hyd

TURNAROUND TIME: regular

RUSH:

PROJECT/CLIENT INFO

Facility Name	Greenhills Operations
Project Manager	Leigh Stickney
Email	leigh.stickney@teck.com
Address	PO Box 5000
City	Elkford
Province	BC
Postal Code	V0B 1H0
Country	Canada
Phone Number	250 865 3274

LABORATORY

Lab Name	Hydroqual Laboratories Ltd.
Lab Contact	Jacklyn Pool
Email	
Address	#4, 6125 - 12th Street S.E.
City	Calgary
Province	AB
Postal Code	T2H 2K1
Country	Can
Phone Number	403.253.7121

OTHER INFO

EDD delivery:

Site: leigh.stickney@teck.com EQuIS: GHO

Report Format / Distribution

Yes PDF Yes Excel

Email 1: leigh.stickney@teck.com

Email 2: jennifer.kropp@teck.com

Email 3: DL-Equis-GHO-Field@teck.com

PO number: 610307

SAMPLE DETAILS

ANALYSIS REQUESTED

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	ANALYSIS: 30 d early life stage fathead minnow P/F (20 ug/l CU Treated)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_FR1_WS_2019-03-19_N	1819-0816	GH_FR1	WS	N	19-Mar-19	10:40	G	4	x	x											
GH_ER2_WS_2019-03-19_N	1819-0817	GH_ER2	WS	N	19-Mar-19		G	2	x												
GH_ERC_WS_2019-03-19_N	1819-0818	GH_ERC	WS	N	19-Mar-19		G	2	x												
2019/03/20	COC 1/3																				
11:00	Week 4																				
Bear Paw																					
J.C.																					
6x 20L carboys																					
NO3/NO2 &																					
GH_ER2 not present																					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION

	Date	Time

Accepted By/Affiliation

	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				*Yes* PDF	*Yes*	Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610307		

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Perserved or both (F, P, F/P)											
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d early life stage fathead minnow F/P (10 ug/l CU Treated)	30 d early life stage fathead minnow F/P (20 ug/l CU Treated)										
GH_FR1_WS_2019-03-19_N	GH_FR1	WS	N	19-Mar-19	10:40	G	4	x	x										
GH_ER2_WS_2019-03-19_N	GH_ER2	WS	N	19-Mar-19		G	2	x											
GH_ERC_WS_2019-03-19_N	GH_ERC	WS	N	19-Mar-19		G	2	x											
COC 2/3 Week 4																			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				Yes PDF	Yes	Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	DL-EquIS-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610307		

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Perserved or both (F, P, F/P)											
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)										
GH_FR1_WS_2019-03-19_N	GH_FR1	WS	N	19-Mar-19		G	4	x	x										
GH_ER2_WS_2019-03-19_N	GH_ER2	WS	N	19-Mar-19		G	2	x											
GH_ERC_WS_2019-03-19_N	GH_ERC	WS	N	19-Mar-19	14:55	G	2	x											
COC 3/3																			
Week 4																			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190326-1449	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - AB			Report Format / Distribution	Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1: neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	ABinfo@nautilusenvironmental.ca			Email 2: dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	#4, 6125 12 Street SE			Email 3: chelsea.jensen@teck.com	X	X	X
								Email 4: jared.cayenne@teck.com	X	X	X
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 5: scott.roughead@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Canada	Email 6: teckcoal@equisonline.com			X
Phone Number	1-250-865-5204			Phone Number	403-253-7121			PO number			

| SAMPLE DETAILS | | | | | | | | ANALYSIS REQUESTED | | | | | | | |

Teck

COC ID:	WEEKLY_CHRONIC_03262019	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Hydroqual Laboratories			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Claudio Quinteros			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com				Jessica Wang			Email 2:	teckcoal@equisonline.com			X
				Email	claudio@nautilusenvironmental.ca			Email 3:	Jay.Jones@teck.com	X	X	X
					jessica@nautilusenvironmental.ca			Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	#4, 6125-12th Street S.E.			Email 5:				
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	403-253-7121							

SAMPLE DETAILS — ANALYSIS REQUESTED (Filtered: F= Field, L= Lab, FL= Field & Lab, N= None)

2019/03/27
10:40
Bear Pass
S.C.
6xc 20L carboys
Nos/NoI
Good Condition
Week 5

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	PRESERV.	ANALYSIS: 30 d fathead minnow P/F (10 ug/l CU Treated)		30 d fathead minnow P/F (20 ug/l CU Treated)								
CM_MC1_WS_2019-03-26_N 1819-0819	CM_MC1	WS	n	3/26/2019	10:20	G	2			X										
CM_MC2_WS_2019-03-26_N 1819-0820	CM_MC2	WS	n	3/26/2019	11:17	G	4			X		X								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	SH/DS	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	3/26/2019 14:00:00
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190326CRN5	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q1 Chronic Sampling			Lab Contact	Tamara McClure			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email				Email 2:	teckcoal@equisonline.com			X
Email	Cameron.Griffin@teck.com			Address	#4, 6125-12th Street S.E			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3							Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number	VPO00610856			
Postal Code	V0B 2G1	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	403 253 7121							

SAMPLE DETAILS — **ANALYSIS REQUESTED** (Filtered - 1: Field, 2: Lab, 3: Field & Lab, N: None)

2019/03/27 Good Condition
10:40 Week 5
Bear Paw
S.C.
4x20L carbon/S
NoS/NoZ 1819-0822

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILTERED / PRESERVED / ANALYSIS	30-d fathead minnow P/F (10 ug/l Cu Treated)									
								FILTERED	No	No								
								PRESERVED										
EV_HC1_WS_2019-03_WK5_N	EV_HC1	WS	N	2019/03/26	08:40	G	2		2									
EV_MC2_WS_2019-03_WK5_N	EV_MC2	WS	N	2019/03/26	10:20	G	2		2									
1819-0822																		
					Total		4											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Jason Gravelle	26-Mar-19		

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jason Gravelle	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	March 26, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190326 Chronic tox | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact	Jeslin Wijaya			Email 1:	drake.tymstra@teck.com	X	X	
Email	Chris.Blurton@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	X	X	
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com	X	X	
	15km North Hwy 43							Email 4:	teckcoal@equistonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number	PO#0085[illegible]			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS | ANALYSIS REQUESTED (Filtered - F, Field; L, Lab; FL, Field & Lab; N, None)

2019/03/27
10:40
Bear Pav
D.C.
10x20L carboys
No5/No7
Good Condition
Week5
COC 1/5

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	BIL	PRESERV.	ANALYSIS: 30-d fathead minnow P/F (10 ug/l Cu Treated)
LC_LCDSSLCC_WS_2019-03-26_N 1819-0826	LC_LCDSSLCC	WS	N			G	2			X
LC_SLC_WS_2019-03-26_N 1819-0827	LC_SLC	WS	N			G	2			X
LC_LC3_WS_2019-03-26_N 1819-0824	LC_LC3	WS	N			G	2			X
LC_LC5_WS_2019-03-26_N 1819-0825	LC_LC5	WS	N			G	2			X
LC_DCDS_WS_2019-03-26_N 1819-0823	LC_DCDS	WS	N			G	2			X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	26-Mar		

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	March 26, 2019

Teck

COC ID:	20190326 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact	Jeslin Wijaya			Email 1:	drake.tymstra@teck.com			
Email	Chris.Blurton@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com			
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com			
	15km North Hwy 43							Email 4:	teckcoale@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

Week 5
COC 2/5

SAMPLE DETAILS								ANALYSIS REQUESTED (Filtered - F; Field, F; Lab, FL; Field & Lab, N; None)												
								Tox												
								HERSTEN												
								ANALYSIS	30-d fathead minnow P/F (10 ug/l Cu Treated)											
Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.													
LC_LCDSSLCC_WS_2019-03-26_N	LC_LCDSSLCC	WS	N			G	2		X											
LC_SLC_WS_2019-03-26_N	LC_SLC	WS	N			G	2		X											
LC_LC3_WS_2019-03-26_N	LC_LC3	WS	N			G	2		X											
LC_LC5_WS_2019-03-26_N	LC_LC5	WS	N			G	2		X											
LC_DCDS_WS_2019-03-26_N	LC_DCDS	WS	N			G	2		X											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	26-Mar		

SERVICE REQUEST (rush - subject to availability)					
Regular (default) X	Sampler's Name	Drake Tymstra	Mobile #		
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	March 26, 2019	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190326 Chronic tox

TURNAROUND TIME: RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution	Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact	Jeslin Wijaya			Email 1:	drake.tymstra@teck.com	x	
Email	Chris.Blurton@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	x	
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com		x
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada				
Phone Number	250-425-3196			Phone Number	403-253-7121						

SAMPLE DETAILS

ANALYSIS REQUESTED (Filtered - F; Field, L; Lab, FL; Field & Lab, N; None)

Week 5
COC 3/5

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30-d fathead minnow P/F (10 ug/l Cu Treated)									
								PRESERV:									
								Filt:									
LC_LCDSSLCC_WS_2019-03-26_N	LC_LCDSSLCC	WS	N			G	2	X									
LC_SLC_WS_2019-03-26_N	LC_SLC	WS	N			G	2	X									
LC_LC3_WS_2019-03-26_N	LC_LC3	WS	N			G	2	X									
LC_LC5_WS_2019-03-26_N	LC_LC5	WS	N			G	2	X									
LC_DCDS_WS_2019-03-26_N	LC_DCDS	WS	N			G	2	X									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	26-Mar		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	March 26, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190326 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact	Jeslin Wijaya			Email 1:	drake.tymstra@teck.com	x	x	
Email	Chris.Blurton@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	x	x	
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number	VPO00608754			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS / ANALYSIS REQUESTED — Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Week 5
COC 4/5

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow P/F (10 ug/l Cu Treated)
LC_LCDSSLCC_WS_2019-03-26_N	LC_LCDSSLCC	WS	N	March 26	9:45	G	2	X
LC_SLC_WS_2019-03-26_N	LC_SLC	WS	N		11:32	G	2	X
LC_LC3_WS_2019-03-26_N	LC_LC3	WS	N		10:22	G	2	X
LC_LC5_WS_2019-03-26_N	LC_LC5	WS	N		9:00	G	2	X
LC_DCDS_WS_2019-03-26_N	LC_DCDS	WS	N			G	2	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	26-Mar		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	March 26, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190326 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact	Jeslin Wijaya			Email 1:	drake.tymstra@teck.com	x	x	
Email	Chris.Blurton@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	x	x	
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			x
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number	PO 0000[illegible]			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Week 5
COC 5/5

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt. / Preserv. / Analysis: 30-d fathead minnow P/F (10 ug/l Cu Treated)
~~LC_LCDSSLCC_WS_2019-03-26_N~~	~~LC_LCDSSLCC~~	WS	N			G	2	X
~~LC_SLC_WS_2019-03-26_N~~	~~LC_SLC~~	WS	N			G	2	X
~~LC_LC3_WS_2019-03-26_N~~	~~LC_LC3~~	WS	N			G	2	X
~~LC_LC5_WS_2019-03-26_N~~	~~LC_LC5~~	WS	N			G	2	X
LC_DCDS_WS_2019-03-26_N	LC_DCDS	WS	N	March 26	11:30	G	2	X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	26-Mar		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	March 26, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				*Yes* PDF	*Yes*	Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610307		

2019/03/27
10:40
Bear Paw
J.C.
6x 20L carboys
NO3/NO2
COC 3 damaged

Week 5
COC 1/3

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Perserved or both (F, P, F/P)											
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)										
GH_FR1_WS_2019-03-26_N 1819-0816	GH_FR1	WS	N	26-Mar-19	10:38	G	4	x	x										
GH_ER2_WS_2019-03-26_N 1819-0817	GH_ER2	WS	N	26-Mar-19	12:15	G	2	x											
GH_ERC_WS_2019-03-26_N 1819-0818	GH_ERC	WS	N	26-Mar-19		G	2	x											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				Yes PDF	Yes	Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	DL-EquisGHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610307		

SAMPLE DETAILS

Week 5
COC 2/3

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
										Please indicate below Filtered, Perserved or both (F, P, F/P)											
GH_FR1_WS_2019-03-26_N	GH_FR1	WS	N	26-Mar-19	10:30	G	4	x	x												
GH_ER2_WS_2019-03-26_N	GH_ER2	WS	N	26-Mar-19	12:15	G	2	x													
GH_ERC_WS_2019-03-26_N	GH_ERC	WS	N	26-Mar-19		G	2	x													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Jacklyn Pool			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				Yes PDF	Yes	Excel
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 1:	leigh.stickney@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 2:	jennifer.kropp@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			Email 3:	DL-Equis-GHO-Field@teck.com		
								PO number	610307		

Week 5
COC 3/3

SAMPLE DETAILS / ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_FR1	WS	N	26-Mar-19	10:30	G	4	x	x												
GH_ER2	WS	N	26-Mar-19	12:15	G	2	x													
GH_ERC	WS	N	26-Mar-19	13:56	G	2	x													

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

END OF REPORT

Second Quarter 2019
Nautilus Toxicity Testing on Elk Valley Samples with *Ceriodaphnia dubia*, *Pseudokirchneriella subcapitata*, *Hyalella azteca*, and *Oncorhyncus mykiss*

Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia*, *Pseudokirchneriella subcapitata*, *Hyalella azteca*, and *Oncorhyncus mykiss*

Second Quarter 2019 Results

Revised Final Report

March 24, 2020

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

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SIGNATURE PAGE

Report By:
Jeslin Wijaya, B.Sc.
Laboratory Biologist

Reviewed By:
Melanie Gallant. Ph.D.
Environmental Toxicologist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

SUMMARY

Summaries of sample information and test results from the toxicity tests conducted on samples collected from the Elk Valley to meet requirements of the quarterly toxicity testing program required under BC Ministry of Environment and Sustainability permit number 107517 in the first quarter of 2019 are provided in the tables below.

Sample and Test Type Information

Sample IDs	FR_UFR1 (site control), GH_ER2 (site control), CM_MC1 (site control), LC_SLC (site control), FR_FRABCH, FR_FRCP1, GH_FR1, GH_ERC, CM_MC2, EV_MC2 , EV_HC1, LC_DCDS, LC_LC3, LC_LC5, LC_LCDSSLCC, RG_MIDAG*
Sample collection dates	May 7, 14, 21, 28 and June 4, 2019
Sample receipt dates	One day after sample collection
Sample receipt temperatures	Ranged from 0.0 to 12.8°C
Test types	*Ceriodaphnia dubia* 7-d survival and reproduction#
	Pseudokirchneriella subcapitata 72-h growth inhibition
	Hyalella azteca 28-d survival and growth
	Oncorhynchus mykiss (rainbow trout) embryo-alevin development

* Not tested with *P. subcapitata* and *O. mykiss*

Test extended to 8 days to evaluate brooding

Summary of Results

Endpoint	Mean ± SD				
	Laboratory Control	FR_UFR1 (Site Control)	GH_ER2 (Site Control)	CM_MC1 (Site Control)	LC_SLC (Site Control)
C. dubia					
Survival (%)	100	100	90	90	100
Reproduction	23.5 ± 2.8	18.5 ± 3.4 *	17.7 ± 4.5 *	16.3 ± 4.5 *	19.6 ± 4.2
P. subcapitata					
Cell Yield (x 10^4 cells/mL)	34.4 ± 3.0	113.8 ± 7.6$^{\#\partial}$	111.5 ± 6.8$^{\#\partial}$	123.0 ± 6.1	121.2 ± 9.0
O. mykiss					
Survival (%)	83.3 ± 5.8	88.0 ± 10.6	77.9 ± 10.9	76.3 ± 14.9	78.1 ± 11.8
Viability (%)	78.8 ± 8.6	84.7 ± 13.3	73.5 ± 9.1	70.6 ± 17.8	78.1 ± 11.8
Length (mm)	21.1 ± 0.5	21.4 ± 0.2	21.9 ± 0.6	21.6 ± 0.5	20.6 ± 0.4 $^{\beta}$
Wet weight (mg)	97.2 ± 2.1	98.5 ± 1.7	106.6 ± 8.4	105.7 ± 2.0	97.6 ± 2.5

SD = Standard Deviation
* Result was significantly lower than the laboratory control
$^{\alpha}$ Result was significantly lower than the site control FR_UFR1
$^{\beta}$ Result was significantly lower than the site control GH_ER2
Result was significantly lower than the site control CM_MC1
$^{\partial}$ Result was significantly lower than the site control LC_SLC

Summary of Results (continued)

Endpoint	Mean ± SD					
	FR_FRCP1	FR_FRABCH	GH_FR1	GH_ERC	CM_MC2	EV_MC2
C. dubia						
Survival (%)	100	100	100	80	90	100
Reproduction	18.7 ± 3.6 *	16.5 ± 3.3 *	18.8 ± 4.8	19.2 ± 3.0 *	16.7 ± 3.0 *	19.6 ± 1.6 *
P. subcapitata						
Cell Yield (x 10^4 cells/mL)	107.5 ± 9.9$^{\#\partial}$	120.2 ± 5.1	120.5 ± 8.4	120.0 ± 6.7	113.5 ± 12.8	105.2 ± 9.7$^{\#\partial}$
O. mykiss						
Survival (%)	73.3 ± 3.3	61.1 ± 13.5$^{*\alpha}$	57.8 ± 8.4$^{*\alpha\beta\partial}$	78.7 ± 20.3	71.4 ± 7.0	76.2 ± 14.0
Viability (%)	68.9 ± 5.1	58.9 ± 9.6$^{*\alpha\partial}$	55.6 ± 10.1$^{*\alpha\partial}$	75.3 ± 18.3	67.2 ± 7.5	74.0 ± 15.7
Length (mm)	21.9 ± 0.1	20.2 ± 0.7$^{\beta\#}$	21.6 ± 0.8	21.7 ± 0.7	21.7 ± 0.9	22.1 ± 0.3
Wet weight (mg)	116.1 ± 15.3	93.5 ± 7.9	103.5 ± 8.7	108.0 ± 2.1	107.7 ± 10.7	105.5 ± 9.5

SD = Standard Deviation
* Result was significantly lower than the laboratory control
$^{\alpha}$ Result was significantly lower than the site control FR_UFR1
$^{\beta}$ Result was significantly lower than the site control GH_ER2
Result was significantly lower than the site control CM_MC1
$^{\partial}$ Result was significantly lower than the site control LC_SLC

Summary of Results (continued)

Endpoint	Mean ± SD					
	EV_HC1	LC_DCDS	LC_LC3	LC_LC5	LC_LCDSSLCC	RG_MIDAG
C. dubia						
Survival (%)	100	90	100	100	100	100
Reproduction	18.2 ± 2.2 *	19.1 ± 6.2	19.9 ± 2.8	18.6 ± 2.0 *	19.1 ± 1.5 *	19.1 ± 2.2 *
P. subcapitata						
Cell Yield (x 10^4 cells/mL)	134.0 ± 5.1	112.0 ± 7.3[#]	113.8 ± 11.4[#]	104.2 ± 8.0[α #∂]	110.8 ± 2.6[#∂]	NT
O. mykiss						
Survival (%)	79.5 ± 11.2	79.5 ± 11.2	76.6 ± 11.6	75.8 ± 5.2	84.2 ± 8.8	NT
Viability (%)	71.9 ± 10.1	77.3 ± 12.7	74.5 ± 10.6	70.3 ± 9.0	79.7 ± 11.8	NT
Length (mm)	21.4 ± 0.6	22.2 ± 0.3	22.0 ± 0.3	21.6 ± 0.3	21.9 ± 0.6	NT
Wet weight (mg)	109.1 ± 3.8	108.7 ± 5.5	114.9 ± 8.0	109.6 ± 1.2	111.8 ± 4.6	NT

SD = Standard Deviation, NT=Not Tested
* Result was significantly lower than the laboratory control
[α] Result was significantly lower than the site control FR_UFR1
[β] Result was significantly lower than the site control GH_ER2
[#] Result was significantly lower than the site control CM_MC1
[∂] Result was significantly lower than the site control LC_SLC

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on samples collected from various locations in the Elk Valley as part of a quarterly toxicity testing program required under the Elk Valley *Environmental Management Act* Permit 107517.

Stations sampled (Figure 1) in the second quarter of 2019 align with the integrated chronic toxicity testing program, which was designed to eliminate redundancy between Permit 107517 Section 9.8 (ii) and Permit 106970 toxicity testing programs. The integrated program was approved by BC Ministry of Environment and Sustainability on March 4, 2019 (BC ENV 2019). Test species required to be tested quarterly include a cladoceran (*Ceriodaphnia dubia*) and a unicellular green alga (*Pseudokirchneriella subcapitata*). Tests are also required on a semi-annual basis using rainbow trout (*Oncorhynchus mykiss*; Q2 and Q4), an amphipod (*Hyalella azteca*; Q2 and Q4), and fathead minnow (*Pimephales promelas*; Q1 and Q3).

Water samples used for testing were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 0.0 to 12.8°C and were stored in the dark at 4 ± 2°C prior to testing. Table 1 summarizes the toxicity tests that were conducted on each sample as well as sample collection dates. Samples were collected weekly on the dates shown in Table 1 for the duration of the *H. azteca* and *O. mykiss* tests. All toxicity tests were conducted at the Nautilus Environmental laboratory in Burnaby, BC.

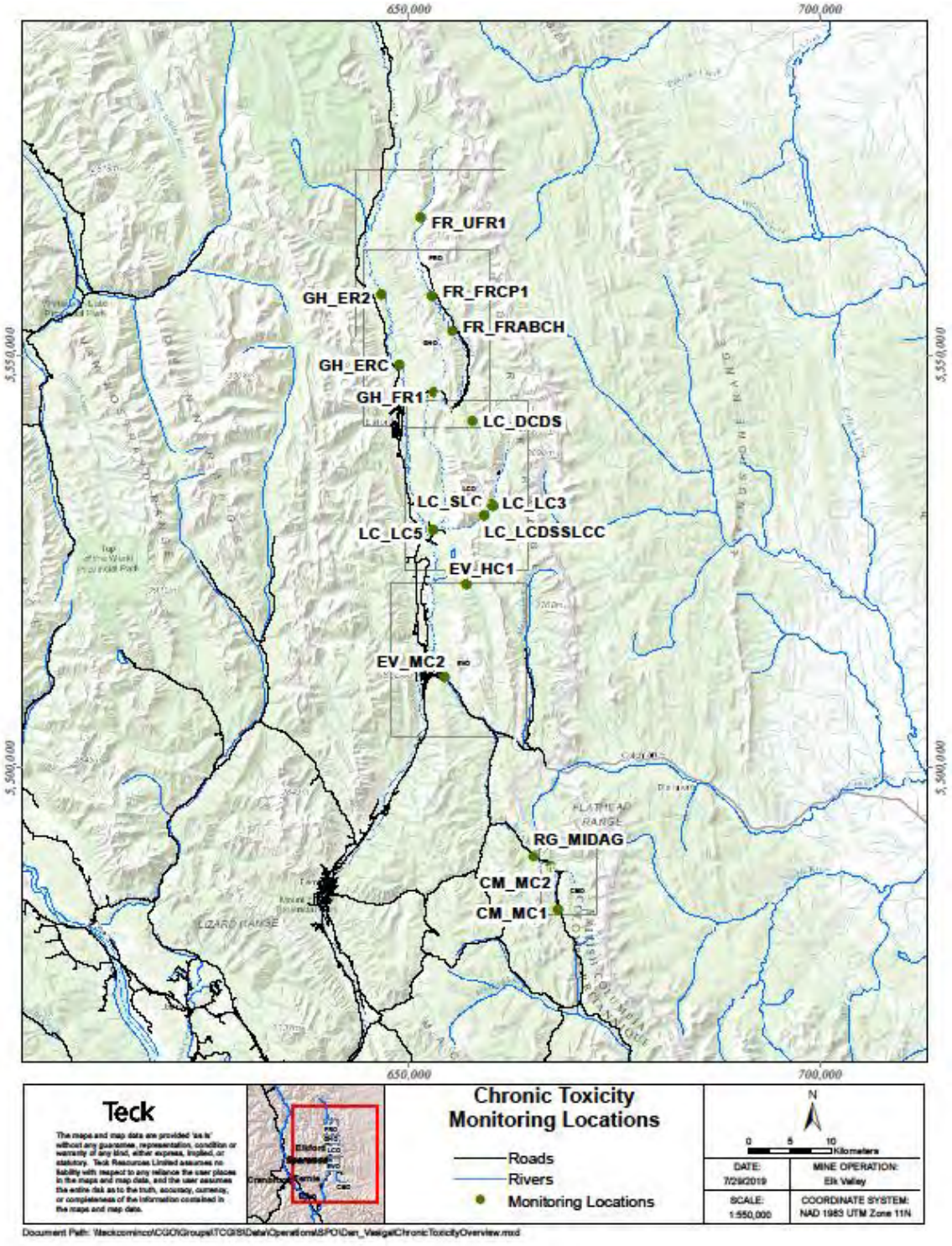
This report presents the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through E. Results of analytical chemistry that was performed on the samples tested in this program are uploaded by Teck to the Environmental Management System database. These samples were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix E. This report revises and replaces an earlier version of this report dated October 30, 2019. Changes were made to this report to present data analysis for *C. dubia* in a manner that was consistent with the data for other quarters and the Environment Canada test method.

Table 1. Summary of toxicity testing program.

Sample ID	EMS Location ID	Species Tested	Sample Collection Dates
FR_UFR1 *	E300071	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	May 7, 14, 21, 28 and June 4, 2019
GH_ER2 *	E300090	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	May 7, 14, 21, 28 and June 4, 2019
CM_MC1 *	E258937	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	May 7, 14, 21, 28 and June 4, 2019
LC_SLC *	E282149	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	May 7, 14, 21, 28 and June 4, 2019
FR_FRCP1	E299272	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	May 7, 14, 21, 28 and June 4, 2019
FR_FRABCH	-	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	May 7, 14, 21, 28 and June 4, 2019
GH_FR1	E200028	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	May 7, 14, 21, 28 and June 4, 2019
GH_ERC	E258175	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	May 7, 14, 21, 28 and June 4, 2019
EV_HC1	E299270	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	May 7, 14, 21, 28 and June 4, 2019
EV_MC2	E102682	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	May 7, 14, 21, 28 and June 4, 2019
CM_MC2	E300091	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	May 7, 14, 21, 28 and June 4, 2019
RG_MIDAG	-	*C. dubia* and *H. azteca*	May 7, 14, 21, and 28, 2019
LC_LCDSSLCC	E282149	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	May 7, 14, 21, 28 and June 4, 2019

***** Site water controls

Figure 1. Chronic toxicity monitoring locations.



2.0 METHODS

Methods for the toxicity tests using *C. dubia*, *P. subcapitata*, *H. azteca,* and *O. mykiss* are summarized in Tables 2 through 5. Laboratory control water was 20% Perrier water prepared with deionized water for *C. dubia*; reconstituted water prepared by addition of reagent grade salts to dechlorinated Metro Vancouver municipal tap water for *H. azteca* according to a recipe provided in Environment Canada (2013); dechlorinated Metro Vancouver municipal tap water for *O. mykiss*; and deionized water with supplemented nutrients for *P. subcapitata*.

For *C. dubia*, the test protocol specifies that test duration must be 7 ± 1 day, with the test being terminated on the day that at least 60% of control organisms have produced three broods. To better evaluate the potential effect of brood patterns on responses, the laboratory was instructed to extend the test to 8 days, regardless of the timing of controls reaching 60% with three broods. However, the results reported here are based on the regular test method (which in this case, was based on Day 7 data).

For the *H. azteca* tests, all of the site waters were supplemented with 25 mg/L chloride and 0.02 mg/L bromide using NaCl and NaBr, respectively, according to recommendations of the *Hyalella* Advisory Group (chaired by Chris Ingersoll, USGS) (Norberg-King et al., 2014), since low concentrations of these halides are known to impair growth of this species. The laboratory control water contained approximately 75 mg/L chloride and 0.8 mg/L bromide, respectively.

As requested by the client, *O. mykiss* site waters were amended with 20 µg/L copper to reduce potential confounding effects due to the presence of microbes.

Statistical analyses were performed using CETIS (Tidepool Scientific Software, 2013), and involved comparison of results to both the laboratory and site water controls.

Table 2. Test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test species	*Ceriodaphnia dubia*
Organism source	In-house culture
Organism age	<24 hour old neonates, produced within a 12 hour window
Test type	Static-renewal
Test duration	8 days*
Test vessel	20-mL glass test tube
Test volume	15 mL
Test solution depth	10 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	10 per treatment
Number of organisms	1 per replicate
Control water	20% Perrier water and 80% deionized water + 5 µg/L Se and 2 µg/L vitamin B12
Test solution renewal	Daily (100% renewal)
Test temperature	25 ± 1°C
Feeding	Daily with *Pseudokirchneriella subcapitata* and YCT (3:1 ratio)
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival and reproduction checked daily
Test protocol	Environment Canada (2007a), EPS 1/RM/21
Statistical software	CETIS Version 1.9.4
Test endpoints	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods; no ephippia present
Reference toxicant	Sodium chloride (NaCl)

* Test duration was extended to 8 days to allow for evaluation of brood patterns. Summarized data and calculated endpoints are based on results from Day 7, according to the standard test procedure; however, all of the data through 8 days are provided in Appendix A for subsequent evaluations.

Table 3. Test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test species	*Pseudokirchneriella subcapitata*, strain CPCC# 37
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Center, and originally isolated from Nivelta River, Norway.
Organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test concentrations	Full strength sample diluted to 95.2% (v/v) by addition of nutrients, plus laboratory control
Test replicates	4 per treatment; 8 for laboratory control and site control
Number of organisms	10,000 cells/mL
Control water	Deionized water supplemented with nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature and pH measured at test initiation; pH of two control wells measured at test termination
Test protocol	Environment Canada (2007b), EPS 1/RM/25
Statistical software	CETIS Version 1.9.4
Test endpoints	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤ 20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc (added as $ZnSO_4$)

Table 4. Test conditions: *Hyalella azteca* survival and growth test.

Test species	*Hyalella azteca*
Organism source	Aquatic Research Organisms, NH
Organism age	7- to 8-days old
Test type	Static-renewal
Test duration	28 days
Test vessel	375-mL glass container
Test volume	300 mL
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	5 per treatment
Number of organisms	10 per replicate
Control water	Reconstituted water containing ~75 mg/L Cl and 0.8 mg/L Br (Environment Canada 2013). Samples were supplemented with 25 mg/L Cl and 0.02 mg/L Br.
Test solution renewal	Twice daily (~80% renewal)
Test temperature	23 ± 1°C
Feeding	1 mL of YCT daily to each container. Tetramin daily, with amounts increasing weekly: Week 1: 0.25 mg, Week 2: 0.5 mg, Week 3: 1 mg, Week 4: 1.5 mg in each test container.
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity measured upon arrival; hardness and alkalinity measured at test termination; total ammonia measured at test initiation and termination
Test protocol	Modified from US EPA (2000), as described in Norberg-King et al. (2014)
Statistical software	CETIS Version 1.9.4
Test endpoints	Survival and dry weight
Test acceptability criteria for controls	Mean control survival of ≥80% survival
Reference toxicant	Sodium chloride (NaCl)

Table 5. Test conditions: *Oncorhynchus mykiss* embryo-alevin development test.

Test species	*Oncorhynchus mykiss*
Organism source	Lyndon Fish Hatcheries, ON
Gamete quality	Small amount of water added to milt on a dry glass slide; verification of vigorous sperm motility using a compound microscope (100 X magnification)
Organism age	<30 minutes post fertilization, <24 hour old gametes
Test type	Static-renewal
Test duration	Test terminated 7 days after ≥50% of controls hatch
Test vessel	4-L plastic containers
Test volume	2 L
Test solution depth	17 cm
Test concentrations	100% (undiluted sample) amended with 20 µg/L Cu, plus laboratory control
Test replicates	3 per treatment
Number of organisms	30 per replicate
Control water	Dechlorinated Metro Vancouver municipal tap water
Test solution renewal	Daily (80% renewal)
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark; low intensity light used during solution renewals
Aeration	Continuous gentle aeration
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured upon arrival; survival checked daily
Test protocol	Environment Canada (1998), EPS 1/RM/28
Statistical software	CETIS Version 1.9.4
Test endpoint	Survival, viability (which assesses incidence of deformities), length, wet weight
Test acceptability criteria for controls	≥65% normally developed hatched fish
Reference toxicant	Sodium dodecyl sulphate (SDS)

3.0 RESULTS

3.1 *Ceriodaphnia dubia*

Results of the toxicity tests using *C. dubia* are provided in Table 6. With the exception of South Line Creek (LC_SLC), reproduction in all site water controls (Fording River, Elk River, and Michel Creek) performed significantly lower than the laboratory control.

There were no adverse effects on survival in any of the samples tested; survival ranged between 80 and 100%. With the exception of GH_FR1, LC_DCDS, and LC_LC3, reproduction was significantly reduced in the remaining samples relative to the laboratory control. None of the samples were significantly reduced when compared to the site water controls.

3.2 *Pseudokirchneriella subcapitata*

Results of the toxicity tests using *P. subcapitata* are provided in Table 7. The site water controls FR_UFR1, GH_ER2, CM_MC1 and LC_SLC produced 3.2 to 3.6-fold greater growth than the laboratory control. This finding is not unusual, since the higher ionic strength associated with the site water controls would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water.

There were no adverse effects on cell yield in any of the samples tested relative to the laboratory control. Cell yield stimulation were observed in all samples tested compared to the laboratory control; percent stimulation ranged between 84.8% and 154.7%. Compared to the upstream site water controls CM_MC1 and LC_SLC, there was a small, but statistically significant decrease in growth in samples FR_FRCP1, EV_MC2, LC_LC5 and LC_LCDSSLCC. Similarly, statistically significant decrease in cell yield was observed in samples LC_DCDS and LC_LC3 when compared to the site water control CM_MC1.

3.3 *Hyalella azteca*

Control passing criteria for both survival and dry weight endpoints were not met for this test. Laboratory control survival was 24% and the site water controls survival ranged between 40% and 62%. Passing criteria for this test is 80% survival therefore laboratory control organisms performed well below passing criteria. Water quality remained within acceptable ranges and therefore an unlikely cause for low survival. Due to poor control performance, raw data is provided in Appendix C but not summarized herein. Site water will be collected and re-tested in quarter three.

3.4 *Oncorhynchus mykiss*

Results of the toxicity tests using *O. mykiss* are provided in Table 9. The site water controls FR_UFR1, CM_MC1, GH_ER2 and LC_SLC performed similarly to the laboratory control for this species, indicating that there were no adverse effects associated with the upstream site waters. In the *O. mykiss* test during this quarter, eggs in one of the four replicates were considered non-viable, producing particularly poor results (near complete mortality within the first two weeks of exposure); therefore, data from this replicate was excluded from statistical analysis.

Sample FR_FRABCH exhibited adverse effects on survival, embryo viability and length relative to the laboratory control and one or more of the site water controls. There were adverse effects on survival and embryo viability in two samples (FR_FRABCH and GH_FR1) relative to the laboratory control and one or more of the site water controls. There were no adverse effects on survival and embryo viability in any of the other samples tested. Excluding FR_FRABCH and GH_FR1, survival ranged between 71.4 and 84.2%; embryo viability ranged between 67.2 and 79.7%.

Significant reduction in comparison to one or more of the site waters in alevin length was observed only in the sample FR_FRABCH. The remaining samples performed similarly to the laboratory controls and site water controls for the alevin's length and wet weight endpoints. Microbial/fungal growth was not observed.

There were no observations of unusual behaviour of *O. mykiss* in any of the test solutions. A hatch rate was not calculated in these tests; however, the survival endpoint provides an appropriate measure of successful hatch, since the test is terminated shortly following hatch.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Sample ID	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	23.5 ± 2.8
FR_UFR1 (Site Control)	100	18.5 ± 3.4*
GH_ER2 (Site Control)	90	17.7 ± 4.5*
CM_MC1 (Site Control)	90	16.3 ± 4.5*
LC_SLC (Site Control)	100	19.6 ± 4.2
FR_FRABCH	100	16.5 ± 3.3*
FR_FRCP1	100	18.7 ± 3.6*
GH_FR1	100	18.8 ± 4.8
GH_ERC	80	19.2 ± 3.0*
CM_MC2	90	16.7 ± 3.0*
EV_MC2	100	19.6 ± 1.6*
EV_HC1	100	18.2 ± 2.2*
LC_DCDS	90	19.1 ± 6.2
LC_LC3	100	19.9 ± 2.8
LC_LC5	100	18.6 ± 2.0*
LC_LCDSSLCC	100	19.1 ± 1.5*
RG_MIDAG	100	19.1 ± 2.2*

SD = Standard Deviation
* Result was significantly lower than the laboratory control
None of the samples were significantly different from the site controls in either endpoints for this species.

Table 7. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Sample ID	Cell Yield (x 10^4 cells/mL) (Mean ± SD)	Stimulation relative to laboratory control (%)
Laboratory Control	34.4 ± 3.0	0.0
FR_UFR1 (Site Control)	113.8 ± 7.6[#ð]	90.2
GH_ER2 (Site Control)	111.5 ± 6.8[#ð]	84.8
CM_MC1 (Site Control)	123.0 ± 6.1	125.4
LC_SLC (Site Control)	121.2 ± 9.0	139.1
FR_FRABCH	120.2 ± 5.1	124.2
FR_FRCP1	107.5 ± 9.9[#ð]	-
GH_FR1	120.5 ± 8.4	123.4
GH_ERC	120.0 ± 6.7	98.4
CM_MC2	113.5 ± 12.8	142.2
EV_MC2	105.2 ± 9.7[#ð]	154.7
EV_HC1	134.0 ± 5.1	139.8
LC_DCDS	112.0 ± 7.3[#]	158.6
LC_LC3	113.8 ± 11.4[#]	148.4
LC_LC5	104.2 ± 8.0[#ð]	154.7
LC_LCDSSLCC	110.8 ± 2.6[#ð]	139.8

SD = Standard Deviation
# Result was significantly lower than the site control CM_MC1
ð Result was significantly lower than the site control LC_SLC

Table 8. Results: *Oncorhynchus mykiss* embryo-alevin development test.

Sample ID	(Mean ± SD)			
	Survival (%)	Viability (%)	Length (mm)	Wet Weight (mg)
Laboratory Control	83.3 ± 5.8	78.8 ± 8.6	21.1 ± 0.5	97.2 ± 2.1
FR_UFR1 (Site Control)	88.0 ± 10.6	84.7 ± 13.3	21.4 ± 0.2	98.5 ± 1.7
GH_ER2 (Site Control)	77.9 ± 10.9	73.5 ± 9.1	21.9 ± 0.6	106.6 ± 8.4
CM_MC1 (Site Control)	76.3 ± 14.9	70.6 ± 17.8	21.6 ± 0.5	105.7 ± 2.0
LC_SLC (Site Control)	78.1 ± 11.8	78.1 ± 11.8	20.6 ± 0.4$^{\beta}$	97.6 ± 2.5
FR_FRABCH	61.1 ± 13.5$^{*\alpha}$	58.9 ± 9.6$^{*\alpha\partial}$	20.2 ± 0.7$^{\beta\#}$	93.5 ± 7.9
FR_FRCP1	73.3 ± 3.3	68.9 ± 5.1	21.9 ± 0.1	116.1 ± 15.3
GH_FR1	57.8 ± 8.4$^{*\alpha\beta\partial}$	55.6 ± 10.1$^{*\alpha\partial}$	21.6 ± 0.8	103.5 ± 8.7
GH_ERC	78.7 ± 20.3	75.3 ± 18.3	21.7 ± 0.7	108.0 ± 2.1
CM_MC2	71.4 ± 7.0	67.2 ± 7.5	21.7 ± 0.9	107.7 ± 10.7
EV_MC2	76.2 ± 14.0	74.0 ± 15.7	22.1 ± 0.3	105.5 ± 9.5
EV_HC1	79.5 ± 11.2	71.9 ± 10.1	21.4 ± 0.6	109.1 ± 3.8
LC_DCDS	79.5 ± 11.2	77.3 ± 12.7	22.2 ± 0.3	108.7 ± 5.5
LC_LC3	76.6 ± 11.6	74.5 ± 10.6	22.0 ± 0.3	114.9 ± 8.0
LC_LC5	75.8 ± 5.2	70.3 ± 9.0	21.6 ± 0.3	109.6 ± 1.2
LC_LCDSSLCC	84.2 ± 8.8	79.7 ± 11.8	21.9 ± 0.6	111.8 ± 4.6

Note: Site waters were amended with 20 µg/L Cu
SD = Standard Deviation
* Result was significantly lower than the laboratory control
$^{\alpha}$ Result was significantly lower than the site control FR_UFR1
$^{\beta}$ Result was significantly lower than the site control GH_ER2
Result was significantly lower than the site control CM_MC1
$^{\partial}$ Result was significantly lower than the site control LC_SLC

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the test protocols. Water quality parameters remained within the ranges specified in the protocols throughout the tests and uncertainty associated with these tests is best described by the standard deviations around the means.

All tests reported here met control acceptability criteria, with the exception of the *H. azteca* test. The *H. azteca* test did not meet control passing criteria for either survival or weight endpoints. Teck Coal Ltd. was notified of the control test failure and the results were included in this report for informational purposes only. To satisfy permit requirements, repeat testing was scheduled for quarter three.

There were no deviations from test methodologies (other than the planned modification to the *H. azteca* method as described in Section 2.0), with the exception that 20 µg/L Cu was added to site waters to reduce potential microbial effects and that the eggs in the rainbow trout embryo-alevin test were exposed using a blocked design (i.e., eggs from one fish was used for replicate A of each test concentration, eggs from the second fish for replicate B, and so on). The blocked design approach deviates from the Environment Canada test method, which indicates that the eggs should be pooled prior to testing. However, this modification is considered appropriate because it reduces the risk of non-viable eggs affecting the test results, since in the event that one of the batches of eggs had been non-viable, it would have been possible to exclude data for that replicate. In the *O. mykiss* test during this quarter, eggs in one of the four replicates were considered non-viable, producing particularly poor results (near complete mortality within the first two weeks of exposure); therefore, data from this replicate was excluded from statistical analysis.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate. The reference toxicant tests were performed under the same conditions as those used for the samples.

Table 9. Reference toxicant test results.

Test species	Endpoint	Historical mean (2 SD Range)	CV (%)	Test date
C. dubia	Survival (LC50): 2.0 g/L NaCl	2.0 (1.8 – 2.2)	5	May 1, 2019
	Reproduction (IC50): 1.2 g/L NaCl	1.6 (1.1 – 2.3)	19	
P. subcapitata	Growth (IC50): 30.0 µg/L Zn	30.9 (25.0 – 38.2)	10	April 26, 2019
H. azteca	Survival (LC50): 5.6 g/L NaCl	5.8 (4.3 – 7.8)	15	May 9, 2019
O. mykiss	Viability (EC50): 7.2 mg/L SDS	4.0 (2.0 – 7.9)	35	May 8, 2019

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration

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APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: TECK
Work Order No.: ~~190907~~ 190907 SSK

Start Date/Time: May 09/19 @ 1400h
Set up by: SSK / KL

Test Validity Criteria:
1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:
T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Sample Information:

Sample ID: Various (see below)
Sample Date: May 07/19
Date Received: May 08/19
Sample Volume: 2-5 X 20L

Test Organism Information:

Broodstock No.: BB042919B, BB050119A+B, 050219A, 050219C+D
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 19
Mortality (%) in previous 7 d: 3
Individual female # used ≥8 young on test day: 31-38, 40, 6, 11, 13, 15-17, 20, 24, 35, 2, 10-12, 20, 11, 18, 29, 38

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd 220
Stock Solution ID: 18NA06 (100g/L NaCl)
Date Initiated: May 01/19

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.2 (1.1-1.3) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.1-2.3) g/L NaCL CV (%): 19

Test Results:

	Survival (%)	Reproduction (Mean ± SD)
Negative Control	100	23.5 ± 2.8 SSK
FR_UFR1_MON_2019_05-06_N	100	18.5 ± 3.4 [a]
GH_ER2_WS_2019-05-06_N	90	17.7 ± 4.5 [a]
CM_MCI_WS_2019-05-07_N	90	16.3 ± 4.5 [a]
LC_SLC_MNT_2019-05-07_N	100	19.6 ± 4.2
FR_FRABCH_MON_2019_05-06_N	100	16.5 ± 3.3 [a]
FR_FRCP1_MON_2019-05-06_N	100	18.7 ± 3.6 [a]
GH_FR1_WS_2019-05-06_N	100	18.8 ± 4.8
GH_ERC_WS_2019-05-06_N	80	19.2 ± 3.0 [a]

a → represents that reproduction is sig. lower than lab control.

Reviewed by: [signature]
Date reviewed: March 5, 2020

Ceriodaphnia dubia Summary Sheet

Client: TECK
Work Order No.: 190907

Start Date/Time: May 09/19 @1400h
Set up by: SSK / KL

Sample Information:

Sample ID: various (see below)
Sample Date: May 07/19
Date Received: May 08/19
Sample Volume: 2-5 X 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: BB042919B, BB050119A+B, 050219A, 050219C+D
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 19
Mortality (%) in previous 7 d: 3
Individual female # used ≥8 young on test day: #31-38, 40, 6, 11, 13, 15-17, 20, 24, 35, 2, 10-12, 20, 11, 18, 29, 38

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd220
Stock Solution ID: 18NaCl06 (100g/L NaCl)
Date Initiated: May 01/19

7-d LC50 (95% CL): 2.0 (1.7 - 2.3) g/L NaCl
7-d IC50 (95% CL): 1.2 (1.1 - 1.3) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8 - 2.2) g/L NaCl CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.1 - 2.3) g/L NaCl CV (%): 19

Test Results:

	Survival (%)	Reproduction (Mean ± SD)
~~SSK Negative Control~~		±
CM_MC2_WS_2019-05-07_N	90	16.7 ± 3.0 [a]
EL_MC2_WS_2019-05-MON_N	100	19.6 ± 1.6 [a]
EL_HCl_WS_2019-05-MON_N	100	18.2 ± 2.2 [a]
LC_OCDS_MNT_2019-05-07_N	90	19.1 ± 6.2
LC_LC3_MNT_2019-05-07_N	100	19.9 ± 2.8
LC_LC5_MNT_2019-05-07_N	100	18.6 ± 2.0 [a]
LC_LCDSSLCC_MNT_2019_05_07_N	100	19.1 ± 1.5 [a]
PG_MIDAG_WS_2019-05-07_N	100	19.1 ± 2.2 [a]

Reviewed by: [signature]
Date reviewed: March 5, 2020

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Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TECK
Sample ID: various (see below)
Work Order #: 190907

Start Date & Time: May 09 11AC 1400h
Stop Date & Time: May 17 11AE 1400h
CER #: 4
Test Species: *Ceriodaphnia dubia*

%(v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0	25.0	25.0	25.0	24.0	25.0	25.0
DO (mg/L)	8.2	7.3	8.2	7.2	8.1	7.9	8.1	6.9	8.0	6.9	8.1	7.0	8.0	7.0
pH	8.2	7.9	8.2	7.9	8.2	7.9	8.2	7.7	8.3	7.9	8.3	7.9	8.2	7.9
Cond. (µS/cm)	215	216		215		215		215		216		216		—
Initials	SSK	SSK		A		A		SSK		JB		SSK		JB

① (100) Concentration FR_UFR1	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.0	7.3	8.1	7.0	8.0	7.1	8.1	7.3	~~8.3~~ 8.4	7.2	8.2	7.1	~~8.2~~ 8.3	7.3
pH	8.2	8.1	8.2	7.9	8.2	7.9	8.1	7.9	~~8.0~~ 8.1	7.9	8.2	8.0	8.2	7.9
Cond. (µS/cm)	294	296		270		274		290		296		295		—
Initials	SSK	SSK		SSK		A		SSK		CSK		SSK		JB

@8.1 @

② (100) Concentration GH_ER2	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.0	7.3	8.1	7.0	8.0	7.2	8.1	7.4	8.4	7.4	8.4	~~7.2~~ 8.3	~~8.2~~ 8.3	7.3
pH	8.2	8.1	8.3	7.9	8.2	8.0	8.2	7.9	8.1	8.0	8.2	8.1	8.1	7.9
Cond. (µS/cm)	323	324		320		322		325		322		325		—
Initials	SSK	SSK		SSK		A		SSK		SSK		SSK		JB

@8.2 K

③ (100) Concentration CM_MC1	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.0	7.3	8.1	7.0	8.1	7.1	8.0	7.4	~~8.3~~ 8.4	7.4	8.4	7.1	~~8.2~~ 8.3	7.4
pH	8.2	8.1	8.2	7.9	8.1	8.1	8.1	7.9	8.1	7.9	8.1	8.1	8.1	7.8
Cond. (µS/cm)	265	266		258		256		266		265		264		—
Initials	SSK	SSK		SSK		A		SSK		SSK		SSK		JB

@8.3 @8.2 K

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	Control	FR_UFR1 (100%)	GH_ER2 (100%)	CM_MC1 (100%)
Hardness*	100	178	160	130
Alkalinity*	108	130	136	118

* mg/L as CaCO3

Analysts: SSK, KE, AWO, JB.
Reviewed by:
Date reviewed: June 4, 2019

Sample Description: ①-③ : clear, colourless, odourless, no particulates

Comments: Broodboard Used: SB042919B (#36-38, 40), 050119AED (#6, 11, 13, 15-17, 20, 24, 35), 050219A (#2, 10-12, 20), 050219CED (#18, 29, 38, 11)

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TECK
Sample ID: Various (see below)
Work Order #: 190907

Start Date & Time: May 09/19 @ 1400h
Stop Date & Time: May 17/19 @ 1400h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(%v/v) Concentration CONTROL	Days													
	7 ~~0~~	final ~~1~~ 8		2		3		4		5		6		7
	~~init.~~ NEW	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0												
DO (mg/L)	8.0	7.0												
pH	8.3	7.8												
Cond. (µS/cm)	216	213												
Initials	JB	JB												

① (100) Concentration FR_UFR1	Days													
	7 ~~0~~	final ~~1~~ 8		2		3		4		5		6		7
	~~init.~~ NEW	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0												
DO (mg/L)	8.1	7.0												
pH	8.2	7.9												
Cond. (µS/cm)	289	285												
Initials	JB	JB												

② (100) Concentration GH_ER2	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ NEW	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0												
DO (mg/L)	8.1	6.9												
pH	8.2	8.0												
Cond. (µS/cm)	326	320												
Initials	SSK	JB												

③ (100) Concentration CM_MC1	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ NEW	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.1	6.9												
pH	8.2	8.0												
Cond. (µS/cm)	269	265												
Initials	SSK	JB												

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	Control	FR_UFR1	GH_ER2	CM_MC1
Hardness*	100	178	160	130
Alkalinity*	108	130	136	118

* mg/L as CaCO3

Analysts: SSK, JB, AND.

Reviewed by: [signature]

Date reviewed: June 4, 2019

Sample Description: see previous ~~page~~ pg

Comments: Broodboard Used: see ~~previous~~ pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various (see below)
Work Order #: 190907

Start Date & Time: May 09 /19c 1400h
Stop Date & Time: May 17 /19c 1400h
CER #: 4
Test Species: *Ceriodaphnia dubia*

4 (100) Concentration LC_SLC

	Days														
	0	1		2		3		4		5		6		7 ~~final~~	old
	init.	old	new	old	new	old	new	old	new	old	new	old	new		
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	
DO (mg/L) ①	~~8.8~~	7.4	8.1	7.0	8.1	7.0	8.1	7.5	~~8.3~~	7.5	8.0	7.1	~~8.2~~	7.4	
pH	8.2	8.1	8.3	7.9	8.2	7.9	8.1	7.8	8.1	7.8	8.2	8.2	8.2	7.9	
Cond. (µS/cm)	354	357		350		355		354		352		355		—	
Initials	SSK	SSK		SSK		A		SSK		SSK		SSK		JB	

① 8.2 K ① 8.2 K ① 8.2 K

5 (100) Concentration FR_FRABCH

	Days														
	0	1		2		3		4		5		6		7 ~~final~~	old
	init.	old	new	old	new	old	new	old	new	old	new	old	new		
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	
DO (mg/L)	8.2	7.4	8.1	7.0	8.0	7.1	8.0	7.5	~~8.3~~	7.6	~~8.3~~	7.2	~~8.2~~	7.2	
pH	8.1	8.2	8.2	7.9	8.1	7.9	8.1	7.8	8.0	7.8	8.0	8.0	8.0	7.9	
Cond. (µS/cm)	1139	1131		1125		1135		1134		1139		1132		—	
Initials	SSK	SSK		SSK		A		SSK		SSK		SSK		JB	

8.2 ③ 8.2 ⑥ 8.2 ⑦

6 (100) Concentration FR_FRCP1

	Days														
	0	1		2		3		4		5		6		7 ~~final~~	old
	init.	old	new	old	new	old	new	old	new	old	new	old	new		
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	
DO (mg/L)	8.2	7.1	8.1	7.0	8.2	7.1	8.0	7.4 ①	~~8.2~~	7.4	~~8.0~~	7.0	~~8.0~~	7.2	
pH	8.3	8.2	8.3	7.9	8.3	8.0	8.2	7.8	8.3	8.1	8.3	8.2	8.3	8.1	
Cond. (µS/cm)	944	942		936		943		945		938		939		—	
Initials	SSK	SSK		SSK		A		SSK		SSK		CSK		JB	

① 8.2 K 8.2 ⑤ ⑦ 8.2 K

7 (100) Concentration CAL_FR1

	Days														
	0	1		2		3		4		5		6		7 ~~final~~	old
	init.	old	new	old	new	old	new	old	new	old	new	old	new		
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	
DO (mg/L)	~~8.0~~	7.3	8.1	7.0	~~8.1~~	7.2	8.1	7.5 ①	~~8.0~~	7.4	~~8.0~~	7.1	~~8.0~~	7.3	
pH	8.3	8.2	8.3	8.4	8.4	8.1	8.3	8.1	8.2	8.3	8.3	8.3	8.3	8.0	
Cond. (µS/cm)	925	926		920		925		932		930		930		—	
Initials	SSK	SSK		SSK		A		SSK		SSK		SSK		JB	

8.2 ① 8.2 K 8.2 ④ ⑦ 8.2 K

Thermometer: 4 DO meter/probe: 1 / 1 (100%) pH meter/probe: 1 / 1 (100%) Conductivity meter/probe: 1 / 1

LC_SLC (100%)

	~~Control~~	FR_FRABCH	FR_FRCP1	CAL_FR1
Hardness*	180	580	600	500
Alkalinity*	128	210	220	240

* mg/L as CaCO3

Analysts: SSK, AND, JDS
Reviewed by:
Date reviewed: June 4, 2019

Sample Description: ④-⑦: Clear, colourless, odourless, no particulates.

Comments: Broodboard Used: ~~SS~~ see pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TECK
Sample ID: Various (see below)
Work Order #: 190907

Start Date & Time: May 09/19 @ 1400h
Stop Date & Time: May 17/19 @ 1400h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(4) (100) Concentration LC-SLC	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ New	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0												
DO (mg/L)	8.1	6.7												
pH	8.2	8.0												
Cond. (µS/cm)	355	350												
Initials	JB	JB												

(5) (100) Concentration FR_FRABCH	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ New	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0												
DO (mg/L)	8.1	6.3												
pH	8.2	8.0												
Cond. (µS/cm)	1123	1082												
Initials	JB	JB												

(6) (100) Concentration FR_FRCP1	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ New	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.0	6.3												
pH	8.2	8.1												
Cond. (µS/cm)	932	916												
Initials	JB	JB												

(7) (100) Concentration GH_FR1	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ New	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0												
DO (mg/L)	8.1	6.4												
pH	8.4	8.2												
Cond. (µS/cm)	925	914												
Initials	JB	JB												

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ LC-SLC	FR_FRABCH	FR_FRCP1	GH_FR1
Hardness*	180	580	600	500
Alkalinity*	128	210	220	240

* mg/L as CaCO3

Analysts: SSK, AWD, JB

Reviewed by: [signature]
Date reviewed: June 4, 2019

Sample Description: see previous page

Comments: Broodboard Used: see ~~previous~~ pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various (see below)
Work Order #: 190907

Start Date & Time: May 09 11 9C Hook
Stop Date & Time: May 17 11 9C Hook
CER #: 4
Test Species: *Ceriodaphnia dubia*

Y.(v/v)

(8) (100) Concentration GH Rec	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old K
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	~~8.2~~ (1)	7.3	8.2	7.0	8.0	7.2	8.1	7.5	~~8.2~~ (2)	7.5	~~8.3~~ (3)	7.9	~~8.2~~ (4)	7.1
pH	8.2	8.2	8.3	8.2	8.2	8.1	8.2	8.1	8.1	8.0	8.2	8.2	8.1	8.0
Cond. (µS/cm)	357	356		356		360		359		358		363		—
Initials	SSK	SSK		SSK		A		SSK		SSK		SSK		JB
	8.2 (0)							8.2 (2)		8.2 (3)		8.2 (4)		

(9) (100) Concentration CM_Mix	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old K
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	~~8.2~~ (5)	7.1	8.2	7.0	8.1	7.3	8.1	7.2	~~8.3~~ (6)	7.2	~~8.2~~ (7)	7.2	~~8.2~~ (8)	7.2
pH	8.2	8.2	8.3	8.0	8.3	8.1	8.2	8.1	8.2	8.2	8.3	8.2	8.3	8.2
Cond. (µS/cm)	750	748		748		750		750		761		~~SSK 740~~ 750 (10)		—
Initials	SSK	SSK		SSK		A		SSK		SSK		SSK		SSK
	8.2 (5)							8.2 (6)		8.2 (7)		~~7550~~ (1)		8.2 (5)

(10) (100) Concentration EV_Mix	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old K
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	~~8.2~~ (9)	7.1	8.2	7.0	8.0	7.4	8.1	7.3	~~8.3~~ (10)	7.3	~~8.2~~ (11)	7.2	~~8.2~~ (12)	7.2
pH	8.1	8.1	8.2	8.1	8.1	8.0	8.1	8.1	8.0	8.2	8.2	8.1	8.2	8.2
Cond. (µS/cm)	395	394		390		392		400		396		345		—
Initials	SSK	SSK		SSK		A		SSK		SSK		SSK		SSK
	8.2 (9)							8.2 (10)		8.2 (11)		8.2 (12)		

(11) (100) Concentration EV-HCl	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old K
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.2	7.0	8.2	7.0	8.1	7.3	8.1	7.3	~~8.2~~ (13)	7.4	~~8.2~~ (14)	7.3	~~8.2~~ (15)	7.2
pH	8.3	8.2	8.3	8.2	8.3	8.1	8.2	8.2	8.2	8.2	8.3	8.2	8.3	8.2
Cond. (µS/cm)	704	703		693		695		710		708		709		—
Initials	SSK	SSK		SSK		A		SSK		SSK		SSK		SSK
								8.2 (13)		8.2 (14)		8.2 (15)		

Thermometer: 4 DO meter/probe: 1 / 1 (GH Rec (100%) / (100%)) pH meter/probe: 1 / 1 (100%) / (100%) Conductivity meter/probe: 1 / 1

	~~Control~~ K	CM_Mix	EV_Mix	EV-HCl
Hardness*	310	510 ~~570~~ K	320	370
Alkalinity*	180	210	150	220

* mg/L as CaCO3

Analysts: SSK, AWR, JB

Reviewed by:

Date reviewed: June 4, 2019

Sample Description: (8) – (11): clear, colourless, odourless, no particulates.

Comments: Broodboard Used: ~~BB~~ K see pg 1

pg 6/10

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TECK
Sample ID: various (see below)
Work Order #: 190907

Start Date & Time: May 09/19 @ 1400h
Stop Date & Time: May 17/19 @ 1400h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(8) (100) Concentration GH_ERC	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ NEW	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0												
DO (mg/L)	8.0	~~7.0~~ 6.4												
pH	8.3	8.2												
Cond. (µS/cm)	359	356												
Initials	JB	JB												

(9) (100) Concentration CM_MC2	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0												
DO (mg/L)	8.1	7.0												
pH	8.4	8.1												
Cond. (µS/cm)	744	737												
Initials	JB	JB												

(10) (100) Concentration EV_MC2	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ NEW	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.1	6.9												
pH	8.2	8.1												
Cond. (µS/cm)	393	390												
Initials	JB	JB												

(11) (100) Concentration EV_HC1	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ NEW	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0												
DO (mg/L)	8.0	6.9												
pH	8.2	8.2												
Cond. (µS/cm)	~~1042~~ 710	692												
Initials	JB	JB												

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ GH_ERC	CM_MC2	EV_MC2	EV_HC1
Hardness*	310	510	320	370
Alkalinity*	180	210	150	220

* mg/L as CaCO3

Analysts: SSK, AJD, JB.

Reviewed by: [signature]
Date reviewed: June 4, 2019

Sample Description: see previous pg

Comments: Broodboard Used: See ~~previous~~ pg 1

~~8945~~
pg 7/10

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TECK
Sample ID: various (see below)
Work Order #: 190907

Start Date & Time: May 09 / 19C 1400h
Stop Date & Time: May 17 / 19C 1400h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(12) (100) Concentration LC-DCOS

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.1	6.9	8.2	7.0	8.0	7.3	8.1	7.1	~~8.2~~	7.4	~~8.2~~	7.3	~~8.2~~	7.1
pH	8.5	8.1	8.4	8.0	8.4	8.2	8.5	8.2	8.5	8.2	8.5	8.2	8.4	8.2
Cond. (µS/cm)	474	470		470		475		470		476		475		—
Initials	SSK	SSK		SSK		~		SSK		SSK		SSK		SSK
								8.2 (2)		(3) 8.2		8.2 (4)		

(13) (100) Concentration LC-LCS

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.1	7.1	8.2	7.0	8.1	7.1	8.2	7.1	~~8.2~~	7.2	~~8.2~~	7.3	~~8.2~~	7.1
pH	8.0	8.1	8.2	8.0	8.1	8.0	8.2	8.2	8.1	8.2	8.1	8.1	8.1	8.1
Cond. (µS/cm)	1036	1037		1020		1035		1040		1042		1041		—
Initials	SSK	SSK		SSK		~		SSK		SSK		SSK		SSK
								8.2 (5)		8.2 (6)		8.2 (7)		

(14) (100) Concentration LC-LCS

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	~~8.1~~ (1)	7.1	8.2	7.0	8.0	7.3	8.1	7.2	~~8.2~~ (9)	7.2	~~8.2~~ (10)	7.2	~~8.2~~ (11)	7.0
pH	8.3	8.2	8.3	8.1	8.3	8.1	8.2	8.2	8.2	8.2	8.3	8.2	8.3	8.2
Cond. (µS/cm)	811	802		804		805		810		811		813		—
Initials	SSK	SSK		SSK		~		SSK		SSK		SSK		SSK
	8.2 (8)							8.2 (9)		8.2 (10)		(11) 8.2		

(15) (100) Concentration LC-LCOSSLCS

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	~~8.0~~ (12)	7.2	8.2	7.0	8.0	7.3	8.1	7.2	~~8.2~~ (13)	7.1	~~8.2~~ (14)	7.1	~~8.2~~ (15)	7.0
pH	8.3	8.2	8.3	8.1	8.3	8.1	8.2	8.2	8.2	8.2	8.3	8.2	8.3	8.2
Cond. (µS/cm)	826	823		820		823		828		826		829		—
Initials	SSK	SSK		SSK		~		SSK		SSK		SSK		SSK
	8.2 (12)							8.2 (13)		8.2 (14)		8.0 (15)		

Thermometer: 4 **DO meter/probe:** 1 / 1 **pH meter/probe:** 1 / 1 **Conductivity meter/probe:** 1 / 1
LC-DCOS (100%) (100%) (100%)

	~~Control~~	LC-LC3	LC-LCS (100%)	LC-LCOSSLCS
Hardness*	460	690	460	540
Alkalinity*	180	220	230	220

* mg/L as CaCO3

Analysts: SSK, AJD, JK
Reviewed by:
Date reviewed: June 4, 2019

Sample Description: (12)-(15): clear, colourless, odourless, no particulates.

Comments: Broadboard Used: ~~SS~~ see pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various (see below)
Work Order #: 190907

Start Date & Time: May ~~8~~ 9/19 @ 1400h
Stop Date & Time: May 17/19 @ 1400h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(12) (100) Concentration LC-DCDS	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ new	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0												
DO (mg/L)	8.0	6.6												
pH	8.2	8.1												
Cond. (µS/cm)	~~1042~~ SSK	484												
Initials	JB	JB												

488 (1)

(13) (100) Concentration LC-LC3	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ new	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0												
DO (mg/L)	8.1	6.5												
pH	8.4	8.2												
Cond. (µS/cm)	SSK ~~400~~	1022												
Initials	JB	JB												

1045 (2)

(14) (100) Concentration LC-LC5	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ new	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0												
DO (mg/L)	8.1	6.4												
pH	8.3	8.2												
Cond. (µS/cm)	807	798												
Initials	JB	JB												

(15) (100) Concentration LC-LCDSSLCC	Days													
	7 ~~0~~	8 ~~1~~ final		2		3		4		5		6		7
	~~init.~~ new	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0												
DO (mg/L)	8.1	6.4												
pH	8.4	8.2												
Cond. (µS/cm)	829	813												
Initials	JB	JB												

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	LC-DCDS ~~Control~~	LC-LC3	LC-LC5	LC-LCDSSLCC
Hardness*	410	690	460	540
Alkalinity*	180	220	230	220

* mg/L as CaCO3

Analysts: SSK, AWD, ~~JB~~ JB

Reviewed by: [signature]

Date reviewed: June 4, 2019

Sample Description: see previous pg

Comments: Broodboard Used: see ~~previous~~ pg 1

~~pg 5~~
pg 9/10

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TEAC
Sample ID: various (see below)
Work Order #: 190907

Start Date & Time: May 09 / 19 1400h
Stop Date & Time: May 17 / 19 1400h
CER #: 4
Test Species: *Ceriodaphnia dubia*

% (v/v)

(16) (100) Concentration RG-MIDAG	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.2	7.1	8.2	7.0	8.1	7.2	8.1	7.3	8.2	7.3	~~8.2~~ 8.0	7.3	8.2	7.1
pH	8.3	8.2	8.3	8.1	8.3	8.1	8.2	8.1	8.3	8.1	8.2	8.2	8.2	8.1
Cond. (µS/cm)	512	515		510		513		512		512		511		—
Initials	SSK	SSK		SSK		A		~~SSK~~		SSK		SSK		SSK

8.2(1)

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~	RG-MIDAG (100%)		
Hardness*		300		
Alkalinity*		180		

* mg/L as CaCO3

Analysts: SSK, NS, AD.
Reviewed by:
Date reviewed: June 4, 2019

Sample Description: (16): clear, colourless, odourless, no particulates

Comments: **Broodboard Used:** ~~B~~ see pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TECK
Sample ID: Various (see below)
Work Order #: 1900907

Start Date & Time: May 09/19 @ 1400h
Stop Date & Time: May 17/19 @ 1400h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(16) (100) Concentration RG-MIDAG	Days													
	~~70~~ New init.	80 SSK old	new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	24.0	25-0												
DO (mg/L)	8.0	6.2												
pH	8.3	8.2												
Cond. (µS/cm)	512	511												
Initials	JB	SSK												

Concentration	Days													
	0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

SSK

Concentration	Days													
	0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

SSK

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~	RG-MIDAG		
Hardness*		300		
Alkalinity*		180		

* mg/L as CaCO3

Analysts: SSK, JB, AWD

Reviewed by:

Date reviewed: June 4, 2019

Sample Description: See previous pg

Comments: Broodboard Used: See previous pg 1

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: TCK
Sample ID: various (see below)
Work Order: 190907

Start Date & Time: May 09/19 1400h
Stop Date & Time: May 17/19 1400h
Set up by: KE/SSK

% (v/v)

Concentration: CM-MC2 (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	✓	✓	3	3	2	3	2	2	3	2	A
4	2	3	6	6	4	6	6	✓	✓	4	SSK
5	✓	7	✓	✓	✓	7	7	8	9	8	SSK
6	9	9	10	9	9	9	9	9	9	✓	SSK
7	✓	9	13	8	✓	✓	X	✓	✓	✓	SSK
8	✓	✓	✓	✓	✓	✓	✓	✓	✓	10	JB
Total	11	19	19	18	15	16	15X	19	21	14	✓

Concentration: EV-MC2 (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	3	2	3	3	3	3	3	3	✓	2	A
4	7	✓	✓	✓	5	✓	✓	✓	3	✓	SSK
5	✓	8	8	9	8	7	9	8	6	7	SSK
6	10	9	10	9	9	9	9	10	✓	10	SSK
7	11	12	✓	13	13	✓	✓	✓	10	10	SSK
8	✓	✓	11	✓	✓	✓	11	11	5	✓	JB
Total	20	19	21	21	16	19	21	21	19	19	✓

Concentration: EV-HC1 (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	2	3	3	2	3	4	3	3	2	3	A
4	4	✓	✓	8	6	6	6	7	6	6	SSK
5	7	6	7	✓	✓	✓	9	✓	✓	8	SSK
6	10	9	10	10	11	10	9	9	9	9	SSK
7	✓	12	14	13	12	10	✓	12	14	10	SSK
8	10	✓	✓	13	11	13	10	15	✓	6	JB
Total	13	18	20	20	20	20	18	19	17	17	✓

Concentration: LC-DC05 (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	3	✓	3	✓	3	2	3	3	2	✓	A
4	✓	✓	✓	✓	✓	✓	4	5	✓	4	SSK
5	10	9	8	6	7	9	8	✓	8	8	SSK
6	12	9	9	11	12	13	12	11	12	11	SSK
7	13	8	11	✓	✓	13	13	12	✓	13	SSK
8	✓	✓	✓	13	14	✓	12	12	13	9	JB
Total	25	4X	20	17	22	24	15	19	22	23	✓

Concentration: LC-LC3 (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	2	2	3	✓	3	4	3	✓	✓	4	A
4	✓	✓	✓	4	✓	✓	6	5	3	✓	SSK
5	9	7	6	8	9	7	✓	8	✓	7	SSK
6	11	9	11	10	9	9	10	9	✓	11	SSK
7	10	10	12	11	✓	11	10	✓	10	11	SSK
8	11	✓	✓	9	3	✓	8	10	✓	✓	JB
Total	22	18	20	22	21	20	19	22	13	22	✓

Concentration: LC-LC5 (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	3	2	3	3	✓	4	3	4	4	4	A
4	✓	✓	6	6	2	✓	5	6	✓	7	SSK
5	7	6	✓	7	7	8	8	✓	7	✓	SSK
6	9	9	9	11	9	9	9	9	11	9	SSK
7	✓	12	12	13	14	9	10	11	12	10	SSK
8	✓	✓	✓	✓	6	5	11	12	✓	14	JB
Total	19	17	18	16	18	21	16	19	22	20	✓

Concentration: LC-LC05SLCC (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	3	✓	2	3	2	✓	3	3	3	3	A
4	6	4	✓	✓	✓	4	✓	✓	5	✓	SSK
5	✓	7	8	6	8	7	9	6	✓	7	SSK
6	9	9	9	9	9	10	10	9	9	9	SSK
7	11	✓	13	10	13	✓	✓	✓	10	10	SSK
8	✓	8	✓	✓	✓	11	11	✓	✓	✓	JB
Total	18	20	19	18	19	21	22	18	17	19	✓

Concentration: FG-MIDAG (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SSK
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
3	3	✓	✓	3	3	3	✓	3	3	3	A
4	5	5	4	✓	✓	✓	✓	✓	✓	✓	SSK
5	✓	9	6	6	7	7	5	7	5	7	SSK
6	9	9	10	10	10	10	10	10	9	10	SSK
7	14	✓	✓	9	9	14	✓	10	9	10	SSK
8	✓	11	✓	✓	✓	✓	10	✓	✓	✓	JB
Total	17	23	20	19	20	20	25 SSK 15	20	17	20	✓

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Comments: 1. Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

2. Ephippia present in Controls (Y) (N)?

Reviewed by: [signature]

Date reviewed: June 4, 2019

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: Various (see below)
Work Order: 190907

Start Date & Time: May 9 /19 1400h
Stop Date & Time: May 17 /19 1400h
Set up by: SSK / KL

%(v/v)

Concentration: (control)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	5	6	✓	✓	8	✓	✓	4	8	6	JB
5	✓	✓	8	8	✓	3	6	8	✓	6	JB
6	8	8	8	9	9	7	9	9	11	10	SSK
7	9	9	10	9	11	9	7	✓	7	8	JB
8	9	12	✓	✓	5	✓	4	7	7	✓	JB
Total	22	23	26	26	28	19	22	21	26	22	JB

Concentration: FR-UFP1 (100%)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	K
3	2	3	3	✓	3	2	4	2	2	4	MG
4	6	✓	✓	3	✓	✓	8	✓	3	!	JB
5	✓	6	7	7	7	7	✓	7	6	7	JB
6	9	8	11	✓	9	7	9	10	10	11	SSK
7	9	12	11	12	✓	✓	10	✓	✓	13	JB
8	✓	✓	✓	11	8	7	✓	✓	7	✓	JB
Total	17	17	21	22	19	16	21	19	11	22	K

Concentration: GH-FR2 ~~(100%)~~ (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	K
3	✓	✓	3	✓	✓	3	2	3	✓	✓	MG
4	3	3	✓	✓	✓	✓	6	5	4	4	JB
5	6	7	7	7	5	5	✓	✓	5	6	JB
6	9	8	8	10	9	9	X	11	11	9	SSK
7	✓	✓	✓	9	✓	✓	1	✓	✓	✓	JB
8	10	9	✓	✓	✓	5	1	✓	12	9	JB
Total	18	18	18	26	14	17	8X	19	20	19	K

Concentration: CH-MC1 (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	K
3	✓	✓	✓	✓	2	✓	✓	2	3	4	MG
4	✓	6	3	3	7	3	3	4	5	3	JB
5	7	✓	6	7	✓	6	6	✓	✓	5	JB
6	9	9	9	9	7	✓	8X	~~9~~	6	11	SSK
7	✓	11	✓	✓	7	✓	1	9	9	13	JB
8	7	9	13	9	✓	8	1	✓	7	✓	JB
Total	~~23~~ 16	26	18	19	16	17	17X	16	14	12	K

Concentration: LC-SLC (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	K
3	✓	✓	✓	3	✓	✓	3	✓	3	2	MG
4	3	8	3	✓	3	6	✓	5	4	✓	JB
5	7	✓	5	5	5	5	✓	4	10 JB	4	JB
6	~~8~~	9	10	9	9	10	10	10	10	9	SSK
7	9	12	✓	✓	✓	9	12	12	10	7	JB
8	✓	✓	13	✓	7	✓	✓	✓	✓	✓	JB
Total	19	24	18	17	17	20	25	19	17	15	K

Concentration: FR-FRASCH (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	K
3	4	✓	2	2	3	2	✓	2	✓	3	MG
4	✓	✓	✓	✓	✓	3	3	✓	✓	✓	JB
5	6	5	5	✓	5	7	4	6	4	7	JB
6	9	7	10	7	9	10	✓	11	10	10	SSK
7	9	✓	9	6	✓	6	6	9	7	9	JB
8	✓	✓	✓	✓	8	✓	6	✓	✓	✓	JB
Total	19	12	17	15	17	12	13	19	21	20	K

Concentration: FR-FFCP1 (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	K
3	✓	3	4	4	✓	✓	3	✓	2	✓	MG
4	✓	✓	✓	✓	✓	✓	✓	5	6	3	JB
5	6	7	✓	7	6	4	7	10	✓	7	JB
6	7	8	8	10	8	✓	9	✓	9	9	SSK
7	✓	9	9	10	8	9	✓	9	✓	✓	JB
8	✓	✓	✓	✓	7	✓	✓	✓	✓	✓	JB
Total	13	18	21	21	22	13	19	24	17	19	K

Concentration: GH-FP1 (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	K
3	2	4	2	2	3	✓	✓	✓	2	4	MG
4	5	✓	4	✓	✓	✓	2	✓	✓	✓	JB
5	✓	6	✓	5	7	7	4	5	✓	7	JB
6	10	10	9	9	10	10	5	9	10	9	SSK
7	11	11	12	12	12	9 JB	9	✓	14	11	JB
8	✓	✓	8	✓	✓	✓	9	✓	8	✓	JB
Total	17	20	15	19	20	26	11	14	26	20	K

Concentration: GH-EPC (100)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JB
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	K
3	✓	3	4	2	✓	2	3	2	3	3	MG
4	✓	✓	✓	✓	✓	6	✓	6*	✓	6	JB
5	4	6	5	5	6	✓	5	7	7	✓	JB
6	6	9	10	9	10	11	9	10	8	10	SSK
7	9	9	HT	11	11	9	10	11X	X9	10	JB
8	✓	✓	✓	✓	✓	✓	✓	1	1	✓	JB
Total	19	18	20	16	27	19	17	19X	18X	19	K

Notes: X = mortality.

Comments: 1. Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

2. Ephippia present in Controls (Y), (N)?

Reviewed by: [signature]

Date reviewed: June 4, 2019

CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	19-7914-0920	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	09 May-19 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	17 May-19 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
(1) control	10-9512-0320	09 May-19	09 May-19	14h	Teck Coal	
(2) FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	53h (1.3 °C)		
(2) GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	62h (2.5 °C)		
(2) CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	50h (7.6 °C)		
(2) LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	53h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	53h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	51h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	62h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	62h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	52h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	53h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	54h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	51h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	52h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	53h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	51h (1.4 °C)		
RG_MIDAG	01-1821-2622	07 May-19 09:25	08 May-19 10:18	53h (3.4 °C)		

① control: Lab control (20% Perrier)
② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
control	control	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-05-	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
13-5998-8117	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	GH_ERC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	control failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	GH_FR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	EV_HC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	FR_UFR1 failed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	FR_FRABCH failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	RG_MIDAG failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	LC_LC3 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	EV_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	CM_MC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	LC_SLC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	GH_ER2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	CM_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	LC_LC5 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	FR_FRCP1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	LC_DCDS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	LC_LCDSSLSS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	GH_ER2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	FR_FRABCH failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	LC_LCDSSLSS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	EV_HC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	FR_FRCP1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	EV_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	CM_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	LC_SLC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	RG_MIDAG failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	LC_LC5 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	GH_ERC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	control failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	LC_LC3 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	GH_FR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	FR_UFR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	CM_MC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0133	LC_DCDS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	CM_MC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	LC_SLC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	LC_LC5 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	FR_FRCP1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	FR_FRABCH failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	FR_UFR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	CM_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	RG_MIDAG failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	GH_ERC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	EV_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	GH_FR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	LC_DCDS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	control failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	EV_HC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	LC_LC3 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	LC_LCDSSLSS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0094	GH_ER2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	control passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	EV_HC1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	FR_FRCP1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	FR_FRABCH passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	LC_LC3 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	LC_SLC passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	LC_DCDS passed reproduction	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	GH_ERC passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	RG_MIDAG passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	EV_MC2 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	LC_LC5 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	GH_FR1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	CM_MC2 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	GH_ER2 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	LC_LCDSSLSS passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	FR_UFR1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	CM_MC1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	LC_DCDS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	GH_FR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	EV_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	GH_ER2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	GH_ERC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	LC_LC5 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	LC_LCDSSLSS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	FR_FRCP1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	FR_FRABCH failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	CM_MC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	control failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	FR_UFR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	EV_HC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	LC_SLC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	RG_MIDAG failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	CM_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0030	LC_LC3 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	EV_HC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	EV_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	GH_ER2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	LC_LCDSSLSS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	FR_UFR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	control failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	GH_ERC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	FR_FRABCH failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	FR_FRCP1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	LC_LC3 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	CM_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	LC_SLC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	LC_LC5 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	LC_DCDS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	RG_MIDAG failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	GH_FR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0317	CM_MC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	CM_MC2 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	GH_ERC passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	FR_UFR1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	GH_FR1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	control passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	EV_MC2 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	RG_MIDAG passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	LC_LC3 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	LC_LC5 passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	GH_ER2 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	LC_DCDS passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	EV_HC1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	FR_FRABCH passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	FR_FRCP1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	LC_LCDSSLSS passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	LC_SLC passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0807	CM_MC1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	GH_ERC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	LC_LC5 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	LC_DCDS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	CM_MC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	LC_LC3 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	CM_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	GH_FR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	RG_MIDAG failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	EV_HC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	EV_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	FR_UFR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	LC_LCDSSLSS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	LC_SLC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	control failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	FR_FRCP1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	GH_ER2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0232	FR_FRABCH failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	EV_HC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	RG_MIDAG failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	LC_LC5 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	GH_FR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	LC_LCDSSLSS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	LC_LC3 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	EV_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	LC_DCDS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	FR_FRCP1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	LC_SLC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	FR_UFR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	GH_ER2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	CM_MC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	control failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	GH_ERC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	CM_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0026	FR_FRABCH failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	LC_LCDSSLSS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	FR_FRCP1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	control failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	LC_LC5 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	CM_MC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	LC_LC3 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	GH_ER2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	CM_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	FR_FRABCH failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	GH_FR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	EV_HC1 failed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	LC_DCDS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	FR_UFR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	RG_MIDAG failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	GH_ERC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	LC_SLC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0119	EV_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	LC_LC3 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	FR_FRCP1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	EV_HC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	FR_FRABCH failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	CM_MC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	LC_DCDS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	FR_UFR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	GH_FR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	GH_ERC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	CM_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	RG_MIDAG failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	LC_LC5 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	LC_LCDSSLSS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	control failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	LC_SLC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	EV_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0039	GH_ER2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	FR_UFR1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	CM_MC1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	GH_ER2 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	LC_LC5 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	CM_MC2 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	LC_SLC passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	LC_DCDS passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	LC_LC3 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	GH_FR1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	LC_LCDSSLSS passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	GH_ERC passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	FR_FRABCH passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	RG_MIDAG passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	EV_HC1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	EV_MC2 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	FR_FRCP1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.2393	control passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	LC_LCDSSLSS passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	LC_LC3 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	FR_FRCP1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	GH_ER2 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	EV_MC2 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	LC_LC5 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	control passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	RG_MIDAG passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	CM_MC2 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	GH_ERC passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	GH_FR1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	FR_UFR1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	CM_MC1 passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	EV_HC1 passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	LC_DCDS passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	LC_SLC passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0740	FR_FRABCH passed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	CM_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	control failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	FR_FRABCH failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	RG_MIDAG failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	LC_DCDS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	LC_LCDSSLSS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	LC_LC5 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	EV_HC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	EV_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	LC_LC3 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	GH_ER2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	LC_SLC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	FR_FRCP1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	GH_FR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	GH_ERC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	FR_UFR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0073	CM_MC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	GH_FR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	control failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	RG_MIDAG failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	CM_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	GH_ERC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	LC_LCDSSLSS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	LC_DCDS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	LC_SLC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	EV_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	FR_UFR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	FR_FRABCH failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	EV_HC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	LC_LC3 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	LC_LC5 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	CM_MC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	FR_FRCP1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0083	GH_ER2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	FR_FRABCH failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	LC_LC3 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	EV_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	GH_ER2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	GH_FR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	control failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	GH_ERC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	CM_MC1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	CM_MC2 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	LC_SLC failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	LC_LCDSSLSS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	LC_DCDS failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	LC_LC5 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	FR_FRCP1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	RG_MIDAG failed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	FR_UFR1 failed reproduction	1
03-4556-8877	Reproduction	Steel Many-One Rank Sum Test	0.0187	EV_HC1 failed reproduction	1

7d Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
control	LC	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_UFR1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
GH_ER2		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
CM_MC1		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
LC_SLC	US	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_FRABCH		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_FRCP1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
GH_FR1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
GH_ERC		10	0.8000	0.4984	1.0000	0.0000	1.0000	0.1333	0.4216	52.70%	20.00%
CM_MC2		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
EV_MC2		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
EV_HC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_DCDS		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
LC_LC3		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_LC5		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_LCDSSLSS		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
RG_MIDAG		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
control	LC	10	23.5	21.47	25.53	19	28	0.8975	2.838	12.08%	0.00%
FR_UFR1		10	18.5	16.06	20.94	11	22	1.078	3.408	18.42%	21.28%
GH_ER2		10	17.7	14.45	20.95	8	26	1.438	4.547	25.69%	24.68%
CM_MC1		10	16.3	13.08	19.52	9	26	1.422	4.498	27.60%	30.64%
LC_SLC	US	10	19.6	16.56	22.64	15	29	1.343	4.248	21.67%	16.60%
FR_FRABCH		10	16.5	14.11	18.89	12	21	1.057	3.342	20.25%	29.79%
FR_FRCP1		10	18.7	16.11	21.29	13	24	1.146	3.622	19.37%	20.43%
GH_FR1		10	18.8	15.35	22.25	11	26	1.526	4.826	25.67%	20.00%
GH_ERC		10	19.2	17.07	21.33	16	27	0.9404	2.974	15.49%	18.30%
CM_MC2		10	16.7	14.54	18.86	11	21	0.9551	3.02	18.09%	28.94%
EV_MC2		10	19.6	18.47	20.73	16	21	0.4989	1.578	8.05%	16.60%
EV_HC1		10	18.2	16.63	19.77	13	20	0.696	2.201	12.09%	22.55%
LC_DCDS		10	19.1	14.7	23.5	4	25	1.946	6.154	32.22%	18.72%
LC_LC3		10	19.9	17.89	21.91	13	22	0.8876	2.807	14.10%	15.32%
LC_LC5		10	18.6	17.16	20.04	16	22	0.636	2.011	10.81%	20.85%
LC_LCDSSLSS		10	19.1	18.01	20.19	17	22	0.4819	1.524	7.98%	18.72%
RG_MIDAG		10	19.1	17.5	20.7	15	23	0.7063	2.234	11.69%	18.72%

Analyst: SK QA: March 5/20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
LC_SLC	US	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLSS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	LC	22	23	26	26	28	19	22	21	26	22
FR_UFR1		17	17	21	22	19	16	21	19	11	22
GH_ER2		18	18	18	26	14	17	8	19	20	19
CM_MC1		16	26	18	19	16	9	17	16	14	12
LC_SLC	US	19	29	18	17	17	20	25	19	17	15
FR_FRABCH		19	12	17	15	17	12	13	19	21	20
FR_FRCP1		13	18	21	21	22	13	19	24	17	19
GH_FR1		17	20	15	19	20	26	11	14	26	20
GH_ERC		19	18	20	16	27	19	17	19	18	19
CM_MC2		11	19	19	18	15	16	15	19	21	14
EV_MC2		20	19	21	21	16	19	21	21	19	19
EV_HC1		13	18	20	20	20	20	18	19	17	17
LC_DCDS		25	4	20	17	22	24	15	19	22	23
LC_LC3		22	18	20	22	21	20	19	22	13	22
LC_LC5		19	17	18	16	18	21	16	19	22	20
LC_LCDSSLSS		18	20	19	18	19	21	22	18	17	19
RG_MIDAG		17	23	20	19	20	20	15	20	17	20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	LC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
LC_SLC	US	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLSS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-5998-8117	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 May-19 14:48	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	19-7914-0920	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	09 May-19 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	17 May-19 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① control	10-9512-0320	09 May-19	09 May-19	14h	Teck Coal	
② FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	53h (1.3 °C)		
② GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	62h (2.5 °C)		
② CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	50h (7.6 °C)		
② LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	53h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	53h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	51h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	62h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	62h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	52h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	53h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	54h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	51h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	52h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	53h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	51h (1.4 °C)		
RG_MIDAG	01-1821-2622	07 May-19 09:25	08 May-19 10:18	53h (3.4 °C)		

① control = Lab control ; 20% perrier

② FR_UFR1, GH_ER2, CM_MC1, LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
control	control	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-05-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.5000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.2368	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect

Analyst: _____ QA: June 6/19

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 13-5998-8117 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 23 May-19 14:48 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLSS	1.0000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
control	LC	10	0	10	1	0	0.0%
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		9	1	10	0.9	0.1	10.0%
CM_MC1		9	1	10	0.9	0.1	10.0%
LC_SLC		10	0	10	1	0	0.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		8	2	10	0.8	0.2	20.0%
CM_MC2		9	1	10	0.9	0.1	10.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		10	0	10	1	0	0.0%
LC_LCDSSLSS		10	0	10	1	0	0.0%
RG_MIDAG		10	0	10	1	0	0.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	LC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLSS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

June 6/19

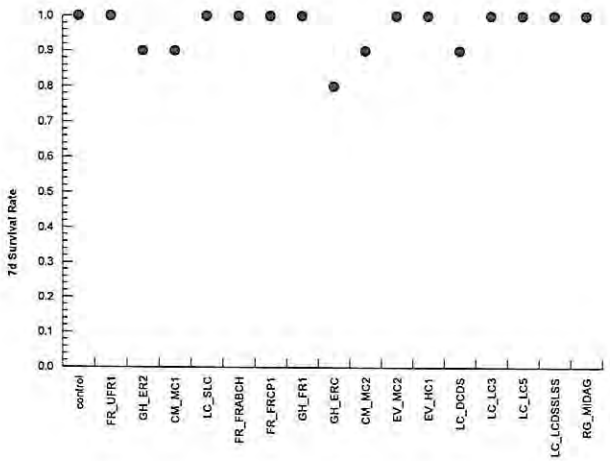
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 13-5998-8117 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 23 May-19 14:48 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	LC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
LC_SLC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLSS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	03-4556-8877	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Feb-20 14:41	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	19-7914-0920	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	09 May-19 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	17 May-19 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① control	10-9512-0320	09 May-19	09 May-19	14h	Teck Coal	
② FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	53h (1.3 °C)		
② GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	62h (2.5 °C)		
② CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	50h (7.6 °C)		
② LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	53h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	53h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	51h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	62h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	62h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	52h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	53h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	54h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	51h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	52h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	53h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	51h (1.4 °C)		
RG_MIDAG	01-1821-2622	07 May-19 09:25	08 May-19 10:18	53h (3.4 °C)		

① Control : Lab Control (20% Perrier)
② FR_UFR1, GH_ER2, CM_MC1 + LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
control	control	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-05-	

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 03-4556-8877 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 27 Feb-20 14:41 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 failed reproduction	17.40%
		GH_ER2 failed reproduction	17.40%
		CM_MC1 failed reproduction	17.40%
		LC_SLC passed reproduction	17.40%
		FR_FRABCH failed reproduction	17.40%
		FR_FRCP1 failed reproduction	17.40%
		GH_FR1 passed reproduction	17.40%
		GH_ERC failed reproduction	17.40%
		CM_MC2 failed reproduction	17.40%
		EV_MC2 failed reproduction	17.40%
		EV_HC1 failed reproduction	17.40%
		LC_DCDS passed reproduction	17.40%
		LC_LC3 passed reproduction	17.40%
		LC_LC5 failed reproduction	17.40%
		LC_LCDSSLSS failed reproduction	17.40%
		RG_MIDAG failed reproduction	17.40%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		FR_UFR1*	66	70	3	18	CDF	0.0187	Significant Effect
		GH_ER2*	64.5	70	2	18	CDF	0.0133	Significant Effect
		CM_MC1*	63	70	2	18	CDF	0.0094	Significant Effect
		LC_SLC	73	70	1	18	CDF	0.0740	Non-Significant Effect
		FR_FRABCH*	58.5	70	2	18	CDF	0.0030	Significant Effect
		FR_FRCP1*	68.5	70	3	18	CDF	0.0317	Significant Effect
		GH_FR1	73.5	70	2	18	CDF	0.0807	Non-Significant Effect
		GH_ERC*	67	70	1	18	CDF	0.0232	Significant Effect
		CM_MC2*	58	70	2	18	CDF	0.0026	Significant Effect
		EV_MC2*	64	70	2	18	CDF	0.0119	Significant Effect
		EV_HC1*	59.5	70	1	18	CDF	0.0039	Significant Effect
		LC_DCDS	81	70	3	18	CDF	0.2393	Non-Significant Effect
		LC_LC3	73	70	3	18	CDF	0.0740	Non-Significant Effect
		LC_LC5*	62	70	3	18	CDF	0.0073	Significant Effect
		LC_LCDSSLSS*	62.5	70	3	18	CDF	0.0083	Significant Effect
		RG_MIDAG*	66	70	2	18	CDF	0.0187	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	426.553	26.6596	16	2.173	0.0081	Significant Effect
Error	1877.5	12.2712	153			
Total	2304.05		169			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	39.79	32	8.3E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.96	0.9786	8.7E-05	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 03-4556-8877 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 27 Feb-20 14:41 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Reproduction Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
control	LC	10	23.5	21.47	25.53	22.5	19	28	0.8975	12.08%	0.00%
FR_UFR1		10	18.5	16.06	20.94	19	11	22	1.078	18.42%	21.28%
GH_ER2		10	17.7	14.45	20.95	18	8	26	1.438	25.69%	24.68%
CM_MC1		10	16.3	13.08	19.52	16	9	26	1.422	27.60%	30.64%
LC_SLC		10	19.6	16.56	22.64	18.5	15	29	1.343	21.67%	16.60%
FR_FRABCH		10	16.5	14.11	18.89	17	12	21	1.057	20.25%	29.79%
FR_FRCP1		10	18.7	16.11	21.29	19	13	24	1.146	19.37%	20.43%
GH_FR1		10	18.8	15.35	22.25	19.5	11	26	1.526	25.67%	20.00%
GH_ERC		10	19.2	17.07	21.33	19	16	27	0.9404	15.49%	18.30%
CM_MC2		10	16.7	14.54	18.86	17	11	21	0.9551	18.09%	28.94%
EV_MC2		10	19.6	18.47	20.73	19.5	16	21	0.4989	8.05%	16.60%
EV_HC1		10	18.2	16.63	19.77	18.5	13	20	0.696	12.09%	22.55%
LC_DCDS		10	19.1	14.7	23.5	21	4	25	1.946	32.22%	18.72%
LC_LC3		10	19.9	17.89	21.91	20.5	13	22	0.8876	14.10%	15.32%
LC_LC5		10	18.6	17.16	20.04	18.5	16	22	0.636	10.81%	20.85%
LC_LCDSSLSS		10	19.1	18.01	20.19	19	17	22	0.4819	7.98%	18.72%
RG_MIDAG		10	19.1	17.5	20.7	20	15	23	0.7063	11.69%	18.72%

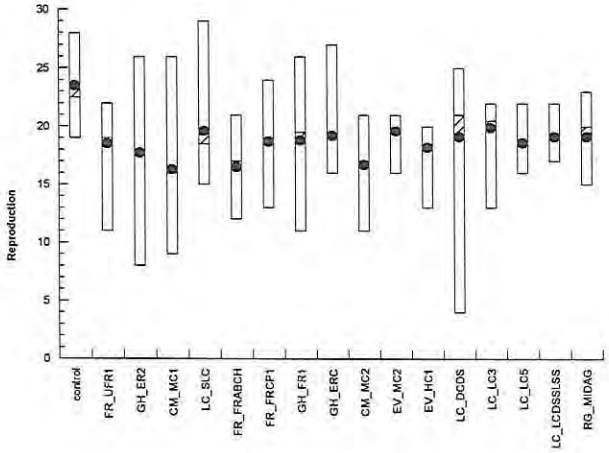
Reproduction Detail

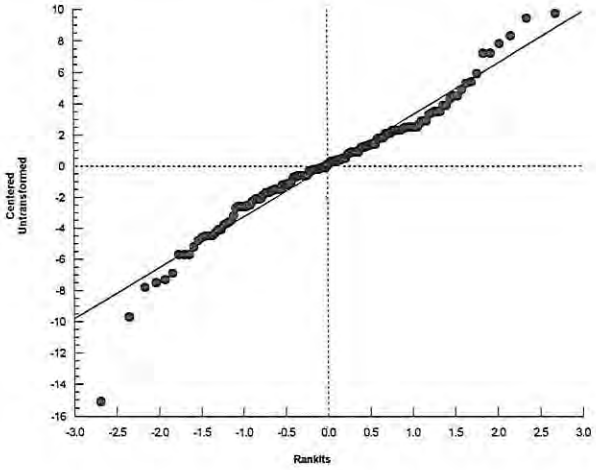
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	LC	22	23	26	26	28	19	22	21	26	22
FR_UFR1		17	17	21	22	19	16	21	19	11	22
GH_ER2		18	18	18	26	14	17	8	19	20	19
CM_MC1		16	26	18	19	16	9	17	16	14	12
LC_SLC		19	29	18	17	17	20	25	19	17	15
FR_FRABCH		19	12	17	15	17	12	13	19	21	20
FR_FRCP1		13	18	21	21	22	13	19	24	17	19
GH_FR1		17	20	15	19	20	26	11	14	26	20
GH_ERC		19	18	20	16	27	19	17	19	18	19
CM_MC2		11	19	19	18	15	16	15	19	21	14
EV_MC2		20	19	21	21	16	19	21	21	19	19
EV_HC1		13	18	20	20	20	20	18	19	17	17
LC_DCDS		25	4	20	17	22	24	15	19	22	23
LC_LC3		22	18	20	22	21	20	19	22	13	22
LC_LC5		19	17	18	16	18	21	16	19	22	20
LC_LCDSSLSS		18	20	19	18	19	21	22	18	17	19
RG_MIDAG		17	23	20	19	20	20	15	20	17	20

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-4556-8877	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Feb-20 14:41	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

Graphics





CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	02-3684-2528	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 May-19 14:53	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	19-7914-0920	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	09 May-19 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	17 May-19 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	53h (1.3 °C)	Teck Coal	
② GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	62h (2.5 °C)		
② CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	50h (7.6 °C)		
② LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	53h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	53h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	51h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	62h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	62h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	52h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	53h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	54h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	51h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	52h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	53h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	51h (1.4 °C)		
RG_MIDAG	01-1821-2622	07 May-19 09:25	08 May-19 10:18	53h (3.4 °C)		

① FR_UFR1 = upstream control (n); site control
② GH_ER2, CM_MC1 and LC_SLC are also site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-05-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Upstream Control		GH_ER2	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.5000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.2368	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	02-3684-2528	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 May-19 14:53	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLSS	1.0000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	U	10	0	10	1	0	0.0%
GH_ER2		9	1	10	0.9	0.1	10.0%
CM_MC1		9	1	10	0.9	0.1	10.0%
LC_SLC		10	0	10	1	0	0.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		8	2	10	0.8	0.2	20.0%
CM_MC2		9	1	10	0.9	0.1	10.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		10	0	10	1	0	0.0%
LC_LCDSSLSS		10	0	10	1	0	0.0%
RG_MIDAG		10	0	10	1	0	0.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	U	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLSS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

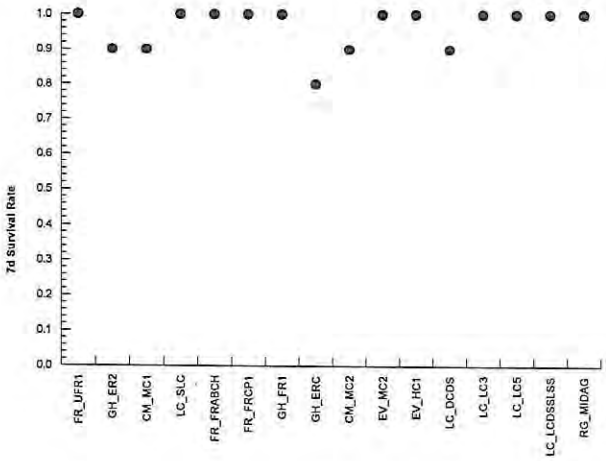
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	02-3684-2528	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 May-19 14:53	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
LC_SLC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLSS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	12-0835-5569	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Feb-20 14:42	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	19-7914-0920	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	09 May-19 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	17 May-19 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	53h (1.3 °C)	Teck Coal	
② GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	62h (2.5 °C)		
③ CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	50h (7.6 °C)		
④ LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	53h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	53h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	51h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	62h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	62h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	52h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	53h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	54h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	51h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	52h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	53h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	51h (1.4 °C)		
RG_MIDAG	01-1821-2622	07 May-19 09:25	08 May-19 10:18	53h (3.4 °C)		

① FR_UFR1 = upstream control (U); site control.

② GH_ER2, CM_MC1 & LC_SLC are also site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-05-	

Analyst: SK QA: March 5/20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 12-0835-5569 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 27 Feb-20 14:42 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed reproduction	22.19%
		CM_MC1 passed reproduction	22.19%
		LC_SLC passed reproduction	22.19%
		FR_FRABCH passed reproduction	22.19%
		FR_FRCP1 passed reproduction	22.19%
		GH_FR1 passed reproduction	22.19%
		GH_ERC passed reproduction	22.19%
		CM_MC2 passed reproduction	22.19%
		EV_MC2 passed reproduction	22.19%
		EV_HC1 passed reproduction	22.19%
		LC_DCDS passed reproduction	22.19%
		LC_LC3 passed reproduction	22.19%
		LC_LC5 passed reproduction	22.19%
		LC_LCDSSLSS passed reproduction	22.19%
		RG_MIDAG passed reproduction	22.19%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Upstream Control		GH_ER2	97	71	2	18	CDF	0.7794	Non-Significant Effect
		CM_MC1	83.5	71	3	18	CDF	0.3083	Non-Significant Effect
		LC_SLC	105	71	2	18	CDF	0.9375	Non-Significant Effect
		FR_FRABCH	88	71	3	18	CDF	0.4681	Non-Significant Effect
		FR_FRCP1	107	71	5	18	CDF	0.9578	Non-Significant Effect
		GH_FR1	103.5	71	3	18	CDF	0.9178	Non-Significant Effect
		GH_ERC	103.5	71	3	18	CDF	0.9178	Non-Significant Effect
		CM_MC2	86	71	4	18	CDF	0.3946	Non-Significant Effect
		EV_MC2	110.5	71	3	18	CDF	0.9805	Non-Significant Effect
		EV_HC1	99	71	2	18	CDF	0.8316	Non-Significant Effect
		LC_DCDS	118	71	4	18	CDF	0.9974	Non-Significant Effect
		LC_LC3	120	71	4	18	CDF	0.9986	Non-Significant Effect
		LC_LC5	101	71	6	18	CDF	0.8752	Non-Significant Effect
		LC_LCDSSLSS	107	71	5	18	CDF	0.9578	Non-Significant Effect
		RG_MIDAG	107	71	2	18	CDF	0.9578	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	188.9	12.5933	15	1.005	0.4537	Non-Significant Effect
Error	1805	12.5347	144			
Total	1993.9		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	39.09	30.58	6.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9564	0.9774	6.7E-05	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 12-0835-5569 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 27 Feb-20 14:42 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

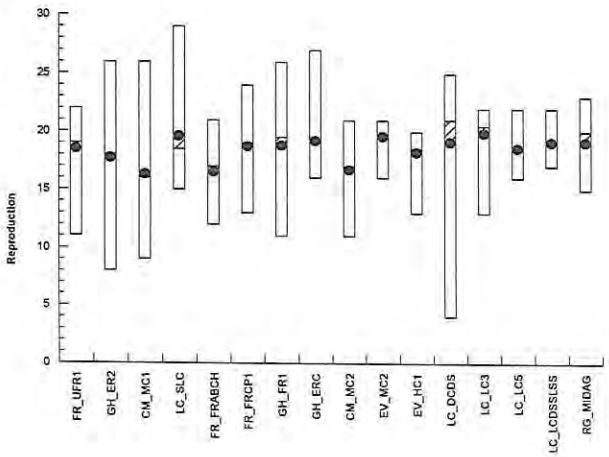
Reproduction Summary

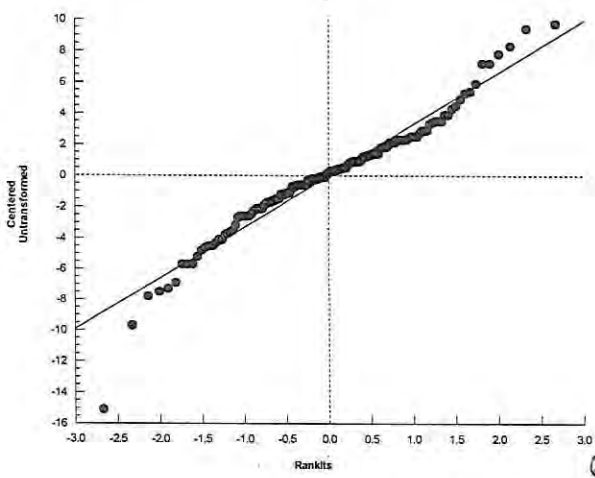
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	U	10	18.5	16.06	20.94	19	11	22	1.078	18.42%	0.00%
GH_ER2		10	17.7	14.45	20.95	18	8	26	1.438	25.69%	4.32%
CM_MC1		10	16.3	13.08	19.52	16	9	26	1.422	27.60%	11.89%
LC_SLC		10	19.6	16.56	22.64	18.5	15	29	1.343	21.67%	-5.95%
FR_FRABCH		10	16.5	14.11	18.89	17	12	21	1.057	20.25%	10.81%
FR_FRCP1		10	18.7	16.11	21.29	19	13	24	1.146	19.37%	-1.08%
GH_FR1		10	18.8	15.35	22.25	19.5	11	26	1.526	25.67%	-1.62%
GH_ERC		10	19.2	17.07	21.33	19	16	27	0.9404	15.49%	-3.78%
CM_MC2		10	16.7	14.54	18.86	17	11	21	0.9551	18.09%	9.73%
EV_MC2		10	19.6	18.47	20.73	19.5	16	21	0.4989	8.05%	-5.95%
EV_HC1		10	18.2	16.63	19.77	18.5	13	20	0.696	12.09%	1.62%
LC_DCDS		10	19.1	14.7	23.5	21	4	25	1.946	32.22%	-3.24%
LC_LC3		10	19.9	17.89	21.91	20.5	13	22	0.8876	14.10%	-7.57%
LC_LC5		10	18.6	17.16	20.04	18.5	16	22	0.636	10.81%	-0.54%
LC_LCDSSLSS		10	19.1	18.01	20.19	19	17	22	0.4819	7.98%	-3.24%
RG_MIDAG		10	19.1	17.5	20.7	20	15	23	0.7063	11.69%	-3.24%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	U	17	17	21	22	19	16	21	19	11	22
GH_ER2		18	18	18	26	14	17	8	19	20	19
CM_MC1		16	26	18	19	16	9	17	16	14	12
LC_SLC		19	29	18	17	17	20	25	19	17	15
FR_FRABCH		19	12	17	15	17	12	13	19	21	20
FR_FRCP1		13	18	21	21	22	13	19	24	17	19
GH_FR1		17	20	15	19	20	26	11	14	26	20
GH_ERC		19	18	20	16	27	19	17	19	18	19
CM_MC2		11	19	19	18	15	16	15	19	21	14
EV_MC2		20	19	21	21	16	19	21	21	19	19
EV_HC1		13	18	20	20	20	20	18	19	17	17
LC_DCDS		25	4	20	17	22	24	15	19	22	23
LC_LC3		22	18	20	22	21	20	19	22	13	22
LC_LC5		19	17	18	16	18	21	16	19	22	20
LC_LCDSSLSS		18	20	19	18	19	21	22	18	17	19
RG_MIDAG		17	23	20	19	20	20	15	20	17	20

Graphics





Analyst: SLK QA: Mark 5/20

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-2210-4540	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 May-19 15:00	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	19-7914-0920	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	09 May-19 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	17 May-19 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	53h (1.3 °C)	Teck Coal	
① GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	62h (2.5 °C)		
② CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	50h (7.6 °C)		
② LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	53h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	53h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	51h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	62h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	62h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	52h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	53h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	54h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	51h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	52h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	53h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	51h (1.4 °C)		
RG_MIDAG	01-1821-2622	07 May-19 09:25	08 May-19 10:18	53h (3.4 °C)		

① GH_ER2 = receiving water (R); site control

② FR_UFR1, CM_MC1, LC_SLC are also site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-05-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Receiving Water		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.7632	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.7632	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.7632	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 04-2210-4540 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 23 May-19 15:00 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLSS	1.0000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2	R	9	1	10	0.9	0.1	10.0%
CM_MC1		9	1	10	0.9	0.1	10.0%
LC_SLC		10	0	10	1	0	0.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		8	2	10	0.8	0.2	20.0%
CM_MC2		9	1	10	0.9	0.1	10.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		10	0	10	1	0	0.0%
LC_LCDSSLSS		10	0	10	1	0	0.0%
RG_MIDAG		10	0	10	1	0	0.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2	R	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLSS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

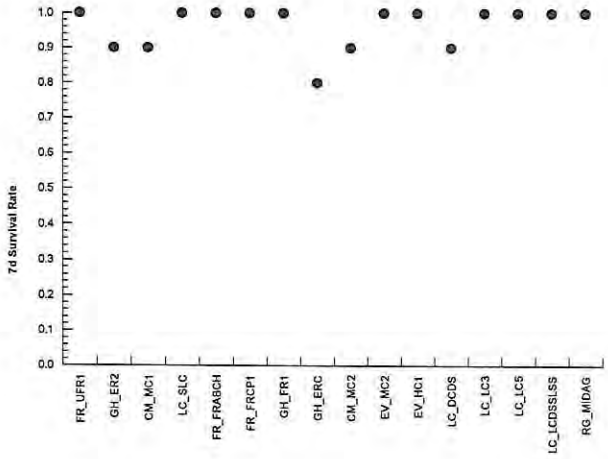
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-2210-4540	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 May-19 15:00	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_SLC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLSS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



6/4/19

CETIS Analytical Report

Report Date: 27 Feb-20 14:55 (p 1 of 3)
Test Code/ID: 190907 / 03-6681-1041

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	06-5002-8230	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Feb-20 14:43	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

Batch ID:	19-7914-0920	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	09 May-19 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	17 May-19 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	53h (1.3 °C)	Teck Coal	
② GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	62h (2.5 °C)		
① CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	50h (7.6 °C)		
① LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	53h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	53h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	51h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	62h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	62h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	52h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	53h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	54h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	51h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	52h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	53h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	51h (1.4 °C)		
RG_MIDAG	01-1821-2622	07 May-19 09:25	08 May-19 10:18	53h (3.4 °C)		

② GH_ER2 = receiving water (R); site control.

① FR_UFR1, CM_MC1 & LC_SLC are also site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-05-	

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 06-5002-8230 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 27 Feb-20 14:43 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	23.19%
		CM_MC1 passed reproduction	23.19%
		LC_SLC passed reproduction	23.19%
		FR_FRABCH passed reproduction	23.19%
		FR_FRCP1 passed reproduction	23.19%
		GH_FR1 passed reproduction	23.19%
		GH_ERC passed reproduction	23.19%
		CM_MC2 passed reproduction	23.19%
		EV_MC2 passed reproduction	23.19%
		EV_HC1 passed reproduction	23.19%
		LC_DCDS passed reproduction	23.19%
		LC_LC3 passed reproduction	23.19%
		LC_LC5 passed reproduction	23.19%
		LC_LCDSSLSS passed reproduction	23.19%
		RG_MIDAG passed reproduction	23.19%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Receiving Water		FR_UFR1	113	71	2	18	CDF	0.9894	Non-Significant Effect
		CM_MC1	88	71	5	18	CDF	0.4681	Non-Significant Effect
		LC_SLC	110.5	71	4	18	CDF	0.9805	Non-Significant Effect
		FR_FRABCH	96.5	71	3	18	CDF	0.7650	Non-Significant Effect
		FR_FRCP1	114	71	3	18	CDF	0.9918	Non-Significant Effect
		GH_FR1	113.5	71	5	18	CDF	0.9907	Non-Significant Effect
		GH_ERC	115	71	4	18	CDF	0.9938	Non-Significant Effect
		CM_MC2	98	71	3	18	CDF	0.8065	Non-Significant Effect
		EV_MC2	129.5	71	2	18	CDF	1.0000	Non-Significant Effect
		EV_HC1	111	71	4	18	CDF	0.9826	Non-Significant Effect
		LC_DCDS	120	71	3	18	CDF	0.9986	Non-Significant Effect
		LC_LC3	129.5	71	3	18	CDF	1.0000	Non-Significant Effect
		LC_LC5	111	71	4	18	CDF	0.9826	Non-Significant Effect
		LC_LCDSSLSS	118.5	71	4	18	CDF	0.9977	Non-Significant Effect
		RG_MIDAG	120.5	71	3	18	CDF	0.9988	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	188.9	12.5933	15	1.005	0.4537	Non-Significant Effect
Error	1805	12.5347	144			
Total	1993.9		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	39.09	30.58	6.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9564	0.9774	6.7E-05	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 06-5002-8230 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 27 Feb-20 14:43 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

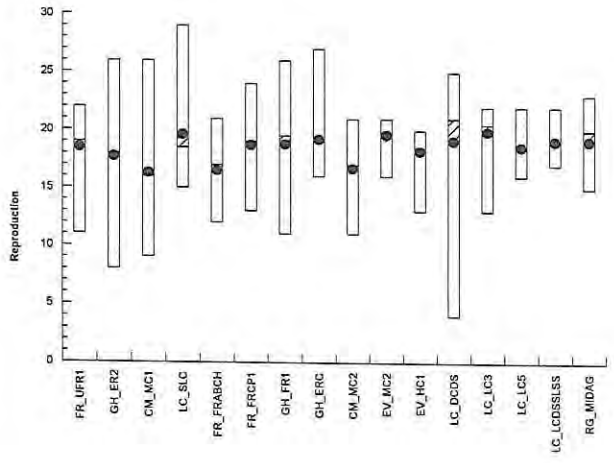
Reproduction Summary

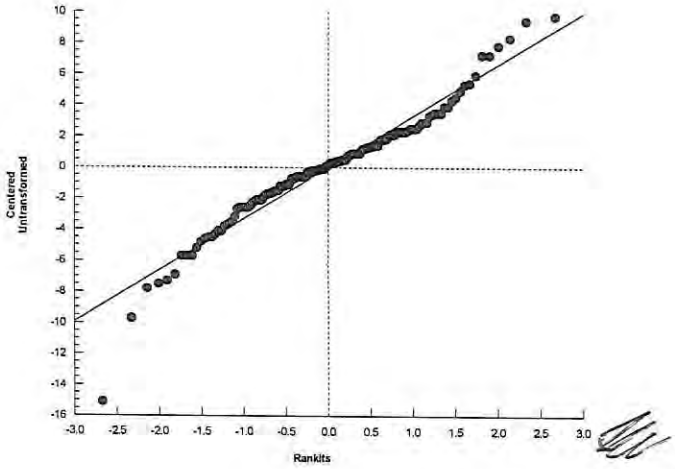
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	18.5	16.06	20.94	19	11	22	1.078	18.42%	0.00%
GH_ER2	R	10	17.7	14.45	20.95	18	8	26	1.438	25.69%	4.32%
CM_MC1		10	16.3	13.08	19.52	16	9	26	1.422	27.60%	11.89%
LC_SLC		10	19.6	16.56	22.64	18.5	15	29	1.343	21.67%	-5.95%
FR_FRABCH		10	16.5	14.11	18.89	17	12	21	1.057	20.25%	10.81%
FR_FRCP1		10	18.7	16.11	21.29	19	13	24	1.146	19.37%	-1.08%
GH_FR1		10	18.8	15.35	22.25	19.5	11	26	1.526	25.67%	-1.62%
GH_ERC		10	19.2	17.07	21.33	19	16	27	0.9404	15.49%	-3.78%
CM_MC2		10	16.7	14.54	18.86	17	11	21	0.9551	18.09%	9.73%
EV_MC2		10	19.6	18.47	20.73	19.5	16	21	0.4989	8.05%	-5.95%
EV_HC1		10	18.2	16.63	19.77	18.5	13	20	0.696	12.09%	1.62%
LC_DCDS		10	19.1	14.7	23.5	21	4	25	1.946	32.22%	-3.24%
LC_LC3		10	19.9	17.89	21.91	20.5	13	22	0.8876	14.10%	-7.57%
LC_LC5		10	18.6	17.16	20.04	18.5	16	22	0.636	10.81%	-0.54%
LC_LCDSSLSS		10	19.1	18.01	20.19	19	17	22	0.4819	7.98%	-3.24%
RG_MIDAG		10	19.1	17.5	20.7	20	15	23	0.7063	11.69%	-3.24%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		17	17	21	22	19	16	21	19	11	22
GH_ER2	R	18	18	18	26	14	17	8	19	20	19
CM_MC1		16	26	18	19	16	9	17	16	14	12
LC_SLC		19	29	18	17	17	20	25	19	17	15
FR_FRABCH		19	12	17	15	17	12	13	19	21	20
FR_FRCP1		13	18	21	21	22	13	19	24	17	19
GH_FR1		17	20	15	19	20	26	11	14	26	20
GH_ERC		19	18	20	16	27	19	17	19	18	19
CM_MC2		11	19	19	18	15	16	15	19	21	14
EV_MC2		20	19	21	21	16	19	21	21	19	19
EV_HC1		13	18	20	20	20	20	18	19	17	17
LC_DCDS		25	4	20	17	22	24	15	19	22	23
LC_LC3		22	18	20	22	21	20	19	22	13	22
LC_LC5		19	17	18	16	18	21	16	19	22	20
LC_LCDSSLSS		18	20	19	18	19	21	22	18	17	19
RG_MIDAG		17	23	20	19	20	20	15	20	17	20

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	12-8939-0676	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 May-19 15:01	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	19-7914-0920	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	09 May-19 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	17 May-19 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	53h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	62h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	50h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	53h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	53h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	51h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	62h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	62h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	52h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	53h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	54h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	51h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	52h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	53h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	51h (1.4 °C)		
RG_MIDAG	01-1821-2622	07 May-19 09:25	08 May-19 10:18	53h (3.4 °C)		

① CM_MC1 = site control (xC)

② GH_ER2, FR_UFR1, LC_SLC are also site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-05-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.7632	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.7632	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.7632	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 12-8939-0676 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 23 May-19 15:01 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLSS	1.0000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		9	1	10	0.9	0.1	10.0%
CM_MC1	XC	9	1	10	0.9	0.1	10.0%
LC_SLC		10	0	10	1	0	0.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		8	2	10	0.8	0.2	20.0%
CM_MC2		9	1	10	0.9	0.1	10.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		10	0	10	1	0	0.0%
LC_LCDSSLSS		10	0	10	1	0	0.0%
RG_MIDAG		10	0	10	1	0	0.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
CM_MC1	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLSS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

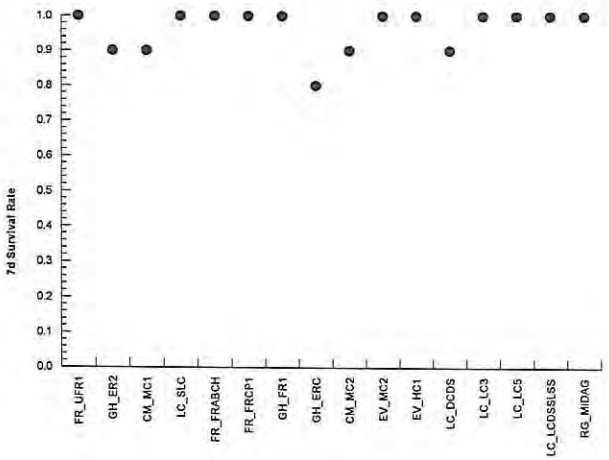
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 12-8939-0676 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 23 May-19 15:01 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
CM_MC1	XC	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
LC_SLC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLSS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	17-4073-0974	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Feb-20 14:45	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	19-7914-0920	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	09 May-19 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	17 May-19 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	53h (1.3 °C)	Teck Coal	
① GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	62h (2.5 °C)		
② CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	50h (7.6 °C)		
① LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	53h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	53h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	51h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	62h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	62h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	52h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	53h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	54h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	51h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	52h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	53h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	51h (1.4 °C)		
RG_MIDAG	01-1821-2622	07 May-19 09:25	08 May-19 10:18	53h (3.4 °C)		

② CM_MC1 = site control (XC)

① FR_UFR1, GH_ER2 & LC_SLC are also site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-05-	

Analyst: SSpc QA: March 5/20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 17-4073-0974 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 27 Feb-20 14:45 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	25.19%
		GH_ER2 passed reproduction	25.19%
		LC_SLC passed reproduction	25.19%
		FR_FRABCH passed reproduction	25.19%
		FR_FRCP1 passed reproduction	25.19%
		GH_FR1 passed reproduction	25.19%
		GH_ERC passed reproduction	25.19%
		CM_MC2 passed reproduction	25.19%
		EV_MC2 passed reproduction	25.19%
		EV_HC1 passed reproduction	25.19%
		LC_DCDS passed reproduction	25.19%
		LC_LC3 passed reproduction	25.19%
		LC_LC5 passed reproduction	25.19%
		LC_LCDSSLSS passed reproduction	25.19%
		RG_MIDAG passed reproduction	25.19%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	126.5	71	3	18	CDF	0.9998	Non-Significant Effect
		GH_ER2	122	71	5	18	CDF	0.9993	Non-Significant Effect
		LC_SLC	130	71	3	18	CDF	1.0000	Non-Significant Effect
		FR_FRABCH	111	71	3	18	CDF	0.9826	Non-Significant Effect
		FR_FRCP1	126	71	3	18	CDF	0.9998	Non-Significant Effect
		GH_FR1	122.5	71	4	18	CDF	0.9994	Non-Significant Effect
		GH_ERC	134	71	4	18	CDF	1.0000	Non-Significant Effect
		CM_MC2	111	71	4	18	CDF	0.9826	Non-Significant Effect
		EV_MC2	138.5	71	2	18	CDF	1.0000	Non-Significant Effect
		EV_HC1	129.5	71	3	18	CDF	1.0000	Non-Significant Effect
		LC_DCDS	127	71	2	18	CDF	0.9999	Non-Significant Effect
		LC_LC3	136	71	2	18	CDF	1.0000	Non-Significant Effect
		LC_LC5	129.5	71	4	18	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLSS	136.5	71	3	18	CDF	1.0000	Non-Significant Effect
		RG_MIDAG	133.5	71	2	18	CDF	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	188.9	12.5933	15	1.005	0.4537	Non-Significant Effect
Error	1805	12.5347	144			
Total	1993.9		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	39.09	30.58	6.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9564	0.9774	6.7E-05	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID: 17-4073-0974 Endpoint: Reproduction CETIS Version: CETISv1.9.4
Analyzed: 27 Feb-20 14:45 Analysis: Nonparametric-Control vs Treatments Status Level: 1

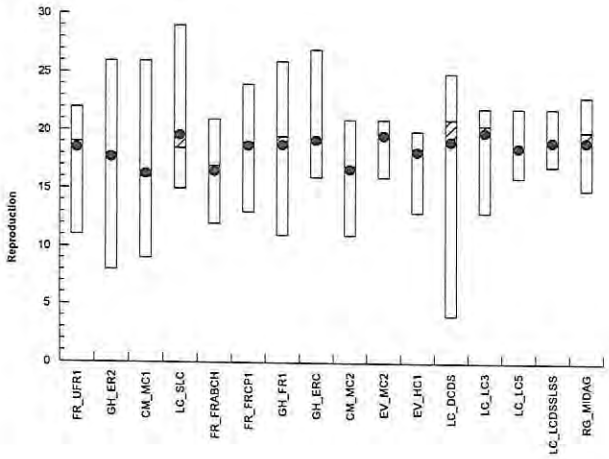
Reproduction Summary

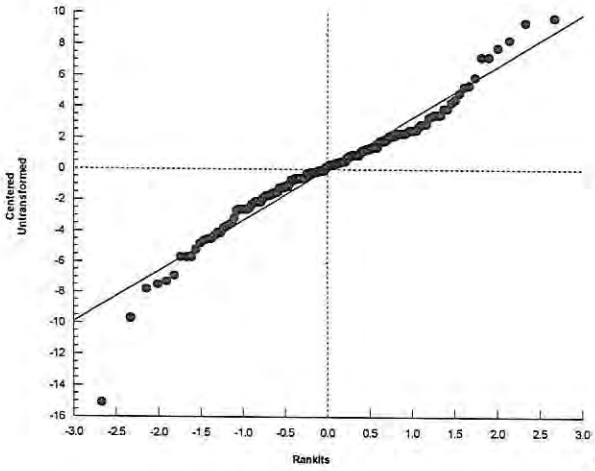
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	18.5	16.06	20.94	19	11	22	1.078	18.42%	0.00%
GH_ER2		10	17.7	14.45	20.95	18	8	26	1.438	25.69%	4.32%
CM_MC1	XC	10	16.3	13.08	19.52	16	9	26	1.422	27.60%	11.89%
LC_SLC		10	19.6	16.56	22.64	18.5	15	29	1.343	21.67%	-5.95%
FR_FRABCH		10	16.5	14.11	18.89	17	12	21	1.057	20.25%	10.81%
FR_FRCP1		10	18.7	16.11	21.29	19	13	24	1.146	19.37%	-1.08%
GH_FR1		10	18.8	15.35	22.25	19.5	11	26	1.526	25.67%	-1.62%
GH_ERC		10	19.2	17.07	21.33	19	16	27	0.9404	15.49%	-3.78%
CM_MC2		10	16.7	14.54	18.86	17	11	21	0.9551	18.09%	9.73%
EV_MC2		10	19.6	18.47	20.73	19.5	16	21	0.4989	8.05%	-5.95%
EV_HC1		10	18.2	16.63	19.77	18.5	13	20	0.696	12.09%	1.62%
LC_DCDS		10	19.1	14.7	23.5	21	4	25	1.946	32.22%	-3.24%
LC_LC3		10	19.9	17.89	21.91	20.5	13	22	0.8876	14.10%	-7.57%
LC_LC5		10	18.6	17.16	20.04	18.5	16	22	0.636	10.81%	-0.54%
LC_LCDSSLSS		10	19.1	18.01	20.19	19	17	22	0.4819	7.98%	-3.24%
RG_MIDAG		10	19.1	17.5	20.7	20	15	23	0.7063	11.69%	-3.24%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		17	17	21	22	19	16	21	19	11	22
GH_ER2		18	18	18	26	14	17	8	19	20	19
CM_MC1	XC	16	26	18	19	16	9	17	16	14	12
LC_SLC		19	29	18	17	17	20	25	19	17	15
FR_FRABCH		19	12	17	15	17	12	13	19	21	20
FR_FRCP1		13	18	21	21	22	13	19	24	17	19
GH_FR1		17	20	15	19	20	26	11	14	26	20
GH_ERC		19	18	20	16	27	19	17	19	18	19
CM_MC2		11	19	19	18	15	16	15	19	21	14
EV_MC2		20	19	21	21	16	19	21	21	19	19
EV_HC1		13	18	20	20	20	20	18	19	17	17
LC_DCDS		25	4	20	17	22	24	15	19	22	23
LC_LC3		22	18	20	22	21	20	19	22	13	22
LC_LC5		19	17	18	16	18	21	16	19	22	20
LC_LCDSSLSS		18	20	19	18	19	21	22	18	17	19
RG_MIDAG		17	23	20	19	20	20	15	20	17	20

Graphics





CETIS Analytical Report

Test Code/ID: 190907 / 03-6681-1041

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-6496-4747	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 May-19 15:04	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	19-7914-0920	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	09 May-19 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	17 May-19 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	53h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	62h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	50h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	53h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	53h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	51h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	62h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	62h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	52h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	53h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	54h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	51h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	52h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	53h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	51h (1.4 °C)		
RG_MIDAG	01-1821-2622	07 May-19 09:25	08 May-19 10:18	53h (3.4 °C)		

① LC_SLC = unamended sample (US); the control

② FR_UFR1, GH_ER2, CM_MC1 are also the controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-05-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Unamended Sample		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.5000	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.2368	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect

Analyst: KL QA: JME 4/19

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 11-6496-4747 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 23 May-19 15:04 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLSS	1.0000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		9	1	10	0.9	0.1	10.0%
CM_MC1		9	1	10	0.9	0.1	10.0%
LC_SLC	US	10	0	10	1	0	0.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		10	0	10	1	0	0.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		8	2	10	0.8	0.2	20.0%
CM_MC2		9	1	10	0.9	0.1	10.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		10	0	10	1	0	0.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		10	0	10	1	0	0.0%
LC_LCDSSLSS		10	0	10	1	0	0.0%
RG_MIDAG		10	0	10	1	0	0.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
LC_SLC	US	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLSS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

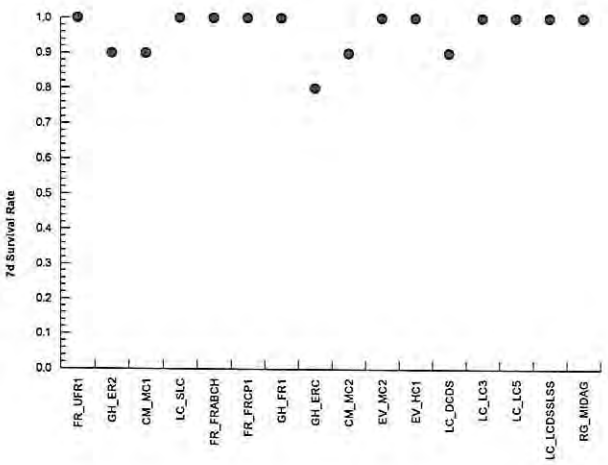
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-6496-4747	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 May-19 15:04	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
LC_SLC	US	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLSS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	12-2289-8548	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	27 Feb-20 14:46	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	19-7914-0920	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	09 May-19 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	17 May-19 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	53h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	62h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	50h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	53h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	53h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	51h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	62h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	62h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	52h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	53h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	54h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	51h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	52h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	53h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	51h (1.4 °C)		
RG_MIDAG	01-1821-2622	07 May-19 09:25	08 May-19 10:18	53h (3.4 °C)		

① LC_SLC = unamended sample (US); site control.

② FR_UFR1, GH_ER2, CM_MC1 are also site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-05-	

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 12-2289-8548 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 27 Feb-20 14:46 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	20.95%
		GH_ER2 passed reproduction	20.95%
		CM_MC1 passed reproduction	20.95%
		FR_FRABCH passed reproduction	20.95%
		FR_FRCP1 passed reproduction	20.95%
		GH_FR1 passed reproduction	20.95%
		GH_ERC passed reproduction	20.95%
		CM_MC2 passed reproduction	20.95%
		EV_MC2 passed reproduction	20.95%
		EV_HC1 passed reproduction	20.95%
		LC_DCDS passed reproduction	20.95%
		LC_LC3 passed reproduction	20.95%
		LC_LC5 passed reproduction	20.95%
		LC_LCDSSLSS passed reproduction	20.95%
		RG_MIDAG passed reproduction	20.95%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Unamended Sampl		FR_UFR1	105	71	2	18	CDF	0.9375	Non-Significant Effect
		GH_ER2	99.5	71	4	18	CDF	0.8433	Non-Significant Effect
		CM_MC1	80	71	3	18	CDF	0.2045	Non-Significant Effect
		FR_FRABCH	88	71	4	18	CDF	0.4681	Non-Significant Effect
		FR_FRCP1	106	71	3	18	CDF	0.9485	Non-Significant Effect
		GH_FR1	104.5	71	4	18	CDF	0.9314	Non-Significant Effect
		GH_ERC	108	71	4	18	CDF	0.9658	Non-Significant Effect
		CM_MC2	87.5	71	3	18	CDF	0.4495	Non-Significant Effect
		EV_MC2	119.5	71	2	18	CDF	0.9983	Non-Significant Effect
		EV_HC1	105	71	4	18	CDF	0.9375	Non-Significant Effect
		LC_DCDS	112	71	5	18	CDF	0.9864	Non-Significant Effect
		LC_LC3	120.5	71	3	18	CDF	0.9988	Non-Significant Effect
		LC_LC5	104	71	4	18	CDF	0.9248	Non-Significant Effect
		LC_LCDSSLSS	112.5	71	4	18	CDF	0.9880	Non-Significant Effect
		RG_MIDAG	112	71	4	18	CDF	0.9864	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	188.9	12.5933	15	1.005	0.4537	Non-Significant Effect
Error	1805	12.5347	144			
Total	1993.9		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	39.09	30.58	6.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9564	0.9774	6.7E-05	Non-Normal Distribution

March 5/20

Analysis ID: 12-2289-8548 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 27 Feb-20 14:46 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

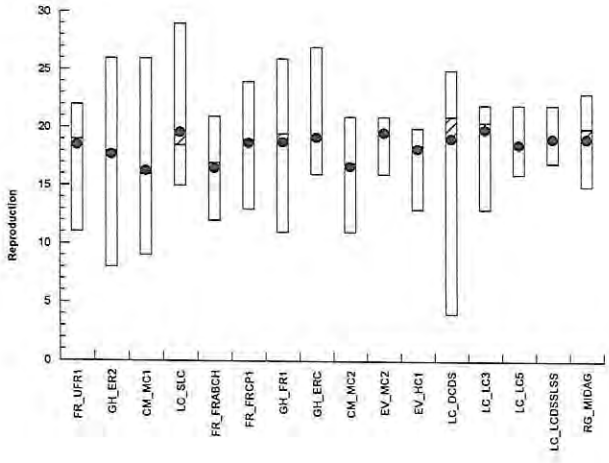
Reproduction Summary

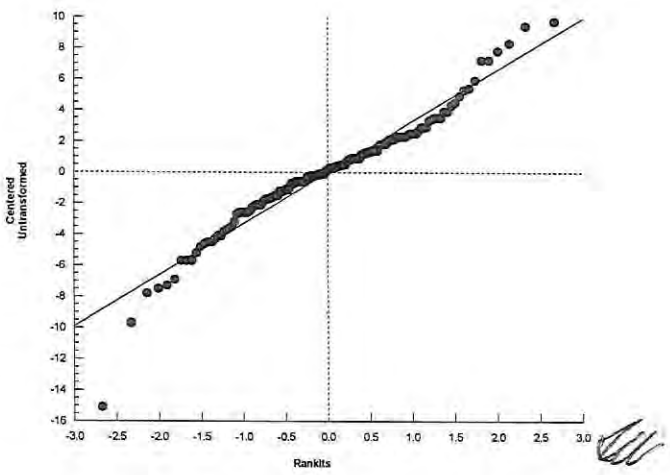
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	18.5	16.06	20.94	19	11	22	1.078	18.42%	0.00%
GH_ER2		10	17.7	14.45	20.95	18	8	26	1.438	25.69%	4.32%
CM_MC1		10	16.3	13.08	19.52	16	9	26	1.422	27.60%	11.89%
LC_SLC	US	10	19.6	16.56	22.64	18.5	15	29	1.343	21.67%	-5.95%
FR_FRABCH		10	16.5	14.11	18.89	17	12	21	1.057	20.25%	10.81%
FR_FRCP1		10	18.7	16.11	21.29	19	13	24	1.146	19.37%	-1.08%
GH_FR1		10	18.8	15.35	22.25	19.5	11	26	1.526	25.67%	-1.62%
GH_ERC		10	19.2	17.07	21.33	19	16	27	0.9404	15.49%	-3.78%
CM_MC2		10	16.7	14.54	18.86	17	11	21	0.9551	18.09%	9.73%
EV_MC2		10	19.6	18.47	20.73	19.5	16	21	0.4989	8.05%	-5.95%
EV_HC1		10	18.2	16.63	19.77	18.5	13	20	0.696	12.09%	1.62%
LC_DCDS		10	19.1	14.7	23.5	21	4	25	1.946	32.22%	-3.24%
LC_LC3		10	19.9	17.89	21.91	20.5	13	22	0.8876	14.10%	-7.57%
LC_LC5		10	18.6	17.16	20.04	18.5	16	22	0.636	10.81%	-0.54%
LC_LCDSSLSS		10	19.1	18.01	20.19	19	17	22	0.4819	7.98%	-3.24%
RG_MIDAG		10	19.1	17.5	20.7	20	15	23	0.7063	11.69%	-3.24%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		17	17	21	22	19	16	21	19	11	22
GH_ER2		18	18	18	26	14	17	8	19	20	19
CM_MC1		16	26	18	19	16	9	17	16	14	12
LC_SLC	US	19	29	18	17	17	20	25	19	17	15
FR_FRABCH		19	12	17	15	17	12	13	19	21	20
FR_FRCP1		13	18	21	21	22	13	19	24	17	19
GH_FR1		17	20	15	19	20	26	11	14	26	20
GH_ERC		19	18	20	16	27	19	17	19	18	19
CM_MC2		11	19	19	18	15	16	15	19	21	14
EV_MC2		20	19	21	21	16	19	21	21	19	19
EV_HC1		13	18	20	20	20	20	18	19	17	17
LC_DCDS		25	4	20	17	22	24	15	19	22	23
LC_LC3		22	18	20	22	21	20	19	22	13	22
LC_LC5		19	17	18	16	18	21	16	19	22	20
LC_LCDSSLSS		18	20	19	18	19	21	22	18	17	19
RG_MIDAG		17	23	20	19	20	20	15	20	17	20

Graphics





APPENDIX B – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck coal
Work Order No.: 190905
Start Date: May 10/19
Set up by: MG

Sample Information:

Sample ID: various: see results table for IDs.
Sample Date: May 7/19
Date Received: May 8/19
Sample Volume: various.

Test Organism Information:

Culture Date: May 3/19
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC187
Stock Solution ID: 19Zn07
Date Initiated: April 26/19

72-h IC50 (95% CL): 30.0 (26.7 - 33.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.9 (25.0 - 38.2) ug/L Zn CV (%): 10.

① site control

Test Results:

	Cell Yield (Mean± SD)
Negative Control (Lab control)	34.4 ± 3.0
FR_UPR1_MON_2019-05-06_N ①	113.8 ± 7.6 *df
GH_ER2_WS_2019-05-06_N ①	111.5 ± 6.8 *df
CM_MC1_WS_2019-05-07_N ①	123.0 ± 6.1 *bc
LC_SLC_MNT_2019-05-07_N ①	121.2 ± 9.0 *bc
FR_FRABCH_MON_2019-05-06_NP	120.2 ± 5.1 *c
FR_PR1_MON_2019-05-06_N	107.5 ± 9.9 *df
GH_FR1_WS_2019-05-06_N	120.5 ± 8.4 *c
GH_ER1_WS_2019-05-06_N	120.0 ± 6.7 *c

*indicates cell yield that is significantly greater than the lab control

a) indicates cell yield that is significantly lower than site control FR_UPR1

b) indicates cell yield that is significantly greater than site control FR_UPR1

c) indicates cell yield that is significantly greater than site control GH_ER2

d) indicates cell yield that is significantly lower than site control CM_MC1

e) indicates cell yield that is significantly greater than site control CM_MC1 and LC_SLC

Reviewed by: [signature]
Date reviewed: June 17, 2019

f) indicates cell yield that is significantly lower than site control LC_SLC

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck coal
Work Order No.: 190905
Start Date: May 10/19
Set up by: MG

Sample Information:

Sample ID: various. see ~~Excel~~ results table for IDs
Sample Date: May 7/19
Date Received: May 8/19
Sample Volume: various

Test Organism Information:

Culture Date: May 3/19
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC182
Stock Solution ID: 193n.02
Date Initiated: Apr 26/19

72-h IC50 (95% CL): 30.0 (26.7 - 33.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.9 (25.0 - 38.2) ug/L Zn CV (%): 10.

Test Results:

	Cell Yield (Mean± SD)
Negative Control	34.4 ± 3.0
CM_MC2-WS-2019-05-07-N	113.5 ± 12.8 *
EV_MC2-WS-2019-05-MON-N	105.2 ± 9.7 *df
EV_HCl_WS_2019-05-MON-N	134.0 ± 5.1 *bce
LC-DCDS-MNT-2019-05-07-N	112.0 ± 7.3 *d
LC_LC3-MNT-2019-05-07-N	113.8 ± 11.4 *d
LC-LCS-MNT-2019-05-07-N	104.2 ± 8.0 *adf
LC_LCDSSLCC_MNT-2019-05-07-N	110.8 ± 2.6 *df
	±

*indicates cell yield that is significantly greater than the lab control

a) indicates cell yield that is significantly lower than site control FR_NFR1
b) indicates cell yield that is significantly greater than site control FR_NFR1
c) indicates cell yield that is significantly greater than site control GH_ER2
d) indicates cell yield that is significantly lower than site control CM_MC1
e) indicates cell yield that is significantly greater than site control CM_MC1 and LC-SLC
f) indicates cell yield that is significantly lower than site control LC-SLC.

Reviewed by: [signature]
Date reviewed: June 17, 2019

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MG

Sample ID: various | Test Date/Time: May 10/19 @ 0730h

Work Order No.: 190904 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: May 3/19 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 390 2 420 | Average: 405 | Culture Cell Density (c1): 405 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 405 x 10⁴ cells/ml = 5.43 mL

Time Zero Counts: 1 21 2 24 | Average: 22.5

No. of Cells/mL: 22.5 x 10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10227 cells/mL

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
95.2 Control	7.2	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
FR1/FR1	8.2	23.0					✓	✓	✓	✓
GH_ER2	8.3	23.0					✓	✓	✓	✓
CM_MC1	8.3	23.0					✓	✓	✓	✓
LC_SLC	8.3	23.0					✓	✓	✓	✓
FR_FRBACH	8.2	23.0					✓	✓	✓	✓
FR_FRCP1	8.3	23.0					✓	✓	✓	✓
GH_FR1	8.3	23.0					✓	✓	✓	✓
GH_ERC	8.3	23.0					✓	✓	✓	✓
CM_MC2	8.3	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.2 Well 2: 7.2

Final control pH: Well 1: 7.0 Well 2: 7.0

Light intensity (lux): 4300 | Date measured: May 10/19

Thermometer: 4 | Light meter: 1 | pH meter/probe: 1/1

Sample Description: all samples: clear, colourless, odourless, no particulates

Comments:

Reviewed: [signature] | Date reviewed: May 31, 2019

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLG

Sample ID: Various | Test Date/Time: May 10/19 @ 0730h

Work Order No.: 190905 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: May 3/19 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 390 2 420 | Average: 405 | Culture Cell Density (c1): 405 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 405 x 10⁴ cells/ml = 5.43mL

Time Zero Counts: 1 21 2 24 | Average: 22.5

No. of Cells/mL: 22.5 x 10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 1022 cells/mL

Concentration %(v/v) 95.2	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.2	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
EV_MC2	8.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
EV_HCl	8.3	23.0					✓	✓	✓	✓
LC_DCDS	8.3	23.0					✓	✓	✓	✓
LC_LC3	8.3	23.0					✓	✓	✓	✓
LC_LC5	8.3	23.0					✓	✓	✓	✓
LC_LCDSSLCC	8.3	23.0					✓	✓	✓	✓
Initials	MLG	MLG	MLG	MLG	MLG	MLG	MLG	MLG	MLG	MLG

Initial control pH: Well 1: 7.2 Well 2: 7.2

Final control pH: Well 1: 7.0 Well 2: 7.0

Light intensity (lux): 4300 Date measured: May 10/19

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1

Sample Description: all samples: clear, colourless, odourless, no particulates

Comments:

Reviewed: [signature] Date reviewed: May 31, 2019

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal
Start Date/Time: May 10/19 @ 0730h
Work Order #: 190905
Termination Date: May 13/19 @ 0730h
Sample ID: various.
Test set up by: ML
95.2%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	36					ML
	B	31					
	C	37					
	D	33					
	E	32					
	F	39					
	G	37					
	H	38					
FR_UPR1 (site)	A	111					
	B	109					
	C	101					
	D	117					
	E (ML)	121					
	F B	119					
	G C	115					
	H D	125					
GH_ER2 (site)	A	102					
	B	110					
	C	111					
	D	125					
	E (ML)	112					
	F B	118					
	G C	108					
	H D	114					
CM_MC1 (site)	A	119					
	B	126					
	C	130					
	D	123					
	E (ML)	135					
	F B	117					
	G C	123					
	H D	119					✓
	A						
	B						
	C						
	D						

Comments:

Reviewed by: [signature] Date Reviewed: May 31, 2019

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal
Start Date/Time: May 10/19 @ 0730h
Work Order #: 190905
Termination Date: May 13/19 @ 0730h
Sample ID: various
Test set up by: MLT
99.2%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A						
	B						
	C						
	D						
	E						
	F						
	G						
	H						
LC_SLC (site)	A	111					MLT
	B	132					
	C	134					
	D	121					
	EA 119	124					
	FB	128					
	GC	118					
	HD	110					
FR_FRBACH	A	118					
	B	127					
	C	116					
	D	124					
FR_FRCP1	A	108					
	B	118					
	C	95					
	D	113					
GH_FR1	A	127					
	B	130					
	C	112					
	D	117					
GH_ERC	A	121					
	B	123					
	C	112					
	D	128					
GM_ML2	A	120					
	B	130					
	C	105					
	D	103					✓

Comments:

Reviewed by: [signature] Date Reviewed: May 31, 2019

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: May 10/19 @ 0730h
Work Order #: 190905 Termination Date: May 13/19 @ 0730h
Sample ID: Various Test set up by: MG
95.2 %(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A						
	B						
	C						
	D						
	E						
	F						
	G						
	H						
EV_MC2	A	120					MG
	B	98					
	C	106					
	D	101					
EV_HC1	A	135					
	B	133					
	C	130					
	D	142					
LC_DCD3	A	109					
	B	117					
	C	105					
	D	121					
LC_LC3	A	125					
	B	124					
	C	103					
	D	107					
LC_LC5	A	98					
	B	110					
	C	99					
	D	114					
LC_LCDSS_LCC	A	114					
	B	112					
	C	108					
	D	113					✓
	A						
	B						
	C						
	D						

Comments:

Reviewed by: Date Reviewed: May 31, 2019

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 190905
Sample ID: Teck Coal various samples pass/fail

Start Date/Time: 10-May-19 @ 0730h
Termination Date/Time 13-May-19 @ 0730h
Initial Cell Density: 10227 cell/mL

									225000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10227.27
Control	A	36				36	35.0	mean	34.4
Lab Control	B	31				31	30.0	SD	2.973094
	C	37				37	36.0	CV	8.654722
	D	33				33	32.0		
	E	32				32	31.0		
	F	39				39	38.0		
	G	37				37	36.0		
	H	38				38	37.0		
Control	A	111				111	110.0	mean	113.7
Site Water	B	109				109	108.0	SD	7.592289
(FR_UFR1)	C	101				101	100.0	CV	6.675874
95.2% (v/v)	D	117				117	116.0		
	E	121				121	120.0		
	F	119				119	118.0		
	G	115				115	114.0		
	H	125				125	124.0		
Control	A	102				102	101.0	mean	111.5
Site Water	B	110				110	109.0	SD	6.845228
(GH_ER2)	C	111				111	110.0	CV	6.140469
95.2% (v/v)	D	125				125	124.0		
	E	112				112	111.0		
	F	118				118	117.0		
	G	108				108	107.0		
	H	114				114	113.0		
Control	A	119				119	118.0	mean	123.0
Site Water	B	126				126	125.0	SD	6.117889
(CM_MC1)	C	130				130	129.0	CV	4.974813
95.2% (v/v)	D	123				123	122.0		
	E	135				135	134.0		
	F	117				117	116.0		
	G	123				123	122.0		
	H	119				119	118.0		
						#DIV/0!	#DIV/0!		
						#DIV/0!	#DIV/0!		
						#DIV/0!	#DIV/0!		
						#DIV/0!	#DIV/0!		

Reviewed by: _____ Date reviewed: May 31, 2019

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 190905
Sample ID: Teck Coal various samples pass/fail

Start Date/Time: 10-May-19 @ 0730h
Termination Date/Time: 11-May-19 @ 0730h
Initial Cell Density: 10227 cell/mL

225000
0.22
0.01
10227.27

Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		
Control	A					#DIV/0!	#DIV/0!	mean	#DIV/0!
	B					#DIV/0!	#DIV/0!	SD	#DIV/0!
	C					#DIV/0!	#DIV/0!	CV	#DIV/0!
	D					#DIV/0!	#DIV/0!		
	A					#DIV/0!	#DIV/0!		
	B					#DIV/0!	#DIV/0!		
	C					#DIV/0!	#DIV/0!		
	D					#DIV/0!	#DIV/0!		
Site Control	A	111				111	110.0	mean	121.2
(LC_SLC)	B	132				132	131.0	SD	8.988087
95.2% (v/v)	C	134				134	133.0	CV	7.414245
	D	121				121	120.0		
	E	124				124	123.0		
	F	128				128	127.0		
	G	118				118	117.0		
	H	110				110	109.0		
FR_FRABCH	A	118				118	117.0		
95.2% (v/v)	B	127				127	126.0		
	C	116				116	115.0		
	D	124				124	123.0		
FR_FRCP1	A	108				108	107.0		
95.2% (v/v)	B	118				118	117.0		
	C	95				95	94.0		
	D	113				113	112.0		
GH_FR1	A	127				127	126.0		
95.2% (v/v)	B	130				130	129.0		
	C	112				112	111.0		
	D	117				117	116.0		
GH_ERC	A	121				121	120.0		
95.2% (v/v)	B	123				123	122.0		
	C	112				112	111.0		
	D	128				128	127.0		
CM_MC2	A	120				120	119.0		
95.2% (v/v)	B	130				130	129.0		
	C	105				105	104.0		
	D	103				103	102.0		

Reviewed by: _____

Date reviewed: May 31, 2019

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 190905
Sample ID: Teck Coal various samples pass/fail

Start Date/Time: 10-May-19 @ 0730h
Termination Date/Time: 13-May-19 @ 0730h
Initial Cell Density: 10227 cell/mL

									225000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10227.27
Control	A					#DIV/0!	#DIV/0!	mean	#DIV/0!
	B					#DIV/0!	#DIV/0!	SD	#DIV/0!
	C					#DIV/0!	#DIV/0!	CV	#DIV/0!
	D					#DIV/0!	#DIV/0!		
	A					#DIV/0!	#DIV/0!		
	B					#DIV/0!	#DIV/0!		
	C					#DIV/0!	#DIV/0!		
	D					#DIV/0!	#DIV/0!		
EV_MC2	A	120				120	119.0		
95.2% (v/v)	B	98				98	97.0		
	C	106				106	105.0		
	D	101				101	100.0		
EV_HC1	A	135				135	134.0		
95.2% (v/v)	B	133				133	132.0		
	C	130				130	129.0		
	D	142				142	141.0		
LC_DCDS	A	109				109	108.0		
95.2% (v/v)	B	117				117	116.0		
	C	105				105	104.0		
	D	121				121	120.0		
LC_LC3	A	125				125	124.0		
95.2% (v/v)	B	124				124	123.0		
	C	103				103	102.0		
	D	107				107	106.0		
LC_LC5	A	98				98	97.0		
95.2% (v/v)	B	110				110	109.0		
	C	99				99	98.0		
	D	114				114	113.0		
LC_LCDSSLC	A	114				114	113.0		
95.2% (v/v)	B	112				112	111.0		
	C	108				108	107.0		
	D	113				113	112.0		
	A					#DIV/0!	#DIV/0!		
	B					#DIV/0!	#DIV/0!		
	C					#DIV/0!	#DIV/0!		
	D					#DIV/0!	#DIV/0!		

Reviewed by: _____ Date reviewed: May 31, 2019

EC Alga Growth Inhibition Test

Nautilus Environmental

Batch ID:	10-7994-3277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	10 May-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	13 May-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	16-1243-0961	10 May-19	10 May-19	8h	Teck Coal	
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	70h (1.3 °C)		
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	80h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	68h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	71h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	70h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	68h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	80h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	80h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	69h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	70h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	72h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	68h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	70h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	70h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	69h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	GH_FR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	CM_MC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	LC_SLC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	CM_MC2 passed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.7282	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	EV_HC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	LC_SLC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	FR_FRABCH passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	LC_LC3 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	GH_ER2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	GH_FR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	FR_UFR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9535	EV_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_DCDS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	GH_FR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	EV_HC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_LC3 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	GH_ER2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	FR_FRCP1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_LCDSSLSS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	CM_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_SLC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	GH_ERC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	FR_FRABCH failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	EV_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	FR_UFR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_LC5 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	CM_MC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0089	Lab Control failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	FR_FRCP1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_LC3 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_LC5 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	GH_ER2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	CM_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	FR_FRABCH passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	EV_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	CM_MC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_SLC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	FR_UFR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	LC_LC5 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	LC_SLC passed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	LC_LCDSSLSS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	GH_ER2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	FR_FRCP1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	FR_FRABCH passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	Lab Control passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	CM_MC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	GH_FR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	EV_HC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	CM_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	LC_DCDS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	EV_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	GH_ERC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.2718	LC_LC3 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	GH_ERC failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	CM_MC2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	EV_MC2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	GH_ER2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	Lab Control failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	LC_LC5 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	FR_FRABCH failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	LC_DCDS failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	LC_SLC failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	LC_LC3 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	FR_FRCP1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	LC_LCDSSLSS failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	CM_MC1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	FR_UFR1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	EV_HC1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0465	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	EV_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	LC_LC3 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	GH_ERC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	LC_DCDS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	EV_HC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	GH_ER2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	CM_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	LC_LC5 passed cell yield	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	LC_LCDSSLSS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	FR_UFR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	LC_SLC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	FR_FRABCH passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	Lab Control passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	CM_MC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7282	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	FR_FRABCH passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	LC_SLC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	LC_LC3 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	EV_HC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	EV_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	FR_UFR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	GH_FR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9857	GH_ER2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	GH_ERC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	LC_LC3 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	FR_FRCP1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	Lab Control failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	CM_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	EV_HC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	GH_FR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	LC_LCDSSLSS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	FR_FRABCH failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	GH_ER2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	LC_LC5 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	LC_SLC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	EV_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	FR_UFR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	LC_DCDS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0016	CM_MC1 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	GH_ER2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	LC_LC3 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	LC_SLC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	FR_FRABCH passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	CM_MC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	FR_FRCP1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	EV_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	LC_LC5 passed cell yield	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9984	CM_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	CM_MC2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	FR_UFR1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	LC_LCDSSLSS failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	CM_MC1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	LC_DCDS failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	LC_SLC failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	LC_LC3 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	FR_FRABCH failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	LC_LC5 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	EV_HC1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	GH_ER2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	FR_FRCP1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	GH_ERC failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	GH_FR1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	Lab Control failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0143	EV_MC2 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	GH_ERC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	CM_MC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	FR_UFR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	EV_HC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	LC_LCDSSLSS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	Lab Control passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	GH_FR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2718	FR_FRCP1 passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	EV_MC2 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	LC_LC5 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	CM_MC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	LC_SLC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	GH_FR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9984	LC_LCDSSLSS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_LC3 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	FR_FRABCH failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_DCDS failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_SLC failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	EV_HC1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	CM_MC2 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_LCDSSLSS failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	FR_FRCP1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	CM_MC1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	Lab Control failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	GH_ERC failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_LC5 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	GH_ER2 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	GH_FR1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	FR_UFR1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0089	EV_MC2 failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	FR_UFR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	EV_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	GH_FR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	EV_HC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	LC_LC3 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	FR_FRABCH passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	GH_ER2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.3280	LC_SLC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	Lab Control failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	LC_DCDS failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	EV_HC1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	CM_MC2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	LC_SLC failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	LC_LC5 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	LC_LC3 failed cell yield	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	CM_MC1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	EV_MC2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	FR_FRABCH failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	GH_ERC failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	LC_LCDSSLSS failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	GH_ER2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	FR_FRCP1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	FR_UFR1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0016	GH_FR1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	FR_UFR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	CM_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	EV_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	FR_FRABCH passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	LC_LCDSSLSS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	GH_FR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	Lab Control passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	GH_ERC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	FR_FRCP1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	CM_MC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	LC_LC5 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	EV_HC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	LC_LC3 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	LC_DCDS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	LC_SLC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.6720	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	CM_MC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	EV_HC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	GH_ERC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	GH_FR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	FR_UFR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_LCDSSLSS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	FR_FRCP1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9911	Lab Control passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	GH_FR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	LC_SLC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	CM_MC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	LC_LC5 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9857	FR_UFR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	LC_DCDS failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	GH_ER2 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	CM_MC2 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	FR_UFR1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	LC_LC5 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	CM_MC1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	FR_FRCP1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	LC_SLC failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	GH_ERC failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	FR_FRABCH failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	Lab Control failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	EV_HC1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	GH_FR1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	EV_MC2 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	LC_LCDSSLSS failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0465	LC_LC3 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	LC_DCDS passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	LC_LC5 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	EV_HC1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	FR_FRCP1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	EV_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	LC_LC3 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	Lab Control passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	FR_UFR1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	GH_ER2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	GH_ERC passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	LC_LCDSSLSS passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	GH_FR1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	CM_MC1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	CM_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	FR_FRABCH passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.3280	LC_SLC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	EV_MC2 passed cell yield	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	FR_FRCP1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	LC_SLC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	GH_ER2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	LC_LC3 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	FR_FRABCH passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	CM_MC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	CM_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.6720	LC_LC5 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	LC_DCDS failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	EV_HC1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	CM_MC2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	FR_FRCP1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	LC_LC5 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	LC_LC3 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	EV_MC2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	GH_ER2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	GH_FR1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	FR_UFR1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	Lab Control failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	CM_MC1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	LC_SLC failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	LC_LCDSSLSS failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	GH_ERC failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0143	FR_FRABCH failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	FR_FRCP1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	FR_UFR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	LC_LCDSSLSS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	GH_FR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	Lab Control passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	CM_MC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	EV_HC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9535	GH_ERC passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	LC_SLC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	CM_MC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	GH_FR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9755	LC_LC5 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	EV_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	CM_MC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	FR_UFR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	GH_ER2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	LC_LC5 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	EV_HC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	FR_FRABCH passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	LC_LCDSSLSS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	Lab Control passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	FR_FRCP1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	LC_DCDS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	LC_SLC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	CM_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	LC_LC3 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0787	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	LC_SLC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	EV_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	EV_HC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	LC_LC3 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	FR_FRABCH passed cell yield	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	GH_FR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	FR_UFR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5786	GH_ER2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	LC_SLC passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	Lab Control passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	LC_LCDSSLSS passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	FR_FRCP1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	FR_FRABCH passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	EV_HC1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	GH_ER2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	CM_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	FR_UFR1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	LC_LC5 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	LC_DCDS passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	GH_ERC passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	EV_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	CM_MC1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	LC_LC3 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2297	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	GH_ER2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	EV_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	FR_FRABCH passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	LC_LC5 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	CM_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	LC_SLC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	CM_MC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	FR_FRCP1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7703	LC_LC3 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	CM_MC1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	GH_ER2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	LC_SLC failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	FR_FRCP1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	FR_FRABCH failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	FR_UFR1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	LC_LC3 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	Lab Control failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	LC_DCDS failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	EV_HC1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	GH_FR1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	GH_ERC failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	EV_MC2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	CM_MC2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	LC_LCDSSLSS failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0245	LC_LC5 failed cell yield	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	FR_FRCP1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	GH_ERC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	FR_UFR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	GH_ER2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	GH_FR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	LC_SLC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	FR_FRABCH passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	Lab Control passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	CM_MC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	LC_LCDSSLSS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	EV_HC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	CM_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	EV_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	LC_LC5 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	LC_LC3 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4214	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	CM_MC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	LC_LCDSSLSS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	EV_HC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	Lab Control passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	GH_FR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	FR_UFR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	FR_FRCP1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9213	GH_ERC passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	LC_LC5 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	GH_FR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	CM_MC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.2133	LC_SLC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	LC_LCDSSLSS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	LC_LC5 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	LC_DCDS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	FR_FRABCH passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	Lab Control passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	GH_ERC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	CM_MC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	FR_UFR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	FR_FRCP1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	CM_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	EV_HC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	LC_SLC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	EV_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	LC_LC3 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.8753	GH_ER2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	EV_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	EV_HC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	FR_FRABCH passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	GH_ER2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	GH_FR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	LC_LC3 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	LC_SLC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9821	FR_UFR1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	LC_DCDS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	CM_MC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	LC_LCDSSLSS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	GH_ERC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	LC_LC3 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	LC_LC5 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	FR_FRABCH failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	CM_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	FR_FRCP1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	FR_UFR1 failed cell yield	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	Lab Control failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	LC_SLC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	GH_FR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	EV_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	GH_ER2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0034	EV_HC1 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	FR_FRCP1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	CM_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	CM_MC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	EV_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	GH_ER2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	LC_SLC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	LC_LC5 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	LC_LC3 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9966	FR_FRABCH passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	Lab Control passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	EV_HC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	LC_DCDS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	GH_ERC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	GH_ER2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	FR_FRCP1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	CM_MC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	LC_LCDSSLSS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	FR_FRABCH passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	LC_LC5 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	LC_LC3 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	FR_UFR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	CM_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	LC_SLC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	EV_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.7867	GH_FR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	LC_LC5 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	LC_LC3 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	FR_FRCP1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	GH_ERC failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	LC_SLC failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	CM_MC1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	Lab Control failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	GH_ER2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	GH_FR1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	FR_UFR1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	FR_FRABCH failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	LC_LCDSSLSS failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	CM_MC2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	EV_MC2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	EV_HC1 failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0179	LC_DCDS failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	EV_HC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	FR_UFR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	CM_MC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	GH_ERC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	FR_FRCP1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	LC_LCDSSLSS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	GH_FR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.1247	Lab Control passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	GH_FR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	LC_SLC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	CM_MC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	LC_LC5 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9632	GH_ERC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	LC_DCDS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	LC_SLC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	LC_LC5 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	GH_FR1 passed cell yield	1

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	GH_ERC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	Lab Control passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	FR_FRABCH passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	FR_FRCP1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	GH_ER2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	LC_LCDSSLSS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	CM_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	FR_UFR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	EV_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	EV_HC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	LC_LC3 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0953	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	FR_UFR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	EV_HC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	EV_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	GH_ER2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	LC_LC3 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	FR_FRABCH passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	GH_FR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5538	LC_SLC passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	GH_FR1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	FR_FRABCH passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	Lab Control passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	FR_FRCP1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	LC_SLC passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	GH_ER2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	FR_UFR1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	CM_MC1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	GH_ERC passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	CM_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	LC_LC3 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	LC_LCDSSLSS passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	EV_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	LC_LC5 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	LC_DCDS passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2834	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	FR_FRABCH passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	LC_SLC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	FR_FRCP1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	GH_ER2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	LC_LC5 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	CM_MC1 passed cell yield	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	EV_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	CM_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7166	LC_LC3 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	LC_DCDS failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	LC_LC3 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	GH_FR1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	GH_ERC failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	EV_MC2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	FR_UFR1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	GH_ER2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	LC_LC5 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	CM_MC1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	LC_SLC failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	CM_MC2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	FR_FRCP1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	FR_FRABCH failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	LC_LCDSSLSS failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	Lab Control failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0368	EV_HC1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	GH_FR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	CM_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	EV_HC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	LC_LC3 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	GH_ERC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	LC_LC5 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	LC_LCDSSLSS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	LC_DCDS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	FR_UFR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	FR_FRCP1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	GH_ER2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	Lab Control passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	EV_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	LC_SLC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	CM_MC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4462	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	GH_FR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	EV_HC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	GH_ERC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	Lab Control passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	CM_MC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	FR_FRCP1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	LC_LCDSSLSS passed cell yield	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9047	FR_UFR1 passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	LC_SLC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	CM_MC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	GH_FR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	LC_LC5 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9658	EV_HC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	LC_LCDSSLSS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	LC_SLC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	LC_LC5 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	GH_ER2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	FR_UFR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	Lab Control passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	CM_MC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	GH_ERC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	FR_FRABCH passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	CM_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	EV_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	EV_HC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	LC_DCDS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	LC_LC3 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.0970	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	FR_FRABCH passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	LC_SLC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	GH_FR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	EV_HC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	FR_UFR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	EV_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	LC_LC3 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.5939	GH_ER2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	LC_LC5 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	LC_DCDS passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	EV_HC1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	EV_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	FR_FRCP1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	LC_LC3 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	FR_UFR1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	GH_ERC passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	LC_SLC passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	CM_MC1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	GH_FR1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	Lab Control passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	GH_ER2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	FR_FRABCH passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	CM_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.2272	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	FR_FRABCH passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	LC_LC3 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	CM_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	FR_FRCP1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	EV_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	LC_LC5 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	GH_ER2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	CM_MC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.7728	LC_SLC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	LC_LC3 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	FR_FRABCH failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	GH_FR1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	EV_MC2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	LC_SLC failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	CM_MC1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	LC_LCDSSLSS failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	FR_FRCP1 failed cell yield	1

Analyst: MD QA: June 18/19

EC Alga Growth Inhibition Test

Nautilus Environmental

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	LC_DCDS failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	Lab Control failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	FR_UFR1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	EV_HC1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	LC_LC5 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	GH_ERC failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	CM_MC2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.0342	GH_ER2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	LC_LC3 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	FR_FRCP1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	LC_LC5 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	LC_DCDS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	EV_HC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	GH_ER2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	GH_FR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	FR_UFR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	EV_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	LC_LCDSSLSS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	GH_ERC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	Lab Control passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	CM_MC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	FR_FRABCH passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	LC_SLC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.4061	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	CM_MC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	LC_LCDSSLSS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	EV_HC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	FR_FRCP1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	Lab Control passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	FR_UFR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	GH_ERC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	GH_FR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9030	CM_MC2 passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	CM_MC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	LC_SLC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	LC_LC5 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6370	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	LC_LC3 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	LC_LCDSSLSS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	LC_DCDS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	FR_UFR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	CM_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	EV_HC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	CM_MC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	GH_ER2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	GH_ERC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	LC_LC5 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	EV_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	FR_FRCP1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	FR_FRABCH passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	LC_SLC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5168	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	LC_SLC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	GH_ER2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	EV_HC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	FR_UFR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	LC_LC3 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	FR_FRABCH passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	EV_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	GH_FR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8766	LC_LC5 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	EV_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	LC_DCDS passed cell yield	1

EC Alga Growth Inhibition Test — **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	LC_SLC passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	GH_FR1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	GH_ERC passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	LC_LC3 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	FR_FRABCH passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	CM_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	GH_ER2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	LC_LC5 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	CM_MC1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	LC_LCDSSLSS passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	EV_HC1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	Lab Control passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	FR_FRCP1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0523	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	CM_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	FR_FRABCH passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	EV_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	LC_SLC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	CM_MC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	GH_ER2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	LC_LC5 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	LC_LC3 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9477	FR_FRCP1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	CM_MC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	LC_LC5 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	LC_SLC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	FR_FRCP1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	LC_LCDSSLSS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	GH_ERC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	EV_HC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	LC_LC3 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	FR_FRABCH passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	FR_UFR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	Lab Control passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	CM_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	GH_ER2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	LC_DCDS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	GH_FR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3630	EV_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	CM_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	LC_LCDSSLSS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	LC_DCDS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	LC_LC3 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	GH_ERC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	GH_FR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	FR_UFR1 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	EV_HC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	Lab Control passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	CM_MC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	FR_FRABCH passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	LC_SLC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	LC_LC5 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	EV_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	GH_ER2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1234	FR_FRCP1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	GH_ERC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	FR_FRCP1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	CM_MC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	FR_UFR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	Lab Control passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	GH_FR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	EV_HC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	LC_LCDSSLSS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.4832	FR_FRABCH passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	GH_FR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	LC_LC5 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	LC_SLC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	CM_MC1 passed cell yield	1

EC Alga Growth Inhibition Test — Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.1108	GH_ER2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	CM_MC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	LC_DCDS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	EV_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	LC_LCDSSLSS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	FR_FRABCH passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	EV_HC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	GH_ER2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	LC_LC5 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	FR_FRCP1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	GH_ERC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	FR_UFR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	CM_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	LC_LC3 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	Lab Control passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9374	LC_SLC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	FR_UFR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	GH_ER2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	EV_HC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	FR_FRABCH passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	GH_FR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_SLC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_LC3 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	EV_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9911	LC_DCDS passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	GH_FR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	EV_HC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	GH_ER2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	FR_FRCP1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	LC_LCDSSLSS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	FR_UFR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	LC_LC5 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	CM_MC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	LC_SLC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	FR_FRABCH failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	GH_ERC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	Lab Control failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	LC_DCDS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	LC_LC3 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	EV_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0014	CM_MC2 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	FR_FRABCH passed cell yield	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	EV_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	GH_ER2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	CM_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	LC_SLC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	LC_LC5 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	FR_FRCP1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	LC_LC3 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	CM_MC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9986	EV_HC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	LC_SLC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	CM_MC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	GH_FR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	CM_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	EV_HC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	FR_FRABCH passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	LC_DCDS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	LC_LC5 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	EV_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	FR_FRCP1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	FR_UFR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	LC_LCDSSLSS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	LC_LC3 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	Lab Control passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	GH_ERC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.8892	GH_ER2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	GH_FR1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	GH_ERC failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	EV_HC1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_SLC failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	EV_MC2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_LC3 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	CM_MC2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	Lab Control failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	FR_FRCP1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	FR_FRABCH failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_LCDSSLSS failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_DCDS failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	LC_LC5 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	GH_ER2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	CM_MC1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0089	FR_UFR1 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	FR_UFR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	FR_FRCP1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	LC_LCDSSLSS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	GH_FR1 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	EV_HC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	CM_MC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	GH_ERC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0626	Lab Control passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	LC_LC5 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	CM_MC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	GH_FR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	LC_SLC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.9999	FR_FRCP1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	LC_SLC failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	FR_FRABCH failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	LC_DCDS failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	LC_LC3 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	GH_FR1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	CM_MC1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	LC_LCDSSLSS failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	EV_HC1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	FR_FRCP1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	LC_LC5 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	GH_ER2 failed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	FR_UFR1 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	Lab Control failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	EV_MC2 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	CM_MC2 failed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	3.8E-04	GH_ERC failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	EV_MC2 failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	FR_UFR1 failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	FR_FRABCH failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	GH_ERC failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	GH_ER2 failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	FR_FRCP1 failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	CM_MC1 failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	EV_HC1 failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	CM_MC2 failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	LC_LC5 failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	GH_FR1 failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	LC_DCDS failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	LC_SLC failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	Lab Control failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	LC_LC3 failed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.0133	LC_LCDSSLSS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	CM_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	FR_FRCP1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	LC_LC3 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	EV_MC2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	FR_UFR1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	LC_LC5 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	Lab Control passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	GH_FR1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	LC_SLC passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	CM_MC1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	FR_FRABCH passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	LC_LCDSSLSS passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	GH_ERC passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	GH_ER2 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	LC_DCDS passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.9942	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	FR_UFR1 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	EV_HC1 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	LC_LCDSSLSS failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	FR_FRABCH failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	FR_FRCP1 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	LC_LC3 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	CM_MC1 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	LC_SLC failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	GH_FR1 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	Lab Control failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	GH_ER2 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	LC_LC5 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	LC_DCDS failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	GH_ERC failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	EV_MC2 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.0058	CM_MC2 failed cell yield	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	GH_FR1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	EV_MC2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	FR_FRABCH failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	LC_SLC failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	LC_DCDS failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	GH_ER2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	Lab Control failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	LC_LC5 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	EV_HC1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	GH_ERC failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	CM_MC2 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	LC_LCDSSLSS failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	FR_FRCP1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	CM_MC1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	FR_UFR1 failed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	9.1E-05	LC_LC3 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	CM_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	LC_LCDSSLSS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	FR_FRABCH passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	LC_LC5 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	EV_HC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	LC_DCDS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	LC_SLC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	LC_LC3 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	GH_FR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	EV_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	Lab Control passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	CM_MC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	FR_UFR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	GH_ERC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	FR_FRCP1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.9867	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	LC_LCDSSLSS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	Lab Control passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	GH_FR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	CM_MC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	GH_ERC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	FR_UFR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	EV_HC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.9996	FR_FRCP1 passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	CM_MC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	GH_FR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	LC_LC5 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.5454	LC_SLC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	Lab Control passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	CM_MC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	LC_DCDS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	EV_HC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	LC_LC5 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	LC_LCDSSLSS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	CM_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	LC_LC3 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	FR_FRCP1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	GH_ER2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	FR_UFR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	LC_SLC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	FR_FRABCH passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	EV_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.6443	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	GH_ER2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	FR_UFR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	LC_SLC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	EV_MC2 passed cell yield	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	GH_FR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	FR_FRABCH passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	LC_LC3 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9467	EV_HC1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	Lab Control failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	GH_ERC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	EV_HC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	GH_ER2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	LC_SLC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	CM_MC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	LC_LCDSSLSS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	FR_FRCP1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	GH_FR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	FR_FRABCH failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	EV_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	CM_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	LC_LC3 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	FR_UFR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	LC_LC5 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0100	LC_DCDS failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	LC_SLC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	FR_FRABCH passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	FR_FRCP1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	LC_LC5 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	EV_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	GH_ER2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	CM_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	LC_LC3 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9900	CM_MC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	GH_FR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	FR_UFR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	EV_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	GH_ER2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	LC_DCDS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	CM_MC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	FR_FRCP1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	LC_SLC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	FR_FRABCH passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	Lab Control passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	LC_LC5 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	LC_LC3 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	LC_LCDSSLSS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	GH_ERC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	CM_MC2 passed cell yield	1

Analyst: MT QA June 18/19

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.4546	EV_HC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	EV_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	FR_UFR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	CM_MC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	FR_FRCP1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	LC_DCDS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	GH_FR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	LC_LC5 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	GH_ERC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	CM_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	FR_FRABCH passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	LC_SLC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	Lab Control passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	LC_LC3 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	LC_LCDSSLSS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	EV_HC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0533	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	CM_MC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	FR_FRCP1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	LC_LCDSSLSS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	GH_FR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	Lab Control passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	FR_UFR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	EV_HC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.3557	GH_ERC passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	CM_MC1 passed cell yield	1

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	LC_LC5 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	LC_SLC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.6632	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	LC_DCDS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	FR_FRABCH passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	EV_HC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	CM_MC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	EV_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	Lab Control passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	CM_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	LC_LCDSSLSS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	GH_ER2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	GH_ERC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	FR_FRCP1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	LC_SLC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	LC_LC3 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	FR_UFR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.5000	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	FR_UFR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	FR_FRABCH passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	GH_ER2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	GH_FR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	EV_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	LC_SLC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	EV_HC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	LC_LC3 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.8808	FR_FRCP1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	FR_FRABCH failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	LC_LC3 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	LC_DCDS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	FR_UFR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	EV_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	LC_SLC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	LC_LC5 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	CM_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	CM_MC1 failed cell yield	1

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	LC_LCDSSLSS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	GH_ER2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	Lab Control failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	GH_ERC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	GH_FR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	EV_HC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0453	FR_FRCP1 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	CM_MC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	FR_FRCP1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	LC_LC5 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	CM_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	LC_SLC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	FR_FRABCH passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	EV_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	LC_LC3 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9547	GH_ER2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	FR_UFR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	CM_MC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	LC_LCDSSLSS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	LC_SLC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	LC_LC5 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	FR_FRCP1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	EV_HC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	Lab Control passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	FR_FRABCH passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	GH_ER2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	EV_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	GH_ERC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	GH_FR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	LC_LC3 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	LC_DCDS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.3368	CM_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	CM_MC1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	GH_ERC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	FR_UFR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	GH_ER2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	FR_FRABCH passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	LC_SLC passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	LC_LCDSSLSS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	LC_LC3 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	EV_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	CM_MC2 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	LC_DCDS passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	Lab Control passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	FR_FRCP1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	EV_HC1 passed cell yield	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	GH_FR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.1192	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	LC_LCDSSLSS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	FR_UFR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	GH_FR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	GH_ERC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	CM_MC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	FR_FRCP1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	Lab Control passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.5000	EV_HC1 passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	GH_FR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	LC_LC5 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	LC_SLC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.0656	CM_MC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	EV_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	FR_UFR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	LC_LC5 passed cell yield	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	FR_FRCP1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	GH_ERC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	EV_HC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	LC_LC3 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	LC_DCDS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	LC_SLC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	CM_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	LC_LCDSSLSS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	GH_ER2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	Lab Control passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	CM_MC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.9641	FR_FRABCH passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	GH_ER2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	FR_UFR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	LC_SLC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	EV_HC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	EV_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	GH_FR1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	FR_FRABCH passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9952	LC_LC3 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	EV_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	CM_MC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	LC_LC3 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	LC_LCDSSLSS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	FR_UFR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	GH_ER2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	LC_LC5 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	EV_HC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	FR_FRABCH failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	FR_FRCP1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	GH_FR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	Lab Control failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	GH_ERC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	LC_DCDS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	CM_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	5.3E-04	LC_SLC failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	FR_FRCP1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	LC_LC5 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	EV_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	FR_FRABCH passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	LC_SLC passed cell yield	1

Analyst: MT QA: June 18/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	LC_LC3 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	CM_MC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	CM_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9995	GH_ER2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	Lab Control passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	GH_ERC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	CM_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	EV_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	GH_ER2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	FR_FRCP1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	CM_MC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	LC_DCDS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	EV_HC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	GH_FR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	FR_UFR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	LC_SLC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	LC_LC5 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	LC_LC3 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	LC_LCDSSLSS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.9344	FR_FRABCH passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	LC_LC3 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	GH_ER2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	EV_MC2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	FR_FRCP1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	FR_UFR1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	FR_FRABCH failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	GH_ERC failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	CM_MC1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	Lab Control failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	LC_SLC failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	GH_FR1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	LC_DCDS failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	LC_LCDSSLSS failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	CM_MC2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	EV_HC1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0048	LC_LC5 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	LC_LCDSSLSS failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	EV_MC2 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	GH_FR1 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	CM_MC2 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	Lab Control failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	FR_FRABCH failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	GH_ERC failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	LC_LC3 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	FR_UFR1 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	LC_LC5 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	GH_ER2 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	FR_FRCP1 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	LC_DCDS failed cell yield	1

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	CM_MC1 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	LC_SLC failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.0359	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	CM_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	FR_UFR1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	GH_ER2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	LC_SLC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	FR_FRABCH passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	Lab Control passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	GH_ERC passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	LC_LCDSSLSS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	CM_MC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	EV_MC2 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	EV_HC1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	LC_DCDS passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	LC_LC3 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	LC_LC5 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	FR_FRCP1 passed cell yield	1
03-3416-5852	Cell Yield	Equal Variance t Two-Sample Test	0.4199	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	CM_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	CM_MC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	GH_ER2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	GH_FR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	Lab Control passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	LC_SLC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	FR_UFR1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	GH_ERC passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	LC_LCDSSLSS passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	EV_MC2 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	LC_LC5 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	LC_LC3 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	EV_HC1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	FR_FRABCH passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	FR_FRCP1 passed cell yield	1
04-5347-4771	Cell Yield	Equal Variance t Two-Sample Test	0.7653	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	FR_FRABCH passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	FR_UFR1 passed cell yield	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	FR_FRCP1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	GH_ER2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	CM_MC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	Lab Control passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	EV_HC1 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	LC_SLC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	CM_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	LC_DCDS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	LC_LC3 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	EV_MC2 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	GH_ERC passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	LC_LC5 passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	LC_LCDSSLSS passed cell yield	1
04-8193-3019	Cell Yield	Equal Variance t Two-Sample Test	0.9755	GH_FR1 passed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	CM_MC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	FR_FRABCH failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	FR_UFR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	LC_SLC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	Lab Control failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	LC_LC5 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	GH_FR1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	GH_ER2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	LC_LCDSSLSS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	GH_ERC failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	CM_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	FR_FRCP1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	EV_MC2 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	EV_HC1 failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	LC_DCDS failed cell yield	1
05-5487-3038	Cell Yield	Equal Variance t Two-Sample Test	0.0019	LC_LC3 failed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	CM_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	EV_MC2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	LC_LCDSSLSS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	LC_DCDS passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	GH_FR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	Lab Control passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	FR_FRABCH passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	CM_MC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	GH_ER2 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	FR_UFR1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	GH_ERC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	LC_SLC passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	LC_LC5 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	EV_HC1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	FR_FRCP1 passed cell yield	1
14-4318-9405	Cell Yield	Equal Variance t Two-Sample Test	0.9981	LC_LC3 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	FR_UFR1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	GH_ER2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	CM_MC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	FR_FRABCH passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	Lab Control passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	GH_ERC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	LC_LCDSSLSS passed cell yield	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	LC_SLC passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	CM_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	EV_MC2 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	EV_HC1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	LC_DCDS passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	LC_LC3 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	LC_LC5 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	FR_FRCP1 passed cell yield	1
15-2293-4219	Cell Yield	Equal Variance t Two-Sample Test	0.5801	GH_FR1 passed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	FR_UFR1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	EV_HC1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	FR_FRABCH failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	CM_MC1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	LC_DCDS failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	LC_LCDSSLSS failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	LC_SLC failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	Lab Control failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	LC_LC5 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	LC_LC3 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	GH_ER2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	CM_MC2 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	FR_FRCP1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	GH_ERC failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	GH_FR1 failed cell yield	1
16-7245-7401	Cell Yield	Equal Variance t Two-Sample Test	0.0245	EV_MC2 failed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	EV_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	EV_HC1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	LC_LC3 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	GH_FR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	LC_SLC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	FR_UFR1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	GH_ERC passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	Lab Control passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	FR_FRCP1 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	CM_MC2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	LC_LC5 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	GH_ER2 passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	LC_LCDSSLSS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	FR_FRABCH passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	LC_DCDS passed cell yield	1
18-3881-8706	Cell Yield	Equal Variance t Two-Sample Test	0.2347	CM_MC1 passed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRABCH failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	Lab Control failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_SLC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_HC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_FR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ER2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_UFR1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC1 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	GH_ERC failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	CM_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	EV_MC2 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	FR_FRCP1 failed cell yield	1

Analyst: MD QA: June 18/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_DCDS failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC5 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LC3 failed cell yield	1
20-6200-7102	Cell Yield	Equal Variance t Two-Sample Test	<1.0E-37	LC_LCDSSLSS failed cell yield	1

Cell Yield Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	N	8	34.38	31.89	36.86	30	38	1.051	2.973	8.65%	0.00%
FR_UFR1		8	113.8	107.4	120.1	100	124	2.684	7.592	6.67%	-230.91%
GH_ER2		8	111.5	105.8	117.2	101	124	2.42	6.845	6.14%	-224.36%
CM_MC1		8	123	117.9	128.1	116	134	2.163	6.118	4.97%	-257.82%
LC_SLC	XC	8	121.2	113.7	128.8	109	133	3.178	8.988	7.41%	-252.73%
FR_FRABCH		4	120.2	112.1	128.4	115	126	2.562	5.123	4.26%	-249.82%
FR_FRCP1		4	107.5	91.77	123.2	94	117	4.941	9.883	9.19%	-212.73%
GH_FR1		4	120.5	107.1	133.9	111	129	4.213	8.426	6.99%	-250.55%
GH_ERC		4	120	109.4	130.6	111	127	3.342	6.683	5.57%	-249.09%
CM_MC2		4	113.5	93.1	133.9	102	129	6.41	12.82	11.29%	-230.18%
EV_MC2		4	105.2	89.75	120.8	97	119	4.871	9.743	9.26%	-206.18%
EV_HC1		4	134	125.9	142.1	129	141	2.55	5.099	3.81%	-289.82%
LC_DCDS		4	112	100.4	123.6	104	120	3.651	7.303	6.52%	-225.82%
LC_LC3		4	113.8	95.64	131.9	102	124	5.692	11.38	10.01%	-230.91%
LC_LC5		4	104.2	91.56	116.9	97	113	3.987	7.974	7.65%	-203.27%
LC_LCDSSLSS		4	110.8	106.6	114.9	107	113	1.315	2.63	2.37%	-222.18%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	N	35	30	36	32	31	38	36	37
FR_UFR1		110	108	100	116	120	118	114	124
GH_ER2		101	109	110	124	111	117	107	113
CM_MC1		118	125	129	122	134	116	122	118
LC_SLC	XC	110	131	133	120	123	127	117	109
FR_FRABCH		117	126	115	123				
FR_FRCP1		107	117	94	112				
GH_FR1		126	129	111	116				
GH_ERC		120	122	111	127				
CM_MC2		119	129	104	102				
EV_MC2		119	97	105	100				
EV_HC1		134	132	129	141				
LC_DCDS		108	116	104	120				
LC_LC3		124	123	102	106				
LC_LC5		97	109	98	113				
LC_LCDSSLSS		113	111	107	112				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	20-6200-7102	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 15:05	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	10-7994-3277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	10 May-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	13 May-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	16-1243-0961	10 May-19	10 May-19	8h	Teck Coal	
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	70h (1.3 °C)		
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	80h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	68h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	71h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	70h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	68h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	80h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	80h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	69h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	70h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	72h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	68h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	70h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	70h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	69h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 20-6200-7102 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:05 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 failed cell yield	9.28%
		GH_ER2 failed cell yield	9.28%
		CM_MC1 failed cell yield	9.28%
		LC_SLC failed cell yield	9.28%
		FR_FRABCH failed cell yield	9.28%
		FR_FRCP1 failed cell yield	9.28%
		GH_FR1 failed cell yield	9.28%
		GH_ERC failed cell yield	9.28%
		CM_MC2 failed cell yield	9.28%
		EV_MC2 failed cell yield	9.28%
		EV_HC1 failed cell yield	9.28%
		LC_DCDS failed cell yield	9.28%
		LC_LC3 failed cell yield	9.28%
		LC_LC5 failed cell yield	9.28%
		LC_LCDSSLSS failed cell yield	9.28%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1*	27.53	1.761	5.077	14	CDF	<1.0E-37	Significant Effect
		GH_ER2*	29.23	1.761	4.647	14	CDF	<1.0E-37	Significant Effect
		CM_MC1*	36.85	1.761	4.236	14	CDF	<1.0E-37	Significant Effect
		LC_SLC*	25.96	1.761	5.895	14	CDF	<1.0E-37	Significant Effect
		FR_FRABCH*	37.4	1.812	4.162	10	CDF	<1.0E-37	Significant Effect
		FR_FRCP1*	20.05	1.812	6.612	10	CDF	<1.0E-37	Significant Effect
		GH_FR1*	26.83	1.812	5.819	10	CDF	<1.0E-37	Significant Effect
		GH_ERC*	31.59	1.812	4.912	10	CDF	<1.0E-37	Significant Effect
		CM_MC2*	17.35	1.812	8.268	10	CDF	<1.0E-37	Significant Effect
		EV_MC2*	19.66	1.812	6.535	10	CDF	<1.0E-37	Significant Effect
		EV_HC1*	43.5	1.812	4.151	10	CDF	<1.0E-37	Significant Effect
		LC_DCDS*	26.91	1.812	5.228	10	CDF	<1.0E-37	Significant Effect
		LC_LC3*	19.31	1.812	7.451	10	CDF	<1.0E-37	Significant Effect
		LC_LC5*	22.7	1.812	5.579	10	CDF	<1.0E-37	Significant Effect
		LC_LCDSSLSS*	43.39	1.812	3.19	10	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.9049	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	51871.9	3458.13	15	59.45	<1.0E-37	Significant Effect
Error	3955.62	58.171	68			
Total	55827.6		83			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	16.77	30.58	0.3330	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9878	0.9596	0.6184	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 20-6200-7102 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:05 **Analysis:** Parametric-Two Sample **Status Level:** 1

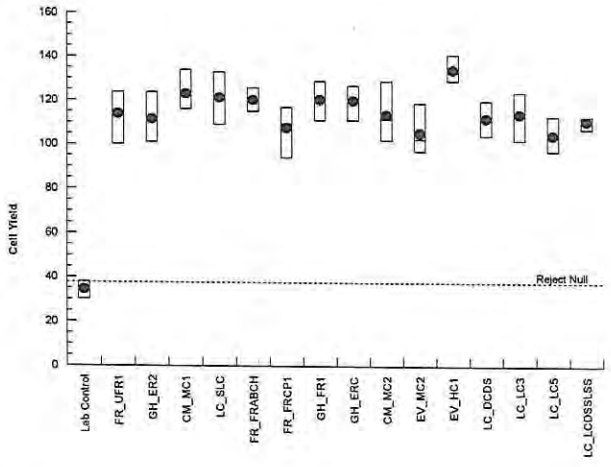
Cell Yield Summary

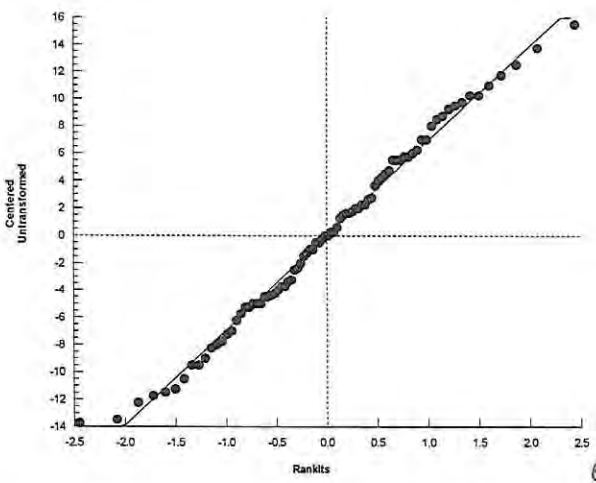
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	N	8	34.38	31.89	36.86	35.5	30	38	1.051	8.65%	0.00%
FR_UFR1		8	113.8	107.4	120.1	115	100	124	2.684	6.67%	-230.91%
GH_ER2		8	111.5	105.8	117.2	110.5	101	124	2.42	6.14%	-224.36%
CM_MC1		8	123	117.9	128.1	122	116	134	2.163	4.97%	-257.82%
LC_SLC		8	121.2	113.7	128.8	121.5	109	133	3.178	7.41%	-252.73%
FR_FRABCH		4	120.2	112.1	128.4	120	115	126	2.562	4.26%	-249.82%
FR_FRCP1		4	107.5	91.77	123.2	109.5	94	117	4.941	9.19%	-212.73%
GH_FR1		4	120.5	107.1	133.9	121	111	129	4.213	6.99%	-250.55%
GH_ERC		4	120	109.4	130.6	121	111	127	3.342	5.57%	-249.09%
CM_MC2		4	113.5	93.1	133.9	111.5	102	129	6.41	11.29%	-230.18%
EV_MC2		4	105.2	89.75	120.8	102.5	97	119	4.871	9.26%	-206.18%
EV_HC1		4	134	125.9	142.1	133	129	141	2.55	3.81%	-289.82%
LC_DCDS		4	112	100.4	123.6	112	104	120	3.651	6.52%	-225.82%
LC_LC3		4	113.8	95.64	131.9	114.5	102	124	5.692	10.01%	-230.91%
LC_LC5		4	104.2	91.56	116.9	103.5	97	113	3.987	7.65%	-203.27%
LC_LCDSSLSS		4	110.8	106.6	114.9	111.5	107	113	1.315	2.37%	-222.18%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	N	35	30	36	32	31	38	36	37
FR_UFR1		110	108	100	116	120	118	114	124
GH_ER2		101	109	110	124	111	117	107	113
CM_MC1		118	125	129	122	134	116	122	118
LC_SLC		110	131	133	120	123	127	117	109
FR_FRABCH		117	126	115	123				
FR_FRCP1		107	117	94	112				
GH_FR1		126	129	111	116				
GH_ERC		120	122	111	127				
CM_MC2		119	129	104	102				
EV_MC2		119	97	105	100				
EV_HC1		134	132	129	141				
LC_DCDS		108	116	104	120				
LC_LC3		124	123	102	106				
LC_LC5		97	109	98	113				
LC_LCDSSLSS		113	111	107	112				

Graphics





Analyst: MD QA: June 17/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	18-3881-8706	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 15:04	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	10-7994-3277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	10 May-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	13 May-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	70h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	80h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	68h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	71h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	70h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	68h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	80h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	80h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	69h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	70h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	72h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	68h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	70h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	70h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	69h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

June 17/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 18-3881-8706 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:04 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed cell yield	6.36%
		CM_MC1 passed cell yield	6.36%
		LC_SLC passed cell yield	6.36%
		FR_FRABCH passed cell yield	6.36%
		FR_FRCP1 passed cell yield	6.36%
		GH_FR1 passed cell yield	6.36%
		GH_ERC passed cell yield	6.36%
		CM_MC2 passed cell yield	6.36%
		EV_MC2 passed cell yield	6.36%
		EV_HC1 passed cell yield	6.36%
		LC_DCDS passed cell yield	6.36%
		LC_LC3 passed cell yield	6.36%
		LC_LC5 failed cell yield	6.36%
		LC_LCDSSLSS passed cell yield	6.36%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2	0.6225	1.761	6.366	14	CDF	0.2718	Non-Significant Effect
FR-UPR1		CM_MC1	-2.683	1.761	6.072	14	CDF	0.9911	Non-Significant Effect
		LC_SLC	-1.803	1.761	7.327	14	CDF	0.9535	Non-Significant Effect
		FR_FRABCH	-1.528	1.812	7.708	10	CDF	0.9213	Non-Significant Effect
		FR_FRCP1	1.223	1.812	9.263	10	CDF	0.1247	Non-Significant Effect
		GH_FR1	-1.404	1.812	8.715	10	CDF	0.9047	Non-Significant Effect
		GH_ERC	-1.392	1.812	8.137	10	CDF	0.9030	Non-Significant Effect
		CM_MC2	0.04312	1.812	10.51	10	CDF	0.4832	Non-Significant Effect
		EV_MC2	1.673	1.812	9.208	10	CDF	0.0626	Non-Significant Effect
		EV_HC1	-4.766	1.812	7.702	10	CDF	0.9996	Non-Significant Effect
		LC_DCDS	0.3807	1.812	8.332	10	CDF	0.3557	Non-Significant Effect
		LC_LC3	0	1.812	9.879	10	CDF	0.5000	Non-Significant Effect
		LC_LC5*	2.012	1.812	8.556	10	CDF	0.0359	Significant Effect
		LC_LCDSSLSS	0.7521	1.812	7.229	10	CDF	0.2347	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.1087	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3849.03	274.93	14	4.307	3.1E-05	Significant Effect
Error	3893.75	63.832	61			
Total	7742.78		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.876	29.14	0.7712	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9822	0.9559	0.3656	Normal Distribution

Analyst: WG QA: June 17/19

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID: 18-3881-8706 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:04 **Analysis:** Parametric-Two Sample **Status Level:** 1

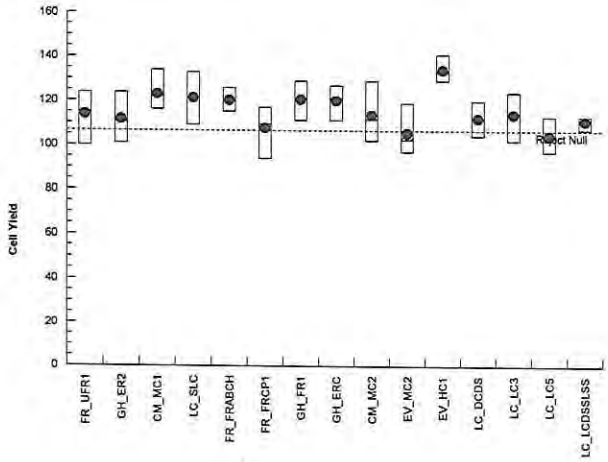
Cell Yield Summary

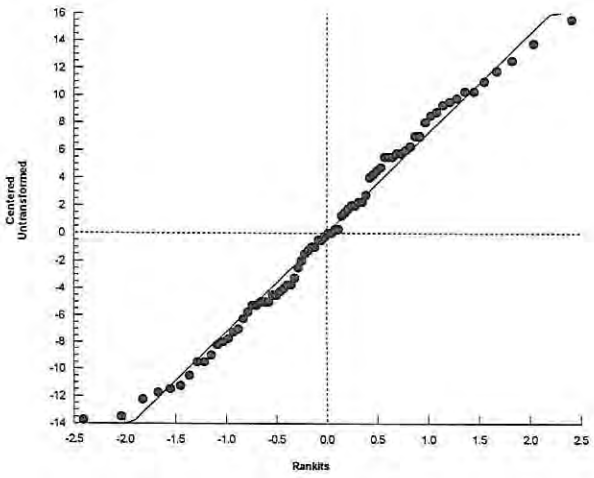
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	8	113.8	107.4	120.1	115	100	124	2.684	6.67%	0.00%
GH_ER2		8	111.5	105.8	117.2	110.5	101	124	2.42	6.14%	1.98%
CM_MC1		8	123	117.9	128.1	122	116	134	2.163	4.97%	-8.13%
LC_SLC		8	121.2	113.7	128.8	121.5	109	133	3.178	7.41%	-6.59%
FR_FRABCH		4	120.2	112.1	128.4	120	115	126	2.562	4.26%	-5.71%
FR_FRCP1		4	107.5	91.77	123.2	109.5	94	117	4.941	9.19%	5.49%
GH_FR1		4	120.5	107.1	133.9	121	111	129	4.213	6.99%	-5.93%
GH_ERC		4	120	109.4	130.6	121	111	127	3.342	5.57%	-5.49%
CM_MC2		4	113.5	93.1	133.9	111.5	102	129	6.41	11.29%	0.22%
EV_MC2		4	105.2	89.75	120.8	102.5	97	119	4.871	9.26%	7.47%
EV_HC1		4	134	125.9	142.1	133	129	141	2.55	3.81%	-17.80%
LC_DCDS		4	112	100.4	123.6	112	104	120	3.651	6.52%	1.54%
LC_LC3		4	113.8	95.64	131.9	114.5	102	124	5.692	10.01%	0.00%
LC_LC5		4	104.2	91.56	116.9	103.5	97	113	3.987	7.65%	8.35%
LC_LCDSSLSS		4	110.8	106.6	114.9	111.5	107	113	1.315	2.37%	2.64%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	XC	110	108	100	116	120	118	114	124
GH_ER2		101	109	110	124	111	117	107	113
CM_MC1		118	125	129	122	134	116	122	118
LC_SLC		110	131	133	120	123	127	117	109
FR_FRABCH		117	126	115	123				
FR_FRCP1		107	117	94	112				
GH_FR1		126	129	111	116				
GH_ERC		120	122	111	127				
CM_MC2		119	129	104	102				
EV_MC2		119	97	105	100				
EV_HC1		134	132	129	141				
LC_DCDS		108	116	104	120				
LC_LC3		124	123	102	106				
LC_LC5		97	109	98	113				
LC_LCDSSLSS		113	111	107	112				

Graphics





June 17/19

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	04-5347-4771	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 15:04	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	10-7994-3277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	10 May-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	13 May-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	70h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	80h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	68h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	71h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	70h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	68h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	80h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	80h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	69h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	70h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	72h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	68h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	70h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	70h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	69h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID: 04-5347-4771 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:04 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp
Untransformed	C < T

Comparison Result	PMSD
GH_ER2 passed cell yield	6.36%
CM_MC1 failed cell yield	6.36%
LC_SLC failed cell yield	6.36%
FR_FRABCH passed cell yield	6.36%
FR_FRCP1 passed cell yield	6.36%
GH_FR1 passed cell yield	6.36%
GH_ERC passed cell yield	6.36%
CM_MC2 passed cell yield	6.36%
EV_MC2 passed cell yield	6.36%
EV_HC1 failed cell yield	6.36%
LC_DCDS passed cell yield	6.36%
LC_LC3 passed cell yield	6.36%
LC_LC5 passed cell yield	6.36%
LC_LCDSSLSS passed cell yield	6.36%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2	-0.6225	1.761	6.366	14	CDF	0.7282	Non-Significant Effect
FR_UFC1		CM_MC1*	2.683	1.761	6.072	14	CDF	0.0089	Significant Effect
		LC_SLC*	1.803	1.761	7.327	14	CDF	0.0465	Significant Effect
		FR_FRABCH	1.528	1.812	7.708	10	CDF	0.0787	Non-Significant Effect
		FR_FRCP1	-1.223	1.812	9.263	10	CDF	0.8753	Non-Significant Effect
		GH_FR1	1.404	1.812	8.715	10	CDF	0.0953	Non-Significant Effect
		GH_ERC	1.392	1.812	8.137	10	CDF	0.0970	Non-Significant Effect
		CM_MC2	-0.04312	1.812	10.51	10	CDF	0.5168	Non-Significant Effect
		EV_MC2	-1.673	1.812	9.208	10	CDF	0.9374	Non-Significant Effect
		EV_HC1*	4.766	1.812	7.702	10	CDF	3.8E-04	Significant Effect
		LC_DCDS	-0.3807	1.812	8.332	10	CDF	0.6443	Non-Significant Effect
		LC_LC3	0	1.812	9.879	10	CDF	0.5000	Non-Significant Effect
		LC_LC5	-2.012	1.812	8.556	10	CDF	0.9641	Non-Significant Effect
		LC_LCDSSLSS	-0.7521	1.812	7.229	10	CDF	0.7653	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.1087	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3849.03	274.93	14	4.307	3.1E-05	Significant Effect
Error	3893.75	63.832	61			
Total	7742.78		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.876	29.14	0.7712	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9822	0.9559	0.3656	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 04-5347-4771 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:04 **Analysis:** Parametric-Two Sample **Status Level:** 1

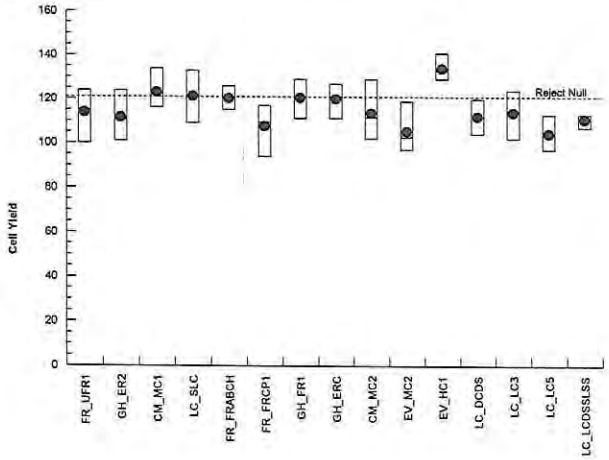
Cell Yield Summary

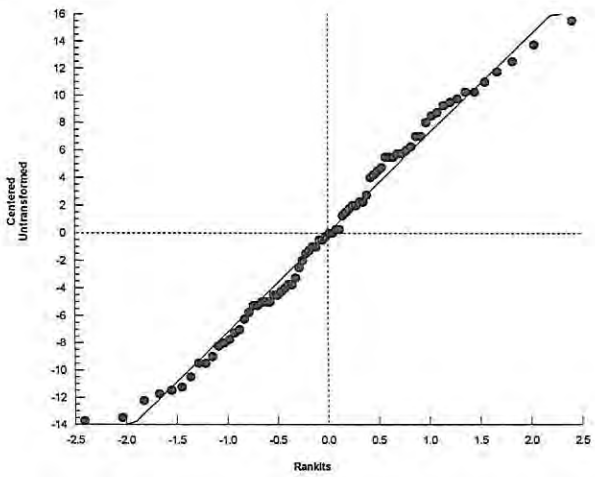
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	8	113.8	107.4	120.1	115	100	124	2.684	6.67%	0.00%
GH_ER2		8	111.5	105.8	117.2	110.5	101	124	2.42	6.14%	1.98%
CM_MC1		8	123	117.9	128.1	122	116	134	2.163	4.97%	-8.13%
LC_SLC		8	121.2	113.7	128.8	121.5	109	133	3.178	7.41%	-6.59%
FR_FRABCH		4	120.2	112.1	128.4	120	115	126	2.562	4.26%	-5.71%
FR_FRCP1		4	107.5	91.77	123.2	109.5	94	117	4.941	9.19%	5.49%
GH_FR1		4	120.5	107.1	133.9	121	111	129	4.213	6.99%	-5.93%
GH_ERC		4	120	109.4	130.6	121	111	127	3.342	5.57%	-5.49%
CM_MC2		4	113.5	93.1	133.9	111.5	102	129	6.41	11.29%	0.22%
EV_MC2		4	105.2	89.75	120.8	102.5	97	119	4.871	9.26%	7.47%
EV_HC1		4	134	125.9	142.1	133	129	141	2.55	3.81%	-17.80%
LC_DCDS		4	112	100.4	123.6	112	104	120	3.651	6.52%	1.54%
LC_LC3		4	113.8	95.64	131.9	114.5	102	124	5.692	10.01%	0.00%
LC_LC5		4	104.2	91.56	116.9	103.5	97	113	3.987	7.65%	8.35%
LC_LCDSSLSS		4	110.8	106.6	114.9	111.5	107	113	1.315	2.37%	2.64%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	XC	110	108	100	116	120	118	114	124
GH_ER2		101	109	110	124	111	117	107	113
CM_MC1		118	125	129	122	134	116	122	118
LC_SLC		110	131	133	120	123	127	117	109
FR_FRABCH		117	126	115	123				
FR_FRCP1		107	117	94	112				
GH_FR1		126	129	111	116				
GH_ERC		120	122	111	127				
CM_MC2		119	129	104	102				
EV_MC2		119	97	105	100				
EV_HC1		134	132	129	141				
LC_DCDS		108	116	104	120				
LC_LC3		124	123	102	106				
LC_LC5		97	109	98	113				
LC_LCDSSLSS		113	111	107	112				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	03-3416-5852	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 15:05	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	10-7994-3277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	10 May-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	13 May-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	70h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	80h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	68h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	71h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	70h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	68h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	80h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	80h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	69h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	70h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	72h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	68h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	70h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	70h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	69h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Analyst: MC June 17/19 QA:

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 03-3416-5852 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:05 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed cell yield	5.88%
		CM_MC1 passed cell yield	5.88%
		LC_SLC passed cell yield	5.88%
		FR_FRABCH passed cell yield	5.88%
		FR_FRCP1 passed cell yield	5.88%
		GH_FR1 passed cell yield	5.88%
		GH_ERC passed cell yield	5.88%
		CM_MC2 passed cell yield	5.88%
		EV_MC2 passed cell yield	5.88%
		EV_HC1 passed cell yield	5.88%
		LC_DCDS passed cell yield	5.88%
		LC_LC3 passed cell yield	5.88%
		LC_LC5 passed cell yield	5.88%
		LC_LCDSSLSS passed cell yield	5.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-0.6225	1.761	6.366	14	CDF	0.7282	Non-Significant Effect
GH_ERC		CM_MC1	-3.543	1.761	5.717	14	CDF	0.9984	Non-Significant Effect
		LC_SLC	-2.441	1.761	7.035	14	CDF	0.9857	Non-Significant Effect
		FR_FRABCH	-2.24	1.812	7.079	10	CDF	0.9755	Non-Significant Effect
		FR_FRCP1	0.8289	1.812	8.746	10	CDF	0.2133	Non-Significant Effect
		GH_FR1	-1.998	1.812	8.164	10	CDF	0.9632	Non-Significant Effect
		GH_ERC	-2.042	1.812	7.544	10	CDF	0.9658	Non-Significant Effect
		CM_MC2	-0.3604	1.812	10.06	10	CDF	0.6370	Non-Significant Effect
		EV_MC2	1.304	1.812	8.688	10	CDF	0.1108	Non-Significant Effect
		EV_HC1	-5.766	1.812	7.072	10	CDF	0.9999	Non-Significant Effect
		LC_DCDS	-0.1169	1.812	7.753	10	CDF	0.5454	Non-Significant Effect
		LC_LC3	-0.434	1.812	9.397	10	CDF	0.6632	Non-Significant Effect
		LC_LC5	1.644	1.812	7.994	10	CDF	0.0656	Non-Significant Effect
		LC_LCDSSLSS	0.2074	1.812	6.555	10	CDF	0.4199	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.2751	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3849.03	274.93	14	4.307	3.1E-05	Significant Effect
Error	3893.75	63.832	61			
Total	7742.78		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.876	29.14	0.7712	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9822	0.9559	0.3656	Normal Distribution

June 17/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 03-3416-5852 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:05 **Analysis:** Parametric-Two Sample **Status Level:** 1

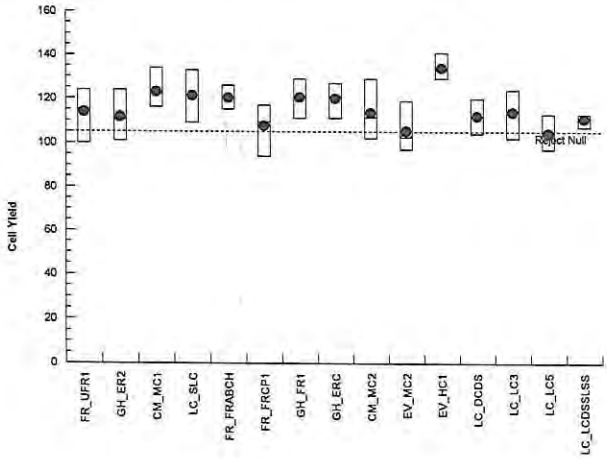
Cell Yield Summary

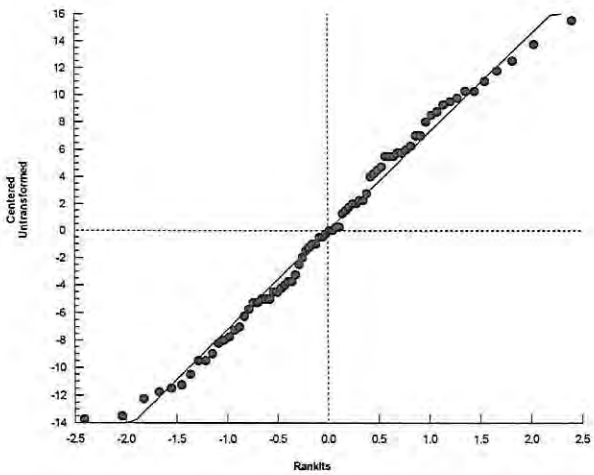
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	113.8	107.4	120.1	115	100	124	2.684	6.67%	0.00%
GH_ER2	XC	8	111.5	105.8	117.2	110.5	101	124	2.42	6.14%	1.98%
CM_MC1		8	123	117.9	128.1	122	116	134	2.163	4.97%	-8.13%
LC_SLC		8	121.2	113.7	128.8	121.5	109	133	3.178	7.41%	-6.59%
FR_FRABCH		4	120.2	112.1	128.4	120	115	126	2.562	4.26%	-5.71%
FR_FRCP1		4	107.5	91.77	123.2	109.5	94	117	4.941	9.19%	5.49%
GH_FR1		4	120.5	107.1	133.9	121	111	129	4.213	6.99%	-5.93%
GH_ERC		4	120	109.4	130.6	121	111	127	3.342	5.57%	-5.49%
CM_MC2		4	113.5	93.1	133.9	111.5	102	129	6.41	11.29%	0.22%
EV_MC2		4	105.2	89.75	120.8	102.5	97	119	4.871	9.26%	7.47%
EV_HC1		4	134	125.9	142.1	133	129	141	2.55	3.81%	-17.80%
LC_DCDS		4	112	100.4	123.6	112	104	120	3.651	6.52%	1.54%
LC_LC3		4	113.8	95.64	131.9	114.5	102	124	5.692	10.01%	0.00%
LC_LC5		4	104.2	91.56	116.9	103.5	97	113	3.987	7.65%	8.35%
LC_LCDSSLSS		4	110.8	106.6	114.9	111.5	107	113	1.315	2.37%	2.64%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		110	108	100	116	120	118	114	124
GH_ER2	XC	101	109	110	124	111	117	107	113
CM_MC1		118	125	129	122	134	116	122	118
LC_SLC		110	131	133	120	123	127	117	109
FR_FRABCH		117	126	115	123				
FR_FRCP1		107	117	94	112				
GH_FR1		126	129	111	116				
GH_ERC		120	122	111	127				
CM_MC2		119	129	104	102				
EV_MC2		119	97	105	100				
EV_HC1		134	132	129	141				
LC_DCDS		108	116	104	120				
LC_LC3		124	123	102	106				
LC_LC5		97	109	98	113				
LC_LCDSSLSS		113	111	107	112				

Graphics





June 17/19

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	15-2293-4219	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 15:05	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	10-7994-3277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	10 May-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	13 May-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	70h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	80h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	68h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	71h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	70h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	68h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	80h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	80h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	69h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	70h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	72h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	68h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	70h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	70h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	69h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 15-2293-4219 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:05 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 passed cell yield	5.88%
		CM_MC1 failed cell yield	5.88%
		LC_SLC failed cell yield	5.88%
		FR_FRABCH failed cell yield	5.88%
		FR_FRCP1 passed cell yield	5.88%
		GH_FR1 failed cell yield	5.88%
		GH_ERC failed cell yield	5.88%
		CM_MC2 passed cell yield	5.88%
		EV_MC2 passed cell yield	5.88%
		EV_HC1 failed cell yield	5.88%
		LC_DCDS passed cell yield	5.88%
		LC_LC3 passed cell yield	5.88%
		LC_LC5 passed cell yield	5.88%
		LC_LCDSSLSS passed cell yield	5.88%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	0.6225	1.761	6.366	14	CDF	0.2718	Non-Significant Effect
GH-ER2		CM_MC1*	3.543	1.761	5.717	14	CDF	0.0016	Significant Effect
		LC_SLC*	2.441	1.761	7.035	14	CDF	0.0143	Significant Effect
		FR_FRABCH*	2.24	1.812	7.079	10	CDF	0.0245	Significant Effect
		FR_FRCP1	-0.8289	1.812	8.746	10	CDF	0.7867	Non-Significant Effect
		GH_FR1*	1.998	1.812	8.164	10	CDF	0.0368	Significant Effect
		GH_ERC*	2.042	1.812	7.544	10	CDF	0.0342	Significant Effect
		CM_MC2	0.3604	1.812	10.06	10	CDF	0.3630	Non-Significant Effect
		EV_MC2	-1.304	1.812	8.688	10	CDF	0.8892	Non-Significant Effect
		EV_HC1*	5.766	1.812	7.072	10	CDF	9.1E-05	Significant Effect
		LC_DCDS	0.1169	1.812	7.753	10	CDF	0.4546	Non-Significant Effect
		LC_LC3	0.434	1.812	9.397	10	CDF	0.3368	Non-Significant Effect
		LC_LC5	-1.644	1.812	7.994	10	CDF	0.9344	Non-Significant Effect
		LC_LCDSSLSS	-0.2074	1.812	6.555	10	CDF	0.5801	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.2751	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3849.03	274.93	14	4.307	3.1E-05	Significant Effect
Error	3893.75	63.832	61			
Total	7742.78		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.876	29.14	0.7712	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9822	0.9559	0.3656	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 15-2293-4219 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:05 **Analysis:** Parametric-Two Sample **Status Level:** 1

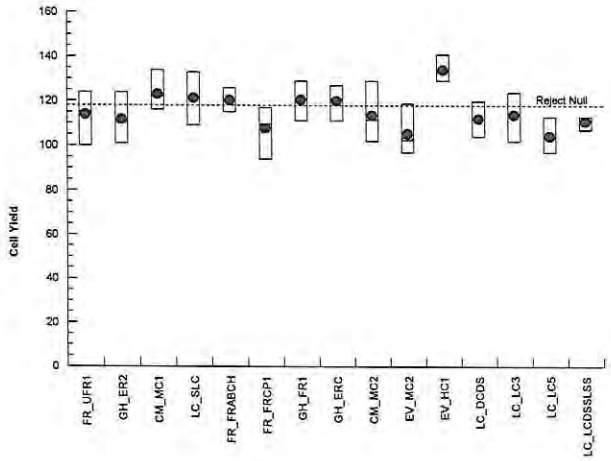
Cell Yield Summary

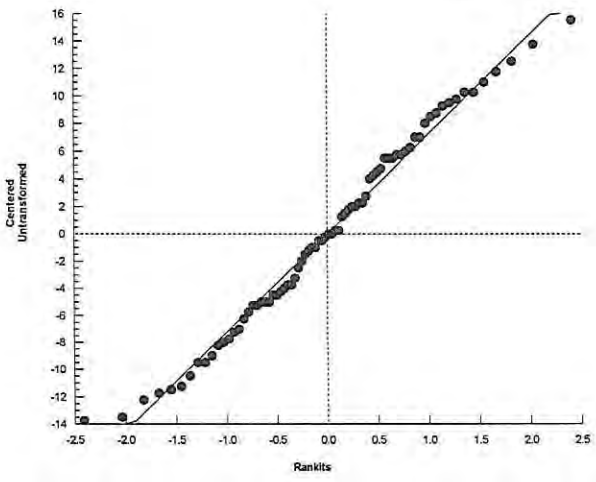
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	113.8	107.4	120.1	115	100	124	2.684	6.67%	0.00%
GH_ER2	XC	8	111.5	105.8	117.2	110.5	101	124	2.42	6.14%	1.98%
CM_MC1		8	123	117.9	128.1	122	116	134	2.163	4.97%	-8.13%
LC_SLC		8	121.2	113.7	128.8	121.5	109	133	3.178	7.41%	-6.59%
FR_FRABCH		4	120.2	112.1	128.4	120	115	126	2.562	4.26%	-5.71%
FR_FRCP1		4	107.5	91.77	123.2	109.5	94	117	4.941	9.19%	5.49%
GH_FR1		4	120.5	107.1	133.9	121	111	129	4.213	6.99%	-5.93%
GH_ERC		4	120	109.4	130.6	121	111	127	3.342	5.57%	-5.49%
CM_MC2		4	113.5	93.1	133.9	111.5	102	129	6.41	11.29%	0.22%
EV_MC2		4	105.2	89.75	120.8	102.5	97	119	4.871	9.26%	7.47%
EV_HC1		4	134	125.9	142.1	133	129	141	2.55	3.81%	-17.80%
LC_DCDS		4	112	100.4	123.6	112	104	120	3.651	6.52%	1.54%
LC_LC3		4	113.8	95.64	131.9	114.5	102	124	5.692	10.01%	0.00%
LC_LC5		4	104.2	91.56	116.9	103.5	97	113	3.987	7.65%	8.35%
LC_LCDSSLSS		4	110.8	106.6	114.9	111.5	107	113	1.315	2.37%	2.64%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		110	108	100	116	120	118	114	124
GH_ER2	XC	101	109	110	124	111	117	107	113
CM_MC1		118	125	129	122	134	116	122	118
LC_SLC		110	131	133	120	123	127	117	109
FR_FRABCH		117	126	115	123				
FR_FRCP1		107	117	94	112				
GH_FR1		126	129	111	116				
GH_ERC		120	122	111	127				
CM_MC2		119	129	104	102				
EV_MC2		119	97	105	100				
EV_HC1		134	132	129	141				
LC_DCDS		108	116	104	120				
LC_LC3		124	123	102	106				
LC_LC5		97	109	98	113				
LC_LCDSSLSS		113	111	107	112				

Graphics





EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	05-5487-3038	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 15:06	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	10-7994-3277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	10 May-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	13 May-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	70h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	80h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	68h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	71h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	70h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	68h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	80h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	80h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	69h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	70h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	72h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	68h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	70h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	70h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	69h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

June 17/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 05-5487-3038 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:06 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 failed cell yield	4.80%
		GH_ER2 failed cell yield	4.80%
		LC_SLC passed cell yield	4.80%
		FR_FRABCH passed cell yield	4.80%
		FR_FRCP1 failed cell yield	4.80%
		GH_FR1 passed cell yield	4.80%
		GH_ERC passed cell yield	4.80%
		CM_MC2 passed cell yield	4.80%
		EV_MC2 failed cell yield	4.80%
		EV_HC1 passed cell yield	4.80%
		LC_DCDS failed cell yield	4.80%
		LC_LC3 failed cell yield	4.80%
		LC_LC5 failed cell yield	4.80%
		LC_LCDSSLSS failed cell yield	4.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1*	2.683	1.761	6.072	14	CDF	0.0089	Significant Effect
CM_MC1		GH_ER2*	3.543	1.761	5.717	14	CDF	0.0016	Significant Effect
		LC_SLC	0.4552	1.761	6.771	14	CDF	0.3280	Non-Significant Effect
		FR_FRABCH	0.7693	1.812	6.479	10	CDF	0.2297	Non-Significant Effect
		FR_FRCP1*	3.398	1.812	8.269	10	CDF	0.0034	Significant Effect
		GH_FR1	0.5923	1.812	7.649	10	CDF	0.2834	Non-Significant Effect
		GH_ERC	0.7785	1.812	6.984	10	CDF	0.2272	Non-Significant Effect
		CM_MC2	1.785	1.812	9.644	10	CDF	0.0523	Non-Significant Effect
		EV_MC2*	3.92	1.812	8.207	10	CDF	0.0014	Significant Effect
		EV_HC1	-3.081	1.812	6.472	10	CDF	0.9942	Non-Significant Effect
		LC_DCDS*	2.765	1.812	7.21	10	CDF	0.0100	Significant Effect
		LC_LC3*	1.872	1.812	8.953	10	CDF	0.0453	Significant Effect
		LC_LC5*	4.55	1.812	7.468	10	CDF	5.3E-04	Significant Effect
		LC_LCDSSLSS*	3.762	1.812	5.902	10	CDF	0.0019	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.5540	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3849.03	274.93	14	4.307	3.1E-05	Significant Effect
Error	3893.75	63.832	61			
Total	7742.78		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.876	29.14	0.7712	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9822	0.9559	0.3656	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 05-5487-3038 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:06 **Analysis:** Parametric-Two Sample **Status Level:** 1

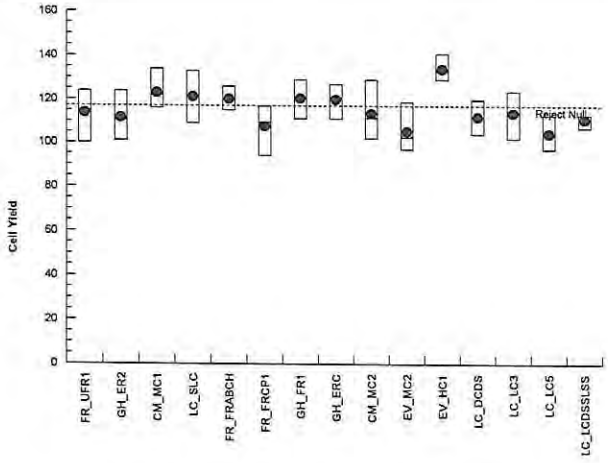
Cell Yield Summary

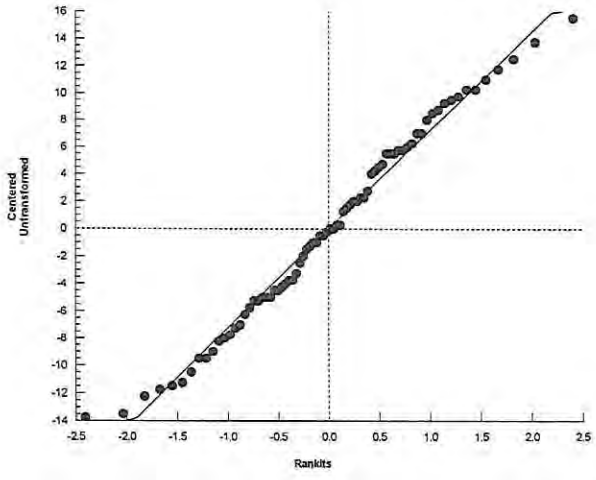
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	113.8	107.4	120.1	115	100	124	2.684	6.67%	0.00%
GH_ER2		8	111.5	105.8	117.2	110.5	101	124	2.42	6.14%	1.98%
CM_MC1	XC	8	123	117.9	128.1	122	116	134	2.163	4.97%	-8.13%
LC_SLC		8	121.2	113.7	128.8	121.5	109	133	3.178	7.41%	-6.59%
FR_FRABCH		4	120.2	112.1	128.4	120	115	126	2.562	4.26%	-5.71%
FR_FRCP1		4	107.5	91.77	123.2	109.5	94	117	4.941	9.19%	5.49%
GH_FR1		4	120.5	107.1	133.9	121	111	129	4.213	6.99%	-5.93%
GH_ERC		4	120	109.4	130.6	121	111	127	3.342	5.57%	-5.49%
CM_MC2		4	113.5	93.1	133.9	111.5	102	129	6.41	11.29%	0.22%
EV_MC2		4	105.2	89.75	120.8	102.5	97	119	4.871	9.26%	7.47%
EV_HC1		4	134	125.9	142.1	133	129	141	2.55	3.81%	-17.80%
LC_DCDS		4	112	100.4	123.6	112	104	120	3.651	6.52%	1.54%
LC_LC3		4	113.8	95.64	131.9	114.5	102	124	5.692	10.01%	0.00%
LC_LC5		4	104.2	91.56	116.9	103.5	97	113	3.987	7.65%	8.35%
LC_LCDSSLSS		4	110.8	106.6	114.9	111.5	107	113	1.315	2.37%	2.64%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		110	108	100	116	120	118	114	124
GH_ER2		101	109	110	124	111	117	107	113
CM_MC1	XC	118	125	129	122	134	116	122	118
LC_SLC		110	131	133	120	123	127	117	109
FR_FRABCH		117	126	115	123				
FR_FRCP1		107	117	94	112				
GH_FR1		126	129	111	116				
GH_ERC		120	122	111	127				
CM_MC2		119	129	104	102				
EV_MC2		119	97	105	100				
EV_HC1		134	132	129	141				
LC_DCDS		108	116	104	120				
LC_LC3		124	123	102	106				
LC_LC5		97	109	98	113				
LC_LCDSSLSS		113	111	107	112				

Graphics





June 17/19

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	14-4318-9405	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 15:06	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	10-7994-3277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	10 May-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	13 May-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	70h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	80h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	68h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	71h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	70h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	68h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	80h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	80h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	69h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	70h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	72h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	68h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	70h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	70h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	69h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

June 17/19

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 14-4318-9405 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:06 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 passed cell yield	4.80%
		GH_ER2 passed cell yield	4.80%
		LC_SLC passed cell yield	4.80%
		FR_FRABCH passed cell yield	4.80%
		FR_FRCP1 passed cell yield	4.80%
		GH_FR1 passed cell yield	4.80%
		GH_ERC passed cell yield	4.80%
		CM_MC2 passed cell yield	4.80%
		EV_MC2 passed cell yield	4.80%
		EV_HC1 failed cell yield	4.80%
		LC_DCDS passed cell yield	4.80%
		LC_LC3 passed cell yield	4.80%
		LC_LC5 passed cell yield	4.80%
		LC_LCDSSLSS passed cell yield	4.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-2.683	1.761	6.072	14	CDF	0.9911	Non-Significant Effect
CMMC1		GH_ER2	-3.543	1.761	5.717	14	CDF	0.9984	Non-Significant Effect
		LC_SLC	-0.4552	1.761	6.771	14	CDF	0.6720	Non-Significant Effect
		FR_FRABCH	-0.7693	1.812	6.479	10	CDF	0.7703	Non-Significant Effect
		FR_FRCP1	-3.398	1.812	8.269	10	CDF	0.9966	Non-Significant Effect
		GH_FR1	-0.5923	1.812	7.649	10	CDF	0.7166	Non-Significant Effect
		GH_ERC	-0.7785	1.812	6.984	10	CDF	0.7728	Non-Significant Effect
		CM_MC2	-1.785	1.812	9.644	10	CDF	0.9477	Non-Significant Effect
		EV_MC2	-3.92	1.812	8.207	10	CDF	0.9986	Non-Significant Effect
		EV_HC1*	3.081	1.812	6.472	10	CDF	0.0058	Significant Effect
		LC_DCDS	-2.765	1.812	7.21	10	CDF	0.9900	Non-Significant Effect
		LC_LC3	-1.872	1.812	8.953	10	CDF	0.9547	Non-Significant Effect
		LC_LC5	-4.55	1.812	7.468	10	CDF	0.9995	Non-Significant Effect
		LC_LCDSSLSS	-3.762	1.812	5.902	10	CDF	0.9981	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.5540	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3849.03	274.93	14	4.307	3.1E-05	Significant Effect
Error	3893.75	63.832	61			
Total	7742.78		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.876	29.14	0.7712	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9822	0.9559	0.3656	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 14-4318-9405 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:06 **Analysis:** Parametric-Two Sample **Status Level:** 1

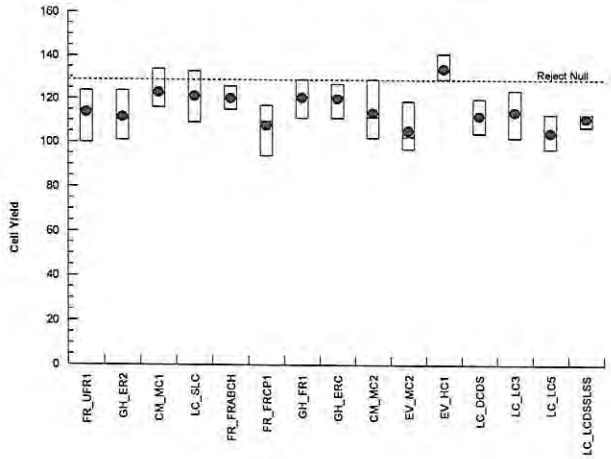
Cell Yield Summary

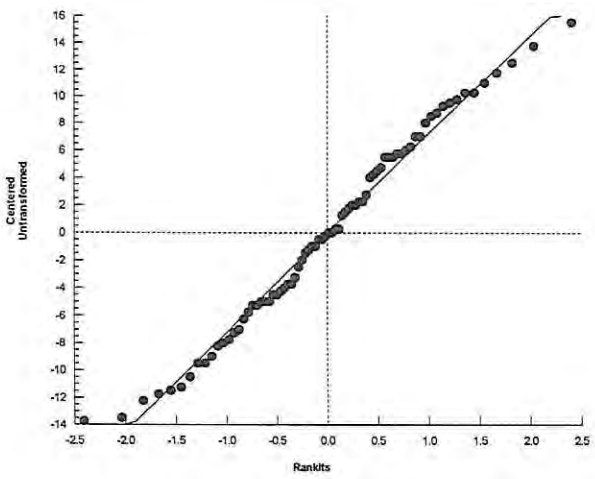
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	113.8	107.4	120.1	115	100	124	2.684	6.67%	0.00%
GH_ER2		8	111.5	105.8	117.2	110.5	101	124	2.42	6.14%	1.98%
CM_MC1	XC	8	123	117.9	128.1	122	116	134	2.163	4.97%	-8.13%
LC_SLC		8	121.2	113.7	128.8	121.5	109	133	3.178	7.41%	-6.59%
FR_FRABCH		4	120.2	112.1	128.4	120	115	126	2.562	4.26%	-5.71%
FR_FRCP1		4	107.5	91.77	123.2	109.5	94	117	4.941	9.19%	5.49%
GH_FR1		4	120.5	107.1	133.9	121	111	129	4.213	6.99%	-5.93%
GH_ERC		4	120	109.4	130.6	121	111	127	3.342	5.57%	-5.49%
CM_MC2		4	113.5	93.1	133.9	111.5	102	129	6.41	11.29%	0.22%
EV_MC2		4	105.2	89.75	120.8	102.5	97	119	4.871	9.26%	7.47%
EV_HC1		4	134	125.9	142.1	133	129	141	2.55	3.81%	-17.80%
LC_DCDS		4	112	100.4	123.6	112	104	120	3.651	6.52%	1.54%
LC_LC3		4	113.8	95.64	131.9	114.5	102	124	5.692	10.01%	0.00%
LC_LC5		4	104.2	91.56	116.9	103.5	97	113	3.987	7.65%	8.35%
LC_LCDSSLSS		4	110.8	106.6	114.9	111.5	107	113	1.315	2.37%	2.64%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		110	108	100	116	120	118	114	124
GH_ER2		101	109	110	124	111	117	107	113
CM_MC1	XC	118	125	129	122	134	116	122	118
LC_SLC		110	131	133	120	123	127	117	109
FR_FRABCH		117	126	115	123				
FR_FRCP1		107	117	94	112				
GH_FR1		126	129	111	116				
GH_ERC		120	122	111	127				
CM_MC2		119	129	104	102				
EV_MC2		119	97	105	100				
EV_HC1		134	132	129	141				
LC_DCDS		108	116	104	120				
LC_LC3		124	123	102	106				
LC_LC5		97	109	98	113				
LC_LCDSSLSS		113	111	107	112				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-7245-7401	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 15:07	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	10-7994-3277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	10 May-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	13 May-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	70h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	80h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	68h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	71h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	70h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	68h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	80h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	80h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	69h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	70h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	72h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	68h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	70h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	70h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	69h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Analyst: MLT QA: June 17/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 16-7245-7401 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:07 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 failed cell yield	7.01%
		GH_ER2 failed cell yield	7.01%
		CM_MC1 passed cell yield	7.01%
		FR_FRABCH passed cell yield	7.01%
		FR_FRCP1 failed cell yield	7.01%
		GH_FR1 passed cell yield	7.01%
		GH_ERC passed cell yield	7.01%
		CM_MC2 passed cell yield	7.01%
		EV_MC2 failed cell yield	7.01%
		EV_HC1 passed cell yield	7.01%
		LC_DCDS passed cell yield	7.01%
		LC_LC3 passed cell yield	7.01%
		LC_LC5 failed cell yield	7.01%
		LC_LCDSSLSS failed cell yield	7.01%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1*	1.803	1.761	7.327	14	CDF	0.0465	Significant Effect
LC_SLC		GH_ER2*	2.441	1.761	7.035	14	CDF	0.0143	Significant Effect
		CM_MC1	-0.4552	1.761	6.771	14	CDF	0.6720	Non-Significant Effect
		FR_FRABCH	0.2034	1.812	8.909	10	CDF	0.4214	Non-Significant Effect
		FR_FRCP1*	2.423	1.812	10.28	10	CDF	0.0179	Significant Effect
		GH_FR1	0.1388	1.812	9.793	10	CDF	0.4462	Non-Significant Effect
		GH_ERC	0.2441	1.812	9.283	10	CDF	0.4061	Non-Significant Effect
		CM_MC2	1.23	1.812	11.42	10	CDF	0.1234	Non-Significant Effect
		EV_MC2*	2.834	1.812	10.23	10	CDF	0.0089	Significant Effect
		EV_HC1	-2.595	1.812	8.903	10	CDF	0.9867	Non-Significant Effect
		LC_DCDS	1.773	1.812	9.454	10	CDF	0.0533	Non-Significant Effect
		LC_LC3	1.254	1.812	10.84	10	CDF	0.1192	Non-Significant Effect
		LC_LC5*	3.192	1.812	9.652	10	CDF	0.0048	Significant Effect
		LC_LCDSSLSS*	2.239	1.812	8.498	10	CDF	0.0245	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.3987	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3849.03	274.93	14	4.307	3.1E-05	Significant Effect
Error	3893.75	63.832	61			
Total	7742.78		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.876	29.14	0.7712	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9822	0.9559	0.3656	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 16-7245-7401 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:07 **Analysis:** Parametric-Two Sample **Status Level:** 1

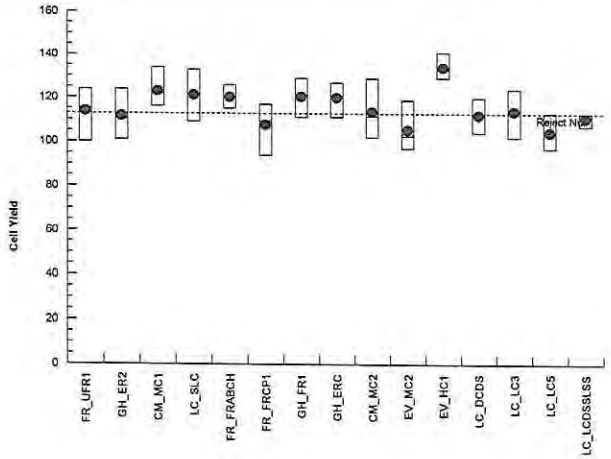
Cell Yield Summary

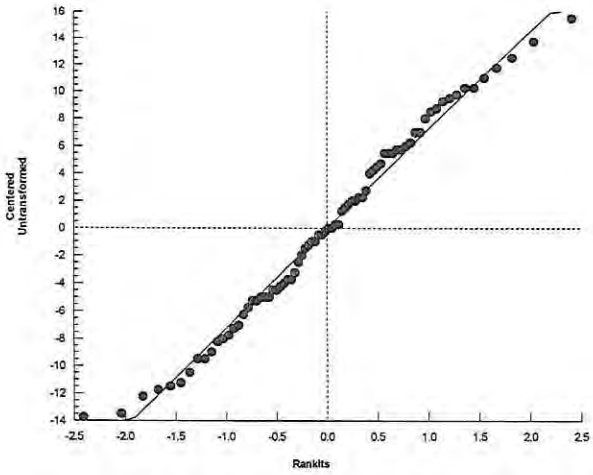
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	113.8	107.4	120.1	115	100	124	2.684	6.67%	0.00%
GH_ER2		8	111.5	105.8	117.2	110.5	101	124	2.42	6.14%	1.98%
CM_MC1		8	123	117.9	128.1	122	116	134	2.163	4.97%	-8.13%
LC_SLC	XC	8	121.2	113.7	128.8	121.5	109	133	3.178	7.41%	-6.59%
FR_FRABCH		4	120.2	112.1	128.4	120	115	126	2.562	4.26%	-5.71%
FR_FRCP1		4	107.5	91.77	123.2	109.5	94	117	4.941	9.19%	5.49%
GH_FR1		4	120.5	107.1	133.9	121	111	129	4.213	6.99%	-5.93%
GH_ERC		4	120	109.4	130.6	121	111	127	3.342	5.57%	-5.49%
CM_MC2		4	113.5	93.1	133.9	111.5	102	129	6.41	11.29%	0.22%
EV_MC2		4	105.2	89.75	120.8	102.5	97	119	4.871	9.26%	7.47%
EV_HC1		4	134	125.9	142.1	133	129	141	2.55	3.81%	-17.80%
LC_DCDS		4	112	100.4	123.6	112	104	120	3.651	6.52%	1.54%
LC_LC3		4	113.8	95.64	131.9	114.5	102	124	5.692	10.01%	0.00%
LC_LC5		4	104.2	91.56	116.9	103.5	97	113	3.987	7.65%	8.35%
LC_LCDSSLSS		4	110.8	106.6	114.9	111.5	107	113	1.315	2.37%	2.64%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		110	108	100	116	120	118	114	124
GH_ER2		101	109	110	124	111	117	107	113
CM_MC1		118	125	129	122	134	116	122	118
LC_SLC	XC	110	131	133	120	123	127	117	109
FR_FRABCH		117	126	115	123				
FR_FRCP1		107	117	94	112				
GH_FR1		126	129	111	116				
GH_ERC		120	122	111	127				
CM_MC2		119	129	104	102				
EV_MC2		119	97	105	100				
EV_HC1		134	132	129	141				
LC_DCDS		108	116	104	120				
LC_LC3		124	123	102	106				
LC_LC5		97	109	98	113				
LC_LCDSSLSS		113	111	107	112				

Graphics





CETIS Analytical Report

Test Code/ID: 190905 / 11-4614-5928

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-8193-3019	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	17 Jun-19 15:07	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	10-7994-3277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	10 May-19 07:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	13 May-19 07:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	70h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	80h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	68h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	71h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	70h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	68h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	80h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	80h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	69h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	70h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	72h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	68h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	70h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	70h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	69h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Analyst: MLJ QA: June 17/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 04-8193-3019 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:07 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 passed cell yield	7.01%
		GH_ER2 passed cell yield	7.01%
		CM_MC1 passed cell yield	7.01%
		FR_FRABCH passed cell yield	7.01%
		FR_FRCP1 passed cell yield	7.01%
		GH_FR1 passed cell yield	7.01%
		GH_ERC passed cell yield	7.01%
		CM_MC2 passed cell yield	7.01%
		EV_MC2 passed cell yield	7.01%
		EV_HC1 failed cell yield	7.01%
		LC_DCDS passed cell yield	7.01%
		LC_LC3 passed cell yield	7.01%
		LC_LC5 passed cell yield	7.01%
		LC_LCDSSLSS passed cell yield	7.01%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-1.803	1.761	7.327	14	CDF	0.9535	Non-Significant Effect
LC-SLC		GH_ER2	-2.441	1.761	7.035	14	CDF	0.9857	Non-Significant Effect
		CM_MC1	0.4552	1.761	6.771	14	CDF	0.3280	Non-Significant Effect
		FR_FRABCH	-0.2034	1.812	8.909	10	CDF	0.5786	Non-Significant Effect
		FR_FRCP1	-2.423	1.812	10.28	10	CDF	0.9821	Non-Significant Effect
		GH_FR1	-0.1388	1.812	9.793	10	CDF	0.5538	Non-Significant Effect
		GH_ERC	-0.2441	1.812	9.283	10	CDF	0.5939	Non-Significant Effect
		CM_MC2	-1.23	1.812	11.42	10	CDF	0.8766	Non-Significant Effect
		EV_MC2	-2.834	1.812	10.23	10	CDF	0.9911	Non-Significant Effect
		EV_HC1*	2.595	1.812	8.903	10	CDF	0.0133	Significant Effect
		LC_DCDS	-1.773	1.812	9.454	10	CDF	0.9467	Non-Significant Effect
		LC_LC3	-1.254	1.812	10.84	10	CDF	0.8808	Non-Significant Effect
		LC_LC5	-3.192	1.812	9.652	10	CDF	0.9952	Non-Significant Effect
		LC_LCDSSLSS	-2.239	1.812	8.498	10	CDF	0.9755	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.3987	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3849.03	274.93	14	4.307	3.1E-05	Significant Effect
Error	3893.75	63.832	61			
Total	7742.78		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.876	29.14	0.7712	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9822	0.9559	0.3656	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 04-8193-3019 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 17 Jun-19 15:07 **Analysis:** Parametric-Two Sample **Status Level:** 1

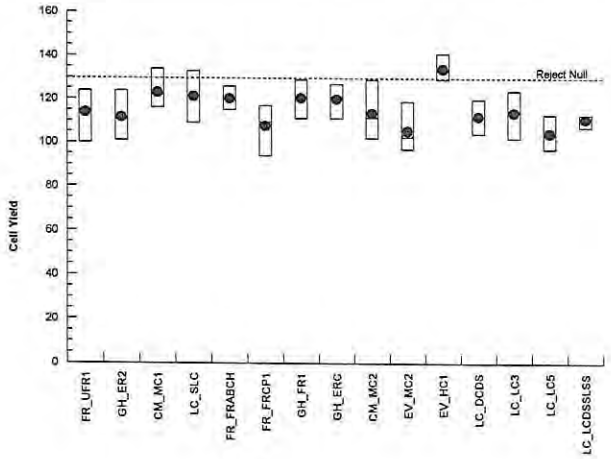
Cell Yield Summary

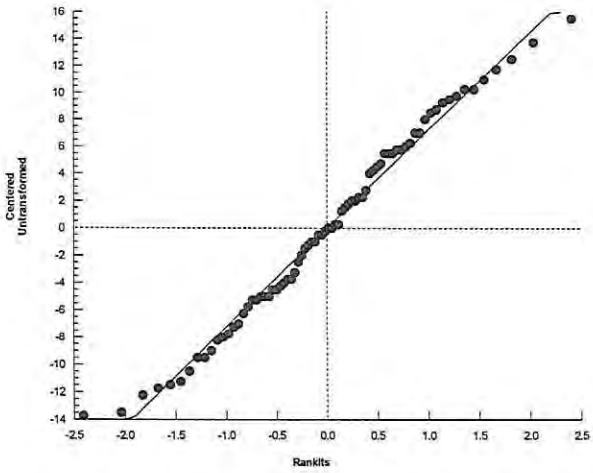
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	113.8	107.4	120.1	115	100	124	2.684	6.67%	0.00%
GH_ER2		8	111.5	105.8	117.2	110.5	101	124	2.42	6.14%	1.98%
CM_MC1		8	123	117.9	128.1	122	116	134	2.163	4.97%	-8.13%
LC_SLC	XC	8	121.2	113.7	128.8	121.5	109	133	3.178	7.41%	-6.59%
FR_FRABCH		4	120.2	112.1	128.4	120	115	126	2.562	4.26%	-5.71%
FR_FRCP1		4	107.5	91.77	123.2	109.5	94	117	4.941	9.19%	5.49%
GH_FR1		4	120.5	107.1	133.9	121	111	129	4.213	6.99%	-5.93%
GH_ERC		4	120	109.4	130.6	121	111	127	3.342	5.57%	-5.49%
CM_MC2		4	113.5	93.1	133.9	111.5	102	129	6.41	11.29%	0.22%
EV_MC2		4	105.2	89.75	120.8	102.5	97	119	4.871	9.26%	7.47%
EV_HC1		4	134	125.9	142.1	133	129	141	2.55	3.81%	-17.80%
LC_DCDS		4	112	100.4	123.6	112	104	120	3.651	6.52%	1.54%
LC_LC3		4	113.8	95.64	131.9	114.5	102	124	5.692	10.01%	0.00%
LC_LC5		4	104.2	91.56	116.9	103.5	97	113	3.987	7.65%	8.35%
LC_LCDSSLSS		4	110.8	106.6	114.9	111.5	107	113	1.315	2.37%	2.64%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		110	108	100	116	120	118	114	124
GH_ER2		101	109	110	124	111	117	107	113
CM_MC1		118	125	129	122	134	116	122	118
LC_SLC	XC	110	131	133	120	123	127	117	109
FR_FRABCH		117	126	115	123				
FR_FRCP1		107	117	94	112				
GH_FR1		126	129	111	116				
GH_ERC		120	122	111	127				
CM_MC2		119	129	104	102				
EV_MC2		119	97	105	100				
EV_HC1		134	132	129	141				
LC_DCDS		108	116	104	120				
LC_LC3		124	123	102	106				
LC_LC5		97	109	98	113				
LC_LCDSSLSS		113	111	107	112				

Graphics





APPENDIX C – *Hyalella azteca* Toxicity Test Data

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Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190908

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control Water	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5
FR_UFR1	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5
FR_FRCP1	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	23.0	22.0	22.5	22.0	22.0	22.5
FR_FRABCM	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	23.0	22.0	22.0	22.0	22.0	22.5
GM_FR1	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	23.0	22.0	22.5	22.0	22.0	22.5
GM_ERC	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5
GM_ER2	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5
CM_MC1	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5
CM_MC2	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5
CM_MIDAG1	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.5
Technician Initials	KM	MM	MM	JD	JD	JD	JD							KM

Thermometer: 6

Conductivity (µS)

(*)1019

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control Water	448	471	445	456	442	475	448	460	444	462	444	468	445	463
FR_UFR1	378	400	374	382	372	386	378	388	377	385	380	389	385	391
FR_FRCP1	1012	1033	1016	1013	1007	1017	1007	1006	991	997	991	997	992	998
FR_FRABCM	1193	1184	1195	1192	1190	1192	1181	1179	1163	1166	1152	1162	1146	1154
GM_FR1	1022	1015	1001	1010	1004	1020	1006	1011	1005	1010	1019	1015	1024	1025
GM_ERC	449	465	435	450	442	467	445	449	440	448	443	454	447	456
GM_ER2	423	436	405	416	406	419	409	415	404	414	407	416	411	422
CM_MC1	351	362	348	361	362	364	361	361	358	364	359	372	362	369
CM_MC2	826	825	819	826	825	834	823	823	825	830	826	840	834	823
CM_MIDAG1	590	607	592	602	597	604	603	599	598	601	602	610	603	604
Technician Initials	KM	MM	MM	JD	JD	JD	JD							KM

Conductivity meter: 313

Comments:

Reviewed by: [signature]

Date Reviewed: Aug 14, 2019

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Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck.
Work Order No.: 190908

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV_MC2	22.0	22.5	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	23.0	22.0	22.5	22.5
EV_HCl	22.0	22.5	22.5	22.0	22.0	22.0	22.5	22.0	23.0	22.0	23.0	22.0	22.5	22.5
LC_SLC	22.0	22.5	22.5	22.0	22.0	22.0	22.5	22.0	23.0	22.0	23.0	22.0	22.5	22.5
LC_LCDSSLCC	22.0	22.5	22.5	22.0	22.0	22.0	22.0	22.0	23.0	22.0	23.0	22.0	23.0	22.5
LC_LC3	22.0	22.5	22.5	22.0	22.5	22.0	22.0	22.0	23.0	22.0	23.0	22.0	22.5	22.5
LC_LC5	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5
LC_DCDS	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5
EDTA Control	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5
FR_FRCPi+EDTA	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5
CM_MC2+EDTA	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5
Technician Initials	KJL	MM	MM	JD	JD	JD	JD							MM

Thermometer: 6

Conductivity (µS)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV_MC2	470	494	495	487	478	474	484	484	481	486	484	496	490	493
EV_HCl	778	794	797	787	783	796	787	787	785	785	790	799	802	795
LC_SLC	439	456	438	451	445	467	447	451	445	452	448	458	453	456
LC_LCDSSLCC	902	908	900	905	909	913	908	905	908	906	912	911	920	915
LC_LC3	1102	1100	1098	1107	1103	1109	1107	1104	1107	1104	1111	1117	1120	1115
LC_LC5	882	889	880	886	885	904	888	886	886	889	888	894	892	891
LC_DCDS	558	574	552	571	559	575	566	566	561	567	563	572	568	570
EDTA Control	445	466	446	458	450	464	454	455	449	456	450	460	453	466
FR_FRCPi+EDTA	1013	1016	1014	1028	1020	1017	1017	1011	1002	1006	996	1007	1001	1017
CM_MC2+EDTA	822	824	821	826	826	837	841	832	826	827	828	833	833	829
Technician Initials	KJL	MM	MM	JD	JD	JD	JD							MM

Conductivity meter: 313 *1013

Comments:

Reviewed by: [signature] Date Reviewed: Aug 14, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190908

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RGT_MIDAG+EDTA	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5
Technician Initials	KSV	WM		JD	JD	JD	JD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	KSV

Thermometer: 6

Conductivity (µS)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RGT_MIDAG+EDTA	592	606	592	602	595	617	597	594	592	596	595	606	600	605
Technician Initials	KSV	WM	WM	JD	JD	JD	JD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	KSV

Conductivity meter: 313

Comments:

Reviewed by: [signature]

Date Reviewed: Aug. 14, 2019

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Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 190908

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control Water	22.0	23.5	22.0	22.5	22.0	~~23.5~~	22.0	23.0	22.0	22.0	22.0	22.5	23.0	23.0
FR-UFR1	23.0	23.5	22.5	22.5	22.0	23.0	23.0	23.5	22.5	22.0	22.5	23.0	23.0	23.0
FR-FRCP1	23.0	23.5	22.5	22.5	22.0	23.0	23.0	23.5	22.5	22.0	22.5	23.0	23.0	23.0
FR-FRABCH	23.0	23.5	22.5	23.0	22.0	23.5	23.0	23.5	22.5	22.0	23.0	23.0	23.0	23.0
GH-FR1	23.0	23.5	22.5	23.0	22.5	23.5	23.0	23.5	23.0	22.0	23.0	23.0	23.0	23.0
GH-ERC	23.0	23.5	22.5	23.0	22.0	23.5	23.0	23.5	23.0	22.5	23.0	23.0	23.0	23.0
GH-ER2	23.0	23.5	22.5	23.0	22.5	23.5	23.0	24.0	23.0	23.0	23.0	23.0	23.0	23.0
CM-MC1	23.0	23.5	22.5	22.5	22.5	23.5	22.5	23.5	23.0	22.0	23.0	23.0	23.0	23.0
CM-MC2	23.0	23.5	22.5	22.5	22.5	23.5	22.5	23.5	23.0	22.5	23.0	24.0	23.5	23.0
CM-MIDAG	23.0	23.5	23.5	23.0	23.0	23.5	24.0	23.5	24.0	22.5	23.0	24.0	23.5	23.0
Technician Initials	KJL	KJL	KJL	RC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Thermometer: 6

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Conductivity (µS)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control Water	446	453	443	457	447	458	448	464	448	460	448	467	447	457
FR-UFR1	257	344	321	340	325	340	326	339	329	340	330	345	328	339
FR-FRCP1	517	721	582	648	586	615	582	604	584	596	586	600	585	596
FR-FRABCH	751	902	813	835	788	810	787	812	790	797	792	802	790	794
GH-FR1	670	833	715	757	718	738	717	734	720	729	719	731	720	733
GH-ERC	359	441	430	444	430	443	432	440	433	439	432	442	430	441
GH-ER2	346	~~433~~ 399	386	395	386	397	387	396	388	395	388	402	385	400
CM-MC1	248	309	283	295	279	290	282	291	280	291	280	290	279	290
CM-MC2	501	630	576	584	553	570	557	570	557	562	556	~~594~~ ②	555	567
CM-MIDAG	380	458	410	430	411	423	411	422	412	419	411	420	410	421
Technician Initials	KJL	KJL	KJL	[illegible]	[illegible]	[illegible]	[illegible]	RC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Conductivity meter: 3/3

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Comments:

Reviewed by: [signature]

Date Reviewed: Aug. 14, 2019

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Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 190908

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV_MC2	23.0	23.0	23.5	23.0	23.5	23.5	24.0	23.5	24.0	23.0	23.0	24.0	24.0	23.0
EV_HC1	23.0	23.0	24.0	23.0	23.5	23.5	24.0	23.5	24.0	23.0	23.0	24.0	24.0	23.0
LC_SLC	23.0	23.0	24.0	23.0	23.5	23.5	24.0	23.5	24.0	22.5	23.0	24.0	24.0	23.0
LC_LCDSSLCC	23.0	23.0	24.0	23.0	23.5	23.5	24.0	23.5	24.0	23.0	23.5	24.0	24.0	23.0
LC_LC3	23.0	23.0	24.0	23.0	23.5	23.5	24.0	23.5	24.0	23.0	23.0	24.0	24.0	23.0
LC_LC5	23.0	23.0	24.0	23.0	23.5	23.5	22.5	23.5	22.5	23.0	23.0	24.0	24.0	23.0
LC_DCDS	23.0	23.0	22.5	23.0	22.5	23.5	22.5	23.5	22.5	23.0	23.0	24.0	24.0	23.0
EDTA Control	23.0	23.0	22.5	23.0	22.5	23.5	22.5	23.5	22.5	23.0	23.0	24.0	24.0	23.0
FR_FRCP1+EDTA	23.0	23.0	22.5	23.0	22.5	23.5	22.5	~~59~~ 23.5	22.5	23.0	23.0	24.0	24.0	23.0
CM_MC2+EDTA	23.0	23.0	22.5	23.0	22.5	23.5	22.5	23.5	22.5	23.0	23.0	24.0	24.0	23.0
Technician Initials	KJL	KJL	KJL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Thermometer: 6

Conductivity (µS)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV_MC2	281	381	332	351	333	345	335	347	336	345	334	348	335	~~420~~ 349
EV_HC1	482	668	530	568	531	551	533	544	537	538	535	540	537	544
LC_SLC	302	366	338	344	327	344	330	347	331	339	330	342	330	337
LC_LCDSSLCC	578	742	637	663	638	649	639	642	639	641	638	639	640	646
① 893 LC_LC3	857	960	~~[illegible]~~ ①	913	895	903	896	900	900	897	901	894	900	902
LC_LC5	630	773	666	706	667	688	671	683	673	779	671	777	679	716
LC_DCDS	501	516	480	497	485	500	486	496	487	495	486	495	484	497
EDTA Control	442	455	446	457	446	453	448	455	449	455	449	456	448	459
FR_FRCP1+EDTA	564	735	571	617	572	599	575	590	575	584	576	588	575	585
CM_MC2+EDTA	488	645	540	581	543	563	545	558	546	552	546	554	550	554
Technician Initials	KJL	KJL	KJL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Conductivity meter: 3/3

Comments:

Reviewed by: [illegible]

Date Reviewed: Aug 14, 2019

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Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 190908

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	7	8		9 ~~10~~		10		11 ~~12~~		12 ~~13~~		13 ~~14~~		14 ~~15~~
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG+EDTA	23.0	23.0	22.5	23.0	22.5	23.5	22.5	23.5	22.5	23.0	23.0	24.0	24.0	23.0
Technician Initials	KJL	KJL	KJL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Thermometer: 6

Conductivity (µS)

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG+EDTA	360	490	412	447	412	433	413	426	415	422	414	426	414	426
Technician Initials	KJL	KJL	KJL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Conductivity meter: 3/3

Comments:

Reviewed by: [signature]

Date Reviewed: Aug 14, 2019

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~~5/8~~ 11

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 190908

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control Water	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
FR_UFR1	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0
FR_FRCP1	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0
FR_FRABCH	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0
GH_FR1	22.0	22.0	23.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0
GH_ERC	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
GH_ER2	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
CM_MC1	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
CM_MC2	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
CM_MIDAG	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Technician Initials	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	MG	MG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Thermometer: 6

Conductivity (µS)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control Water	445	465	446	462	448	466	451	460	450	459	451	465	451	464
FR_UFR1	331	345	339	343	335	347	338	343	340	346	341	351	343	346
FR_FRCP1	828	733	827	780	827	813	829	824	830	834	841	847	843	836
FR_FRABCH	954	894	971	934	967	958	968	969	969	970	969	979	969	972
GH_FR1	809	784	817	803	817	817	819	830	824	830	833	836	835	831
GH_ERC	407	430	410	419	410	423	411	423	412	423	420	439	417	424
GH_ER2	374	396	381	397	380	393	382	390	381	392	390	400	387	393
CM_MC1	291	302	297	301	297	306	299	309	300	311	308	319	303	313
CM_MC2	660	629	665	646	666	663	670	671	664	670	672	678	675	674
CM_MIDAG	525	483	530	512	529	527	531	535	533	537	535	542	542	539
Technician Initials	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	MG	MG	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Conductivity meter: 313

Comments:

Reviewed by: [illegible]

Date Reviewed: Aug 14, 2019

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Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck.
Work Order No.: 190408

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV_MC2	23.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.5	22.5	23.0
EV_HC1	23.0	22.0	22.5	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.5	22.5	22.5	23.0
LC_SLC	22.5	22.0	22.0	22.0	~~358~~ *22.5	22.0	22.0	22.0	22.0	22.0	22.5	22.5	22.5	23.0
LC_LCDSSLCC	23.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.5	23.0
LC_LC3	23.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.5	23.0
LC_LC5	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	23.0
LC_DCDS	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0	23.0
EDTA Control	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0	23.0
FR_FRCP1+EDTA	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0	23.0
CM_MC2+EDTA	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0	23.0
Technician Initials						MLT	MLT							

Thermometer: 6 *22.5

Conductivity (µS)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV_MC2	439	401	441	~~462~~ 0424	441	442	444	446	446	447	448	451	450	451
EV_HC1	622	582	617	605	619	619	621	625	621	625	627	632	632	630
LC_SLC	360	352	358	362	358	369	361	369	363	370	365	377	368	371
LC_LCDSSLCC	690	670	690	680	692	697	698	697	696	697	701	707	706	702
LC_LC3	866	887	865	879	865	872	866	872	871	874	873	879	883	876
LC_LC5	711	719	712	721	714	725	719	726	718	724	720	730	724	727
LC_DCDS	441	471	442	459	444	457	447	455	447	454	450	465	452	456
EDTA Control	445	452	449	454	447	457	452	459	451	458	452	464	457	459
FR_FRCP1+EDTA	822	703	823	768	821	808	824	826	822	825	825	829	835	826
CM_MC2+EDTA	663	618	666	643	668	665	670	672	668	674	670	678	678	676
Technician Initials						MLT	MLT							

Conductivity meter: 313 0424

Comments:

Reviewed by: Date Reviewed: Aug 14, 2019

9/12

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: ~~RG-MIDAG+tc~~ 190908

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG+EDTA	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0	22.0
Technician Initials				a	a	MG	MG					a	a	

Thermometer: 6

Conductivity (µS)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG+EDTA	521	470	522	502	523	525	526	532	528	530	531	536	532	533
Technician Initials				a	a	MG	MG					a	a	

Conductivity meter: 313

Comments:

Reviewed by: [signature] Date Reviewed: Aug. 14, 2019

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Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 190908

Start Date: May 9/19
Termination Date: May 16/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control water	22.0	22.0	22.0	22.0	23.0	22.5	22.0	22.0	22.0	23.0	22.0	22.0	22.0	22.0
FR-UFRI	22.0	22.0	22.0	22.0	23.0	23.0	~~22.5~~	23.0	23.0	22.5	23.0	23.0	23.0	23.0
FR-FRCPI	22.0	22.0	23.0	22.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
FR-FRABCH	22.0	22.0	23.0	22.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0
GH-FRI	22.0	22.0	23.0	23.0	23.0	23.0	23.5	23.0	23.0	22.5	23.0	23.0	23.0	23.0
GH-ERC	22.0	22.0	22.5	22.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
GH-ER2	22.0	22.5	22.0	22.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
CM-MC1	22.0	22.0	22.0	23.0	23.0	23.0	23.0	22.5	23.0	22.0	22.5	23.0	23.0	23.0
CM-MC2	22.0	22.0	22.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
CM-MIDAG.	22.0	23.0	23.0	23.0	23.0	23.0	23.5	23.0	23.5	23.0	23.0	23.0	23.0	23.0
Technician Initials	JP	JP	JP	JD	JD	MM	MM	JP	JP	JP	JP	JP	JP	JP

Thermometer: 6

Conductivity (µS)

Sample ID	Day 21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control Water	450	457	451	464	454	459	449	459	450	455	452	455	451	456
FR-UFRI	335	346	339	349	342	342	341	340	340	342	341	342	341	344
FR-FRCPI	~~660~~ ①	787	649	730	658	673	649	667	650	663	651	658	650	657
FR-FRABCH	773	914	829	881	840	863	831	837	832	831	829	830	829	830
GH-FRI	711	807	730	786	707	742	743	752	733	754	731	746	730	742
GH-ERC	373	419	390	412	404	404	397	405	401	406	399	405	400	404
GH-ER2	320	385	371	394	380	382	375	380	374	385	370	382	371	380
CM-MC1	260	302	267	299	270	282	268	278	270	280	269	278	270	275
CM-MC2	581	645	584	633	593	602	597	594	596	595	594	593	594	593
CM-MIDAG.	421	495	421	470	425	436	424	432	424	434	426	431	426	427
Technician Initials	JP	JP	JP	JD	JD	MM	MM	JP	JP	JP	JP	JP	JP	JP

Conductivity meter: 331

① 638

Comments:

Reviewed by: [signature] Date Reviewed: Aug. 14, 2019

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Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190908

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV-MC2	22.0	22.5	23.0	22.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0	23.0	23.0	23.0
EV-HCl	22.0	22.5	23.0	22.5	23.0	23.0	23.5	22.5	23.0	23.0	23.0	23.0	23.0	23.0
LC-SLC	22.0	22.5	23.0	22.5	23.0	23.0	23.5	23.0	23.0	22.0	23.0	23.0	23.0	23.0
LC-LCDSSLCC	22.0	23.0	23.0	21.5	23.0	23.0	23.5	23.0	23.0	22.5	23.0	23.0	23.0	23.0
LC-LC3	22.0	22.5	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	22.5	23.0	23.0	23.0
LC-LC5	22.0	22.5	22.5	23.0	22.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC-DCDS	22.0	23.0	22.5	23.0	22.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
EDTA Control	22.0	22.0	22.0	23.0	22.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
FR-FRCP1+EDTA	22.0	22.5	22.0	23.0	23	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
CM-MC2+EDTA	22.0	23.0	22.0	23.0	22.5		23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Technician Initials				SD	SD									

Thermometer: 6

Conductivity (µS)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV-MC2	362	429	368	374	374	385	371	386	370	380	371	378	371	375
EV-HCl	580	612	576	613	586	587	578	586	577	585	574	587	575	581
LC-SLC	340	365	342	362	348	353	349	353	345	358	342	353	345	351
LC-LCDSSLCC	610	670	606	658	619	624	612	618	610	622	614	619	615	618
LC-LC3	854	876	857	877	874	865	860	853	861	862	860	863	860	862
LC-LC5	670	711	668	700	681	678	671	680	673	677	672	679	673	678
LC-DCDS	451	453	447	463	455	455	451	457	452	457	450	456	451	456
EDTA Control	448	462	448	469	454	461	454	456	449	461	451	460	451	458
FR-FRCP1+EDTA	640	784	643	734	651	678	645	660	649	657	648	655	648	652
CM-MC2+EDTA	585	650	581	635	594	601	589	594	590	594	592	595	593	595
Technician Initials				SD	DD									

Conductivity meter: 3/3

Comments:

Reviewed by: [signature] Date Reviewed: Aug. 14, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 190908

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG+EDTA	22.0	23.0	22.0	23.0	22.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Technician Initials				JD	JD									
Thermometer:	6													

Conductivity (µS)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RGE MIDAG+EDTA	417	510	419	481	424	438	421	432	422	430	420	429	421	427
Technician Initials				JD	JD									
Conductivity meter:	318													

Comments:

Reviewed by: [signature] Date Reviewed: Aug. 14, 2019

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Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190408
~~Test Condition~~: IW

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control water	8.6	7.0	8.4	7.8	7.9	6.9	8.0	7.1	8.3	7.1	8.3	7.0	8.2	7.2
FR-UFRI	8.5	7.2	8.5	7.3	~~7.08~~	7.2	7.6	7.0	8.0	7.1	8.2	6.9	7.9	6.8
FR-FRCP1	8.5	7.1	8.4	8.1	8.3	7.0	7.7	7.4	8.2	7.2	8.2	6.9	8.0	7.0
FR-FRABCH	8.5	6.9	8.4	7.4	6.5	6.9	7.8	7.1	8.1	7.3	8.3	6.8	7.9	7.0
GH-FRI	8.5	7.2	8.4	7.5	6.5	6.8	7.8	7.2	8.0	7.0	8.2	6.8	7.9	7.1
GH-ERC	8.5	7.2	8.5	7.7	8.9	6.5	8.0	7.1	7.9	6.9	8.3	6.7	7.8	7.1
GH-ER2	8.5	7.0	8.5	7.6	8.7	7.0	7.9	7.1	8.2	7.0	8.3	6.6	7.9	7.1
CM-MC1	8.4	7.1	8.5	7.8	8.6	6.8	7.9	7.1	8.2	6.8	8.1	6.6	7.9	7.0
CM-MC2	8.5	7.0	8.4	7.9	8.6	6.7	8.0	7.0	8.2	6.9	8.1	6.8	7.8	6.8
CM-MIDAGH	8.5	6.8	8.4	7.1	7.6	6.7	7.9	7.4	8.0	6.8	8.0	6.7	7.8	6.9
Technician Initials	KDL	MM	MM	JD	JD	JD	JD							KDL

DO meter: 313

pH

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control water	7.6	7.3	7.6	7.1	7.4	7.2	~~8.6~~	7.3	7.5	7.1	7.4	7.2	7.5	7.2
FR-UFRI	7.8	7.7	8.0	7.4	7.7	7.7	8.0	7.7	7.8	7.6	7.7	7.5	7.7	7.5
FR-FRCP1	7.9	7.9	8.1	7.7	7.8	8.0	8.1	8.0	7.9	7.8	7.8	7.7	7.7	7.5
FR-FRABCH	7.7	7.8	7.9	7.6	7.8	8.0	~~8.13~~	8.0	7.9	7.9	7.8	7.8	7.8	7.6
GH-FRI	7.9	7.9	8.0	7.8	7.9	8.1	8.3	8.1	8.2	8.0	8.1	7.9	8.0	7.7
GH-ERC	7.8	7.8	7.9	7.6	7.8	8.0	8.1	7.9	8.0	7.8	7.9	7.7	7.9	7.7
GH-ER2	7.9	7.8	8.0	7.6	7.7	8.0	8.1	7.9	8.0	7.7	7.9	7.7	7.9	7.7
CM-MC1	7.7	7.7	7.8	7.6	7.6	7.7	8.1	7.8	7.9	7.5	7.8	7.6	7.9	7.5
CM-MC2	7.8	7.8	7.9	7.6	7.8	8.0	8.2	7.9	8.1	7.7	8.0	7.7	7.8	7.6
CM-MIDAGH	7.8	7.8	8.0	7.7	7.8	8.0	8.2	8.0	8.0	7.8	7.9	7.7	7.8	7.8
Technician Initials	KDL	MM	MM	JD	JD	JD	JD							KDL

pH meter: 313

Light meter: Lit-1

Light intensity (Lux): 400-950

Comments:

Reviewed by:

Date Reviewed: Aug. 14, 2019

~~2/8~~ 2/12

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190908
~~Test Condition~~: in

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV-MC2	8.6	7.1	8.5	7.1	8.6	6.6	7.9 ~~6.9~~	~~7.2~~	7.9	7.2	7.9	6.9	7.9	7.0
EV-HC1	8.6	7.1	8.4	7.6	8.5	6.8	~~7.6~~ 7.9	7.0 ~~7.2~~	8.0	6.8	8.0	6.5	8.0	7.1
LC-SLC	8.5	7.0	8.4	7.5	8.4	6.7	~~7.8~~ ~~6.6~~	6.7 ~~7.2~~	8.0	6.6	8.0	6.2	7.9	7.1
LC-LCDSSLCC	8.5	7.1	8.4	7.8	8.5	6.7	7.8 ~~8.0~~	7.2 ~~7.4~~	8.0	6.8	8.0	6.5	7.8	7.0
LC-LC3	8.5	6.9	8.4	7.9	8.4	~~7.5~~	7.8 ~~8.0~~	7.1 ~~7.3~~	7.9	6.8	8.1	6.6	7.9	7.1
LC-LC5	8.5	6.9	8.4	7.8	8.4	7.2	8.0	7.2	7.9	7.1	8.1	7.0	7.8	7.2
LC-DCDS	8.5	7.0	8.5	7.4	8.5	7.2	7.9	6.9	7.8	6.4	7.9	6.3	7.9	7.1
EDTA Control	8.6	7.1	8.5	7.8	8.5	6.7	8.0	6.8	8.1	6.5	8.1	6.5	7.9	6.9
FR-FRCP1+EDTA	8.5	7.1	8.4	6.5	8.6	7.7	8.1	5.9	8.1	5.7	8.0	5.6	7.8	6.1
CM-MC2+EDTA	8.5	7.0	8.4	7.8	8.5	7.6	8.1	7.4	8.2	7.1	8.1	6.7	7.8	6.9
Technician Initials	KJV	MM	MM	JD	JD	JD	JD							KJV

DO meter: 313

pH

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV-MC2	7.7	7.7	7.8	7.5	7.7	7.7	8.1	7.8	7.9	7.7	7.8	7.7	7.8	7.5
EV-HC1	7.9	7.9	8.0	7.7	7.9	8.0	8.2	8.0	8.1	7.8	8.0	7.8	7.9	7.6
LC-SLC	7.9	7.8	7.9	~~7.6~~ 7.7	7.8	7.9	8.2	7.8	8.0	7.6	7.9	7.6	7.8	7.5
LC-LCDSSLCC	7.9	7.9	7.9	7.7	7.8	8.1	8.3	8.0	8.1	7.8	8.0	7.8	7.9	7.~~8~~6 KJV
LC-LC3	7.8	7.9	7.8	7.7	7.9	8.1	8.3	8.0	8.2	7.9	8.0	7.9	7.9	7.6
LC-LC5	8.0	8.0	8.0	7.8	7.9	8.1	8.3	8.1	8.2	8.0	8.0	7.9	7.9	7.6
LC-DCDS	8.4	8.0	8.3	7.6	7.9	7.8	8.2	7.9	8.0	7.7	7.9	7.6	7.9	7.5
EDTA Control	7.7	7.4	7.7	7.8	7.9	7.5	7.8	7.4	7.6	7.3	7.5	7.3	7.5	7.3
FR-FRCP1+EDTA	7.9	7.8	8.0	7.2	7.8	8.0	8.2	7.8	8.0	7.7	7.9	7.7	7.8	7.5
CM-MC2+EDTA	7.9	7.9	7.9	7.7	7.8	8.0	8.2	8.1	8.1	7.9	8.0	7.8	7.9	7.6
Technician Initials	KJV	MM	MM	JD	JD	JD	JD							KJV

pH meter: 313

Light meter: Lit-1

Light intensity (Lux): 400-950

Comments:

Reviewed by:

Date Reviewed: Aug 14, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190908
Test Condition: KN
Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG2-NTA+EDTA	8.4	7.0	8.4	7.3	8.5	7.4	8.1	7.1	8.0	6.8	8.0	6.5	7.8	7.0
Technician Initials	KN	MM	MM	JD	JD	JD	JD							KN

DO meter: 3/3

pH

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG2-NTA+EDTA	7.6	7.8	7.9	7.6	7.8	8.0	8.2	8.0	8.0	7.8	7.9	7.7	7.9	7.6
Technician Initials	KN	MM	MM	JD	JD	JD	JD							KN

pH meter: 3/3

Light meter: Lit-1
Light intensity (Lux): 400-950

Comments:

Reviewed by: MM
Date Reviewed: Aug 14, 2019

3/8 4/12

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190908
~~Test Condition~~: IC

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control Water	8.3	6.9	8.5	7.0	8.7	7.0	8.5	6.0	8.6	6.4	8.4	6.6	8.4	7.4
FR-UFR1	8.2	6.6	8.0	6.7	8.3	7.1	8.1	6.5	8.5	6.6	8.5	6.7	8.2	7.4
FR_FRCP1	8.3	6.3	8.1	6.8	8.3	6.9	8.2	6.3	8.3	6.7	8.6	6.8	8.4	7.5
FR_FRABCH	8.3	6.8	8.1	6.8	8.4	6.8	8.1	6.4	8.4	6.6	8.5	6.6	8.5	7.4
GH-FR1	8.4	6.6	8.1	6.9	8.4	6.9	8.1	6.8	8.8	6.5	8.7	6.4	8.6	7.4
GH_ERC	8.3	6.7	8.2	7.1	8.3	6.9	7.8	7.6	8.5	7.2	8.6	7.0	8.5	7.5
GH_ER2	8.2	6.8	8.0	6.9	8.3	7.0	8.2	6.7	8.5	6.5	8.4	6.4	8.4	7.6
CM_MC1	8.2	6.9	8.0	7.0	8.5	6.7	8.1	6.2	8.8	6.3	8.5	6.5	8.2	7.6
CM_MC2	8.1	6.9	7.9	7.3	8.7	6.8	8.1	6.7	8.9	6.5	8.5	6.4	8.4	7.6
CM_MIDAGR	8.2	6.9	8.0	7.2	8.7	6.7	8.1	6.3	8.7	6.2	8.6	6.0	8.3	7.5
Technician Initials	KJV	KJV	KJV	RC	RC	WW	WW	RC	RC					

DO meter: 3/3

pH

Sample ID	Day 7	8		9		10 ①		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
① xylco new 7.7														
7.7 Control Water	7.4	7.9	7.6	6.9	7.6	7.2	8.2	7.2	7.7	7.2	7.6	7.3	7.6	7.3
7.7 FR-UFR1	7.7	7.5	7.9	7.2	7.7	7.6	8.0	7.5	7.8	7.6	7.7	7.6	7.7	7.6
7.6 FR_FRCP1	7.6	7.6	7.8	7.4	7.8	7.7	8.1	7.5	7.8	7.6	7.8	7.7	7.8	7.8
7.7 FR_FRABCH	7.6	7.7	7.8	7.6	7.7	7.6	8.0	7.7	7.9	7.7	7.8	7.8	7.8	7.7
7.9 GH-FR1	7.8	7.8	7.9	7.7	7.9	7.7	8.0	7.8	8.0	7.7	7.9	7.7	7.8	7.8
7.9 GH_ERC	7.8	7.7	7.9	7.7	7.9	7.7	8.1	7.9	7.9	7.8	7.8	7.8	7.9	7.8
7.8 GH_ER2	7.8	7.9	7.9	7.6	7.9	7.6	8.0	7.7	7.9	7.7	7.8	7.8	7.8	7.8
7.7 CM_MC1	7.7	7.4	7.8	7.1	7.8	7.5	8.0	7.7	7.7	7.6	7.7	7.7	7.8	7.7
7.6 CM_MC2	7.6	7.6	7.8	7.5	7.7	7.6	7.8	7.6	7.8	7.6	7.8	7.6	7.7	7.6
7.7 CM_MIDAGR	7.8	7.6	7.8	7.5	7.7	7.7	7.9	7.8	7.8	7.7	7.7	7.8	7.8	7.7
Technician Initials	KJV	KJV	KJV	RC	RC	WW	WW	RC	RC					

pH meter: 3/3

Light meter: Lit-1
Light intensity (Lux): 400 - 950

Comments:

Reviewed by: [signature]
Date Reviewed: Aug 14, 2019

5/12

4/8 lw

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190908
~~Test Condition~~: 1-

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV_MC2	8.2	7.1	8.1	7.7	8.9	6.9	8.2	6.4	8.4	6.4	8.4	6.3	8.4	7.5
EV_HC1	8.2	6.9	8.1	8.0	8.4	6.4	8.0	6.2	8.5	6.3	8.4	6.4	8.2	7.4
LC_SLC	8.1	6.7	8.2	7.1	8.4	6.7	8.1	6.8	8.6	6.6	8.5	6.5	8.2	7.6
LC_LCDSSLCC	8.2	6.6	8.0	8.0	8.5	6.6	8.0	6.7	8.6	6.5	8.6	6.4	8.4	7.5
LC_LC3	8.3	6.7	8.2	7.8	8.5	6.9	8.0	6.8	8.6	6.4	8.5	6.2	8.2	7.5
LC_LC5	8.2	6.8	8.2	7.2	8.4	6.9	8.1	6.8	8.0	6.5	8.2	6.1	8.0	7.4
LC_DCDS	8.2	6.8	8.1	6.4	8.6	7.0	8.0	6.7	7.8	6.4	8.5	6.4	8.2	7.5
EDTA Control	8.3	7.0	8.4	6.9	8.4	6.8	8.0	6.5	8.1	6.4	8.4	6.2	8.1	7.4
FR_FRCP1+EDTA	8.3	7.0	8.2	6.2	8.4	6.8	7.9	6.8	8.0	6.7	8.3	6.3	8.0	7.4
CM_MC2+EDTA	8.3	6.9	8.1	7.6	8.6	6.7	7.8	6.8	8.0	6.6	8.4	6.2	8.1	7.5
Technician Initials	KM	KL	KL	lw	lw	lw	lw	lw	lw					

DO meter: 3/3

pH

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV_MC2	7.7	7.6	7.8	7.4	7.5	7.7	7.6	7.3	7.7	7.5	7.6	7.5	7.6	7.4
EV_HC1	7.7	~~7.80~~	7.8	7.5	7.8	7.8	7.7	7.6	7.9	7.7	7.8	7.6	7.8	7.7
LC_SLC	7.8	7.5	7.8	7.5	7.7	7.8	7.8	7.5	7.8	7.6	7.8	7.6	7.8	7.5
LC_LCDSSLCC	7.7	7.7	7.8	7.4	7.8	7.8	7.9	7.5	7.9	7.6	7.9	7.6	7.8	7.7
LC_LC3	7.5	7.7	7.7	7.7	7.7	7.6	7.8	7.7	7.9	7.7	7.8	7.7	7.8	7.8
LC_LC5	7.8	7.7	7.9	7.4	7.9	7.7	7.9	7.6	8.0	7.7	7.9	7.8	7.9	7.8
LC_DCDS	7.9	7.6	7.9	7.6	7.8	~~7.89~~	7.8	7.6	7.8	7.8	7.8	7.8	7.8	7.5
EDTA Control	7.5	7.5	7.5	7.6	7.5	7.6	7.8	7.8	7.6	7.5	7.7	7.5	7.6	7.3
FR_FRCP1+EDTA	7.7	7.6	7.8	7.7	7.8	7.8	7.8	7.7	7.9	7.7	7.8	7.7	7.8	7.6
CM_MC2+EDTA	7.6	7.7	7.8	7.5	7.7	7.8	7.7	7.7	7.9	7.8	7.9	7.8	7.8	7.6
Technician Initials	KL	KM	KL	lw	lw	lw	lw	lw	lw					

0 7.8

pH meter: 3/3

Light meter: Lit-1

Light intensity (Lux): 400-950

Comments:

Reviewed by:

Date Reviewed: Aug 14, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 190908
Test Condition: RG

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG+EDTA	8.2	7.0	8.1	8.1	8.7	6.9	8.1	6.8	8.1	6.4	8.3	6.2	8.1	7.3
Technician Initials	KJV	KJV	KJV	RC	RC	MW	MW	RC	RC					

DO meter: 3/3

pH

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG+EDTA	7.6	7.8	7.7	7.6	7.7	7.7	7.7	7.6	7.8	7.7	7.8	7.7	7.8	7.6
Technician Initials	KJV	KJV	KJV	RC	RC	MW	MW	RC	RC					

pH meter: 3/3

Light meter: Lit-1
Light intensity (Lux): 400-950

Comments:

Reviewed by: MW
Date Reviewed: Aug 14, 2019

5/8 7/12

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190908
~~Test Condition:~~ IW

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 14 new	15 old	15 new	16 old	16 new	17 old	17 new	18 old	18 new	19 old	19 new	20 ③old	20 new	21 old
Control Water	~~8.0~~	6.4	8.4	8.1	10.1②	6.2	8.4	6.9	8.4	6.6	8.3	7.5	8.7	7.4
FR_UFR1	8.7	6.8	8.4	6.7	9.1②	6.3	8.0	6.8	8.2	6.5	8.4	5.3	8.5	5.5
FR_FRCP1	8.6	6.9	8.5	6.9	9.0②	6.4	8.0	6.8	8.1	6.4	8.2	5.3	8.5	5.6
FR_FRABCH	8.7	6.8	8.5	6.9	9.0②	6.2	8.0	6.8	8.1	6.5	8.2	5.4	8.6	5.5
GH_FR1	8.8	7.0	8.5	6.4	9.1②	6.0	8.1	6.7	8.1	6.5	8.2	5.5	8.3	5.4
GH_ERC	8.5	6.8	8.4	6.4	8.7	6.1	8.2	6.7	8.2	6.4	8.3	5.8	8.1	5.7
GH_ER2	8.6	6.8	8.3	6.5	8.7	6.2	8.1	6.8	8.1	6.3	8.2	6.1	8.2	6.0
CM_MC1	8.7	6.9	8.4	6.8	8.9②	6.1	8.1	6.8	8.1	6.5	8.2	6.2	8.2	6.1
CM_MC2	8.5	7.0	8.4	7.2	8.9②	6.1	8.3	6.7	8.2	6.2	8.2	5.4	8.3	5.5
CM_MIDAG1	8.5	6.9	8.3	7.0	9.0②	6.0	8.3	6.5	8.2	6.2	8.2	5.9	8.6	5.7
Technician Initials						MG	MG							

DO meter: 3/3

① 8.3

② double checked value, checked salinity too as well

③ double-checked readings with 2, D2 probe and other reps

pH

Sample ID	Day 14 new	15 old	15 new	16 old	16 new	17 old	17 new	18 old	18 new	19 old	19 new	20 old	20 new	21 old
Control Water	7.4	7.3	7.4	7.1	7.5	7.1	7.8	7.3	7.4	7.3	7.4	7.1	7.3	7.2
FR_UFR1	7.9	7.8	7.9	7.1	7.7	7.3	7.9	7.1	7.9	7.4	7.8	7.0	7.5	7.3
FR_FRCP1	7.9	7.8	7.8	7.5	7.9	7.6	8.0	7.6	7.9	7.8	7.9	7.5	7.8	7.7
FR_FRABCH	7.9	7.8	7.9	7.6	7.9	7.8	8.1	7.7	7.9	7.8	7.9	7.6	7.8	7.7
GH_FR1	8.0	7.8	7.9	7.6	8.0	7.9	8.2	7.8	8.0	7.8	8.1	7.6	7.9	7.7
GH_ERC	7.8	7.7	7.8	7.5	7.8	7.8	8.2	7.8	8.0	7.7	8.0	7.4	7.7	7.6
GH_ER2	7.8	7.8	7.8	7.5	7.8	7.8	8.1	7.8	7.9	7.7	7.9	7.4	7.7	7.7
CM_MC1	7.7	7.6	7.7	7.2	7.7	7.7	8.0	7.6	7.9	7.5	7.8	7.2	7.6	7.4
CM_MC2	7.9	7.8	7.9	7.4	7.9	7.6	8.1	7.6	7.9	7.7	7.9	7.3	7.8	7.6
CM_MIDAG1	7.8	7.8	7.8	7.4	7.8	7.7	8.1	7.8	8.0	7.7	7.9	7.4	7.7	7.7
Technician Initials						MG	MG							

pH meter: 3/3

Light meter: Lit-1

Light intensity (Lux): 400-950

Comments:

Reviewed by:

Date Reviewed: Aug 14, 2019

6/8 8/12

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190908
~~Test Condition:~~ LC

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV-MC2	8.7	6.7	8.6	6.8	8.5	6.2	8.3	6.6	8.2	6.5	8.3	5.7	8.4	5.6
EV-HC1	8.6	6.7	8.5	6.8	8.5	6.3	8.3	6.7	8.2	6.5	8.3	6.2	8.3	6.0
LC-SLC	8.4	6.6	8.4	6.9	8.5	6.4	8.3	6.5	8.2	6.4	8.2	6.2	8.5	6.2
LC-LCDSSLCC	8.5	6.8	8.4	7.1	8.5	6.2	8.3	6.4	8.2	6.4	8.2	6.4	8.6	6.2
LC-LC3	8.6	6.9	8.4	7.1	8.6	6.2	8.3	6.4	8.2	6.3	8.2	6.5	8.6	6.1
LC-LC5	8.5	6.7	8.3	7.2	8.6	6.2	8.3	6.5	8.2	6.3	8.2	6.0	8.3	6.0
LC-DCDS	8.7	6.8	8.5	7.6	8.6	6.3	8.3	6.8	8.3	6.5	8.3	6.0	8.4	6.1
EDTA control	8.3	6.5	8.2	7.3	8.7	6.3	8.4	6.7	8.3	6.6	8.4	6.2	8.4	6.0
FR-FRLPI+EDTA	8.4	6.4	8.2	7.3	8.6	6.2	8.4	6.5	8.3	6.4	8.3	6.0	8.5	6.0
CM-MC2+EDTA	8.5	6.6	8.3	7.2	8.6	6.3	8.4	6.6	8.3	6.3	8.4	5.9	8.6	6.0
Technician Initials						MH	MH							

DO meter: 3/3

pH

Sample ID	Day 14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV-MC2	7.7	7.6	7.7	7.4	7.7	7.7	8.1	7.3	7.7	7.5	7.8	7.2	7.6	7.5
EV-HC1	8.0	7.8	7.9	7.5	7.9	7.8	8.2	7.5	7.8	7.8	8.1	7.5	7.9	7.6
LC-SLC	7.9	7.8	7.9	7.4	7.8	7.9	8.1	7.7	7.8	7.6	7.9	7.3	7.7	7.6
LC-LCDSSLCC	7.9	7.8	7.9	7.5	7.8	7.9	8.1	7.7	7.9	7.8	8.0	7.5	7.9	7.7
LC-LC3	7.8	7.7	7.8	7.6	7.8	7.9	8.1	7.7	7.9	7.8	7.9	7.6	7.9	7.7
LC-LC5	8.1	7.8	~~7.9~~ (1) 8.0	7.7	8.0	7.9	8.2	7.7	7.9	7.8	7.9	7.5	7.9	7.8
LC-DCDS	7.9	7.8	7.9	7.4	7.8	7.9	8.1	7.8	7.9	7.6	7.8	7.3	7.7	7.7
EDTA control	7.4	7.4	7.5	7.2	7.5	7.6	7.9	7.5	7.5	7.7	7.9	7.1	7.5	7.3
FR-FRLPI+EDTA	7.8	7.8	7.8	7.6	7.9	7.8	8.1	7.8	7.9	7.7	7.9	7.5	7.9	7.7
CM-MC2+EDTA	7.8	7.8	7.8	7.6	7.8	7.8	8.1	7.8	7.9	7.8	7.9	7.4	7.8	7.7
Technician Initials						MH	MH							

pH meter: 3/3

Light meter: Lit-1
Light intensity (Lux): 400-950

Comments:

Reviewed by:
Date Reviewed: Aug 14, 2019

9/12

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 190908
~~Test Condition~~: in

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG+EDTA	8.4	6.7	8.3	7.3	8.7	6.5	8.4	6.7	8.2	6.4	8.2	6.5	8.5	6.3
Technician Initials						MG	MG							

DO meter: 3/3

pH

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG+EDTA	7.7	7.7	7.7	7.4	7.8	7.8	8.1	7.7	7.9	7.7	7.9	7.5	7.8	7.7
Technician Initials						MG	MG							

pH meter: 3/3

Light meter: Li-1

Light intensity (Lux): 400-950

Comments:

Reviewed by:

Date Reviewed: Aug. 14, 2019

7/8 10/12

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190908
~~Test Condition:~~ lw

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control Water	8.5	6.6	8.3	5.6 ~~6.0~~	8.5	6.2	8.5	6.4	8.4	6.4	8.4	6.5	8.3	6.4
FR_UFRi	8.6	6.7	8.4	4.6	8.2	~~4.5~~ 6.6	8.2	6.2	8.2	6.4	8.3	6.7	8.3	6.6
FR_FRCP1	8.6	6.5	8.4	6.0	8.0	5.9	8.3	6.6	8.2	6.5	8.2	6.6	8.2	6.5
FR_FRABCH	8.5	6.5	8.4	4.8	8.0	6.0	8.2	6.7	8.2	6.6	8.2	6.6	8.2	6.4
GH_FRi	8.6	6.4	8.4	4.7	8.0	5.7	8.2	6.3	8.1	6.5	8.2	6.4	8.3	6.3
GH_ERC	8.5	6.4	8.4	4.9	8.2	6.0	8.3	6.6	8.2	6.7	8.2	6.5	8.2	6.4
GH_ER2	8.5	6.4	8.4	5.3	8.2	6.1	8.2	6.7	8.1	6.6	8.2	6.4	8.1	6.3
CM_MC1	8.4	6.6	8.4	5.1	8.4	6.2	8.4	6.3	8.3	6.8	8.1	6.6	8.1	6.5
CM_MC2	8.6	6.5	8.5	5.4	8.4	5.9	8.4	6.4	8.3	6.5	8.2	6.4	8.1	6.3
CM_MIDAGH	8.6	6.4	8.5	5.5	8.6	6.1	8.4	6.5	8.3	6.5	8.1	6.5	8.1	6.3
Technician Initials				DD	DD									

DO meter: 313

pH

Sample ID	Day 21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control Water	7.3	7.0	7.2	7.2	7.5	7.0	7.5	7.2	7.4	7.2	7.3	7.2	7.3	7.2
FR_UFRi	7.7	7.4	7.6	7.4	8.0	7.4	7.6	7.6	7.7	7.5	7.6	7.4	7.5	7.5
FR_FRCP1	7.7	7.4	7.6	7.6	8.1	7.3	7.6	7.6	7.7	7.6	7.7	7.5	7.7	7.6
FR_FRABCH	7.7	7.4	7.7	7.7	8.2	7.4	7.6	7.7	7.7	7.6	7.6	7.5	7.6	7.5
GH_FRi	7.9	7.6	7.8	7.7	8.3	7.6	7.8	7.7	7.8	7.6	7.7	7.5	7.6	7.6
GH_ERC	7.7	7.4	7.6	7.6	8.2	7.4	7.7	7.6	7.7	7.6	7.7	7.5	7.7	7.5
GH_ER2	7.7	7.4	7.6	7.7	8.2	7.5	7.7	7.7	7.8	7.6	7.7	7.5	7.7	7.5
CM_MC1	7.7	7.4	7.6	7.5	8.1	7.4	7.6	7.6	7.7	7.5	7.6	7.4	7.5	7.4
CM_MC2	7.9	7.5	7.8	7.7	8.2	7.4	7.7	7.6	7.8	7.5	7.7	7.4	7.7	7.4
CM_MIDAGH	7.8	7.4	7.7	7.6	8.2	7.5	7.8	7.5	7.7	7.5	7.7	7.5	7.7	7.5
Technician Initials				DD	DD									

pH meter: 3

Light meter: Lit-1

Light intensity (Lux): 400-950

Comments:

Reviewed by: [signature]

Date Reviewed: Aug 14, 2019

8/8 W 4/12

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190908
~~Test Condition~~: W

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV_MC2	8.5	6.5	8.5	5.4	8.1	5.9	8.3	6.7	8.3	6.6	8.2	7.0	8.2	6.9
EV-HCl	8.5	6.4	8.4	5.8	8.0	6.0	8.3	6.9	8.2	6.7	8.2	7.1	8.3	6.9
LC_SLC	8.5	6.6	8.4	5.8	8.1	6.2	8.4	6.8	8.3	6.6	8.2	6.9	8.4	6.7
LC_LCDSSLCC	8.6	6.5	8.5	5.6	8.2	6.2	8.4	6.7	8.3	6.6	8.2	6.8	8.2	6.7
LC_LC3	8.6	6.5	8.4	5.9	8.2	5.7	8.4	6.4	8.2	6.5	8.1	6.7	8.3	6.4
LC_LC5	8.5	6.4	8.4	5.9	8.2	5.6	8.4	6.6	8.3	6.5	8.2	6.6	8.2	6.3
LC_DCDS	8.5	6.3	8.4	4.9	8.2	6.0	8.3	6.7	8.2	6.6	8.2	6.6	8.2	6.4
EDTA Control	8.6	6.4	8.4	5.3	8.1	6.1	8.4	6.7	8.3	6.6	8.3	6.5	8.2	6.3
FR_FRCPi+EDTA	8.5	6.4	8.4	5.1	8.2	5.8	8.4	6.4	8.3	6.5	8.2	6.5	8.3	6.3
CM_MC2+EDTA	8.6	6.3	8.4	5.1	8.3	5.9	8.3	6.6	8.2	6.6	8.1	6.~~6~~0	8.1	6.1
Technician Initials				JD	JD									

DO meter: 313

① 6.2

pH

Sample ID	Day 21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EV_MC2	7.6	7.4	7.5	7.6	8.1	7.3	7.6	7.4	7.6	7.4	7.6	7.4	7.5	7.4
EV-HCl	7.8	7.6	7.7	7.8	8.3	7.4	7.8	7.5	7.7	7.4	7.6	7.4	7.6	7.4
LC_SLC	7.7	7.6	7.7	7.8	8.2	7.4	7.7	7.5	7.7	7.5	7.6	7.4	7.5	7.5
LC_LCDSSLCC	7.8	7.5	7.7	7.8	8.2	7.5	7.6	7.5	7.7	7.5	7.6	7.4	7.6	7.5
LC_LC3	7.8	7.6	7.7	7.8	8.2	7.4	7.6	7.5	7.7	7.5	7.7	7.6	7.7	7.5
LC_LC5	8.0	7.7	7.9	7.8	8.3	7.5	7.7	7.8	7.9	7.8	7.9	7.8	7.9	7.8
LC_DCDS	7.7	7.5	7.6	7.6	8.2	7.6	7.5	7.6	7.6	7.5	7.5	7.6	7.6	7.6
EDTA Control	7.4	7.0	7.3	7.5	7.6	7.1	7.1	7.2	7.3	7.2	7.3	7.3	7.3	7.3
FR_FRCPi+EDTA	7.8	7.5	7.7	7.8	8.0	7.7	7.5	7.6	7.7	7.5	7.6	7.4	7.6	7.5
CM_MC2+EDTA	7.8	7.4	7.7	7.7	8.1	7.6	7.~~5~~9	7.6	7.7	7.6	7.7	7.5	7.7	7.5
Technician Initials				JD	JD									

pH meter: 313

Light meter: Lit-1

Light intensity (Lux): 400-950

Comments:

Reviewed by: [signature]

Date Reviewed: Aug. 14, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 190908
~~Test Condition~~:

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG+EDTA	8.5	6.8	8.5	4.8	8.4	6.0	8.3	6.4	8.3	6.3	8.2	6.7	8.2	6.4
Technician Initials				DD	DD									

DO meter: 313

pH

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG+EDTA	7.7	7.5	7.6	7.6	8.1	7.3	7.6	7.4	7.7	7.4	7.6	7.4	7.6	7.4
Technician Initials				DD	DD									

pH meter: 313

Light meter: Lit-1
Light intensity (Lux): 400-950

Comments:

Reviewed by:
Date Reviewed: Aug. 14, 2019

Client: Teck

W.O.#: 190908

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Control Water	May 9/19	May 22/19	50	3.1	3.2	60	50	6.6	132	SSM
FR_UFR1	↓	↓	50	6.6	6.7	130	50	8.9	178	↓
FR_FRCP1			10	2.3	2.4	220	10	6.0	600	
FR_FRABCH			10	2.2	2.3	210	10	5.8	580	
GH_FR1			10	2.5	2.6	240	10	5.0	500	
GH_ERC			10	1.9	2.0	180 136	10	3.1	310	
GH_ER2			50	6.9	7.0	~~680~~ ~~128~~	50	8.0	160	
CM_MC1			50	6.0	6.1	~~540~~ 118	50	6.5	130	
CM_MC2			10	2.2	2.3	210	10	5.1	510	
CM_MIDAG1			10	1.9	2.0	180	10	3.0	300	
EV_MC2			10	1.6	1.7	150	10	3.2	320	
EV_HC1			10	2.3	2.4	220	10	3.7	370	
LC_SLC			50	6.5	6.6	128	50	9.0	180	
LC_LCDSSLCC			10	2.3	2.4	220	10	5.4	540	
LC_LC3			10	2.3	2.4	220	10	6.9	690	
LC_LC5			10	2.4	2.5	230	10	4.6	460	
LC_DCDS	↓	↓	10	1.9	2.0	180	10	4.1	410	

Day 0

Notes:

Reviewed by: [signature]

Date Reviewed: Aug. 14, 2019

Client: Teck

W.O.#: 190908

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Control Water	May 15/19	May 2019	50	3.2	3.3	62	50	6.6	132	SSM
FR_UFR1	May 15/19		50	6.1	6.2	120	50	7.7	154	
FR_FRCP1			10	1.5	1.6	140	10	2.7	270	
FR_FRABCH			10	2.0	2.1	190	10	5.0	500	
GH_FR1			10	2.2	2.3	210	10	4.4	440	
GH_ERC			10	1.8	1.9	170	10	3.0	300	
GH_ER2			50	6.7	6.8	132	50	7.8	156	
CM_MC1			50	5.7	5.8	112	50	6.2	124	
CM_MC2			10	1.9	2.0	180	10	4.4	440	
CM_MIDAG1			10	1.7	1.8	160	10	2.5	250	
EV_MC2			10	1.4	1.5	130	10	3.0	300	
EV_HC1			10	~~2.0~~ 1.8	~~2.1~~ 1.9	~~180~~ 170	10	3.3	330	
LC_SLC			50	6.0	6.1	118	50	8.1	162	
LC_LCDSSLCC			10	1.8	1.9	170	10	4.6	460	
LC_LC3			10	1.7	1.8	160	10	6.0	600	
LC_LC5			10	1.9	2.0	180	10	4.0	400	
LC_DCDS			10	1.7	1.8	160	10	3.8	380	

Week 2

Notes:

Reviewed by: [signature]

Date Reviewed: Aug. 14, 2019

Client: Teck

W.O.#: 190908

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Control Water	May 23/19	May27/19	50	3.1	3.2	60	50	6.7	134 ~~335~~	SSM
FR-UFR1			50	6.5	6.6	128	50	8.5	170 ~~425~~	
FR-FRCP1			10	2.1	2.2	200	10	5.~~8~~6	560	
FR-FRABCM			10	2.0	2.1	190	10	5.4	540	
GH-FR1			10	2.3	2.4	220	10	4.6	460	
GH-ERC			10	1.7	1.8	160	10	3.0	300	
GH-ER2			50	6.6	6.7	130	50	7.5	150 ~~378~~	
CM-MC1			50	5.8	5.9	114	50	6.3	126 ~~315~~	
CM-MC2			10	2.1	2.2	200	10	4.7	470	
CM-MIDAGM			10	1.8	1.9	170	10	2.8	280	
EV-MC2			10	1.5	1.6	140	10	3.1	310	
EV-HC1			10	2.1	2.2	200	10	3.5	350	
LC-SLC			50	6.2	6.3	122	50	8.4	168 ~~420~~	
LC-LCDSSLCC			10	2.0	2.1	190	10	4.9	490	
LC-LC3			10	1.9	2.0	180	10	6.1	610	
LC-LC5			10	2.1	2.2	200	10	4.2	420	
LC-DCDS			10	1.5	1.6	140	10	3.6	360	

Week 3

Notes:

Reviewed by: [signature]

Date Reviewed: Aug 14, 2019

Client: Teck

W.O.#: 190908

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Control Water	Jun6/19	Jun7/19	50	3.1	3.2	60	50	6.6	132	SSM
FR_UFR1			50	5.4	5.5	106	50	6.8	136	
FR_FRCP1			10	1.7	1.8	160	10	5.0	500	
FR_FRABCM			10	1.8	1.9	170	10	3.2	320	
GIH_FR1			10	1.4	1.5	130	10	5.3	530	
GIH_ERC			10	1.6	1.7	150	10	3.0	300	
GIH_ER2			50	6~~8~~.3	6.4	~~130~~ 124	50	7.8	156	
CM_MC1			50	4~~.8~~4	4.5	~~124~~ 86	50	5.5	110	
CM_MC2			10	1.6	1.7	~~130~~ 150	10	3.5	350	
CM_MIDAGM			10	1.5	1.6	~~140~~ 140	10	3.0	300	
EV_MC2			10	1.2	1.3	~~110~~ 110	10	2.4	240	
EV_HC1			10	1.9	2.0	180	10	3.4	340	
LC_SLC			50	5.8	5.9	114	50	7.0	140	
LC_LCDSSLCC			10	1.7	1.8	160	10	3.2	320	
LC_LC3			10	2.1	2.2	200	10	4.6	460	
LC_LC5			10	1.8	1.9	170	10	3.8	380	
LC_DCDS	↓	↓	10	1.4	1.5	130	10	2.8	280	↓

Day 28

Notes:

Reviewed by: [signature]

Date Reviewed: Aug 14, 2019

H. azteca Water-only Toxicity Test Data Sheet

~~14~~ 28-d Survival and Weight

Client: Teck
Work Order No: 190908
Sample ID: Various - see below

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (T2 Black)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Control	1	A	2	0	8		1058.35	1058.40	2	
	2	B	2	0	8		1040.16	1040.21	2	
	3	C	3	0	7		1058.11	1058.29	3	
	4	D	2	0	8		1073.05	1073.10	2	
	5	E	3	0	7		1047.35	1047.47	3	
FR-iuFR1	6	A	3	0	7		1062.26	1062.50	3	
	7	B	3	5	2		1046.17	1046.50	3	
	8	C	8	0	2		1037.09	1039.22	8	
	9	D	7	1	2		1056.45	1057.02	7	
	10	E	9	0	1		1059.83	1061.43	9	
FR-FRCP1	11	A	3	4	3		1046.18	1046.28	3	
	12	B	9	0	1		1062.90	1063.27	9	
	13	C	2	6	2		1065.66	1065.85	2	
	14	D	4	3	3		1053.75	1054.09	4	
	15	E	5	3	2		1050.70	1051.23	5	
FR-FRABCH	16	A	6	1	3		1042.44	1043.19	6	
	17	B	2	4	4		1049.41	1049.65	2	
	18	C	3	5	2		1077.70	1078.19	3	
	19	D	2	8	0		1069.27	1069.39	2	
	20	E	5	3	2		1048.20	1048.76	5	

Comments: Reweighed pans: 9 - 1061.45 16 - 1043.41

Reviewed by: [signature]

Date Reviewed: Aug 14, 2019

H. azteca Water-only Toxicity Test Data Sheet

~~14~~-d Survival and Weight 28

Client: Teck
Work Order No: 190908
Sample ID: Various - See below

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (T2 start)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~	21	A	5	1	4	MLT ②	1063.88	1064.47	5	
GH-FR1	22	B	~~4~~ 8	~~4~~ 0	2		1059.42	1060.10	8	
	23	C	~~5~~ 9	~~4~~ 0	~~0~~ 1		1047.66	1048.68	9	
	24	D	~~4~~ 6	4	~~2~~ 0		1070.52	1071.42	6	
	25	E	7	0	3		1057.92	1058.61	7	
GH-ERC	26	A	7	0	3		1054.53	1055.26	7	
	27	B	9	1	0		1038.37	1039.55	9	
	28	C	4	0	6		1062.77	1063.27	4	
	29	D	7	0	3		1063.36	1063.98	7	
	30	E	10	0	0		1036.06	1037.14	10 ~~8~~ ③	
GH-ER2	31	A	1 ①	2	7	JW	1038.29	1038.31	1	
	32	B	6 ①	3	1		1064.77	1065.44	6	
	33	C	4 ①	1	5		1037.33	1037.81	4	
	34	D	8	0	2		1025.75	1026.64	8	
	35	E	9	0	1		1046.98	1048.08	9	
CM-MC1	36	A	JW ~~8~~ 7	0	JW ~~3~~	JW	1054.98	1055.63	7	
	37	B	6	2	JW ~~3~~ 2		1085.24	1085.73	6	
	38	C	6	2	2		1043.30	1044.00	6	
	39	D	4	3	3		1081.00	1081.35	4	
	40	E	8	0	2		1069.84	1073.33	8	

Comments: ① checked by MLT ② checked by JW ~~③ 2 organisms lost in transfer~~
Reweighed pans: 24 - 1071.30 ~~35~~ 35 - 1048.00 JW

Reviewed by: [signature]

Date Reviewed: Aug 16, 2019

H. azteca Water-only Toxicity Test Data Sheet

~~14~~ 28-d Survival and Weight

Client: Teck
Work Order No: 190908
Sample ID: Various - See below

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (T2 Mack)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
↑ ~~Control~~	41	A	8	0	2		1037.82	1038.52	8	
CM_MC2	42	B	6	1	3	ST	1070.09	1070.65	6	
	43	C ①	–	–	–	–	1060.16	–	–	
	44	D	8	0	2	ST	1058.15	1059.23	8	
↓	45	E	9	0	1	ST	1042.13	1046.29	9	
CM_MIDAG1	46	A	10	0	0	SSM	1053.24	1055.10	10	
	47	B	3	1	6		1047.56	1047.82	3	
	48	C	~~7~~ 8	~~3~~ 2	0		1030.38	1031.24	8	
	49	D	6	3	1		1063.44	1064.38	6	
↓	50	E	1	4	5		1050.11	1050.13	1	
EV_MC2	51	A	6	0	4	↓	1052.58	1053.28	6	
	52	B	10	0	0		1050.42	1051.94	10	
	53	C	7	2	1		1049.84	1050.~~08~~35	7 ~~2~~ ②	
	54	D	6	1	3		1057.72	1058.59	6	
↓	55	E	7	0	3		1045.94	1047.20	7	
EV_HC1	56	A	5	2	3		1063.77	1064.15	5	
	57	B	2	0	8		1057.70	1057.93	2	
	58	C	~~2~~ 3	2	~~3~~ 5	↓	1030.47	1030.80	3 ~~2~~	
	59	D	2	4	4	SZ	1024.76	1025.01	2	
↓	60	E	2	0	8	↓	1058.23	1058.52	2	↓

Comments: ① jar broken ② pan flipped and organisms lost and replaced upon pan. Reweighed pans 52 - 1051.87 59 - 1024.74

Reviewed by: [signature]

Date Reviewed: Aug. 14, 2019

4/6

H. azteca Water-only Toxicity Test Data Sheet

~~14~~ 28-d Survival and Weight

Client: Teck
Work Order No: 190908
Sample ID: Various - see below

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (TZ black)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~	61	A	JL ~~7~~ 8	0	JL ~~3~~ 2	JL	1065.83	1066.32	7 ③	
LC-SLC	62	B	1	0	9	JL	1049.78	1049.80	1	
	63	C	1	JL ~~0~~ ~~1~~ 4	5 ~~9~~ ~~8~~ JL	JL	1054.90	1054.92	1	
	64	D	JL ~~3~~ 7	JL ~~3~~ ~~4~~ 0	JL ~~4~~ ~~3~~ 3	JL	1074.27	1074.95	7	
	65	E	3	4	3	JL	1051.90	1052.06	3	
LC-LCDSSLCC	66	A	3 ②	4	3	MG	1057.26	1057.60	3	
	67	B	8	0	2		1075.67	1076.47	8	
	68	C	9	0	1		1047.50	1048.85	9	
	69	D	1 ①	5	4		1052.00	1052.06	1	
	70	E	4 ①	2	4		1061.92	1062.37	4	
LC-LC3	71	A	6 ①	0	4	MG	1083.71	1084.13	6	
	72	B	9	0	1		1050.63	1055.71	9	
	73	C	7 ①	1	2		1076.66	1077.66	7	
	74	D	6 ①	2	2		1069.94	1070.47	6	
	75	E	2 ②	2	6		1053.19	1053.30	2	
LC-LC5	76	A	9	0	1		1079.72	1080.38	9	
	77	B	2	3	5	JL	1058.14	1058.33	2	
	78	C	3	2	5	JL	1079.45	1079.68	3	
	79	D	2	0	8	ST	1051.70	1051.87	2	
	80	E	9	1	0		1060.70	1061.54	9	

Comments: ① checked by SSM ② checked by JW ③ 1 lost in transfer
Reweighed pans 68 - 1048.63 80 - 1061.47

Reviewed by: [signature]

Date Reviewed: Aug 14, 2019

5/6

H. azteca Water-only Toxicity Test Data Sheet

~~14~~ 28-d Survival and Weight

Client: Teck.

Work Order No: 190908

Sample ID: Various, see below

Start Date: May 9/19

Termination Date: Jun 6/19

Test Organism: *Hyalella azteca*

Balance: 1

Sample ID	T2 Pan No. Hall	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
↑ Control ~~A~~	81	A	9	0	1	ST	1068.63	1070.37	9	~~A~~
LC-DCDS	82	B	9	0	1	ST	1057.62	1059.06	9	
	83	C	8 ②	0	2	ST	1053.39	1055.44	8	
	84	D	8	1	1	ST	1059.72	1060.43	8	
↓	~~85~~	E	9	0	1	ST	1068.07	1069.71	9	
EDTA Control	86	A	4 ①	0	6	~~A~~	1057.76	1057.93	4	
	87	B	2 ①	0	8	↓	1069.89	1070.00	2	
	88	C	3 ①	0	7		1063.23	1063.32	3	
	89	D	0	1	9		1058.61	—	—	
↓	90	E	0	0	10	JZ	1052.45	—	—	
FR-FRCP1 + EDTA	91	A	0 ②	0	10	JW	1068.37	—	—	
	92	B	8	0	2		1061.60	1062.38	8	
	93	C	7	1	2		1058.26	1058.77	7	
	94	D	JW 7 6 ①	1	3		1069.16	1069.66	6	
↓	95	E	0 ②	2	8	↓	1042.12	—	—	
CM-MCA + EDTA	96	A	8	0	2	JW	1053.95	1054.67	8	
	97	B	9	1	0		1087.00	1088.50	9	
	98	C	8	0	2		1063.01	1066.07	8	
	99	D	10	0	0		1066.24	1067.93	10	
↓	100	E	JW ~~10~~ 11	0	0	↓	1059.83	1062.75	11	↓

Comments: ① checked by MLT ② checked by SSM

Reweighed pans - 84-1060.31 92-1062.35

Reviewed by: [signature]

Date Reviewed: Aug. 14, 2019

H. azteca Water-only Toxicity Test Data Sheet

14-d Survival and Weight

Client: Teck
Work Order No: 190908
Sample ID: Various, see below

Start Date: May 9/19
Termination Date: Jun 6/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No.	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~	101	A	10	0	0	JW	1054.07	1054.91	10	
RG_MIDA(2)+EDTA	102	B	8	0	2	MJ	1089.95	1090.62	8	
	103	C	6	2	2	JW	1061.65	1062.16	6	
	104	D	7	1	2	JW	1043.60	1044.27	7	
	105	E	8	0	2	MJ	1023.68	1024.34	8	
		A								
		B								
		C								
		D								
		E								
		A								
		B								
		C								
		D								
		E								
		A								
		B								
		C								
		D								
		E								

Comments:

Reviewed by: [signature]

Date Reviewed: Aug. 14, 2019

APPENDIX D – *Oncorhynchus mykiss* Toxicity Test Data

Embryo-Alevin Test Summary Sheet

Client: Teck
Work Order No.: 190906
Test Date: May 8 - June 7, 2019
Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: Various - see table below
Sample Date: May 7, May 14, May 21, May 28 and June 4, 2019
Date Received: May 8, May 15, May 22, May 29 and June 5, 2019
Sample Volume: (1-5) x 20 L per refresh

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L CaCO3): 8 - 10
Alkalinity (mg/L CaCO3): 8 - 10

Test Organism Information:

Batch No: 050819
Source: Ted's Trout, Campbell Lake, BC
Number male broodstock used: 4
Loading Density: 1.21 g/L
Number female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE121
Stock Solution ID: 19S01
Date Initiated: May 8, 2019
7-d EC50 (95% CL): 7.2 (7.0 - 7.5) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.0 - 7.9) mg/L SDS
Reference Toxicant CV (%): 35

Test Results:

Sample ID	Survival (%) (Mean ± SD)	Normal (%) (Mean ± SD)	Length (mm) (Mean ± SD)	Wet weight (mg) (Mean ± SD)
Control	83.3 ± 5.8	78.8 ± 8.6	21.1 ± 0.5	97.2 ± 2.1
FR_UFR1 †	88.0 ± 10.6	84.7 ± 13.3	21.4 ± 0.2	98.5 ± 1.7
GH_ER2 †	77.9 ± 10.9	73.5 ± 9.1	21.9 ± 0.6	106.6 ± 8.4
CM_MC1 †	76.3 ± 14.9	70.6 ± 17.8	21.6 ± 0.5	105.7 ± 2.0
LC_SLC †	78.1 ± 11.8	78.1 ± 11.8	20.6 ± 0.4 [2]	97.6 ± 2.5
FR_FRABCH †	61.1 ± 13.5 *,[1]	58.9 ± 9.6 *,[1,4]	20.2 ± 0.7 [2,3]	93.5 ± 7.9
FR_FRCP1 †	73.3 ± 3.3	68.9 ± 5.1	21.9 ± 0.1	116.1 ± 15.3
GH_FR1 †	57.8 ± 8.4 *,[1,2,4]	55.6 ± 10.1 *,[1,4]	21.6 ± 0.8	103.5 ± 8.7
GH_ERC †	78.7 ± 20.3	75.3 ± 18.3	21.7 ± 0.7	108.0 ± 2.1
CM_MC2 †	71.4 ± 7.0	67.2 ± 7.5	21.7 ± 0.9	107.7 ± 10.7
EV_MC2 †	76.2 ± 14.0	74.0 ± 15.7	22.1 ± 0.3	105.5 ± 9.5
EV_HC1 †	79.5 ± 11.2	71.9 ± 10.1	21.4 ± 0.6	109.1 ± 3.8
LC_DCDS †	79.5 ± 11.2	77.3 ± 12.7	22.2 ± 0.3	108.7 ± 5.5
LC_LC3 †	76.6 ± 11.6	74.5 ± 10.6	22.0 ± 0.3	114.9 ± 8.0
LC_LC5 †	75.8 ± 5.2	70.3 ± 9.0	21.6 ± 0.3	109.6 ± 1.2
LC_LCDSSLCC †	84.2 ± 8.8	79.7 ± 11.8	21.9 ± 0.6	111.8 ± 4.6

† + 20 µg/L Cu

* Indicates results that were significantly lower relative to the laboratory control
[1] Indicates results that were significantly lower relative to reference site FR_UFR1
[2] Indicates results that were significantly lower relative to reference site GH_ER2
[3] Indicates results that were significantly lower relative to reference site CM_MC1
[4] Indicates results that were significantly lower relative to reference site LC_SLC

Reviewed by: JCM
Date reviewed: Aug 19/19

Rainbow Trout Embryo-Alevin Toxicity Test - Overall Results

Client: Teck
WO#: 190906

Test Initiation Date: May 8, 2019
Test Termination Date: June 7, 2019

*Final results excluded Rep 4 (D) - see statistical Analyses pages - due to poor egg quality.

	Test Conc.		Mortality Counts Day	Day	Day	Total	Abnormal	Normal	Total No.	Total No.				Normal Alevins		
	(% v/v)	Rep	1 - 12	13 - 24	25 - 30	Dead	Alevins	Alevins	Alevins	Exposed	Survival					
Control	Control	1	0	0	7	7	2 (1)	21	23	30	76.7			70.0		
		2	0	0	4	4	2 (2)	23	25	29	86.2			79.3		
		3	1	2	1	4	0	27	27	31	87.1	Mean	SD	87.1	Mean	SD
		4	30	0	0	30	0	0	0	30	0.0	62.5	41.9	0.0	59.1	40.0
1	100	1	0	2	4	6	1 (3)	23	24	30	80.0			76.7		
FR_UFR1		2	1	3	1	5	2 (4)	24	26	31	83.9			77.4		
+ 20 µg/L Cu		3	0	0	0	0	0	30	30	30	100.0	Mean	SD	100.0	Mean	SD
		4	28	0	2	30	0	0	0	30	0.0	66.0	44.8	0.0	63.5	43.7
2	100	1	0	2	7	9	1 (5)	20	21	30	70.0			66.7		
GH_ER2		2	2	6	0	8	1 (6)	21	22	30	73.3			70.0		
+ 20 µg/L Cu		3	2	0	1	3	2 (9)	26	28	31	90.3	Mean	SD	83.9	Mean	SD
		4	30	0	0	30	0	0	0	30	0.0	58.4	39.9	0.0	55.1	37.5
3	100	1	0	5	5	10	3 (7)	16	19	29	65.5			55.2		
CM_MC1		2	0	9	0	9	1 (4)	20	21	30	70.0			66.7		
+ 20 µg/L Cu		3	0	0	2	2	1 (3)	27	28	30	93.3	Mean	SD	90.0	Mean	SD
		4	25	1	3	29	0	0	0	29	0.0	57.2	40.0	0.0	53.0	38.2
4	100	1	0	1	6	7	0	24	24	31	77.4			77.4		
LC_SLC		2	1	7	2	10	0	20	20	30	66.7			66.7		
+ 20 µg/L Cu		3	0	0	3	3	0	28	28	31	90.3	Mean	SD	90.3	Mean	SD
		4	26	1	2	29	0	0	0	29	0.0	58.6	40.2	0.0	58.6	40.2
5	100	1	0	5	2	7	2 (10)	21	23	30	76.7			70.0		
FR_FRABCH		2	3	8	3	14	0	16	16	30	53.3			53.3		
+ 20 µg/L Cu		3	6	5	3	14	0	16	16	30	53.3	Mean	SD	53.3	Mean	SD
		4	30	0	0	30	0	0	0	30	0.0	45.8	32.5	0.0	44.2	30.5
6	100	1	1	4	4	9	2 (11)	19	21	30	70.0			63.3		
FR_FRCP1		2	0	6	1	7	1 (12)	22	23	30	76.7			73.3		
+ 20 µg/L Cu		3	2	5	1	8	1 (6)	21	22	30	73.3	Mean	SD	70.0	Mean	SD
		4	29	0	1	30	0	0	0	30	0.0	55.0	36.8	0.0	51.7	34.7
7	100	1	0	8	8	16	1 (13)	15	16	32	50.0			46.9		
GH_FR1		2	2	7	1	10	0	20	20	30	66.7			66.7		
+ 20 µg/L Cu		3	3	9	1	13	1 (3)	16	17	30	56.7	Mean	SD	53.3	Mean	SD
		4	29	1	0	30	0	0	0	30	0.0	43.3	29.7	0.0	41.7	29.0
8	100	1	1	7	5	13	0	17	17	30	56.7			56.7		
GH_ERC		2	0	5	0	5	2 (14)	22	24	29	82.8			75.9		
+ 20 µg/L Cu		3	1	0	0	1	1 (13)	28	29	30	96.7	Mean	SD	93.3	Mean	SD
		4	28	0	1	29	0	0	0	29	0.0	59.0	42.7	0.0	56.5	40.5
9	100	1	2	7	2	11	0	19	19	30	63.3			63.3		
CM_MC2		2	1	5	2	8	4 (15)	20	24	32	75.0			62.5		
+ 20 µg/L Cu		3	1	5	1	7	0	22	22	29	75.9	Mean	SD	75.9	Mean	SD
		4	30	0	0	30	0	0	0	30	0.0	53.5	36.2	0.0	50.4	34.2
10	100	1	0	4	7	11	1 (13)	17	18	29	62.1			58.6		
EV_MC2		2	0	7	0	7	1 (16)	22	23	30	76.7			73.3		
+ 20 µg/L Cu		3	0	2	1	3	0	27	27	30	90.0	Mean	SD	90.0	Mean	SD
		4	30	0	0	30	0	0	0	30	0.0	57.2	39.8	0.0	55.5	39.2
11	100	1	1	2	3	6	4 (17)	21	25	31	80.6			67.7		
EV_HC1		2	0	9	1	10	1 (12)	20	21	31	67.7			64.5		
+ 20 µg/L Cu		3	1	1	1	3	2 (18)	25	27	30	90.0	Mean	SD	83.3	Mean	SD
		4	30	0	0	30	0	0	0	30	0.0	59.6	40.8	0.0	53.9	36.9
12	100	1	0	3	3	6	1 (13)	24	25	31	80.6			77.4		
LC_DCDS		2	1	8	1	10	1 (13)	20	21	31	67.7			64.5		
+ 20 µg/L Cu		3	2	1	0	3	0	27	27	30	90.0	Mean	SD	90.0	Mean	SD
		4	28	0	1	29	0	0	0	29	0.0	59.6	40.8	0.0	58.0	40.0
13	100	1	0	5	4	9	1 (16)	21	22	31	71.0			67.7		
LC_LC3		2	3	5	1	9	0	20	20	29	69.0			69.0		
+ 20 µg/L Cu		3	1	1	1	3	1 (3)	26	27	30	90.0	Mean	SD	86.7	Mean	SD
		4	27	3	0	30	0	0	0	30	0.0	57.5	39.5	0.0	55.8	38.2
14	100	1	0	1	6	7	1 (5)	23	24	31	77.4			74.2		
LC_LC5		2	0	7	2	9	3 (19)	18	21	30	70.0			60.0		
+ 20 µg/L Cu		3	2	2	2	6	1 (6)	23	24	30	80.0	Mean	SD	76.7	Mean	SD
		4	30	0	0	30	0	0	0	30	0.0	56.9	38.1	0.0	52.7	35.9
15	100	1	1	0	4	5	3 (20)	22	25	30	83.3			73.3		
LC_LCDSSLCC		2	0	7	0	7	1 (21)	21	22	29	75.9			72.4		
+ 20 µg/L Cu		3	1	0	1	2	0	28	28	30	93.3	Mean	SD	93.3	Mean	SD
		4	30	0	0	30	0	0	0	30	0.0	63.1	42.7	0.0	59.8	41.0

① 1 abnormal jaw, 1 yolksac edema
② 1 abnormal growth on head, 1 scoliosis
③ 1 abnormal eye
④ 1 abnormal eye, 1 abnormal jaw
⑤ 1 abnormal jaw
⑥ 1 scoliosis
⑦ 1 abnormal jaw, 1 partially hatched (head unhatched)
⑨ 1 kyphosis, 1 yolksac edema, 1 yolksac edema + abnormal jaw
⑨ 1 lordosis
⑩ 1 lordosis, 1 yolksac edema
⑪ 1 kyphosis, 1 scoliosis + abnormal eye
⑫ 1 kyphosis
⑬ 1 yolksac edema
⑭ 1 abnormal growth on head, 1 kyphosis
⑮ 1 abnormal eye, 3 kyphosis
⑯ 1 yolksac edema + abnormal jaw
⑰ 1 yolksac edema, 1 kyphosis, 1 yolksac edema + abnormal jaw, 1 yolksac edema
⑱ 2 kyphosis
⑲ 1 kyphosis, 1 kyphosis + abnormal growth on head, 1 yolksac edema
⑳ 1 yolksac edema, 1 yolksac edema + abnormal jaw, 1 abnormal jaw
㉑ 1 kyphosis + abnormal growth on head.

JGe
Aug. 19/19

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

Control Concentration	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.2	10.3	10.2	10.2	10.3	10.2	9.9	10.2	10.0	10.2	10.1	10.2	10.1
pH	6.9	6.6	6.8	6.9	6.9	7.1	7.0	7.1	6.8	6.9	6.9	6.6	6.8
Cond. (µS/cm)	32	33		33		33		34		33		30	
Initials	MW	MW		MW		A		MW		MW		MW	

FR_UFR1 Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.3	10.1	10.2	10.0	10.2	10.1	9.8	10.1	10.0	9.9	10.1	10.2	10.1
pH	7.7	7.6	7.9	7.7	7.9	7.9	7.9	7.9	7.9	7.8	7.9	7.8	7.9
Cond. (µS/cm)	274	275		277		276		277		275		284	
Initials	MW	MW		MW		A		MW		MW		MW	

GM_ER2 Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.1	10.0	10.2	10.1	10.3	10.1	9.9	10.1	10.1	10.0	10.1	10.2	10.2
pH	7.8	7.8	8.0	7.8	8.0	8.0	8.0	8.0	8.0	7.9	8.1	8.0	8.0
Cond. (µS/cm)	313	312		313		313		314		312		321	
Initials	MW	MW		MW		A		MW		MW		MW	

CM_MCl Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.2	10.2	10.2	10.1	10.2	10.1	9.8	10.1	10.0	10.0	10.2	10.2	10.1
pH	7.7	7.7	7.9	7.8	7.9	7.9	8.1	8.0	7.9	7.9	8.0	7.9	8.1
Cond. (µS/cm)	256	256		256		257		259		258		259	
Initials	MW	MW		MW		A		MW		MW		MW	

Thermometer: CER#3 DO meter: 213 (probe) | 213 pH meter: 213 (probe) | 213 Conductivity meter: 213 (probe) | 213

	Control	FR_UFR1	GM_ER2	CM_MCl
Hardness*	9	178	160	130
Alkalinity*	10	130	128	118

* mg/L as CaCO3

Analysts: AWD, MW
Reviewed by: JBL
Date reviewed: Aug 12/19

Sample Description: FR_UFR1, GM_ER2, CM_MCl - clear, no colour, no odour, no particulates

Comments: used stock soln 19(001 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

LC_SLC Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	13.5	14.0	13.5	13.5
DO (mg/L)	10.2	10.1	10.2	10.1	10.2	10.1	9.8	10.1	10.0	10.0	10.1	10.2	10.3
pH	7.8	7.8	8.0	7.8	8.0	7.9	8.1	7.9	8.0	7.9	8.1	7.8	8.0
Cond. (µS/cm)	341	342		342		342		343		342		348	
Initials	MM	MM		MM		M		MM		MM		MM	

FR_FRABCH Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	13.5	14.0	13.5	13.5
DO (mg/L)	10.2	10.2	10.3	10.0	10.2	10.0	9.9	10.2	10.0	9.9	10.1	10.2	10.2
pH	7.7	7.7	8.1	7.7	8.1	7.8	8.2	7.8	8.1	7.7	8.1	7.8	8.1
Cond. (µS/cm)	1112	1112		1114		1112		1113		1111		1117	
Initials	MM	MM		MM		M		M		MM		MM	

FR_FRCP1 Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	13.5	14.0	13.5	13.5
DO (mg/L)	9.8	10.1	10.2	9.9	10.3	10.1	9.8	10.1	10.0	10.0	10.1	10.2	10.2
pH	8.1	8.1	8.1	8.1	8.2	8.1	8.2	8.1	8.1	8.1	8.2	8.1	8.2
Cond. (µS/cm)	921	923		926		924		925		924		940	
Initials	MM	MM		MM		M		MM		MM		MM	

GH_FR1 Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	13.5	14.0	13.5	13.5
DO (mg/L)	10.3	10.2	10.2	10.0	10.2	10.1	9.9	10.2	10.1	9.9	10.1	10.0	10.2
pH	8.1	8.1	8.2	8.1	8.2	8.2	8.2	8.1	8.2	8.1	8.2	8.1	8.3
Cond. (µS/cm)	903	908		909		908		910		906		918	
Initials	MM	MM		MM		M		MM		MM		MM	

Thermometer: CER#3 **DO meter:** 213 / 213 (probe) **pH meter:** 213 / 213 (probe) **Conductivity meter:** 213 / 213 (probe)

	~~Control~~ LC_SLC	FR_FRABCH	FR_FRCP1	GH_FR1
Hardness*	180	580	600	500
Alkalinity*	128	210	220	240

* mg/L as CaCO3

Analysts: AWD, MM
Reviewed by: JGK
Date reviewed: Aug. 12/19

Sample Description: LC_SLC, FR_FRABCH, FR_FRCP1, GH_FR1 - clear, no colour, no odour, no particulates,

Comments: used stock soln 19Cu01 (100 mg/L Cu)

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Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

GH-ERC Concentration ± 20 µg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.0	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.2	10.1	10.2	10.0	10.3	10.1	9.9	10.1	10.1	10.1	10.2	10.1	10.3
pH	7.8	8.0	8.1	7.9	8.1	7.9	8.1	8.0	8.2	8.0	8.2	8.0	8.2
Cond. (µS/cm)	344	346		345		347		346		346		347	
Initials	MM	MM		MM		~		MM		MM		MM	

CM-MC2 Concentration ± 20 µg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.4	10.2	10.2	10.1	10.3	10.1	9.8	10.0	10.2	10.0	10.1	10.0	10.1
pH	8.0	8.1	8.1	8.1	8.2	8.1	8.2	8.1	8.2	8.1	8.2	8.1	8.3
Cond. (µS/cm)	730	736		738		740		739		737		741	
Initials	MM	MM		MM		~		MM		MM		MM	

EV-MC2 Concentration ± 20 µg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.4	10.2	10.3	10.0	10.2	10.1	9.7	10.1	10.1	10.0	10.1	9.9	10.2
pH	7.8	7.8	8.0	7.8	8.0	7.9	8.1	7.9	8.1	7.9	8.1	8.0	8.1
Cond. (µS/cm)	400	400		403		401		400		406		409	
Initials	MM	MM		MM		~		MM		MM		MM	

EV-HCl Concentration ± 20 µg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.3	10.3	10.3	10.0	10.2	10.1	9.9	10.1	10.1	10.0	10.2	9.9	10.2
pH	8.0	8.0	8.2	8.0	8.2	8.1	8.3	8.1	8.2	8.1	8.2	8.1	8.2
Cond. (µS/cm)	690	694		693		695		694		692		695	
Initials	MM	MM		MM		~		MM		MM		MM	

Thermometer: CER#3 **DO meter:** 213 (GH-ERC probe) / 213 **pH meter:** 213 (probe) / 213 **Conductivity meter:** 213 (probe) / 213

	~~Control~~ GH-ERC	CM-MC2	EV-MC2	EV-HCl
Hardness*	310	510	320	370
Alkalinity*	180	210	150	220

* mg/L as CaCO3

Analysts: AWD, MM

Reviewed by: JM
Date reviewed: Aug. 12/19

Sample Description: GH-ERC, CM-MC2, EV-MC2, EV-HCl - clear, no colour, no odour, no particulates.

Comments: used stock soln 19CU01 (100 mg/L Cu)

AB 4/20

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 1909016

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

LC-DCDS Concentration ± 20 mg/L Cu

	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	13.0	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.0	10.2	10.2	10.0	10.2	10.1	9.8	10.2	10.1	10.0	10.1	10.0	10.1
pH	8.5	8.5	8.0	8.4	8.0	8.4	8.1	8.4	8.1	8.4	8.1	8.5	8.1
Cond. (µS/cm)	458	460		465		469		467		462		467	
Initials	MM	MM		MM		~		MM		MM		MM	

LC-LC3 Concentration ± 20 mg/L Cu

	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	9.9	10.2	10.3	10.1	10.2	10.1	9.9	10.1	10.0	9.9	10.1	10.0	10.1
pH	7.8	7.8	8.2	7.9	8.2	8.0	8.2	8.0	8.2	7.9	8.2	8.0	8.2
Cond. (µS/cm)	1004	1005		1038		1028		1030		1024		1025	
Initials	MM	MM		MM		~		MM		MM		MM	

LC-LC5 Concentration ± 20 mg/L Cu

	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.2	10.1	10.2	10.1	10.2	10.1	9.8	10.0	10.2	9.9	10.1	9.3	10.2
pH	8.1	8.1	8.2	8.1	8.2	8.1	8.2	8.0	8.2	8.1	8.3	8.1	8.3
Cond. (µS/cm)	780	798		798		801		803		798		801	
Initials	MM	MM		MM		~		MM		MM		MM	

LC-LCDSSLCC Concentration ± 20 mg/L Cu

	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.0	10.1	10.2	10.1	10.2	10.2	9.9	10.1	10.1	10.0	10.2	9.8	10.2
pH	8.1	8.1	8.2	8.1	8.2	8.1	8.3	8.1	8.2	8.1	8.3	8.1	8.3
Cond. (µS/cm)	806	813		813		816		813		817		817	
Initials	MM	MM		MM		~		MM		MM		MM	

Thermometer: CER#3 **DO meter:** 2/3 | 213 (LC-DCDS probe) **pH meter:** 2/3 | 213 (probe) **Conductivity meter:** 2/3 | 213 (probe)

	~~Control~~	LC-LC3	LC-LC5	LC-LCDSSLCC
Hardness*	410	690	460	540
Alkalinity*	180	220	230	220

* mg/L as CaCO3

Analysts: AWD, MM

Reviewed by: JGH

Date reviewed: Aug. 12/19

Sample Description: LC-DCDS, LC-LC3, LC-LC5, LC-LCDSSLCC / clear, no colour, no odour, no particulates

Comments: used stock soln 19C001 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

Control Concentration	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	14.0
DO (mg/L)	10.0	10.1	10.1	10.0	10.2	10.1	10.1	10.1	10.1	10.1	10.2	10.3	10.2	10.1
pH	6.9	7.0	6.7	6.8	7.0	6.9	6.8	7.1	7.0	7.1	6.9	6.8	6.7	7.0
Cond. (µS/cm)	32		32		31		32		32		32		31	
Initials	MM		MM		MM		A		A		MM		MM	

FR_UFR1 Concentration + 20 mg/L Cu	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	14.0
DO (mg/L)	10.0	10.2	10.0	10.1	10.1	10.2	10.0	10.1	10.2	10.1	10.0	10.1	10.0	10.2
pH	7.7	7.9	7.9	7.9	7.8	7.9	7.8	8.0	7.8	8.0	7.8	7.9	7.8	8.0
Cond. (µS/cm)	276		236		235		234		235		236		233	
Initials	MM		MM		MM		A		A		MM		MM	

GH-ER2 Concentration + 20 mg/L Cu	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	14.0
DO (mg/L)	9.9	10.1	9.9	10.1	10.2	10.2	10.1	10.1	10.0	10.1	10.0	10.1	9.9	10.1
pH	7.9	8.0	7.9	8.0	7.9	8.0	8.0	8.0	7.9	8.0	7.9	8.0	8.0	8.0
Cond. (µS/cm)	314		292		293		294		293		292		295	
Initials	MM		MM		MM		A		A		MM		MM	

CM_MCI Concentration + 20 mg/L Cu	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	14.0
DO (mg/L)	9.9	10.1	10.0	10.1	10.2	10.1	10.1	10.1	10.0	10.1	10.0	10.2	9.8	10.2
pH	7.8	8.1	7.8	8.1	7.8	8.0	8.1	8.0	7.8	8.0	7.8	8.1	7.8	8.0
Cond. (µS/cm)	256		186①		235	186	187		188		189		192	
Initials	MM		MM		MM		A		A		MM		MM	

Thermometer: CER #3 DO meter: 213 / 213 (probe) pH meter: 213 / 213 (probe) Conductivity meter: 213 / 213 (probe)

	Control	FR_UFR1	GH-ER2	CM_MCI
Hardness*	9	154	156	124
Alkalinity*	10	120	132	112

* mg/L as CaCO3

Analysts: AWD, MM
Reviewed by: JPM
Date reviewed: Aug. 12/19

Sample Description: FR_UFR1, GH-ER2, CM_MCI - clear, no colour, no odour, no particulates

Comments: ① confirmed w/ 2nd c-meter; used stock saline 19(vol) (100 mg/L Cu)

B6/20

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: ~~May~~ June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

LC-SLC Concentration + 20 mg/L Cu	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	14.0
DO (mg/L)	10.1	10.2	10.0	10.1	10.1	10.2	10.1	10.1	10.0	10.2	10.1	10.2	10.0	10.2
pH	7.8	8.0	7.8	8.1	7.8	8.1	8.1	8.0	7.9	8.0	7.8	8.1	7.8	8.0
Cond. (µS/cm)	343		2350		235		236		235		236		239	
Initials	MM		MM		MM		AP		AP		MM		MM	

FR-FRABCH Concentration + 20 mg/L Cu	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	14.0	14.0
DO (mg/L)	10.2	10.2	9.7	10.1	10.1	10.2	10.11	10.1	9.9	10.2	9.9	10.2	9.8	10.2
pH	7.7	8.1	7.8	8.0	7.7	8.1	8.0	8.0	7.8	8.0	7.8	8.0	7.8	8.0
Cond. (µS/cm)	1108		705		704		708		707		705		709	
Initials	MM		MM		MM		AP		AP		MM		MM	

FR-FRCP1 Concentration + 20 mg/L Cu	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	14.0	14.0
DO (mg/L)	10.2	10.3	9.9	10.1	10.1	10.2	10.1	10.0	9.8	9.9	9.9	10.2	9.8	10.1
pH	8.1	8.2	8.0	8.2	8.0	8.2	8.0	8.1	8.0	8.0	8.0	8.1	8.0	8.2
Cond. (µS/cm)	926		4920		490		489		490		492		494	
Initials	MM		MM		MM		AP		AP		MM		MM	

GH-FR1 Concentration + 20 mg/L Cu	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	14.0	14.0
DO (mg/L)	10.1	10.2	10.0	10.1	10.2	10.1	9.9	10.2	9.9	10.2	10.0	10.2	9.9	10.1
pH	8.1	8.3	8.0	8.2	8.0	8.2	8.2	8.1	8.0	8.0	8.0	8.1	8.0	8.1
Cond. (µS/cm)	910		6240		627		626		625		623		624	
Initials	MM		MM		MM		AP		AP		MM		MM	

Thermometer: CER#3 **DO meter:** 213 / 213 (LC-SLC probe) **pH meter:** 213 / 213 (probe) **Conductivity meter:** 213 / 213 (probe)

	~~Control~~	FR-FRABCH	FR-FRCP1	GH-FR1
Hardness*	162	500	270	440
Alkalinity*	118	190	140	210

* mg/L as CaCO3

Analysts: AWD, YM
Reviewed by: JM
Date reviewed: Aug. 12/19

Sample Description: LC-SLC, FR-FRABCH, FR-FRCP1, GH-FR1 - clear, no colour, no odour, no particulates

Comments: ① confirmed w/ 2nd c-meter; used stock soln 19Cu01 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

B37/20

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

GH-ERC Concentration + 20 mg/L Cu

	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	14.0
DO (mg/L)	9.9	10.1	10.0	10.2	10.1	10.2	10.0	10.0	10.0	10.1	10.0	10.2	9.9	10.2
pH	8.0	8.2	7.9	8.2	7.9	8.2	8.0	8.1	8.0	8.2	7.9	8.1	8.0	8.1
Cond. (µS/cm)	346		336		336		342		345		341		339	
Initials	MM		MM		MM		A		A		MM		MM	

CM-MC2 Concentration + 20 mg/L Cu

	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	14.0
DO (mg/L)	10.2	10.1	10.1	10.2	9.9	10.1	10.0	10.0	10.1	10.1	9.9	10.2	9.8	10.2
pH	8.1	8.3	7.9	8.2	7.9	8.2	8.0	8.1	8.0	8.2	7.9	8.2	8.0	8.2
Cond. (µS/cm)	740		460 ①		465		463		465		465		461	
Initials	MM		MM		MM		A		A		MM		MM	

EV-MC2 Concentration + 20 mg/L Cu

	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	14.0
DO (mg/L)	10.1	10.2	10.1	10.2	10.0	10.2	10.0	9.9	10.0	10.2	9.9	10.2	9.9	10.1
pH	8.0	8.1	7.7	8.1	7.8	8.1	7.9	8.0	8.0	8.1	7.7	8.0	7.8	8.0
Cond. (µS/cm)	408		238 ①		237		241		245		238		239	
Initials	MM		MM		MM		A		A		MM		MM	

EV-HCl Concentration + 20 mg/L Cu

	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	14.0
DO (mg/L)	9.8	10.2	10.0	10.1	10.1	10.2	10.0	10.0	10.0	10.2	10.1	10.3	10.1	10.1
pH	8.0	8.2	7.9	8.2	7.9	8.1	8.0	8.1	8.0	8.1	7.9	8.1	8.0	8.1
Cond. (µS/cm)	694		437 ①		437		438		440		438		441	
Initials	MM		MM		MM		A		A		MM		MM	

Thermometer: CTR #3 DO meter: 213 | 213 pH meter: 213 | 213 (probe) Conductivity meter: 213 | 213 (probe)

	GH-ERC Control	CM-MC2	EV-MC2	EV-HCl
Hardness*	300	440	300	330
Alkalinity*	170	180	130	170

* mg/L as CaCO3

Analysts: AWD, MM
Reviewed by: JGW
Date reviewed: Aug. 12/19

Sample Description: GH-ERC, CM-MC2, EV-MC2, EV-HCl - clear, no colour, no odour, no particulates

Comments: ① confirmed w/ 2nd C-meter; used stock soln 19 vol (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

LC-DCDS Concentration + 20 mg/L Cu

	Days 7 new	7 old	8 new	8 old	9 new	9 old	10 new	10 old	11 new	11 old	12 new	12 old	13 new	13 old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.6	14.0	13.5	14.0	13.5	14.0	14.0
DO (mg/L)	10.0	10.2	9.9	10.2	10.1	10.2	10.0	9.8	10.1	10.2	10.0	10.2	9.9	10.2
pH	8.4	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.0	8.0	8.1
Cond. (µS/cm)	471		398		399		404		401		396		404	
Initials	MM		MM		MM		AP		AP		MM		MM	

LC-LC3 Concentration + 20 mg/L Cu

	Days new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.6	14.0	13.5	13.5	13.5	14.0	14.0
DO (mg/L)	9.8	10.2	9.9	10.1	10.2	10.3	10.1	9.9	10.2	10.1	10.2	10.1	10.0	10.2
pH	8.0	8.2	7.8	8.1	7.9	8.2	8.0	8.1	8.0	8.2	7.8	8.1	8.0	8.1
Cond. (µS/cm)	1031		807 ①		806		810		812		805		810	
Initials	MM		MM		MM		AP		AP		MM		MM	

LC-LC5 Concentration + 20 mg/L Cu

	Days new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.6	14.0	13.6	14.0	13.5	14.0	14.0
DO (mg/L)	9.9	10.2	10.2	10.1	10.2	10.3	10.0	9.9	10.1	10.2	9.8	10.2	10.0	10.1
pH	8.1	8.3	8.0	8.2	8.0	8.2	8.0	8.2	8.0	8.1	8.0	8.1	8.0	8.1
Cond. (µS/cm)	801		586 ①		590		593		594		585		586	
Initials	MM		MM		MM		AP		AP		MM		MM	

LC-LCDSSLCC Concentration + 20 mg/L Cu

	Days new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.6	14.0	13.6	13.5	13.5	14.0	14.0
DO (mg/L)	10.1	10.2	10.1	10.1	10.1	10.2	10.0	10.0	10.1	10.2	9.9	10.2	10.1	10.2
pH	8.1	8.3	7.9	8.3	7.9	8.2	8.0	8.2	8.0	8.2	8.0	8.2	7.9	8.2
Cond. (µS/cm)	817		541 ①		540		542		542		541		540	
Initials	MM		MM		MM		AP		AP		MM		MM	

Thermometer: CER#3 (LC-DCDS probe) DO meter: 213 | 213 pH meter: 213 | 213 (probe) Conductivity meter: 213 | 213 (probe)

	~~Control~~ Tank	LC-LC3	LC-LC5	LC-LCDSSLCC
Hardness*	380	600	400	460
Alkalinity*	160	160	180	170

* mg/L as CaCO3

Analysts: AWD, MM
Reviewed by: JH
Date reviewed: Aug. 12/19

Sample Description: LC-DCDS, LC-LC3, LC-LC5, LC-LCDSSLCC – clear, no colour, no odour, no particulates

Comments: ① confirmed w/ 2nd conductivity meter; used stock solln 19Cu01 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

RS 9/20

Client: Teck
Sample ID: (Various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

Control Concentration	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	10.1	10.0	10.1	10.2	10.0	10.1	10.1	10.1	10.1	9.9	10.1	10.2	10.0	10.2
pH	6.8	6.9	6.6	6.8	6.7	6.9	6.7	6.9	6.7	6.9	6.8	6.9	6.7	6.8
Cond. (µS/cm)	31		31		31		32		32		32		32	
Initials	MM		MM		MM		A		A		MM		MM	

FR-UTR1 Concentration + 20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.2	10.2	10.0	10.2	9.9	10.0	10.3	10.2	9.8	9.8	10.0	10.3	9.8	10.2
pH	7.8	8.0	7.8	8.0	7.8	7.9	7.6	7.8	7.6	7.9	7.7	7.8	7.7	7.9
Cond. (µS/cm)	241		253		251		250		250		252		254	
Initials	MM		MM		MM		A		A		MM		MM	

GH-ER2 Concentration + 20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.1	10.0	9.8	10.1	9.8	10.1	10.3	10.2	9.9	9.8	10.0	10.3	9.9	10.2
pH	7.9	8.0	7.8	8.0	7.8	8.0	7.6	7.9	7.6	8.0	7.7	7.8	7.7	8.0
Cond. (µS/cm)	297		297		297		295		297		294		298	
Initials	MM		MM		MM		A		A		MM		MM	

CM-MC1 Concentration + 20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.0	10.2	10.0	10.1	9.9	10.1	10.3	10.3	10.0	9.9	10.1	10.2	9.8	10.2
pH	7.9	8.0	7.7	8.0	7.7	7.9	7.5	7.8	7.5	8.0	7.6	7.8	7.6	8.0
Cond. (µS/cm)	190		215		214		214		215		213		215	
Initials	MM		MM		MM		A		A		MM		MM	

Thermometer: CER#3 DO meter: 213 / 213 (probe) pH meter: 213 / 213 (probe) Conductivity meter: 213 / 213 (probe)

	Control	FR-UTR1	GH-ER2	CM-MC1
Hardness*	9	~~425~~ 170	~~375~~ 150	~~315~~ 126
Alkalinity*	8	128	130	114

* mg/L as CaCO3

Analysts: AWD, YML
Reviewed by: JGH
Date reviewed: Aug 12/19

Sample Description: FR-UTR1, GH-ER2, CM-MC1 – clear, no colour, no odour, no particulates

Comments: used stock soln (Cu6) (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

AJ 10/20

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

LC-SLC Concentration +20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.5	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.1	10.1	10.0	10.2	9.8	10.1	10.3	10.2	10.3	9.9	10.1	10.1	9.9	10.3
pH	7.8	8.1	7.8	8.0	7.9	8.0	7.6	7.9	7.6	8.0	7.7	8.0	7.7	7.9
Cond. (µS/cm)	239		275		277		274		274		272		276	
Initials	MM		MM		MM		A		A		MM		MM	

FR-FRABCH Concentration +20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.1	10.1	10.0	10.2	9.9	10.0	10.3	10.2	10.3	9.8	10.0	10.1	9.7	10.2
pH	7.8	8.0	7.9	8.1	7.8	8.1	7.6	8.0	7.6	8.0	7.7	8.0	7.8	8.0
Cond. (µS/cm)	704		887 ①		890		887		890		885		886	
Initials	MM		MM		MM		A		A		MM		MM	

FR-FRCP1 Concentration +20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.0	10.1	9.8	10.2	9.7	10.0	10.3	10.2	10.3	9.9	10.1	10.1	9.8	10.3
pH	8.1	8.2	8.1	8.2	8.1	8.2	7.7	8.0	7.7	7.9	7.8	8.0	8.0	8.1
Cond. (µS/cm)	488		748 ①		746		745		745		741		746	
Initials	MM		MM		MM		A		A		MM		MM	

GH-FR1 Concentration +20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	14.0	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.0	10.2	9.9	10.2	9.9	10.1	10.3	10.2	10.3	9.9	10.0	10.2	10.0	10.3
pH	8.0	8.2	8.1	8.3	8.1	8.2	7.8	8.0	7.8	8.0	7.8	7.9	8.0	8.1
Cond. (µS/cm)	630		728		739		731		733		730		731	
Initials	MM		MM		MM		A		A		MM		MM	

Thermometer: CTR#3 (LC-SLC probe) **DO meter:** 213 / 213 (probe) **pH meter:** 213 / 213 (probe) **Conductivity meter:** 213 / 213 (probe)

	~~Control~~	FR_FRABCH	FR_FRCP1	GH_FR1
Hardness*	168 ~~420~~	540	560	460
Alkalinity*	122	190	2100	220

* mg/L as CaCO3

Analysts: AWD, MM
Reviewed by: JM
Date reviewed: Aug. 12/19

Sample Description: LC-SLC, FR_FRABCH, FR_FRCP1, GH-FR1 - clear, no colour, no odour, no particulates

Comments: ① confirmed w/ 2nd C-meter; used stock soln IGCU01 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

PB 11/20

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

GH-ERC ± 20 µg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.1	10.1	10.0	10.2	9.9	10.1	10.3	10.2	10.3	9.8	9.9	10.1	9.9	10.3
pH	7.9	8.1	7.9	8.1	7.9	8.1	7.8	8.0	7.6	8.0	7.7	7.9	7.8	8.0
Cond. (µS/cm)	335	~~238~~	326		329		327		328		329		327	
Initials	MM		MM		MM		A		A		MM		MM	

CM-MC2 ± 20 µg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.1	10.0	9.8	10.1	9.9	10.1	10.2	10.1	10.2	9.9	9.9	10.2	9.7	10.2
pH	7.8	8.1	7.9	8.2	7.9	8.1	7.8	8.0	7.8	8.0	7.8	7.9	7.9	8.0
Cond. (µS/cm)	461	~~726~~	585 ①		586		583		586		586		589	
Initials	MM		MM		MM		A		A		MM		MM	

EV-MC2 ± 20 µg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	9.8	10.0	9.9	10.2	9.8	10.1	10.2	10.2	10.2	9.8	9.8	10.1	9.8	10.2
pH	7.9 ~~8.1~~	8.2	7.8	8.2	7.8	8.1	7.5	8.0	7.5	8.0	7.9	8.0	7.8	8.0
Cond. (µS/cm)	342	~~454~~	359 ①		361		358		360		362		359	
Initials	MM		MM		MM		A		A		MM		MM	

EV-HCl ± 20 µg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.0	10.1	10.0	10.2	9.9	10.1	10.1	10.3	10.1	9.9	9.9	10.1	9.9	10.2
pH	8.0	8.2	8.0	8.2	8.0	8.2	7.8	8.1	7.8	8.0	7.9	8.0	7.9	8.1
Cond. (µS/cm)	445	~~629~~	535 ①		536		533		535		534		536	
Initials	MM		MM		MM		A		A		MM		MM	

Thermometer: CER#3 **DO meter:** 213 | 213 (probe) **pH meter:** 213 | 213 (probe) **Conductivity meter:** 213 | 213 (probe)

	~~Control~~ GH-ERC	CM-MC2	EV-MC2	EV-HCl
Hardness*	300	470	310	350
Alkalinity*	160	200	140	200

* mg/L as CaCO3

Analysts: AW, MM

Reviewed by: JH

Date reviewed: Aug. 12/19

Sample Description: GH-ERC, CM-MC2, EV-MC2, EV-HCl - clear, no colour, no odour, no particulates.

Comments: ① confirmed w/ 2nd C-meter; used stock soln 19Cu01 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

AB.12/20

Client: Teck
Sample ID: (various)
Work Order #: 1909060

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

LC-DCDS Concentration + 20 mg/L Cu

	Days 14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	9.9	10.1	10.0	10.2	10.0	10.1	10.1	10.1	10.1	9.9	9.9	10.1	9.9	10.2
pH	8.1	8.2	7.9	8.2	7.9	8.1	7.7	8.0	7.7	8.0	7.8	8.0	7.9	8.1
Cond. (µS/cm)	396		361		362		360		362		360		363	
Initials	MM		MM		MM		[illegible]		[illegible]		MM		MM	

LC-LC3 Concentration + 20 mg/L Cu

	Days 14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.0	10.0	9.8	10.2	9.9	10.1	10.1	10.3	10.1	9.8	9.9	10.1	10.0	10.2
pH	7.9	8.1	7.8	8.1	7.8	8.1	7.6	8.0	7.6	8.1	7.8	8.1	7.9	8.1
Cond. (µS/cm)	812		793		794		787		790		792		791	
Initials	MM		MM		MM		[illegible]		[illegible]		MM		MM	

LC-LC5 Concentration + 20 mg/L Cu

	Days 14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.0	10.1	9.8	10.2	9.9	10.2	10.3	10.2	10.3	9.8	9.9	10.2	10.0	10.3
pH	8.0	8.2	8.1	8.2	8.0	8.1	7.9	8.0	7.9	8.0	7.9	8.0	8.0	8.1
Cond. (µS/cm)	595		635		638		634		635		637		638	
Initials	MM		MM		MM		[illegible]		[illegible]		MM		MM	

LC-LCDSSLCC Concentration + 20 mg/L Cu

	Days 14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.0	10.1	9.9	10.2	10.0	10.1	10.0	10.2	10.[illegible]	9.9	10.0	10.2	9.9	10.2
pH	8.0	8.3	8.0	8.2	8.0	8.2	7.8	8.1	7.8	8.0	7.9	8.0	7.9	8.1
Cond. (µS/cm)	545		605		610		605		608		606		607	
Initials	MM		MM		MM		[illegible]		[illegible]		MM		MM	

Thermometer: CER#3 **DO meter:** 213 / 213 **pH meter:** 213 / 213 **Conductivity meter:** 213 / 213
(DO probe; pH probe; Conductivity probe)

	~~Control~~ LC-DCDS	LC-LC3	LC-LC5	LC-LCDSSLCC
Hardness*	360	610	420	490
Alkalinity*	140	180	200	190

* mg/L as CaCO3

Analysts: AWD, MM

Reviewed by: JW
Date reviewed: Aug. 12/19

Sample Description: LC-DCDS, LC-LC3, LC-LC5, LC-LCDSSLCC - clear, no colour, no odour, no particulates

Comments: used stock soln 1906001 (100 mg/L Cu)

RB 13/20

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TPCK
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

Control Concentration	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	10.0	10.1	10.1	10.2	10.1	10.2	10.1	9.9	10.1	10.0	10.0	10.1	10.2	10.2
pH	6.8	6.9	6.7	6.7	6.6	6.7	6.9	6.9	6.9	6.8	6.7	6.8	6.8	6.8
Cond. (µS/cm)	32		31		31		32		31		31		31	
Initials														

FR_UTR1 Concentration + 20 µg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	9.9	10.1	9.8	10.1	10.0	10.2	10.1	10.0	10.1	10.0	10.0	10.1	9.9	10.2
pH	7.8	8.0	7.8	7.9	7.8	7.9	7.9	7.8	7.9	7.9	7.8	7.9	7.9	7.9
Cond. (µS/cm)	253		246		245		246		245		247		247	
Initials														

GH_ER2 Concentration + 20 µg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	9.9	10.1	9.9	10.1	10.0	10.2	10.2	10.0	10.1	10.0	10.0	10.0	9.9	10.1
pH	7.8	8.0	7.8	8.0	7.8	8.0	7.9	7.9	8.0	8.0	7.9	8.0	7.9	8.0
Cond. (µS/cm)	296		290		289		290		293		290		291	
Initials														

CM_MC1 Concentration + 20 µg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	10.0	10.1	9.8	10.1	10.1	10.1	10.1	10.1	10.0	10.0	10.0	10.0	9.8	10.1
pH	7.7	7.9	7.6	7.9	7.7	7.8	7.9	8.0	8.0	7.9	7.8	8.0	7.8	7.8
Cond. (µS/cm)	214		184		186		184		185		185		187	
Initials														

Thermometer: CER#3 **DO meter:** 213 / 213 (probe) **pH meter:** 213 / 213 (probe) **Conductivity meter:** 213 / 213 (probe)

	Control	FR_UTR1	GH_ER2	CM_MC1
Hardness*	8	190	256	124
Alkalinity*	9	108	134	86

* mg/L as CaCO3

Analysts: AWD, YM
Reviewed by: JBE
Date reviewed: Aug. 12/19

Sample Description: FR_UTR1, GH_ER2, CM_MC1 - clear, no colour, no odour, no particulates

Comments: Used stock soln 190501 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

13/4/20

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

LC-SCC Concentration +20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.6	14.0	13.6	14.0	13.5	14.0	13.5
DO (mg/L)	9.9	10.2	10.0	10.2	10.1	10.2	10.1	10.0	10.1	10.0	9.9	10.1	10.0	10.2
pH	7.8	8.0	7.9	7.9	7.8	8.0	7.9	8.0	8.0	8.0	7.9	8.0	7.8	8.0
Cond. (µS/cm)	275		257		255		262		265		260		258	
Initials	MM		MM		MM		A		A		MM		MM	

FR_FRABCH Concentration +20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	9.8	10.2	9.9	10.1	10.0	10.2	10.0	9.9	10.0	10.1	10.0	10.1	10.0	10.2
pH	7.9	8.1	7.8	8.0	7.8	8.0	7.9	7.8	7.9	8.0	7.8	8.0	7.9	8.0
Cond. (µS/cm)	389		753 ①		757		757		757		754		756	
Initials	MM		MM		MM		A		A		MM		MM	

FR_FRCP1 Concentration +20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	9.8	10.2	9.9	10.0	10.1	10.2	10.1	9.9	10.0	10.0	10.0	10.0	9.9	10.2
pH	8.0	8.1	7.9	8.1	7.9	8.0	7.9	8.0	7.9	8.0	7.9	8.0	7.9	8.0
Cond. (µS/cm)	747		563 ①		570		567		570		565		562	
Initials	MM		MM		MM		A		A		MM		MM	

GH_FR1 Concentration +20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.6	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	10.0	10.1	9.9	10.0	10.1	10.2	10.1	9.9	10.0	10.2	10.0	10.1	9.9	10.1
pH	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.2	8.0	8.1
Cond. (µS/cm)	729		657		660		661		662		659		661	
Initials	MM		MM		MM		A		A		MM		MM	

Thermometer: CER#3 (LC-SCC) **DO meter:** 213 | 213 probe **pH meter:** 213 | 213 probe **Conductivity meter:** 213 | 213 probe

	~~Control~~	FR_FRABCH	FR_FRCP1	GH_FR1
Hardness*	198	710	470	500
Alkalinity*	126	200	180	220

* mg/L as CaCO3

Analysts: AWD, MM

Reviewed by: JGH

Date reviewed: May 12/19

Sample Description: LC_SCC, FR_FRABCH, FR_FRCP1, GH_FR1 - clear, no colour, no odour, no particulates

Comments: ① confirmed w/ 2nd c-meter, used stock soln 19(001) (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

R3.15.20

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

GH_ERC Concentration ± 20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	10.1	10.3	10.0	10.2	10.1	10.1	10.0	9.9	10.1	10.2	9.9	10.0	9.8	10.2
pH	7.9	8.1	7.9	8.0	7.8	8.0	7.9	8.0	7.9	8.0	7.9	8.0	8.0	8.0
Cond. (µS/cm)	328		315		316		319		320		317		321	
Initials	MM		MM		MM		A		A		MM		MM	

CM_MC2 Concentration ± 20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	10.0	10.2	9.8	10.1	10.2	10.2	10.0	9.8	10.1	10.1	9.9	10.1	10.0	10.1
pH	7.9	8.0	8.0	8.1	8.0	8.1	8.0	8.0	8.0	8.0	8.0	8.1	8.0	8.1
Cond. (µS/cm)	504		508		510		509		510		510		511	
Initials	MM		MM		MM		A		A		MM		MM	

EV_MC2 Concentration ± 20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	10.0	10.2	10.0	10.2	10.1	10.2	10.1	9.9	10.1	10.2	9.9	10.1	9.8	10.0
pH	7.9	8.1	7.9	7.9	7.9	8.0	8.0	8.1	8.0	8.1	7.9	8.0	7.9	8.0
Cond. (µS/cm)	361		283		286		284		285		283		286	
Initials	MM		MM		MM		A		A		MM		MM	

EV_MC1 Concentration ± 20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	10.0	10.1	10.0	10.1	10.1	10.2	10.0	9.9	10.0	10.2	9.9	10.0	9.9	10.1
pH	8.0	8.1	8.0	8.1	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.0	8.1
Cond. (µS/cm)	538		486		494		493		495		495		494	
Initials	MM		MM		MM		A		A		MM		MM	

Thermometer: CER#3 (GH_ERC probe) **DO meter:** 213/213 **pH meter:** 213/213 (probe) **Conductivity meter:** 213/213 (probe)

	~~Control~~ MM	CM_MC2	EV_MC2	EV_MC1
Hardness*	240	280	210	330
Alkalinity*	130	160	120	180

* mg/L as CaCO3

Analysts: AWD, MM

Reviewed by: JM
Date reviewed: Aug. 12/19

Sample Description: GH_ERC, CM_MC2, EV_MC2, EV_MC1 - clear, no colour, no odour, no particulates

Comments: used stock solin 19(c01 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

PB 16/20

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

LC-DCDS Concentration ± 20 mg/L Cu

	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.6	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	9.7	10.2	9.8	10.1	10.2	10.2	10.0	9.9	10.0	10.2	10.1	10.0	9.9	10.1
pH	7.8	8.0	8.0	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0	7.9	8.0
Cond. (µS/cm)	361		369		372		371		370		371		367	
Initials	MM		MM		MM		A		A		MM		MM	

LC-LC3 Concentration ± 20 mg/L Cu

	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.5	14.0	13.5	14.0	13.5
DO (mg/L)	9.9	10.2	9.8	10.1	10.1	10.1	10.0	9.8	10.0	10.2	10.1	10.1	9.9	10.1
pH	7.9	8.1	7.7	8.0	7.6	8.0	7.8	7.9	7.8	7.9	7.8	8.0	7.7	7.9
Cond. (µS/cm)	793		798		786		790		791		790		791	
Initials	MM		MM		MM		A		A		MM		MM	

LC-LC5 Concentration ± 20 mg/L Cu

	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	14.0	13.6	14.0	13.5	14.0	13.5
DO (mg/L)	9.9	10.1	9.9	10.1	10.2	10.2	10.0	9.8	10.0	10.2	10.0	10.1	9.8	10.2
pH	7.9	8.1	8.0	8.1	7.9	8.0	7.8	8.0	7.8	8.0	8.0	8.0	8.0	8.1
Cond. (µS/cm)	636		591		590		593		593		592		596	
Initials	MM		MM		MM		A		A		MM		MM	

LC-LCDSSLCC Concentration ± 20 mg/L Cu

	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.6	14.0	13.6	14.0	13.5	14.0	13.5
DO (mg/L)	10.0	10.1	9.9	10.2	10.1	10.2	10.1	9.9	10.0	10.2	10.0	10.1	9.9	10.1
pH	7.9	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1
Cond. (µS/cm)	608		526		530		528		530		529		532	
Initials	MM		MM		MM		A		A		MM		MM	

Thermometer: CER#3 (LC-DCDS) **DO meter:** 213 | 213 (probe) **pH meter:** 213 | 213 (probe) **Conductivity meter:** 213 | 213 (probe)

	~~Control~~	LC-LC3	LC-LC5	LC-LCDSSLCC
Hardness*	250	510	420	320
Alkalinity*	130	170	180	170

* mg/L as CaCO3

Analysts: AWD, MM

Reviewed by: JM
Date reviewed: Aug. 12/19

Sample Description: LC-DCDS, LC-LC3, LC-LC5, LC-LCDSSLCC - clear, no colour, no odour, no particulates

Comments: used stock soln 19Cu01 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

Control Concentration	Days													
	28		29		30 final									
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0		13.5								
DO (mg/L)	10.0	10.0	9.9	10.0		10.0								
pH	6.6	6.8	6.7	6.6		6.7								
Cond. (µS/cm)	31		31		36									
Initials	HM		HM		M									

FR_UFR1 Concentration +20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0		13.5								
DO (mg/L)	10.0	10.1	9.7	9.9		10.1								
pH	7.7	7.9	7.6	7.8		7.7								
Cond. (µS/cm)	223		218		224									
Initials	HM		HM		M									

GH_ER2 Concentration +20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0		13.5								
DO (mg/L)	10.0	10.2	9.6	9.9		10.1								
pH	7.8	8.0	7.7	7.9		7.9								
Cond. (µS/cm)	261		256		267									
Initials	HM		HM		M									

CM_MC1 Concentration +20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0		13.5								
DO (mg/L)	9.8	10.2	9.8	10.0		10.2								
pH	7.7	7.9	7.6	7.9		7.8								
Cond. (µS/cm)	170		172		180									
Initials	HM		HM		M									

Thermometer: CER#3 **DO meter:** 213 1312 (probe) **pH meter:** 213 1312 (probe) **Conductivity meter:** 213 1312 (probe)

	Control	FR_UFR1	GH_ER2	CM_MC1
Hardness*	10	138	164	116
Alkalinity*	10	96	106	78

* mg/L as CaCO3

Analysts: HM

Reviewed by: JGh
Date reviewed: Aug. 12/19

Sample Description: FR_UFR1, GH_ER2, CM_MC1 - clear, no colour, no odour, no particulates

Comments: used stock soln 19Cu01 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 1909060

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

LC-SLC Concentration +20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~ final	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0	|	13.5								
DO (mg/L)	10.0	10.1	9.6	9.9	|	10.1								
pH	7.8	8.0	7.7	7.9	|	7.9								
Cond. (µS/cm)	211		207		224									
Initials	MM		MM		MM									

FR-FRABCH Concentration +20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~ final	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0	|	13.5								
DO (mg/L)	9.9	10.1	9.8	9.9	|	10.2								
pH	7.8	8.0	7.8	7.9	|	7.9								
Cond. (µS/cm)	551①		550		586①									
Initials	MM		MM		MM									

FR-FRCP1 Concentration +20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~ final	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0	|	13.5								
DO (mg/L)	9.7	10.1	9.8	9.9	|	10.1								
pH	7.8	8.0	7.9	8.0	|	8.0								
Cond. (µS/cm)	464		466		502									
Initials	MM		MM		MM									

GH-FR1 ② Concentration +20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~ final	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0	|	13.5								
DO (mg/L)	10.0	10.1	9.7	10.0	|	10.1								
pH	7.9	8.1	7.9	8.0	|	8.1								
Cond. (µS/cm)	650		654		670									
Initials	MM		MM		MM									

Thermometer: CER#3 **DO meter:** 2/3 / 3/2 (probe) **pH meter:** 2/3 / 3/2 (probe) **Conductivity meter:** 2/3 / 3/2 (probe)

	~~Control~~ LC-SLC	FR-FRABCH	FR-FRCP1	GH-FR1
Hardness*	138	260	270	500
Alkalinity*	92	140	110	220

* mg/L as $CaCO_3$

Analysts: MM

Reviewed by: JOL
Date reviewed: Aug. 12/19

Sample Description: LC-SLC, FR-FRABCH, FR-FRCP1, GH-FR1 – clear, no colour, no odour, no particulates

Comments: ① confirmed w/ 2nd C-meter; used stock soln 19Cu01 (100 mg/L Cu)
② week 5 sample arrived damaged; weight was used for change

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

AB 19/20

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

GH-ERC Concentration ± 20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0		13.5								
DO (mg/L)	10.0	10.2	9.9	10.0		10.2								
pH	7.9	8.0	7.8	7.9		7.9								
Cond. (µS/cm)	280		281		322									
Initials	MW		MW		MW									

CM_MC2 Concentration ± 20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0		13.5								
DO (mg/L)	9.9	10.2	9.6	10.0		10.2								
pH	7.9	8.0	7.8	8.0		7.9								
Cond. (µS/cm)	395		393		434									
Initials	MW		MW		MW									

EV_MC2 Concentration ± 20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0		13.5								
DO (mg/L)	10.1	10.2	9.9	10.0		10.1								
pH	7.9	8.1	7.8	7.9		8.0								
Cond. (µS/cm)	234		235		261									
Initials	MW		MW		MW									

EV_HCl Concentration ± 20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0		13.5								
DO (mg/L)	10.1	10.2	9.9	9.9		10.1								
pH	7.9	8.0	7.8	8.0		8.0								
Cond. (µS/cm)	444		443		471									
Initials	MW		MW		MW									

Thermometer: CER#3 (GH-ERC probe) **DO meter:** 2432312 **pH meter:** 213 | 312 (probe) **Conductivity meter:** 43 | 23 (probe)

	Control	CM-MC2	EV_MC2	EV_HCl
Hardness*	230	270	200	290
Alkalinity*	100	150	100	130

* mg/L as CaCO3

Analysts: YML

Reviewed by: JBe
Date reviewed: Aug. 12/19

Sample Description: GH-ERC, CM-MC2, EV-MC2, EV-HCl - clear, no colour, no odour, no particulates

Comments: used stock soln 19C001 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

LC_DCDS Concentration + 20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0		13.5								
DO (mg/L)	10.1	10.2	9.6	9.9		10.1								
pH	7.9	8.0	7.8	8.0		7.9								
Cond. (µS/cm)	320		318		338									
Initials	[illegible]		[illegible]		[illegible]									

LC_LC3 Concentration + 20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0		13.5								
DO (mg/L)	10.0	10.1	9.6	9.8		10.2								
pH	7.8	8.1	7.9	8.0		8.1								
Cond. (µS/cm)	558 ①		558		592									
Initials	[illegible]		[illegible]		[illegible]									

LC_LC5 Concentration + 20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0		13.5								
DO (mg/L)	10.0	10.1	9.8	9.9		10.1								
pH	7.9	8.1				~~8.1~~ 8.1								
Cond. (µS/cm)	441 ①		444		485									
Initials	[illegible]		[illegible]		[illegible]									

LC_LCDSSLCC Concentration + 20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0		13.5								
DO (mg/L)	9.9	10.1	9.8	10.0		10.1								
pH	8.0	8.1	7.9	8.1		8.1								
Cond. (µS/cm)	406 ①		407		437									
Initials	[illegible]		[illegible]		[illegible]									

Thermometer: CER#3 **DO meter:** 213 / 213 probe **pH meter:** 213 / 213 probe **Conductivity meter:** 213 / 213 probe

	LC-DCDS ~~Control~~	LC_LC3	LC-LC5	LC-LCDSSLCC
Hardness*	260	320	290	220
Alkalinity*	120	210	70	60

* mg/L as CaCO3

Analysts: YYL

Reviewed by: [illegible]

Date reviewed: Aug. 12/19

Sample Description: LC-DCDS, LC-LC3, LC-LC5, LC-LCDSSLCC – clear, no colour, no odour, no particulates

Comments: ① confirmed w/ 2nd c-meter; used stock soln 19Cu01 (100 mg/L Cu)

Embryo-Alevin Toxicity Test
Daily Mortality

Client: TRCK
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

~~Concentration~~ Sample ID	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		1 Ø	2	3	4	5	6	7	8	9	10	11	12	
Control	1	0	0	0	0	0	0	0	0	0	0	0	0	0
	2									0				0
	3									1				1
	4						4	20	5	0			1	30
FR_UFR1	1						0	0	0				0	0
+ 20 µg/L Cu	2											1		1
	3											0		0
	4						7	15	4			2		28
GH-ER2	1						0	0	0			0		0
+ 20 µg/L Cu	2					1			0			1		2
	3					0	100		1			1		2
	4						10	17	3	—	—	1	—	30
CM-MCI	1							0	0	0	0	0	0	0
+ 20 µg/L Cu	2													0
	3													0
	4						9	12	3	1				25
LC-SLC	1						0	0	0	0				0
+ 20 µg/L Cu	2						1							1
	3						0							0
	4						7	10	3					26
FR-FRABCH	1						0	0	0					0
+ 20 µg/L Cu	2					1			0				2	3
	3					0			2	1		2	1	6
	4						11	17	1	0		1	—	30
FR-FRCP1	1						0	0	0			0	1	1
+ 20 µg/L Cu	2												0	0
	3									1			1	2
	4						16	12	1	0			0	29
GH-FR1	1						0	0	0				0	0
+ 20 µg/L Cu	2					1							1	2
	3					0				1			2	3
	4	V		—		0	7	17	2	1	—	2	0	29
Tech Initials		MM	MM	~	MM	MM	MM	MM	MM	MM	~	MM	MM	MM

Comments:

Reviewed by: JCH **Date reviewed:** Aug. 13/19

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

~~Concentration~~ Sample ID	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		1	2	3	4	5	6	7	8	9	10	11	12	
GH-ERC	1	0	0	0	0	0	0	1	0	0	0	0	0	1
+ 20 µg/L Cu	2	↓	↓	↓	↓	↓	↓	0	↓	↓	↓	↓	0	0
	3	↓	↓	↓	↓	↓	↓	0	↓	↓	↓	↓	1	1
	4	↓	↓	↓	↓	↓	13	14	1	↓	↓	↓	1	28
CL-MC2	1	↓	↓	↓	↓	↓	0	1	1	↓	↓	↓	0	2
+ 20 µg/L Cu	2	↓	↓	↓	↓	↓	↓	1	0	↓	↓	↓	0	1
	3	↓	↓	↓	↓	↓	↓	0	0	↓	↓	↓	1	1
	4	↓	↓	↓	↓	↓	13	17	—	—	—	—	—	30
EV-MC2	1	↓	↓	↓	↓	↓	0	0	0	0	0	0	0	0
+ 20 µg/L Cu	2	↓	↓	↓	↓	↓	↓	0	↓	↓	↓	↓	↓	0
	3	↓	↓	↓	↓	↓	↓	0	↓	↓	↓	↓	↓	0
	4	↓	↓	↓	↓	↓	10	15	3	1	↓	1	—	30
EV-HCl	1	↓	↓	↓	↓	↓	0	0	0	0	↓	1	0	1
+ 20 µg/L Cu	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	0	0
	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	1	1
	4	↓	↓	↓	↓	↓	11	16	1	↓	↓	2	—	30
LC-DCDS	1	↓	↓	↓	↓	↓	0	0	0	↓	↓	0	0	0
+ 20 µg/L Cu	2	↓	↓	↓	↓	1	↓	0	0	↓	↓	↓	↓	1
	3	↓	↓	↓	↓	0	↓	1	1	↓	↓	↓	↓	2
	4	↓	↓	↓	↓	2	14	11	1	↓	↓	↓	↓	~~29~~ 28
LC-LC3	1	↓	↓	↓	↓	0	0	0	0	↓	↓	↓	↓	0
+ 20 µg/L Cu	2	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	1	2	3
	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	0	1
	4	↓	↓	↓	↓	↓	15	11	1	0	↓	↓	↓	27
LC-LC5	1	↓	↓	↓	↓	↓	0	0	0	↓	↓	↓	↓	0
+ 20 µg/L Cu	2	↓	↓	↓	↓	↓	↓	↓	0	↓	↓	↓	↓	0
	3	↓	↓	↓	↓	↓	↓	↑	1	↓	↓	↓	1	2
	4	↓	↓	↓	↓	↓	15	13	2	~~1~~	~~1~~	—	↓	30
LC-LCDSSLCC	1	↓	↓	↓	↓	↓	0	0	0	0 ~~1~~	0 ~~1~~	0	1	1
+ 20 µg/L Cu	2	↓	↓	↓	↓	↓	0	↓	↓	↓	↓	↓	0	0
	3	↓	↓	↓	↓	↓	1	↓	↓	↓	↓	↓	0	1
	4	↓	↓	—	↓	↓	12	15	↓	↓	—	2	1	30
Tech Initials		MW	MW	A	MW	MW	MW	MW	MW	MW	N	MW	MW	MW

Comments:

Reviewed by: JCM **Date reviewed:** Aug. 13/19

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

~~Concentration~~ Sample ID	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		13	14	15	16	17	18	19	20	21	22	23	24	
Control	1	0	0	0	0	0	0	0	0	0 ②	0	0 ③	0	0
	2	0	↓	↓	0	↓	↓	↓	↓	↓	↓ ③	↓ ③	↓	0
	3	1	↓	↓	1	↓	↓	↓	↓	↓	↓ ③	↓ ③	1	2
	4	—	—	—	—	—	—	—	—	—	—	—	—	—
FR_UFR1	1	0	0	0	0	0	0	0	0	0 ②	0	2 ③	0	2
+ 20 mg/L Cu	2	↓	↓	↓	1	↓	↓	↓	↓	↓	2 ③	0 ③	↓	3
	3	↓	↓	↓	0	↓	↓	↓	↓	↓	0	↓ ②	↓ ③	0
	4	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	↓	1	0
GH_ER2	1	↓	↓	↓	↓	↓	↓	↓	↓	↓ ②	0	2 ③	0	2
+ 20 mg/L Cu	2	1	↓	↓	↓	↓	↓	↓	↓	↓ ③	5 ②	0 ③	1	6
	3	0	↓	↓	↓	↓	↓	↓	↓	↓	0	0 ②	1 ③	0
	4	—	—	—	—	—	—	—	—	—	—	—	—	—
CM_MC1	1	0	1	0	0	0	0	0	0	1 ②	1	2 ③	0	5
+ 20 mg/L Cu	2	↓	0	1	↓	↓	↓	↓	↓	1	6 ②	1 ③	↓	9
	3	↓	↓	0	↓	↓	↓	↓	↓	0	0	0 ③	↓	0
	4	↓	↓	↓	↓	↓	↓	1	↓	↓	0	0	1	1
LC_SLC	1	↓	↓	↓	↓	↓	↓	0	↓	↓ ②	0	1 ③	0	1
+ 20 mg/L Cu	2	↓	↓	↓	↓	↓	↓	↓	↓	↓ ②	4	3 ③	↓	7
	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	0 ②	0 ③	↓	0
	4	↓	1	↓	↓	↓	↓	↓	↓	↓	0	0	↓	1
FR_FRABCH	1	↓	0	↓	↓	↓	↓	↓	1	↓ ②	1	3 ③	↓	5
+ 20 mg/L Cu	2	↓	1	↓	1	1	↓	1	2	1	1 ②	0 ③	↓	8
	3	↓	0	↓	0	0	↓	0	1	2	2 ②	0 ③	1	5
	4	—	—	—	—	—	—	—	—	—	—	—	—	—
FR_FRCP1	1	0	0	0	0	0	0	0	0	1	0 ②	3 ③	0	4
+ 20 mg/L Cu	2	0	↓	1	↓	0	↓	0	1	0 ②	2	2 ③	0	6
	3	2	↓	0	↓	1	↓	1	1	↓	0 ②	0	0 ③	5
	4	0	↓	1	1	0	↓	0	0	1	0	0 ③	0	0
GH_FR1	1	1	↓	↓	1	0	↓	↓	0	1	0 ②	2	3	8
+ 20 mg/L Cu	2	1	↓	↓	0	0	↓	↓	1	0 ②	1	4 ③	0	7
	3	2	1	3	0	2	↓	↓	0	1	0 ②	0 ③	0	9
	4	1	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	1
Tech Initials		MM	MM	MM	MM	MM	[illegible]	MM	MM	MM	MM	MM	[illegible]	MM

Comments: ① at eyed stage ② starting to hatch ③ >50% hatched

Reviewed by: JOh **Date reviewed:** Aug. 13/19

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Tech
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

~~Concentration~~ Sample ID	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		13	14①	15	16	17	18	19	20	21	22	23	24	
GH-ERC	1	0	0	0	0	0	0	1	1	1②	2	2③	0	7
+ 20 mg/L Cu	2	↓	↓	↓	↓	↓	↓	0	0	2②	1	2③	↓	5
	3	↓	↓	↓	↓	↓	↓	↓	↓	0	0②	0③	↓	0
	4	↓	↓	↓	↓	↓	↓	↓	↓	0	0	0	↓	0
CM-MC2	1	↓	↓	1	↓	↓	↓	↓	↓	1②	2	3③	↓	7
+ 20 mg/L Cu	2	↓	↓	0	↓	↓	↓	↓	↓	1②	0	2③	↓	5
	3	↓	2	0	1	↓	↓	1	0	0	1②	0③	↓	5
	4	—	—	—	—	—	—	—	—	—	—	—	—	—
EV-MC2	1	0	0	0	0	0	0	0	1	0②	1	2③	↓	4
+ 20 mg/L Cu	2	0	↓	↓	1	0	↓	1	0	↓	2②	3③	↓	7
	3	1	↓	↓	0	1	↓	0	0	↓	0	0③	↓	2
	4	—	—	—	—	—	—	—	—	—	↓	—	—	—
EV-HCl	1	0	0	0	0	0	0	0	0	0②	0	2③	0	2
+ 20 mg/L Cu	2	↓	↓	↓	↓	↓	↓	↓	1	1	4②	3③	0	9
	3	↓	↓	↓	↓	↓	↓	↓	0	0	0③	1③	0	1
	4	—	—	—	—	—	—	—	—	—	—	—	—	—
LC-DCDS	1	0	0	0	0	0	0	0	0	0②	1	2③	0	3
+ 20 mg/L Cu	2	1	↓	↓	↓	↓	↓	↓	↓	0②	4	4③	0	8
	3	0	↓	↓	↓	↓	↓	↓	↓	1	0②	0③	0	1
	4	0	↓	↓	↓	↓	↓	↓	↓	0	0	0	0	0
LC-LC3	1	0	↓	↓	↓	↓	↓	↓	↓	1②	3	1③	0	5
+ 20 mg/L Cu	2	1	↓	↓	↓	↓	↓	1	1	0	0②	2③	0	5
	3	0	↓	1	↓	↓	↓	0	0	1②	0	3	0	1
	4	1	↓	0	↓	↓	↓	↓	1	1	1	—	—	3
LC-LC5	1	↓	↓	↓	↓	↓	↓	↓	0	0②	0	1③	0	1
+ 20 mg/L Cu	2	↓	↓	↓	1	↓	↓	1	2	2	1	1③	0	7
	3	1	↓	1	0	↓	↓	0	0	0	↓②	0③	0	2
	4	—	—	—	—	—	—	—	—	—	—	—	—	—
LC-LCDSSLCC	1	0	0	0	0	0	0	0	0	0	0②	0③	0	0
+ 20 mg/L Cu	2	↓	↓	↓	↓	↓	↓	2	↓	2②	2	1③	0	7
	3	↓	↓	↓	↓	↓	↓	0	↓	0	0	0③	0	0
	4	—	—	—	—	—	—	—	—	—	—	—	—	—
Tech Initials		MM	MM	MM	MM	MM	AA	MM	MM	MM	MM	MM	AA	MM

Comments: ① at eyed stage ② starting to hatch ③

Reviewed by: JM **Date reviewed:** Aug. 13/19

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

~~Concentration~~ Sample ID	Rep	Day of Test - No. of Mortalities							Total Dead Embryos/ Alevins	Total ~~Undeveloped~~/ Abnormal Alevins Unhatched	Total No. Alevins - Normal	Total Exposed Eggs
		25	26	27	28	29	30	Day 25-30 Total Dead				
Control	1	3	0	0	0	3	1	7	7	2	21	30
	2	1	↓	↓	↓	3	0	4	4	2	23	29
	3	1	↓	↓	↓	0	0	1	4	0	27	31
	4	—	—	—	—	—	—	—	30	0	0	30
FR_VHR1	1	2	0	0	0	2	0	4	6	1	23	30
+ 20 mg/L Cu	2	0	1	1	1	1	0	1	5	2	24	31
	3	0	↓	↓	↓	0	0	0	0	0	30	30
	4	0	↓	↓	↓	1	2	2	30	0	0	30
GH-ER2	1	4	1	2	0	1	0	7	9	1	20	30
+ 20 mg/L Cu	2	0	0	0	1	↓	0	0	8	1	21	30
	3	~~30~~	0	0	↓	1	0	1	3	2	26	31
	4	—	—	—	—	—	—	—	30	0	0	30
CM_MCI	1	4	1	0	0	0	0	5	10	3	16	29
+ 20 mg/L Cu	2	0	0	0	1	1	0	0	9	1	20	30
	3	1	1	↓	1	1	1	2	2	1	27	30
	4	2	1	0	1	1	1	3	29	0	0	29
LL_SLC	1	4	1	1	1	1	~~0~~ 2	6	7	0	24	31
+ 20 mg/L Cu	2	2	1	1	1	↓	0	2	10	0	20	30
	3	1	1	1	↓	1	1	3	3	0	28	31
	4	0	1	↓	1	0	1	2	29	0	0	29
FR_FRABCM	1	1	1	1	0	0	0	2	7	2	21	30
+ 20 mg/L Cu	2	2	1	0	1	1	0	3	14	0	16	30
	3	2	↓	0	↓	0	1	3	14	0	16	30
	4	—	—	—	—	—	—	—	30	0	0	30
FR_FRCPI	1	3	0	0	0	1	0	4	9	2	19	30
+ 20 mg/L Cu	2	1	↓	↓	↓	0	0	1	7	1	22	30
	3	~~2~~ 1	↓	↓	↓	0	0	1	8	1	21	30
	4	1	—	—	—	—	—	1	30	0	0	30
GH_FR1	1	3	0	0	1	3	1	8	16	1	15	32
+ 20 mg/L Cu	2	0	↓	↓	0	1	0	1	10	0	20	30
	3	0	↓	↓	0	0	1	1	13	1	16	30
	4	—	—	—	—	—	—	—	30	0	0	30
Tech Initials		MM	MM	MM	MM	MM	MM	MM	MM	MM	MM	MM

Comments: ① yolksac edema
See "Rainbow Trout Embryo-Alevin Toxicity Test - Overall Results" page for detailed normality assessments.

Reviewed by: JCM **Date reviewed:** Aug. 13/19

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: (various)
Work Order #: 190906

Start Date & Time: May 8, 2019 @ 1435h
Stop Date & Time: June 7, 2019 @ 1000h
Test Species: *Oncorhynchus mykiss*

~~Concentration~~ Sample ID	Rep	Day of Test - No. of Mortalities: 25	26	27	28	29	30	Day 25-30 Total Dead	Total Dead Embryos/ Alevins	Total ~~Undeveloped/ Unhatched~~ Abnormal Alevins	Total No. Alevins- Normal	Total Exposed Eggs
GH-ERC	1	3	0	0	1	1	0	5	13	~~2~~ 0	~~2~~ 17	30
+ 20 µg/L Cu	2	0	↓	↓	0	0	0	0	5	2	~~23~~ 22	29
	3	0	↓	↓	0	0	0	0	1	1	~~27~~ 28	30
	4	1	—	—	—	—	—	1	29	0	0	29
CM-MC2	1	2	0	0	0	0	0	2	11	0	~~23~~ 19	30
+ 20 µg/L Cu	2	1	1	↓	↓	↓	0	2	8	4	~~29~~ 20	32
	3	1	0	↓	↓	↓	0	1	7	0	~~30~~ 22	29
	4	~~0~~	—	—	—	—	—	—	30	0	0	30
EV-MC2	1	3	1	0	1	0	2	7	11	1	~~20~~ 17	29
+ 20 µg/L Cu	2	0	0	0	0	↓	0	0	7	1	~~21~~ 22	30
	3	0	0	1	0	↓	0	1	3	0	~~26~~ 27	30
	4	—	—	—	—	—	—	0	30	0	0	30
EV-HC1	1	2	0	0	0	1	0	3	6	4	~~16~~ 21	31
+ 20 µg/L Cu	2	1	↓	↓	↓	0	0	1	10	1	~~20~~ 20	31
	3	1	↓	↓	↓	0	0	1	3	2	~~27~~ 25	30
	4	—	—	—	—	—	—	—	30	0	0	30
LC-DCDS	1	1	0	1	0	1	0	3	6	1	24	31
+ 20 µg/L Cu	2	1	↓	0	↓	0	0	1	10	1	20	31
	3	0	↓	0	↓	0	0	0	3	0	27	30
	4	1	—	—	—	—	—	1	29	0	0	29
LC-LC3	1	2	2	0	0	0	0	4	9	1	21	31
+ 20 µg/L Cu	2	1	0	↓	↓	↓	0	1	9	0	20	29
	3	1	0	↓	↓	↓	0	1	3	1	26	30
	4	—	—	—	—	—	—	—	~~30~~	~~0~~	0	30
LC-LC5	1	3	0	0	0	2	1	6	7	1	23	31
+ 20 µg/L Cu	2	2	↓	↓	↓	0	0	2	9	3	18	30
	3	0	↓	↓	↓	0	2	2	6	1	23	30
	4	—	—	—	—	—	—	—	30	0	0	30
LC-LCDSSLCC	1	3	0	0	0	0	1	4	5	3	22	30
+ 20 µg/L Cu	2	0	↓	↓	↓	↓	0	0	7	1	21	29
	3	0	↓	↓	↓	↓	1	1	2	0	28	30
	4	—	—	—	—	—	—	—	30	0	0	30
Tech Initials		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments: see "Rainbow Trout Embryo-Alevin Toxicity Test-Overall Result" page for detailed normality assessments

Reviewed by: [signature]

Date reviewed: Aug. 13/19

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 190906

	CONTROL				FR_UFR1			
Fish #	**Control A**	**Control B**	**Control C**	**Control D**	**100 A**	**100 B**	**100 C**	**100 D**
1	21.0	22.0	22.0		21.5	22.0	22.0	
2	22.0	22.0	21.0		21.0	20.5	20.5	
3	21.0	21.0	21.5		22.0	19.0	20.0	
4	21.0	21.5	21.5		22.5	22.0	22.0	
5	22.0	22.0	21.5		20.0	20.5	21.5	
6	21.0	21.5	21.0		22.5	21.5	20.5	
7	21.5	21.5	21.0		22.5	21.0	21.0	
8	21.5	21.5	21.5		21.5	21.5	21.5	
9	21.0	21.0	21.5		22.0	22.0	21.5	
10	21.0	21.0	21.5		22.5	22.5	21.0	
11	22.5	21.5	22.0		22.0	21.5	20.5	
12	20.5	21.0	21.5		22.0	21.0	22.0	
13	20.5	21.5	22.0		22.5	22.5	21.5	
14	21.0	22.5	21.5		22.0	22.5	21.0	
15	19.0	21.5	21.5		22.5	21.5	20.5	
16	20.5	22.0	21.0		22.5	22.0	20.5	
17	19.5	21.5	21.5		19.5	22.0	21.0	
18	20.0	22.5	21.5		21.5	22.0	22.5	
19	19.5	21.5	21.0		21.5	21.0	22.0	
20	20.5	21.0	21.5		22.5	21.0	21.0	
21	20.5	21.0	22.0		21.0	22.0	21.5	
22	18.0	22.5	22.0		19.5	21.0	21.5	
23	18.5	20.5	21.0		21.5	21.5	21.5	
24		20.0	22.0		19.5	22.0	21.0	
25		17.5	21.5			20.0	22.0	
26			21.5			17.0	21.0	
27			20.0				21.0	
28							21.0	
29							21.5	
30							22.5	
31								
# Survivors	23	25	27		24	26	30	
Average Length (mm)	**20.587**	**21.320**	**21.444**	**#DIV/0!**	**21.583**	**21.269**	**21.283**	**#DIV/0!**
Pooled Weight (g)	2.21	2.40	2.69		2.38	2.51	2.99	
Pooled Weight (mg)	**2210**	**2400**	**2690**	**0**	**2380**	**2510**	**2990**	**0**
Average Weight (g)	0.096	0.096	0.100	#DIV/0!	0.099	0.097	0.100	#DIV/0!
= abnormal								

JM Aug. 13/19

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 190906

	GH_ER2				CM_MC1			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	20.0	23.0	23.0		21.5	22.0	21.5	
2	22.5	22.5	23.0		22.0	24.0	21.5	
3	22.5	24.0	22.0		24.0	22.0	22.0	
4	21.5	22.5	22.0		23.5	23.0	22.0	
5	22.0	24.0	22.0		22.0	22.0	22.5	
6	21.5	23.0	21.5		21.5	22.0	21.0	
7	22.0	23.5	22.5		23.0	22.0	22.0	
8	20.0	22.5	22.0		23.5	21.0	22.5	
9	21.0	21.5	22.5		23.0	22.5	22.5	
10	21.5	23.5	22.0		21.5	23.5	22.0	
11	22.0	23.5	23.0		23.0	22.0	22.0	
12	21.0	23.0	23.5		23.0	21.5	21.0	
13	20.0	20.5	22.5		20.0	22.5	22.5	
14	21.0	22.5	22.5		22.0	22.5	21.5	
15	22.0	22.0	23.0		20.0	23.0	22.0	
16	22.0	23.0	22.5		19.0	22.0	21.0	
17	22.0	22.5	22.0		17.0	21.0	22.5	
18	22.5	22.5	23.0		19.0	22.0	22.0	
19	18.0	21.5	22.0		11.5	21.5	23.0	
20	22.0	23.0	22.5			23.0	22.5	
21	18.5	22.5	23.0			13.0	22.0	
22		14.0	22.0				22.0	
23			21.0				22.0	
24			23.0				22.5	
25			22.0				21.0	
26			22.5				22.0	
27			20.0				22.0	
28			18.0				22.0	
29								
30								
31								
# Survivors	21	22	28		19	21	28	
Average Length (mm)	**21.214**	**22.295**	**22.161**	**#DIV/0!**	**21.053**	**21.810**	**21.964**	**#DIV/0!**
Pooled Weight (g)	2.29	2.14	3.18		2.05	2.21	2.91	
Pooled Weight (mg)	**2290**	**2140**	**3180**	**0**	**2050**	**2210**	**2910**	**0**
Average Weight (g)	0.109	0.097	0.114	#DIV/0!	0.108	0.105	0.104	#DIV/0!
= abnormal								

JGe
Aug. 13/19

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 190906

	LC_SLC				FR_FRABCH			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	20.5	21.5	20.0		19.5	20.5	21.0	
2	20.5	21.5	21.0		21.0	19.5	21.0	
3	19.5	21.0	20.5		19.0	18.0	21.5	
4	21.0	20.5	21.0		18.0	20.0	20.5	
5	21.0	21.5	19.0		22.0	19.0	21.0	
6	17.5	21.5	21.5		21.5	20.0	20.5	
7	21.0	20.5	19.5		20.0	20.0	21.0	
8	21.5	20.5	20.5		19.0	20.5	20.5	
9	21.0	20.5	20.0		22.0	20.5	21.0	
10	19.0	22.0	21.0		21.5	20.0	21.5	
11	20.5	22.0	20.0		20.5	20.0	22.0	
12	21.0	21.5	19.5		19.5	20.5	21.0	
13	22.0	19.5	19.5		19.5	19.5	21.5	
14	22.0	21.0	20.0		20.0	19.0	21.5	
15	20.5	21.0	21.0		20.0	17.0	20.0	
16	21.0	21.0	21.0		20.5	19.0	21.0	
17	18.0	21.5	20.5		20.5			
18	21.5	22.0	19.5		21.0			
19	20.0	21.5	20.0		21.0			
20	20.5	20.0	21.0		20.5			
21	20.5		19.5		21.0			
22	21.0		20.0		17.5			
23	20.0		20.5		16.5			
24	20.0		21.0					
25			19.5					
26			20.5					
27			21.0					
28			19.0					
29								
30								
31								
# Survivors	24	20	28		23	16	16	
Average Length (mm)	**20.458**	**21.100**	**20.250**	**#DIV/0!**	**20.065**	**19.563**	**21.031**	**#DIV/0!**
Pooled Weight (g)	2.28	2.00	2.74		2.18	1.36	1.61	
Pooled Weight (mg)	**2280**	**2000**	**2740**	**0**	**2180**	**1360**	**1610**	**0**
Average Weight (g)	0.095	0.100	0.098	#DIV/0!	0.095	0.085	0.101	#DIV/0!
= abnormal								

JOL
Aug. 13/19

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 190906

	FR_FRCP1				GH_FR1			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	22.5	22.5	22.5		21.5	22.5	22.5	
2	23.0	22.0	22.0		17.0	21.5	22.5	
3	22.5	22.0	22.5		19.0	22.0	21.5	
4	22.5	23.0	23.0		20.5	22.0	22.0	
5	21.5	22.0	22.5		22.5	21.0	22.0	
6	22.0	22.0	22.0		22.0	21.5	22.0	
7	22.5	21.5	22.5		20.0	22.5	20.5	
8	22.5	22.0	23.0		21.5	22.5	22.0	
9	22.0	21.0	23.0		20.5	23.0	23.0	
10	22.0	22.0	21.5		21.5	22.5	23.0	
11	21.0	22.5	22.0		21.5	23.0	22.0	
12	21.0	22.5	23.0		22.0	22.0	22.5	
13	22.5	19.5	22.0		20.0	21.0	22.5	
14	21.5	22.0	22.5		19.0	23.0	22.0	
15	21.0	22.5	22.0		22.5	22.0	23.0	
16	23.0	22.0	22.0		20.5	22.0	21.5	
17	21.0	23.0	22.5			22.5	18.5	
18	22.0	21.5	21.5			22.5		
19	23.0	22.5	21.5			23.0		
20	21.0	22.5	22.5			21.5		
21	19.0	22.5	22.5					
22		22.0	12.0					
23		20.5						
24								
25								
26								
27								
28								
29								
30								
31								
# Survivors	21	23	22		16	20	17	
Average Length (mm)	**21.857**	**21.978**	**21.841**	**#DIV/0!**	**20.719**	**22.175**	**21.941**	**#DIV/0!**
Pooled Weight (g)	2.29	2.43	2.94		1.51	2.09	1.90	
Pooled Weight (mg)	**2290**	**2430**	**2940**	**0**	**1510**	**2090**	**1900**	**0**
Average Weight (g)	0.109	0.106	0.134	#DIV/0!	0.094	0.105	0.112	#DIV/0!
= abnormal								

JCL
Aug. 13/19

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 190906

	GH_ERC				CM_MC2			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	21.5	22.0	21.5		22.0	21.5	22.5	
2	21.5	22.5	23.0		20.0	22.0	21.5	
3	21.0	22.5	23.0		22.5	21.0	22.5	
4	19.0	22.0	22.0		23.5	20.5	21.0	
5	22.5	23.0	22.5		23.5	20.0	22.0	
6	21.5	22.0	21.5		23.0	21.5	20.0	
7	20.0	22.0	22.0		22.5	21.0	23.0	
8	20.5	22.5	22.5		23.0	21.5	22.0	
9	21.5	22.5	23.0		23.5	20.5	22.5	
10	21.0	22.5	22.5		24.0	20.5	22.0	
11	21.5	22.5	23.5		21.0	21.0	22.0	
12	22.0	19.5	23.0		23.0	22.0	22.0	
13	21.5	20.0	22.0		22.0	22.0	23.0	
14	19.5	24.0	22.5		24.0	22.0	22.5	
15	20.5	22.5	22.0		21.5	22.5	22.5	
16	20.5	23.5	23.0		24.0	21.0	22.5	
17	20.0	22.0	22.5		21.0	22.0	23.0	
18		23.0	21.0		20.0	20.0	24.0	
19		22.0	21.5		20.0	20.0	23.0	
20		22.5	23.0			21.5	21.0	
21		23.0	22.0			19.0	21.0	
22		22.0	23.0			18.0	22.0	
23		21.0	23.5			16.0		
24		17.0	22.0			19.0		
25			22.0					
26			22.5					
27			23.5					
28			22.0					
29			18.0					
30								
31								
# Survivors	17	24	29		19	24	22	
Average Length (mm)	**20.912**	**22.000**	**22.276**	**#DIV/0!**	**22.316**	**20.667**	**22.159**	**#DIV/0!**
Pooled Weight (g)	1.81	2.57	3.20		2.23	2.31	2.41	
Pooled Weight (mg)	**1810**	**2570**	**3200**	**0**	**2230**	**2310**	**2410**	**0**
Average Weight (g)	0.106	0.107	0.110	#DIV/0!	0.117	0.096	0.110	#DIV/0!
= abnormal								

JGH
Aug. 13/19

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 190906

	EV_MC2				EV_HC1			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	21.5	22.5	22.0		22.5	22.0	22.5	
2	22.5	21.0	22.0		21.0	23.0	22.5	
3	21.0	21.5	23.0		20.0	21.0	22.5	
4	21.0	22.5	22.5		22.0	22.5	22.0	
5	22.0	22.0	22.5		19.0	22.5	21.0	
6	21.5	22.0	22.0		23.0	21.5	23.0	
7	23.0	22.5	23.0		22.0	22.0	22.0	
8	21.5	22.5	22.0		20.5	23.0	21.0	
9	23.0	22.0	22.5		22.0	23.0	22.5	
10	23.5	22.5	23.0		22.5	23.0	23.0	
11	21.0	23.0	22.0		22.5	23.0	23.0	
12	21.5	22.0	23.0		22.5	20.0	21.5	
13	22.5	22.0	22.5		20.5	21.0	21.5	
14	22.0	23.0	23.0		21.0	21.5	23.0	
15	23.0	22.5	23.0		22.0	21.5	23.0	
16	23.5	21.0	21.5		20.0	20.0	21.5	
17	21.0	22.5	22.5		21.5	23.0	22.0	
18	18.5	22.5	22.0		23.0	22.0	22.5	
19		23.0	22.5		23.0	22.5	21.0	
20		23.0	22.5		23.0	21.5	21.0	
21		22.5	22.0		19.0	14.0	22.5	
22		21.5	22.5		18.0		22.0	
23		18.5	21.0		17.0		22.0	
24			22.0		14.0		21.0	
25			22.5		18.0		21.5	
26			23.0				22.0	
27			23.0				17.0	
28								
29								
30								
31								
# Survivors	18	23	27		25	21	27	
Average Length (mm)	**21.861**	**22.087**	**22.407**	**#DIV/0!**	**20.780**	**21.595**	**21.852**	**#DIV/0!**
Pooled Weight (g)	2.03	2.18	2.94		2.83	2.28	2.85	
Pooled Weight (mg)	**2030**	**2180**	**2940**	**0**	**2830**	**2280**	**2850**	**0**
Average Weight (g)	0.113	0.095	0.109	#DIV/0!	0.113	0.109	0.106	#DIV/0!
= abnormal								

JAK Aug. 13/19

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 190906

	LC_DCDS				LC_LC3			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	22.0	22.5	24.0		22.0	20.0	23.0	
2	23.0	23.0	22.5		22.5	22.5	21.0	
3	21.5	23.0	23.0		22.5	24.0	22.0	
4	22.0	23.0	22.0		21.0	23.0	21.0	
5	23.5	22.5	23.0		21.5	21.5	23.0	
6	22.0	21.5	22.5		22.0	24.0	22.0	
7	23.0	23.0	22.0		22.0	22.5	22.5	
8	23.5	22.0	21.5		22.0	23.0	21.5	
9	22.5	20.0	22.0		21.0	22.5	22.0	
10	22.0	22.0	23.0		22.0	20.5	22.0	
11	22.0	22.5	23.0		21.5	21.5	22.0	
12	23.0	21.5	21.5		23.0	23.0	22.0	
13	23.0	23.0	23.0		22.0	21.0	22.5	
14	22.5	22.5	23.0		21.5	22.5	21.5	
15	23.0	20.0	23.5		21.5	22.0	23.0	
16	21.5	21.5	23.0		21.0	23.5	21.0	
17	23.0	23.0	22.0		20.5	23.0	22.0	
18	21.0	23.0	23.0		22.5	22.0	22.5	
19	22.0	22.0	23.0		20.0	22.5	22.0	
20	21.5	21.0	23.0		22.0	22.0	21.0	
21	22.5	20.0	22.0		22.5		22.0	
22	21.0		22.0		19.5		21.0	
23	21.0		23.0				23.0	
24	20.0		22.5				22.5	
25	20.0		23.0				22.5	
26			22.5				22.0	
27			22.5				21.0	
28								
29								
30								
31								
# Survivors	25	21	27		22	20	27	
Average Length (mm)	**22.080**	**22.024**	**22.630**	**#DIV/0!**	**21.636**	**22.325**	**21.981**	**#DIV/0!**
Pooled Weight (g)	2.79	2.15	3.03		2.40	2.48	3.01	
Pooled Weight (mg)	**2790**	**2150**	**3030**	**0**	**2400**	**2480**	**3010**	**0**
Average Weight (g)	0.112	0.102	0.112	#DIV/0!	0.109	0.124	0.111	#DIV/0!
= abnormal								

JGa Aug. 13/19

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

PSBIB

Client : Teck WO#: 190906

	LC_LC5				LC_LCDSSLCC			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	23.0	21.5	21.5		23.0	23.5	21.5	
2	23.0	21.0	23.0		23.5	23.0	23.0	
3	21.5	22.5	22.5		23.0	22.0	23.0	
4	23.0	23.0	20.5		21.5	23.0	19.5	
5	22.5	22.5	21.5		22.0	22.0	22.5	
6	22.5	22.5	21.5		22.0	23.0	23.0	
7	22.0	22.0	23.0		21.0	20.5	22.5	
8	22.5	21.0	22.0		22.0	23.5	22.5	
9	21.0	23.5	20.0		23.0	23.0	23.0	
10	22.0	23.0	22.0		21.0	21.0	22.0	
11	23.0	23.0	23.0		22.5	22.0	22.0	
12	20.0	22.5	22.5		20.5	22.5	21.5	
13	21.0	22.0	22.5		19.0	22.5	22.5	
14	20.0	23.0	21.5		22.0	23.0	22.0	
15	20.0	24.0	22.0		21.0	23.0	22.0	
16	22.0	23.0	22.0		21.0	23.0	23.0	
17	22.0	23.0	22.0		21.0	22.5	21.5	
18	21.5	17.0	19.0		21.0	22.5	20.5	
19	19.0	19.0	22.0		20.5	23.5	23.0	
20	20.0	19.0	22.5		20.0	20.5	23.0	
21	20.0	20.0	22.5		20.5	21.0	23.0	
22	20.0		22.5		22.0	15.5	22.5	
23	20.0		22.0		21.5		22.0	
24	18.0		15.0		19.0		22.5	
25					16.5		23.0	
26							23.0	
27							23.0	
28							22.0	
29								
30								
31								
# Survivors	24	21	24		25	22	28	
Average Length (mm)	**21.229**	**21.810**	**21.604**	**#DIV/0!**	**21.200**	**22.091**	**22.304**	**#DIV/0!**
Pooled Weight (g)	2.60	2.30	2.66		2.87	2.51	2.98	
Pooled Weight (mg)	**2600**	**2300**	**2660**	**0**	**2870**	**2510**	**2980**	**0**
Average Weight (g)	0.108	0.110	0.111	#DIV/0!	0.115	0.114	0.106	#DIV/0!
= abnormal								

JGL Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: Teck

Sample ID: Control

Work Order No.: 190906

Start Date: May 8, 2019

Termination Date: June 7, 2019

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
A	1	21.0	✓		
	2	22.0	✓		
	3	21.0	✓		
	4	21.0	✓		
	5	22.0	✓		
	6	21.0	✓		
	7	21.5	✓		
	8	21.5	✓		
	9	21.0	✓		
	10	21.0	✓		
	11	22.5	✓		
	12	20.5	✓		
	13	20.5	✓		
	14	21.0	✓		
	15	19.0	✓		
	16	20.5	✓		
	17	19.5	✓		
	18	20.0	✓		
	19	19.5	✓		
	20	20.5	✓		
	21	20.5	✓		
	22	18.0		✓	abnormal jaw
	23	19.5		✓	yolksac edema
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.21 g

Number of survivors: 23

Number of deformed/have difficulty swimming: 2/0

Initials: MM

Reviewed by: JCM

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: Teck

Sample ID: Control

Work Order No.: 190906

Start Date: May 8, 2019

Termination Date: June 7, 2019

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
B	1	22.0	✓		
	2	22.0	✓		
	3	21.0	✓		
	4	21.5	✓		
	5	22.0	✓		
	6	21.5	✓		
	7	21.5	✓		
	8	21.5	✓		
	9	21.0	✓		
	10	21.0	✓		
	11	21.5	✓		
	12	21.0	✓		
	13	21.5	✓		
	14	22.5	✓		
	15	21.5	✓		
	16	22.0	✓		
	17	21.5	✓		
	18	22.5	✓		
	19	21.5	✓		
	20	21.0	✓		
	21	21.0	✓		
	22	22.5	✓		
	23	20.5	✓		
	24	20.0		✓	abnormal growth on head
	25	~~21.~~ 17.5		✓	scoliosis.
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.40 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 2/1

Initials: MM

Reviewed by: JOL

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: Control

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
C	1	22.0	✓		
	2	21.0	✓		
	3	21.5	✓		
	4	21.5	✓		
	5	21.5	✓		
	6	21.0	✓		
	7	21.0	✓		
	8	21.5	✓		
	9	21.5	✓		
	10	21.5	✓		
	11	22.0	✓		
	12	21.5	✓		
	13	22.0	✓		
	14	21.5	✓		
	15	21.5	✓		
	16	21.0	✓		
	17	21.5	✓		
	18	21.5	✓		
	19	21.0	✓		
	20	21.5	✓		
	21	22.0	✓		
	22	22.0	✓		
	23	21.0	✓		
	24	22.0	✓		
	25	21.5	✓		
	26	21.5	✓		
	27	22.0	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.69 g

Number of survivors: 27

Number of deformed/have difficulty swimming: 0 | 0

Initials: MM

Reviewed by: JOh

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**
Sample ID: FR_UFR1
Work Order No.: **190906**

Start Date: **May 8, 2019**
Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+20 mg/L Ca)	1	21.5	✓		
	2	21.0	✓		
	3	22.0	✓		
	4	22.5	✓		
	5	20.0	✓		
	6	22.5	✓		
	7	22.5	✓		
	8	21.5	✓		
	9	22.0	✓		
	10	22.5	✓		
	11	22.0	✓		
	12	22.0	✓		
	13	22.5	✓		
	14	22.0	✓		
	15	22.5	✓		
	16	22.5	✓		
	17	19.5	✓		
	18	21.5	✓		
	19	21.5	✓		
	20	22.5	✓		
	21	21.0	✓		
	22	19.5	✓		
	23	21.5	✓		
	24	19.5		✓	abnormal eye
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 238 g
Number of survivors: 24
Number of deformed/have difficulty swimming: 1 ø 10
Initials: MM

Reviewed by: JCH
Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: Teck

Sample ID: FR-UFR1

Work Order No.: 190906

Start Date: May 8, 2019

Termination Date: June 7, 2019

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+20 mg/L Cu)	1	22.0	✓		
	2	20.5	✓		
	3	19.0	✓		
	4	22.0	✓		
	5	20.5	✓		
	6	21.5	✓		
	7	21.0	✓		
	8	21.5	✓		
	9	22.0	✓		
	10	22.5	✓		
	11	21.5	✓		
	12	21.0	✓		
	13	22.5	✓		
	14	22.5	✓		
	15	21.5	✓		
	16	22.0	✓		
	17	22.0	✓		
	18	22.0	✓		
	19	21.0	✓		
	20	21.0	✓		
	21	22.0	✓		
	22	21.0	✓		
	23	21.5	✓		
	24	22.0	✓		
	25	20.0		✓	abnormal eye
	26	17.0		✓	abnormal jaw
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 251 g

Number of survivors: 26

Number of deformed/have difficulty swimming: 2010

Initials: [illegible]

Reviewed by: [illegible]

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: Teck

Sample ID: FR_UFR1

Work Order No.: 190906

Start Date: May 8, 2019

Termination Date: June 7, 2019

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 mg/L Cu)	1	22.0	✓		
	2	20.5	✓		
	3	20.0	✓		
	4	22.0	✓		
	5	21.5	✓		
	6	20.5	✓		
	7	21.0	✓		
	8	21.5	✓		
	9	21.5	✓		
	10	21.0	✓		
	11	~~21~~ 20.5	✓		
	12	22.0	✓		
	13	21.5	✓		
	14	21.0	✓		
	15	20.5	✓		
	16	20.5	✓		
	17	21.0	✓		
	18	22.5	✓		
	19	22.0	✓		
	20	21.0	✓		
	21	21.5	✓		
	22	21.5	✓		
	23	21.5	✓		
	24	21.0	✓		
	25	22.0	✓		
	26	21.0	✓		
	27	21.0	✓		
	28	21.0	✓		
	29	21.5	✓		
	30	22.5	✓		
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.993

Number of survivors: 30

Number of deformed/have difficulty swimming: 0 | 0

Initials: MM

Reviewed by: JOH

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-ER2

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+20 mg/L Ca)	1	20.0	✓		
	2	22.5	✓		
	3	22.5	✓		
	4	21.5	✓		
	5	22.0	✓		
	6	21.5	✓		
	7	22.0	✓		
	8	20.0	✓		
	9	21.0	✓		
	10	21.5	✓		
	11	22.0	✓		
	12	21.0	✓		
	13	20.5	✓		
	14	21.0	✓		
	15	22.0	✓		
	16	22.0	✓		
	17	22.0	✓		
	18	22.5	✓		
	19	18.0	✓		
	20	22.0	✓		
	21	18.5		✓	abnormal jaw
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 229 g

Number of survivors: 21

Number of deformed/have difficulty swimming: 1 Ø / 0

Initials: MHL

Reviewed by: JGu

Date Reviewed: Aug. 13/19

AB 8/48

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-ER2

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+ 20 mg/L Ca)	1	23.0	✓		
	2	22.5	✓		
	3	24.0	✓		
	4	22.5	✓		
	5	24.0	✓		
	6	23.0	✓		
	7	23.5	✓		
	8	22.5	✓		
	9	21.5	✓		
	10	23.5	✓		
	11	23.5	✓		
	12	23.0	✓		
	13	20.5	✓		
	14	22.5	✓		
	15	22.0	✓		
	16	23.0	✓		
	17	22.5	✓		
	18	22.5	✓		
	19	21.5	✓		
	20	23.0	✓		
	21	22.5	✓		
	22	14.0		✓	Scoliosis
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.149

Number of survivors: 22

Number of deformed/have difficulty swimming: 1/1

Initials: RL/MM

Reviewed by: JOL

Date Reviewed: Aug. 13/19

B-9/48

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: Teck

Sample ID: GH-ER2

Work Order No.: 190906

Start Date: May 8, 2019

Termination Date: June 7, 2019

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 mg/L Cu)	1	23.0	✓		
	2	23.0	✓		
	3	22.0	✓		
	4	22.0	✓		
	5	22.0	✓		
	6	21.5	✓		
	7	22.5	✓		
	8	22.0	✓		
	9	22.5	✓		
	10	22.0	✓		
	11	23.0	✓		
	12	23.5	✓		
	13	22.5	✓		
	14	22.5	✓		
	15	23.0	✓		
	16	22.5	✓		
	17	22.0	✓		
	18	23.0	✓		
	19	22.0	✓		
	20	22.5	✓		
	21	23.0 ~~22.0~~	✓		
	22	22.0	✓		
	23	21.0	✓		
	24	23.0	✓		
	25	22.0	✓		
	26	22.5	✓		
	27	20.0		✓	abnormal jaw
	28	18.0		✓	head unhatched
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): ~~3.6~~ 3.18 g

Number of survivors: 28

Number of deformed/have difficulty swimming: 2/2

Initials: KL/MM

Reviewed by: JBr

Date Reviewed: Aug. 13/19

RS 10/48

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: Teck

Sample ID: CM_MC1

Work Order No.: 190906

Start Date: May 8, 2019

Termination Date: June 7, 2019

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+ 20 ug/L Cu)	1	21.5	✓		
	2	22.0	✓		
	3	24.0	✓		
	4	23.5	✓		
	5	22.0	✓		
	6	21.5	✓		
	7	23.0	✓		
	8	23.5	✓		
	9	23.0	✓		
	10	21.5	✓		
	11	23.0	✓		
	12	23.0	✓		
	13	20.0	✓		
	14	22.0	✓		
	15	20.0	✓		
	16	19.0	✓		
	17	17.0		✓	kyphosis
	18	19.0		✓	yolk sac edema
	19	11.5		✓	yolk sac edema & ~~jaw~~ abnormal jaw.
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.05 g

Number of survivors: 19

Number of deformed/have difficulty swimming: 3/3

Initials: KL/YUL

Reviewed by: JGu

Date Reviewed: Aug. 13/19

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

PS 11/48

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: CM_MC1

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+20 mgL Ca)	1	22.0	✓		
	2	24.0	✓		
	3	22.0	✓		
	4	23.0	✓		
	5	22.0	✓		
	6	22.0	✓		
	7	22.0	✓		
	8	21.0	✓		
	9	22.5	✓		
	10	23.5	✓		
	11	22.0	✓		
	12	21.5	✓		
	13	22.5	✓		
	14	22.5	✓		
	15	23.0	✓		
	16	22.0	✓		
	17	21.0	✓		
	18	22.0	✓		
	19	21.5	✓		
	20	23.0	✓		
	21	13.0		✓	lordosis
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.21 g

Number of survivors: 21

Number of deformed/have difficulty swimming: 1/1

Initials: KL/MM

Reviewed by: JGr

Date Reviewed: Aug. 13/19

PB 12/48

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Start Date: **May 8, 2019**

Sample ID: CM_MC1

Termination Date: **June 7, 2019**

Work Order No.: **190906**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 mg/L Ca)	1	21.5	✓		
	2	21.5	✓		
	3	22.0	✓		
	4	22.0	✓		
	5	22.5	✓		
	6	21.0	✓		
	7	22.0	✓		
	8	22.5	✓		
	9	22.5	✓		
	10	22.0	✓		
	11	22.0	✓		
	12	21.0	✓		
	13	22.5	✓		
	14	21.5	✓		
	15	22.0	✓		
	16	21.0	✓		
	17	22.5	✓		
	18	22.0	✓		
	19	22.0	✓		
	20	22.5	✓		
	21	22.0	✓		
	22	22.0	✓		
	23	22.0	✓		
	24	22.5	✓		
	25	21.0	✓		
	26	22.0	✓		
	27	22.0	✓		
	28	22.0		✓	abnormal eye
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.91 g

Number of survivors: 28

Number of deformed/have difficulty swimming: 1/0

Initials: KL/MW

Reviewed by: JM

Date Reviewed: Aug. 13/19

RB. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC_SLC

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+20 mg/L CO)	1	20.5	✓		
	2	20.5	✓		
	3	19.5	✓		
	4	21.0	✓		
	5	21.0	✓		
	6	17.5	✓		
	7	21.0	✓		
	8	21.5	✓		
	9	21.0	✓		
	10	19.0	✓		
	11	20.5	✓		
	12	21.0	✓		
	13	22.0	✓		
	14	22.0	✓		
	15	20.5	✓		
	16	21.0	✓		
	17	18.0	✓		
	18	21.5	✓		
	19	20.0	✓		
	20	20.5	✓		
	21	20.5	✓		
	22	21.0	✓		
	23	20.0	✓		
	24	20.0	✓		
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): K ~~LSH~~ 2.2 g

Number of survivors: 24

Number of deformed/have difficulty swimming: 0 | 0

Initials: KL/MH

Reviewed by: JCh

Date Reviewed: Aug. 13/19

RS 14/48

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-SLC

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+20 wgLCw)	1	21.5	✓		
	2	21.5	✓		
	3	21.0	✓		
	4	20.5	✓		
	5	21.5	✓		
	6	21.5	✓		
	7	20.5	✓		
	8	20.5	✓		
	9	20.5	✓		
	10	22.0	✓		
	11	22.0	✓		
	12	21.5 20.5 22	✓		
	13	19.5	✓		
	14	21.0	✓		
	15	21.0	✓		
	16	21.0	✓		
	17	21.5	✓		
	18	22.0	✓		
	19	21.5	✓		
	20	20.0	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.00g

Number of survivors: 20

Number of deformed/have difficulty swimming: 0 | 0

Initials: KC/MM

Reviewed by: JCM

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-SLC

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 ug/L Cu)	1	20.0	✓		
	2	21.0	✓		
	3	20.5	✓		
	4	21.0	✓		
	5	19.0	✓		
	6	21.5	✓		
	7	19.5	✓		
	8	20.5	✓		
	9	20.0	✓		
	10	21.0	✓		
	11	~~20.0~~ 20.0	✓		
	12	18.5	✓		
	13	19.5	✓		
	14	20.0	✓		
	15	21.0	✓		
	16	21.0	✓		
	17	20.5	✓		
	18	19.5	✓		
	19	20.0	✓		
	20	21.0	✓		
	21	19.5	✓		
	22	20.0	✓		
	23	20.5	✓		
	24	21.0	✓		
	25	19.5	✓		
	26	20.5	✓		
	27	21.0	✓		
	28	19.0	✓		
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.74 g

Number of survivors: 28

Number of deformed/have difficulty swimming: 0 | 0

Initials: KL/MC

Reviewed by: JCh

Date Reviewed: Aug. 13/19

RS16148

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR-FRABCH1

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+20 lab ctl)	1	19.5	✓		
	2	21.0	✓		
	3	wt 19.0	✓		
	4	18.0	✓		
	5	22.0	✓		
	6	21.5	✓		
	7	20.0	✓		
	8	19.0	✓		
	9	22.0	✓		
	10	21.5	✓		
	11	20.5	✓		
	12	19.5	✓		
	13	19.5	✓		
	14	20.0	✓		
	15	20.0	✓		
	16	20.5	✓		
	17	20.5	✓		
	18	21.0	✓		
	19	21.0	✓		
	20	20.5	✓		
	21	21.0	✓		
	22	17.5		✓	lordosis
	23	16.5		✓	yolksac edema
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.183

Number of survivors: 23

Number of deformed/have difficulty swimming: 2/1

Initials: KL/MM

Reviewed by: JCH

Date Reviewed: Aug. 13/19

B-17148

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR_FRABCH1

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (< 20 mg/L Cu)	1	20.5	✓		
	2	19.5	✓		
	3	18.0	✓		
	4	20.0	✓		
	5	19.0	✓		
	6	20.0	✓		
	7	20.0	✓		
	8	20.5	✓		
	9	20.5	✓		
	10	20.0	✓		
	11	20.0	✓		
	12	20.5	✓		
	13	19.5	✓		
	14	19.0	✓		
	15	17.0	✓		
	16	19.0	✓		
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.36 g

Number of survivors: 16

Number of deformed/have difficulty swimming: 0 | 0

Initials: KL/MM

Reviewed by: JCh

Date Reviewed: Aug. 13/19

RS.18/498

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR-FRABCH

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 mg/L Ca)	1	21.0	✓		
	2	21.0	✓		
	3	21.5	✓		
	4	20.5	✓		
	5	21.0	✓		
	6	20.5	✓		
	7	21.0	✓		
	8	20.5	✓		
	9	21.0	✓		
	10	21.5	✓		
	11	22.0	✓		
	12	21.0	✓		
	13	21.5	✓		
	14	21.5	✓		
	15	20.0	✓		
	16	21.0	✓		
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.61g

Number of survivors: 16

Number of deformed/have difficulty swimming: 0/0

Initials: KL/MH

Reviewed by: JOH

Date Reviewed: Aug. 13/19

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR FRCP1

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+20 ug/L Cu)	1	22.5	✓		
	2	23.0	✓		
	3	22.5	✓		
	4	22.5	✓		
	5	21.5	✓		
	6	22.0	✓		
	7	22.5	✓		
	8	22.5	✓		
	9	22.0	✓		
	10	22.0	✓		
	11	21.0	✓		
	12	21.0	✓		
	13	22.5	✓		
	14	21.5	✓		
	15	21.0	✓		
	16	23.0	✓		
	17	21.0	✓		
	18	22.0	✓		
	19	23.0	✓		
	20	21.0		✓	~~lordosis~~ kyphosis
	21	19.0		✓	scoliosis, abnormal eye
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2-29g

Number of survivors: 21

Number of deformed/have difficulty swimming: 2/2

Initials: KL/MM

Reviewed by: [signature]

Date Reviewed: Aug. 13/19

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

P3.20/48

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR-FRCP1

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+20 µg/L Cu)	1	22.5	✓		
	2	22.0	✓		
	3	22.0	✓		
	4	23.0	✓		
	5	22.0	✓		
	6	22.0	✓		
	7	21.5	✓		
	8	22.0	✓		
	9	21.0	✓		
	10	~~22.0~~ 23	✓		
	11	22.5	✓		
	12	22.5	✓		
	13	19.5	✓		
	14	22.0	✓		
	15	22.5	✓		
	16	22.0	✓		
	17	23.0	✓		
	18	21.5	✓		
	19	22.5	✓		
	20	22.5	✓		
	21	22.5	✓		
	22	22.0	✓		
	23	20.5		✓	kyphosis
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.43g

Number of survivors: 23

Number of deformed/have difficulty swimming: 1 | 1

Initials: KL YM

Reviewed by: JM

Date Reviewed: Aug 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR_FRCP1

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 mg/L Ca)	1	22.5	✓		
	2	22.0	✓		
	3	22.5	✓		
	4	23.0	✓		
	5	22.5	✓		
	6	22.0	✓		
	7	22.5	✓		
	8	23.0	✓		
	9	23.0	✓		
	10	21.5	✓		
	11	22.0	✓		
	12	23.0	✓		
	13	22.0	✓		
	14	22.5	✓		
	15	22.0	✓		
	16	22.0	✓		
	17	22.5	✓		
	18	21.5	✓		
	19	21.5	✓		
	20	22.5	✓		
	21	22.5	✓		
	22	12.0		✓	scoliosis
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 294

Number of survivors: 22

Number of deformed/have difficulty swimming: 1/1

Initials: KLMM

Reviewed by: JGM

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-FR1

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+20 wgt (w)	1	21.5	✓		
	2	17.0	✓		
	3	19.0	✓		
	4	20.5	✓		
	5	22.5	✓		
	6	22.0	✓		
	7	20.0	✓		
	8	21.5	✓		
	9	20.5	✓		
	10	21.5	✓		
	11	21.5	✓		
	12	22.0	✓		
	13	20.0	✓		
	14	19.0	✓		
	15	22.5	✓		
	16	20.5		✓	yolksac edema
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.51g

Number of survivors: 16

Number of deformed/have difficulty swimming: 1/0

Initials: KL/MM

Reviewed by: JCM

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-FR1

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+20 ugL Cu)	1	22.5	✓		
	2	21.5	✓		
	3	22.0	✓		
	4	22.0	✓		
	5	21.0	✓		
	6	21.5	✓		
	7	22.5	✓		
	8	22.5	✓		
	9	23.0	✓		
	10	22.5	✓		
	11	23.0	✓		
	12	22.0	✓		
	13	21.0	✓		
	14	23.0	✓		
	15	22.0	✓		
	16	22.0	✓		
	17	22.5	✓		
	18	22.5	✓		
	19	23.0	✓		
	20	21.5	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.09g

Number of survivors: 20

Number of deformed/have difficulty swimming: 0/0

Initials: KL/MM

Reviewed by: JCh

Date Reviewed: Aug. 13/19

23-24148

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-FR1

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+ 20 mg/L Cu)	1	22.5	✓		
	2	22.5	✓		
	3	21.5	✓		
	4	22.0	✓		
	5	22.0	✓		
	6	22.0	✓		
	7	20.5	✓		
	8	22.0	✓		
	9	23.0	✓		
	10	23.0	✓		
	11	22.0	✓		
	12	22.5	✓		
	13	22.5	✓		
	14	22.0	✓		
	15	23.0	✓		
	16	21.5	✓		
	17	18.5		✓	abnormal eye
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.90g

Number of survivors: 17

Number of deformed/have difficulty swimming: 1/0

Initials: KL/MW

Reviewed by: JBr

Date Reviewed: Aug. 13/19

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-ERC

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+20 mg/L Ca)	1	21.5	✓		
	2	21.5	✓		
	3	21.0	✓		
	4	19.0	✓		
	5	22.5	✓		
	6	21.5	✓		
	7	20.0	✓		
	8	20.5	✓		
	9	21.5	✓		
	10	~~21.0~~ 21.0	✓		
	11	21.5	✓		
	12	22.0	✓		
	13	21.5	✓		
	14	19.5	✓		
	15	20.5	✓		
	16	20.5	✓		
	17	20.0	✓		
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.81 g

Number of survivors: 17

Number of deformed/have difficulty swimming: 0/0

Initials: KSJ KCHM

Reviewed by: JCh

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH_ERC

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+20 mg/L Cu)	1	22.0	✓		
	2	22.5	✓		
	3	22.5	✓		
	4	22.0	✓		
	5	23.0	✓		
	6	22.0	✓		
	7	22.0	✓		
	8	22.5	✓		
	9	22.5	✓		
	10	22.5	✓		
	11	22.5	✓		
	12	19.5	✓		
	13	20.0	✓		
	14	~~19.~~ 24.0	✓		
	15	22.5	✓		
	16	23.5	✓		
	17	22.0	✓		
	18	23.0	✓		
	19	22.0	✓		
	20	22.5	✓		
	21	23.0	✓		
	22	22.0	✓		
	23	21.0		✓	growth on head
	24	17.0		✓	kyphosis
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.57 g

Number of survivors: 24

Number of deformed/have difficulty swimming: 2/1

Initials: KS/KL/MM

Reviewed by: JGM

Date Reviewed: Aug. 13/19

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-ERC

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 ug/L Cu)	1	21.5	✓		
	2	23.0	✓		
	3	23.0	✓		
	4	22.0	✓		
	5	22.5	✓		
	6	21.5	✓		
	7	22.0	✓		
	8	22.5	✓		
	9	23.0	✓		
	10	22.5	✓		
	11	23.5	✓		
	12	23.0	✓		
	13	22.0	✓		
	14	22.5	✓		
	15	22.0	✓		
	16	23.0	✓		
	17	22.5	✓		
	18	21.0	✓		
	19	21.5	✓		
	20	23.0	✓		
	21	22.0	✓		
	22	23.0	✓		
	23	23.5	✓		
	24	22.0	✓		
	25	22.0	✓		
	26	22.5	✓		
	27	23.5	✓		
	28	22.0	✓		
	29	18.0		✓	yolk sac edema
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 3.20 g

Number of survivors: 29

Number of deformed/have difficulty swimming: 1/0

Initials: KSL/KL/MM

Reviewed by: [signature]

Date Reviewed: Aug. 13/19

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: CM_MC2

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+20 mg/L Ca)	1	22.0	/		
	2	20.0	/		
	3	22.5	/		
	4	23.5	/		
	5	23.5	/		
	6	23.0	/		
	7	22.5	/		
	8	23.0	/		
	9	23.5	/		
	10	24.0	/		
	11	21.0	/		
	12	23.0	/		
	13	22.0	/		
	14	24.0	/		
	15	21.5	/		
	16	24.0	/		
	17	21.0	/		
	18	20.0	/		
	19	20.0	/		
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.23g

Number of survivors: 19

Number of deformed/have difficulty swimming: 0/0

Initials: KS/KE/MH

Reviewed by: JM

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: CM_MC2

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+20 mg/L CaCO3)	1	21.5	✓		
	2	22.0	✓		
	3	21.0	✓		
	4	20.5	✓		
	5	20.0	✓		
	6	21.5	✓		
	7	21.0	✓		
	8	21.5	✓		
	9	20.5	✓		
	10	20.5	✓		
	11	21.0	✓		
	12	22.0	✓		
	13	22.0	✓		
	14	22.0	✓		
	15	22.5	✓		
	16	21.0	✓		
	17	22.0	✓		
	18	20.0	✓		
	19	20.0	✓		
	20	21.5	✓		
	21	19.0		✓	abnormal eye
	22	18.0		✓	kyphosis
	23	16.0		✓	kyphosis
	24	19.0		✓	kyphosis
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): ~~4.54~~ 2.31 g

Number of survivors: 24

Number of deformed/have difficulty swimming: 4/3

Initials: KJL/KL/MM

Reviewed by: [signature]

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Start Date: **May 8, 2019**

Sample ID: CM_MC2

Termination Date: **June 7, 2019**

Work Order No.: **190906**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 ug/L Cu)	1	22.5	✓		
	2	21.5	✓		
	3	22.5	✓		
	4	21.0	✓		
	5	22.0	✓		
	6	20.0	✓		
	7	23.0	✓		
	8	22.0	✓		
	9	22.5	✓		
	10	22.0	✓		
	11	22.0	✓		
	12	22.0	✓		
	13	23.0	✓		
	14	22.5	✓		
	15	22.5	✓		
	16	22.5	✓		
	17	23.0	✓		
	18	24.0	✓		
	19	23.0	✓		
	20	21.0	✓		
	21	21.0	✓		
	22	22.0	✓		
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.41 g

Number of survivors: 22

Number of deformed/have difficulty swimming: 0/0

Initials: KJL/KE/MM

Reviewed by: JM

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: Teck

Sample ID: EV_MC2

Work Order No.: 190906

Start Date: May 8, 2019

Termination Date: June 7, 2019

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+20 ug/L Cu)	1	21.5	✓		
	2	22.5	✓		
	3	21.0	✓		
	4	21.0	✓		
	5	22.0	✓		
	6	21.5	✓		
	7	23.0	✓		
	8	21.5	✓		
	9	23.0	✓		
	10	23.5	✓		
	11	21.0	✓		
	12	21.5	✓		
	13	22.5	✓		
	14	22.0	✓		
	15	23.0	✓		
	16	23.5	✓		
	17	21.0	✓		
	18	18.5		✓	yolksac edema
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.03 g

Number of survivors: 18

Number of deformed/have difficulty swimming: 1/0

Initials: KL/YM

Reviewed by: JGh

Date Reviewed: Aug. 13/19

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: EV_MC2

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+20 ug/L Cu)	1	22.5	✓		
	2	21.0	✓		
	3	21.5	✓		
	4	22.5	✓		
	5	22.0	✓		
	6	22.0	✓		
	7	22.5	✓		
	8	22.5	✓		
	9	22.0	✓		
	10	22.5	✓		
	11	23.0	✓		
	12	22.0	✓		
	13	22.0	✓		
	14	23.0	✓		
	15	22.5	✓		
	16	21.0	✓		
	17	~~22.5~~	✓		
	18	22.5	✓		
	19	23.0	✓		
	20	23.0	✓		
	21	22.5	✓		
	22	21.5	✓		
	23	19.5		✓	yolksac edema, abnormal jaw
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.1B3

Number of survivors: 23

Number of deformed/have difficulty swimming: 1/1

Initials: KL/MH

Reviewed by: JCW

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: EV_MC2

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 mg/L Ca)	1	22.0	✓		
	2	22.0	✓		
	3	23.0	✓		
	4	22.5	✓		
	5	22.5	✓		
	6	22.0	✓		
	7	23.0	✓		
	8	22.0	✓		
	9	22.5	✓		
	10	23.0	✓		
	11	22.0	✓		
	12	23.0	✓		
	13	22.5	✓		
	14	23.0	✓		
	15	23.0	✓		
	16	21.5	✓		
	17	22.5	✓		
	18	22.0	✓		
	19	22.5	✓		
	20	22.5	✓		
	21	22.0	✓		
	22	22.5	✓		
	23	22.0	✓		
	24	22.0	✓		
	25	22.5	✓		
	26	23.0	✓		
	27	23.0	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.94g

Number of survivors: 27

Number of deformed/have difficulty swimming: 0/0

Initials: KJ/MM

Reviewed by: JCM

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: EV-HC1

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+20 ug/L Cu)	1	22.5	✓		
	2	21.0	✓		
	3	20.0	✓		
	4	22.0	✓		
	5	19.0	✓		
	6	23.0	✓		
	7	22.0	✓		
	8	20.5	✓		
	9	22.0	✓		
	10	22.5	✓		
	11	22.5	✓		
	12	22.5	✓		
	13	20.5	✓		
	14	21.0	✓		
	15	22.0	✓		
	16	20.0	✓		
	17	21.5	✓		
	18	23.0	✓		
	19	23.0	✓		
	20	23.0	✓		
	21	19.0	✓		
	22	18.0		✓	yolksac edema
	23	17.0		✓	kyphosis
	24	14.0		✓	yolksac edema + abnormal jaw
	25	18.0		✓	yolksac edema
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.839

Number of survivors: 25

Number of deformed/have difficulty swimming: 4/2

Initials: KL/YM

Reviewed by: [signature]

Date Reviewed: Aug. 13/19

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: EV_HCl

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+20 mg/L Cu)	1	22.0	✓		
	2	23.0	✓		
	3	21.0	✓		
	4	22.5	✓		
	5	22.5	✓		
	6	21.5	✓		
	7	22.0	✓		
	8	23.0	✓		
	9	23.0	✓		
	10	23.0	✓		
	11	23.0	✓		
	12	20.0	✓		
	13	21.0	✓		
	14	21.5	✓		
	15	21.5	✓		
	16	w 220.0	✓		
	17	23.0	✓		
	18	22.0	✓		
	19	22.5	✓		
	20	21.5	✓		
	21	14.0	~~✓~~ w	✓	Kyphosis
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.28 g

Number of survivors: 21

Number of deformed/have difficulty swimming: 1/1

Initials: KL/[illegible]

Reviewed by: [signature]

Date Reviewed: Aug. 8/19

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: EV-HCl

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 µg/L Cu)	1	22.5	✓		
	2	22.5	✓		
	3	22.5	✓		
	4	22.0	✓		
	5	21.0	✓		
	6	23.0	✓		
	7	22.0	✓		
	8	21.0	✓		
	9	22.5	✓		
	10	23.0	✓		
	11	23.0	✓		
	12	21.5	✓		
	13	21.5	✓		
	14	23.0	✓		
	15	23.0	✓		
	16	21.5	✓		
	17	22.0	✓		
	18	22.5	✓		
	19	21.0	✓		
	20	21.0	✓		
	21	22.5	✓		
	22	22.0	✓		
	23	22.0	✓		
	24	21.0	✓		
	25	21.5	✓		
	26	22.0		✓	kyphosis
	27	17.0		✓	kyphosis
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.85 g

Number of survivors: 27

Number of deformed/have difficulty swimming: 2/2

Initials: KJ YW

Reviewed by: JGu

Date Reviewed: Aug. 13/19

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-DCDS

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+20 ug/L Cu)	1	22.0	✓		
	2	23.0	✓		
	3	21.5	✓		
	4	22.0	✓		
	5	23.5	✓		
	6	22.0	✓		
	7	23.0	✓		
	8	~~23~~ 23.5	✓		
	9	22.5	✓		
	10	22.0	✓		
	11	22.0	✓		
	12	23.0	✓		
	13	23.0	✓		
	14	22.5	✓		
	15	23.0	✓		
	16	21.5	✓		
	17	23.0	✓		
	18	21.0	✓		
	19	22.0	✓		
	20	21.5	✓		
	21	22.5	✓		
	22	21.0	✓		
	23	21.0	✓		
	24	20.0	✓		
	25	20.0		✓	yolksac edema
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.79g

Number of survivors: 25

Number of deformed/have difficulty swimming: 1/0

Initials: KL/[illegible]

Reviewed by: [signature]

Date Reviewed: Aug. 13/19

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-DCDS

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+20 mg/L Cu)	1	22.5	✓		
	2	23.0	✓		
	3	23.0	✓		
	4	23.0	✓		
	5	22.5	✓		
	6	21.5	✓		
	7	23.0	✓		
	8	22.0	✓		
	9	20.0	✓		
	10	22.0	✓		
	11	22.5	✓		
	12	21.5	✓		
	13	23.0	✓		
	14	22.5	✓		
	15	20.0	✓		
	16	21.5	✓		
	17	23.0	✓		
	18	23.0	✓		
	19	22.0	✓		
	20	21.0	✓		
	21	20.0		✓	yolk sac edema
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.15g

Number of survivors: 21

Number of deformed/have difficulty swimming: 1 / 1

Initials: KL/MM

Reviewed by: JGh

Date Reviewed: Aug. 13/19

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-DCDS

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 ug/L Cu)	1	24.0	✓		
	2	22.5	✓		
	3	23.0	✓		
	4	22.0	✓		
	5	23.0	✓		
	6	22.5	✓		
	7	22.0	✓		
	8	21.5	✓		
	9	22.0	✓		
	10	23.0	✓		
	11	23.0	✓		
	12	21.5	✓		
	13	23.0	✓		
	14	23.0	✓		
	15	23.5	✓		
	16	23.0	✓		
	17	22.0	✓		
	18	23.0	✓		
	19	23.0	✓		
	20	23.0	✓		
	21	22.0	✓		
	22	22.0	✓		
	23	23.0	✓		
	24	22.5	✓		
	25	23.0	✓		
	26	22.5	✓		
	27	22.5	✓		
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): ~~303g~~ 3.03g

Number of survivors: 27

Number of deformed/have difficulty swimming: 0/0

Initials: KL/YM

Reviewed by: JOh

Date Reviewed: Aug. 13/19

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: Teck

Sample ID: LC_LC$3

Work Order No.: 190906

Start Date: May 8, 2019

Termination Date: June 7, 2019

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 ~~A~~ (+20 mg/L Cu)	1	22.0	✓		
	2	22.5	✓		
	3	22.5	✓		
	4	21.0	✓		
	5	21.5	✓		
	6	22.0	✓		
	7	22.0	✓		
	8	22.0	✓		
	9	21.0	✓		
	10	22.0	✓		
	11	21.5	✓		
	12	23.0	✓		
	13	22.0	✓		
	14	21.5	✓		
	15	21.5	✓		
	16	21.0	✓		
	17	20.5	✓		
	18	22.5	✓		
	19	20.0	✓		
	20	22.0	✓		
	21	22.5	✓		
	22	19.5		✓	yolksac edema, abnormal jaw
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.40 g

Number of survivors: 22

Number of deformed/have difficulty swimming: 1/1

Initials: KJ/MM

Reviewed by: [signature]

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-LC3

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 AB 4m (±20 mg/L Cu)	1	20.0	✓		
	2	22.5	✓		
	3	24.0	✓		
	4	23.0	✓		
	5	21.5	✓		
	6	24.0	✓		
	7	22.5	✓		
	8	23.0	✓		
	9	22.5	✓		
	10	20.5	✓		
	11	21.5	✓		
	12	23.0	✓		
	13	21.0	✓		
	14	22.5	✓		
	15	22.0	✓		
	16	23.5	✓		
	17	23.0	✓		
	18	22.0	✓		
	19	22.5	✓		
	20	22.0	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.489

Number of survivors: 20

Number of deformed/have difficulty swimming: 0/0

Initials: KL/MW

Reviewed by: JGM

Date Reviewed: Aug. 13/19

B42/48

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-LC3

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
(00 BC w (+20 ug/L Cu)	1	23.0	✓		
	2	21.0	✓		
	3	22.0	✓		
	4	21.0	✓		
	5	23.0	✓		
	6	22.0	✓		
	7	22.5	✓		
	8	21.5	✓		
	9	22.0	✓		
	10	22.0	✓		
	11	22.0	✓		
	12	22.0	✓		
	13	22.5	✓		
	14	21.5	✓		
	15	23.0	✓		
	16	21.0	✓		
	17	22.0	✓		
	18	22.5	✓		
	19	22.0	✓		
	20	21.0	✓		
	21	22.0	✓		
	22	21.0	✓		
	23	23.0	✓		
	24	22.5	✓		
	25	22.5	✓		
	26	22.0	✓		
	27	21.0		✓	abnormal eye
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 3.01 g

Number of survivors: 27

Number of deformed/have difficulty swimming: 1/0

Initials: KLMM

Reviewed by: JCM

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: Teck

Sample ID: LC-LC~~B~~S

Work Order No.: 190906

Start Date: May 8, 2019

Termination Date: June 7, 2019

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 ~~CB~~ A (+20 mg/L Cu)	1	23.0	✓		
	2	23.0	✓		
	3	21.5	✓		
	4	23.0	✓		
	5	22.5	✓		
	6	22.5	✓		
	7	22.0	✓		
	8	22.5	✓		
	9	21.0	✓		
	10	22.0	✓		
	11	23.0	✓		
	12	20.0	✓		
	13	21.0	✓		
	14	20.0	✓		
	15	20.0	✓		
	16	22.0	✓		
	17	22.0	✓		
	18	21.5	✓		
	19	~~[illegible]~~ 18.0	✓		
	20	20.0	✓		
	21	20.0	✓		
	22	20.0	✓		
	23	20.0	✓		
	24	18.0		✓	abnormal jaw
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.60 g

Number of survivors: 24

Number of deformed/have difficulty swimming: 1/0

Initials: KL/[illegible]

Reviewed by: [signature]

Date Reviewed: Aug. 13/19

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

B44/48

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-LCS

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+20 ug/L Cu)	1	21.5	/		
	2	21.0	/		
	3	22.5	/		
	4	23.0	/		
	5	22.5	/		
	6	22.5	/		
	7	22.0	/		
	8	21.0	/		
	9	23.5	/		
	10	23.0 u	/		
	11	23.0	/		
	12	22.5	/		
	13	22.0	/		
	14	23.0	/		
	15	24.0	/		
	16	23.0	/		
	17	23.0	/		
	18	17.0		/	kyphosis
	19	19.0		/	kyphosis and growth on head.
	20	19.0	/		
	21	20.0		/	yolk sac edema
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.30 g

Number of survivors: 21

Number of deformed/have difficulty swimming: 3 / 2

Initials: RL/MM

Reviewed by: [signature]

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-LCS

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 mg/L Cu)	1	21.5	✓		
	2	23.0	✓		
	3	22.5	✓		
	4	20.5	✓		
	5	21.5	✓		
	6	21.5	✓		
	7	23.0	✓		
	8	22.0	✓		
	9	20.0	✓		
	10	22.0	✓		
	11	23.0	✓		
	12	22.5	✓		
	13	22.5	✓		
	14	21.5	✓		
	15	22.0	✓		
	16	22.0	✓		
	17	22.0	✓		
	18	19.0	✓		
	19	22.0	✓		
	20	22.5	✓		
	21	22.5	✓		
	22	22.5	✓		
	23	22.0	✓		
	24	15.0		✓	Scoliosis
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.66 g

Number of survivors: 24

Number of deformed/have difficulty swimming: 1/1

Initials: KL/MM

Reviewed by: JGr

Date Reviewed: Aug. 13/19

P346/43

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-LCOSSLCC

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A (+20 ug/L Cu)	1	23.0	✓		
	2	23.5	✓		
	3	23.0	✓		
	4	21.5	✓		
	5	22.0	✓		
	6	22.0	✓		
	7	21.0	✓		
	8	22.0	✓		
	9	23.0	✓		
	10	21.0	✓		
	11	22.5	✓		
	12	20.5	✓		
	13	19.0	✓		
	14	22.0	✓		
	15	21.0	✓		
	16	21.0	✓		
	17	21.0	✓		
	18	21.0	✓		
	19	20.5	✓		
	20	20.0	✓		
	21	20.5	✓		
	22	22.0	✓		
	23	21.5		✓	yolksac edema
	24	19.0		✓	yolksac edema + abnormal jaw
	25	16.5		✓	abnormal jaw
	26	~~22.5~~		~~✓~~	
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.87g

Number of survivors: 25

Number of deformed/have difficulty swimming: 3/1

Initials: KL/MM

Reviewed by: JGL

Date Reviewed: Aug. 13/19

Issued: July 17, 2006; Ver. 1.0

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Start Date: **May 8, 2019**

Sample ID: LC_LCDSSLCC

Termination Date: **June 7, 2019**

Work Order No.: **190906**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B (+22 ug/L Cu)	1	23.5	✓		
	2	23.0	✓		
	3	22.0	✓		
	4	23.0	✓		
	5	22.0	✓		
	6	23.0	✓		
	7	20.5	✓		
	8	23.5	✓		
	9	23.0	✓		
	10	21.0	✓		
	11	22.0	✓		
	12	22.5	✓		
	13	22.5	✓		
	14	23.0	✓		
	15	23.0	✓		
	16	23.0	✓		
	17	22.5	✓		
	18	22.5	✓		
	19	23.5	✓		
	20	20.5	✓		
	21	21.0	✓		
	22	15.5		✓	Kyphosis, abnormal growth on head.
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 251 g

Number of survivors: 22

Number of deformed/have difficulty swimming: 1/1

Initials: RL/MW

Reviewed by: JGL

Date Reviewed: Aug. 13/19

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC LCD55LCC

Work Order No.: **190906**

Start Date: **May 8, 2019**

Termination Date: **June 7, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C (+20 µS/cm)	1	21.5	✓		
	2	23.0	✓		
	3	23.0	✓		
	4	19.5	✓		
	5	22.5	✓		
	6	23.0	✓		
	7	22.5	✓		
	8	22.5	✓		
	9	23.0	✓		
	10	22.0	✓		
	11	22.0	✓		
	12	21.5	✓		
	13	22.5	✓		
	14	22.0	✓		
	15	22.0	✓		
	16	23.0	✓		
	17	21.5	✓		
	18	20.5	✓		
	19	23.0	✓		
	20	23.0	✓		
	21	23.0	✓		
	22	22.5	✓		
	23	22.0	✓		
	24	22.5	✓		
	25	23.0	✓		
	26	23.0	✓		
	27	23.0	✓		
	28	22.0	✓		
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.98g

Number of survivors: 28

Number of deformed/have difficulty swimming: 0/0

Initials: KLMM

Reviewed by: JCR

Date Reviewed: Aug. 13/19

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Batch ID:	05-5020-6892	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Dechlor Control	13-5684-1924	08 May-19	08 May-19	15h	Teck Coal	
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)		
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

only 3 replicates used in statistical analyses (Rep D excluded due to possible poor egg quality)

① Reference sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Dechlor Control	Control water	Teck Coal	Dechlor Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	CM_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	LC_DCDS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	LC_LC3 passed proportion normal	1

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8831	FR_FRCP1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	LC_SLC failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	LC_LC3 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	Dechlor Control failed proportion normal	1

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	GH_FR1 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	GH_ER2 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	FR_FRCP1 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	FR_FRABCH failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	EV_MC2 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	GH_ERC failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	EV_HC1 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	FR_UFR1 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	LC_LCDSSLSS failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	LC_LC5 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	LC_DCDS failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	CM_MC2 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0416	CM_MC1 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	LC_LC3 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	CM_MC1 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	GH_FR1 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	GH_ERC failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	LC_LC5 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	FR_FRCP1 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	GH_ER2 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	FR_FRABCH failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	LC_DCDS failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	LC_SLC failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	CM_MC2 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	EV_MC2 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	LC_LCDSSLSS failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	FR_UFR1 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	EV_HC1 failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0092	Dechlor Control failed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed proportion normal	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	FR_FRCP1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	CM_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	LC_LC3 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	LC_DCDS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.6697	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed proportion normal	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed proportion normal	1

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed proportion normal	1
18-7106-6687	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed proportion normal	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	FR_FRABCH passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	EV_HC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	FR_FRCP1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	GH_ERC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8622	LC_LC3 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	EV_MC2 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	CM_MC1 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	Dechlor Control failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	FR_FRCP1 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	LC_DCDS failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	FR_FRABCH failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	FR_UFR1 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	LC_LCDSSLSS failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	EV_HC1 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	CM_MC2 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	LC_LC3 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	LC_LC5 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	LC_SLC failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	GH_ER2 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	GH_ERC failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0100	GH_FR1 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	FR_FRCP1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	FR_FRABCH passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	LC_LC3 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	EV_HC1 passed survival rate	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	GH_ERC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8833	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	LC_LCDSSLSS failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	GH_FR1 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	EV_HC1 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	CM_MC1 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	FR_FRCP1 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	LC_SLC failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	LC_LC5 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	Dechlor Control failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	GH_ER2 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	GH_ERC failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	LC_LC3 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	CM_MC2 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	LC_DCDS failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	EV_MC2 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	FR_UFR1 failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0018	FR_FRABCH failed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	GH_ERC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	FR_FRCP1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	FR_FRABCH passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	EV_HC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	LC_LC3 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5318	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLSS passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Dechlor Control passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
01-0587-2086	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1

Salmonid Embryo-Alevin Survival and Development Test

Nautilus Environmental

Proportion Normal Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Dechlor Control	N	3	0.7880	0.5754	1.0000	0.7000	0.8710	0.0494	0.0856	10.86%	0.00%
① FR_UFR1		3	0.8470	0.5176	1.0000	0.7667	1.0000	0.0766	0.1326	15.66%	-7.48%
① GH_ER2		3	0.7351	0.5085	0.9618	0.6667	0.8387	0.0527	0.0912	12.41%	6.71%
① CM_MC1		3	0.7061	0.2653	1.0000	0.5517	0.9000	0.1025	0.1775	25.13%	10.39%
① LC_SLC		3	0.7814	0.4871	1.0000	0.6667	0.9032	0.0684	0.1184	15.16%	0.85%
FR_FRABCH		3	0.5889	0.3499	0.8279	0.5333	0.7000	0.0556	0.0962	16.34%	25.27%
FR_FRCP1	+	3	0.6889	0.5624	0.8154	0.6333	0.7333	0.0294	0.0509	7.39%	12.58%
GH_FR1	20 mg/L	3	0.5562	0.3055	0.8070	0.4688	0.6667	0.0583	0.1009	18.14%	29.41%
GH_ERC	CU	3	0.7529	0.2973	1.0000	0.5667	0.9333	0.1059	0.1834	24.36%	4.46%
CM_MC2		3	0.6723	0.4864	0.8583	0.6250	0.7586	0.0432	0.0749	11.13%	14.68%
EV_MC2		3	0.7398	0.3498	1.0000	0.5862	0.9000	0.0906	0.1570	21.22%	6.11%
EV_HC1		3	0.7186	0.4687	0.9686	0.6452	0.8333	0.0581	0.1006	14.00%	8.81%
LC_DCDS		3	0.7731	0.4566	1.0000	0.6452	0.9000	0.0736	0.1274	16.48%	1.89%
LC_LC3		3	0.7446	0.4815	1.0000	0.6774	0.8667	0.0612	0.1059	14.22%	5.51%
LC_LC5		3	0.7029	0.4794	0.9263	0.6000	0.7667	0.0519	0.0899	12.80%	10.81%
LC_LCDSSLSS	CC	3	0.7969	0.5033	1.0000	0.7241	0.9333	0.0683	0.1182	14.83%	-1.13%

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Dechlor Control	N	3	0.8332	0.6896	0.9769	0.7667	0.8710	0.0334	0.0578	6.94%	0.00%
① FR_UFR1		3	0.8796	0.6161	1.0000	0.8000	1.0000	0.0612	0.1061	12.06%	-5.56%
① GH_ER2		3	0.7789	0.5081	1.0000	0.7000	0.9032	0.0629	0.1090	13.99%	6.53%
① CM_MC1		3	0.7628	0.3918	1.0000	0.6552	0.9333	0.0862	0.1493	19.58%	8.45%
① LC_SLC		3	0.7814	0.4871	1.0000	0.6667	0.9032	0.0684	0.1184	15.16%	6.23%
FR_FRABCH		3	0.6111	0.2765	0.9458	0.5333	0.7667	0.0778	0.1347	22.04%	26.66%
FR_FRCP1	+	3	0.7333	0.6505	0.8161	0.7000	0.7667	0.0193	0.0333	4.55%	11.99%
GH_FR1	20 mg/L	3	0.5718	0.0000	1.0000	0.5667	0.6667	0.0500	0.0707	11.47%	25.99%
GH_ERC	CU	3	0.7870	0.2825	1.0000	0.5667	0.9667	0.1172	0.2031	25.80%	5.55%
CM_MC2		3	0.7140	0.5401	0.8878	0.6333	0.7586	0.0404	0.0700	9.80%	14.31%
EV_MC2		3	0.7625	0.4154	1.0000	0.6207	0.9000	0.0807	0.1397	18.32%	8.49%
EV_HC1		3	0.7946	0.5170	1.0000	0.6774	0.9000	0.0645	0.1118	14.06%	4.63%
LC_DCDS		3	0.7946	0.5170	1.0000	0.6774	0.9000	0.0645	0.1118	14.06%	4.63%
LC_LC3		3	0.7664	0.4780	1.0000	0.6897	0.9000	0.0670	0.1161	15.15%	8.02%
LC_LC5		3	0.7581	0.6291	0.8870	0.7000	0.8000	0.0300	0.0519	6.85%	9.02%
LC_LCDSSLSS		3	0.8418	0.6240	1.0000	0.7586	0.9333	0.0506	0.0877	10.41%	-1.02%

① Reference sites

Salmonid Embryo-Alevin Survival and Development Test — Nautilus Environmental

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Dechlor Control	N	0.7000	0.7931	0.8710
① FR_UFR1		0.7667	0.7742	1.0000
① GH_ER2		0.6667	0.7000	0.8387
① CM_MC1		0.5517	0.6667	0.9000
① LC_SLC		0.7742	0.6667	0.9032
FR_FRABCH		0.7000	0.5333	0.5333
FR_FRCP1		0.6333	0.7333	0.7000
GH_FR1	+ 20 µg/L Cu	0.4688	0.6667	0.5333
GH_ERC		0.5667	0.7586	0.9333
CM_MC2		0.6333	0.6250	0.7586
EV_MC2		0.5862	0.7333	0.9000
EV_HC1		0.6774	0.6452	0.8333
LC_DCDS		0.7742	0.6452	0.9000
LC_LC3		0.6774	0.6897	0.8667
LC_LC5		0.7419	0.6000	0.7667
LC_LCDSSLSS		0.7333	0.7241	0.9333

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Dechlor Control	N	0.7667	0.8621	0.8710
① FR_UFR1		0.8000	0.8387	1.0000
① GH_ER2		0.7000	0.7333	0.9032
① CM_MC1		0.6552	0.7000	0.9333
① LC_SLC		0.7742	0.6667	0.9032
FR_FRABCH		0.7667	0.5333	0.5333
FR_FRCP1		0.7000	0.7667	0.7333
GH_FR1	+ 20 µg/L Cu	0.5000	0.6667	0.5667
GH_ERC		0.5667	0.8276	0.9667
CM_MC2		0.6333	0.7500	0.7586
EV_MC2		0.6207	0.7667	0.9000
EV_HC1		0.8065	0.6774	0.9000
LC_DCDS		0.8065	0.6774	0.9000
LC_LC3		0.7097	0.6897	0.9000
LC_LC5		0.7742	0.7000	0.8000
LC_LCDSSLSS		0.8333	0.7586	0.9333

① Reference sites

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Proportion Normal Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
Dechlor Control	N	21/30	23/29	27/31
① FR_UFR1		23/30	24/31	30/30
① GH_ER2		20/30	21/30	26/31
① CM_MC1		16/29	20/30	27/30
① LC_SLC		24/31	20/30	28/31
FR_FRABCH		21/30	16/30	16/30
FR_FRCP1	+	19/30	22/30	21/30
GH_FR1	20 µg/L	15/32	20/30	16/30
GH_ERC	Cu	17/30	22/29	28/30
CM_MC2		19/30	20/32	22/29
EV_MC2		17/29	22/30	27/30
EV_HC1		21/31	20/31	25/30
LC_DCDS		24/31	20/31	27/30
LC_LC3		21/31	20/29	26/30
LC_LC5		23/31	18/30	23/30
LC_LCDSSL~~SS~~ CC		22/30	21/29	28/30

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
Dechlor Control	N	23/30	25/29	27/31
① FR_UFR1		24/30	26/31	30/30
① GH_ER2 .		21/30	22/30	28/31
① CM_MC1		19/29	21/30	28/30
① LC_SLC		24/31	20/30	28/31
FR_FRABCH		23/30	16/30	16/30
FR_FRCP1	+	21/30	23/30	22/30
GH_FR1	20 µg/L	16/32	20/30	17/30
GH_ERC	Cu	17/30	24/29	29/30
CM_MC2		19/30	24/32	22/29
EV_MC2		18/29	23/30	27/30
EV_HC1		25/31	21/31	27/30
LC_DCDS		25/31	21/31	27/30
LC_LC3		22/31	20/29	27/30
LC_LC5		24/31	21/30	24/30
LC_LCDSSL~~SS~~ CC		25/30	22/29	28/30

① Reference sites

CETIS Analytical Report

Test Code/ID: 190906a / 07-0683-8665

Salmonid Embryo-Alevin Survival and Development Test

Nautilus Environmental

Analysis ID:	01-0587-2086	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 12:05	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	05-5020-6892	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Dechlor Control	13-5684-1924	08 May-19	08 May-19	15h	Teck Coal	
① FR_UFR1	10-0027-4786	07 May-19 09:00 ✓	08 May-19 10:18	30h (1.3 °C)		
② GH_ER2	09-4887-2646	07 May-19 ✓	08 May-19 10:18	39h (2.5 °C)		
③ CM_MC1	05-7345-8193	07 May-19 12:00 ✓	08 May-19 10:18	27h (7.6 °C)		
④ LC_SLC	01-9748-1591	07 May-19 08:53 ✓	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25 ✓	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15 ✓	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19 ✓	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19 ✓	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01 ✓	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10 ✓	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50 ✓	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30 ✓	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48 ✓	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10 ✓	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54 ✓	08 May-19 10:18	28h (1.4 °C)		

① Reference STTD

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Dechlor Control	Control water	Teck Coal	Dechlor Control	
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
② GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
③ CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
④ LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		① FR_UFR1	0.8622	Exact	0.8622	Non-Significant Effect
		② GH_ER2	0.2371	Exact	1.0000	Non-Significant Effect
		③ CM_MC1	0.1661	Exact	1.0000	Non-Significant Effect
		④ LC_SLC	0.2485	Exact	1.0000	Non-Significant Effect
		FR_FRABCH*	0.0007	Exact	0.0100	Significant Effect
		FR_FRCP1	0.0736	Exact	0.8833	Non-Significant Effect
		GH_FR1*	0.0001	Exact	0.0018	Significant Effect
		GH_ERC	0.2718	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.0409	Exact	0.5318	Non-Significant Effect
		EV_MC2	0.1661	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.3091	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.3091	Exact	1.0000	Non-Significant Effect

Analyst: QA: Aug. 14/19

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID: 01-0587-2086 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 12:05 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC3	0.1758	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.1427	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLSS	0.6450	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Dechlor Control	N	75	15	90	0.8333	0.1667	-9.9%
FR_UFR1		80	11	91	0.8791	0.1209	-15.94%
GH_ER2		71	20	91	0.7802	0.2198	-2.9%
CM_MC1		68	21	89	0.764	0.236	-0.77%
LC_SLC		72	20	92	0.7826	0.2174	-3.21%
FR_FRABCH		55	35	90	0.6111	0.3889	19.4%
FR_FRCP1		66	24	90	0.7333	0.2667	3.29%
GH_FR1		53	39	92	0.5761	0.4239	24.02%
GH_ERC		70	19	89	0.7865	0.2135	-3.73%
CM_MC2		65	26	91	0.7143	0.2857	5.8%
EV_MC2		68	21	89	0.764	0.236	-0.77%
EV_HC1		73	19	92	0.7935	0.2065	-4.65%
LC_DCDS		73	19	92	0.7935	0.2065	-4.65%
LC_LC3		69	21	90	0.7667	0.2333	-1.11%
LC_LC5		69	22	91	0.7582	0.2418	0.0%
LC_LCDSSLSS		75	14	89	0.8427	0.1573	-11.14%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Dechlor Control	N	0.7667	0.8621	0.8710
FR_UFR1		0.8000	0.8387	1.0000
GH_ER2		0.7000	0.7333	0.9032
CM_MC1		0.6552	0.7000	0.9333
LC_SLC		0.7742	0.6667	0.9032
FR_FRABCH		0.7667	0.5333	0.5333
FR_FRCP1		0.7000	0.7667	0.7333
GH_FR1		0.5000	0.6667	0.5667
GH_ERC		0.5667	0.8276	0.9667
CM_MC2		0.6333	0.7500	0.7586
EV_MC2		0.6207	0.7667	0.9000
EV_HC1		0.8065	0.6774	0.9000
LC_DCDS		0.8065	0.6774	0.9000
LC_LC3		0.7097	0.6897	0.9000
LC_LC5		0.7742	0.7000	0.8000
LC_LCDSSLSS		0.8333	0.7586	0.9333

① Reference sites

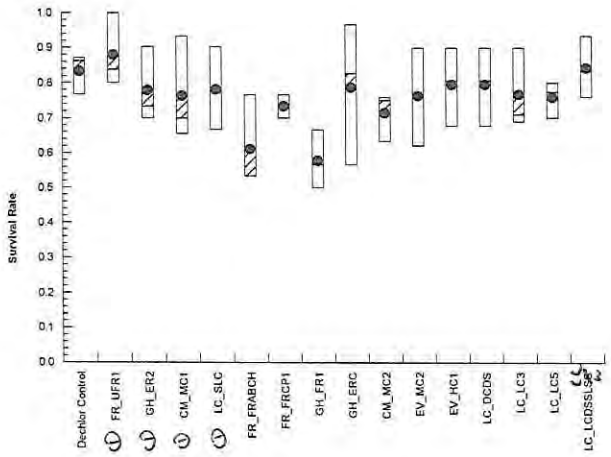
Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	01-0587-2086	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 12:05	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
Dechlor Control	N	23/30	25/29	27/31
FR_UFR1		24/30	26/31	30/30
GH_ER2		21/30	22/30	28/31
CM_MC1		19/29	21/30	28/30
LC_SLC		24/31	20/30	28/31
FR_FRABCH		23/30	16/30	16/30
FR_FRCP1		21/30	23/30	22/30
GH_FR1		16/32	20/30	17/30
GH_ERC		17/30	24/29	29/30
CM_MC2		19/30	24/32	22/29
EV_MC2		18/29	23/30	27/30
EV_HC1		25/31	21/31	27/30
LC_DCDS		25/31	21/31	27/30
LC_LC3		22/31	20/29	27/30
LC_LC5		24/31	21/30	24/30
LC_LCDSSLS		25/30	22/29	28/30

Graphics



Reference sites.

Analyst: _____ QA: _____ Aug. 14/19

Salmonid Embryo-Alevin Survival and Development Test

Nautilus Environmental

Analysis ID:	18-7106-6687	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 12:05	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	05-5020-6892	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Dechlor Control	13-5684-1924	08 May-19	08 May-19	15h	Teck Coal	
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)		
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Dechlor Control	Control water	Teck Coal	Dechlor Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	0.8831	Exact	0.8831	Non-Significant Effect
		GH_ER2	0.2557	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.1407	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.5310	Exact	1.0000	Non-Significant Effect
		FR_FRABCH*	0.0030	Exact	0.0416	Significant Effect
		FR_FRCP1	0.0871	Exact	1.0000	Non-Significant Effect
		GH_FR1*	0.0006	Exact	0.0092	Significant Effect
		GH_ERC	0.3460	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.0515	Exact	0.6697	Non-Significant Effect
		EV_MC2	0.2843	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.1721	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.4602	Exact	1.0000	Non-Significant Effect

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID: 18-7106-6687 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 12:05 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC3	0.2987	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.1246	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLSS	0.6294	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Dechlor Control	N	71	19	90	0.7889	0.2111	-12.17%
① FR_UFR1		77	14	91	0.8462	0.1538	-20.31%
① GH_ER2		67	24	91	0.7363	0.2637	-4.69%
① CM_MC1		63	26	89	0.7079	0.2921	-0.65%
① LC_SLC		72	20	92	0.7826	0.2174	-11.28%
FR_FRABCH		53	37	90	0.5889	0.4111	16.27%
FR_FRCP1		62	28	90	0.6889	0.3111	2.05%
GH_FR1		51	41	92	0.5543	0.4457	21.18%
GH_ERC		67	22	89	0.7528	0.2472	-7.04%
CM_MC2		61	30	91	0.6703	0.3297	4.69%
EV_MC2		66	23	89	0.7416	0.2584	-5.44%
EV_HC1		66	26	92	0.7174	0.2826	-2.0%
LC_DCDS		71	21	92	0.7717	0.2283	-9.73%
LC_LC3		67	23	90	0.7444	0.2556	-5.85%
LC_LC5		64	27	91	0.7033	0.2967	0.0%
LC_LCDSSLSS		71	18	89	0.7978	0.2022	-13.43%

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Dechlor Control	N	0.7000	0.7931	0.8710
① FR_UFR1		0.7667	0.7742	1.0000
① GH_ER2		0.6667	0.7000	0.8387
① CM_MC1		0.5517	0.6667	0.9000
① LC_SLC		0.7742	0.6667	0.9032
FR_FRABCH		0.7000	0.5333	0.5333
FR_FRCP1		0.6333	0.7333	0.7000
GH_FR1		0.4688	0.6667	0.5333
GH_ERC		0.5667	0.7586	0.9333
CM_MC2		0.6333	0.6250	0.7586
EV_MC2		0.5862	0.7333	0.9000
EV_HC1		0.6774	0.6452	0.8333
LC_DCDS		0.7742	0.6452	0.9000
LC_LC3		0.6774	0.6897	0.8667
LC_LC5		0.7419	0.6000	0.7667
LC_LCDSSLSS		0.7333	0.7241	0.9333

① Reference sites

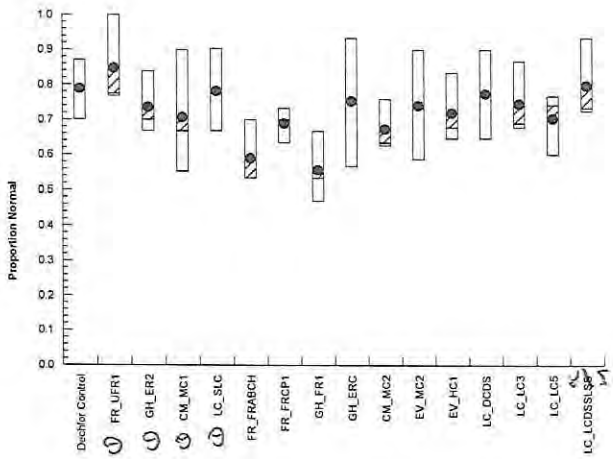
Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	18-7106-6687	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 12:05	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Proportion Normal Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
Dechlor Control	N	21/30	23/29	27/31
① FR_UFR1		23/30	24/31	30/30
① GH_ER2		20/30	21/30	26/31
① CM_MC1		16/29	20/30	27/30
① LC_SLC		24/31	20/30	28/31
FR_FRABCH		21/30	16/30	16/30
FR_FRCP1		19/30	22/30	21/30
GH_FR1		15/32	20/30	16/30
GH_ERC		17/30	22/29	28/30
CM_MC2		19/30	20/32	22/29
EV_MC2		17/29	22/30	27/30
EV_HC1		21/31	20/31	25/30
LC_DCDS		24/31	20/31	27/30
LC_LC3		21/31	20/29	26/30
LC_LC5		23/31	18/30	23/30
LC_LCDSSLS		22/30	21/29	28/30

Graphics



① Reference sites

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	21-4537-8401	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:40	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	05-5020-6892	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
④ FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
⑤ GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
④ CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
① LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

① Reference STP28

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
④ FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
⑤ GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
④ CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
③ Upstream Control (FR_UFR1)		⑤ GH_ER2	0.0569	Exact	0.3411	Non-Significant Effect
		④ CM_MC1	0.0336	Exact	0.3023	Non-Significant Effect
		① LC_SLC	0.0609	Exact	0.3044	Non-Significant Effect
		FR_FRABCH*	0.0000	Exact	3.5E-04	Significant Effect
		FR_FRCP1	0.0104	Exact	0.1149	Non-Significant Effect
		GH_FR1*	0.0000	Exact	4.3E-05	Significant Effect
		GH_ERC	0.0709	Exact	0.2835	Non-Significant Effect
		CM_MC2	0.0047	Exact	0.0558	Non-Significant Effect
		EV_MC2	0.0336	Exact	0.3023	Non-Significant Effect
		EV_HC1	0.0857	Exact	0.2572	Non-Significant Effect
		LC_DCDS	0.0857	Exact	0.2572	Non-Significant Effect
		LC_LC3	0.0364	Exact	0.2546	Non-Significant Effect
		LC_LC5	0.0266	Exact	0.2662	Non-Significant Effect
		LC_LCDSSLCC	0.3119	Exact	0.3119	Non-Significant Effect

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID: 21-4537-8401 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 15:40 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	U	80	11	91	0.8791	0.1209	-15.94%
GH_ER2		71	20	91	0.7802	0.2198	-2.9%
CM_MC1		68	21	89	0.764	0.236	-0.77%
LC_SLC		72	20	92	0.7826	0.2174	-3.21%
FR_FRABCH		55	35	90	0.6111	0.3889	19.4%
FR_FRCP1		66	24	90	0.7333	0.2667	3.29%
GH_FR1		53	39	92	0.5761	0.4239	24.02%
GH_ERC		70	19	89	0.7865	0.2135	-3.73%
CM_MC2		65	26	91	0.7143	0.2857	5.8%
EV_MC2		68	21	89	0.764	0.236	-0.77%
EV_HC1		73	19	92	0.7935	0.2065	-4.65%
LC_DCDS		73	19	92	0.7935	0.2065	-4.65%
LC_LC3		69	21	90	0.7667	0.2333	-1.11%
LC_LC5		69	22	91	0.7582	0.2418	0.0%
LC_LCDSSL		75	14	89	0.8427	0.1573	-11.14%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1	U	0.8000	0.8387	1.0000
GH_ER2		0.7000	0.7333	0.9032
CM_MC1		0.6552	0.7000	0.9333
LC_SLC		0.7742	0.6667	0.9032
FR_FRABCH		0.7667	0.5333	0.5333
FR_FRCP1		0.7000	0.7667	0.7333
GH_FR1		0.5000	0.6667	0.5667
GH_ERC		0.5667	0.8276	0.9667
CM_MC2		0.6333	0.7500	0.7586
EV_MC2		0.6207	0.7667	0.9000
EV_HC1		0.8065	0.6774	0.9000
LC_DCDS		0.8065	0.6774	0.9000
LC_LC3		0.7097	0.6897	0.9000
LC_LC5		0.7742	0.7000	0.8000
LC_LCDSSL		0.8333	0.7586	0.9333

Survival Rate Binomials

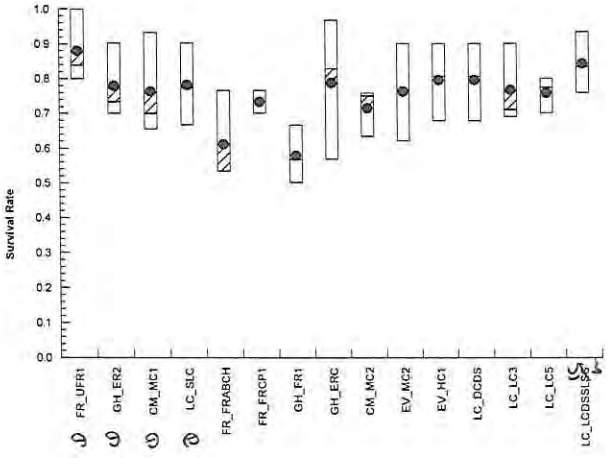
Sample	Code	Rep 1	Rep 2	Rep 3
GH_ER2		21/30	22/30	28/31
CM_MC1		19/29	21/30	28/30
LC_SLC		24/31	20/30	28/31
FR_FRABCH		23/30	16/30	16/30
FR_FRCP1		21/30	23/30	22/30
GH_FR1		16/32	20/30	17/30
GH_ERC		17/30	24/29	29/30
CM_MC2		19/30	24/32	22/29
EV_MC2		18/29	23/30	27/30
EV_HC1		25/31	21/31	27/30
LC_DCDS		25/31	21/31	27/30
LC_LC3		22/31	20/29	27/30
LC_LC5		24/31	21/30	24/30
LC_LCDSSL		25/30	22/29	28/30

5 Reference sites

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	21-4537-8401	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:40	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① ① ① ② ① reference sites

Analyst: [signature] QA: [signature] Aug. 14/19

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	14-1777-6746	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:40	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	05-5020-6892	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Upstream Control (FR_UFR1)		GH_ER2	0.0500	Exact	0.3497	Non-Significant Effect
		CM_MC1	0.0197	Exact	0.1776	Non-Significant Effect
		LC_SLC	0.1802	Exact	0.3604	Non-Significant Effect
		FR_FRABCH*	0.0001	Exact	0.0013	Significant Effect
		FR_FRCP1	0.0096	Exact	0.1055	Non-Significant Effect
		GH_FR1*	0.0000	Exact	1.8E-04	Significant Effect
		GH_ERC	0.0837	Exact	0.3349	Non-Significant Effect
		CM_MC2	0.0045	Exact	0.0536	Non-Significant Effect
		EV_MC2	0.0601	Exact	0.3605	Non-Significant Effect
		EV_HC1	0.0264	Exact	0.2115	Non-Significant Effect
		LC_DCDS	0.1374	Exact	0.4122	Non-Significant Effect
		LC_LC3	0.0649	Exact	0.3246	Non-Significant Effect
		LC_LC5	0.0162	Exact	0.1623	Non-Significant Effect
		LC_LCDSSLCC	0.2566	Exact	0.2566	Non-Significant Effect

Analyst: YL QA: JGL Aug. 14/19

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID: 14-1777-6746 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 15:40 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

	Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
①	FR_UFR1	U	77	14	91	0.8462	0.1538	-20.31%
①	GH_ER2		67	24	91	0.7363	0.2637	-4.69%
①	CM_MC1		63	26	89	0.7079	0.2921	-0.65%
①	LC_SLC		72	20	92	0.7826	0.2174	-11.28%
	FR_FRABCH		53	37	90	0.5889	0.4111	16.27%
	FR_FRCP1		62	28	90	0.6889	0.3111	2.05%
	GH_FR1		51	41	92	0.5543	0.4457	21.18%
	GH_ERC		67	22	89	0.7528	0.2472	-7.04%
	CM_MC2		61	30	91	0.6703	0.3297	4.69%
	EV_MC2		66	23	89	0.7416	0.2584	-5.44%
	EV_HC1		66	26	92	0.7174	0.2826	-2.0%
	LC_DCDS		71	21	92	0.7717	0.2283	-9.73%
	LC_LC3		67	23	90	0.7444	0.2556	-5.85%
	LC_LC5		64	27	91	0.7033	0.2967	0.0%
	LC_LCDSSLSS	CC	71	18	89	0.7978	0.2022	-13.43%

Proportion Normal Detail

	Sample	Code	Rep 1	Rep 2	Rep 3
①	FR_UFR1	U	0.7667	0.7742	1.0000
①	GH_ER2		0.6667	0.7000	0.8387
①	CM_MC1		0.5517	0.6667	0.9000
①	LC_SLC		0.7742	0.6667	0.9032
	FR_FRABCH		0.7000	0.5333	0.5333
	FR_FRCP1		0.6333	0.7333	0.7000
	GH_FR1		0.4688	0.6667	0.5333
	GH_ERC		0.5667	0.7586	0.9333
	CM_MC2		0.6333	0.6250	0.7586
	EV_MC2		0.5862	0.7333	0.9000
	EV_HC1		0.6774	0.6452	0.8333
	LC_DCDS		0.7742	0.6452	0.9000
	LC_LC3		0.6774	0.6897	0.8667
	LC_LC5		0.7419	0.6000	0.7667
	LC_LCDSSLSS	CC	0.7333	0.7241	0.9333

Proportion Normal Binomials

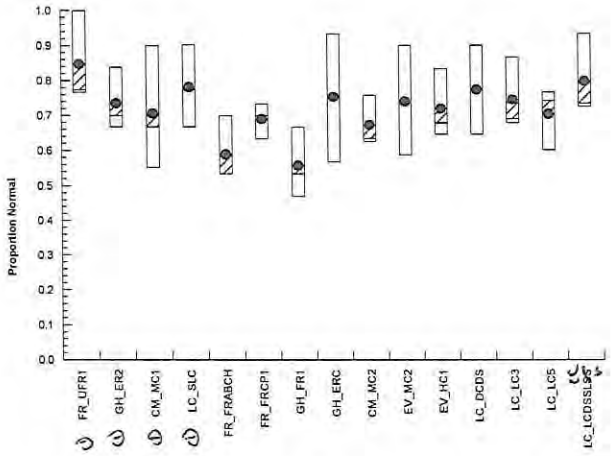
	Sample	Code	Rep 1	Rep 2	Rep 3
①	GH_ER2		20/30	21/30	26/31
①	CM_MC1		16/29	20/30	27/30
①	LC_SLC		24/31	20/30	28/31
	FR_FRABCH		21/30	16/30	16/30
	FR_FRCP1		19/30	22/30	21/30
	GH_FR1		15/32	20/30	16/30
	GH_ERC		17/30	22/29	28/30
	CM_MC2		19/30	20/32	22/29
	EV_MC2		17/29	22/30	27/30
	EV_HC1		21/31	20/31	25/30
	LC_DCDS		24/31	20/31	27/30
	LC_LC3		21/31	20/29	26/30
	LC_LC5		23/31	18/30	23/30
	LC_LCDSSLSS	CC	22/30	21/29	28/30

① Reference sites

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	14-1777-6746	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:40	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference sites

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-4482-7149	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:42	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	05-5020-6892	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

① Reference sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Receiving Water (GH-ER2)		FR_UFR1	0.9763	Exact	0.9763	Non-Significant Effect
		CM_MC1	0.4676	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.5862	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.0102	Exact	0.1325	Non-Significant Effect
		FR_FRCP1	0.2872	Exact	1.0000	Non-Significant Effect
		GH_FR1*	0.0025	Exact	0.0346	Significant Effect
		GH_ERC	0.6113	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.1970	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.4676	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.6551	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.6551	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.4839	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.4303	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.8966	Exact	1.0000	Non-Significant Effect

Analyst: YL QA: Aug. 14/19

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID: 11-4482-7149 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 15:42 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		80	11	91	0.8791	0.1209	-15.94%
GH_ER2	R	71	20	91	0.7802	0.2198	-2.9%
CM_MC1		68	21	89	0.764	0.236	-0.77%
LC_SLC		72	20	92	0.7826	0.2174	-3.21%
FR_FRABCH		55	35	90	0.6111	0.3889	19.4%
FR_FRCP1		66	24	90	0.7333	0.2667	3.29%
GH_FR1		53	39	92	0.5761	0.4239	24.02%
GH_ERC		70	19	89	0.7865	0.2135	-3.73%
CM_MC2		65	26	91	0.7143	0.2857	5.8%
EV_MC2		68	21	89	0.764	0.236	-0.77%
EV_HC1		73	19	92	0.7935	0.2065	-4.65%
LC_DCDS		73	19	92	0.7935	0.2065	-4.65%
LC_LC3		69	21	90	0.7667	0.2333	-1.11%
LC_LC5		69	22	91	0.7582	0.2418	0.0%
LC_LCDSSLSS		75	14	89	0.8427	0.1573	-11.14%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		0.8000	0.8387	1.0000
GH_ER2	R	0.7000	0.7333	0.9032
CM_MC1		0.6552	0.7000	0.9333
LC_SLC		0.7742	0.6667	0.9032
FR_FRABCH		0.7667	0.5333	0.5333
FR_FRCP1		0.7000	0.7667	0.7333
GH_FR1		0.5000	0.6667	0.5667
GH_ERC		0.5667	0.8276	0.9667
CM_MC2		0.6333	0.7500	0.7586
EV_MC2		0.6207	0.7667	0.9000
EV_HC1		0.8065	0.6774	0.9000
LC_DCDS		0.8065	0.6774	0.9000
LC_LC3		0.7097	0.6897	0.9000
LC_LC5		0.7742	0.7000	0.8000
LC_LCDSSLSS		0.8333	0.7586	0.9333

Survival Rate Binomials

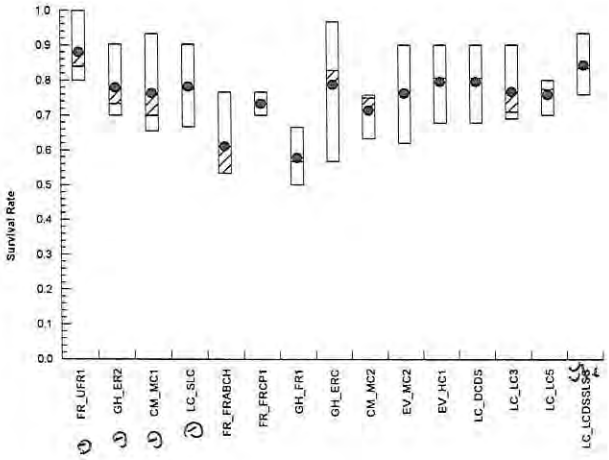
Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		24/30	26/31	30/30
CM_MC1		19/29	21/30	28/30
LC_SLC		24/31	20/30	28/31
FR_FRABCH		23/30	16/30	16/30
FR_FRCP1		21/30	23/30	22/30
GH_FR1		16/32	20/30	17/30
GH_ERC		17/30	24/29	29/30
CM_MC2		19/30	24/32	22/29
EV_MC2		18/29	23/30	27/30
EV_HC1		25/31	21/31	27/30
LC_DCDS		25/31	21/31	27/30
LC_LC3		22/31	20/29	27/30
LC_LC5		24/31	21/30	24/30
LC_LCDSSLSS		25/30	22/29	28/30

① Reference sites

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-4482-7149	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:42	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① reference sites

Analyst: _____ QA: Aug. 14/19

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	07-8147-4760	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:42	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	05-5020-6892	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

① Reference sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Receiving Water (GH-ER2)		FR_UFR1	0.9780	Exact	0.9780	Non-Significant Effect
		CM_MC1	0.3979	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.8176	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.0260	Exact	0.3378	Non-Significant Effect
		FR_FRCP1	0.2947	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.0077	Exact	0.1073	Non-Significant Effect
		GH_ERC	0.6645	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.2087	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.5988	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.4521	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.7669	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.6159	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.3708	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.8753	Exact	1.0000	Non-Significant Effect

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID: 07-8147-4760 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 15:42 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		77	14	91	0.8462	0.1538	-20.31%
GH_ER2	R	67	24	91	0.7363	0.2637	-4.69%
CM_MC1		63	26	89	0.7079	0.2921	-0.65%
LC_SLC		72	20	92	0.7826	0.2174	-11.28%
FR_FRABCH		53	37	90	0.5889	0.4111	16.27%
FR_FRCP1		62	28	90	0.6889	0.3111	2.05%
GH_FR1		51	41	92	0.5543	0.4457	21.18%
GH_ERC		67	22	89	0.7528	0.2472	-7.04%
CM_MC2		61	30	91	0.6703	0.3297	4.69%
EV_MC2		66	23	89	0.7416	0.2584	-5.44%
EV_HC1		66	26	92	0.7174	0.2826	-2.0%
LC_DCDS		71	21	92	0.7717	0.2283	-9.73%
LC_LC3		67	23	90	0.7444	0.2556	-5.85%
LC_LC5		64	27	91	0.7033	0.2967	0.0%
LC_LCDSSLS		71	18	89	0.7978	0.2022	-13.43%

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		0.7667	0.7742	1.0000
GH_ER2	R	0.6667	0.7000	0.8387
CM_MC1		0.5517	0.6667	0.9000
LC_SLC		0.7742	0.6667	0.9032
FR_FRABCH		0.7000	0.5333	0.5333
FR_FRCP1		0.6333	0.7333	0.7000
GH_FR1		0.4688	0.6667	0.5333
GH_ERC		0.5667	0.7586	0.9333
CM_MC2		0.6333	0.6250	0.7586
EV_MC2		0.5862	0.7333	0.9000
EV_HC1		0.6774	0.6452	0.8333
LC_DCDS		0.7742	0.6452	0.9000
LC_LC3		0.6774	0.6897	0.8667
LC_LC5		0.7419	0.6000	0.7667
LC_LCDSSLS		0.7333	0.7241	0.9333

Proportion Normal Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		23/30	24/31	30/30
CM_MC1		16/29	20/30	27/30
LC_SLC		24/31	20/30	28/31
FR_FRABCH		21/30	16/30	16/30
FR_FRCP1		19/30	22/30	21/30
GH_FR1		15/32	20/30	16/30
GH_ERC		17/30	22/29	28/30
CM_MC2		19/30	20/32	22/29
EV_MC2		17/29	22/30	27/30
EV_HC1		21/31	20/31	25/30
LC_DCDS		24/31	20/31	27/30
LC_LC3		21/31	20/29	26/30
LC_LC5		23/31	18/30	23/30
LC_LCDSSLS		22/30	21/29	28/30

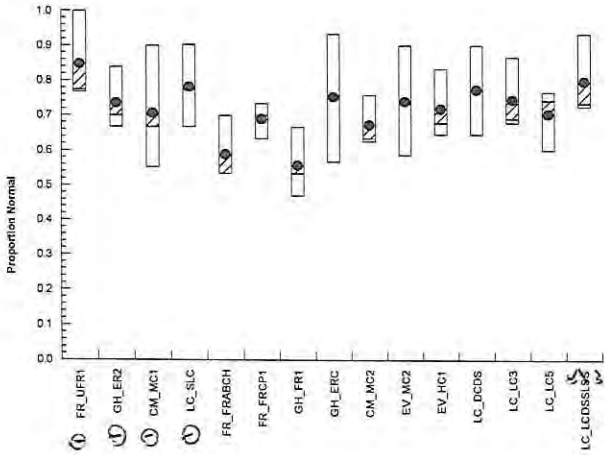
Reference sites

Analyst: QA: Aug. 14/19

Salmonid Embryo-Alevin Survival and Development Test **Nautilus Environmental**

Analysis ID:	07-8147-4760	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:42	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference sites

Analyst: _____ QA: Aug. 14/19

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-8491-5395	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:43	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	05-5020-6892	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (CM_MC1)		FR_UFR1	0.9871	Exact	0.9871	Non-Significant Effect
		GH_ER2	0.6687	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.6829	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.0201	Exact	0.2619	Non-Significant Effect
		FR_FRCP1	0.3818	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.0056	Exact	0.0778	Non-Significant Effect
		GH_ERC	0.7048	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.2777	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.5700	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.7441	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.7441	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.5862	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.5334	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.9347	Exact	1.0000	Non-Significant Effect

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID: 03-8491-5395 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 15:43 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		80	11	91	0.8791	0.1209	-15.94%
GH_ER2		71	20	91	0.7802	0.2198	-2.9%
CM_MC1	XC	68	21	89	0.764	0.236	-0.77%
LC_SLC		72	20	92	0.7826	0.2174	-3.21%
FR_FRABCH		55	35	90	0.6111	0.3889	19.4%
FR_FRCP1		66	24	90	0.7333	0.2667	3.29%
GH_FR1		53	39	92	0.5761	0.4239	24.02%
GH_ERC		70	19	89	0.7865	0.2135	-3.73%
CM_MC2		65	26	91	0.7143	0.2857	5.8%
EV_MC2		68	21	89	0.764	0.236	-0.77%
EV_HC1		73	19	92	0.7935	0.2065	-4.65%
LC_DCDS		73	19	92	0.7935	0.2065	-4.65%
LC_LC3		69	21	90	0.7667	0.2333	-1.11%
LC_LC5		69	22	91	0.7582	0.2418	0.0%
LC_LCDSSLSS		75	14	89	0.8427	0.1573	-11.14%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		0.8000	0.8387	1.0000
GH_ER2		0.7000	0.7333	0.9032
CM_MC1	XC	0.6552	0.7000	0.9333
LC_SLC		0.7742	0.6667	0.9032
FR_FRABCH		0.7667	0.5333	0.5333
FR_FRCP1		0.7000	0.7667	0.7333
GH_FR1		0.5000	0.6667	0.5667
GH_ERC		0.5667	0.8276	0.9667
CM_MC2		0.6333	0.7500	0.7586
EV_MC2		0.6207	0.7667	0.9000
EV_HC1		0.8065	0.6774	0.9000
LC_DCDS		0.8065	0.6774	0.9000
LC_LC3		0.7097	0.6897	0.9000
LC_LC5		0.7742	0.7000	0.8000
LC_LCDSSLSS		0.8333	0.7586	0.9333

Survival Rate Binomials

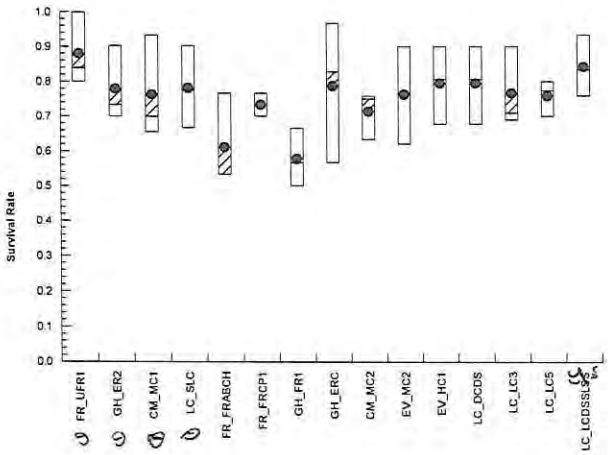
Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		24/30	26/31	30/30
GH_ER2		21/30	22/30	28/31
LC_SLC		24/31	20/30	28/31
FR_FRABCH		23/30	16/30	16/30
FR_FRCP1		21/30	23/30	22/30
GH_FR1		16/32	20/30	17/30
GH_ERC		17/30	24/29	29/30
CM_MC2		19/30	24/32	22/29
EV_MC2		18/29	23/30	27/30
EV_HC1		25/31	21/31	27/30
LC_DCDS		25/31	21/31	27/30
LC_LC3		22/31	20/29	27/30
LC_LC5		24/31	21/30	24/30
LC_LCDSSLSS		25/30	22/29	28/30

① Reference sites

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-8491-5395	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:43	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference sites

Analyst: _____ QA: _____ Aug. 14/19

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	06-1017-1064	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:43	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	05-5020-6892	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (CM_MC1)		FR_UFR1	0.9923	Exact	0.9923	Non-Significant Effect
		GH_ER2	0.7229	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.9076	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.0654	Exact	0.8496	Non-Significant Effect
		FR_FRCP1	0.4548	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.0234	Exact	0.3272	Non-Significant Effect
		GH_ERC	0.8007	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.3511	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.7488	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.6202	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.8748	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.7630	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.5384	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.9414	Exact	1.0000	Non-Significant Effect

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	06-1017-1064	**Endpoint:** Proportion Normal	**CETIS Version:** CETISv1.9.4
Analyzed:	01 Aug-19 15:43	**Analysis:** STP 2xK Contingency Tables	**Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
① FR_UFR1		77	14	91	0.8462	0.1538	-20.31%
① GH_ER2		67	24	91	0.7363	0.2637	-4.69%
① CM_MC1	XC	63	26	89	0.7079	0.2921	-0.65%
① LC_SLC		72	20	92	0.7826	0.2174	-11.28%
FR_FRABCH		53	37	90	0.5889	0.4111	16.27%
FR_FRCP1		62	28	90	0.6889	0.3111	2.05%
GH_FR1		51	41	92	0.5543	0.4457	21.18%
GH_ERC		67	22	89	0.7528	0.2472	-7.04%
CM_MC2		61	30	91	0.6703	0.3297	4.69%
EV_MC2		66	23	89	0.7416	0.2584	-5.44%
EV_HC1		66	26	92	0.7174	0.2826	-2.0%
LC_DCDS		71	21	92	0.7717	0.2283	-9.73%
LC_LC3		67	23	90	0.7444	0.2556	-5.85%
LC_LC5		64	27	91	0.7033	0.2967	0.0%
LC_LCDSSLS		71	18	89	0.7978	0.2022	-13.43%

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		0.7667	0.7742	1.0000
① GH_ER2		0.6667	0.7000	0.8387
① CM_MC1	XC	0.5517	0.6667	0.9000
① LC_SLC		0.7742	0.6667	0.9032
FR_FRABCH		0.7000	0.5333	0.5333
FR_FRCP1		0.6333	0.7333	0.7000
GH_FR1		0.4688	0.6667	0.5333
GH_ERC		0.5667	0.7586	0.9333
CM_MC2		0.6333	0.6250	0.7586
EV_MC2		0.5862	0.7333	0.9000
EV_HC1		0.6774	0.6452	0.8333
LC_DCDS		0.7742	0.6452	0.9000
LC_LC3		0.6774	0.6897	0.8667
LC_LC5		0.7419	0.6000	0.7667
LC_LCDSSLS		0.7333	0.7241	0.9333

Proportion Normal Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		23/30	24/31	30/30
① GH_ER2		20/30	21/30	26/31
① LC_SLC		24/31	20/30	28/31
FR_FRABCH		21/30	16/30	16/30
FR_FRCP1		19/30	22/30	21/30
GH_FR1		15/32	20/30	16/30
GH_ERC		17/30	22/29	28/30
CM_MC2		19/30	20/32	22/29
EV_MC2		17/29	22/30	27/30
EV_HC1		21/31	20/31	25/30
LC_DCDS		24/31	20/31	27/30
LC_LC3		21/31	20/29	26/30
LC_LC5		23/31	18/30	23/30
LC_LCDSSLS		22/30	21/29	28/30

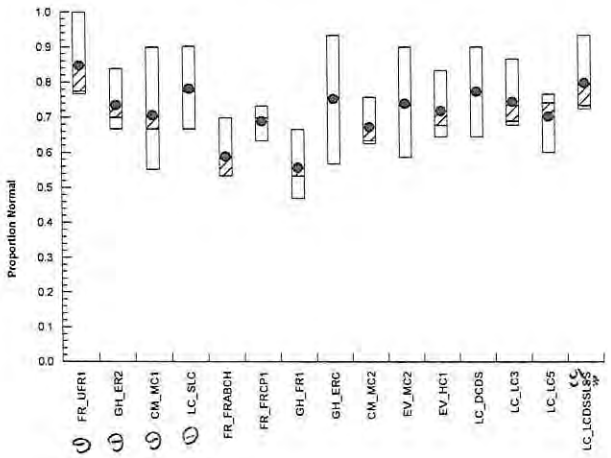
① Reference sites

Analyst: Aug. 14/19 QA:

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	06-1017-1064	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:43	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① reference sites

Analyst: _____ QA: _____ Aug. 14/19

Salmonid Embryo-Alevin Survival and Development Test

Nautilus Environmental

Analysis ID:	01-5041-5988	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:44	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	05-5020-6892	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Unamended Sample (LCSLC)		FR_UFR1	0.9743	Exact	0.9743	Non-Significant Effect
		GH_ER2	0.5554	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.4518	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.0090	Exact	0.1171	Non-Significant Effect
		FR_FRCP1	0.2733	Exact	1.0000	Non-Significant Effect
		GH_FR1*	0.0021	Exact	0.0298	Significant Effect
		GH_ERC	0.5963	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.1855	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.4518	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.6407	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.6407	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.4680	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.4145	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.8900	Exact	1.0000	Non-Significant Effect

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID: 01-5041-5988 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 15:44 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
① FR_UFR1		80	11	91	0.8791	0.1209	-15.94%
① GH_ER2		71	20	91	0.7802	0.2198	-2.9%
① CM_MC1		68	21	89	0.764	0.236	-0.77%
① LC_SLC	US	72	20	92	0.7826	0.2174	-3.21%
FR_FRABCH		55	35	90	0.6111	0.3889	19.4%
FR_FRCP1		66	24	90	0.7333	0.2667	3.29%
GH_FR1		53	39	92	0.5761	0.4239	24.02%
GH_ERC		70	19	89	0.7865	0.2135	-3.73%
CM_MC2		65	26	91	0.7143	0.2857	5.8%
EV_MC2		68	21	89	0.764	0.236	-0.77%
EV_HC1		73	19	92	0.7935	0.2065	-4.65%
LC_DCDS		73	19	92	0.7935	0.2065	-4.65%
LC_LC3		69	21	90	0.7667	0.2333	-1.11%
LC_LC5		69	22	91	0.7582	0.2418	0.0%
LC_LCDSSLSS		75	14	89	0.8427	0.1573	-11.14%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		0.8000	0.8387	1.0000
① GH_ER2		0.7000	0.7333	0.9032
① CM_MC1		0.6552	0.7000	0.9333
① LC_SLC	US	0.7742	0.6667	0.9032
FR_FRABCH		0.7667	0.5333	0.5333
FR_FRCP1		0.7000	0.7667	0.7333
GH_FR1		0.5000	0.6667	0.5667
GH_ERC		0.5667	0.8276	0.9667
CM_MC2		0.6333	0.7500	0.7586
EV_MC2		0.6207	0.7667	0.9000
EV_HC1		0.8065	0.6774	0.9000
LC_DCDS		0.8065	0.6774	0.9000
LC_LC3		0.7097	0.6897	0.9000
LC_LC5		0.7742	0.7000	0.8000
LC_LCDSSLSS		0.8333	0.7586	0.9333

Survival Rate Binomials

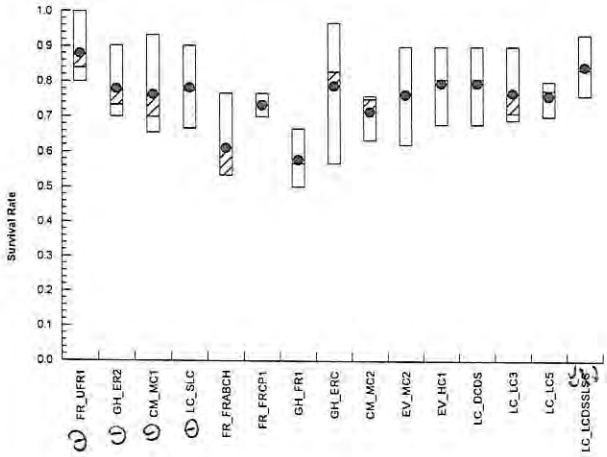
Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		24/30	26/31	30/30
① GH_ER2		21/30	22/30	28/31
① CM_MC1		19/29	21/30	28/30
FR_FRABCH		23/30	16/30	16/30
FR_FRCP1		21/30	23/30	22/30
GH_FR1		16/32	20/30	17/30
GH_ERC		17/30	24/29	29/30
CM_MC2		19/30	24/32	22/29
EV_MC2		18/29	23/30	27/30
EV_HC1		25/31	21/31	27/30
LC_DCDS		25/31	21/31	27/30
LC_LC3		22/31	20/29	27/30
LC_LC5		24/31	21/30	24/30
LC_LCDSSLSS		25/30	22/29	28/30

① Reference sites

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	01-5041-5988	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:44	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference sites

Analyst: _____ QA: _____ Aug. 14/19

CETIS Analytical Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	13-9064-9039	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:44	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	05-5020-6892	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Reference sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Unamended Sample (LCSLC)		FR_UFR1	0.9026	Exact	0.9026	Non-Significant Effect
		GH_ER2	0.2877	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.1626	Exact	1.0000	Non-Significant Effect
		FR_FRABCH*	0.0038	Exact	0.0495	Significant Effect
		FR_FRCP1	0.1026	Exact	1.0000	Non-Significant Effect
		GH_FR1*	0.0008	Exact	0.0114	Significant Effect
		GH_ERC	0.3825	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.0618	Exact	0.7413	Non-Significant Effect
		EV_MC2	0.3178	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.1974	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.3331	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.1449	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLSS	0.6670	Exact	1.0000	Non-Significant Effect

Analyst: YL QA: Aug. 14/19

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID: 13-9064-9039 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 15:44 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		77	14	91	0.8462	0.1538	-20.31%
GH_ER2		67	24	91	0.7363	0.2637	-4.69%
CM_MC1		63	26	89	0.7079	0.2921	-0.65%
LC_SLC	US	72	20	92	0.7826	0.2174	-11.28%
FR_FRABCH		53	37	90	0.5889	0.4111	16.27%
FR_FRCP1		62	28	90	0.6889	0.3111	2.05%
GH_FR1		51	41	92	0.5543	0.4457	21.18%
GH_ERC		67	22	89	0.7528	0.2472	-7.04%
CM_MC2		61	30	91	0.6703	0.3297	4.69%
EV_MC2		66	23	89	0.7416	0.2584	-5.44%
EV_HC1		66	26	92	0.7174	0.2826	-2.0%
LC_DCDS		71	21	92	0.7717	0.2283	-9.73%
LC_LC3		67	23	90	0.7444	0.2556	-5.85%
LC_LC5		64	27	91	0.7033	0.2967	0.0%
LC_LCDSSLSS		71	18	89	0.7978	0.2022	-13.43%

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		0.7667	0.7742	1.0000
GH_ER2		0.6667	0.7000	0.8387
CM_MC1		0.5517	0.6667	0.9000
LC_SLC	US	0.7742	0.6667	0.9032
FR_FRABCH		0.7000	0.5333	0.5333
FR_FRCP1		0.6333	0.7333	0.7000
GH_FR1		0.4688	0.6667	0.5333
GH_ERC		0.5667	0.7586	0.9333
CM_MC2		0.6333	0.6250	0.7586
EV_MC2		0.5862	0.7333	0.9000
EV_HC1		0.6774	0.6452	0.8333
LC_DCDS		0.7742	0.6452	0.9000
LC_LC3		0.6774	0.6897	0.8667
LC_LC5		0.7419	0.6000	0.7667
LC_LCDSSLSS		0.7333	0.7241	0.9333

Proportion Normal Binomials

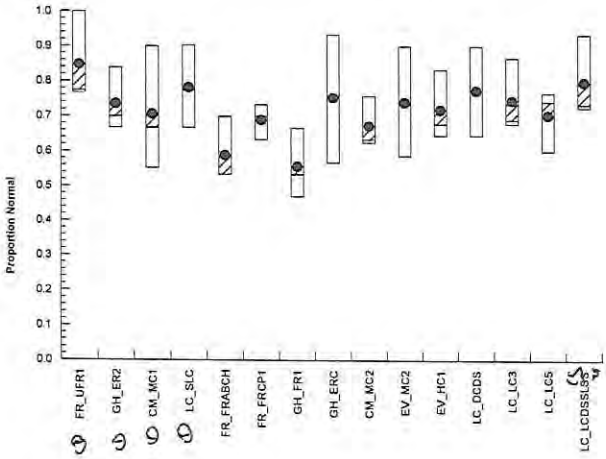
Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		23/30	24/31	30/30
GH_ER2		20/30	21/30	26/31
CM_MC1		16/29	20/30	27/30
FR_FRABCH		21/30	16/30	16/30
FR_FRCP1		19/30	22/30	21/30
GH_FR1		15/32	20/30	16/30
GH_ERC		17/30	22/29	28/30
CM_MC2		19/30	20/32	22/29
EV_MC2		17/29	22/30	27/30
EV_HC1		21/31	20/31	25/30
LC_DCDS		24/31	20/31	27/30
LC_LC3		21/31	20/29	26/30
LC_LC5		23/31	18/30	23/30
LC_LCDSSLSS		22/30	21/29	28/30

Reference sites

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	13-9064-9039	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 15:44	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference sites

Analyst: _____ QA: _____ 14/19

CETIS Summary Report

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Batch ID:	13-8193-4534	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Dechlor Control	13-5684-1924	08 May-19	08 May-19	15h	Teck Coal	
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)		
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLSS	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

- only 3 replicates used in statistical analyses (Rep D excluded due to possible poor egg quality)

D Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Dechlor Control	Control water	Teck Coal	Dechlor Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLSS	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	GH_ERC passed length-mm	1

Analyst: YL QA: Aug. 14/19

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9887	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9982	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.5269	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	EV_MC2 passed length-mm	1

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.1696	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9983	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	LC_LC5 passed length-mm	1

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9994	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9993	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	GH_ERC passed length-mm	1

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9910	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9999	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	FR_FRCP1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	GH_ER2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9970	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	LC_LCDSSLSS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	GH_ER2 passed length-mm	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	CM_MC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	LC_SLC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	FR_FRABCH passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	Dechlor Control passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	GH_ERC passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	FR_UFR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	LC_LC5 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	GH_FR1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	CM_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	EV_MC2 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	EV_HC1 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	LC_DCDS passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	LC_LC3 passed length-mm	1
07-4581-4185	Length-mm	Dunnett Multiple Comparison Test	0.9998	FR_FRCP1 passed length-mm	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9640	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9998	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	EV_HC1 passed mean dry weight-mg	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9471	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7619	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed mean dry weight-mg	1

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9980	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	FR_FRABCH passed mean dry weight-mg	1

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9995	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9999	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	Dechlor Control passed mean dry weight-	1

Analyst: _____ QA: _____ Aug. 14/19

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLSS passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	Dechlor Control passed mean dry weight-	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed mean dry weight-mg	1
02-1395-6122	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed mean dry weight-mg	1

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Dechlor Control	N	3	21.12	19.97	22.27	20.59	21.44	0.2675	0.4633	2.19%	0.00%
① FR_UFR1		3	21.38	20.94	21.82	21.27	21.58	0.1024	0.1774	0.83%	-1.24%
① GH_ER2		3	21.89	20.43	23.35	21.21	22.3	0.3402	0.5892	2.69%	-3.66%
① CM_MC1		3	21.61	20.4	22.82	21.05	21.96	0.2817	0.4878	2.26%	-2.33%
① LC_SLC		3	20.6	19.5	21.7	20.25	21.1	0.2558	0.443	2.15%	2.44%
FR_FRABCH		3	20.22	18.37	22.07	19.56	21.03	0.431	0.7465	3.69%	4.25%
FR_FRCP1		3	21.89	21.71	22.08	21.84	21.98	0.04333	0.07505	0.34%	-3.67%
GH_FR1	+20 µgC/L	3	21.61	19.67	23.55	20.72	22.17	0.4515	0.7821	3.62%	-2.34%
GH_ERC		3	21.73	19.94	23.52	20.91	22.28	0.4164	0.7212	3.32%	-2.90%
CM_MC2		3	21.71	19.45	23.98	20.67	22.32	0.5255	0.9103	4.19%	-2.83%
EV_MC2		3	22.12	21.44	22.8	21.86	22.41	0.1585	0.2745	1.24%	-4.74%
EV_HC1		3	21.41	20.02	22.8	20.78	21.85	0.3231	0.5597	2.61%	-1.38%
LC_DCDS		3	22.24	21.41	23.08	22.02	22.63	0.1933	0.3347	1.50%	-5.34%
LC_LC3		3	21.98	21.13	22.84	21.64	22.33	0.1988	0.3443	1.57%	-4.09%
LC_LC5		3	21.55	20.82	22.28	21.23	21.81	0.1699	0.2943	1.37%	-2.04%
LC_LCDSSLS~~S~~		3	21.86	20.41	23.32	21.2	22.3	0.338	0.5855	2.68%	-3.54%

Mean ~~Dry~~ Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Dechlor Control	N	3	97.24	92.09	102.4	96	99.63	1.196	2.071	2.13%	0.00%
① FR_UFR1		3	98.46	94.28	102.6	96.54	99.67	0.9702	1.68	1.71%	-1.25%
① GH_ER2		3	106.6	85.73	127.5	97.27	113.6	4.858	8.414	7.89%	-9.66%
① CM_MC1		3	105.7	100.7	110.7	103.9	107.9	1.167	2.021	1.91%	-8.69%
① LC_SLC		3	97.62	91.39	103.9	95	100	1.448	2.508	2.57%	-0.39%
FR_FRABCH		3	93.47	73.86	113.1	85	100.6	4.558	7.895	8.45%	3.88%
FR_FRCP1		3	116.1	78.18	154	105.7	133.6	8.817	15.27	13.15%	-19.41%
GH_FR1	+20 µgC/L	3	103.5	81.85	125.2	94.38	111.8	5.043	8.734	8.43%	-6.49%
GH_ERC		3	108	102.8	113.1	106.5	110.3	1.202	2.083	1.93%	-11.03%
CM_MC2		3	107.7	81.2	134.2	96.25	117.4	6.164	10.68	9.91%	-10.78%
EV_MC2		3	105.5	81.96	129	94.78	112.8	5.467	9.469	8.98%	-8.48%
EV_HC1		3	109.1	99.54	118.7	105.6	113.2	2.223	3.85	3.53%	-12.21%
LC_DCDS		3	108.7	95.04	122.4	102.4	112.2	3.182	5.511	5.07%	-11.82%
LC_LC3		3	114.9	94.97	134.7	109.1	124	4.623	8.007	6.97%	-18.12%
LC_LC5		3	109.6	106.5	112.7	108.3	110.8	0.722	1.25	1.14%	-12.67%
LC_LCDSSLS~~S~~		3	111.8	100.2	123.3	106.4	114.8	2.68	4.642	4.15%	-14.95%

① Reference Sites

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Dechlor Control	N	20.59	21.32	21.44
FR_UFR1		21.58	21.27	21.28
GH_ER2		21.21	22.3	22.16
CM_MC1		21.05	21.81	21.96
LC_SLC		20.46	21.1	20.25
FR_FRABCH		20.07	19.56	21.03
FR_FRCP1		21.86	21.98	21.84
GH_FR1	+ 20 mg/L	20.72	22.17	21.94
GH_ERC	C	20.91	22	22.28
CM_MC2		22.32	20.67	22.16
EV_MC2		21.86	22.09	22.41
EV_HC1		21.78	21.6	21.85
LC_DCDS		22.08	22.02	22.63
LC_LC3		21.64	22.33	21.98
LC_LC5		21.23	21.81	21.6
LC_LCDSSLSS		21.2	22.09	22.3

Mean ~~Dry~~ Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Dechlor Control	N	96.09	96	99.63
FR_UFR1		99.17	96.54	99.67
GH_ER2		109	97.27	113.6
CM_MC1		107.9	105.2	103.9
LC_SLC		95	100	97.86
FR_FRABCH		94.78	85	100.6
FR_FRCP1		109	105.7	133.6
GH_FR1	+ 20 mg/L	94.38	104.5	111.8
GH_ERC	C	106.5	107.1	110.3
CM_MC2		117.4	96.25	109.5
EV_MC2		112.8	94.78	108.9
EV_HC1		113.2	108.6	105.6
LC_DCDS		111.6	102.4	112.2
LC_LC3		109.1	124	111.5
LC_LC5		108.3	109.5	110.8
LC_LCDSSLSS		114.8	114.1	106.4

① Reference sites

Analyst: _____ QA: Aug. 14/19

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test

Nautilus Environmental

Analysis ID:	07-4581-4185	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:11	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	13-8193-4534	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Dechlor Control	13-5684-1924	08 May-19	08 May-19	15h	Teck Coal	
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)		
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Dechlor Control	Control water	Teck Coal	Dechlor Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	07-4581-4185	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:11	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	① FR_UFR1 passed length-mm	5.58%
		① GH_ER2 passed length-mm	5.58%
		① CM_MC1 passed length-mm	5.58%
		① LC_SLC passed length-mm	5.58%
		FR_FRABCH passed length-mm	5.58%
		FR_FRCP1 passed length-mm	5.58%
		GH_FR1 passed length-mm	5.58%
		GH_ERC passed length-mm	5.58%
		CM_MC2 passed length-mm	5.58%
		EV_MC2 passed length-mm	5.58%
		EV_HC1 passed length-mm	5.58%
		LC_DCDS passed length-mm	5.58%
		LC_LC3 passed length-mm	5.58%
		LC_LC5 passed length-mm	5.58%
		LC_LCDSSLSS passed length-mm	5.58%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		① FR_UFR1	-0.5973	2.693	1.179	4	CDF	0.9887	Non-Significant Effect
		① GH_ER2	-1.766	2.693	1.179	4	CDF	0.9999	Non-Significant Effect
		① CM_MC1	-1.123	2.693	1.179	4	CDF	0.9982	Non-Significant Effect
		① LC_SLC	1.175	2.693	1.179	4	CDF	0.5269	Non-Significant Effect
		FR_FRABCH	2.05	2.693	1.179	4	CDF	0.1696	Non-Significant Effect
		FR_FRCP1	-1.77	2.693	1.179	4	CDF	0.9999	Non-Significant Effect
		GH_FR1	-1.13	2.693	1.179	4	CDF	0.9983	Non-Significant Effect
		GH_ERC	-1.398	2.693	1.179	4	CDF	0.9994	Non-Significant Effect
		CM_MC2	-1.363	2.693	1.179	4	CDF	0.9993	Non-Significant Effect
		EV_MC2	-2.287	2.693	1.179	4	CDF	1.0000	Non-Significant Effect
		EV_HC1	-0.6668	2.693	1.179	4	CDF	0.9910	Non-Significant Effect
		LC_DCDS	-2.575	2.693	1.179	4	CDF	1.0000	Non-Significant Effect
		LC_LC3	-1.973	2.693	1.179	4	CDF	0.9999	Non-Significant Effect
		LC_LC5	-0.9834	2.693	1.179	4	CDF	0.9970	Non-Significant Effect
		LC_LCDSSLSS	-1.708	2.693	1.179	4	CDF	0.9998	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	12.8757	0.858379	15	2.986	0.0046	Significant Effect
Error	9.19871	0.28746	32			
Total	22.0744		47			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	13.34	30.58	0.5757	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9567	0.9345	0.0740	Normal Distribution

① Reference sites

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	07-4581-4185	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:11	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Length-mm Summary

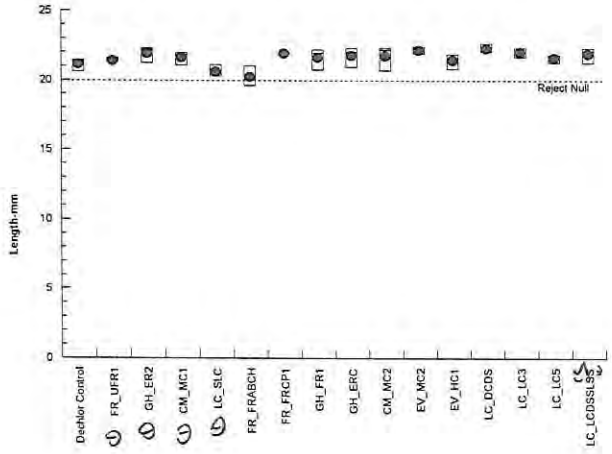
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Dechlor Control	N	3	21.12	19.97	22.27	21.32	20.59	21.44	0.2675	2.19%	0.00%
FR_UFR1		3	21.38	20.94	21.82	21.28	21.27	21.58	0.1024	0.83%	-1.24%
GH_ER2		3	21.89	20.43	23.35	22.16	21.21	22.3	0.3402	2.69%	-3.66%
CM_MC1		3	21.61	20.4	22.82	21.81	21.05	21.96	0.2817	2.26%	-2.33%
LC_SLC		3	20.6	19.5	21.7	20.46	20.25	21.1	0.2558	2.15%	2.44%
FR_FRABCH		3	20.22	18.37	22.07	20.07	19.56	21.03	0.431	3.69%	4.25%
FR_FRCP1		3	21.89	21.71	22.08	21.86	21.84	21.98	0.04334	0.34%	-3.67%
GH_FR1		3	21.61	19.67	23.55	21.94	20.72	22.17	0.4515	3.62%	-2.34%
GH_ERC		3	21.73	19.94	23.52	22	20.91	22.28	0.4164	3.32%	-2.90%
CM_MC2		3	21.71	19.45	23.98	22.16	20.67	22.32	0.5255	4.19%	-2.83%
EV_MC2		3	22.12	21.44	22.8	22.09	21.86	22.41	0.1585	1.24%	-4.74%
EV_HC1		3	21.41	20.02	22.8	21.6	20.78	21.85	0.3231	2.61%	-1.38%
LC_DCDS		3	22.24	21.41	23.08	22.08	22.02	22.63	0.1933	1.50%	-5.34%
LC_LC3		3	21.98	21.13	22.84	21.98	21.64	22.33	0.1988	1.57%	-4.09%
LC_LC5		3	21.55	20.82	22.28	21.6	21.23	21.81	0.1699	1.37%	-2.04%
LC_LCDSSLS		3	21.86	20.41	23.32	22.09	21.2	22.3	0.338	2.68%	-3.54%

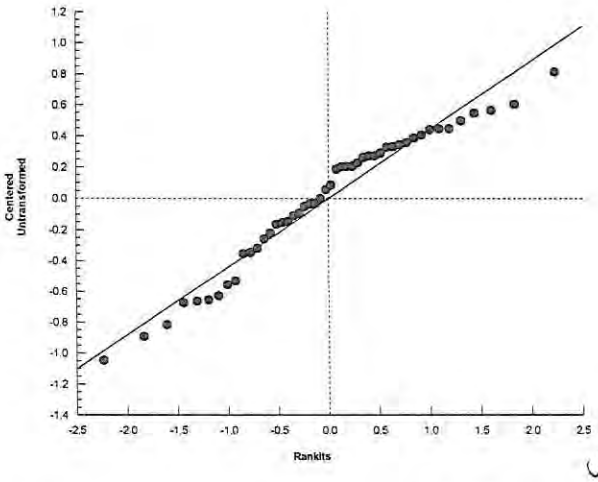
Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Dechlor Control	N	20.59	21.32	21.44
FR_UFR1		21.58	21.27	21.28
GH_ER2		21.21	22.3	22.16
CM_MC1		21.05	21.81	21.96
LC_SLC		20.46	21.1	20.25
FR_FRABCH		20.07	19.56	21.03
FR_FRCP1		21.86	21.98	21.84
GH_FR1		20.72	22.17	21.94
GH_ERC		20.91	22	22.28
CM_MC2		22.32	20.67	22.16
EV_MC2		21.86	22.09	22.41
EV_HC1		20.78	21.6	21.85
LC_DCDS		22.08	22.02	22.63
LC_LC3		21.64	22.33	21.98
LC_LC5		21.23	21.81	21.6
LC_LCDSSLS		21.2	22.09	22.3

Reference Sites

Graphics





Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test

Nautilus Environmental

Analysis ID:	02-1395-6122	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:11	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	13-8193-4534	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Dechlor Control	13-5684-1924	08 May-19	08 May-19	15h	Teck Coal	
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)		
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Reference sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Dechlor Control	Control water	Teck Coal	Dechlor Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	02-1395-6122	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:11	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	① FR_UFR1 passed mean dry weight-mg	15.99%
		① GH_ER2 passed mean dry weight-mg	15.99%
		① CM_MC1 passed mean dry weight-mg	15.99%
		① LC_SLC passed mean dry weight-mg	15.99%
		FR_FRABCH passed mean dry weight-mg	15.99%
		FR_FRCP1 passed mean dry weight-mg	15.99%
		GH_FR1 passed mean dry weight-mg	15.99%
		GH_ERC passed mean dry weight-mg	15.99%
		CM_MC2 passed mean dry weight-mg	15.99%
		EV_MC2 passed mean dry weight-mg	15.99%
		EV_HC1 passed mean dry weight-mg	15.99%
		LC_DCDS passed mean dry weight-mg	15.99%
		LC_LC3 passed mean dry weight-mg	15.99%
		LC_LC5 passed mean dry weight-mg	15.99%
		LC_LCDSSLS8 passed mean dry weight-mg	15.99%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		① FR_UFR1	-0.211	2.693	15.55	4	CDF	0.9640	Non-Significant Effect
		① GH_ER2	-1.626	2.693	15.55	4	CDF	0.9998	Non-Significant Effect
		① CM_MC1	-1.463	2.693	15.55	4	CDF	0.9995	Non-Significant Effect
		① LC_SLC	-0.06583	2.693	15.55	4	CDF	0.9471	Non-Significant Effect
		FR_FRABCH	0.6527	2.693	15.55	4	CDF	0.7619	Non-Significant Effect
		FR_FRCP1	-3.268	2.693	15.55	4	CDF	1.0000	Non-Significant Effect
		GH_FR1	-1.092	2.693	15.55	4	CDF	0.9980	Non-Significant Effect
		GH_ERC	-1.857	2.693	15.55	4	CDF	0.9999	Non-Significant Effect
		CM_MC2	-1.815	2.693	15.55	4	CDF	0.9999	Non-Significant Effect
		EV_MC2	-1.427	2.693	15.55	4	CDF	0.9995	Non-Significant Effect
		EV_HC1	-2.055	2.693	15.55	4	CDF	1.0000	Non-Significant Effect
		LC_DCDS	-1.99	2.693	15.55	4	CDF	0.9999	Non-Significant Effect
		LC_LC3	-3.051	2.693	15.55	4	CDF	1.0000	Non-Significant Effect
		LC_LC5	-2.134	2.693	15.55	4	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLS8	-2.517	2.693	15.55	4	CDF	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1854.43	123.629	15	2.471	0.0155	Significant Effect
Error	1601.03	50.0323	32			
Total	3455.46		47			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	24.12	30.58	0.0631	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9658	0.9345	0.1727	Normal Distribution

① Reference sites

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	02-1395-6122	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:11	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Mean ~~Dry~~ Weight-mg Summary

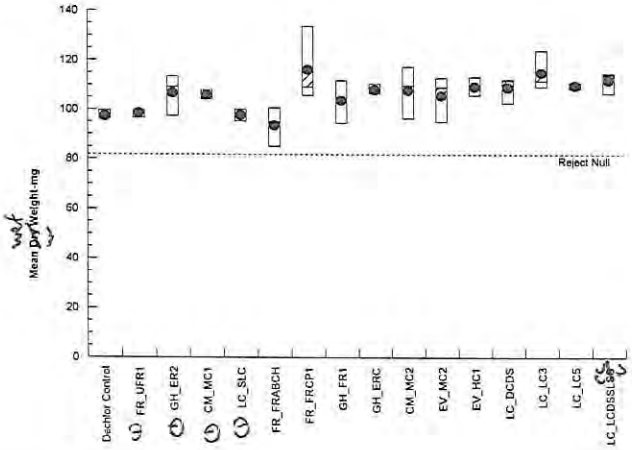
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Dechlor Control	N	3	97.24	92.09	102.4	96.09	96	99.63	1.196	2.13%	0.00%
FR_UFR1		3	98.46	94.28	102.6	99.17	96.54	99.67	0.9702	1.71%	-1.25%
GH_ER2		3	106.6	85.73	127.5	109	97.27	113.6	4.858	7.89%	-9.66%
CM_MC1		3	105.7	100.7	110.7	105.2	103.9	107.9	1.167	1.91%	-8.69%
LC_SLC		3	97.62	91.39	103.9	97.86	95	100	1.448	2.57%	-0.39%
FR_FRABCH		3	93.47	73.86	113.1	94.78	85	100.6	4.558	8.45%	3.88%
FR_FRCP1		3	116.1	78.18	154	109	105.7	133.6	8.817	13.15%	-19.41%
GH_FR1		3	103.5	81.85	125.2	104.5	94.38	111.8	5.043	8.43%	-6.49%
GH_ERC		3	108	102.8	113.1	107.1	106.5	110.3	1.202	1.93%	-11.03%
CM_MC2		3	107.7	81.2	134.2	109.5	96.25	117.4	6.164	9.91%	-10.78%
EV_MC2		3	105.5	81.96	129	108.9	94.78	112.8	5.467	8.98%	-8.48%
EV_HC1		3	109.1	99.54	118.7	108.6	105.6	113.2	2.223	3.53%	-12.21%
LC_DCDS		3	108.7	95.04	122.4	111.6	102.4	112.2	3.182	5.07%	-11.82%
LC_LC3		3	114.9	94.97	134.7	111.5	109.1	124	4.623	6.97%	-18.12%
LC_LC5		3	109.6	106.5	112.7	109.5	108.3	110.8	0.7219	1.14%	-12.67%
LC_LCDSSLSS		3	111.8	100.2	123.3	114.1	106.4	114.8	2.68	4.15%	-14.95%

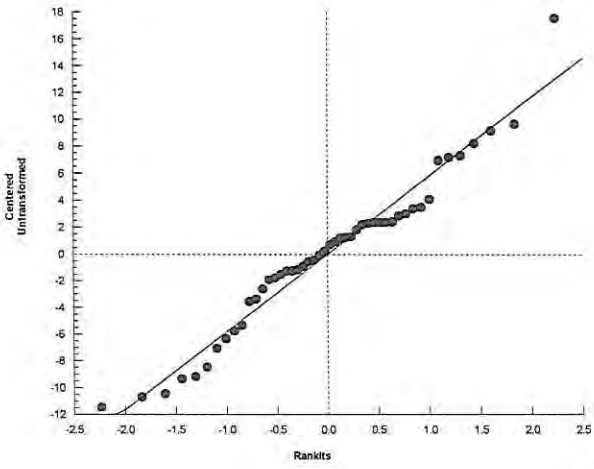
Mean ~~Dry~~ Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Dechlor Control	N	96.09	96	99.63
FR_UFR1		99.17	96.54	99.67
GH_ER2		109	97.27	113.6
CM_MC1		107.9	105.2	103.9
LC_SLC		95	100	97.86
FR_FRABCH		94.78	85	100.6
FR_FRCP1		109	105.7	133.6
GH_FR1		94.38	104.5	111.8
GH_ERC		106.5	107.1	110.3
CM_MC2		117.4	96.25	109.5
EV_MC2		112.8	94.78	108.9
EV_HC1		113.2	108.6	105.6
LC_DCDS		111.6	102.4	112.2
LC_LC3		109.1	124	111.5
LC_LC5		108.3	109.5	110.8
LC_LCDSSLSS		114.8	114.1	106.4

Reference sites

Graphics





Analyst: [signature] QA: [signature] Aug. 14/19

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	17-6495-5830	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:12	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	13-8193-4534	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	17-6495-5830	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:12	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed length-mm	5.53%
		CM_MC1 passed length-mm	5.53%
		LC_SLC passed length-mm	5.53%
		FR_FRABCH passed length-mm	5.53%
		FR_FRCP1 passed length-mm	5.53%
		GH_FR1 passed length-mm	5.53%
		GH_ERC passed length-mm	5.53%
		CM_MC2 passed length-mm	5.53%
		EV_MC2 passed length-mm	5.53%
		EV_HC1 passed length-mm	5.53%
		LC_DCDS passed length-mm	5.53%
		LC_LC3 passed length-mm	5.53%
		LC_LC5 passed length-mm	5.53%
		LC_LCDSSLSS passed length-mm	5.53%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Upstream Control (FR_UFR1)		GH_ER2	-1.159	2.68	1.183	4	CDF	0.9982	Non-Significant Effect
		CM_MC1	-0.5214	2.68	1.183	4	CDF	0.9842	Non-Significant Effect
		LC_SLC	1.758	2.68	1.183	4	CDF	0.2589	Non-Significant Effect
		FR_FRABCH	2.625	2.68	1.183	4	CDF	0.0560	Non-Significant Effect
		FR_FRCP1	-1.163	2.68	1.183	4	CDF	0.9982	Non-Significant Effect
		GH_FR1	-0.5278	2.68	1.183	4	CDF	0.9845	Non-Significant Effect
		GH_ERC	-0.7942	2.68	1.183	4	CDF	0.9935	Non-Significant Effect
		CM_MC2	-0.7594	2.68	1.183	4	CDF	0.9927	Non-Significant Effect
		EV_MC2	-1.676	2.68	1.183	4	CDF	0.9998	Non-Significant Effect
		EV_HC1	-0.06886	2.68	1.183	4	CDF	0.9438	Non-Significant Effect
		LC_DCDS	-1.961	2.68	1.183	4	CDF	0.9999	Non-Significant Effect
		LC_LC3	-1.364	2.68	1.183	4	CDF	0.9992	Non-Significant Effect
		LC_LC5	-0.3828	2.68	1.183	4	CDF	0.9761	Non-Significant Effect
		LC_LCDSSLSS	-1.101	2.68	1.183	4	CDF	0.9978	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	12.2535	0.875248	14	2.994	0.0057	Significant Effect
Error	8.76933	0.292311	30			
Total	21.0228		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	13.27	29.14	0.5056	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9584	0.9308	0.1065	Normal Distribution

9 Reference sites

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID: 17-6495-5830 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 16:12 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Length-mm Summary

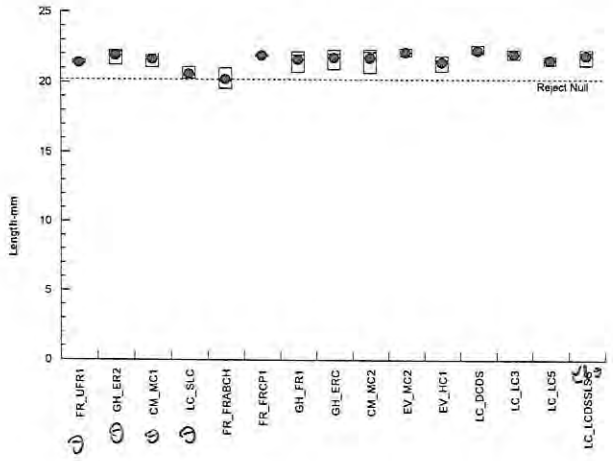
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
① FR_UFR1	U	3	21.38	20.94	21.82	21.28	21.27	21.58	0.1024	0.83%	0.00%
① GH_ER2		3	21.89	20.43	23.35	22.16	21.21	22.3	0.3402	2.69%	-2.39%
① CM_MC1		3	21.61	20.4	22.82	21.81	21.05	21.96	0.2817	2.26%	-1.08%
① LC_SLC		3	20.6	19.5	21.7	20.46	20.25	21.1	0.2558	2.15%	3.63%
FR_FRABCH		3	20.22	18.37	22.07	20.07	19.56	21.03	0.431	3.69%	5.42%
FR_FRCP1		3	21.89	21.71	22.08	21.86	21.84	21.98	0.04334	0.34%	-2.40%
GH_FR1		3	21.61	19.67	23.55	21.94	20.72	22.17	0.4515	3.62%	-1.09%
GH_ERC		3	21.73	19.94	23.52	22	20.91	22.28	0.4164	3.32%	-1.64%
CM_MC2		3	21.71	19.45	23.98	22.16	20.67	22.32	0.5255	4.19%	-1.57%
EV_MC2		3	22.12	21.44	22.8	22.09	21.86	22.41	0.1585	1.24%	-3.46%
EV_HC1		3	21.41	20.02	22.8	21.6	20.78	21.85	0.3231	2.61%	-0.14%
LC_DCDS		3	22.24	21.41	23.08	22.08	22.02	22.63	0.1933	1.50%	-4.05%
LC_LC3		3	21.98	21.13	22.84	21.98	21.64	22.33	0.1988	1.57%	-2.82%
LC_LC5		3	21.55	20.82	22.28	21.6	21.23	21.81	0.1699	1.37%	-0.79%
LC_LCDSSLS		3	21.86	20.41	23.32	22.09	21.2	22.3	0.338	2.68%	-2.27%

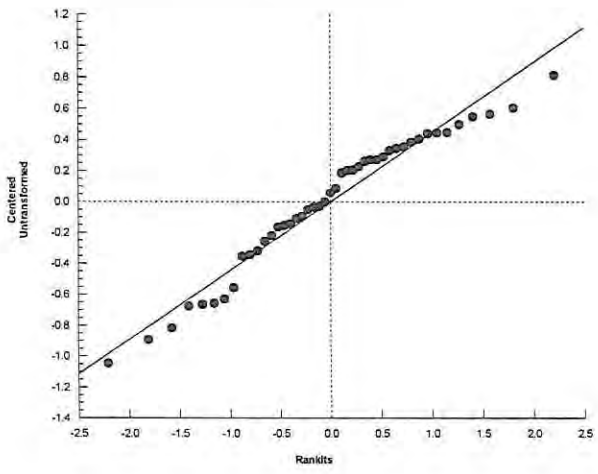
Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1	U	21.58	21.27	21.28
① GH_ER2		21.21	22.3	22.16
① CM_MC1		21.05	21.81	21.96
① LC_SLC		20.46	21.1	20.25
FR_FRABCH		20.07	19.56	21.03
FR_FRCP1		21.86	21.98	21.84
GH_FR1		20.72	22.17	21.94
GH_ERC		20.91	22	22.28
CM_MC2		22.32	20.67	22.16
EV_MC2		21.86	22.09	22.41
EV_HC1		20.78	21.6	21.85
LC_DCDS		22.08	22.02	22.63
LC_LC3		21.64	22.33	21.98
LC_LC5		21.23	21.81	21.6
LC_LCDSSLS		21.2	22.09	22.3

① Reference sites

Graphics





Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	09-7819-4182	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:12	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	13-8193-4534	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	09-7819-4182	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:12	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed mean dry weight-mg	16.19%
		CM_MC1 passed mean dry weight-mg	16.19%
		LC_SLC passed mean dry weight-mg	16.19%
		FR_FRABCH passed mean dry weight-mg	16.19%
		FR_FRCP1 passed mean dry weight-mg	16.19%
		GH_FR1 passed mean dry weight-mg	16.19%
		GH_ERC passed mean dry weight-mg	16.19%
		CM_MC2 passed mean dry weight-mg	16.19%
		EV_MC2 passed mean dry weight-mg	16.19%
		EV_HC1 passed mean dry weight-mg	16.19%
		LC_DCDS passed mean dry weight-mg	16.19%
		LC_LC3 passed mean dry weight-mg	16.19%
		LC_LC5 passed mean dry weight-mg	16.19%
		LC_LCDSSLSS passed mean dry weight-mg	16.19%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Upstream Control (FR_UFR1)		GH_ER2	-1.374	2.68	15.94	4	CDF	0.9992	Non-Significant Effect
		CM_MC1	-1.215	2.68	15.94	4	CDF	0.9986	Non-Significant Effect
		LC_SLC	0.1409	2.68	15.94	4	CDF	0.9073	Non-Significant Effect
		FR_FRABCH	0.8385	2.68	15.94	4	CDF	0.6742	Non-Significant Effect
		FR_FRCP1	-2.968	2.68	15.94	4	CDF	1.0000	Non-Significant Effect
		GH_FR1	-0.8555	2.68	15.94	4	CDF	0.9947	Non-Significant Effect
		GH_ERC	-1.598	2.68	15.94	4	CDF	0.9997	Non-Significant Effect
		CM_MC2	-1.557	2.68	15.94	4	CDF	0.9996	Non-Significant Effect
		EV_MC2	-1.181	2.68	15.94	4	CDF	0.9984	Non-Significant Effect
		EV_HC1	-1.791	2.68	15.94	4	CDF	0.9999	Non-Significant Effect
		LC_DCDS	-1.728	2.68	15.94	4	CDF	0.9998	Non-Significant Effect
		LC_LC3	-2.757	2.68	15.94	4	CDF	1.0000	Non-Significant Effect
		LC_LC5	-1.867	2.68	15.94	4	CDF	0.9999	Non-Significant Effect
		LC_LCDSSLSS	-2.238	2.68	15.94	4	CDF	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1615.87	115.42	14	2.174	0.0364	Significant Effect
Error	1592.46	53.0818	30			
Total	3208.33		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.44	29.14	0.0908	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9685	0.9308	0.2549	Normal Distribution

① Reference sites

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	09-7819-4182	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:12	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Mean ~~Dry~~ Weight-mg Summary

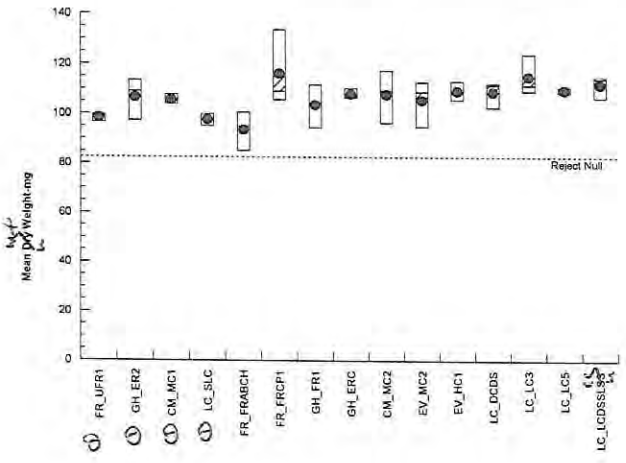
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	U	3	98.46	94.28	102.6	99.17	96.54	99.67	0.9702	1.71%	0.00%
GH_ER2		3	106.6	85.73	127.5	109	97.27	113.6	4.858	7.89%	-8.30%
CM_MC1		3	105.7	100.7	110.7	105.2	103.9	107.9	1.167	1.91%	-7.34%
LC_SLC		3	97.62	91.39	103.9	97.86	95	100	1.448	2.57%	0.85%
FR_FRABCH		3	93.47	73.86	113.1	94.78	85	100.6	4.558	8.45%	5.07%
FR_FRCP1		3	116.1	78.18	154	109	105.7	133.6	8.817	13.15%	-17.93%
GH_FR1		3	103.5	81.85	125.2	104.5	94.38	111.8	5.043	8.43%	-5.17%
GH_ERC		3	108	102.8	113.1	107.1	106.5	110.3	1.202	1.93%	-9.66%
CM_MC2		3	107.7	81.2	134.2	109.5	96.25	117.4	6.164	9.91%	-9.41%
EV_MC2		3	105.5	81.96	129	108.9	94.78	112.8	5.467	8.98%	-7.14%
EV_HC1		3	109.1	99.54	118.7	108.6	105.6	113.2	2.223	3.53%	-10.82%
LC_DCDS		3	108.7	95.04	122.4	111.6	102.4	112.2	3.182	5.07%	-10.44%
LC_LC3		3	114.9	94.97	134.7	111.5	109.1	124	4.623	6.97%	-16.66%
LC_LC5		3	109.6	106.5	112.7	109.5	108.3	110.8	0.7219	1.14%	-11.28%
LC_LCDSSLS~~S~~		3	111.8	100.2	123.3	114.1	106.4	114.8	2.68	4.15%	-13.52%

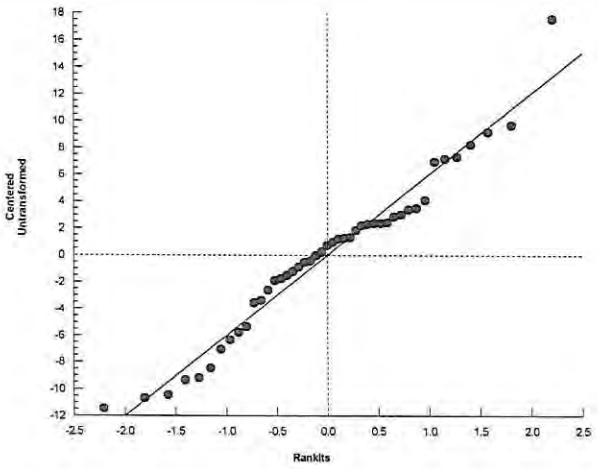
Mean ~~Dry~~ Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1	U	99.17	96.54	99.67
GH_ER2		109	97.27	113.6
CM_MC1		107.9	105.2	103.9
LC_SLC		95	100	97.86
FR_FRABCH		94.78	85	100.6
FR_FRCP1		109	105.7	133.6
GH_FR1		94.38	104.5	111.8
GH_ERC		106.5	107.1	110.3
CM_MC2		117.4	96.25	109.5
EV_MC2		112.8	94.78	108.9
EV_HC1		113.2	108.6	105.6
LC_DCDS		111.6	102.4	112.2
LC_LC3		109.1	124	111.5
LC_LC5		108.3	109.5	110.8
LC_LCDSSLS~~S~~		114.8	114.1	106.4

9 Reference sites

Graphics





Analyst: _____ QA: _____ 14/19

CETIS Analytical Report

Report Date: 01 Aug-19 16:19 (p 1 of 3)
Test Code/ID: 190906b / 18-3017-7394

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	03-9441-0944	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:13	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Batch ID:	13-8193-4534	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
① GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
① CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
① LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSL~~SS~~ CC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

① Reference sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
① GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
① CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSL~~SS~~ CC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	03-9441-0944	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:13	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed length-mm	5.40%
		CM_MC1 passed length-mm	5.40%
		LC_SLC failed length-mm	5.40%
		FR_FRABCH failed length-mm	5.40%
		FR_FRCP1 passed length-mm	5.40%
		GH_FR1 passed length-mm	5.40%
		GH_ERC passed length-mm	5.40%
		CM_MC2 passed length-mm	5.40%
		EV_MC2 passed length-mm	5.40%
		EV_HC1 passed length-mm	5.40%
		LC_DCDS passed length-mm	5.40%
		LC_LC3 passed length-mm	5.40%
		LC_LC5 passed length-mm	5.40%
		LC_LCDSSLSS passed length-mm	5.40%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Receiving Water (GH_ER2)		FR_UFR1	1.159	2.68	1.183	4	CDF	0.5237	Non-Significant Effect
		CM_MC1	0.6373	2.68	1.183	4	CDF	0.7585	Non-Significant Effect
		LC_SLC*	2.916	2.68	1.183	4	CDF	0.0300	Significant Effect
		FR_FRABCH*	3.784	2.68	1.183	4	CDF	0.0037	Significant Effect
		FR_FRCP1	-0.004424	2.68	1.183	4	CDF	0.9340	Non-Significant Effect
		GH_FR1	0.6309	2.68	1.183	4	CDF	0.7610	Non-Significant Effect
		GH_ERC	0.3646	2.68	1.183	4	CDF	0.8515	Non-Significant Effect
		CM_MC2	0.3994	2.68	1.183	4	CDF	0.8412	Non-Significant Effect
		EV_MC2	-0.5173	2.68	1.183	4	CDF	0.9840	Non-Significant Effect
		EV_HC1	1.09	2.68	1.183	4	CDF	0.5569	Non-Significant Effect
		LC_DCDS	-0.8027	2.68	1.183	4	CDF	0.9937	Non-Significant Effect
		LC_LC3	-0.2057	2.68	1.183	4	CDF	0.9607	Non-Significant Effect
		LC_LC5	0.7759	2.68	1.183	4	CDF	0.7016	Non-Significant Effect
		LC_LCDSSLSS	0.05737	2.68	1.183	4	CDF	0.9235	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	12.2535	0.875248	14	2.994	0.0057	Significant Effect
Error	8.76933	0.292311	30			
Total	21.0228		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	13.27	29.14	0.5056	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9584	0.9308	0.1065	Normal Distribution

9 Reference sites

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID: 03-9441-0944 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 16:13 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Length-mm Summary

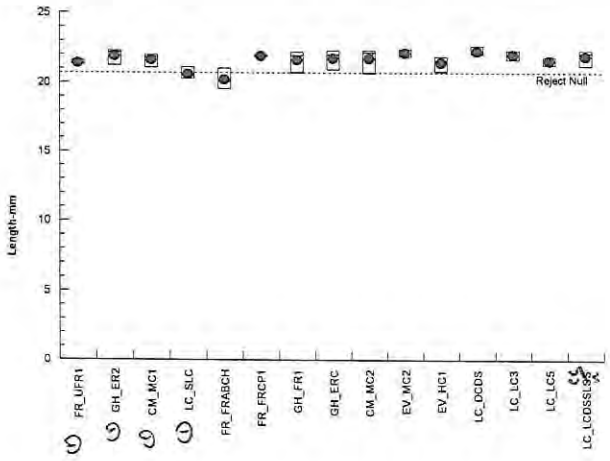
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		3	21.38	20.94	21.82	21.28	21.27	21.58	0.1024	0.83%	0.00%
GH_ER2	R	3	21.89	20.43	23.35	22.16	21.21	22.3	0.3402	2.69%	-2.39%
CM_MC1		3	21.61	20.4	22.82	21.81	21.05	21.96	0.2817	2.26%	-1.08%
LC_SLC		3	20.6	19.5	21.7	20.46	20.25	21.1	0.2558	2.15%	3.63%
FR_FRABCH		3	20.22	18.37	22.07	20.07	19.56	21.03	0.431	3.69%	5.42%
FR_FRCP1		3	21.89	21.71	22.08	21.86	21.84	21.98	0.04334	0.34%	-2.40%
GH_FR1		3	21.61	19.67	23.55	21.94	20.72	22.17	0.4515	3.62%	-1.09%
GH_ERC		3	21.73	19.94	23.52	22	20.91	22.28	0.4164	3.32%	-1.64%
CM_MC2		3	21.71	19.45	23.98	22.16	20.67	22.32	0.5255	4.19%	-1.57%
EV_MC2		3	22.12	21.44	22.8	22.09	21.86	22.41	0.1585	1.24%	-3.46%
EV_HC1		3	21.41	20.02	22.8	21.6	20.78	21.85	0.3231	2.61%	-0.14%
LC_DCDS		3	22.24	21.41	23.08	22.08	22.02	22.63	0.1933	1.50%	-4.05%
LC_LC3		3	21.98	21.13	22.84	21.98	21.64	22.33	0.1988	1.57%	-2.82%
LC_LC5		3	21.55	20.82	22.28	21.6	21.23	21.81	0.1699	1.37%	-0.79%
LC_LCDSSLSC		3	21.86	20.41	23.32	22.09	21.2	22.3	0.338	2.68%	-2.27%

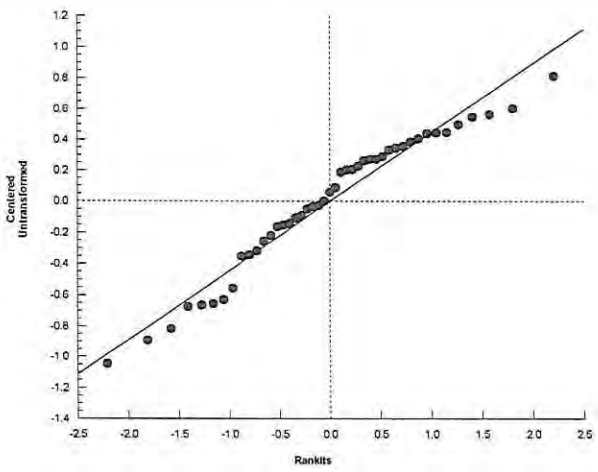
Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		21.58	21.27	21.28
GH_ER2	R	21.21	22.3	22.16
CM_MC1		21.05	21.81	21.96
LC_SLC		20.46	21.1	20.25
FR_FRABCH		20.07	19.56	21.03
FR_FRCP1		21.86	21.98	21.84
GH_FR1		20.72	22.17	21.94
GH_ERC		20.91	22	22.28
CM_MC2		22.32	20.67	22.16
EV_MC2		21.86	22.09	22.41
EV_HC1		20.78	21.6	21.85
LC_DCDS		22.08	22.02	22.63
LC_LC3		21.64	22.33	21.98
LC_LC5		21.23	21.81	21.6
LC_LCDSSLSC		21.2	22.09	22.3

Reference sites

Graphics





Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	05-6497-6611	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:14	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	13-8193-4534	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	05-6497-6611	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:14	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	14.95%
		CM_MC1 passed mean dry weight-mg	14.95%
		LC_SLC passed mean dry weight-mg	14.95%
		FR_FRABCH passed mean dry weight-mg	14.95%
		FR_FRCP1 passed mean dry weight-mg	14.95%
		GH_FR1 passed mean dry weight-mg	14.95%
		GH_ERC passed mean dry weight-mg	14.95%
		CM_MC2 passed mean dry weight-mg	14.95%
		EV_MC2 passed mean dry weight-mg	14.95%
		EV_HC1 passed mean dry weight-mg	14.95%
		LC_DCDS passed mean dry weight-mg	14.95%
		LC_LC3 passed mean dry weight-mg	14.95%
		LC_LC5 passed mean dry weight-mg	14.95%
		LC_LCDSSLSS passed mean dry weight-mg	14.95%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Receiving Water (GH-ER2)		FR_UFR1	1.374	2.68	15.94	4	CDF	0.4212	Non-Significant Effect
		CM_MC1	0.1586	2.68	15.94	4	CDF	0.9035	Non-Significant Effect
		LC_SLC	1.515	2.68	15.94	4	CDF	0.3574	Non-Significant Effect
		FR_FRABCH	2.212	2.68	15.94	4	CDF	0.1243	Non-Significant Effect
		FR_FRCP1	-1.594	2.68	15.94	4	CDF	0.9997	Non-Significant Effect
		GH_FR1	0.5184	2.68	15.94	4	CDF	0.8023	Non-Significant Effect
		GH_ERC	-0.2245	2.68	15.94	4	CDF	0.9626	Non-Significant Effect
		CM_MC2	-0.1833	2.68	15.94	4	CDF	0.9583	Non-Significant Effect
		EV_MC2	0.1929	2.68	15.94	4	CDF	0.8959	Non-Significant Effect
		EV_HC1	-0.4166	2.68	15.94	4	CDF	0.9784	Non-Significant Effect
		LC_DCDS	-0.3537	2.68	15.94	4	CDF	0.9740	Non-Significant Effect
		LC_LC3	-1.383	2.68	15.94	4	CDF	0.9992	Non-Significant Effect
		LC_LC5	-0.493	2.68	15.94	4	CDF	0.9828	Non-Significant Effect
		LC_LCDSSLSS	-0.8645	2.68	15.94	4	CDF	0.9949	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1615.87	115.42	14	2.174	0.0364	Significant Effect
Error	1592.46	53.0818	30			
Total	3208.33		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.44	29.14	0.0908	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9685	0.9308	0.2549	Normal Distribution

① Reference sites

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	05-6497-6611	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:14	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Mean ~~Dry~~ Weight-mg Summary

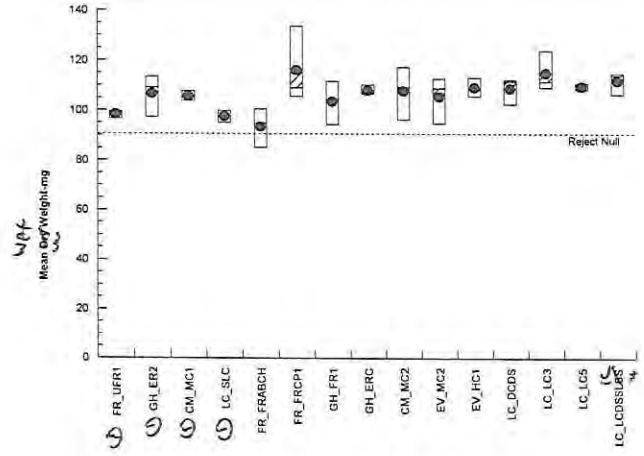
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		3	98.46	94.28	102.6	99.17	96.54	99.67	0.9702	1.71%	0.00%
GH_ER2	R	3	106.6	85.73	127.5	109	97.27	113.6	4.858	7.89%	-8.30%
CM_MC1		3	105.7	100.7	110.7	105.2	103.9	107.9	1.167	1.91%	-7.34%
LC_SLC		3	97.62	91.39	103.9	97.86	95	100	1.448	2.57%	0.85%
FR_FRABCH		3	93.47	73.86	113.1	94.78	85	100.6	4.558	8.45%	5.07%
FR_FRCP1		3	116.1	78.18	154	109	105.7	133.6	8.817	13.15%	-17.93%
GH_FR1		3	103.5	81.85	125.2	104.5	94.38	111.8	5.043	8.43%	-5.17%
GH_ERC		3	108	102.8	113.1	107.1	106.5	110.3	1.202	1.93%	-9.66%
CM_MC2		3	107.7	81.2	134.2	109.5	96.25	117.4	6.164	9.91%	-9.41%
EV_MC2		3	105.5	81.96	129	108.9	94.78	112.8	5.467	8.98%	-7.14%
EV_HC1		3	109.1	99.54	118.7	108.6	105.6	113.2	2.223	3.53%	-10.82%
LC_DCDS		3	108.7	95.04	122.4	111.6	102.4	112.2	3.182	5.07%	-10.44%
LC_LC3		3	114.9	94.97	134.7	111.5	109.1	124	4.623	6.97%	-16.66%
LC_LC5		3	109.6	106.5	112.7	109.5	108.3	110.8	0.7219	1.14%	-11.28%
LC_LCDSSLS		3	111.8	100.2	123.3	114.1	106.4	114.8	2.68	4.15%	-13.52%

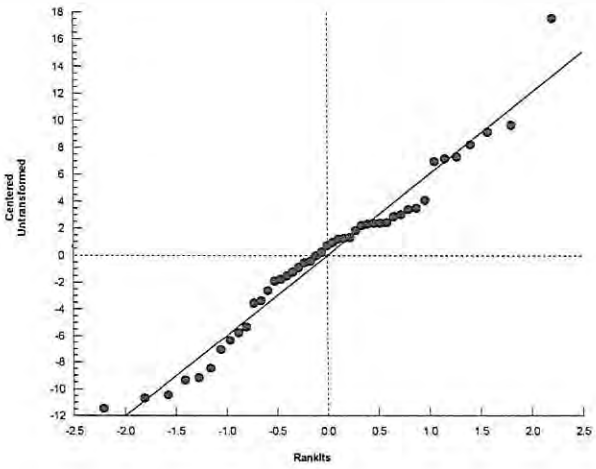
Mean ~~Dry~~ Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		99.17	96.54	99.67
GH_ER2	R	109	97.27	113.6
CM_MC1		107.9	105.2	103.9
LC_SLC		95	100	97.86
FR_FRABCH		94.78	85	100.6
FR_FRCP1		109	105.7	133.6
GH_FR1		94.38	104.5	111.8
GH_ERC		106.5	107.1	110.3
CM_MC2		117.4	96.25	109.5
EV_MC2		112.8	94.78	108.9
EV_HC1		113.2	108.6	105.6
LC_DCDS		111.6	102.4	112.2
LC_LC3		109.1	124	111.5
LC_LC5		108.3	109.5	110.8
LC_LCDSSLS		114.8	114.1	106.4

Reference sites

Graphics





Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test

Nautilus Environmental

Analysis ID:	13-7049-0991	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:15	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	13-8193-4534	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	13-7049-0991	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:15	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	① FR_UFR1 passed length-mm	5.48%
		① GH_ER2 passed length-mm	5.48%
		① LC_SLC passed length-mm	5.48%
		FR_FRABCH failed length-mm	5.48%
		FR_FRCP1 passed length-mm	5.48%
		GH_FR1 passed length-mm	5.48%
		GH_ERC passed length-mm	5.48%
		CM_MC2 passed length-mm	5.48%
		EV_MC2 passed length-mm	5.48%
		EV_HC1 passed length-mm	5.48%
		LC_DCDS passed length-mm	5.48%
		LC_LC3 passed length-mm	5.48%
		LC_LC5 passed length-mm	5.48%
		LC_LCDSSL~~SS~~ passed length-mm	5.48%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
① Site Control (CM_MC1)		① FR_UFR1	0.5214	2.68	1.183	4	CDF	0.8013	Non-Significant Effect
		① GH_ER2	-0.6373	2.68	1.183	4	CDF	0.9890	Non-Significant Effect
		① LC_SLC	2.279	2.68	1.183	4	CDF	0.1102	Non-Significant Effect
		FR_FRABCH*	3.147	2.68	1.183	4	CDF	0.0177	Significant Effect
		FR_FRCP1	-0.6417	2.68	1.183	4	CDF	0.9892	Non-Significant Effect
		GH_FR1	-0.006408	2.68	1.183	4	CDF	0.9344	Non-Significant Effect
		GH_ERC	-0.2727	2.68	1.183	4	CDF	0.9673	Non-Significant Effect
		CM_MC2	-0.2379	2.68	1.183	4	CDF	0.9640	Non-Significant Effect
		EV_MC2	-1.155	2.68	1.183	4	CDF	0.9982	Non-Significant Effect
		EV_HC1	0.4526	2.68	1.183	4	CDF	0.8245	Non-Significant Effect
		LC_DCDS	-1.44	2.68	1.183	4	CDF	0.9994	Non-Significant Effect
		LC_LC3	-0.843	2.68	1.183	4	CDF	0.9945	Non-Significant Effect
		LC_LC5	0.1386	2.68	1.183	4	CDF	0.9077	Non-Significant Effect
		LC_LCDSSL~~SS~~	-0.5799	2.68	1.183	4	CDF	0.9869	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	12.2535	0.875248	14	2.994	0.0057	Significant Effect
Error	8.76933	0.292311	30			
Total	21.0228		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	13.27	29.14	0.5056	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9584	0.9308	0.1065	Normal Distribution

① Reference sites

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Analysis ID: 13-7049-0991 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 16:15 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Length-mm Summary

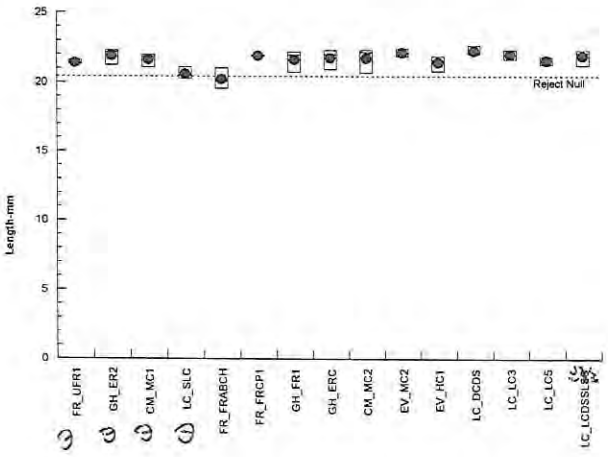
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
① FR_UFR1		3	21.38	20.94	21.82	21.28	21.27	21.58	0.1024	0.83%	0.00%
① GH_ER2		3	21.89	20.43	23.35	22.16	21.21	22.3	0.3402	2.69%	-2.39%
① CM_MC1	XC	3	21.61	20.4	22.82	21.81	21.05	21.96	0.2817	2.26%	-1.08%
① LC_SLC		3	20.6	19.5	21.7	20.46	20.25	21.1	0.2558	2.15%	3.63%
FR_FRABCH		3	20.22	18.37	22.07	20.07	19.56	21.03	0.431	3.69%	5.42%
FR_FRCP1		3	21.89	21.71	22.08	21.86	21.84	21.98	0.04334	0.34%	-2.40%
GH_FR1		3	21.61	19.67	23.55	21.94	20.72	22.17	0.4515	3.62%	-1.09%
GH_ERC		3	21.73	19.94	23.52	22	20.91	22.28	0.4164	3.32%	-1.64%
CM_MC2		3	21.71	19.45	23.98	22.16	20.67	22.32	0.5255	4.19%	-1.57%
EV_MC2		3	22.12	21.44	22.8	22.09	21.86	22.41	0.1585	1.24%	-3.46%
EV_HC1		3	21.41	20.02	22.8	21.6	20.78	21.85	0.3231	2.61%	-0.14%
LC_DCDS		3	22.24	21.41	23.08	22.08	22.02	22.63	0.1933	1.50%	-4.05%
LC_LC3		3	21.98	21.13	22.84	21.98	21.64	22.33	0.1988	1.57%	-2.82%
LC_LC5		3	21.55	20.82	22.28	21.6	21.23	21.81	0.1699	1.37%	-0.79%
LC_LCDSSLS ~~S~~		3	21.86	20.41	23.32	22.09	21.2	22.3	0.338	2.68%	-2.27%

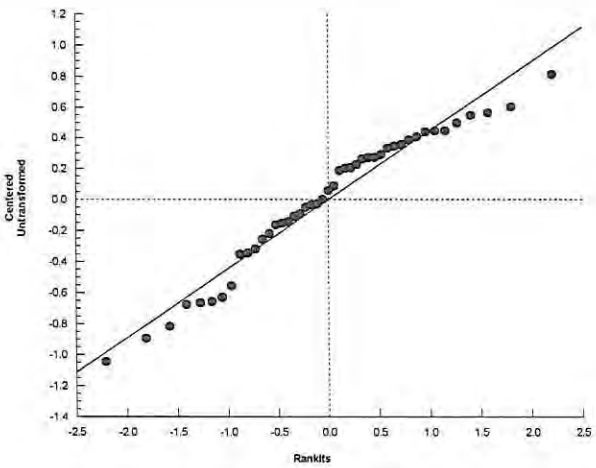
Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		21.58	21.27	21.28
① GH_ER2		21.21	22.3	22.16
① CM_MC1	XC	21.05	21.81	21.96
① LC_SLC		20.46	21.1	20.25
FR_FRABCH		20.07	19.56	21.03
FR_FRCP1		21.86	21.98	21.84
GH_FR1		20.72	22.17	21.94
GH_ERC		20.91	22	22.28
CM_MC2		22.32	20.67	22.16
EV_MC2		21.86	22.09	22.41
EV_HC1		20.78	21.6	21.85
LC_DCDS		22.08	22.02	22.63
LC_LC3		21.64	22.33	21.98
LC_LC5		21.23	21.81	21.6
LC_LCDSSLS ~~S~~		21.2	22.09	22.3

① Reference sites

Graphics





Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	00-4156-4777	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:15	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	13-8193-4534	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

① Reference sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID: 00-4156-4777 **Endpoint:** Mean ~~Dry~~ wet Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 16:15 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	① FR_UFR1 passed mean dry weight-mg	15.09%
		① GH_ER2 passed mean dry weight-mg	15.09%
		① LC_SLC passed mean dry weight-mg	15.09%
		FR_FRABCH passed mean dry weight-mg	15.09%
		FR_FRCP1 passed mean dry weight-mg	15.09%
		GH_FR1 passed mean dry weight-mg	15.09%
		GH_ERC passed mean dry weight-mg	15.09%
		CM_MC2 passed mean dry weight-mg	15.09%
		EV_MC2 passed mean dry weight-mg	15.09%
		EV_HC1 passed mean dry weight-mg	15.09%
		LC_DCDS passed mean dry weight-mg	15.09%
		LC_LC3 passed mean dry weight-mg	15.09%
		LC_LC5 passed mean dry weight-mg	15.09%
		LC_LCDSSLSS passed mean dry weight-mg	15.09%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
① Site Control (CM_MC1)		① FR_UFR1	1.215	2.68	15.94	4	CDF	0.4965	Non-Significant Effect
		① GH_ER2	-0.1586	2.68	15.94	4	CDF	0.9554	Non-Significant Effect
		① LC_SLC	1.356	2.68	15.94	4	CDF	0.4294	Non-Significant Effect
		FR_FRABCH	2.054	2.68	15.94	4	CDF	0.1635	Non-Significant Effect
		FR_FRCP1	-1.752	2.68	15.94	4	CDF	0.9998	Non-Significant Effect
		GH_FR1	0.3598	2.68	15.94	4	CDF	0.8529	Non-Significant Effect
		GH_ERC	-0.3831	2.68	15.94	4	CDF	0.9761	Non-Significant Effect
		CM_MC2	-0.3419	2.68	15.94	4	CDF	0.9731	Non-Significant Effect
		EV_MC2	0.0343	2.68	15.94	4	CDF	0.9276	Non-Significant Effect
		EV_HC1	-0.5752	2.68	15.94	4	CDF	0.9867	Non-Significant Effect
		LC_DCDS	-0.5122	2.68	15.94	4	CDF	0.9838	Non-Significant Effect
		LC_LC3	-1.542	2.68	15.94	4	CDF	0.9996	Non-Significant Effect
		LC_LC5	-0.6516	2.68	15.94	4	CDF	0.9895	Non-Significant Effect
		LC_LCDSSLSS	-1.023	2.68	15.94	4	CDF	0.9971	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1615.87	115.42	14	2.174	0.0364	Significant Effect
Error	1592.46	53.0818	30			
Total	3208.33		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.44	29.14	0.0908	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9685	0.9308	0.2549	Normal Distribution

① Reference sites

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	00-4156-4777	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:15	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Mean Dry Weight-mg Summary

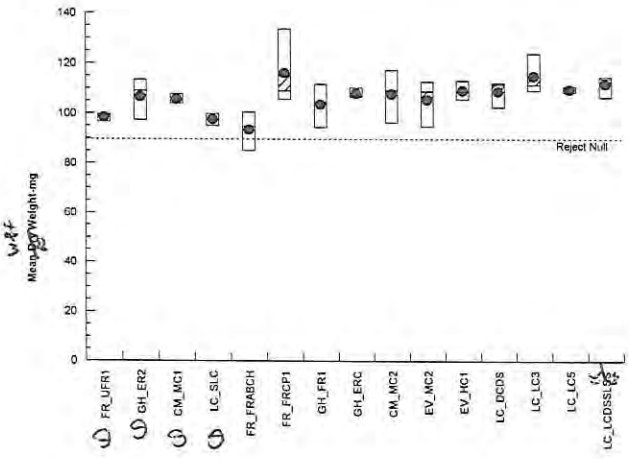
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		3	98.46	94.28	102.6	99.17	96.54	99.67	0.9702	1.71%	0.00%
GH_ER2		3	106.6	85.73	127.5	109	97.27	113.6	4.858	7.89%	-8.30%
CM_MC1	XC	3	105.7	100.7	110.7	105.2	103.9	107.9	1.167	1.91%	-7.34%
LC_SLC		3	97.62	91.39	103.9	97.86	95	100	1.448	2.57%	0.85%
FR_FRABCH		3	93.47	73.86	113.1	94.78	85	100.6	4.558	8.45%	5.07%
FR_FRCP1		3	116.1	78.18	154	109	105.7	133.6	8.817	13.15%	-17.93%
GH_FR1		3	103.5	81.85	125.2	104.5	94.38	111.8	5.043	8.43%	-5.17%
GH_ERC		3	108	102.8	113.1	107.1	106.5	110.3	1.202	1.93%	-9.66%
CM_MC2		3	107.7	81.2	134.2	109.5	96.25	117.4	6.164	9.91%	-9.41%
EV_MC2		3	105.5	81.96	129	108.9	94.78	112.8	5.467	8.98%	-7.14%
EV_HC1		3	109.1	99.54	118.7	108.6	105.6	113.2	2.223	3.53%	-10.82%
LC_DCDS		3	108.7	95.04	122.4	111.6	102.4	112.2	3.182	5.07%	-10.44%
LC_LC3		3	114.9	94.97	134.7	111.5	109.1	124	4.623	6.97%	-16.66%
LC_LC5		3	109.6	106.5	112.7	109.5	108.3	110.8	0.7219	1.14%	-11.28%
LC_LCDSSLS		3	111.8	100.2	123.3	114.1	106.4	114.8	2.68	4.15%	-13.52%

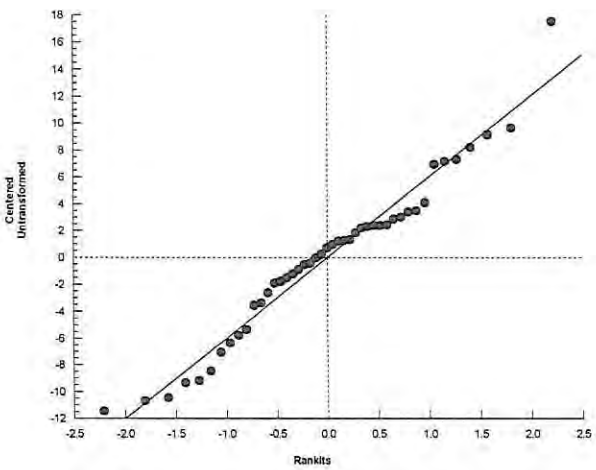
Mean Dry Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		99.17	96.54	99.67
GH_ER2		109	97.27	113.6
CM_MC1	XC	107.9	105.2	103.9
LC_SLC		95	100	97.86
FR_FRABCH		94.78	85	100.6
FR_FRCP1		109	105.7	133.6
GH_FR1		94.38	104.5	111.8
GH_ERC		106.5	107.1	110.3
CM_MC2		117.4	96.25	109.5
EV_MC2		112.8	94.78	108.9
EV_HC1		113.2	108.6	105.6
LC_DCDS		111.6	102.4	112.2
LC_LC3		109.1	124	111.5
LC_LC5		108.3	109.5	110.8
LC_LCDSSLS		114.8	114.1	106.4

① Reference sites

Graphics





Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	14-6122-1397	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:17	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	13-8193-4534	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

① Reference sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Analyst: YL QA: Aug. 19/19

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	14-6122-1397	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:17	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed length-mm	5.74%
		GH_ER2 passed length-mm	5.74%
		CM_MC1 passed length-mm	5.74%
		FR_FRABCH passed length-mm	5.74%
		FR_FRCP1 passed length-mm	5.74%
		GH_FR1 passed length-mm	5.74%
		GH_ERC passed length-mm	5.74%
		CM_MC2 passed length-mm	5.74%
		EV_MC2 passed length-mm	5.74%
		EV_HC1 passed length-mm	5.74%
		LC_DCDS passed length-mm	5.74%
		LC_LC3 passed length-mm	5.74%
		LC_LC5 passed length-mm	5.74%
		LC_LCDSSL passed length-mm	5.74%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Unamended Sampl		FR_UFR1	-1.758	2.68	1.183	4	CDF	0.9998	Non-Significant Effect
		GH_ER2	-2.916	2.68	1.183	4	CDF	1.0000	Non-Significant Effect
		CM_MC1	-2.279	2.68	1.183	4	CDF	1.0000	Non-Significant Effect
		FR_FRABCH	0.8679	2.68	1.183	4	CDF	0.6610	Non-Significant Effect
		FR_FRCP1	-2.921	2.68	1.183	4	CDF	1.0000	Non-Significant Effect
		GH_FR1	-2.285	2.68	1.183	4	CDF	1.0000	Non-Significant Effect
		GH_ERC	-2.552	2.68	1.183	4	CDF	1.0000	Non-Significant Effect
		CM_MC2	-2.517	2.68	1.183	4	CDF	1.0000	Non-Significant Effect
		EV_MC2	-3.434	2.68	1.183	4	CDF	1.0000	Non-Significant Effect
		EV_HC1	-1.826	2.68	1.183	4	CDF	0.9999	Non-Significant Effect
		LC_DCDS	-3.719	2.68	1.183	4	CDF	1.0000	Non-Significant Effect
		LC_LC3	-3.122	2.68	1.183	4	CDF	1.0000	Non-Significant Effect
		LC_LC5	-2.14	2.68	1.183	4	CDF	1.0000	Non-Significant Effect
		LC_LCDSSL	-2.859	2.68	1.183	4	CDF	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	12.2535	0.875248	14	2.994	0.0057	Significant Effect
Error	8.76933	0.292311	30			
Total	21.0228		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	13.27	29.14	0.5056	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9584	0.9308	0.1065	Normal Distribution

Reference sites

Analyst: _____ QA: Aug. 14/19

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	14-6122-1397	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:17	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Length-mm Summary

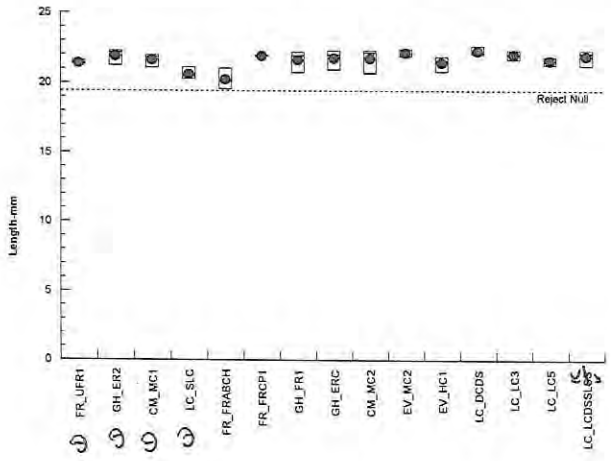
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		3	21.38	20.94	21.82	21.28	21.27	21.58	0.1024	0.83%	0.00%
GH_ER2		3	21.89	20.43	23.35	22.16	21.21	22.3	0.3402	2.69%	-2.39%
CM_MC1		3	21.61	20.4	22.82	21.81	21.05	21.96	0.2817	2.26%	-1.08%
LC_SLC	US	3	20.6	19.5	21.7	20.46	20.25	21.1	0.2558	2.15%	3.63%
FR_FRABCH		3	20.22	18.37	22.07	20.07	19.56	21.03	0.431	3.69%	5.42%
FR_FRCP1		3	21.89	21.71	22.08	21.86	21.84	21.98	0.04334	0.34%	-2.40%
GH_FR1		3	21.61	19.67	23.55	21.94	20.72	22.17	0.4515	3.62%	-1.09%
GH_ERC		3	21.73	19.94	23.52	22	20.91	22.28	0.4164	3.32%	-1.64%
CM_MC2		3	21.71	19.45	23.98	22.16	20.67	22.32	0.5255	4.19%	-1.57%
EV_MC2		3	22.12	21.44	22.8	22.09	21.86	22.41	0.1585	1.24%	-3.46%
EV_HC1		3	21.41	20.02	22.8	21.6	20.78	21.85	0.3231	2.61%	-0.14%
LC_DCDS		3	22.24	21.41	23.08	22.08	22.02	22.63	0.1933	1.50%	-4.05%
LC_LC3		3	21.98	21.13	22.84	21.98	21.64	22.33	0.1988	1.57%	-2.82%
LC_LC5		3	21.55	20.82	22.28	21.6	21.23	21.81	0.1699	1.37%	-0.79%
LC_LCDSSLS		3	21.86	20.41	23.32	22.09	21.2	22.3	0.338	2.68%	-2.27%

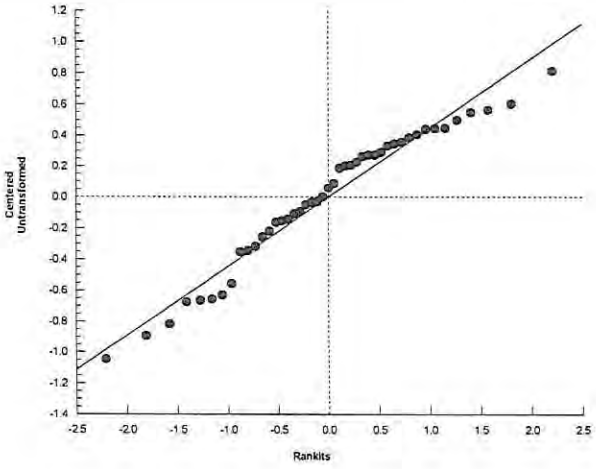
Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		21.58	21.27	21.28
GH_ER2		21.21	22.3	22.16
CM_MC1		21.05	21.81	21.96
LC_SLC	US	20.46	21.1	20.25
FR_FRABCH		20.07	19.56	21.03
FR_FRCP1		21.86	21.98	21.84
GH_FR1		20.72	22.17	21.94
GH_ERC		20.91	22	22.28
CM_MC2		22.32	20.67	22.16
EV_MC2		21.86	22.09	22.41
EV_HC1		20.78	21.6	21.85
LC_DCDS		22.08	22.02	22.63
LC_LC3		21.64	22.33	21.98
LC_LC5		21.23	21.81	21.6
LC_LCDSSLS		21.2	22.09	22.3

① Reference sites

Graphics





Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Analysis ID:	09-8769-1649	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:17	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	13-8193-4534	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	08 May-19 14:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Jun-19 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Ted's Trout, Campbell Lake **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	10-0027-4786	07 May-19 09:00	08 May-19 10:18	30h (1.3 °C)	Teck Coal	
GH_ER2	09-4887-2646	07 May-19	08 May-19 10:18	39h (2.5 °C)		
CM_MC1	05-7345-8193	07 May-19 12:00	08 May-19 10:18	27h (7.6 °C)		
LC_SLC	01-9748-1591	07 May-19 08:53	08 May-19 10:18	30h (0.4 °C)		
FR_FRABCH	15-3806-7513	07 May-19 09:25	08 May-19 10:18	29h (4.1 °C)		
FR_FRCP1	09-2717-4050	07 May-19 11:15	08 May-19 10:18	27h (4.3 °C)		
GH_FR1	19-8063-0056	07 May-19	08 May-19 10:18	39h (2.4 °C)		
GH_ERC	14-5766-5291	07 May-19	08 May-19 10:18	39h (1.8 °C)		
CM_MC2	00-8829-1470	07 May-19 10:01	08 May-19 10:18	29h (6.3 °C)		
EV_MC2	19-6819-7571	07 May-19 09:10	08 May-19 10:18	29h (6.3 °C)		
EV_HC1	07-5448-5899	07 May-19 07:50	08 May-19 10:18	31h (8.9 °C)		
LC_DCDS	17-6874-1557	07 May-19 11:30	08 May-19 10:18	27h (2.3 °C)		
LC_LC3	16-7101-2782	07 May-19 09:48	08 May-19 10:18	29h (2 °C)		
LC_LC5	00-5356-2696	07 May-19 09:10	08 May-19 10:18	29h (2.1 °C)		
LC_LCDSSLCC	03-1279-4914	07 May-19 10:54	08 May-19 10:18	28h (1.4 °C)		

Reference site

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-05-0	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-05-06_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-05-07	
LC_SLC	Water Sample	Teck Coal	LC_SLC_MNT_2019-05-07	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-05	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-05-06_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-05-06	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-05-07	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019-05_M	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019-05_MO	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_MNT_2019-05-0	
LC_LC3	Water Sample	Teck Coal	LC_LC3_MNT_2019-05-07	
LC_LC5	Water Sample	Teck Coal	LC_LC5_MNT_2019-05-07	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_MNT_201	

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Analysis ID: 09-8769-1649 **Endpoint:** Mean ~~Dry~~ wet Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 01 Aug-19 16:17 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	16.33%
		GH_ER2 passed mean dry weight-mg	16.33%
		CM_MC1 passed mean dry weight-mg	16.33%
		FR_FRABCH passed mean dry weight-mg	16.33%
		FR_FRCP1 passed mean dry weight-mg	16.33%
		GH_FR1 passed mean dry weight-mg	16.33%
		GH_ERC passed mean dry weight-mg	16.33%
		CM_MC2 passed mean dry weight-mg	16.33%
		EV_MC2 passed mean dry weight-mg	16.33%
		EV_HC1 passed mean dry weight-mg	16.33%
		LC_DCDS passed mean dry weight-mg	16.33%
		LC_LC3 passed mean dry weight-mg	16.33%
		LC_LC5 passed mean dry weight-mg	16.33%
		LC_LCDSSL~~S~~ passed mean dry weight-mg	16.33%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Unamended Sampl		FR_UFR1	-0.1409	2.68	15.94	4	CDF	0.9533	Non-Significant Effect
(LCSLC)		GH_ER2	-1.515	2.68	15.94	4	CDF	0.9996	Non-Significant Effect
		CM_MC1	-1.356	2.68	15.94	4	CDF	0.9992	Non-Significant Effect
		FR_FRABCH	0.6976	2.68	15.94	4	CDF	0.7344	Non-Significant Effect
		FR_FRCP1	-3.109	2.68	15.94	4	CDF	1.0000	Non-Significant Effect
		GH_FR1	-0.9964	2.68	15.94	4	CDF	0.9968	Non-Significant Effect
		GH_ERC	-1.739	2.68	15.94	4	CDF	0.9998	Non-Significant Effect
		CM_MC2	-1.698	2.68	15.94	4	CDF	0.9998	Non-Significant Effect
		EV_MC2	-1.322	2.68	15.94	4	CDF	0.9990	Non-Significant Effect
		EV_HC1	-1.931	2.68	15.94	4	CDF	0.9999	Non-Significant Effect
		LC_DCDS	-1.869	2.68	15.94	4	CDF	0.9999	Non-Significant Effect
		LC_LC3	-2.898	2.68	15.94	4	CDF	1.0000	Non-Significant Effect
		LC_LC5	-2.008	2.68	15.94	4	CDF	0.9999	Non-Significant Effect
		LC_LCDSSL~~S~~	-2.379	2.68	15.94	4	CDF	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1615.87	115.42	14	2.174	0.0364	Significant Effect
Error	1592.46	53.0818	30			
Total	3208.33		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.44	29.14	0.0908	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9685	0.9308	0.2549	Normal Distribution

Reference sites

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	09-8769-1649	**Endpoint:**	Mean ~~Dry~~ Wet Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Aug-19 16:17	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Mean ~~Dry~~ Wet Weight-mg Summary

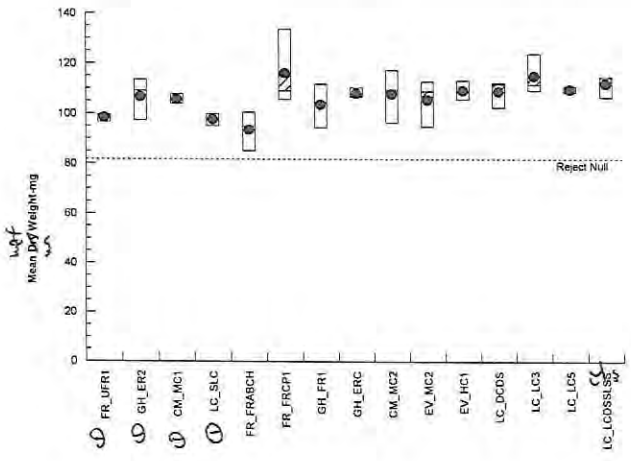
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		3	98.46	94.28	102.6	99.17	96.54	99.67	0.9702	1.71%	0.00%
GH_ER2		3	106.6	85.73	127.5	109	97.27	113.6	4.858	7.89%	-8.30%
CM_MC1		3	105.7	100.7	110.7	105.2	103.9	107.9	1.167	1.91%	-7.34%
LC_SLC	US	3	97.62	91.39	103.9	97.86	95	100	1.448	2.57%	0.85%
FR_FRABCH		3	93.47	73.86	113.1	94.78	85	100.6	4.558	8.45%	5.07%
FR_FRCP1		3	116.1	78.18	154	109	105.7	133.6	8.817	13.15%	-17.93%
GH_FR1		3	103.5	81.85	125.2	104.5	94.38	111.8	5.043	8.43%	-5.17%
GH_ERC		3	108	102.8	113.1	107.1	106.5	110.3	1.202	1.93%	-9.66%
CM_MC2		3	107.7	81.2	134.2	109.5	96.25	117.4	6.164	9.91%	-9.41%
EV_MC2		3	105.5	81.96	129	108.9	94.78	112.8	5.467	8.98%	-7.14%
EV_HC1		3	109.1	99.54	118.7	108.6	105.6	113.2	2.223	3.53%	-10.82%
LC_DCDS		3	108.7	95.04	122.4	111.6	102.4	112.2	3.182	5.07%	-10.44%
LC_LC3		3	114.9	94.97	134.7	111.5	109.1	124	4.623	6.97%	-16.66%
LC_LC5		3	109.6	106.5	112.7	109.5	108.3	110.8	0.7219	1.14%	-11.28%
LC_LCDSSLSS		3	111.8	100.2	123.3	114.1	106.4	114.8	2.68	4.15%	-13.52%

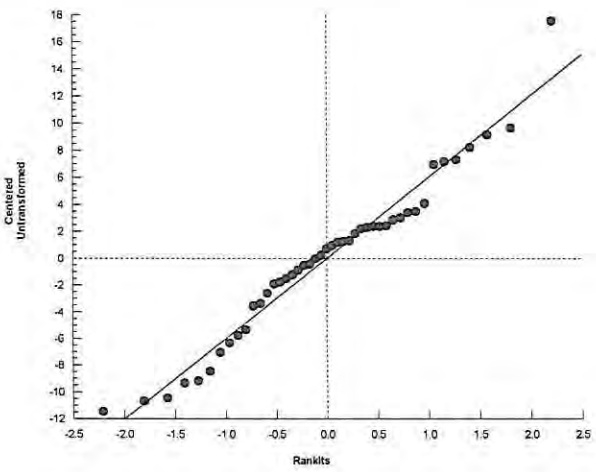
Mean ~~Dry~~ Wet Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		99.17	96.54	99.67
GH_ER2		109	97.27	113.6
CM_MC1		107.9	105.2	103.9
LC_SLC	US	95	100	97.86
FR_FRABCH		94.78	85	100.6
FR_FRCP1		109	105.7	133.6
GH_FR1		94.38	104.5	111.8
GH_ERC		106.5	107.1	110.3
CM_MC2		117.4	96.25	109.5
EV_MC2		112.8	94.78	108.9
EV_HC1		113.2	108.6	105.6
LC_DCDS		111.6	102.4	112.2
LC_LC3		109.1	124	111.5
LC_LC5		108.3	109.5	110.8
LC_LCDSSLSS		114.8	114.1	106.4

① Reference Sites

Graphics





Client: Teck

W.O.#: 190906

Hardness and Alkalinity Datasheet

week 1

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Dechlor Control	May 8/19	May 8/19	100	1.1	1.2	10	100	0.9	9	WM
FR_UFR1			50	6.6	6.7	130	50	8.9	178	SSM
GH_ER2			50	6.9	7.0	128	50	8.0	160	
CM_MC1			50	6.0	6.1	118	50	6.5	130	
LC_SLC			50	6.5	6.6	128	50	9.0	180	
FR_FRABCH			100①	2.2	2.3	210	100①	5.8	580	
FR_FRCP1			100①	2.3	2.4	220	100①	6.0	600	
GH_FR1			100①	2.5	2.6	240	100	5.0	500	
GH_ERC			100①	1.9	2.0	180	100①	3.1	310	
CM_MC2			100①	2.2	2.3	210	100①	5.1	510	
EV_MC2			100①	1.6	1.7	150	100①	3.2	320	
EV_HC1			100①	2.3	2.4	220	100①	3.7	370	
LC_DCDS			100①	1.9	2.0	180	100①	4.1	410	
LC_LC3			100①	2.3	2.4	220	100①	6.9	690	
LC_LC5			100①	2.4	2.5	230	100①	4.6	460	
LC_LCDSSLCC	↓	↓	100①	2.3	2.4	220	100①	5.4	540	↓

Notes: ① Diluted to 100 mL w/ DI water

Reviewed by: JGh Date Reviewed: Aug. 12/19

Client: Teck

W.O.#: 190906

Hardness and Alkalinity Datasheet

week 2

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Dechlor control	May 15/19	May 15/19	100	1.1	1.2	10	100	0.9	9	HM
FR-UFR1			50	6.1	6.2	120	50	7.7	154	SSM
GH-ER2			50	6.7	6.8	132	50	7.8	156	
CM-MC1			50	5.7	5.8	112	50	6.2	124	
LC-SLC			50	6.0	6.1	118	50	8.1	162	
FR-FRABCH			100①	2.0	2.1	190	100①	5.0	500	
FR-FRCP1			100①	1.5	1.6	140	100①	2.7	270	
GH-FR1			100①	2.2	2.3	210	100①	4.4	440	
GH-ERC			100①	1.8	1.9	170	100①	3.0	300	
CM-MC2			100①	1.9	2.0	180	100①	4.4	440	
EV-MC2			100①	1.4	1.5	130	100①	3.0	300	
EV-HC1			100①	1.8	1.9	170	100①	3.3	330	
LC-DCDS			100①	1.7	1.8	160	100①	3.8	380	
LC-LC3			100①	1.7	1.8	160	100①	6.0	600	
LC-LC5			100①	1.9	2.0	180	100①	4.0	400	
LC-LCDSSLCC			100①	1.8	1.9	170	100①	4.6	460	

Notes: ① Diluted to 100 mL w/ DI water

Reviewed by: JOH

Date Reviewed: Aug. 12/19

Client: Teck

W.O.#: 190906

Hardness and Alkalinity Datasheet

week 3

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Dechlor Control	May 22/19	May 22/19	100	0.9	1.0	8	100	0.8	8	MML
FR-UFR1			50	6.5	6.6	128	50	8.5	~~425~~ 170	SSM
GH-ER2			50	6.6	6.7	130	50	7.5	~~375~~ 150	
CM-MC1			50	5.8	5.9	114	50	6.3	~~315~~ 126	
LC-SLC			50	6.2	6.3	122	50	8.4	~~420~~ 168	
FR-FRABCH			10①	2.0	2.1	190	10①	5.4	540	
FR-FRCP1			10①	2.1	2.2	~~2700~~	10①	5.6	560	
GH-FR1			10①	2.3	2.4	220	10①	4.6	460	
GH-ERC			10①	1.7	1.8	160	10①	3.0	300	
CM-MC2			10①	2.1	2.2	200	10①	4.7	470	
EV-MC2			10①	1.5	1.6	140	10①	3.1	310	
EV-HC1			10①	2.1	2.2	200	10①	3.5	350	
LC-DCDS			10①	1.5	1.6	140	10①	3.6	360	
LC-LC3			10①	1.9	2.0	180	10①	6.1	610	
LC-LC5			10①	2.1	2.2	200	10①	4.2	420	
LC-LCDSSLCC			10①	2.0	2.1	190	10①	4.9	490	

Notes: ① Diluted to 100 mL w/ DI water

Reviewed by: JGr

Date Reviewed: Aug. 19/19

Client: Teck

W.O.#: 190906

Hardness and Alkalinity Datasheet

week 4

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Dechlor control	May 29/19	May 29/19	100	1.10	1.1	9	100	0.8	8	MML
FR_VFR1			50	5.6	5.8	~~134~~ 108	50	9.5	190	ST
GH_ER2			50	6.9	7.1	~~86~~ 134	50	12.8	256	
CM_MC1			50	4.5	4.7	~~126~~ 96	50	6.2	124	
LC_SLC			50	6.4	6.5	~~200~~ 126	50	9.9	198	
FR_FRABCH			100①	2.2	2.4	~~180~~ 200	100①	7.1	710	
FR_FRCP1			100①	2.0	2.2	~~220~~ 180	100①	4.7	470	
GH_FR1			100①	2.4	2.6	~~130~~ 220	100①	5.0	500	
GH_ERC			100①	1.5	1.7	~~160~~ 130	100①	2.4	240	
CM_MC2			100①	1.7	1.8	160	100①	2.8	280	
EV_MC2			100①	1.3	1.4	120	100①	2.1	210	
EV_HC1			100①	2.0	2.2	180	100①	3.5	330	
LC_DCDS			100①	1.4	1.5	130	100①	2.5	250	
LC_LC3			100①	1.9	2.1	170	100①	5.1	510	
LC_LC5			100①	2.0	2.2	180	100①	4.2	420	
LC_LCDSSLCC	↓	↓	100①	1.9	2.1	170	100①	3.7	320	↓

Notes: ① Diluted to 100 mL w/ DI water

Reviewed by: JCh

Date Reviewed: Aug. 12/19

Client: Teck

W.O.#: 190906

Hardness and Alkalinity Datasheet

week 5

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Dechlor control	June 5/19	June 5/19	100	1.1	1.2	10	100	1.0	10	HW
FR_UFR1	↓	↓	50	5.0	5.2	96	50	6.9	138	ST
GH_ER2			50	5.5	5.7	106	50	8.2	164	↓
CM_MC1			50	4.1	4.3	78	50	5.8	116	
LC_SLC			50	4.7	4.8	92	50	6.9	138	
FR_FRABCH			10①	1.6	1.8	140	10①	2.6	260	
FR_FRCP1			10①	1.2	1.3	110	10①	2.7	270	
GH_FR1②			10①	2.4	2.6	220	10①	5.0	500	
GH_ERC			10①	1.1	1.2	100	10①	2.3	230	
CM_MC2			10①	1.6	1.7	150	10①	2.7	270	
EV_MC2			10①	1.1	1.2	100	10①	2.0	200	
EV_HC1			10①	1.5	1.7	130	10①	2.9	290	
LC_DCDS			10①	1.3	1.4	120	10①	2.6	260	
LC_LC3			10①	2.3	2.5	210	10①	3.2	320	
LC_LC5			10①	0.9	1.1	70	10①	2.9	290	
LC_LCDSSLCC	↓	↓	10①	0.8	1.0	60	10①	3.2	220	↓

Notes: ① Diluted to 100 mL w/ DI water

② week 5 sample arrived damaged - week 4 sample used

Reviewed by: JCh Date Reviewed: Aug. 12/19

APPENDIX E - Chain-of-Custody Forms

Teck

COC ID:	20190507CRN1B	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations		
Job Description	Q1 Chronic Sampling		
Project Manager	Cam Griffin		
Email	Cameron.griffin@teck.com		
Address	RR#1 HWY# 3		
City	Sparwood	Province	BC
Postal Code	V1C 4C3	Country	Canada
Phone Number	1-250-425-8137		

LABORATORY

Lab Name	Nautilus Environmental		
Lab Contact	Richard Chea		
Email	Richard@nautilusenvironmental.ca		
Address	8664 Commerce Court		
	Imperial Square Lake City		
City	Burnaby	Province	BC
Postal Code	V5A 4N7	Country	Canada
Phone Number	604-420-8773		

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Bryan.Ogden@teck.com	X	X	X
Email 2:	teckcoal@equisonline.com			X
Email 3:	Kimberley.Hackett@teck.com	X	X	X
Email 4:	Cameron.Griffin@teck.com	X	X	X
Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
PO number	VPO00610856			

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	28-d H. azteca	7-d C.dubia P/F	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)				
FILTERED									No	No	No							
PRESERVED									No	No	No							
EV_HC1_WS_2019-05_MON_N	EV_HC1	WS	N	5/7/2019	7:50	G	4 x 20L				4							8.9°C
EV_MC2_WS_2019-05_MON_N	EV_MC2	WS	N	5/7/2019	9:10	G	4 x 20L				4							6.3°C
											190908	190907	190905	190906				
					Total		8											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)

0 clear, colourless, odourless, no particulates.

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Jason Gravelle	7-May-19	Sakshi Khatri Nautilus (Burnaby)	May 08/19 @ 10:18 am Q2-Week 1

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Bryan Ogden	Mobile #	
Sampler's Signature		Date/Time	May 7, 2019

Teck

COC ID: 20190507-1302 | **TURNAROUND TIME:** | **RUSH:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	chelsea.jensen@teck.com	X	X	X
								Email 4:	jared.cayenne@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	scott.roughead@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 6:	teckcoal@equisonline.com			X
Phone Number	1-250-865-5204			Phone Number	604-420-8773			PO number				

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	TH	PRESERV.	7-d C.dubia P/F	7-d C.dubia P/F (EDTA)	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)	30-d embryo EA P/F (40 ug/L Cu)	7-d embryo P/F	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)				
								N	NONE	ANALYSIS											
FR_FRABCH_MON_2019-05-06_NP	FR_FRABCH	WS		2019/05/07	09:25	G	4x2			X		X	X			X					4.1°C
FR_FRCP1_MON_2019-05-06_N	FR_FRCP1	WS		2019/05/07	11:15	G	5x2			X	X	X	X			X	X				4.3°C
FR_UFR1_MON_2019-05-06_N	FR_UFR1	WS		2019/05/07	09:00	G	4x2			X		X	X			X					1.3°C
										190907	190903	190905	190906			190908	190904				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Oclear, colourless, odourless, no particulates	Jared Cayenne	May 7, 2019	Sakshi Khatri Nautilus (Burnaby)	May 08/19 @ 10:18am Q2 - Week 1

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Jared Cayenne	Mobile #	2504219457
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	May 7, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q1 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Emma Marus			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commerce Court				Yes PDF	Yes	Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	610307		

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A 72h P. subcapitata P/F	#N/A 7d C.dubia P/F	#N/A 28-d Hyallella P/F	#N/A 30-d embryo EA P/F	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
(3) GH_FR1_WS_2019-05-06_N	GH_FR1	WS	N	7-May-19		G	4x20L		x	x	x	x									2.4°C
(1) GH_ER2_WS_2019-05-06_N	GH_ER2	WS	N	7-May-19		G	4x20L		x	x	x	x									2.5°C
(2) GH_ERC_WS_2019-05-06_N	GH_ERC	WS	N	7-May-19		G	4x20L		x	x	x	x									1.8°C
									190905	190907	190908	190906									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
Clear, colourless, odourless, no particulates.				Sakshi Khatri Nautilus (Burnaby) Q2 - Week 1	May 05/19	10:15am

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID:	20190507 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	Chris.Blurton@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00608154			
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED — Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	7-d C.dubia P/F	72-hr P. subcapitata P/F	28d Hyallela P/F	30d embryo EA P/F								
(1)	LC_LCDSSLCC_MNT_2019-05-07_N	LC_LCDSSLCC	WS	N	7-May	10:54	G	4 x20L	X	X	X	X								1.4°C
(1)	LC_SLC_MNT_2019-05-07_N	LC_SLC	WS	N	7-May	8:53	G	4 x20L	X	X	X	X								0.4°C
(1)	LC_LC3_MNT_2019-05-07_N	LC_LC3	WS	N	7-May	9:48	G	4 x20L	X	X	X	X								2.0°C
(1)	LC_LC5_MNT_2019-05-07_N	LC_LC5	WS	N	7-May	9:10	G	4 x20L	X	X	X	X								2.1°C
(1)	LC_DCDS_MNT_2019-05-07_N	LC_DCDS	WS	N	7-May	11:30	G	4 x20L	X	X	X	X								2.3°C
									190907	190905	190908	190906								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available (1) clear, odourless, odourless, no particulates	K. Cambell/D.Tymstra	7-May	Sakshi Khatri Nautilus (Burnaby)	May 08/19 @ 10:18am Q2 - Week 1

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	May 7, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: WEEKLY_CHRONIC_05072019 | TURNAROUND TIME: Regular | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Emma Marus			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	emma@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 4	Kate.Middleton@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 4	Don.Sacino@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	Jay.jones@teck.com	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number				
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL.	PRESERV.	ANALYSIS: 7-d C.dubia P/F	7-d C.dubia P/F (EDTA)	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)		
1) CM_MC1_WS_2019-05-07_N	CM_MC1	WS	n	5/7/2019	12:00	G	4x2L			X		X	X	X			7.6°C
2) CM_MC2_WS_2019-05-07_N	CM_MC2	WS	n	5/7/2019	10:01	G	5x2L			X	X	X	X	X	X		6.3°C
3) RG_MIDAG_WS_2019-05-07_N	RG_MIDAG	WS	n	5/7/2019	9:25	G	2x2L			X	X			X	X		3.4°C
										190907	190905	190905	190906	190908	190907		

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
1) clear, colourless, odourless, no particulates.			Sakshi Khatri Nautilus (Burnaby)	May 08/19 @ 10:18am
				2 - Week 1

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	SH/KP	Mobile #	250 425 7518
Sampler's Signature		Date/Time	5/7/2019 14:00:00

Teck

COC ID: 20190514CRN1B | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q1 Chronic Sampling			Lab Contact	Richard Chea			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email	Richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	8664 Commerce Court			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3				Imperial Square Lake City			Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00610856			
Postal Code	V1C 4C3	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED									Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								FILTERED	No	No	No						
								PRESERVED	No	No	No						
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	28-d H. azteca	7-d C.dubia P/F	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)	30d Hyalella P/F		
EV_HC1_WS_2019-05_WK2_N	EV_HC1	WS	N	5/14/2019	9:20	G	4 x2						4	✓			5.6
EV_MC2_WS_2019-05_WK2_N	EV_MC2	WS	N	5/14/2019	12:20	G	4 x2						4	✓			5.6
													190906	190908			
					Total		8										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphinia testing to occur at 20 degrees)	Jason Gravelle	14-May-19	Stephanie TO Nautilus Burnaby	May 15/19 09:47 Q2-W2

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jason Gravelle	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature	Jason Gravelle	Date/Time	May 14, 2019
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190514-1336 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	chelsea.jensen@teck.com	X	X	X
								Email 4:	jared.cayenne@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	scott.roughead@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 6:	teckcoal@equisonline.com			X
Phone Number	1-250-865-5204			Phone Number	604-420-8773			PO number				

SAMPLE DETAILS | **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F (EDTA)	28-d Hyalella P/F								
								FIL: N	N	N								
								PRESERV: NONE	NONE	NONE								
FR_FRABCH_WEK_2019-05-13_NP	FR_FRABCH	WS		2019/05/14	09:06	G	4 x 2L	X		X								10.2
FR_FRCP1_WEK_2019-05-13_N	FR_FRCP1	WS		2019/05/14	10:47	G	5	X	X	X								10.3
FR_UFR1_WEK_2019-05-13_N	FR_UFR1	WS		2019/05/14	10:20	G	4	X		X								8.1°C
								190906	190904	190908								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Jared Cayenne	May 14, 2019	Stephanie TO Nautilus Burnaby	May 15/19 09:47 Q2-W2

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jared Cayenne	Mobile #	2504219457
Sampler's Signature		Date/Time	May 14, 2019

Teck

COC ID:	Q2 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Emma Marus			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commerce Court				Yes PDF	Yes	Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	610307		

SAMPLE DETAILS / ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
									~~72h P. subcapitata P/F~~	~~7d C.dubia P/F~~	28-d Hyallella P/F	30-d embryo EA P/F								
GH_FR1_WS_2019-05-13_N	GH_FR1	WS	N	~~15~~-May-19	13:55	G	4 XLL		x	x	x	x								7.6
GH_ER2_WS_2019-05-13_N	GH_ER2	WS	N	~~13~~-May-19	10:55	G	4		x	x	x	x								8.3
GH_ERC_WS_2019-05-13_N	GH_ERC	WS	N	~~13~~-May-19	12:30	G	4		x	x	x	x								7.9
											190608	190606								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				Stephanie TO Nautilus Burnaby	May 13 19	09:47
					Q2-W2	

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID: 20190513 Chronic tox | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	Chris.Blurton@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			x
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00608154			
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED													Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								Filt.													
								PRESRV.													
Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F											
LC_LCDSSLCC_WS_2019-05-13_N	LC_LCDSSLCC	WS	N	14-May	10:50	G	4 x2		X	X										7.8	
LC_SLC_WS_2019-05-13_N	LC_SLC	WS	N	14-May	9:30	G	4		X	X										7.3	
LC_LC3_WS_2019-05-13_N	LC_LC3	WS	N	14-May	10:40	G	4		X	X										7.6	
LC_LC5_WS_2019-05-13_N	LC_LC5	WS	N	14-May	9:00	G	4		X	X										8.7	
LC_DCDS_WS_2019-05-13_N	LC_DCDS	WS	N	14-May	10:20	G	4		X	X										8.5	
									190906	190905											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	14-May	Stephanie TB	May 15/19 09:47
			Nautilus	
			Burnaby	Q2-W2

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	May 14, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

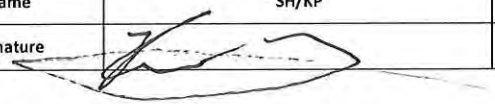
Teck

COC ID:	WEEKLY_CHRONIC_05142019	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Richard Chea			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 4	Kate.Middleton@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 4	Don.Sacino@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	Jay.jones@teck.com	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number				
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED												Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								FIL.												
								PRESERV.												
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)									
CM_MC1_WS_2019-05-14_N	CM_MC1	WS	n	5/14/2019	10:52	G	4 X 20L		X	X										6.5
CM_MC2_WS_2019-05-14_N	CM_MC2	WS	n	5/14/2019	10:11	G	5 X 20L		X	X	X									5.1
RG_MIDAG_WS_2019-05-14_N	RG_MIDAG	WS	n	5/14/2019	9:37	G	2 X 20L			X	X									7.2
									190906	190905	190907									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Stephanie TO Nautilus Burnaby	May 15/19 09:47 Q2-W2

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	SH/KP	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	5/14/2019 14:00:00
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190521CRN1B	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations		
Job Description	Q1 Chronic Sampling		
Project Manager	Cam Griffin		
Email	Cameron.griffin@teck.com		
Address	RR#1 HWY# 3		
City	Sparwood	Province	BC
Postal Code	V1C 4C3	Country	Canada
Phone Number	1-250-425-8137		

LABORATORY

Lab Name	Nautilus Environmental		
Lab Contact	Richard Chea		
Email	Richard@nautilusenvironmental.ca		
Address	8664 Commerce Court		
	Imperial Square Lake City		
City	Burnaby	Province	BC
Postal Code	V5A 4N7	Country	Canada
Phone Number	604-420-8773		

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Bryan.Ogden@teck.com	X	X	X
Email 2:	teckcoal@equisonline.com			X
Email 3:	Kimberley.Hackett@teck.com	X	X	X
Email 4:	Cameron.Griffin@teck.com	X	X	X
Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
PO number	VPO00610856			

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Filtered - F; Field, L- Lab, FL - Field & Lab, N- None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	28-d H. azteca	7-d C.dubia P/F	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)	30d Hyalella P/F			Temp °C
FILTERED								No	No	No	No	No	No	No				
PRESERVED								No	No	No	No	No	No	No				
EV_HC1_WS_2019-05_WK3_N	EV_HC1	WS	N	5/21/2019	10:10	G	4x250L							4	✓			3.1
EV_MC2_WS_2019-05_WK3_N	EV_MC2	WS	N	5/21/2019	13:00	G	4x250L							4	✓			3.6
														190906	190908			
					Total		8											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)	Jason Gravelle	21-May-19	Tyrone Hamilton Nautilus - Burnaby	May 23/19 @ 10:00 Q2-W3

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jason Gravelle	Mobile #	
Sampler's Signature		Date/Time	May 21, 2019

Teck

COC ID: 20190521-1353 | **TURNAROUND TIME:** | **RUSH:**

PROJECT/CLIENT INFO

Facility Name / Job#	Fording River Operation
Project Manager	Neil MacDonald
Email	Neil.MacDonald@teck.com
Address	PO Box 100
City	Elkford
Province	BC
Postal Code	V0B 1H0
Country	Canada
Phone Number	1-250-865-5204

LABORATORY

Lab Name	Nautilus Environmental - BC
Lab Contact	
Email	BCinfo@nautilusenvironmental.ca
Address	8664 Commerce Court
City	Burnaby
Province	BC
Postal Code	V5A 4N7
Country	Canada
Phone Number	604-420-8773

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	neil.macdonald@teck.com	X	X	X
Email 2:	dylan.begin@teck.com	X	X	X
Email 3:	chelsea.jensen@teck.com	X	X	X
Email 4:	jared.cayenne@teck.com	X	X	X
Email 5:	scott.roughead@teck.com	X	X	X
Email 6:	teckcoal@equisonline.com			X
PO number				

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	TAT	PRESERV.	ANALYSIS: 28-d Hyalella P/F	28-d Hyalella P/F (EDTA)	30-d embryo EA P/F (20 ug/L Cu)								Temp °C
FR_FRABCH_WEK_2019-05-20_NP	FR_FRABCH	WS		2019/05/21	08:43	G	4x2			X	X TN	X								0.2
FR_FRCP1_WEK_2019-05-20_N	FR_FRCP1	WS		2019/05/21	09:22	G	5x2			X	X	X								1.2
FR_UFR1_WEK_2019-05-20_N	FR_UFR1	WS		2019/05/21	00:00	G	4x2			X	X TN	X								0.9
										190908	190909	190906								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION

Jared Cayenne

DATE/TIME

May 21, 2019

ACCEPTED BY/AFFILIATION

Tyson Hamilton

Nautilus - Burnaby

DATE/TIME

May 22/19 @ 10:00

Q2-W3

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jared Cayenne	Mobile #	2504219457
Sampler's Signature		Date/Time	May 21, 2019

Teck

COC ID:	Q2 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Emma Marus			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commerce Court				*Yes* PDF	*Yes* Excel	
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	610307		

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	
									72h P. subcapitata P/F	7d C.dubia P/F	28-d Hyallella P/F	30-d embryo EA P/F									Temp °C
GH_FR1_WS_2019-05-20_N	GH_FR1	WS	N	21-May-19	13:30	G	4x250		x	x	x	x									7.1
GH_ER2_WS_2019-05-20_N	GH_ER2	WS	N	21-May-19	11:10	G	4x250		x	x	x	x									7.9
GH_ERC_WS_2019-05-20_N	GH_ERC	WS	N	21-May-19	12:24	G	4x250		x	x	x	x									7.0
											190906	190906									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				Tyrone Hamilton	May 22/19	@ 10:00
				Nautilus - Burnaby	Q2-W3	

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID:	20190521 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	Chris.Blurton@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00608154			
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV.	ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)	ANALYSIS: 28-d Hyalella P/F	Temp °C
LC_LCDSSLCC_WS_2019-05-20_N	LC_LCDSSLCC	WS	N	21-May	13:22	G	4 x 2L		X	X	4.9
LC_SLC_WS_2019-05-20_N	LC_SLC	WS	N	21-May	11:56	G	4 x 2L		X	X	6.0
LC_LC3_WS_2019-05-20_N	LC_LC3	WS	N	21-May	12:50	G	4 x 2L		X	X	3.3
LC_LC5_WS_2019-05-20_N	LC_LC5	WS	N	21-May	14:16	G	4 x 2L		X	X	3.3
LC_DCDS_WS_2019-05-20_N	LC_DCDS	WS	N	21-May	12:10	G	4 x 2L		X	X	3.1
							#NAME?				
							#NAME?				
							#NAME?		190906	190908	
							#NAME?				
							#NAME?				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	21-May	Tyrone Hamilton	May 22/19 @ 10:00
			Nautilus - Burnaby	Q2-W3

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	May 21, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	WEEKLY_CHRONIC_05212019	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Richard Chea			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 4	Kate.Middleton@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 4	Don.Sacino@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	Jay.jones@teck.com	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number				
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED											Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								FIL:											
								PRESERV:											
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)								Temp °C
CM_MC1_WS_2019-05-21_N	CM_MC1	WS	n	5/21/2019	10:57	G	4x20L		X	X									0.1
CM_MC2_WS_2019-05-21_N	CM_MC2	WS	n	5/21/2019	10:19	G	5x20L		X	X	X								0.3
																			RD
RG_MIDAG_WS_2019-05-21_N	RG_MIDAG	WS	n	5/21/2019	9:35	G	2x20L			X	X								0.0
									190908	190908	190908								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Tyrone Hamilton	May 22/19 @ 10:00
			Nautilus - Burnaby	Q2-W3

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	KP/MC	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	5/21/2019 14:00:00
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190528CRN1B	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q1 Chronic Sampling			Lab Contact	Richard Chea			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email	Richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	8664 Commerce Court			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3				Imperial Square Lake City			Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00610856			
Postal Code	V1C 4C3	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED										Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								FILTERED	No	No	No							
								PRESERVED	No	No	No							
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	28-d H. azteca	7-d C dubia P/F	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)	30d Hyalella P/F			Temp °C
EV_HC1_WS_2019-05_WK4_N	EV_HC1	WS	N	5/28/2019	9:50	G	4x20L							4	\			10.9
EV_MC2_WS_2019-05_WK4_N	EV_MC2	WS	N	5/28/2019	11:20	G	4x20L							4	\			11.3
														190906	190908			
					Total		8											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphinia testing to occur at 20 degrees)	Jason Gravelle	28-May-19	Tyrone Hamilton Nautilus - Burnaby	May 29/19 @ 10:35 Q2-W4

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jason Gravelle	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature	Jason Gravelle	Date/Time	May 28, 2019
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190528-1401	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	chelsea.jensen@teck.com	X	X	X
								Email 4:	jared.cayenne@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	scott.roughead@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 6:	teckcoal@equisonline.com			X
Phone Number	1-250-865-5204			Phone Number	604-420-8773			PO number				

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	N	N	N									
								PRESERV.	NONE	NONE	NONE									
								ANALYSIS	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)									°C Temp
FR_FRABCH_WEK_2019-05-27_NP	FR_FRABCH	WS		2019/05/28	08:18	G	4x2L		X	X										8.6
FR_FRCP1_WEK_2019-05-27_N	FR_FRCP1	WS		2019/05/28	09:02	G	5x2L		X	X	X									9.5
FR_UFR1_WEK_2019-05-27_N	FR_UFR1	WS		2019/05/28	08:55	G	4x2L		X	X										7.8
									190906	190908	190904									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Jared Cayenne	May 28, 2019	Tyrone Hamilton	May 29/19 @ 10:35
			@ Nautilus - Burnaby	Q2-W4

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Jared Cayenne	Mobile #	2504219457
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	May 28, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q2 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Emma Marus			Site: leigh.stickney@teck.com	EQuIS:	GHO	
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commerce Court				*Yes* PDF	*Yes* Excel	
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	610307		

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
									72h E. subcapitata P/F	7d C.dubia P/F	28-d Hyallella P/F	30-d embryo EA P/F								Temp °C
GH_FR1_WS_2019-05-27_N	GH_FR1	WS	N	28-May-19	12 50	G	4x2L		x	x	x	x								11.1
GH_ER2_WS_2019-05-27_N	GH_ER2	WS	N	28-May-19	10 00	G	4x2L		x	x	x	x								10.4
GH_ERC_WS_2019-05-27_N	GH_ERC	WS	N	28-May-19	11 00	G	4x2L		x	x	x	x								10.1
											190908	190906								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				Tyrone Hamilton	May 29/19	@ 10:35
				Nautilus - Burnaby		

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID: 20190528 Chronic tox | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	Chris.Blurton@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			x
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00608154			
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS | ANALYSIS REQUESTED (Filtered - F; Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL.	PRESERV.	ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	Temp °C
LC_LCDSSLCC_WS_2019-05-27_N	LC_LCDSSLCC	WS	N	28-May	11:50	G	4 x 20L			X	X	8.2
LC_SLC_WS_2019-05-27_N	LC_SLC	WS	N	28-May	10:01	G	4 x 20L			X	X	6.5
LC_LC3_WS_2019-05-27_N	LC_LC3	WS	N	28-May	10:44	G	4 x 20L			X	X	8.2
LC_LC5_WS_2019-05-27_N	LC_LC5	WS	N	28-May	13:00	G	4 x 20L			X	X	7.5
LC_DCDS_WS_2019-05-27_N	LC_DCDS	WS	N	28-May	12:00	G	4 x 20L			X	X	7.4
										190906	190908	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	28-May	Tyrone Hamilton	May 29/19 @ 10:35
			Nautilus - Burnaby	Q2-W4

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	May 28, 2019

Teck

COC ID: WEEKLY_CHRONIC_05282019 | TURNAROUND TIME: Regular | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Richard Chea			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 4	Kate.Middleton@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 4	Don.Sacino@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	Jay.jones@teck.com	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number				
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS | ANALYSIS REQUESTED | Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIlt.	PRESERV.	ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)								Temp °C
CM_MC1_WS_2019-05-28_N	CM_MC1	WS	n	5/28/2019	10:38	G	4x20L			X	X									3.1
																				4.8
CM_MC2_WS_2019-05-28_N	CM_MC2	WS	n	5/28/2019	9:40	G	5x20L			X	X	X								3.5
RG_MIDAG_WS_2019-05-28_N	RG_MIDAG	WS	n	5/28/2019	9:00	G	2x20L				X	X								
										190906	190908	190904								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Tyrone Hamilton	May 29/19 @ 10:35
			Nautilus - Burnaby	Q2-W4

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	SH/KP	Mobile #	250 425 7518
Sampler's Signature		Date/Time	5/28/2019 14:00:00

Teck

COC ID:	20190604CRN1B	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q1 Chronic Sampling			Lab Contact	Richard Chea			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email	Richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	8664 Commerce Court			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3				Imperial Square Lake City			Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@sharepoint.teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00610356			
Postal Code	V1C 4C3	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED										Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								FILTERED	No	No	No							
								PRESERVED	No	No	No							
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	28-d H. azteca	7-d C.dubia P/F	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)				Temp °C
EV_HC1_WS_2019-06_MON_N	EV_HC1	WS	N	6/4/2019	9:00	G	1x20L							1				9.8
EV_MC2_WS_2019-06_MON_N	EV_MC2	WS	N	6/4/2019	11:30	G	1x20L							1				10.5
														190906				
					Total		2											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphinia testing to occur at 20 degrees) **20L as reqested by Carlie Meyer**	Jason Gravelle	3-Jun-19	Tyrone Hamilton Nautilus - Burnaby	~~Nautilus - Burnaby~~ June 5/19 @ 10:25 Q2-WS

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jason Gravelle	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	June 3, 2019
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190604-1418 | **TURNAROUND TIME:** | **RUSH:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	chelsea.jensen@teck.com	X	X	X
								Email 4:	jared.cayenne@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	scott.roughead@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 6:	teckcoal@equisonline.com			X
Phone Number	1-250-865-5204			Phone Number	604-420-8773			PO number				

SAMPLE DETAILS | **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)										Temp °C
								N	NONE											
FR_FRABCH_MON_2019-06-03_NP	FR_FRABCH	WS		2019/06/04	08:48	G	1x2L			1										12.8
FR_FRCP1_MON_2019-06-03_N	FR_FRCP1	WS		2019/06/04	11:14	G	1x2L			1										12.4
FR_UFR1_MON_2019-06-03_N	FR_UFR1	WS		2019/06/04	10:20	G	1x2L			1										12.6
										190906										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Jared Cayenne	June 4, 2019	Tyrone Hamilton	June 5/19 @ 10:22
			Nautilus - Burnaby	Q2-W5

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	jared Cayenne	Mobile #	2504219457
Sampler's Signature		Date/Time	June 4, 2019

Teck

COC ID:	Q2 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Emma Marus			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commerce Court				*Yes* PDF	*Yes* Excel	
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	610307		

SAMPLE DETAILS

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A 72h P. subcapitata P/F	#N/A 7d C.dubia P/F	#N/A 28-d Hyallella P/F	#N/A 30-d embryo EA P/F	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A Temp °C
GH_FR1_WS_2019-06-03_N	GH_FR1	WS	N	4-Jun-19	13:07	G	1x2L					x								
GH_ER2_WS_2019-06-03_N	GH_ER2	WS	N	4-Jun-19	9:54	G	1x2L					x								11.4
GH_ERC_WS_2019-06-03_N	GH_ERC	WS	N	4-Jun-19	11:40	G	1x2L					x								12.5
												190906								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
GH_FR1 arrived leaking				Tyrone Hamilton	June 5/19	@ 10:22
				Nautilus - Burnaby	Q2-WS	

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID: 20190604 Chronic tox | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	Chris.Blurton@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00608154			
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS | **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	PRESERV	ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)	ANALYSIS: 28-d Hyalella P/F	Temp °C
LC_LCDSSLCC_WS_2019-06-03_N	LC_LCDSSLCC	WS	N	4-Jun	9:30	G	1x2L 4L			X	X	9.6
LC_SLC_WS_2019-06-03_N	LC_SLC	WS	N	4-Jun	8:30	G	4			X	X	9.1
LC_LC3_WS_2019-06-03_N	LC_LC3	WS	N	4-Jun	9:15	G	4			X	X	10.8
LC_LC5_WS_2019-06-03_N	LC_LC5	WS	N	4-Jun	10:00	G	4			X	X	9.2
LC_DCDS_WS_2019-06-03_N	LC_DCDS	WS	N	4-Jun		G	4			X	X	9.5

190906

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	4-Jun	Tyrone Hamilton	June 5/19 @ 10:22
			Nautilus - Burnaby	Q2-W5

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	June 4, 2019

Teck

COC ID: WEEKLY_CHRONIC_06042019 | TURNAROUND TIME: Regular | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Richard Chea			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 4	Kate.Middleton@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 4	Don.Sacino@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	Jay.jones@teck.com	X	X	X
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number				
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS | ANALYSIS REQUESTED | Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)											Temp °C
CM_MC1_WS_2019-06-04_N	CM_MC1	WS	n	6/4/2019	9:27	G	1 x20L			X											9.7
CM_MC2_WS_2019-06-04_N	CM_MC2	WS	n	6/4/2019	8:50	G	1 x 20L			X											10.1
										190906											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Tyrone Hamilton	Nautilus - Burnaby
			June 5/19 @ 10:22	Q2-WS

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	SH/KP	Mobile #	250 425 7518
Sampler's Signature		Date/Time	6/4/2019 14:00:00

END OF REPORT

Third Quarter 2019
Nautilus Toxicity Testing on Elk Valley Samples with *Ceriodaphnia dubia*, *Pseudokirchneriella subcapitata*, *Hyalella azteca*, and *Pimephales promelas*

Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia*, *Pseudokirchneriella subcapitata*, *Hyalella azteca*, and *Pimephales promelas*

Third Quarter 2019

Final Report

January 29, 2020

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

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SIGNATURE PAGE

Report By:
Jeslin Wijaya, BSc
Laboratory Biologist

Reviewed By:
Melanie Gallant, PhD
Environmental Toxicologist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

SUMMARY

Summaries of sample information and toxicity test results from samples collected from the Elk Valley to meet requirements of BC Ministry of Environment and Climate Change Strategy permit number 107517 quarterly toxicity testing program in the third quarter of 2019 are provided in the tables below.

Sample and Test Type Information

Sample IDs	FR_UFR1 (site control), GH_ER2 (site control), CM_MC1 (site control), LC_SLC (site control), FR_FRCP1, FR_FRABCH, GH_FR1, GH_ERC, CM_MC2, EV_MC2 , EV_HC1, LC_DCDS, LC_LC3, LC_LC5, LC_LCDSSLCC, RG_MIDAG*
Sample collection dates	August 20, 27, September 3, 10, and 17, 2019
Sample receipt dates	One day after sample collection
Sample receipt temperatures	Ranged from 5.6 to 15.5°C
Test types	*Ceriodaphnia dubia* 7-d survival and reproduction#
	Pseudokirchneriella subcapitata 72-h growth inhibition
	Hyalella azteca 28-d survival and growth‡
	Pimephales promelas 32-d survival and growth

* Not tested with *P. subcapitata* and *P. promelas*

Test extended to 8 days to provide addition information on brooding pattern

‡ *Hyalella azteca* were tested in Q3, despite not being required by Permit 107517, due to failure of the test in Q2.

Summary of Results

Endpoint	Mean ± SD						
	Laboratory Control	Laboratory Control [+15 µg/L Cu]	Laboratory Control [+20 µg/L Cu]	FR_UFR1 (Site Control)	GH_ER2 (Site Control)	CM_MC1 (Site Control)	LC_SLC (Site Control)
C. dubia							
Survival (%)	100	NT	NT	100	90	100	80
Reproduction	21.4 ± 6.5	NT	NT	20.2 ± 5.7	21.6 ± 3.3	15.7 ± 6.1	15.5 ± 6.0 [β]
P. subcapitata							
Cell Yield (x 10^4 cells/mL)	49.6 ± 7.8	NT	NT	69.5 ± 6.6	45.6 ± 8.9 [α]	48.0 ± 8.6 [α]	51.4 ± 13.3 [α]
H. azteca							
Survival (%)	96.0 ± 5.5	NT	NT	92.0 ± 8.4	89.1 ± 19.2	86.0 ± 8.9	98.0 ± 4.5
Dry weight (mg)	0.46 ± 0.16	NT	NT	0.36 ± 0.11	0.40 ± 0.21	0.49 ± 0.20	0.50 ± 0.14
P. promelas							
Hatch (%)	100 ± 0.0	100 ± 0.0	100 ± 0.0	100	98.3 ± 3.3	98.3 ± 3.3	100
Survival (%)	91.7 ± 6.4	98.3 ± 3.3	96.7 ± 3.8	86.7 ± 12.2 [*]	68.3 ± 30.5 [*]	75.0 ± 18.4 [*]	61.7 ± 22.0 [*, α, #]
Biomass (mg)	2.44 ± 0.10	2.25 ± 0.24	2.43 ± 0.16	2.20 ± 0.08	2.00 ± 0.52	2.16 ± 0.22	1.52 ± 0.61 [*, α]
Length (mm)	10.4 ± 0.3	10.2 ± 0.2	10.2 ± 0.2	10.3 ± 0.4	10.6 ± 0.4	10.6 ± 0.6	9.7 ± 0.5 [β, #]
Normal Development (%)	98.3 ± 0.3	98.3 ± 0.3	100 ± 0.0	100 ± 0.0	100 ± 0.0	100 ± 0.0	100 ± 0.0

SD = Standard Deviation, NT=Not Tested
* Result was significantly lower than the laboratory control or results was significantly lower than 15 µg/L copper-treated laboratory control for fathead minnow
[∞] Result was significantly lower than the 20 µg/L copper-treated laboratory control for fathead minnow
[α] Result was significantly lower than the site control FR_UFR1
[β] Result was significantly lower than the site control GH_ER2
Result was significantly lower than the site control CM_MC1
[∂] Result was significantly lower than the site control LC_SLC

Summary of Results (continued)

Endpoint	Mean ± SD					
	FR_FRCP1	FR_FRABCH	GH_FR1	GH_ERC	CM_MC2	EV_MC2
C. dubia						
Survival (%)	90	100	100	90	80	100
Reproduction	16.1 ± 5.6 $^{\beta}$	17.9 ± 5.6	19.4 ± 2.5	22.0 ± 5.0	18.0 ± 4.1	20.5 ± 3.5
P. subcapitata						
Cell Yield (x 10^4 cells/mL)	34.5 ± 6.6 $^{*, \alpha, \#, \partial}$	27.0 ± 5.5 $^{*, \alpha, \beta, \#, \partial}$	26.0 ± 4.5 $^{*, \alpha, \beta, \#, \partial}$	56.2 ± 3.6 $^{\alpha}$	22.8 ± 3.4 $^{*, \alpha, \beta, \#, \partial}$	39.2 ± 5.4 $^{\alpha, \partial}$
H. azteca						
Survival (%)	92.0 ± 11.0	98.0 ± 4.5	96.0 ± 5.5	90.0 ± 12.2	86.0 ± 13.4	100.0 ± 0.0
Dry weight (mg)	0.34 ± 0.15	0.47 ± 0.12	0.51 ± 0.13	0.39 ± 0.20	0.27 ± 0.12 $^{*, \#, \partial}$	0.65 ± 0.05
P. promelas						
Hatch (%)	100 ± 0.0	98.3 ± 3.3	98.3 ± 3.3	98.3 ± 3.3	98.3 ± 3.3	98.3 ± 3.3
Survival (%)	61.7 ± 16.7 $^{\infty, \alpha}$	71.2 ± 23.8 $^{\infty}$	83.3 ± 17.6 $^{\infty}$	78.3 ± 10.0 *	26.7 ± 12.2 $^{\infty, \alpha, \beta, \#, \partial}$	75.0 ± 23.3 $^{\infty}$
Biomass (mg)	2.07 ± 0.19 $^{\infty}$	2.26 ± 0.08	2.31 ± 0.18	2.37 ± 0.14	1.36 ± 0.11 $^{\infty, \alpha, \beta, \#, \partial}$	2.16 ± 0.32
Length (mm)	11.1 ± 0.9	10.9 ± 1.2	10.4 ± 0.5	10.7 ± 0.4	13.0 ± 2.1	10.6 ± 0.8
Normal Development (%)	100 ± 0.0	100 ± 0.0	100 ± 0.0	100 ± 0.0	100 ± 0.0	100 ± 0.0

SD = Standard Deviation, NT=Not Tested
* Result was significantly lower than the laboratory control
$^{\alpha}$ Result was significantly lower than the site control FR_UFR1
$^{\beta}$ Result was significantly lower than the site control GH_ER2
$^{\#}$ Result was significantly lower than the site control CM_MC1
$^{\partial}$ Result was significantly lower than the site control LC_SLC

Summary of Results (continued)

Endpoint	Mean ± SD					
	EV_HC1	LC_DCDS	LC_LC3	LC_LC5	LC_LCDSSLCC	RG_MIDAG
C. dubia						
Survival (%)	70	90	100	80	80	90
Reproduction	16.8 ± 7.1	23.7 ± 3.4	22.4 ± 4.2	17.5 ± 7.5	19.7 ± 4.9	20.9 ± 5.6
P. subcapitata						
Cell Yield (x 10^4 cells/mL)	52.5 ± 3.9 $^{\alpha}$	58.5 ± 6.5	27.0 ± 3.6 $^{*, \alpha, \beta, \#, \partial}$	26.2 ± 1.5 $^{*, \alpha, \beta, \#, \partial}$	29.8 ± 3.3 $^{*, \alpha, \beta, \#, \partial}$	NT
H. azteca						
Survival (%)	84.0 ± 20.7	90.0 ± 10.0	72.0 ± 16.4 $^{*, \partial}$	78.0 ± 21.7 $^{\partial}$	86.0 ± 16.7	94.0 ± 5.5
Dry weight (mg)	0.31 ± 0.17 $^{\partial}$	0.30 ± 0.11 $^{\#, \partial}$	0.30 ± 0.12 $^{\partial}$	0.35 ± 0.19	0.23 ± 0.12 $^{*, \#, \partial}$	0.49 ± 0.26
P. promelas						
Hatch (%)	100 ± 0.0	98.3 ± 3.3	100 ± 0.0	100 ± 0.0	100 ± 0.0	NT
Survival (%)	80.0 ± 17.2 $^{\infty}$	73.3 ± 18.9 $^{\infty}$	91.7 ± 12.6	86.7 ± 9.4 $^{\infty}$	61.7 ± 11.4 $^{\infty, \alpha, \#}$	NT
Biomass (mg)	2.06 ± 0.33 $^{\infty}$	1.87 ± 0.33 $^{\infty, \alpha}$	2.32 ± 0.11	2.04 ± 0.13 $^{\infty, \alpha}$	1.79 ± 0.21 $^{\infty, \alpha, \partial}$	NT
Length (mm)	10.3 ± 0.2	10.0 ± 0.2 $^{\beta}$	10.7 ± 0.3	9.9 ± 0.5 $^{\beta}$	10.6 ± 0.6	NT
Normal Development (%)	100 ± 0.0	100 ± 0.0	100 ± 0.0	100 ± 0.0	96.4 ± 7.1	NT

SD = Standard Deviation, NT=Not Tested
* Result was significantly lower than the laboratory control; 20 µg/L copper-treated laboratory control for fathead minnow
$^{\infty}$ Result was significantly lower than the 20 µg/L copper-treated laboratory control for fathead minnow
$^{\alpha}$ Result was significantly lower than the site control FR_UFR1
$^{\beta}$ Result was significantly lower than the site control GH_ER2
$^{\#}$ Result was significantly lower than the site control CM_MC1
$^{\partial}$ Result was significantly lower than the site control LC_SLC

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on samples collected from various locations in the Elk Valley as part of a quarterly toxicity testing program required under BC Ministry of Environment and Climate Change Strategy permit number 107517.

Stations sampled in the third quarter of 2019 are shown in Figure 1 and align with the integrated chronic toxicity testing program, which was designed to eliminate redundancy between Permit 107517 Section 9.8 (ii) and Permit 106970 toxicity testing programs. However, *Hyalella azteca* were also tested in the third quarter due to failure of control performance of the test conducted in the previous quarter. The integrated program was approved by BC Ministry of Environment and Climate Change on March 4, 2019 (BC ENV 2019). Test species required to be tested quarterly include a cladoceran (*Ceriodaphnia dubia*) and a unicellular green alga (*Pseudokirchneriella subcapitata*). Tests are also required on a semi-annual basis using rainbow trout (*Oncorhynchus mykiss*; Q2 and Q4), an amphipod (*Hyalella azteca*; Q2 and Q4), and fathead minnow (*Pimephales promelas*; Q1 and Q3).

Water samples used for testing were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 5.6 to 15.5°C and were stored in the dark at 4 ± 2°C prior to testing. Table 1 summarizes the toxicity tests that were conducted on each sample as well as sample collection dates. Samples were collected weekly on the dates shown in Table 1 for the duration of the *H. azteca* and *P. promelas* tests. The *P. promelas* test was conducted at the Nautilus Environmental laboratory in Calgary, AB; the other toxicity tests were conducted at the Burnaby, BC location.

This report presents the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. Results of analytical chemistry that was performed on the samples tested in this program are uploaded by Teck to the Environmental Management System (EMS) database. Analytical samples were collected by Teck personnel at the same time as the samples collected for toxicity testing. The chain-of-custody forms are provided in Appendix E.

Figure 1. Chronic toxicity monitoring locations.

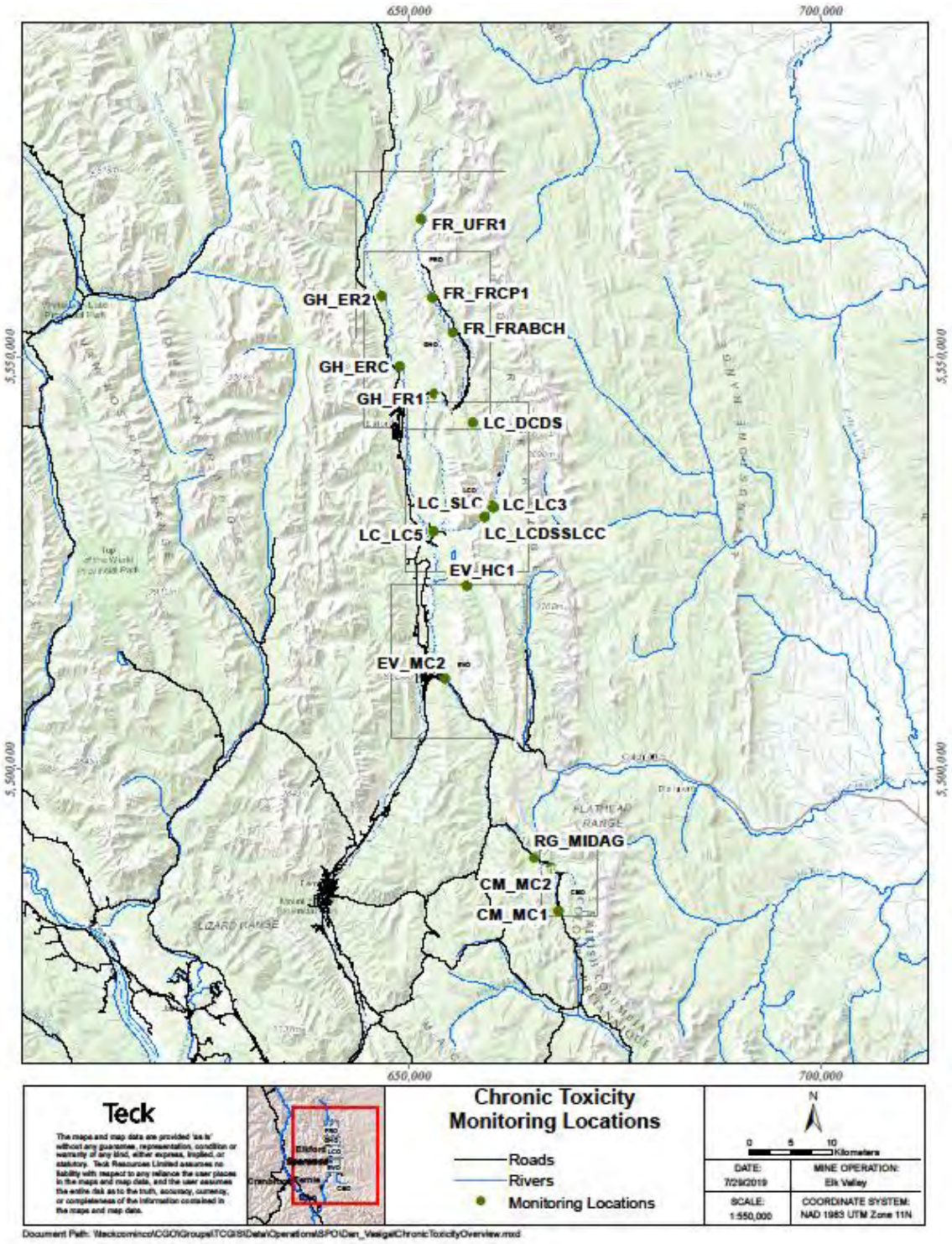

Table 1. Summary of toxicity testing program.

Sample ID	EMS Location ID	Species Tested	Sample Collection Dates
FR_UFR1 *	E300071	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
GH_ER2 *	E300090	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
CM_MC1 *	E258937	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
LC_SLC *	E282149	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
FR_FRCP1	E299272	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
FR_FRABCH	-	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
GH_FR1	E200028	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
GH_ERC	E258175	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
CM_MC2	E300091	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
EV_MC2	E102682	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
EV_HC1	E299270	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
LC_DCDS	E291569	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
LC_LC3	E297110	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
LC_LC5	0200389	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
LC_LCDSSLCC	E282149	*C. dubia*, *P. subcapitata*, *H. azteca* and *P. promelas*	August 20, 27, September 3, 10 and 17, 2019
RG_MIDAG	-	*C. dubia* and *H. azteca*	August 20, 27, September 3 and 10, 2019

***** Site water controls

2.0 METHODS

Methods for the toxicity tests using *C. dubia*, *P. subcapitata*, *H. azteca,* and *P. promelas* are summarized in Tables 2 through 5. Laboratory control water was 20% Perrier water prepared with deionized water for *C. dubia*; deionized water with supplemented nutrients for *P. subcapitata*; reconstituted water prepared by addition of reagent grade salts to dechlorinated Metro Vancouver municipal tap water for *H. azteca* according to a recipe provided in Environment Canada (2013); and dechlorinated City of Calgary municipal tap water with the addition of 4 mg/L potassium chloride (KCl) for *P. promelas*.

For *C. dubia*, the test protocol specifies that test duration must be 7 ± 1 day, with the test being terminated on the day that at least 60% of control organisms have produced three broods. To better evaluate potential effects on brood patterns, the laboratory was instructed to extend the test to 8 days, regardless of the timing of controls reaching 60% with three broods. However, the results reported here are based on the regular test method (which in this case, was based on Day 7 data) and the additional Day 8 data is available in Appendix A.

Low concentrations of chloride and bromide are known to impair the growth of *H. azteca*. Therefore, all of the site waters were supplemented with 25 mg/L chloride and 0.02 mg/L bromide using NaCl and NaBr, respectively, according to recommendations from the *Hyalella* Advisory Group (chaired by Chris Ingersoll, USGS) (Norberg-King et al., 2014). The laboratory control water contained approximately 75 mg/L chloride and 0.8 mg/L bromide, respectively.

Fathead minnows are known to be susceptible to adverse effects caused by fungi and microbes (Grothe and Johnson, 1996; Kszos et al., 1997; Downey et al. 2000). Results of toxicity tests and Toxicity Identification Evaluation efforts conducted in 2015 indicated that artefactual toxicity (*i.e.*, adverse effects that were not associated with toxicants in the sample) had occurred in fathead minnow tests using ambient water samples from the Elk Valley and amendment of the samples with a low dose of copper appeared to counteract the adverse effect. Consequently, samples were amended with copper for the *P. promelas* tests in order to reduce the potential adverse effects caused by fungi and microbes. Based on testing performed in 2018, four of the site water controls (FR_UFR1, GH_ER2, CM_MC1 and LC_SLC) and Elk River test site (GH_ERC) were tested using 15 µg/L copper. The rest of the samples were tested using 20 µg/L copper. Copper-amended control water treatments using the same concentrations were also evaluated to test whether copper itself caused any adverse response.

Statistical analyses were performed using CETIS (Tidepool Scientific Software, 2013), and involved comparison of results to both the laboratory and site water controls.

Table 2. Test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test species	*Ceriodaphnia dubia*
Organism source	In-house culture
Organism age	<24 hour old neonates, produced within a 12 hour window
Test type	Static-renewal
Test duration	8 days*
Test vessel	20-mL glass test tube
Test volume	15 mL
Test solution depth	10 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	10 per treatment
Number of organisms	1 per replicate
Control water	20% Perrier water and 80% deionized water + 5 µg/L Se and 2 µg/L vitamin B12
Test solution renewal	Daily (100% renewal)
Test temperature	25 ± 1°C
Feeding	Daily with *Pseudokirchneriella subcapitata* and TCC[1] (3:1 ratio)
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival and reproduction checked daily
Test protocol	Environment Canada (2007a), EPS 1/RM/21
Statistical software	CETIS Version 1.9.4
Test endpoints	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods; no ephippia present
Reference toxicant	Sodium chloride (NaCl)

* Test duration was extended to 8 days to provide additional information on the brood patterns. Summarized data and calculated endpoints are based on results from Day 7, according to the standard test procedure; however, all of the data through 8 days are provided in Appendix for subsequent evaluations.

[1]TCC = Trout Chow + cerophyl

Table 3. Test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test species	*Pseudokirchneriella subcapitata*, strain CPCC# 37
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Center, and originally isolated from Nivelta River, Norway.
Organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test concentrations	Full strength sample diluted to 95.2% (v/v) by addition of nutrients, plus laboratory control
Test replicates	4 per treatment; 8 for laboratory control and site controls
Number of organisms	10,000 cells/mL
Control water	Deionized water supplemented with nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature and pH measured at test initiation; pH of two control wells measured at test termination
Test protocol	Environment Canada (2007b), EPS 1/RM/25
Statistical software	CETIS Version 1.9.4
Test endpoints	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤ 20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc (added as $ZnSO_4$)

Table 4. Test conditions: *Hyalella azteca* survival and growth test.

Test species	*Hyalella azteca*
Organism source	Aquatic Research Organisms, NH
Organism age	7- to 8-days old
Test type	Static-renewal
Test duration	28 days
Test vessel	375-mL glass container
Test volume	300 mL
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	5 per treatment
Number of organisms	10 per replicate
Control water	Reconstituted water containing ~75 mg/L Cl and 0.8 mg/L Br (Environment Canada 2013). Samples were supplemented with 25 mg/L Cl and 0.02 mg/L Br.
Test solution renewal	Twice daily (~80% renewal)
Test temperature	23 ± 1°C
Feeding	1 mL of YCT daily to each container. Tetramin daily, with amounts increasing weekly: Week 1: 0.25 mg, Week 2: 0.5 mg, Week 3: 1 mg, Week 4: 1.5 mg in each test container.
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity measured upon arrival; hardness and alkalinity measured at test termination; total ammonia measured at test initiation and termination
Test protocol	Modified from US EPA (2000), as described in Norberg-King et al. (2014)
Statistical software	CETIS Version 1.9.4
Test endpoints	Survival and dry weight
Test acceptability criteria for controls	Mean control survival of ≥80% survival
Reference toxicant	Sodium chloride (NaCl)

Table 5. Test conditions: *Pimephales promelas* survival and growth test.

Test species	*Pimephales promelas*
Organism source	Aquatic Biosystems, CO
Organism age	<24 hours
Test type	Static-renewal
Test duration	From egg stage until 28 days post hatch
Test vessel	1-L glass jar
Test volume	1 L
Test concentrations	100% (undiluted) sample amended with 15 or 20 µg/L Cu, plus laboratory control and control amended with 15 or 20 µg/L Cu
Test replicates	4 per treatment
Number of organisms	10 per replicate
Control water	Dechlorinated City of Calgary municipal tapwater amended with 4 mg/L KCl.
Test solution renewal	Daily (80% renewal)
Test temperature	25 ± 1°C
Feeding	Twice a day, after hatch, with newly hatched brine shrimp (*Artemia* nauplii)
Light intensity	100 to 500 lux
Photoperiod	16 hours light / 8 hours dark
Aeration	None unless dissolved oxygen fell to less than 60% saturation
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity measured upon arrival; survival checked daily
Test protocol	US EPA (1996) and ASTM (2013)
Statistical software	CETIS Version 1.9.4
Test endpoints	Hatch, survival, length, biomass, normal development (which assesses incidence of deformities)
Test acceptability criteria for controls	>66% hatch, ≥70% post-hatch survival
Reference toxicant	Sodium chloride (NaCl)

3.0 RESULTS

3.1 *Ceriodaphnia dubia*

Results of the toxicity tests using *C. dubia* are provided in Table 6. The Fording River (FR_UFR1), Elk River (GH_ER2), Michel Creek (CM_MC1) and South Line Creek (LC_SLC) site water controls performed similarly to the laboratory control for this species, indicating that there were no adverse effects associated with the upstream Fording River, Elk River, Michel Creek and South Line Creek stations.

Survival in the samples tested ranged from 70 to 100%. Reproduction in the site water LC_SLC and sample FR_FRCP1 were statistically significantly lower compared to the site water GH_ER2. Reproduction in the remainder of the samples was not significantly reduced relative to the laboratory control or any of the four site water controls.

3.2 *Pseudokirchneriella subcapitata*

Results of the toxicity tests using *P. subcapitata* are provided in Table 7. The site water controls GH_ER2, CM_MC1 and LC_SLC performed similarly to the laboratory control, indicating that there were no adverse effects associated with these upstream site waters. Site water control FR_UFR1 produced 40% greater growth than the laboratory control. This finding is not unusual, since the higher ionic strength associated with the site water control would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water.

Seven of eleven samples tested exhibited significant reduction in cell yield relative to the laboratory control and some or all of the four site water controls. Growth reduction in these seven samples ranged between 40 and 54% compared to the laboratory control. Adverse effects on cell yield were observed in all samples tested relative to the site water control FR_UFR1, with the exception of sample LC_DCDS.

The results of the algal test were unusual compared to prior testing events, in which site water samples have typically exhibited increased growth relative to the laboratory control. There were no changes to methodology in the current test, and it is not known why the stimulation that was observed in site waters in prior rounds was not as apparent in the current test.

3.3 *Hyalella azteca*

Results of the toxicity tests using *H. azteca* are provided in Table 8. Survival in all four site water controls performed similarly to the laboratory control, indicating that there were no adverse effects associated with these upstream site waters. Significant reduction in survival relative to the laboratory control were observed in the sample LC_LC3 (25% reduction). Moreover, significant reduction relative to the site water control LC_SLC were observed in samples LC_LC3 and LC_LC5. Percent reduction ranged between 20.4 and 26.5%.

Adverse effects on dry weight were observed in samples CM_MC2 and LC_LCDSSLCC relative to the laboratory control, and site water controls CM_MC1 and LC_SLC. With the exception of sample LC_LC5, samples collected from the Line Creek Operations produced significant reduction in dry weight relative to the site water control LC_SLC. Samples LC_DCDS also exhibited significant dry weight reduction in comparison to the site water control CM_MC1.

3.4 *Pimephales promelas*

Results of the toxicity tests using *P. promelas* are provided in Table 9. Adverse effects on survival were observed in all site water controls relative to the copper-amended laboratory controls. Site water control LC_SLC also exhibited a significant reduction in biomass when compared to the laboratory control. No differences in hatch rate, length and normal development between site water controls and laboratory control were observed.

There were no adverse effects observed on hatch rate or normal development in any of the samples compared to the site water controls and copper-amended laboratory control. All samples, with the exception of LC_LC3, exhibited adverse effects on survival relative to the laboratory control with the same copper dose. Adverse effects on survival and biomass were observed in sample CM_MC2 and LC_LCDSSLCC compared to two or more of the site water controls. Samples FR_FRCP1, EV_HC1, LC_DCDS and LC_LC5 also exhibited statistically significant reduction in biomass relative to the laboratory control and/or site control FR_UFR1. Reductions in length relative to site control GH_ER2 were observed in samples LC_DCDS and LC_LC5.

Overall, standard deviations for survival in site controls were larger than in laboratory controls, indicating a larger between replicate variability in the site collected reference waters relative to the laboratory control. Higher between replicate variability was also observed in the site samples. In the case of GH_ER2 (replicate values for survival: 27%, 73%, 73% and 100%; mean ± SD 68.3 ± 30.5) and LC_DCDS (replicate values for survival: 47%, 87%, 87% and 100%; mean ± SD 73.3 ±

18.9) the high standard deviations and depressed means were caused by a particularly large adverse effect in one of the four test replicates.

Microbial growth was observed on the test organisms in samples FR_UFR1, FR_FRABCH, FR_FRCP1, CM_MC2 and LC_LCDSSLCC, indicating that Sporadic Mortality Phenomenon associated with microbial constituents in the samples likely occurred in these samples, despite addition of copper to the test solutions. The pattern of mortalities observed in these samples was also consistent with that conclusion, since there was only between 3.3 and 8.8% mortality in these samples in the 18 days of exposure following Day 14 of the test (i.e., the adverse effects occurred primarily in the first 14 days of exposure, which is consistent with that observed with Sporadic Mortality Phenomenon). For site controls GH_ER2, CM_MC1 and LC_SLC and for sites GH_ERC, EV_MC2, and EV HC1, there were no observations of microbial growth, and the mortalities occurred primarily after Day 14 of exposure. Thus, it is unlikely that adverse responses in these samples were caused by microbes.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Sample ID	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	21.4 ± 6.5
FR_UFR1 (Site Control)	100	20.2 ± 5.7
GH_ER2 (Site Control)	90	21.6 ± 3.3
CM_MC1 (Site Control)	100	15.7 ± 6.1
LC_SLC (Site Control)	80	15.5 ± 6.0 [β]
FR_FRCP1	90	16.1 ± 5.6 [β]
FR_FRABCH	100	17.9 ± 5.6
GH_FR1	100	19.4 ± 2.5
GH_ERC	90	22.0 ± 5.0
CM_MC2	80	18.0 ± 4.1
EV_MC2	100	20.5 ± 3.5
EV_HC1	70	16.8 ± 7.1
LC_DCDS	90	23.7 ± 3.4
LC_LC3	100	22.4 ± 4.2
LC_LC5	80	17.5 ± 7.5
LC_LCDSSLCC	80	19.7 ± 4.9
RG_MIDAG	90	20.9 ± 5.6

SD = Standard Deviation
[β] Result was significantly lower than site control GH_ER2

Table 7. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Sample ID	Cell Yield (x 10^4 cells/mL) (Mean ± SD)	Stimulation relative to laboratory control (%)
Laboratory Control	49.6 ± 7.8	-
FR_UFR1 (Site Control)	69.5 ± 6.6	40.0
GH_ER2 (Site Control)	45.6 ± 8.9 $^{\alpha}$	-
CM_MC1 (Site Control)	48.0 ± 8.6 $^{\alpha}$	-
LC_SLC (Site Control)	51.4 ± 13.3 $^{\alpha}$	3.6
FR_FRCP1	34.5 ± 6.6 $^{*, \alpha, \#, \partial}$	-
FR_FRABCH	27.0 ± 5.5 $^{*, \alpha, \beta, \#, \partial}$	-
GH_FR1	26.0 ± 4.5 $^{*,\alpha, \beta, \#, \partial}$	-
GH_ERC	56.2 ± 3.6 $^{\alpha}$	13.5
CM_MC2	22.8 ± 3.4 $^{*, \alpha, \beta, \#, \partial}$	-
EV_MC2	39.2 ± 5.4 $^{\alpha, \partial}$	-
EV_HC1	52.5 ± 3.9 $^{\alpha}$	5.9
LC_DCDS	58.5 ± 6.5	17.9
LC_LC3	27.0 ± 3.6 $^{*, \alpha, \beta, \#, \partial}$	-
LC_LC5	26.2 ± 1.5 $^{*, \alpha, \beta, \#, \partial}$	-
LC_LCDSSLCC	29.8 ± 3.3 $^{*, \alpha, \beta, \#, \partial}$	-

SD = Standard Deviation
* Result was significantly lower than the laboratory control
$^{\alpha}$ Result was significantly lower than the site control FR_UFR1
$^{\beta}$ Result was significantly lower than the site control GH_ER2
Result was significantly lower than the site control CM_MC1
$^{\partial}$ Result was significantly lower than the site control LC_SLC

Table 8. Results: *Hyalella azteca* survival and growth test.

Sample ID	(Mean ± SD)	
	Survival (%)	Dry weight (mg)
Laboratory Control	96.0 ± 5.5	0.46 ± 0.16
FR_UFR1 (Site Control)	92.0 ± 8.4	0.36 ± 0.11
GH_ER2 (Site Control)	89.1 ± 19.2	0.40 ± 0.21
CM_MC1 (Site Control)	86.0 ± 8.9	0.49 ± 0.20
LC_SLC (Site Control)	98.0 ± 4.5	0.50 ± 0.14
FR_FRCP1	92.0 ± 11.0	0.34 ± 0.15
FR_FRABCH	98.0 ± 4.5	0.47 ± 0.12
GH_FR1	96.0 ± 5.5	0.51 ± 0.13
GH_ERC	90.0 ± 12.2	0.39 ± 0.20
CM_MC2	86.0 ± 13.4	0.27 ± 0.12 *, #, ∂
EV_MC2	100.0 ± 0.0	0.65 ± 0.05
EV_HC1	84.0 ± 20.7	0.31 ± 0.17 ∂
LC_DCDS	90.0 ± 10.0	0.30 ± 0.11#, ∂
LC_LC3	72.0 ± 16.4 *, ∂	0.30 ± 0.12 ∂
LC_LC5	78.0 ± 21.7 ∂	0.35 ± 0.19
LC_LCDSSLCC	86.0 ± 16.7	0.23 ± 0.12 *, #, ∂
RG_MIDAG	94.0 ± 5.5	0.49 ± 0.26

SD = Standard Deviation
* Result was significantly lower than the laboratory control
# Result was significantly lower than the site control CM_MC1
∂ Result was significantly lower than the site control LC_SLC

Table 9. Results: *Pimephales promelas* survival and growth test.

Sample ID	(Mean ± SD)				
	Hatch (%)	Survival (%)	Biomass (mg)	Length (mm)	Normal development (%)
Laboratory Control	100.0 ± 0.0	91.7 ± 6.4	2.44 ± 0.10	10.4 ± 0.3	98.3 ± 0.3
Laboratory Control [+15 µg/L Cu]	100.0 ± 0.0	98.3 ± 3.3	2.25 ± 0.24	10.2 ± 0.2	98.3 ± 0.3
Laboratory Control [+20 µg/L Cu]	100.0 ± 0.0	96.7 ± 3.8	2.43 ± 0.16	10.2 ± 0.2	100.0 ± 0.0
FR_UFR1 (Site Control) [+15 µg/L Cu]	100.0 ± 0.0	86.7 ± 12.2 *	2.20 ± 0.08	10.3 ± 0.4	100.0 ± 0.0
GH_ER2 (Site Control) [+15 µg/L Cu]	98.3 ± 3.3	68.3 ± 30.5 *	2.00 ± 0.52	10.6 ± 0.4	100.0 ± 0.0
CM_MC1 (Site Control) [+15 µg/L Cu]	98.3 ± 3.3	75.0 ± 18.4 *	2.16 ± 0.22	10.6 ± 0.6	100.0 ± 0.0
LC_SLC (Site Control) [+15 µg/L Cu]	100.0 ± 0.0	61.7 ± 22.0 *, α, #	1.52 ± 0.61 *, α	9.7 ± 0.5 β, #	100.0 ± 0.0
FR_FRCP1 [+20 µg/L Cu]	100.0 ± 0.0	61.7 ± 16.7 ∞, α	2.07 ± 0.19 ∞	11.1 ± 0.9	100.0 ± 0.0
FR_FRABCH [+20 µg/L Cu]	98.3 ± 3.3	71.2 ± 23.8 ∞	2.26 ± 0.18	10.9 ± 1.2	100.0 ± 0.0
GH_FR1 [+20 µg/L Cu]	98.3 ± 3.3	83.3 ± 17.6 ∞	2.31 ± 0.18	10.4 ± 0.5	100.0 ± 0.0

SD = Standard Deviation
* Result was significantly lower than the 15 µg/L copper-treated laboratory control
∞ Result was significantly lower than the 20 µg/L copper-treated laboratory control
α Result was significantly lower than site control FR_UFR1
β Result was significantly lower than site control GH_ER2
Result was significantly lower than site control CM_MC1
∂ Result was significantly lower than the site control LC_SLC

Table 9. Results: *Pimephales promelas* survival and growth test (continued).

Sample ID	(Mean ± SD)				
	Hatch (%)	Survival (%)	Biomass (mg)	Length (mm)	Normal development (%)
GH_ERC [+15 µg/L Cu]	98.3 ± 3.3	78.3 ± 10.0 *	2.37 ± 0.14	10.7 ± 0.4	100.0 ± 0.0
CM_MC2 [+20 µg/L Cu]	98.3 ± 3.3	26.7 ± 12.2 ∞, α, β, #, ∂	1.36 ± 0.11 ∞, α, β, #, ∂	13.0 ± 2.1	100.0 ± 0.0
EV_MC2 [+20 µg/L Cu]	98.3 ± 3.3	75.0 ± 23.3 ∞	2.16 ± 0.32	10.6 ± 0.8	100.0 ± 0.0
EV_HC1 [+20 µg/L Cu]	100.0 ± 0.0	80.0 ± 17.2 ∞	2.06 ± 0.33 ∞	10.3 ± 0.2	100.0 ± 0.0
LC_DCDS [+20 µg/L Cu]	98.3 ± 3.3	73.3 ± 18.9 ∞	1.87 ± 0.33 ∞, α	10.0 ± 0.2 β	100.0 ± 0.0
LC_LC3 [+20 µg/L Cu]	100.0 ± 0.0	91.7 ± 12.6	2.32 ± 0.11	10.7 ± 0.3	100.0 ± 0.0
LC_LC5 [+20 µg/L Cu]	100.0 ± 0.0	86.7 ± 9.4 ∞	2.04 ± 0.13 ∞, α	9.9 ± 0.5 β	100.0 ± 0.0
LC_LCDSSLCC [+20 µg/L Cu]	100.0 ± 0.0	61.7 ± 11.4 ∞, α, #	1.79 ± 0.21 ∞, α, ∂	10.6 ± 0.6	96.4 ± 7.1

SD = Standard Deviation
* Result was significantly lower than the 15 µg/L copper-treated laboratory control
∞ Result was significantly lower than the 20 µg/L copper-treated laboratory control
α Result was significantly lower than site control FR_UFR1
β Result was significantly lower than site control GH_ER2
Result was significantly lower than site control CM_MC1
∂ Result was significantly lower than the site control LC_SLC

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the test protocols. Tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocol throughout the tests. There were no deviations from the test methodologies, other than the planned modification to the *H. azteca* method and addition of copper in the *P. promelas* tests, as described in Section 2.0. Uncertainty associated with the test is best described by the standard deviation around the mean.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. The *P. subcapitata* IC50 result of the reference toxicant test initiated on August 23, 2019 fell outside of two standard deviations of the historical mean by a small margin; this is expected to happen 5% of the time. An investigation occurred and all testing and culturing procedures were followed appropriately, and the result was considered to be acceptable. Results for the remainder of the tests fell within the acceptable range for organism performance of two standard deviations around the mean, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate. The reference toxicant tests were performed under the same conditions as those used for the samples.

Table 10. Reference toxicant test results.

Test species	Endpoint	Historical mean (2 SD Range)	CV (%)	Test date
C. dubia	Survival (LC50): 2.1 g/L NaCl	2.0 (1.8 – 2.2)	5	August 7, 2019
	Reproduction (IC50): 1.8 g/L NaCl	1.5 (1.0 – 2.3)	20	
P. subcapitata	Growth (IC50): 25.1 µg/L Zn	31.3 (25.7 – 38.0)	10	August 23, 2019
H. azteca	Survival (LC50): 6.9 g/L NaCl	5.8 (4.3 – 7.7)	15	August 22, 2019
P. promelas	Survival (LC50): 6.5 g/L NaCl	6.6 (4.1 – 10.5)	16	August 26, 2019
	Biomass (IC25): 4.6 g/L NaCl	3.9 (2.5 – 6.1)	15	

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration

5.0 REFERENCES

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APPENDIX A – *Ceriodaphnia dubia* toxicity test data

Ceriodaphnia dubia Summary Sheet

Client: Teck
Work Order No.: 191606

Start Date/Time: Aug 21/19 @ 1300h
Set up by: SSK

Sample Information:

Sample ID: Various (see below)
Sample Date: Aug 20/19
Date Received: Aug 21/19
Sample Volume: various

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: BBC80719A, BBC80819A, BBC81319A, BBC81519
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 28
Mortality (%) in previous 7 d: 2.5
Individual female # used ≥8 young on test day: BBC80719A (#1,3,6-8,16,17,19,20); BBC80819A (#1,2,4,7,9,10,11,13-20) BBC81319A (#6); BBC81519 (#82,83,85,88,89,91-95,97-100)

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd230
Stock Solution ID: 19NA01 (100g/L NaCl)
Date Initiated: Aug 07/19

7-d LC50 (95% CL): 2.1 (1.5 - 3.0) g/L NaCl
7-d IC50 (95% CL): ~~SSK~~ 1.8 (1.5 - 2.0) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.5-2.2) g/L NaCl CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.0-2.3) g/L NaCl CV (%): 20

Test Results:

	Survival (%)	Reproduction (Mean ± SD)
Negative Control	100	21.4 ± 6.5
FR_UFR1_MON_2019-08-20_N	100	20.2 ± 5.7
GH_ER2_WS_2019-08-20_N	90	21.6 ± 3.3
CM_MC1_WS_2019-08-20_N	100	15.7 ~~17.5~~ ± ~~4.8~~ 6.1
LC-SLC_WS_2019-08-20_N	80	15.5 ~~16.2~~ ± ~~6.8~~ 6.0 *
FR-FRABCH_MON_2019-08-20_N	100	17.9 ± 5.6
FR_FRCP1_MON_2019-08-20_N	90	16.1 ± 5.6 *
GH_FR1_WS_2019-08-20_N	100	19.4 ± 2.5
GH_ERC_WS_2019-08-20_N	90	22.0 ± 5.0

* indicates that reproduction was significantly lower than the site control GH_ER2

Reviewed by: [signature]
Date reviewed: Nov 6, 2019

Ceriodaphnia dubia Summary Sheet

Client: Teck
Work Order No.: 191606

Start Date/Time: Aug 21/19 @ 1300h
Set up by: SSK

Sample Information:

Sample ID: Various (see below)
Sample Date: Aug 20/19
Date Received: Aug 21/19
Sample Volume: various

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: BB080719A, BB080819A, BB081319A, BB081519
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 28
Mortality (%) in previous 7 d: 2.5
Individual female # used ≥8 young on test day: BB080719A(#1,3,6-8,16,17,19,20); BB080819A(#1,2,4,7,9,19,11,12-20) BB081319A(#6); BB081519(#82,83,85,88,89,91-95,97-100)

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd 230
Stock Solution ID: 19NaCl (100g/L NaCl)
Date Initiated: Aug 07/19

7-d LC50 (95% CL): 2.1 (1.5-3.0) g/L NaCL
7-d IC50 (95% CL): 1.8 (1.5-2.0) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.0-2.3) g/L NaCL CV (%): 20

Test Results:

	Survival (%)	Reproduction (Mean ± SD)
SSK Negative Control		±
CM_MC2_WS_2019-08-20_N	80	18.0 ± 4.1
EV_MC2_WS_2019-Q3_WK1_N	100	20.45 ± 3.5
EV_HCl_WS_2019-Q3_WK1_N	70	16.8 ± 7.1
LC_DCDS_WS_2019-08-19_N	90	23.7 ± 3.4
LC_LC3_WS_2019-08-19_N	100	22.4 ± 4.2
LC_LC5_WS_2019-08-19_N	80	17.5 ± 7.5
LC_LCDSSLCC_WS_2019-08-19_N	80	19.7 ± 4.9
RG_MIDAG_WS_2019-08-20_N	90	20.9 ± 5.6

Reviewed by: [signature]
Date reviewed: Nov 4, 2019

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 191606

Start Date & Time: Aug 21 19 @ 1300h
Stop Date & Time: Aug 29/19 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration: control	Days 0	1		2		3		4		5		6		7	NEW
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	
Temperature (°C)	25.0	25.0	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	25.0	25.0	25.0	25.0	25.0
DO (mg/L)	8.0	6.9	8.0	7.1	8.0	7.4	8.0	7.1	8.1	6.9	8.0	6.8	8.0	6.8	8.0
pH	8.2	7.8	8.1	7.8	8.1	7.8	8.2	7.8	8.2	7.6	8.2	7.5	8.2	7.6	8.2
Cond. (µS/cm)	214	215		215		214		212		215		215		—	216
Initials	SSK	SSK		SSK		^		^		SSK		SSK		MLF	

① Concentration: FR_UFR1	Days 0	1		2		3		4		5		6		7	NEW
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	
Temperature (°C)	25.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	6.9	8.2	7.3	8.1	7.1	7.9	7.0	8.0	~~4.5~~ ①	8.2	6.9	7.6	5.5	8.2
pH	8.3	8.0	8.3	8.0	8.3	8.0	8.3	8.0	8.3	7.7	8.2	7.6	8.0	7.6	8.1
Cond. (µS/cm)	320	322		324		321		322		321		324		—	321
Initials	SSK	MLF		MLF		^		^		MLF		MLF		MLF	

① 5.3

② Concentration: GH_ER2	Days 0	1		2		3		4		5		6		7	NEW
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	7.0	8.2	7.3	8.3	7.2	7.9	6.9	7.5	5.4	8.2	6.8	7.7	5.5	8.2
pH	8.2	8.0	8.3	8.0	8.2	8.0	8.3	7.9	8.2	7.7	8.1	7.6	8.1	7.6	8.0
Cond. (µS/cm)	286	287		289		289		290		287		290		—	286
Initials	SSK	MLF		MLF		^		^		MLF		MLF		MLF	

③ Concentration: CM_MC1	Days 0	1		2		3		4		5		6		7	NEW
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	6.9	8.2	7.3	8.3	7.1	7.8	6.7	7.8	~~4.5~~ ①	8.2	6.9	7.6	5.8	8.2
pH	8.1	8.0	8.3	8.0	8.2	8.0	8.2	7.9	8.2	7.7	8.2	7.6	8.0	7.6	8.1
Cond. (µS/cm)	295	294		294		289		289		293		296		—	292
Initials	SSK	MLF		MLF		^		^		MLF		MLF		MLF	

① 5.0

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	Control	FR_UFR1	GH_ER2	CM_MC1
Hardness*	100	100	190	150
Alkalinity*	92	158	140	150

* mg/L as CaCO3

Analysts: MLF, AWD, SSK
Reviewed by:
Date reviewed: NOV 1, 2019

Sample Description: ~~BBO80719A(#1,3,6-8,16,17,19,20); BBO80819A(#1,2,7,9,10,11,12-20)~~ ~~BBO80719A(#~~ clear, colourless, odourless, no particulates)

Comments: Broodboard Used: BB081519(#82,83,85,88,89,91,92,93,94 95,97-100); BBO81319A(#6) BBO80819A(#1,2,4,7,9-11,13-20); BBO80719A(#1,3,6,17,18,16,17,19,20)

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 191606

Start Date & Time: Aug 21/19 @ 1300h
Stop Date & Time: Aug 29/19 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration: Control	Day	1		2		3		4		5		6		7
	old/new init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.8													
pH	7.6													
Cond. (µS/cm)	217													
Initials	MLF													

① Concentration: FR-UFR1	Day	1		2		3		4		5		6		7
	old/new init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.2													
pH	7.8													
Cond. (µS/cm)	322													
Initials	MLF													

② Concentration: GH-ER2	Day	1		2		3		4		5		6		7
	old/new init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	5.8													
pH	7.7													
Cond. (µS/cm)	702													
Initials	MLF													

③ Concentration: CM-MC1	Day	1		2		3		4		5		6		7
	old/new init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	5.8													
pH	7.8													
Cond. (µS/cm)	304													
Initials	MLF													

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	Control	FR-UFR1	GH-ER2	CM-MC1
Hardness*	100	180	190	156
Alkalinity*	92	156	140	150

* mg/L as CaCO3

Analysts: MLF, AWD, SSK
Reviewed by: [illegible]
Date reviewed: Nov. 1, 2019

Sample Description: see Pg 1.

Comments: Broodboard Used: see Pg 1

~~Pg 2/6~~ SSK

Pg 3/10

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various
Work Order #: 191606

Start Date & Time: Aug 21/19 @ 1300h
Stop Date & Time: Aug 29/19 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

④ Concentration LC-SLC

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	7.0	8.2	7.2	8.2	7.1	7.9	7.0	7.8	5.5	8.2	7.0	7.6	5.5	8.0
pH	8.1	8.0	8.3	8.0	8.2	8.0	8.2	8.1	8.2	7.6	8.1	7.6	8.0	7.6	8.0
Cond. (µS/cm)	334	337		337		332		339		337		337		—	335
Initials	SSK	MLF		MLF		A		A		MLF		MLF		MLF	

⑤ Concentration FR_FRABCH

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	6.8	8.2	7.1	8.4	7.1	7.9	6.9	7.7	5.4	8.2	6.9	7.4	5.5	8.0
pH	8.0	8.0	8.3	8.1	8.2	8.0	8.2	8.0	8.2	7.9	8.0	7.8	8.1	7.8	8.1
Cond. (µS/cm)	901	871		868		873		871		875		874		—	874
Initials	SSK	MLF		MLF		A		A		MLF		MLF		MLF	

⑥ Concentration FR_FRCP1

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	6.9	8.2	7.2	8.3	7.1	7.8	6.8	7.8	5.7	8.2	7.1	7.5	5.5	8.1
pH	8.1	8.1	8.3	8.2	8.3	8.1	8.2	8.0	8.1	7.8	8.1	7.8	8.2	7.7	8.2
Cond. (µS/cm)	~~730~~ 732	726		727		727		728		727		727		—	725
Initials	SSK	MLF		MLF		A		A		MLF		MLF		MLF	

⑦ Concentration ~~MLE~~ GH-~~ERC~~ FR1

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	6.9	8.2	7.3	8.4	7.1	7.9	7.0	7.8	7.0	8.2	7.1	7.1	5.5	8.3
pH	8.2	8.1	8.3	8.2	8.3	~~8.2~~ 8.1	8.3	8.1	8.3	7.8	8.2	7.8	8.1	7.8	8.1
Cond. (µS/cm)	~~740~~ 746	735		735		731		734		736		740		—	737
Initials	SSK	MLF		MLF		A		A		MLF		MLF		MLF	

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ LC-SLC	FR_FRABCH	FR_FRCP1	GH-FR1
Hardness*	196	370	510	~~550~~ 530
Alkalinity*	141	224	198	~~536~~ 208

* mg/L as CaCO3

Analysts: MLF, AWD, SSK

Reviewed by:

Date reviewed: Nov. 1, 2019

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 191606

Start Date & Time: Aug 21/19 @ 1300h
Stop Date & Time: Aug 29/19 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

④ Concentration: LC-SLC

	Days													
	~~0~~ 8	1		2		3		4		5		6		7
	~~Init.~~ 24h	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.1													
pH	7.8													
Cond. (µS/cm)	338													
Initials	MLF													

⑤ Concentration: FR-FRABCH

	Days													
	~~0~~ 8	1		2		3		4		5		6		7
	~~Init.~~ 24h	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.0													
pH	8.0													
Cond. (µS/cm)	858													
Initials	MLF													

⑥ Concentration: FRC FR-FRCPI

	Days													
	~~0~~ 8	1		2		3		4		5		6		7
	~~Init.~~ 24h	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.0													
pH	7.9													
Cond. (µS/cm)	~~723~~													
Initials	MLF													

⑦ Concentration: GM-FRI

	Days													
	~~0~~ 8	1		2		3		4		5		6		7
	~~Init.~~ 24h	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.1													
pH	7.9													
Cond. (µS/cm)	730													
Initials	MLF													

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ LC-SLC	FR_FRABCH	FR_FRCPI	GM-FRI
Hardness*	186	570	510	~~208~~ 530
Alkalinity*	141	224	199	~~530~~ 208

* mg/L as CaCO3

Analysts: MLF, AWD, SSK
Reviewed by:
Date reviewed: Nov 1, 2019

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various
Work Order #: 191606

Start Date & Time: Aug 21/19 @ 1300h
Stop Date & Time: Aug 29/19 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(8) Concentration GH_ERC

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	6.9	8.2	7.2	8.4	7.0	7.9	7.0	7.7	7.0	8.2	7.0	8.0	5.5	8.2
pH	8.2	8.1	8.3	8.1	8.2	7.9	8.3	8.0	8.3	7.9	8.1	7.9	8.0	7.6	8.1
Cond. (µS/cm)	~~347~~ 320	312		311		309		311		312		312		—	309
Initials	SSK	MLF		MLF						MLF		MLF		MLF	

(9) Concentration CM_MC2

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	6.9	8.2	7.2	8.3	7.2	8.0	7.1	7.8	7.0	8.2	7.0	7.8	7.0	8.0
pH	8.2	8.2	8.3	8.1	8.2	8.1	8.3	8.1	8.2	7.8	8.3	7.8	8.1	7.9	8.2
Cond. (µS/cm)	967	948		950		946		950		956		958		—	953
Initials	SSK	MLF		MLF						MLF		MLF		MLF	

(10) Concentration EV_MC2

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	7.0	8.1	7.4	8.4	7.1	7.9	7.0	7.9	7.0	8.2	7.1	7.9	7.1	8.3
pH	8.2	8.1	8.3	8.1	8.3	8.1	8.3	8.0	8.3	7.8	8.2	7.8	8.0	7.8	8.1
Cond. (µS/cm)	579	559		561		560		562		564		559		—	556
Initials	SSK	MLF		MLF						MLF		MLF		MLF	

(11) Concentration EV_HC1

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	7.0	8.1	7.4	8.4	7.2	8.0	7.0	7.8	7.0	8.2	7.0	8.0	7.1	8.0
pH	8.2	8.1	8.3	8.2	8.3	8.2	8.3	8.1	8.2	7.8	8.2	7.7	8.0	7.8	8.1
Cond. (µS/cm)	699	678		680		682		686		674		681		—	676
Initials	SSK	MLF		MLF						MLF		MLF		MLF	

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control sw~~ GH_ERC	CM_MC2	EV_MC2	EV_HC1
Hardness*	~~5000~~ 402	580	380	330
Alkalinity*	160	216	190	190

* mg/L as CaCO3

Analysts: MLF, AWD, SSK
Reviewed by:
Date reviewed: NN - 1.20.20

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 191606

Start Date & Time: Aug 21/19 @ 1300h
Stop Date & Time: Aug 29/19 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(8) Concentration: GH-ERC

	Days													
	~~0~~ 8	1		2		3		4		5		6		7
	~~Initial~~	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.1													
pH	7.8													
Cond. (µS/cm)	317													
Initials	MLF													

(9) Concentration: CM-MC2

	Days													
	~~0~~ 8	1		2		3		4		5		6		7
	~~Initial~~	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.1													
pH	7.9													
Cond. (µS/cm)	940													
Initials	MLF													

(10) Concentration: EV-MC2

	Days													
	~~0~~ 8	1		2		3		4		5		6		7
	~~Initial~~	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	5.9													
pH	7.9													
Cond. (µS/cm)	592													
Initials	MLF													

(11) Concentration: EV-HCl

	Days													
	~~0~~ 8	1		2		3		4		5		6		7
	~~Initial~~	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.3													
pH	7.9													
Cond. (µS/cm)	676													
Initials	MLF													

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ GH-ERC	CM-MC1	EV-MC2	EV-HCl
Hardness*	182	500	380	530
Alkalinity*	160	216	190	198

* mg/L as CaCO3

Analysts: MLF, AWD, SSK
Reviewed by:
Date reviewed: Nov 1, 2019

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Pg 4/6 SSK

Pg 7/10

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various
Work Order #: 191606

Start Date & Time: Aug 21 19 @ 1300h
Stop Date & Time: Aug 29 19 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(12) Concentration LC-DCDS

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	25.0	25.0	24.0
DO (mg/L)	8.2	6.7	7.9	7.2	8.4	7.2	7.9	7.0	7.8	7.0	8.2	7.0	8.1	7.1	8.4
pH	8.4	8.1	8.3	8.0	8.3	8.1	8.3	8.1	8.3	7.6	8.3	7.7	8.0	7.7	8.0
Cond. (µS/cm)	483	486		485		479		480		484		487		—	485
Initials	SSK	MLF		MLF		A		A		MLF		MLF		MLF	

(13) Concentration LC-LC3

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	6.9	8.1	7.4	8.4	7.3	8.0	7.0	7.7	7.1	8.2	7.0	8.1	7.0	8.4
pH	7.9	8.0	8.2	8.1	8.2	8.1	8.4	8.2	8.3	7.9	7.9	7.9	8.0	7.9	8.0
Cond. (µS/cm)	945	941		939		931		935		941		937		—	936
Initials	SSK	MLF		MLF		A		A		MLF		MLF		MLF	

(14) Concentration LC-LC5

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	6.9	8.2	7.5	8.4	7.3	8.0	7.0	7.7	7.0	8.2	7.0	8.0	7.0	8.3
pH	8.2	8.1	8.4	8.2	8.3	8.2	8.3	8.1	8.3	7.8	8.3	7.8	8.1	7.9	8.2
Cond. (µS/cm)	694	670		670		675		671		670		671		—	670
Initials	SSK	MLF		MLF		A		A		MLF		MLF		MLF	

(15) Concentration LC-LCDSSLCC

	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0
DO (mg/L)	8.2	7.1	8.2	7.5	8.4	7.4	8.0	7.1	7.8	7.0	8.2	7.0	7.9	6.9	8.4
pH	8.1	8.1	8.3	8.1	8.3	8.2	8.3	8.2	8.3	7.8	8.2	7.8	8.1	7.8	8.1
Cond. (µS/cm) SSK 7440	~~000~~	731		732		728		731		733		733		~~733~~ —	733
Initials	SSK	MLF		MLF		A		A		MLF		MLF		MLF	

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ SSK	LC-LC3	LC-LC5	LC-LCDSSLCC
Hardness*	246	570	520	430
Alkalinity*	146	212	192	194

* mg/L as CaCO3

Analysts: MLF, AWD, SSK

Reviewed by:

Date reviewed: NOV. 1, 2019

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

4/6 SSK

Pg 8/10

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 191606

Start Date & Time: Aug 21/19 @ 1300h
Stop Date & Time: Aug 29/19 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(12)

Concentration	Days													
	~~0~~ 8	1		2		3		4		5		6		7
LC-DCDS	~~init.~~ OLD	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.0													
pH	7.8													
Cond. (µS/cm)	487													
Initials	MLF													

(13)

Concentration	Days													
	~~0~~ 8	1		2		3		4		5		6		7
LC-LC3	~~init.~~ OLD	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.0													
pH	7.9													
Cond. (µS/cm)	924													
Initials	MLF													

(14)

Concentration	Days													
	~~0~~ 8	1		2		3		4		5		6		7
LC-LC5	~~init.~~ OLD	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.2													
pH	7.9													
Cond. (µS/cm)	671													
Initials	MLF													

(15)

Concentration	Days													
	~~0~~ 8	1		2		3		4		5		6		7
LC-LCDSSLCC	~~init.~~ OLD	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.1													
pH	7.9													
Cond. (µS/cm)	728													
Initials	MLF													

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ LC-DCDS	LC-LC3	LC-LC5	LC-LCDSSLCC
Hardness*	246	570	520	430
Alkalinity*	146	212	192	194

* mg/L as CaCO3

Analysts: MLF, AWD, SSK

Reviewed by: [signature]

Date reviewed: NOV 1, 2019

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

~~Rg. 5/6~~ SSK

Rg 9/10

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various
Work Order #: 191606

Start Date & Time: Aug 21/19 @ 1300h
Stop Date & Time: Aug 29/19 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(16)

Concentration RG-MIDAG	Days													
	0	1		2		3		4		5		6		~~7~~
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ OLD / NEW
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0 / 24.0
DO (mg/L)	8.2	6.8	8.2	7.5	8.4	7.1	8.0	7.2	7.7	7.0	8.2	7.1	7.8	7.1 / 8.4
pH	8.2	8.0	8.3	8.1	8.3	8.2	8.3	8.1	8.2	7.7	8.2	7.8	8.0	7.8 / 8.0
Cond. (µS/cm)	561	563		564		564		563		563		565		— / 562
Initials	SSK	MLF		MLF				A		MLF		MLF		MLF

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	RG-MIDAG ~~Control~~ SSK			
Hardness*	400			
Alkalinity*	174			

* mg/L as CaCO3

Analysts: MLF, AWD, SSK

Reviewed by:

Date reviewed: Nov. 1, 2019

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Tech
Sample ID: Various
Work Order #: 1916006

Start Date & Time: Aug 21/19 @ 1300h
Stop Date & Time: Aug 29/19 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(16)

Concentration: RG-MIDAG	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	5.6													
pH	7.8													
Cond. (µS/cm)	565													
Initials	MLF													

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 2 Conductivity meter/probe: 1 / 1

	RG-MIDAG ~~Control~~ SK			
Hardness*	400			
Alkalinity*	174			

SSK

* mg/L as CaCO3

Analysts: MLF, AWD, SSK

Reviewed by: [signature]
Date reviewed: NN-1, 2019

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: TRCK
Sample ID: VARIOUS
Work Order: 1916006

Start Date & Time: Aug 21/19 @ 1300h
Stop Date & Time: Aug 29/19 @ 1200h
Set up by: SSK

(9) Concentration: CM - MC2

Days	A	B	C	D	E	F	G	H	I	J	Init
1	–	✓	✓	✓	✓	–	✓	✓	✓	✓	MF
2	✓	✓	✓	✓	✓	✓	✓	✓	–	–	MF
3	✓	✓	3	✓	✓	3	4	3	3	✓	A
4	6	3	✓	4	5	✓	6	4	5	5	A
5	6	4	6	5	9	8	✓	X	✓	✓	MF
6	9X	8✓	✓	9	9	10	11	1	11	3	MF
7	1	7	8	5	✓	✓	✓	1	6	7	MF
8	1	5	✓	✓	3	4	✓	1	–	✓	MF
Total	24X	14	17	18	23	21	22	10X	19	15	MF

(10) Concentration: EV - MC2

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	–	✓	✓	✓	✓	✓	✓	✓	–	MF
2	✓	–	–	✓	✓	–	✓	✓	✓	–	MF
3	3	3	3	2	2	3	✓	4	3	3	A
4	5	5	✓	6	✓	✓	5	5	5	6	A
5	✓	✓	6	✓	2	✓	10	✓	8	✓	MF
6	12	14	10	14	10	13	✓	9	8	14	MF
7	9	7	✓	✓	7	9	10	✓	✓	7	MF
8	5	✓	✓	4	✓	6	10	10	✓	X	MF
Total	20	22	19	22	15	25	25	18	16	23X	MF

(11) Concentration: EV - HC1

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MF
3	2	4	3	3	✓	✓	3	✓	3	2	A
4	5	6	6	6	3	7	6	4	5	4	A
5	✓	✓	✓	✓	X	X	✓	7	✓	✓	MF
6	8	11	13	13	|	|	12	14	14	7X	MF
7	8	7	9	12	|	|	10	11	13	|	MF
8	✓	✓	✓	✓	|	|	6	✓	✓	|	MF
Total	15	21	22	22	3X	7X	21	22	22	13	SSK

(12) Concentration: LC - DCD3

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MF
3	3	3	4	✓	4	4	2	✓	✓	A	A
4	6	6	5	5	✓	6	✓	6	3	A	A
5	✓	✓	✓	✓	6	8	✓	✓	10	8	MF
6	14	16	14	13	✓	11	11	11	✓	11	MF
7	8	8	8	X	12	9	✓	11	14	6	MF
8	✓	10	7	1	9	✓	9	8	6	✓	MF
Total	28	25	23	22	23	23	21	24	30	18	SSK

(13) Concentration: LC - LC3

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MF
2	✓	–	✓	✓	✓	✓	✓	–	✓	✓	MF
3	3	3	✓	✓	4	✓	2	3	3	2	A
4	✓	✓	3	5	5	3	5	✓	5	✓	A
5	✓	✓	7	10	✓	9	✓	✓	✓	11	MF
6	7	11	✓	13	12	✓	10	10	12	14	MF
7	6	9	12	✓	12	10	9	15	✓	8	MF
8	✓	✓	7	3	✓	5	✓	✓	✓	✓	MF
Total	16	23	22	28	21	22	17	28	20	27	SSK

(14) Concentration: LC - LC5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MF
3	3	3	✓	2	2	✓	3	✓	✓	A	A
4	✓	✓	5	✓	3	✓	4	3	3	A	A
5	✓	X	✓	✓	✓	6	3	8	8	2X	MF
6	9	|	10	14	13	13	14	✓	12	|	MF
7	9	|	8	✓	✓	7	✓	11	✓	|	MF
8	✓	|	5	✓	10	✓	5	10	7	|	MF
Total	21	3	23	21	15	22	19	23	23	5X	SSK

(15) Concentration: LC - LCDSSLCC

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MF
3	✓	3	✓	4	4	✓	✓	2	✓	4	A
4	3	5	4✓	6	✓	4✓	3✓	✓	3	5	A
5	✓	✓	✓	✓	✓	✓	✓	4	✓	✓	MF
6	12	15	13	12	14	10	11	✓	10	13	MF
7	10	5	10	✓	✓	✓	X	13	X	6	MF
8	✓	✓	✓	✓	9	9	1	✓	1	✓	MF
Total	25	23	27	22	28	14	14X	19	13X	22	SSK

(16) Concentration: RG - MIPAG

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MF
3	✓	✓	3✓	✓	2	3	2	3	2	3	A
4	5	5	✓	5✓	6	✓	✓	✓	✓	6	A
5	7	10	✓	✓	✓	10	5	✓	7	✓	MF
6	✓	✓	15	10	12	8	X	13	12	12	MF
7	7	8	10	11	12	✓	|	7	7	✓	MF
8	12	6	7✓	8	✓	10	|	✓	✓	2	MF
Total	19	23	28	26	20	21	7X	23	21	21	SSK

(17) Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.
① 10 lost in transfer SSK

Comments: 1. Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.
2. Ephippia present in Controls (Y), (N)?

Reviewed by: [signature]

Date reviewed: NOV. 1, 2019

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: TECK
Sample ID: various
Work Order: 191606

Start Date & Time: Aug 21/19 @ 1300h
Stop Date & Time: Aug 29/19 @ 1200h
Set up by: JSL

Concentration: control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
3	4	3	3	✓	4	3	4	3	3	✓	A
4	✓	✓	5	4	✓	✓	✓	5	✓	3	A
5	✓	✓	✓	6	✓	6	✓	✓	9	✓	MLF
6	✓	12	11	13	11	9	13	13	✓	6	MLF
7	4	11	11	✓	15	10	12	9	10	7	MLF
8	7	✓	✓	9	✓	✓	✓	8	12	12	MLF
Total	15	26	28	23	30	18	29	21	22	16	MLF

Concentration: FR-UFR1 (1)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
3	3	3	3	2	3	3	✓	4	4	✓	A
4	6	6	5	5	3	4	6	✓	✓	4	A
5	✓	✓	✓	✓	✓	✓	5	✓	✓	✓	MLF
6	12	10	10	13	2	9	12	✓	6	7	MLF
7	11	13	12	✓	6	11	✓	6	10	10	MLF
8	✓	3	12	8	✓	✓	10	10	✓	11	MLF
Total	21	19	27	26	11	24	23	10	20	21	MLF

Concentration: GH-FR2 (2)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
3	✓	✓	4	4	5	✓	✓	3	3	✓	A
4	3	3	✓	4	✓	2	2	5	✓	3	A
5	9	✓	6	✓	✓	8	✓	11	✓	✓	MLF
6	11	14	11	14	11	5X	13	10	11	13	MLF
7	✓	7	8	7	4	|	4	✓	9	8	MLF
8	12	✓	X	✓	✓	|	✓	8	✓	✓	MLF
Total	23	26	21	22	20	15X	19	26	23	21	MLF

Concentration: CM-MC1 (3)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
3	3	3	✓	4	4	✓	✓	4	✓	A	
4	5	4	✓	2	4	2	2	3	2	✓	A
5	✓	✓	5	✓	8	✓	4	7	✓	4	MLF
6	11	15	6	2	11	2	11	14	13	6	MLF
7	8	3	✓	✓	✓	10	✓	4	5	✓	MLF
8	✓	✓	11	7	✓	✓	9	✓	✓	✓	MLF
Total	19	22	11	4	16	11	17	23	22	18	MLF

Concentration: LC-SLC (4)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
3	✓	✓	3	2	3	✓	✓	✓	3	✓	A
4	3	3	5	4	✓	✓	2	2	✓	3	A
5	6	3X	✓	✓	3	8	✓	✓	2	X	MLF
6	12	|	10	11	13	10	10	9	11	|	MLF
7	✓	|	8	✓	9	✓	6	8	7	|	MLF
8	10		✓	10X	✓	6	✓	✓	✓		MLF
Total	21	6X	18	17X	19	18	18	19	16	3X	MLF

Concentration: FR-FRABCH (5)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
3	3	✓	3	✓	3	3	2	✓	2	2	A
4	6	8	✓	2	✓	5	4	5	8	6	A
5	✓	✓	✓	7	6	✓	✓	3	✓	✓	MLF
6	15	11	✓	9	9	11	13	11	10	12	MLF
7	✓	3	✓	✓	7	7	7	✓	6	3	MLF
8	✓	✓	5	3	✓	✓	✓	6	✓	✓	MLF
Total	24	22	23	18	18	19	19	19	17	20	MLF

Concentration: FR-FRCP1 (6)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
3	2	2	2	✓	✓	3	✓	3	2	3	A
4	4	✓	✓	3	✓	✓	3	✓	4	✓	A
5	✓	8	3	✓	8	X	4	5	✓	✓	MLF
6	12	13	13	12	8	|	8	13	12	9	MLF
7	7	✓	✓	✓	✓	|	✓	✓	4	✓	MLF
8	✓	✓	✓	✓	✓	|	4	✓	✓	4	MLF
Total	18	23	18	14	19	3X	15	21	18	12	MLF

Concentration: GH-FR1 (7)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
3	✓	2	2	2	2	✓	2	3	✓	✓	A
4	2	✓	✓	5X	✓	3	4	3	3	3	A
5	5X	A	A	✓	5X	✓	✓	2	✓	✓	MLF
6	7	12	10	13	12	12	13	11	14	5	MLF
7	7	7	8	11	2	8	✓	7	6	9	MLF
8	7	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
Total	16	21	20	20	19	23	19	16	23	17	MLF

Concentration: GH-ERC (8)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLF
3	✓	2	3	2	3	✓	3	✓	✓	✓	A
4	4	✓	✓	✓	✓	3	✓	5	4	4	A
5	✓	✓	✓	✓	2	7	7	✓	4	6	MLF
6	12	14	9	12	9	7X	11	12	9	10	MLF
7	12	13	12	10	9	|	9	9	5	✓	MLF
8	✓	5	✓	✓	X	|	✓	6	✓	12	MLF
Total	28	29	24	24	14	17X	21	26	17	20	MLF

Notes: X = mortality.

Comments: 1. Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

2. Ephippia present in Controls (Y), (N)?

Reviewed by: [signature]

Date reviewed: Nov. 1, 2019

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	control passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 7d survival rate	1
07-5708-1016	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.8752	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	RG_MIDAG passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	1.0000	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9997	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	CM_MC2 passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9999	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9981	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7794	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	CM_MC1 passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9991	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9964	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	LC_DCDS passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.4310	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.7029	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9938	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	FR_UFR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	EV_MC2 passed reproduction	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9693	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	GH_ERC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	GH_FR1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	control passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	CM_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	LC_LCDSSLCC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	RG_MIDAG passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	FR_FRCP1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	LC_LC5 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	CM_MC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	EV_MC2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	FR_FRABCH passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	GH_ER2 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	LC_LC3 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	EV_HC1 passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	LC_SLC passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	LC_DCDS passed reproduction	1
18-0230-7221	Reproduction	Steel Many-One Rank Sum Test	0.9023	FR_UFR1 passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

7d Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
control	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_UFR1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
GH_ER2		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
CM_MC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_SLC	XC	10	0.8000	0.4984	1.0000	0.0000	1.0000	0.1333	0.4216	52.70%	20.00%
FR_FRABCH		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_FRCP1		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
GH_FR1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
GH_ERC		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
CM_MC2		10	0.8000	0.4984	1.0000	0.0000	1.0000	0.1333	0.4216	52.70%	20.00%
EV_MC2		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
EV_HC1		10	0.7000	0.3544	1.0000	0.0000	1.0000	0.1528	0.4830	69.01%	30.00%
LC_DCDS		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
LC_LC3		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_LC5		10	0.8000	0.4984	1.0000	0.0000	1.0000	0.1333	0.4216	52.70%	20.00%
LC_LCDSSLCC		10	0.8000	0.4984	1.0000	0.0000	1.0000	0.1333	0.4216	52.70%	20.00%
RG_MIDAG		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%

Reproduction Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
control	N	10	21.4	16.77	26.03	8	30	2.045	6.467	30.22%	0.00%
FR_UFR1		10	20.2	16.11	24.29	10	27	1.806	5.712	28.28%	5.61%
GH_ER2		10	21.6	19.26	23.94	15	26	1.035	3.273	15.15%	-0.93%
CM_MC1		10	15.7	11.3	20.1	4	23	1.944	6.147	39.15%	26.64%
LC_SLC	XC	10	15.5	11.22	19.78	3	21	1.893	5.986	38.62%	27.57%
FR_FRABCH		10	17.9	13.88	21.92	3	24	1.779	5.626	31.43%	16.36%
FR_FRCP1		10	16.1	12.08	20.12	3	23	1.779	5.626	34.95%	24.77%
GH_FR1		10	19.4	17.58	21.22	16	23	0.8055	2.547	13.13%	9.35%
GH_ERC		10	22	18.4	25.6	14	29	1.592	5.033	22.88%	-2.80%
CM_MC2		10	18	15.08	20.92	10	23	1.291	4.082	22.68%	15.89%
EV_MC2		10	20.5	17.99	23.01	15	25	1.108	3.504	17.09%	4.21%
EV_HC1		10	16.8	11.76	21.84	3	22	2.23	7.052	41.98%	21.50%
LC_DCDS		10	23.7	21.27	26.13	18	30	1.075	3.401	14.35%	-10.75%
LC_LC3		10	22.4	19.36	25.44	16	28	1.343	4.248	18.96%	-4.67%
LC_LC5		10	17.5	12.11	22.89	3	23	2.382	7.531	43.04%	18.22%
LC_LCDSSLCC		10	19.7	16.19	23.21	13	27	1.55	4.9	24.87%	7.94%
RG_MIDAG		10	20.9	16.89	24.91	7	28	1.773	5.607	26.83%	2.34%

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC	XC	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000
LC_DCDS		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	8	26	21	23	30	18	29	21	22	16
FR_UFR1		21	19	27	26	11	24	23	10	20	21
GH_ER2		23	26	21	22	20	15	19	26	23	21
CM_MC1		19	22	11	4	16	11	17	23	22	12
LC_SLC	XC	21	6	18	17	19	18	18	19	16	3
FR_FRABCH		24	22	3	18	18	19	19	19	17	20
FR_FRCP1		18	23	18	14	19	3	15	21	18	12
GH_FR1		16	21	20	20	19	23	19	16	23	17
GH_ERC		28	29	24	24	14	17	21	26	17	20
CM_MC2		21	14	17	18	23	21	22	10	19	15
EV_MC2		20	22	19	22	15	25	25	18	16	23
EV_HC1		15	21	22	22	3	7	21	22	22	13
LC_DCDS		28	25	23	22	23	23	21	24	30	18
LC_LC3		16	23	22	28	21	22	17	28	20	27
LC_LC5		21	3	23	21	15	22	19	23	23	5
LC_LCDSSLCC		25	23	27	22	18	14	14	19	13	22
RG_MIDAG		19	23	28	26	20	21	7	23	21	21

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_SLC	XC	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC2		0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1	0/1
LC_DCDS		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Analyst: SMC QA: MN 6/19

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-8163-5002	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	05 Nov-19 15:36	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① control	01-7564-4530	21 Aug-19	21 Aug-19	13h	Teck Coal	Teck Coal Q3
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)		
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

① Control : Negative control (N) (20% Perrier)

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
control	Control water	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.2368	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.5000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.2368	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 10-8163-5002 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:36 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		EV_HC1	0.1053	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.2368	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.2368	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.5000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
control	N	10	0	10	1	0	0.0%
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		9	1	10	0.9	0.1	10.0%
CM_MC1		10	0	10	1	0	0.0%
LC_SLC		8	2	10	0.8	0.2	20.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		9	1	10	0.9	0.1	10.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		9	1	10	0.9	0.1	10.0%
CM_MC2		8	2	10	0.8	0.2	20.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		7	3	10	0.7	0.3	30.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		8	2	10	0.8	0.2	20.0%
LC_LCDSSLCC		8	2	10	0.8	0.2	20.0%
RG_MIDAG		9	1	10	0.9	0.1	10.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000
LC_DCDS		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

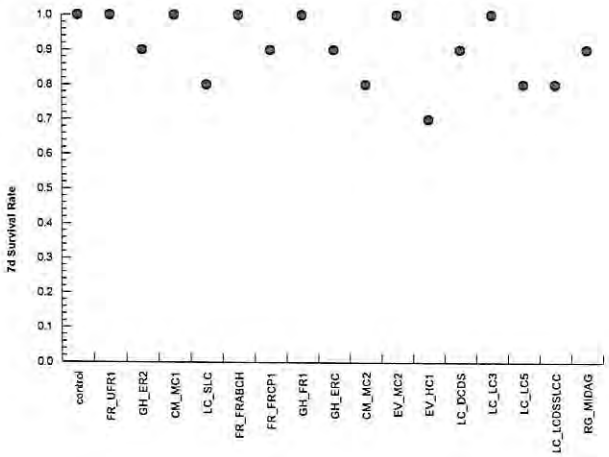
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 10-8163-5002 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:36 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC2		0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1	0/1
LC_DCDS		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-8873-2811	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	05 Nov-19 15:36	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① control	01-7564-4530	21 Aug-19	21 Aug-19	13h	Teck Coal	Teck Coal Q3
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)		
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

① control = Negative control (N) (20% Perrier)

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
control	Control water	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Fisher Exact/Bonferroni-Holm Test

Sample I vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control	FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
	GH_ER2	1.0000	Exact	1.0000	Non-Significant Effect
	CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
	LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
	FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
	FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
	GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
	GH_ERC	1.0000	Exact	1.0000	Non-Significant Effect
	CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
	EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect

NN-6/19

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 10-8873-2811 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:36 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
control	N	10	0	10	1	0	0.0%
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		9	1	10	0.9	0.1	10.0%
CM_MC1		10	0	10	1	0	0.0%
LC_SLC		8	2	10	0.8	0.2	20.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		9	1	10	0.9	0.1	10.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		9	1	10	0.9	0.1	10.0%
CM_MC2		8	2	10	0.8	0.2	20.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		7	3	10	0.7	0.3	30.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		8	2	10	0.8	0.2	20.0%
LC_LCDSSLCC		8	2	10	0.8	0.2	20.0%
RG_MIDAG		9	1	10	0.9	0.1	10.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000
LC_DCDS		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

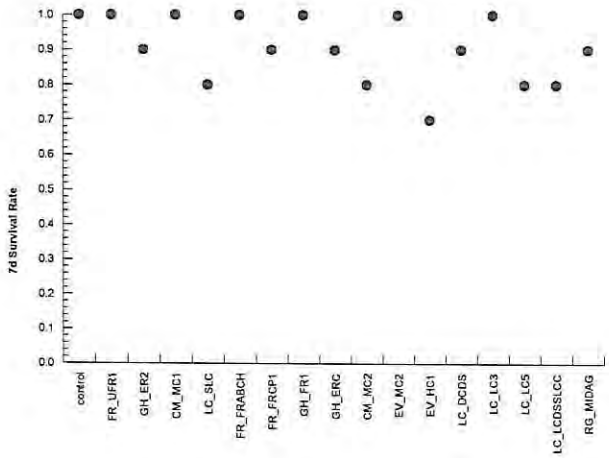
Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 10-8873-2811 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:36 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC2		0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1	0/1
LC_DCDS		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	07-5708-1016	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	05 Nov-19 15:36	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 07-5708-1016 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:36 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	XC	10	0	10	1	0	0.0%
GH_ER2		9	1	10	0.9	0.1	10.0%
CM_MC1		10	0	10	1	0	0.0%
LC_SLC		8	2	10	0.8	0.2	20.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		9	1	10	0.9	0.1	10.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		9	1	10	0.9	0.1	10.0%
CM_MC2		8	2	10	0.8	0.2	20.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		7	3	10	0.7	0.3	30.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		8	2	10	0.8	0.2	20.0%
LC_LCDSSLCC		8	2	10	0.8	0.2	20.0%
RG_MIDAG		9	1	10	0.9	0.1	10.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000
LC_DCDS		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

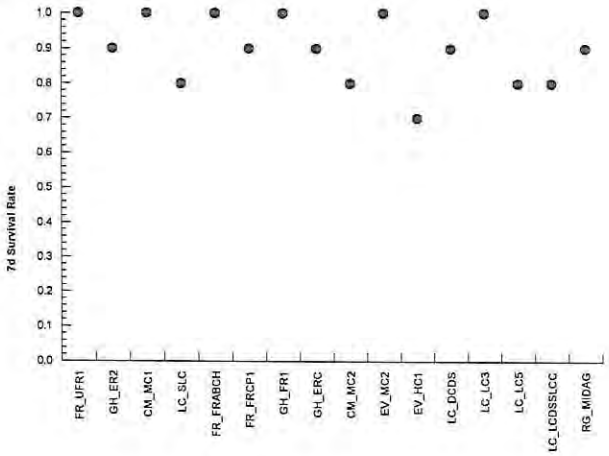
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 07-5708-1016 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:36 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
GH_ER2		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC2		0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1	0/1
LC_DCDS		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	08-7055-0219	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	05 Nov-19 15:36	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR-UFR1, GH_ER2, CM-MC1 & LC-SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.2368	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.5000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.2368	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.1053	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 08-7055-0219 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:36 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	0.2368	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.2368	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.5000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	XC	10	0	10	1	0	0.0%
GH_ER2		9	1	10	0.9	0.1	10.0%
CM_MC1		10	0	10	1	0	0.0%
LC_SLC		8	2	10	0.8	0.2	20.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		9	1	10	0.9	0.1	10.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		9	1	10	0.9	0.1	10.0%
CM_MC2		8	2	10	0.8	0.2	20.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		7	3	10	0.7	0.3	30.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		8	2	10	0.8	0.2	20.0%
LC_LCDSSLCC		8	2	10	0.8	0.2	20.0%
RG_MIDAG		9	1	10	0.9	0.1	10.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000
LC_DCDS		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

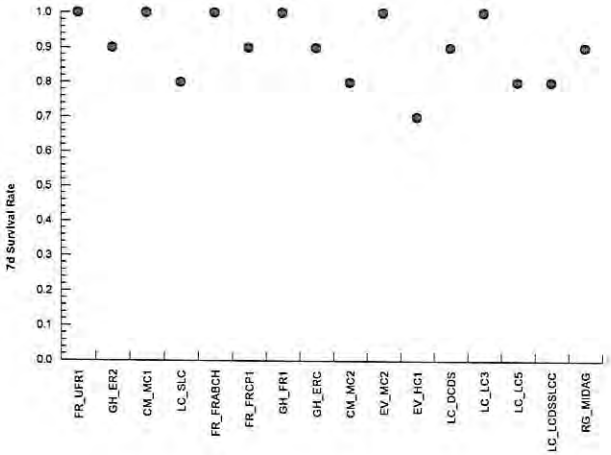
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 08-7055-0219 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:36 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
GH_ER2		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC2		0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1	0/1
LC_DCDS		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Graphics



Analyst: SWC QA: NN-6/19

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-5363-5512	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	05 Nov-19 15:38	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1 & LC-SLC are site controls

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.5000	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.8947	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.5000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.7632	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.5000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.7632	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.8947	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.9567	Exact	0.9567	Non-Significant Effect
		LC_DCDS	0.7632	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.5000	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 03-5363-5512 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:38 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	0.8947	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.8947	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.7632	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2	XC	9	1	10	0.9	0.1	10.0%
CM_MC1		10	0	10	1	0	0.0%
LC_SLC		8	2	10	0.8	0.2	20.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		9	1	10	0.9	0.1	10.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		9	1	10	0.9	0.1	10.0%
CM_MC2		8	2	10	0.8	0.2	20.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		7	3	10	0.7	0.3	30.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		8	2	10	0.8	0.2	20.0%
LC_LCDSSLCC		8	2	10	0.8	0.2	20.0%
RG_MIDAG		9	1	10	0.9	0.1	10.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2	XC	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000
LC_DCDS		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

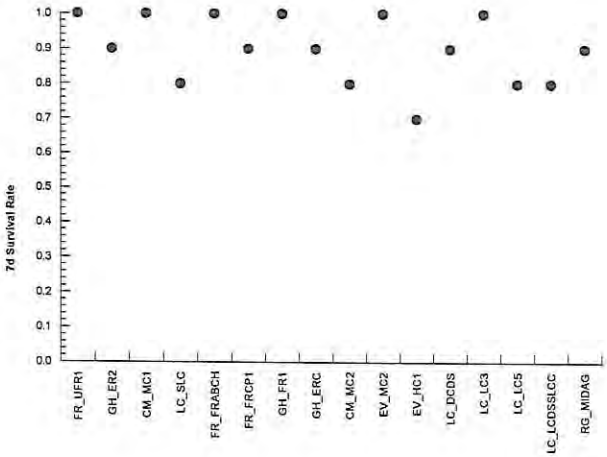
Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID: 03-5363-5512 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:38 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC2		0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1	0/1
LC_DCDS		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	08-1515-3341	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	05 Nov-19 15:38	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
②FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
②GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
②CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
②LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1, & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.5000	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.7632	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.7632	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.2910	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.7632	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect

Analyst: MC QA: NN 6/19

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 08-1515-3341 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:38 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.5000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.7632	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2	XC	9	1	10	0.9	0.1	10.0%
CM_MC1		10	0	10	1	0	0.0%
LC_SLC		8	2	10	0.8	0.2	20.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		9	1	10	0.9	0.1	10.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		9	1	10	0.9	0.1	10.0%
CM_MC2		8	2	10	0.8	0.2	20.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		7	3	10	0.7	0.3	30.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		8	2	10	0.8	0.2	20.0%
LC_LCDSSLCC		8	2	10	0.8	0.2	20.0%
RG_MIDAG		9	1	10	0.9	0.1	10.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2	XC	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000
LC_DCDS		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

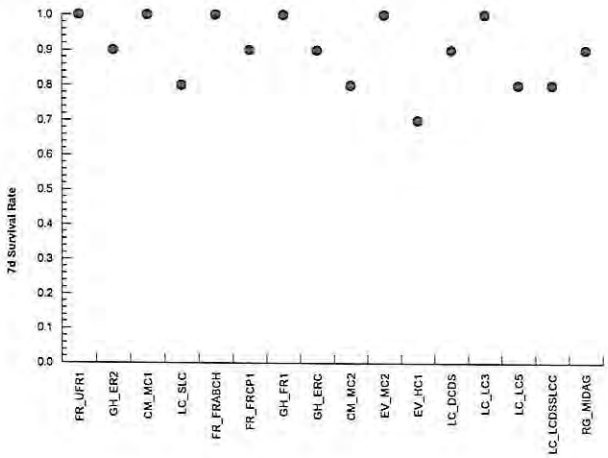
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 08-1515-3341 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:38 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC2		0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1	0/1
LC_DCDS		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-5454-1510	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	05 Nov-19 15:39	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.5000	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.2368	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.5000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.2368	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.1053	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect

Analyst: SSC QA: NOV. 6/19

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 00-5454-1510 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:39 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	0.2368	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.2368	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.5000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		9	1	10	0.9	0.1	10.0%
CM_MC1	XC	10	0	10	1	0	0.0%
LC_SLC		8	2	10	0.8	0.2	20.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		9	1	10	0.9	0.1	10.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		9	1	10	0.9	0.1	10.0%
CM_MC2		8	2	10	0.8	0.2	20.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		7	3	10	0.7	0.3	30.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		8	2	10	0.8	0.2	20.0%
LC_LCDSSLCC		8	2	10	0.8	0.2	20.0%
RG_MIDAG		9	1	10	0.9	0.1	10.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000
LC_DCDS		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

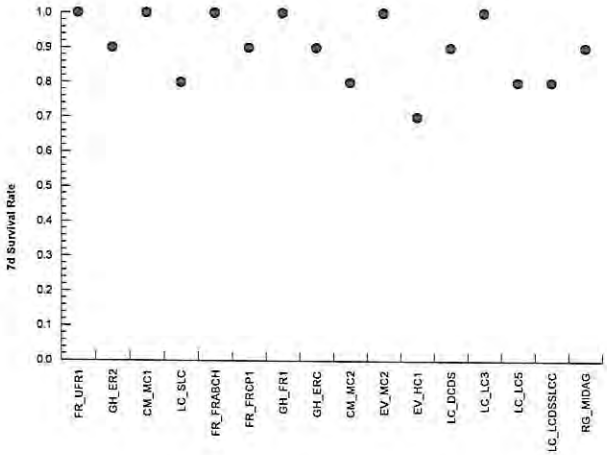
Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 00-5454-1510 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:39 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC2		0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1	0/1
LC_DCDS		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-9167-6783	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	05 Nov-19 15:39	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	1.0000	Exact	1.0000	Non-Significant Effect
		CM_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 00-9167-6783 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:39 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		9	1	10	0.9	0.1	10.0%
CM_MC1	XC	10	0	10	1	0	0.0%
LC_SLC		8	2	10	0.8	0.2	20.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		9	1	10	0.9	0.1	10.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		9	1	10	0.9	0.1	10.0%
CM_MC2		8	2	10	0.8	0.2	20.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		7	3	10	0.7	0.3	30.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		8	2	10	0.8	0.2	20.0%
LC_LCDSSLCC		8	2	10	0.8	0.2	20.0%
RG_MIDAG		9	1	10	0.9	0.1	10.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000
LC_DCDS		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

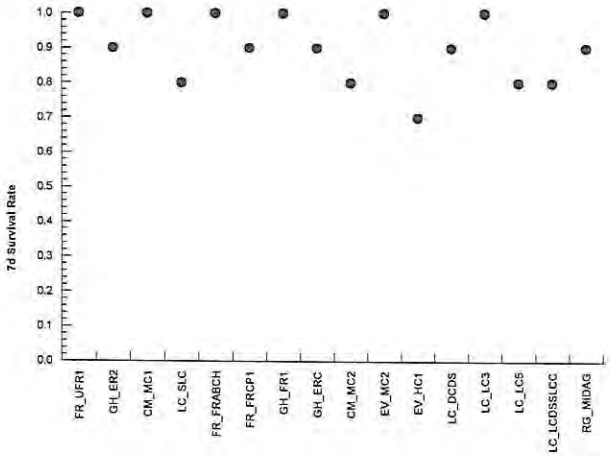
Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 00-9167-6783 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:39 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC2		0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1	0/1
LC_DCDS		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Graphics



Analyst: SMC QA: ND 6/19

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	18-7905-9330	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	05 Nov-19 15:41	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
②FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
②GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
②CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
②LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.8947	Exact	1.0000	Non-Significant Effect
		CM_MC1	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.8947	Exact	1.0000	Non-Significant Effect
		GH_FR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.8947	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.7090	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.5000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.8947	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 18-7905-9330 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:41 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	0.7090	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.7090	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.8947	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		9	1	10	0.9	0.1	10.0%
CM_MC1		10	0	10	1	0	0.0%
LC_SLC	XC	8	2	10	0.8	0.2	20.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		9	1	10	0.9	0.1	10.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		9	1	10	0.9	0.1	10.0%
CM_MC2		8	2	10	0.8	0.2	20.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		7	3	10	0.7	0.3	30.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		8	2	10	0.8	0.2	20.0%
LC_LCDSSLCC		8	2	10	0.8	0.2	20.0%
RG_MIDAG		9	1	10	0.9	0.1	10.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC	XC	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000
LC_DCDS		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

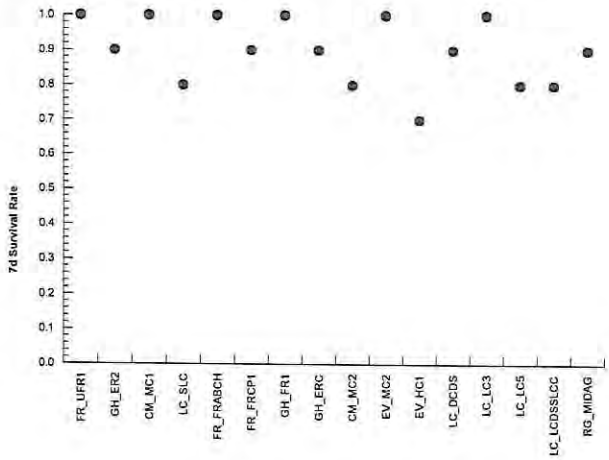
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 18-7905-9330 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:41 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_SLC	XC	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC2		0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1	0/1
LC_DCDS		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-3636-0105	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	05 Nov-19 15:41	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	0.2368	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.2368	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.2368	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.5000	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.2368	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.7090	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.2368	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.8483	Exact	0.8483	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.2368	Exact	1.0000	Non-Significant Effect

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 13-3636-0105 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:41 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC5	0.7090	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.7090	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.5000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		10	0	10	1	0	0.0%
GH_ER2		9	1	10	0.9	0.1	10.0%
CM_MC1		10	0	10	1	0	0.0%
LC_SLC	XC	8	2	10	0.8	0.2	20.0%
FR_FRABCH		10	0	10	1	0	0.0%
FR_FRCP1		9	1	10	0.9	0.1	10.0%
GH_FR1		10	0	10	1	0	0.0%
GH_ERC		9	1	10	0.9	0.1	10.0%
CM_MC2		8	2	10	0.8	0.2	20.0%
EV_MC2		10	0	10	1	0	0.0%
EV_HC1		7	3	10	0.7	0.3	30.0%
LC_DCDS		9	1	10	0.9	0.1	10.0%
LC_LC3		10	0	10	1	0	0.0%
LC_LC5		8	2	10	0.8	0.2	20.0%
LC_LCDSSLCC		8	2	10	0.8	0.2	20.0%
RG_MIDAG		9	1	10	0.9	0.1	10.0%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC	XC	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
FR_FRABCH		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
CM_MC2		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	1.0000	1.0000	1.0000	0.0000
LC_DCDS		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LC5		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000

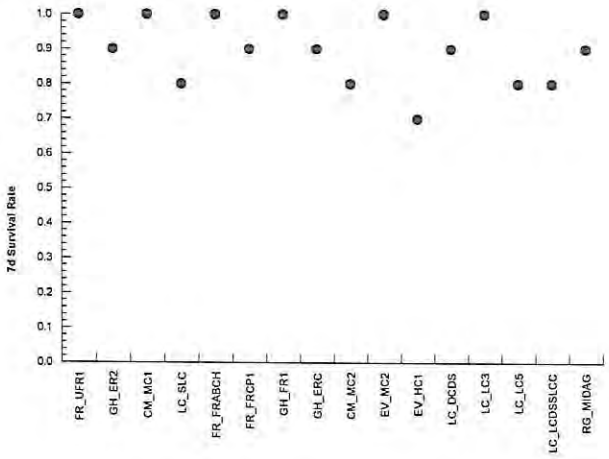
Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 13-3636-0105 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 05 Nov-19 15:41 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_SLC	XC	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
FR_FRABCH		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
CM_MC2		0/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
EV_HC1		1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1	1/1	0/1
LC_DCDS		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LC5		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-6552-3556	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:21	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① control	01-7564-4530	21 Aug-19	21 Aug-19	13h	Teck Coal	Teck Coal Q3
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)		
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

① control = lab control (Negative control) (20% Perrier)

② FR_UFR1, GH_ER2, CM_MC1 + LC_SLC are site controls

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
control	Control water	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 13-6552-3556 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 04 Nov-19 15:21 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	28.81%
		GH_ER2 passed reproduction	28.81%
		CM_MC1 passed reproduction	28.81%
		LC_SLC passed reproduction	28.81%
		FR_FRABCH passed reproduction	28.81%
		FR_FRCP1 passed reproduction	28.81%
		GH_FR1 passed reproduction	28.81%
		GH_ERC passed reproduction	28.81%
		CM_MC2 passed reproduction	28.81%
		EV_MC2 passed reproduction	28.81%
		EV_HC1 passed reproduction	28.81%
		LC_DCDS passed reproduction	28.81%
		LC_LC3 passed reproduction	28.81%
		LC_LC5 passed reproduction	28.81%
		LC_LCDSSLCC passed reproduction	28.81%
		RG_MIDAG passed reproduction	28.81%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	100	70	3	18	CDF	0.8611	Non-Significant Effect
		GH_ER2	103.5	70	4	18	CDF	0.9223	Non-Significant Effect
		CM_MC1	82	70	3	18	CDF	0.2692	Non-Significant Effect
		LC_SLC	76	70	3	18	CDF	0.1208	Non-Significant Effect
		FR_FRABCH	86.5	70	2	18	CDF	0.4228	Non-Significant Effect
		FR_FRCP1	79	70	3	18	CDF	0.1857	Non-Significant Effect
		GH_FR1	89	70	3	18	CDF	0.5162	Non-Significant Effect
		GH_ERC	105	70	3	18	CDF	0.9412	Non-Significant Effect
		CM_MC2	85.5	70	4	18	CDF	0.3865	Non-Significant Effect
		EV_MC2	97.5	70	4	18	CDF	0.8013	Non-Significant Effect
		EV_HC1	87	70	2	18	CDF	0.4413	Non-Significant Effect
		LC_DCDS	118	70	5	18	CDF	0.9976	Non-Significant Effect
		LC_LC3	107	70	4	18	CDF	0.9606	Non-Significant Effect
		LC_LC5	92	70	3	18	CDF	0.6270	Non-Significant Effect
		LC_LCDSSLCC	96	70	3	18	CDF	0.7591	Non-Significant Effect
		RG_MIDAG	101.5	70	3	18	CDF	0.8904	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1016.35	63.5221	16	2.276	0.0052	Significant Effect
Error	4269.3	27.9039	153			
Total	5285.65		169			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	22.02	32	0.1424	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9308	0.9786	2.8E-07	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-6552-3556	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:21	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

Reproduction Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
control	N	10	21.4	16.77	26.03	21.5	8	30	2.045	30.22%	0.00%
FR_UFR1		10	20.2	16.11	24.29	21	10	27	1.806	28.28%	5.61%
GH_ER2		10	21.6	19.26	23.94	21.5	15	26	1.035	15.15%	-0.93%
CM_MC1		10	15.7	11.3	20.1	16.5	4	23	1.944	39.15%	26.64%
LC_SLC		10	15.5	11.22	19.78	18	3	21	1.893	38.62%	27.57%
FR_FRABCH		10	17.9	13.88	21.92	19	3	24	1.779	31.43%	16.36%
FR_FRCP1		10	16.1	12.08	20.12	18	3	23	1.779	34.95%	24.77%
GH_FR1		10	19.4	17.58	21.22	19.5	16	23	0.8055	13.13%	9.35%
GH_ERC		10	22	18.4	25.6	22.5	14	29	1.592	22.88%	-2.80%
CM_MC2		10	18	15.08	20.92	18.5	10	23	1.291	22.68%	15.89%
EV_MC2		10	20.5	17.99	23.01	21	15	25	1.108	17.09%	4.21%
EV_HC1		10	16.8	11.76	21.84	21	3	22	2.23	41.98%	21.50%
LC_DCDS		10	23.7	21.27	26.13	23	18	30	1.075	14.35%	-10.75%
LC_LC3		10	22.4	19.36	25.44	22	16	28	1.343	18.96%	-4.67%
LC_LC5		10	17.5	12.11	22.89	21	3	23	2.382	43.04%	18.22%
LC_LCDSSLCC		10	19.7	16.19	23.21	20.5	13	27	1.55	24.87%	7.94%
RG_MIDAG		10	20.9	16.89	24.91	21	7	28	1.773	26.83%	2.34%

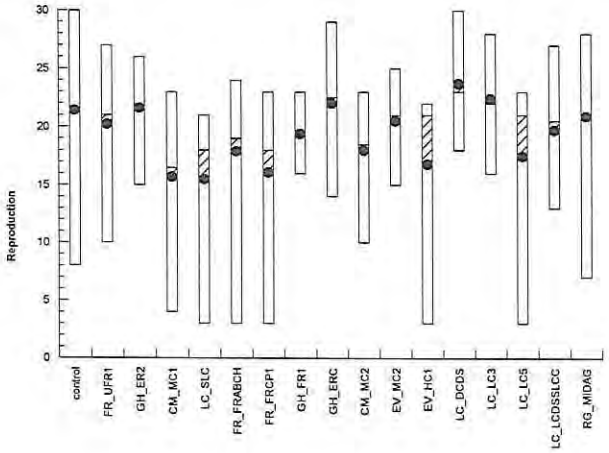
Reproduction Detail

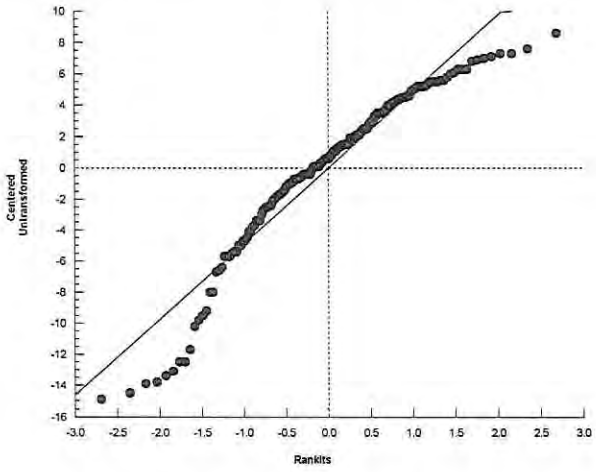
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	8	26	21	23	30	18	29	21	22	16
FR_UFR1		21	19	27	26	11	24	23	10	20	21
GH_ER2		23	26	21	22	20	15	19	26	23	21
CM_MC1		19	22	11	4	16	11	17	23	22	12
LC_SLC		21	6	18	17	19	18	18	19	16	3
FR_FRABCH		24	22	3	18	18	19	19	19	17	20
FR_FRCP1		18	23	18	14	19	3	15	21	18	12
GH_FR1		16	21	20	20	19	23	19	16	23	17
GH_ERC		28	29	24	24	14	17	21	26	17	20
CM_MC2		21	14	17	18	23	21	22	10	19	15
EV_MC2		20	22	19	22	15	25	25	18	16	23
EV_HC1		15	21	22	22	3	7	21	22	22	13
LC_DCDS		28	25	23	22	23	23	21	24	30	18
LC_LC3		16	23	22	28	21	22	17	28	20	27
LC_LC5		21	3	23	21	15	22	19	23	23	5
LC_LCDSSLCC		25	23	27	22	18	14	14	19	13	22
RG_MIDAG		19	23	28	26	20	21	7	23	21	21

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	13-6552-3556	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:21	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

Graphics





CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	20-0610-0182	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:21	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① control	01-7564-4530	21 Aug-19	21 Aug-19	13h	Teck Coal	Teck Coal Q3
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)		
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

① control = Negative control (N) 20% Perrier)

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
control	Control water	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Analyst: _____ QA: NN 4/19

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 20-0610-0182 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 04 Nov-19 15:21 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 passed reproduction	28.81%
		GH_ER2 passed reproduction	28.81%
		CM_MC1 passed reproduction	28.81%
		LC_SLC passed reproduction	28.81%
		FR_FRABCH passed reproduction	28.81%
		FR_FRCP1 passed reproduction	28.81%
		GH_FR1 passed reproduction	28.81%
		GH_ERC passed reproduction	28.81%
		CM_MC2 passed reproduction	28.81%
		EV_MC2 passed reproduction	28.81%
		EV_HC1 passed reproduction	28.81%
		LC_DCDS passed reproduction	28.81%
		LC_LC3 passed reproduction	28.81%
		LC_LC5 passed reproduction	28.81%
		LC_LCDSSLCC passed reproduction	28.81%
		RG_MIDAG passed reproduction	28.81%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	110	70	3	18	CDF	0.9797	Non-Significant Effect
		GH_ER2	106.5	70	4	18	CDF	0.9563	Non-Significant Effect
		CM_MC1	128	70	3	18	CDF	0.9999	Non-Significant Effect
		LC_SLC	134	70	3	18	CDF	1.0000	Non-Significant Effect
		FR_FRABCH	123.5	70	2	18	CDF	0.9996	Non-Significant Effect
		FR_FRCP1	131	70	3	18	CDF	1.0000	Non-Significant Effect
		GH_FR1	121	70	3	18	CDF	0.9991	Non-Significant Effect
		GH_ERC	105	70	3	18	CDF	0.9412	Non-Significant Effect
		CM_MC2	124.5	70	4	18	CDF	0.9997	Non-Significant Effect
		EV_MC2	112.5	70	4	18	CDF	0.9890	Non-Significant Effect
		EV_HC1	123	70	2	18	CDF	0.9995	Non-Significant Effect
		LC_DCDS	92	70	5	18	CDF	0.6270	Non-Significant Effect
		LC_LC3	103	70	4	18	CDF	0.9151	Non-Significant Effect
		LC_LC5	118	70	3	18	CDF	0.9976	Non-Significant Effect
		LC_LCDSSLCC	114	70	3	18	CDF	0.9925	Non-Significant Effect
		RG_MIDAG	108.5	70	3	18	CDF	0.9714	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1016.35	63.5221	16	2.276	0.0052	Significant Effect
Error	4269.3	27.9039	153			
Total	5285.65		169			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	22.02	32	0.1424	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9308	0.9786	2.8E-07	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 20-0610-0182 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 04 Nov-19 15:21 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Reproduction Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
control	N	10	21.4	16.77	26.03	21.5	8	30	2.045	30.22%	0.00%
FR_UFR1		10	20.2	16.11	24.29	21	10	27	1.806	28.28%	5.61%
GH_ER2		10	21.6	19.26	23.94	21.5	15	26	1.035	15.15%	-0.93%
CM_MC1		10	15.7	11.3	20.1	16.5	4	23	1.944	39.15%	26.64%
LC_SLC		10	15.5	11.22	19.78	18	3	21	1.893	38.62%	27.57%
FR_FRABCH		10	17.9	13.88	21.92	19	3	24	1.779	31.43%	16.36%
FR_FRCP1		10	16.1	12.08	20.12	18	3	23	1.779	34.95%	24.77%
GH_FR1		10	19.4	17.58	21.22	19.5	16	23	0.8055	13.13%	9.35%
GH_ERC		10	22	18.4	25.6	22.5	14	29	1.592	22.88%	-2.80%
CM_MC2		10	18	15.08	20.92	18.5	10	23	1.291	22.68%	15.89%
EV_MC2		10	20.5	17.99	23.01	21	15	25	1.108	17.09%	4.21%
EV_HC1		10	16.8	11.76	21.84	21	3	22	2.23	41.98%	21.50%
LC_DCDS		10	23.7	21.27	26.13	23	18	30	1.075	14.35%	-10.75%
LC_LC3		10	22.4	19.36	25.44	22	16	28	1.343	18.96%	-4.67%
LC_LC5		10	17.5	12.11	22.89	21	3	23	2.382	43.04%	18.22%
LC_LCDSSLCC		10	19.7	16.19	23.21	20.5	13	27	1.55	24.87%	7.94%
RG_MIDAG		10	20.9	16.89	24.91	21	7	28	1.773	26.83%	2.34%

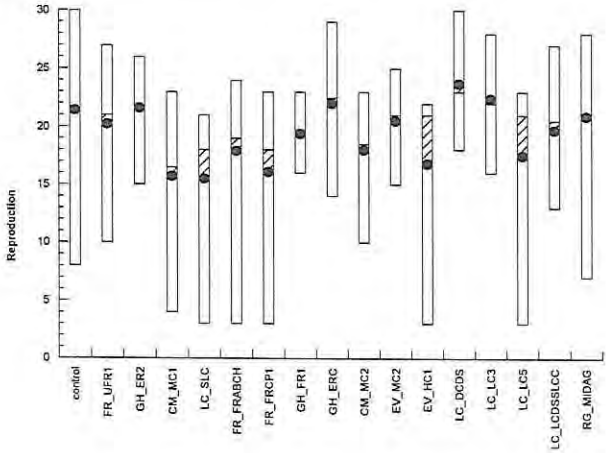
Reproduction Detail

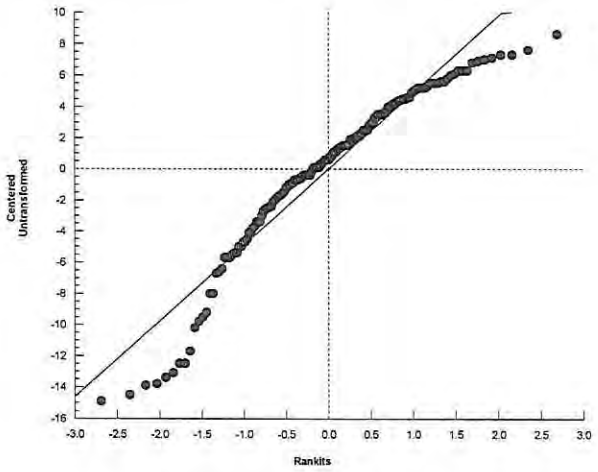
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
control	N	8	26	21	23	30	18	29	21	22	16
FR_UFR1		21	19	27	26	11	24	23	10	20	21
GH_ER2		23	26	21	22	20	15	19	26	23	21
CM_MC1		19	22	11	4	16	11	17	23	22	12
LC_SLC		21	6	18	17	19	18	18	19	16	3
FR_FRABCH		24	22	3	18	18	19	19	19	17	20
FR_FRCP1		18	23	18	14	19	3	15	21	18	12
GH_FR1		16	21	20	20	19	23	19	16	23	17
GH_ERC		28	29	24	24	14	17	21	26	17	20
CM_MC2		21	14	17	18	23	21	22	10	19	15
EV_MC2		20	22	19	22	15	25	25	18	16	23
EV_HC1		15	21	22	22	3	7	21	22	22	13
LC_DCDS		28	25	23	22	23	23	21	24	30	18
LC_LC3		16	23	22	28	21	22	17	28	20	27
LC_LC5		21	3	23	21	15	22	19	23	23	5
LC_LCDSSLCC		25	23	27	22	18	14	14	19	13	22
RG_MIDAG		19	23	28	26	20	21	7	23	21	21

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	20-0610-0182	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:21	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	19-3646-3061	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:24	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1, LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Analyst: SW QA: MN 4/19

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 19-3646-3061 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 04 Nov-19 15:24 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed reproduction	29.85%
		CM_MC1 passed reproduction	29.85%
		LC_SLC passed reproduction	29.85%
		FR_FRABCH passed reproduction	29.85%
		FR_FRCP1 passed reproduction	29.85%
		GH_FR1 passed reproduction	29.85%
		GH_ERC passed reproduction	29.85%
		CM_MC2 passed reproduction	29.85%
		EV_MC2 passed reproduction	29.85%
		EV_HC1 passed reproduction	29.85%
		LC_DCDS passed reproduction	29.85%
		LC_LC3 passed reproduction	29.85%
		LC_LC5 passed reproduction	29.85%
		LC_LCDSSLCC passed reproduction	29.85%
		RG_MIDAG passed reproduction	29.85%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2	109	71	5	18	CDF	0.9725	Non-Significant Effect
		CM_MC1	85	71	3	18	CDF	0.3591	Non-Significant Effect
		LC_SLC	75	71	2	18	CDF	0.0992	Non-Significant Effect
		FR_FRABCH	85.5	71	3	18	CDF	0.3767	Non-Significant Effect
		FR_FRCP1	81	71	3	18	CDF	0.2318	Non-Significant Effect
		GH_FR1	91	71	4	18	CDF	0.5801	Non-Significant Effect
		GH_ERC	113	71	4	18	CDF	0.9894	Non-Significant Effect
		CM_MC2	88.5	71	4	18	CDF	0.4868	Non-Significant Effect
		EV_MC2	101.5	71	3	18	CDF	0.8847	Non-Significant Effect
		EV_HC1	93	71	1	18	CDF	0.6521	Non-Significant Effect
		LC_DCDS	123	71	3	18	CDF	0.9995	Non-Significant Effect
		LC_LC3	115.5	71	4	18	CDF	0.9946	Non-Significant Effect
		LC_LC5	95	71	3	18	CDF	0.7191	Non-Significant Effect
		LC_LCDSSLCC	101.5	71	3	18	CDF	0.8847	Non-Significant Effect
		RG_MIDAG	107.5	71	5	18	CDF	0.9620	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	972.594	64.8396	15	2.398	0.0040	Significant Effect
Error	3892.9	27.034	144			
Total	4865.49		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.14	30.58	0.1325	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9248	0.9774	2.1E-07	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-3646-3061	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:24	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

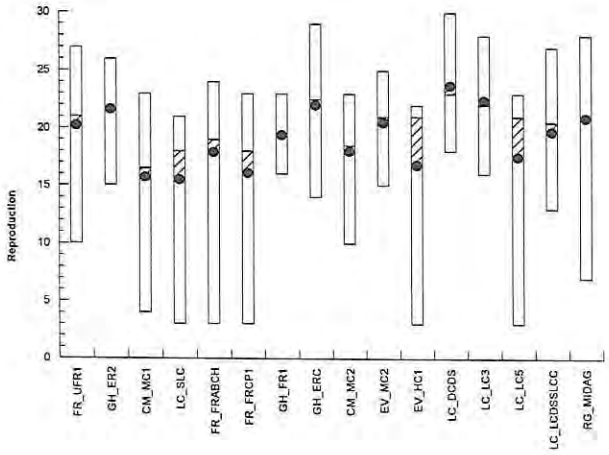
Reproduction Summary

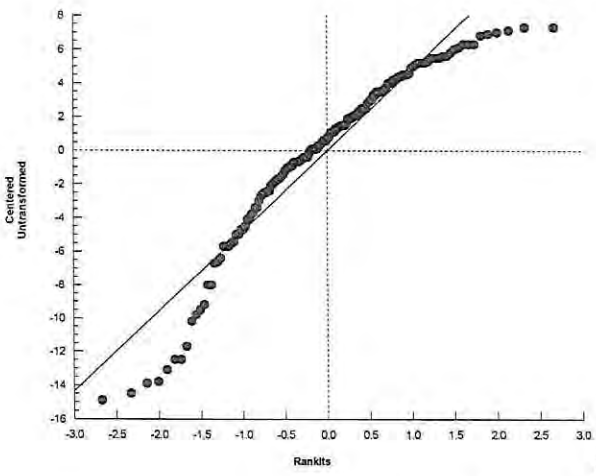
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	10	20.2	16.11	24.29	21	10	27	1.806	28.28%	0.00%
GH_ER2		10	21.6	19.26	23.94	21.5	15	26	1.035	15.15%	-6.93%
CM_MC1		10	15.7	11.3	20.1	16.5	4	23	1.944	39.15%	22.28%
LC_SLC		10	15.5	11.22	19.78	18	3	21	1.893	38.62%	23.27%
FR_FRABCH		10	17.9	13.88	21.92	19	3	24	1.779	31.43%	11.39%
FR_FRCP1		10	16.1	12.08	20.12	18	3	23	1.779	34.95%	20.30%
GH_FR1		10	19.4	17.58	21.22	19.5	16	23	0.8055	13.13%	3.96%
GH_ERC		10	22	18.4	25.6	22.5	14	29	1.592	22.88%	-8.91%
CM_MC2		10	18	15.08	20.92	18.5	10	23	1.291	22.68%	10.89%
EV_MC2		10	20.5	17.99	23.01	21	15	25	1.108	17.09%	-1.49%
EV_HC1		10	16.8	11.76	21.84	21	3	22	2.23	41.98%	16.83%
LC_DCDS		10	23.7	21.27	26.13	23	18	30	1.075	14.35%	-17.33%
LC_LC3		10	22.4	19.36	25.44	22	16	28	1.343	18.96%	-10.89%
LC_LC5		10	17.5	12.11	22.89	21	3	23	2.382	43.04%	13.37%
LC_LCDSSLCC		10	19.7	16.19	23.21	20.5	13	27	1.55	24.87%	2.48%
RG_MIDAG		10	20.9	16.89	24.91	21	7	28	1.773	26.83%	-3.47%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	XC	21	19	27	26	11	24	23	10	20	21
GH_ER2		23	26	21	22	20	15	19	26	23	21
CM_MC1		19	22	11	4	16	11	17	23	22	12
LC_SLC		21	6	18	17	19	18	18	19	16	3
FR_FRABCH		24	22	3	18	18	19	19	19	17	20
FR_FRCP1		18	23	18	14	19	3	15	21	18	12
GH_FR1		16	21	20	20	19	23	19	16	23	17
GH_ERC		28	29	24	24	14	17	21	26	17	20
CM_MC2		21	14	17	18	23	21	22	10	19	15
EV_MC2		20	22	19	22	15	25	25	18	16	23
EV_HC1		15	21	22	22	3	7	21	22	22	13
LC_DCDS		28	25	23	22	23	23	21	24	30	18
LC_LC3		16	23	22	28	21	22	17	28	20	27
LC_LC5		21	3	23	21	15	22	19	23	23	5
LC_LCDSSLCC		25	23	27	22	18	14	14	19	13	22
RG_MIDAG		19	23	28	26	20	21	7	23	21	21

Graphics





Analyst: CM QA: NN 4/19

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	18-0230-7221	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:24	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Analyst: SM QA: NN 4/19

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 18-0230-7221 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 04 Nov-19 15:24 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	GH_ER2 passed reproduction	29.85%
		CM_MC1 passed reproduction	29.85%
		LC_SLC passed reproduction	29.85%
		FR_FRABCH passed reproduction	29.85%
		FR_FRCP1 passed reproduction	29.85%
		GH_FR1 passed reproduction	29.85%
		GH_ERC passed reproduction	29.85%
		CM_MC2 passed reproduction	29.85%
		EV_MC2 passed reproduction	29.85%
		EV_HC1 passed reproduction	29.85%
		LC_DCDS passed reproduction	29.85%
		LC_LC3 passed reproduction	29.85%
		LC_LC5 passed reproduction	29.85%
		LC_LCDSSLCC passed reproduction	29.85%
		RG_MIDAG passed reproduction	29.85%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2	101	71	5	18	CDF	0.8752	Non-Significant Effect
		CM_MC1	125	71	3	18	CDF	0.9997	Non-Significant Effect
		LC_SLC	135	71	2	18	CDF	1.0000	Non-Significant Effect
		FR_FRABCH	124.5	71	3	18	CDF	0.9997	Non-Significant Effect
		FR_FRCP1	129	71	3	18	CDF	0.9999	Non-Significant Effect
		GH_FR1	119	71	4	18	CDF	0.9981	Non-Significant Effect
		GH_ERC	97	71	4	18	CDF	0.7794	Non-Significant Effect
		CM_MC2	121.5	71	4	18	CDF	0.9991	Non-Significant Effect
		EV_MC2	108.5	71	3	18	CDF	0.9693	Non-Significant Effect
		EV_HC1	117	71	1	18	CDF	0.9964	Non-Significant Effect
		LC_DCDS	87	71	3	18	CDF	0.4310	Non-Significant Effect
		LC_LC3	94.5	71	4	18	CDF	0.7029	Non-Significant Effect
		LC_LC5	115	71	3	18	CDF	0.9938	Non-Significant Effect
		LC_LCDSSLCC	108.5	71	3	18	CDF	0.9693	Non-Significant Effect
		RG_MIDAG	102.5	71	5	18	CDF	0.9023	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	972.594	64.8396	15	2.398	0.0040	Significant Effect
Error	3892.9	27.034	144			
Total	4865.49		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.14	30.58	0.1325	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9248	0.9774	2.1E-07	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 18-0230-7221 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 04 Nov-19 15:24 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

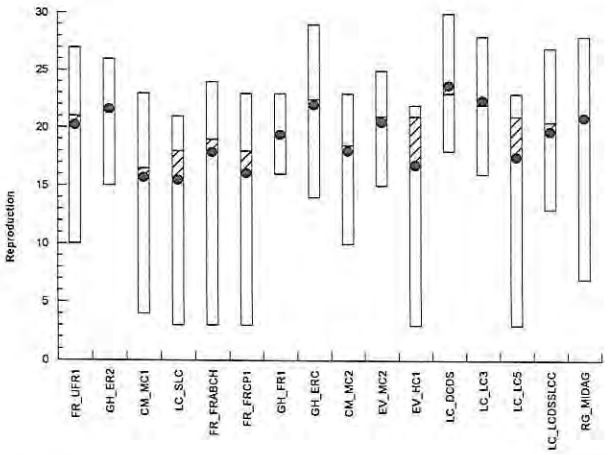
Reproduction Summary

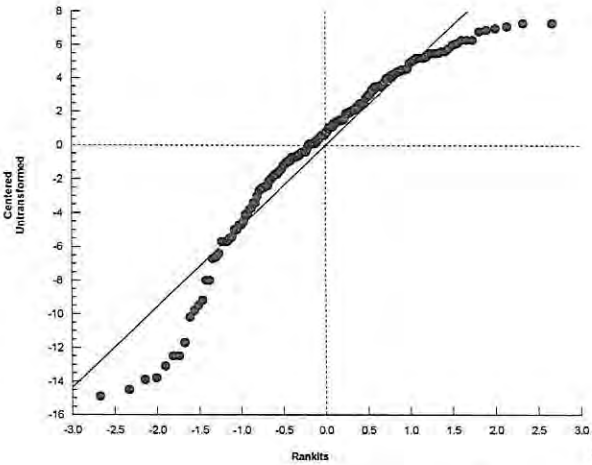
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	10	20.2	16.11	24.29	21	10	27	1.806	28.28%	0.00%
GH_ER2		10	21.6	19.26	23.94	21.5	15	26	1.035	15.15%	-6.93%
CM_MC1		10	15.7	11.3	20.1	16.5	4	23	1.944	39.15%	22.28%
LC_SLC		10	15.5	11.22	19.78	18	3	21	1.893	38.62%	23.27%
FR_FRABCH		10	17.9	13.88	21.92	19	3	24	1.779	31.43%	11.39%
FR_FRCP1		10	16.1	12.08	20.12	18	3	23	1.779	34.95%	20.30%
GH_FR1		10	19.4	17.58	21.22	19.5	16	23	0.8055	13.13%	3.96%
GH_ERC		10	22	18.4	25.6	22.5	14	29	1.592	22.88%	-8.91%
CM_MC2		10	18	15.08	20.92	18.5	10	23	1.291	22.68%	10.89%
EV_MC2		10	20.5	17.99	23.01	21	15	25	1.108	17.09%	-1.49%
EV_HC1		10	16.8	11.76	21.84	21	3	22	2.23	41.98%	16.83%
LC_DCDS		10	23.7	21.27	26.13	23	18	30	1.075	14.35%	-17.33%
LC_LC3		10	22.4	19.36	25.44	22	16	28	1.343	18.96%	-10.89%
LC_LC5		10	17.5	12.11	22.89	21	3	23	2.382	43.04%	13.37%
LC_LCDSSLCC		10	19.7	16.19	23.21	20.5	13	27	1.55	24.87%	2.48%
RG_MIDAG		10	20.9	16.89	24.91	21	7	28	1.773	26.83%	-3.47%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	XC	21	19	27	26	11	24	23	10	20	21
GH_ER2		23	26	21	22	20	15	19	26	23	21
CM_MC1		19	22	11	4	16	11	17	23	22	12
LC_SLC		21	6	18	17	19	18	18	19	16	3
FR_FRABCH		24	22	3	18	18	19	19	19	17	20
FR_FRCP1		18	23	18	14	19	3	15	21	18	12
GH_FR1		16	21	20	20	19	23	19	16	23	17
GH_ERC		28	29	24	24	14	17	21	26	17	20
CM_MC2		21	14	17	18	23	21	22	10	19	15
EV_MC2		20	22	19	22	15	25	25	18	16	23
EV_HC1		15	21	22	22	3	7	21	22	22	13
LC_DCDS		28	25	23	22	23	23	21	24	30	18
LC_LC3		16	23	22	28	21	22	17	28	20	27
LC_LC5		21	3	23	21	15	22	19	23	23	5
LC_LCDSSLCC		25	23	27	22	18	14	14	19	13	22
RG_MIDAG		19	23	28	26	20	21	7	23	21	21

Graphics





CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-1241-6609	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:29	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1, LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Analyst: SMC QA: NN 4/19

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 19-1241-6609 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 04 Nov-19 15:29 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 passed reproduction	27.91%
		CM_MC1 passed reproduction	27.91%
		LC_SLC passed reproduction	27.91%
		FR_FRABCH passed reproduction	27.91%
		FR_FRCP1 passed reproduction	27.91%
		GH_FR1 passed reproduction	27.91%
		GH_ERC passed reproduction	27.91%
		CM_MC2 passed reproduction	27.91%
		EV_MC2 passed reproduction	27.91%
		EV_HC1 passed reproduction	27.91%
		LC_DCDS passed reproduction	27.91%
		LC_LC3 passed reproduction	27.91%
		LC_LC5 passed reproduction	27.91%
		LC_LCDSSLCC passed reproduction	27.91%
		RG_MIDAG passed reproduction	27.91%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	109	71	6	18	CDF	0.9725	Non-Significant Effect
		CM_MC1	133.5	71	3	18	CDF	1.0000	Non-Significant Effect
		LC_SLC	143	71	2	18	CDF	1.0000	Non-Significant Effect
		FR_FRABCH	131.5	71	3	18	CDF	1.0000	Non-Significant Effect
		FR_FRCP1	139	71	4	18	CDF	1.0000	Non-Significant Effect
		GH_FR1	126	71	4	18	CDF	0.9998	Non-Significant Effect
		GH_ERC	101.5	71	4	18	CDF	0.8847	Non-Significant Effect
		CM_MC2	130.5	71	5	18	CDF	1.0000	Non-Significant Effect
		EV_MC2	114.5	71	5	18	CDF	0.9929	Non-Significant Effect
		EV_HC1	124.5	71	3	18	CDF	0.9997	Non-Significant Effect
		LC_DCDS	87.5	71	3	18	CDF	0.4495	Non-Significant Effect
		LC_LC3	98.5	71	4	18	CDF	0.8193	Non-Significant Effect
		LC_LC5	118.5	71	5	18	CDF	0.9977	Non-Significant Effect
		LC_LCDSSLCC	116.5	71	3	18	CDF	0.9959	Non-Significant Effect
		RG_MIDAG	106	71	6	18	CDF	0.9485	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	972.594	64.8396	15	2.398	0.0040	Significant Effect
Error	3892.9	27.034	144			
Total	4865.49		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.14	30.58	0.1325	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9248	0.9774	2.1E-07	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-1241-6609	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:29	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

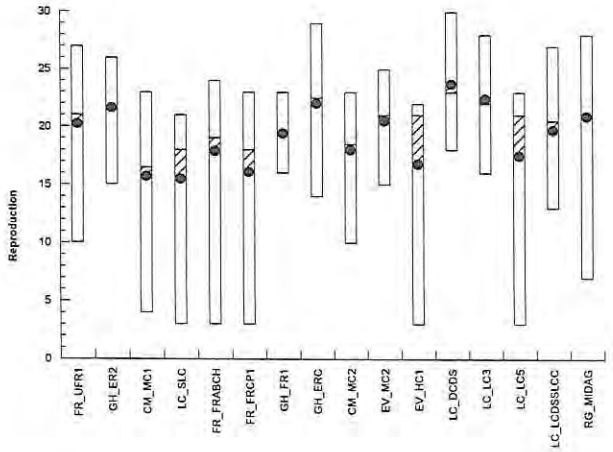
Reproduction Summary

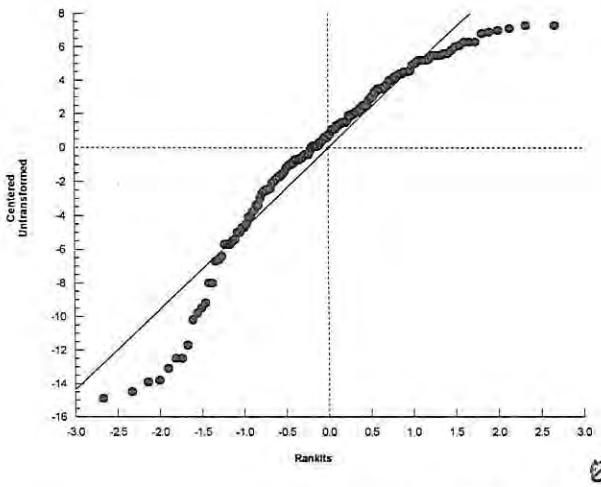
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	20.2	16.11	24.29	21	10	27	1.806	28.28%	0.00%
GH_ER2	XC	10	21.6	19.26	23.94	21.5	15	26	1.035	15.15%	-6.93%
CM_MC1		10	15.7	11.3	20.1	16.5	4	23	1.944	39.15%	22.28%
LC_SLC		10	15.5	11.22	19.78	18	3	21	1.893	38.62%	23.27%
FR_FRABCH		10	17.9	13.88	21.92	19	3	24	1.779	31.43%	11.39%
FR_FRCP1		10	16.1	12.08	20.12	18	3	23	1.779	34.95%	20.30%
GH_FR1		10	19.4	17.58	21.22	19.5	16	23	0.8055	13.13%	3.96%
GH_ERC		10	22	18.4	25.6	22.5	14	29	1.592	22.88%	-8.91%
CM_MC2		10	18	15.08	20.92	18.5	10	23	1.291	22.68%	10.89%
EV_MC2		10	20.5	17.99	23.01	21	15	25	1.108	17.09%	-1.49%
EV_HC1		10	16.8	11.76	21.84	21	3	22	2.23	41.98%	16.83%
LC_DCDS		10	23.7	21.27	26.13	23	18	30	1.075	14.35%	-17.33%
LC_LC3		10	22.4	19.36	25.44	22	16	28	1.343	18.96%	-10.89%
LC_LC5		10	17.5	12.11	22.89	21	3	23	2.382	43.04%	13.37%
LC_LCDSSLCC		10	19.7	16.19	23.21	20.5	13	27	1.55	24.87%	2.48%
RG_MIDAG		10	20.9	16.89	24.91	21	7	28	1.773	26.83%	-3.47%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		21	19	27	26	11	24	23	10	20	21
GH_ER2	XC	23	26	21	22	20	15	19	26	23	21
CM_MC1		19	22	11	4	16	11	17	23	22	12
LC_SLC		21	6	18	17	19	18	18	19	16	3
FR_FRABCH		24	22	3	18	18	19	19	19	17	20
FR_FRCP1		18	23	18	14	19	3	15	21	18	12
GH_FR1		16	21	20	20	19	23	19	16	23	17
GH_ERC		28	29	24	24	14	17	21	26	17	20
CM_MC2		21	14	17	18	23	21	22	10	19	15
EV_MC2		20	22	19	22	15	25	25	18	16	23
EV_HC1		15	21	22	22	3	7	21	22	22	13
LC_DCDS		28	25	23	22	23	23	21	24	30	18
LC_LC3		16	23	22	28	21	22	17	28	20	27
LC_LC5		21	3	23	21	15	22	19	23	23	5
LC_LCDSSLCC		25	23	27	22	18	14	14	19	13	22
RG_MIDAG		19	23	28	26	20	21	7	23	21	21

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	01-9276-0423	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:29	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 01-9276-0423 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 04 Nov-19 15:29 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	27.91%
		CM_MC1 passed reproduction	27.91%
		LC_SLC failed reproduction	27.91%
		FR_FRABCH passed reproduction	27.91%
		FR_FRCP1 failed reproduction	27.91%
		GH_FR1 passed reproduction	27.91%
		GH_ERC passed reproduction	27.91%
		CM_MC2 passed reproduction	27.91%
		EV_MC2 passed reproduction	27.91%
		EV_HC1 passed reproduction	27.91%
		LC_DCDS passed reproduction	27.91%
		LC_LC3 passed reproduction	27.91%
		LC_LC5 passed reproduction	27.91%
		LC_LCDSSLCC passed reproduction	27.91%
		RG_MIDAG passed reproduction	27.91%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	101	71	6	18	CDF	0.8752	Non-Significant Effect
		CM_MC1	76.5	71	3	18	CDF	0.1254	Non-Significant Effect
		LC_SLC*	67	71	2	18	CDF	0.0221	Significant Effect
		FR_FRABCH	78.5	71	3	18	CDF	0.1675	Non-Significant Effect
		FR_FRCP1*	71	71	4	18	CDF	0.0494	Significant Effect
		GH_FR1	84	71	4	18	CDF	0.3249	Non-Significant Effect
		GH_ERC	108.5	71	4	18	CDF	0.9693	Non-Significant Effect
		CM_MC2	79.5	71	5	18	CDF	0.1917	Non-Significant Effect
		EV_MC2	95.5	71	5	18	CDF	0.7349	Non-Significant Effect
		EV_HC1	85.5	71	3	18	CDF	0.3767	Non-Significant Effect
		LC_DCDS	122.5	71	3	18	CDF	0.9994	Non-Significant Effect
		LC_LC3	111.5	71	4	18	CDF	0.9846	Non-Significant Effect
		LC_LC5	91.5	71	5	18	CDF	0.5984	Non-Significant Effect
		LC_LCDSSLCC	93.5	71	3	18	CDF	0.6694	Non-Significant Effect
		RG_MIDAG	104	71	6	18	CDF	0.9248	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	972.594	64.8396	15	2.398	0.0040	Significant Effect
Error	3892.9	27.034	144			
Total	4865.49		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.14	30.58	0.1325	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9248	0.9774	2.1E-07	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	01-9276-0423	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:29	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

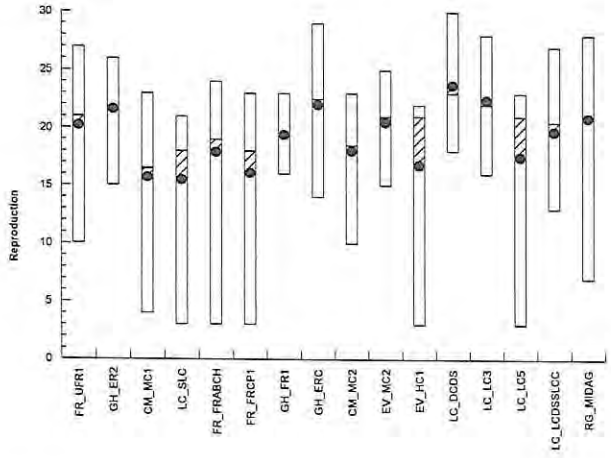
Reproduction Summary

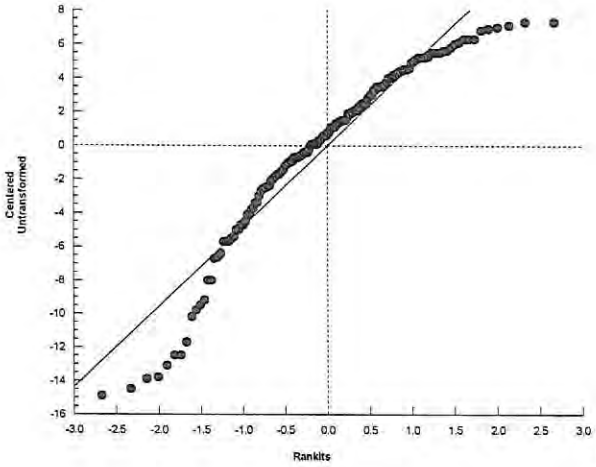
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	20.2	16.11	24.29	21	10	27	1.806	28.28%	0.00%
GH_ER2	XC	10	21.6	19.26	23.94	21.5	15	26	1.035	15.15%	-6.93%
CM_MC1		10	15.7	11.3	20.1	16.5	4	23	1.944	39.15%	22.28%
LC_SLC		10	15.5	11.22	19.78	18	3	21	1.893	38.62%	23.27%
FR_FRABCH		10	17.9	13.88	21.92	19	3	24	1.779	31.43%	11.39%
FR_FRCP1		10	16.1	12.08	20.12	18	3	23	1.779	34.95%	20.30%
GH_FR1		10	19.4	17.58	21.22	19.5	16	23	0.8055	13.13%	3.96%
GH_ERC		10	22	18.4	25.6	22.5	14	29	1.592	22.88%	-8.91%
CM_MC2		10	18	15.08	20.92	18.5	10	23	1.291	22.68%	10.89%
EV_MC2		10	20.5	17.99	23.01	21	15	25	1.108	17.09%	-1.49%
EV_HC1		10	16.8	11.76	21.84	21	3	22	2.23	41.98%	16.83%
LC_DCDS		10	23.7	21.27	26.13	23	18	30	1.075	14.35%	-17.33%
LC_LC3		10	22.4	19.36	25.44	22	16	28	1.343	18.96%	-10.89%
LC_LC5		10	17.5	12.11	22.89	21	3	23	2.382	43.04%	13.37%
LC_LCDSSLCC		10	19.7	16.19	23.21	20.5	13	27	1.55	24.87%	2.48%
RG_MIDAG		10	20.9	16.89	24.91	21	7	28	1.773	26.83%	-3.47%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		21	19	27	26	11	24	23	10	20	21
GH_ER2	XC	23	26	21	22	20	15	19	26	23	21
CM_MC1		19	22	11	4	16	11	17	23	22	12
LC_SLC		21	6	18	17	19	18	18	19	16	3
FR_FRABCH		24	22	3	18	18	19	19	19	17	20
FR_FRCP1		18	23	18	14	19	3	15	21	18	12
GH_FR1		16	21	20	20	19	23	19	16	23	17
GH_ERC		28	29	24	24	14	17	21	26	17	20
CM_MC2		21	14	17	18	23	21	22	10	19	15
EV_MC2		20	22	19	22	15	25	25	18	16	23
EV_HC1		15	21	22	22	3	7	21	22	22	13
LC_DCDS		28	25	23	22	23	23	21	24	30	18
LC_LC3		16	23	22	28	21	22	17	28	20	27
LC_LC5		21	3	23	21	15	22	19	23	23	5
LC_LCDSSLCC		25	23	27	22	18	14	14	19	13	22
RG_MIDAG		19	23	28	26	20	21	7	23	21	21

Graphics





Analyst: MC QA: NN 4/19

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	18-6333-7238	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:34	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 18-6333-7238 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 04 Nov-19 15:34 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	38.40%
		GH_ER2 passed reproduction	38.40%
		LC_SLC passed reproduction	38.40%
		FR_FRABCH passed reproduction	38.40%
		FR_FRCP1 passed reproduction	38.40%
		GH_FR1 passed reproduction	38.40%
		GH_ERC passed reproduction	38.40%
		CM_MC2 passed reproduction	38.40%
		EV_MC2 passed reproduction	38.40%
		EV_HC1 passed reproduction	38.40%
		LC_DCDS passed reproduction	38.40%
		LC_LC3 passed reproduction	38.40%
		LC_LC5 passed reproduction	38.40%
		LC_LCDSSLCC passed reproduction	38.40%
		RG_MIDAG passed reproduction	38.40%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	125	71	3	18	CDF	0.9997	Non-Significant Effect
		GH_ER2	133.5	71	3	18	CDF	1.0000	Non-Significant Effect
		LC_SLC	104	71	3	18	CDF	0.9248	Non-Significant Effect
		FR_FRABCH	117	71	3	18	CDF	0.9964	Non-Significant Effect
		FR_FRCP1	107.5	71	3	18	CDF	0.9620	Non-Significant Effect
		GH_FR1	122.5	71	4	18	CDF	0.9994	Non-Significant Effect
		GH_ERC	134	71	1	18	CDF	1.0000	Non-Significant Effect
		CM_MC2	113.5	71	4	18	CDF	0.9907	Non-Significant Effect
		EV_MC2	128.5	71	4	18	CDF	0.9999	Non-Significant Effect
		EV_HC1	110	71	1	18	CDF	0.9781	Non-Significant Effect
		LC_DCDS	144.5	71	2	18	CDF	1.0000	Non-Significant Effect
		LC_LC3	134.5	71	4	18	CDF	1.0000	Non-Significant Effect
		LC_LC5	117	71	3	18	CDF	0.9964	Non-Significant Effect
		LC_LCDSSLCC	125	71	3	18	CDF	0.9997	Non-Significant Effect
		RG_MIDAG	129.5	71	2	18	CDF	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	972.594	64.8396	15	2.398	0.0040	Significant Effect
Error	3892.9	27.034	144			
Total	4865.49		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.14	30.58	0.1325	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9248	0.9774	2.1E-07	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	18-6333-7238	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:34	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

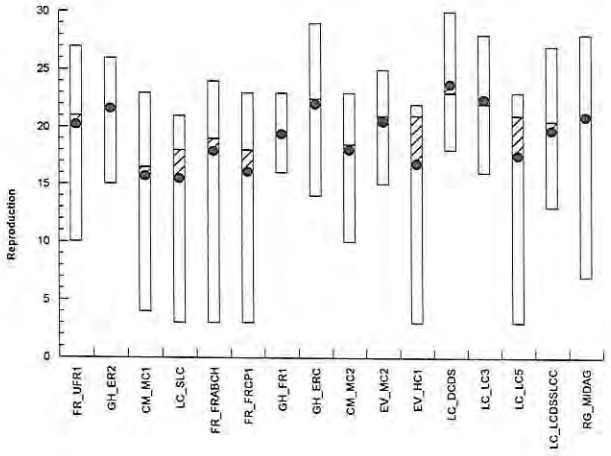
Reproduction Summary

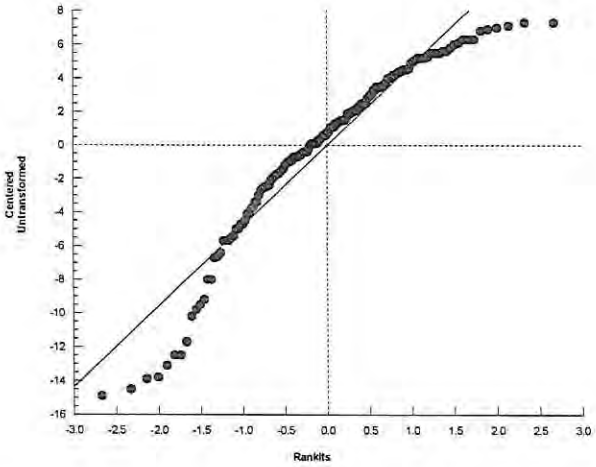
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	20.2	16.11	24.29	21	10	27	1.806	28.28%	0.00%
GH_ER2		10	21.6	19.26	23.94	21.5	15	26	1.035	15.15%	-6.93%
CM_MC1	XC	10	15.7	11.3	20.1	16.5	4	23	1.944	39.15%	22.28%
LC_SLC		10	15.5	11.22	19.78	18	3	21	1.893	38.62%	23.27%
FR_FRABCH		10	17.9	13.88	21.92	19	3	24	1.779	31.43%	11.39%
FR_FRCP1		10	16.1	12.08	20.12	18	3	23	1.779	34.95%	20.30%
GH_FR1		10	19.4	17.58	21.22	19.5	16	23	0.8055	13.13%	3.96%
GH_ERC		10	22	18.4	25.6	22.5	14	29	1.592	22.88%	-8.91%
CM_MC2		10	18	15.08	20.92	18.5	10	23	1.291	22.68%	10.89%
EV_MC2		10	20.5	17.99	23.01	21	15	25	1.108	17.09%	-1.49%
EV_HC1		10	16.8	11.76	21.84	21	3	22	2.23	41.98%	16.83%
LC_DCDS		10	23.7	21.27	26.13	23	18	30	1.075	14.35%	-17.33%
LC_LC3		10	22.4	19.36	25.44	22	16	28	1.343	18.96%	-10.89%
LC_LC5		10	17.5	12.11	22.89	21	3	23	2.382	43.04%	13.37%
LC_LCDSSLCC		10	19.7	16.19	23.21	20.5	13	27	1.55	24.87%	2.48%
RG_MIDAG		10	20.9	16.89	24.91	21	7	28	1.773	26.83%	-3.47%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		21	19	27	26	11	24	23	10	20	21
GH_ER2		23	26	21	22	20	15	19	26	23	21
CM_MC1	XC	19	22	11	4	16	11	17	23	22	12
LC_SLC		21	6	18	17	19	18	18	19	16	3
FR_FRABCH		24	22	3	18	18	19	19	19	17	20
FR_FRCP1		18	23	18	14	19	3	15	21	18	12
GH_FR1		16	21	20	20	19	23	19	16	23	17
GH_ERC		28	29	24	24	14	17	21	26	17	20
CM_MC2		21	14	17	18	23	21	22	10	19	15
EV_MC2		20	22	19	22	15	25	25	18	16	23
EV_HC1		15	21	22	22	3	7	21	22	22	13
LC_DCDS		28	25	23	22	23	23	21	24	30	18
LC_LC3		16	23	22	28	21	22	17	28	20	27
LC_LC5		21	3	23	21	15	22	19	23	23	5
LC_LCDSSLCC		25	23	27	22	18	14	14	19	13	22
RG_MIDAG		19	23	28	26	20	21	7	23	21	21

Graphics





Analyst: SMC QA: NN 4/19

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-0691-9092	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:34	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Analyst: SNC QA: NN 4/19

Analysis ID: 11-0691-9092 Endpoint: Reproduction CETIS Version: CETISv1.9.4
Analyzed: 04 Nov-19 15:34 Analysis: Nonparametric-Control vs Treatments Status Level: 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 passed reproduction	38.40%
		GH_ER2 passed reproduction	38.40%
		LC_SLC passed reproduction	38.40%
		FR_FRABCH passed reproduction	38.40%
		FR_FRCP1 passed reproduction	38.40%
		GH_FR1 passed reproduction	38.40%
		GH_ERC passed reproduction	38.40%
		CM_MC2 passed reproduction	38.40%
		EV_MC2 passed reproduction	38.40%
		EV_HC1 passed reproduction	38.40%
		LC_DCDS failed reproduction	38.40%
		LC_LC3 passed reproduction	38.40%
		LC_LC5 passed reproduction	38.40%
		LC_LCDSSLCC passed reproduction	38.40%
		RG_MIDAG passed reproduction	38.40%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	85	71	3	18	CDF	0.3591	Non-Significant Effect
		GH_ER2	76.5	71	3	18	CDF	0.1254	Non-Significant Effect
		LC_SLC	106	71	3	18	CDF	0.9485	Non-Significant Effect
		FR_FRABCH	93	71	3	18	CDF	0.6521	Non-Significant Effect
		FR_FRCP1	102.5	71	3	18	CDF	0.9023	Non-Significant Effect
		GH_FR1	87.5	71	4	18	CDF	0.4495	Non-Significant Effect
		GH_ERC	76	71	1	18	CDF	0.1162	Non-Significant Effect
		CM_MC2	96.5	71	4	18	CDF	0.7650	Non-Significant Effect
		EV_MC2	81.5	71	4	18	CDF	0.2462	Non-Significant Effect
		EV_HC1	100	71	1	18	CDF	0.8545	Non-Significant Effect
		LC_DCDS*	65.5	71	2	18	CDF	0.0159	Significant Effect
		LC_LC3	75.5	71	4	18	CDF	0.1075	Non-Significant Effect
		LC_LC5	93	71	3	18	CDF	0.6521	Non-Significant Effect
		LC_LCDSSLCC	85	71	3	18	CDF	0.3591	Non-Significant Effect
		RG_MIDAG	80.5	71	2	18	CDF	0.2179	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	972.594	64.8396	15	2.398	0.0040	Significant Effect
Error	3892.9	27.034	144			
Total	4865.49		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.14	30.58	0.1325	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9248	0.9774	2.1E-07	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-0691-9092	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:34	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

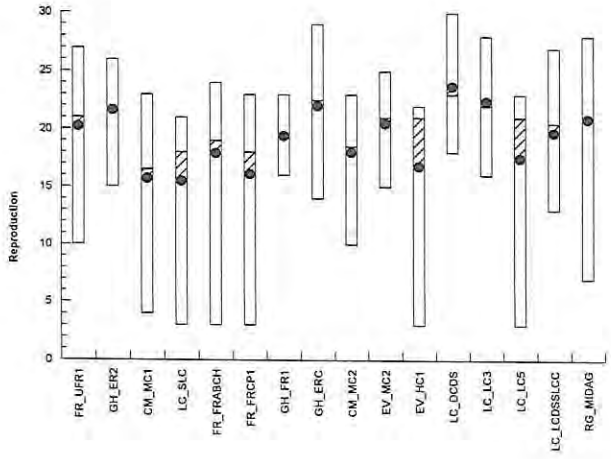
Reproduction Summary

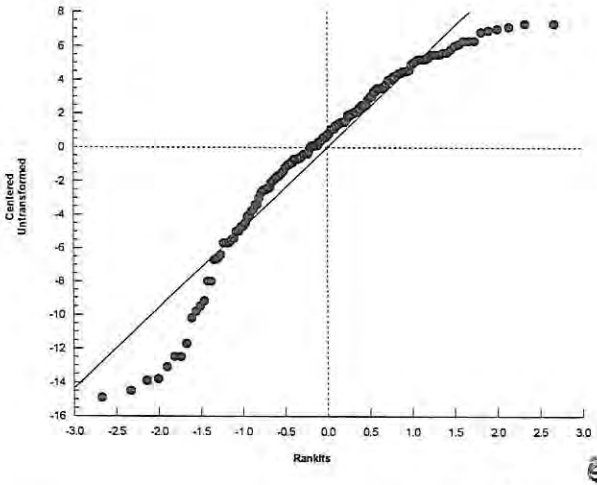
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	20.2	16.11	24.29	21	10	27	1.806	28.28%	0.00%
GH_ER2		10	21.6	19.26	23.94	21.5	15	26	1.035	15.15%	-6.93%
CM_MC1	XC	10	15.7	11.3	20.1	16.5	4	23	1.944	39.15%	22.28%
LC_SLC		10	15.5	11.22	19.78	18	3	21	1.893	38.62%	23.27%
FR_FRABCH		10	17.9	13.88	21.92	19	3	24	1.779	31.43%	11.39%
FR_FRCP1		10	16.1	12.08	20.12	18	3	23	1.779	34.95%	20.30%
GH_FR1		10	19.4	17.58	21.22	19.5	16	23	0.8055	13.13%	3.96%
GH_ERC		10	22	18.4	25.6	22.5	14	29	1.592	22.88%	-8.91%
CM_MC2		10	18	15.08	20.92	18.5	10	23	1.291	22.68%	10.89%
EV_MC2		10	20.5	17.99	23.01	21	15	25	1.108	17.09%	-1.49%
EV_HC1		10	16.8	11.76	21.84	21	3	22	2.23	41.98%	16.83%
LC_DCDS		10	23.7	21.27	26.13	23	18	30	1.075	14.35%	-17.33%
LC_LC3		10	22.4	19.36	25.44	22	16	28	1.343	18.96%	-10.89%
LC_LC5		10	17.5	12.11	22.89	21	3	23	2.382	43.04%	13.37%
LC_LCDSSLCC		10	19.7	16.19	23.21	20.5	13	27	1.55	24.87%	2.48%
RG_MIDAG		10	20.9	16.89	24.91	21	7	28	1.773	26.83%	-3.47%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		21	19	27	26	11	24	23	10	20	21
GH_ER2		23	26	21	22	20	15	19	26	23	21
CM_MC1	XC	19	22	11	4	16	11	17	23	22	12
LC_SLC		21	6	18	17	19	18	18	19	16	3
FR_FRABCH		24	22	3	18	18	19	19	19	17	20
FR_FRCP1		18	23	18	14	19	3	15	21	18	12
GH_FR1		16	21	20	20	19	23	19	16	23	17
GH_ERC		28	29	24	24	14	17	21	26	17	20
CM_MC2		21	14	17	18	23	21	22	10	19	15
EV_MC2		20	22	19	22	15	25	25	18	16	23
EV_HC1		15	21	22	22	3	7	21	22	22	13
LC_DCDS		28	25	23	22	23	23	21	24	30	18
LC_LC3		16	23	22	28	21	22	17	28	20	27
LC_LC5		21	3	23	21	15	22	19	23	23	5
LC_LCDSSLCC		25	23	27	22	18	14	14	19	13	22
RG_MIDAG		19	23	28	26	20	21	7	23	21	21

Graphics





Analyst: SMC QA: NN 4/19

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	20-0942-2120	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:38	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
② FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
② GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
② CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
② LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

② FR_UFR1, GH_ER2, CM_MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	20-0942-2120	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:38	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 passed reproduction	38.90%
		GH_ER2 failed reproduction	38.90%
		CM_MC1 passed reproduction	38.90%
		FR_FRABCH passed reproduction	38.90%
		FR_FRCP1 passed reproduction	38.90%
		GH_FR1 passed reproduction	38.90%
		GH_ERC passed reproduction	38.90%
		CM_MC2 passed reproduction	38.90%
		EV_MC2 passed reproduction	38.90%
		EV_HC1 passed reproduction	38.90%
		LC_DCDS failed reproduction	38.90%
		LC_LC3 failed reproduction	38.90%
		LC_LC5 passed reproduction	38.90%
		LC_LCDSSLCC passed reproduction	38.90%
		RG_MIDAG failed reproduction	38.90%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	75	71	2	18	CDF	0.0992	Non-Significant Effect
		GH_ER2*	67	71	2	18	CDF	0.0221	Significant Effect
		CM_MC1	104	71	3	18	CDF	0.9248	Non-Significant Effect
		FR_FRABCH	87	71	4	18	CDF	0.4310	Non-Significant Effect
		FR_FRCP1	104.5	71	4	18	CDF	0.9314	Non-Significant Effect
		GH_FR1	83	71	4	18	CDF	0.2921	Non-Significant Effect
		GH_ERC	77.5	71	2	18	CDF	0.1454	Non-Significant Effect
		CM_MC2	93	71	4	18	CDF	0.6521	Non-Significant Effect
		EV_MC2	78	71	3	18	CDF	0.1562	Non-Significant Effect
		EV_HC1	89.5	71	2	18	CDF	0.5243	Non-Significant Effect
		LC_DCDS*	60	71	2	18	CDF	0.0042	Significant Effect
		LC_LC3*	70.5	71	3	18	CDF	0.0449	Significant Effect
		LC_LC5	84.5	71	3	18	CDF	0.3418	Non-Significant Effect
		LC_LCDSSLCC	85.5	71	2	18	CDF	0.3767	Non-Significant Effect
		RG_MIDAG*	67.5	71	2	18	CDF	0.0246	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	972.594	64.8396	15	2.398	0.0040	Significant Effect
Error	3892.9	27.034	144			
Total	4865.49		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.14	30.58	0.1325	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9248	0.9774	2.1E-07	Non-Normal Distribution

Analysis ID: 20-0942-2120 | Endpoint: Reproduction | CETIS Version: CETISv1.9.4
Analyzed: 04 Nov-19 15:38 | Analysis: Nonparametric-Control vs Treatments | Status Level: 1

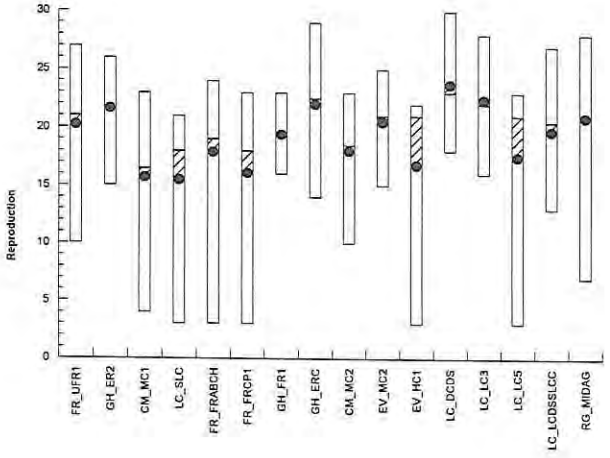
Reproduction Summary

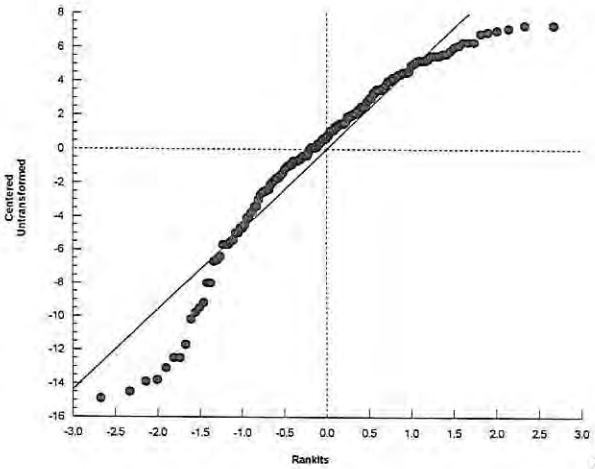
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	20.2	16.11	24.29	21	10	27	1.806	28.28%	0.00%
GH_ER2		10	21.6	19.26	23.94	21.5	15	26	1.035	15.15%	-6.93%
CM_MC1		10	15.7	11.3	20.1	16.5	4	23	1.944	39.15%	22.28%
LC_SLC	XC	10	15.5	11.22	19.78	18	3	21	1.893	38.62%	23.27%
FR_FRABCH		10	17.9	13.88	21.92	19	3	24	1.779	31.43%	11.39%
FR_FRCP1		10	16.1	12.08	20.12	18	3	23	1.779	34.95%	20.30%
GH_FR1		10	19.4	17.58	21.22	19.5	16	23	0.8055	13.13%	3.96%
GH_ERC		10	22	18.4	25.6	22.5	14	29	1.592	22.88%	-8.91%
CM_MC2		10	18	15.08	20.92	18.5	10	23	1.291	22.68%	10.89%
EV_MC2		10	20.5	17.99	23.01	21	15	25	1.108	17.09%	-1.49%
EV_HC1		10	16.8	11.76	21.84	21	3	22	2.23	41.98%	16.83%
LC_DCDS		10	23.7	21.27	26.13	23	18	30	1.075	14.35%	-17.33%
LC_LC3		10	22.4	19.36	25.44	22	16	28	1.343	18.96%	-10.89%
LC_LC5		10	17.5	12.11	22.89	21	3	23	2.382	43.04%	13.37%
LC_LCDSSLCC		10	19.7	16.19	23.21	20.5	13	27	1.55	24.87%	2.48%
RG_MIDAG		10	20.9	16.89	24.91	21	7	28	1.773	26.83%	-3.47%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		21	19	27	26	11	24	23	10	20	21
GH_ER2		23	26	21	22	20	15	19	26	23	21
CM_MC1		19	22	11	4	16	11	17	23	22	12
LC_SLC	XC	21	6	18	17	19	18	18	19	16	3
FR_FRABCH		24	22	3	18	18	19	19	19	17	20
FR_FRCP1		18	23	18	14	19	3	15	21	18	12
GH_FR1		16	21	20	20	19	23	19	16	23	17
GH_ERC		28	29	24	24	14	17	21	26	17	20
CM_MC2		21	14	17	18	23	21	22	10	19	15
EV_MC2		20	22	19	22	15	25	25	18	16	23
EV_HC1		15	21	22	22	3	7	21	22	22	13
LC_DCDS		28	25	23	22	23	23	21	24	30	18
LC_LC3		16	23	22	28	21	22	17	28	20	27
LC_LC5		21	3	23	21	15	22	19	23	23	5
LC_LCDSSLCC		25	23	27	22	18	14	14	19	13	22
RG_MIDAG		19	23	28	26	20	21	7	23	21	21

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	06-0249-4501	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:38	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-7515-0706	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sakshi Singh
Start Date:	21 Aug-19 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	29 Aug-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
(2) FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	26h (12.4 °C)	Teck Coal	Teck Coal Q3
(2) GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	25h (8.2 °C)		
(2) CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	25h (7.6 °C)		
(2) LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	28h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	27h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	29h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	22h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	24h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	26h (8.4 °C)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	26h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	27h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	27h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	27h (8.9 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	26h (9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	27h (7.6 °C)		
RG_MIDAG	10-6405-3149	20 Aug-19 10:30	21 Aug-19 10:30	26h (8.4 °C)		

(2) FRUFR1, GH_ER2, CM-MC1 & LC_SLC are site controls.

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-08-	

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 06-0249-4501 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 04 Nov-19 15:38 **Analysis:** Nonparametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	38.90%
		GH_ER2 passed reproduction	38.90%
		CM_MC1 passed reproduction	38.90%
		FR_FRABCH passed reproduction	38.90%
		FR_FRCP1 passed reproduction	38.90%
		GH_FR1 passed reproduction	38.90%
		GH_ERC passed reproduction	38.90%
		CM_MC2 passed reproduction	38.90%
		EV_MC2 passed reproduction	38.90%
		EV_HC1 passed reproduction	38.90%
		LC_DCDS passed reproduction	38.90%
		LC_LC3 passed reproduction	38.90%
		LC_LC5 passed reproduction	38.90%
		LC_LCDSSLCC passed reproduction	38.90%
		RG_MIDAG passed reproduction	38.90%

Steel Many-One Rank Sum Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	135	71	2	18	CDF	1.0000	Non-Significant Effect
		GH_ER2	143	71	2	18	CDF	1.0000	Non-Significant Effect
		CM_MC1	106	71	3	18	CDF	0.9485	Non-Significant Effect
		FR_FRABCH	123	71	4	18	CDF	0.9995	Non-Significant Effect
		FR_FRCP1	105.5	71	4	18	CDF	0.9432	Non-Significant Effect
		GH_FR1	127	71	4	18	CDF	0.9999	Non-Significant Effect
		GH_ERC	132.5	71	2	18	CDF	1.0000	Non-Significant Effect
		CM_MC2	117	71	4	18	CDF	0.9964	Non-Significant Effect
		EV_MC2	132	71	3	18	CDF	1.0000	Non-Significant Effect
		EV_HC1	120.5	71	2	18	CDF	0.9988	Non-Significant Effect
		LC_DCDS	150	71	2	18	CDF	1.0000	Non-Significant Effect
		LC_LC3	139.5	71	3	18	CDF	1.0000	Non-Significant Effect
		LC_LC5	125.5	71	3	18	CDF	0.9998	Non-Significant Effect
		LC_LCDSSLCC	124.5	71	2	18	CDF	0.9997	Non-Significant Effect
		RG_MIDAG	142.5	71	2	18	CDF	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	972.594	64.8396	15	2.398	0.0040	Significant Effect
Error	3892.9	27.034	144			
Total	4865.49		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	21.14	30.58	0.1325	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9248	0.9774	2.1E-07	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	06-0249-4501	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	04 Nov-19 15:38	**Analysis:**	Nonparametric-Control vs Treatments	**Status Level:**	1

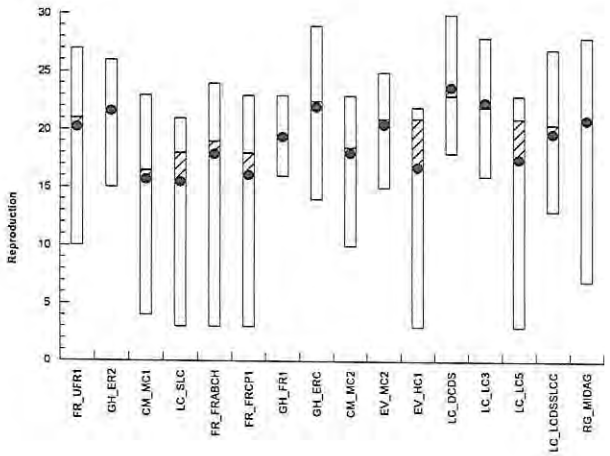
Reproduction Summary

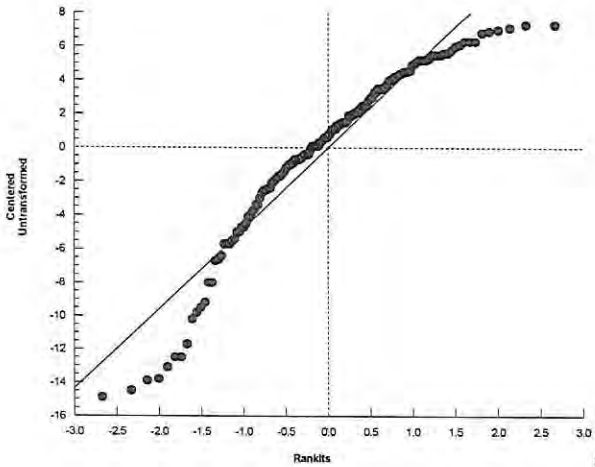
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	20.2	16.11	24.29	21	10	27	1.806	28.28%	0.00%
GH_ER2		10	21.6	19.26	23.94	21.5	15	26	1.035	15.15%	-6.93%
CM_MC1		10	15.7	11.3	20.1	16.5	4	23	1.944	39.15%	22.28%
LC_SLC	XC	10	15.5	11.22	19.78	18	3	21	1.893	38.62%	23.27%
FR_FRABCH		10	17.9	13.88	21.92	19	3	24	1.779	31.43%	11.39%
FR_FRCP1		10	16.1	12.08	20.12	18	3	23	1.779	34.95%	20.30%
GH_FR1		10	19.4	17.58	21.22	19.5	16	23	0.8055	13.13%	3.96%
GH_ERC		10	22	18.4	25.6	22.5	14	29	1.592	22.88%	-8.91%
CM_MC2		10	18	15.08	20.92	18.5	10	23	1.291	22.68%	10.89%
EV_MC2		10	20.5	17.99	23.01	21	15	25	1.108	17.09%	-1.49%
EV_HC1		10	16.8	11.76	21.84	21	3	22	2.23	41.98%	16.83%
LC_DCDS		10	23.7	21.27	26.13	23	18	30	1.075	14.35%	-17.33%
LC_LC3		10	22.4	19.36	25.44	22	16	28	1.343	18.96%	-10.89%
LC_LC5		10	17.5	12.11	22.89	21	3	23	2.382	43.04%	13.37%
LC_LCDSSLCC		10	19.7	16.19	23.21	20.5	13	27	1.55	24.87%	2.48%
RG_MIDAG		10	20.9	16.89	24.91	21	7	28	1.773	26.83%	-3.47%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		21	19	27	26	11	24	23	10	20	21
GH_ER2		23	26	21	22	20	15	19	26	23	21
CM_MC1		19	22	11	4	16	11	17	23	22	12
LC_SLC	XC	21	6	18	17	19	18	18	19	16	3
FR_FRABCH		24	22	3	18	18	19	19	19	17	20
FR_FRCP1		18	23	18	14	19	3	15	21	18	12
GH_FR1		16	21	20	20	19	23	19	16	23	17
GH_ERC		28	29	24	24	14	17	21	26	17	20
CM_MC2		21	14	17	18	23	21	22	10	19	15
EV_MC2		20	22	19	22	15	25	25	18	16	23
EV_HC1		15	21	22	22	3	7	21	22	22	13
LC_DCDS		28	25	23	22	23	23	21	24	30	18
LC_LC3		16	23	22	28	21	22	17	28	20	27
LC_LC5		21	3	23	21	15	22	19	23	23	5
LC_LCDSSLCC		25	23	27	22	18	14	14	19	13	22
RG_MIDAG		19	23	28	26	20	21	7	23	21	21

Graphics





Analyst: GJK QA: NN 4/19

Client: Teck

W.O.#: 191606/191609

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR-UFRI	Aug21/19	Aug21/19	50	8.0	8.1	158	50	9.0	180	MLF
GH-ERZ	Aug21/19	Aug21/19	50	7.2	7.4	140	50	9.5	190	MLF
CM-MC1	Aug21/19	Aug21/19	50	7.7	7.9	150	50	7.9	158	MLF
LC-SLC	Aug21/19	Aug21/19	50	7.3	7.5	141	50	9.3	186	MLF
FR-FRABCH	Aug21/19	Aug21/19	50	11.4	11.6	224	10①	5.7	570	MLF
FR-FRLPI	Aug21/19	Aug21/19	50	10.1	10.3	198	10①	5.1	510	MLF
GH-ERC FRI	Aug21/19	Aug21/19	50	10.6	10.8	~~208~~	10①	5.3	530	MLF
GH-ERC	Aug21/19	Aug21/19	50	8.2	8.4	160	~~10~~ 50	9.1	182	MLF
CM-MC2	Aug21/19	Aug21/19	50	11.0	11.2	216	10①	5.8	580	MLF
EV-MC2	Aug21/19	Aug21/19	50	9.6	9.7	190	10①	3.8	380	MLF
EV-HC1	Aug21/19	Aug21/19	50	10.1	10.3	198	10①	5.3	530	MLF
LC-DCDS	Aug21/19	Aug21/19	50	7.5	7.7	146	50	12.3	246	MLF
LC-LCS	Aug21/19	Aug21/19	50	10.8	11.0	212	10①	5.7	570	MLF
LC-LCS	Aug21/19	Aug21/19	50	9.8	10.0	192	10①	5.2	520	MLF
LC-LCDSSLC	Aug21/19	Aug21/19	50	9.8	9.9	194	10①	4.3	430	MLF
RG-MIDAG	Aug21/19	Aug21/19	50	8.8	8.9	174	10①	4.0	400	MLF
20% Pewter	Aug21/19	Aug21/19	100	9.4	9.6	92	50	5.0	100	SSK

Notes: ① Diluted to 100mL w/ DI Water

Reviewed by: [signature]

Date Reviewed: Nov. 1, 2019

APPENDIX B – *Pseudokirchneriella subcapitata* toxicity test data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 191608
Start Date: Aug 22/19
Set up by: JMW / JW

Sample Information:

Sample ID: various - see below
Sample Date: Aug 20/19
Date Received: Aug 21/19
Sample Volume: various

Test Organism Information:

Culture Date: Aug 16/19
Age of culture (Day 0): 6d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC188
Stock Solution ID: 192102
Date Initiated: Aug 23/19

72-h IC50 (95% CL): 25.1 (21.3 - 29.0) mg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 31.3 (25.7 - 38.0) mg/L Zn CV (%): 1=

Test Results:

	Cell Yield (Mean± SD)
Negative Control	49.6 ± 7.8 a.
FR_UFR1_MON_2019-08-20_N	69.5 ± 6.6 †e
GH_ER2_WS_2019-08-20_N	45.6 ± 8.9 a
CM_MC1_WS_2019-08-20_N	48.0 ± 8.6 a
LC_SLC_WS_2019-08-19_N	51.4 ± 13.3 a.
FR_FRABCH_MON_2019-08-20_NP	27.0 ± 5.5 *abcd
FR_FRCP1_MON_2019-08-20_N	34.5 ± 6.6 *acd
GH_FR1_WS_2019-08-20_N	26.0 ± 4.5 *abcd
GH_ERC_WS_2019-08-20_N	56.2 ± 3.6 a.

† indicates that cell yield is significantly greater than the lab control

a. indicates cell yield that is significantly lower than the site control FR_UFR1

b. indicates cell yield that is significantly lower than the site control GH_ER2

c. indicates cell yield that is significantly lower than site control CM_MC1

d. indicates cel yield that is significantly lower than sit control LC_SLC

* indicates that cell yield is significantly lower than the lab control

Reviewed by: [signature]
Date reviewed: Dec - 29, 2019

e. indicates cell yield that is significantly greater than site controls GH_ER2, CM_MC1 and LC_SLC

~~f. indicates cell yield that is signif~~ ng.

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 191608

Start Date: Aug 22/19
Set up by: JMW/JW

Sample Information:

Sample ID: various - see below
Sample Date: Aug 20/19
Date Received: Aug 21/19
Sample Volume: various

Test Organism Information:

Culture Date: Aug 16/19
Age of culture (Day 0): 6d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC188
Stock Solution ID: 19Zn07
Date Initiated: Aug 23/19

72-h IC50 (95% CL): 25.1 (21.3 - 29.0) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 31.3 (25.7 - 38.0) ug/L Zn CV (%): 10

Test Results:

	Cell Yield (Mean± SD)
Negative Control	49.6 ± 7.8 a
CN_MC2_WS_2019-08-20_N	22.8 ± 3.4 *abcd
EV_MC2_WS_2019_Q3_WKI_N	39.2 ± 5.4 aa
EV_HCl_WS_2019_Q3_WKI_N	52.5 ± 3.9 a.
LC_DCDS_WS_2019-08-19_N	58.5 ± 6.5 f.
LC_LC3_WS_2019-08-19_N	27.0 ± 3.6 *abcd
LC_LCDSS LCC_WS_2019-08-19_N	29.8 ± 3.3 *a.bcd
LC_LC5_WS_2019-08-19_N	26.2 ± 1.5 *a.bcd
	±

a. indicates cell yield that is significantly lower than site control FR_UFR1

b. indicates cell yield that is significantly lower than site control GH_ER2

c. indicates cell yield that is significantly lower than site control CN_MC1

d. indicates cell yield that is significantly ~~greater~~ lower than sit. control LC_SLC.

* indicates cell yield that is significantly lower than the lab control

Reviewed by: [signature]

Date reviewed: Oct. 29, 2019

f. indicates cell yield that is significantly greater than site control GH_ER2

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck coal | Setup by: JMW / JW

Sample ID: various - see below | Test Date/Time: Aug. 22/19 @ ~~4:25 PM~~ 1605h AM

Work Order No.: 191608 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Aug. 16/19 | Age of Culture: 6d | Culture Health: good

Culture Count: 1 600 2 580 | Average: 590 | Culture Cell Density (c1): 590 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 590 x 10^4 cells/ml = 3.7mL

Time Zero Counts: 1 24 2 23 | Average: 23.5

No. of Cells/mL: 23.5 x 10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10682 cells/mL

Concentration %(v/v) 95.2%	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control ~~7.4~~ 7.3	~~7.4~~	24.0	24.0	25.0	25.?	25.?	✓	✓	✓	✓
FR_UFR1	8.4	24.0					✓		✓	✓
GH_ER2	8.3	24.0					✓		✓	✓
CM_MC1	8.3	24.0					✓		✓	✓
LC_SLC	8.3	24.0					✓		✓	✓
FR_FRABCH	8.3	24.0					✓		✓	✓
FR_FRCP1	8.3	24.0					✓		✓	✓
GH_FR1	8.4	24.0					✓		✓	✓
GH_ERC	8.3	24.0					✓		✓	✓
CM_MC2	8.4	24.0					✓		✓	✓
Initials	JMW	JMW	JMW	JMW	~	~	JMW	JMW	~	~

Initial control pH: Well 1: 7.0 | Well 2: 7.0

Final control pH: Well 1: 7.1 | Well 2: 7.1

Light intensity (lux): 4300 lux | Date measured: Aug. 22/19

Thermometer: 4 | Light meter: 1 | pH meter/probe: 1, 1

Sample Description: all samples: clear, colourless, odourless, no particulates

Comments:

Reviewed: [signature] | Date reviewed: Oct. 29, 2019

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: JMW / JMW

Sample ID: various - See below | Test Date/Time: Aug. 22/19 4:25 PM 1625h

Work Order No.: 191608 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Aug. 16/19 | Age of Culture: 6d | Culture Health: good

Culture Count: 1 600 2 580 | Average: 590 | Culture Cell Density (c1): 590 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 590x10⁴ cells/ml = 3.7mL

Time Zero Counts: 1 24 2 23 | Average: 23.5

No. of Cells/mL: 23.5 x 10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10682 cells/mL

Concentration 95.2 %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.3	24.0	24.0	25.0	25	25.0	✓	✓	✓	✓
EV_MC2	8.4	24.0					-		✓	✓
EV_HC1	8.3	24.0					-		✓	✓
LC_DCDS	8.2	24.0					-		✓	✓
LC_LC3	8.1	24.0					-		✓	✓
LC_LCDSSLCC	8.3	24.0					-		✓	✓
LC_LC5	8.4	24.0	↓	↓	↓	↓	-	↓	✓	✓
Initials	JMW	JMW	JMW	JMW	A	~	JMW	JMW	A	~

Initial control pH: Well 1: 7.0 | Well 2: 7.0

Final control pH: Well 1: ~~7.1~~ 7.1 | Well 2: 7.1

Light intensity (lux): JMW 4300 lux | Date measured: Aug. 22/19

Thermometer: 4 | Light meter: 1 | pH meter/probe: 1, 1

Sample Description: all samples: clear, colourless, odourless, no particulates

Comments:

Reviewed: | Date reviewed: Aug. 29, 2019

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck (Cal) Start Date/Time: Aug 22/19 @ 1625h
Work Order #: 191608 Termination Date: Aug 25/19 @ 1625h
Sample ID: various - see below Test set up by: JMW/JW
95.2%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	53					JMW
	B	55					"
	C	44					
	D	46					
	E	57					
	F	36					
	G	58					
	H	56					
FR_UFR1 (site)	A	60					
	B	~~170~~					
	C	74					
	D	71					
	E A	80					
	F B	77					
	G C	68					
	H D[dup]	64					
GH_ER2 (site)	A	59					
	B	58					
	C	39					
	D	36					
	E A	48					
	F B	40					
	G C	52					
	H D[dup]	41					
CM_MC1 (site)	A	38					
	B	44					
	C	60					
	D	49					
	E A	43					
	F B	59					
	G C	42					
	H D[dup]	57					↓
	A						
	B						
	C						
	D						

Comments:

Reviewed by: Date Reviewed: Aug. 29, 2019

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal | Start Date/Time: Aug 22/19 @ 1625h
Work Order #: 191608 | Termination Date: Aug 25/19 @ 1625h
Sample ID: various - see below | Test set up by: JMW/JW
95.2%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A						~~JMW~~
	B						
	C						
	D						
	E						
	F						
	G						
	H						
LC-SLC (site)	A	50					JMW
	B	38					
	C	68					
	D	70					
E	A	65					
F	B	39					
G	C	45					
H	D	44					
FR-FRABCH	A	25					
	B	36					
	C	24					
	D	27					
FR-FRCP1	A	44					
	B	32					
	C	37					
	D	29					
GH-FR1	A	28					
	B	23					
	C	24					
	D	33					
GH-ERC	A	59					
	B	52					
	C	60					
	D	58					
CM-MC2	A	27					
	B	19					
	C	25					
	D	24					

Comments:

Reviewed by: [signature] | Date Reviewed: Oct. 29, 2019

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal | Start Date/Time: Aug 22/19 @ 1625h
Work Order #: 191608 | Termination Date: Aug 25/19 @ 1625h
Sample ID: various - see below | Test set up by: JMW/JW

95.2%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A						
	B						
	C						
	D						
	E						
	F						
	G						
	H						
EV_MC2	A	35					JMW
	B	47					
	C	37					
	D	42					
EV_HC1	A	52					
	B	49					
	C	55					
	D	58					
LC_DCDS	A	58					
	B	69					
	C	55					
	D	56					
LC_LC3	A	28					
	B	26					
	C	25					
	D	33					
LC_LC5	A	26					
	B	29					
	C	26					
	D	28					
LC_LCDSSLCC	A	31					
	B	27					
	C	35					
	D	30					✓
	A						
	B						
	C						
	D						

Comments:

Reviewed by: | Date Reviewed: Oct. 29, 2019

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 191608
Sample ID: Teck Coal various samples pass/fail

Start Date/Time: 22-Aug-19 @ 1625h
Termination Date/Time: 25-Aug-19 @ 1625h
Initial Cell Density: 10682 cell/mL

									235000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10681.82
Control	A	53				53	51.9	mean	49.6
Lab Control	B	55				55	53.9	SD	7.818248
	C	44				44	42.9	CV	15.77633
	D	46				46	44.9		
	E	57				57	55.9		
	F	36				36	34.9		
	G	58				58	56.9		
	H	56				56	54.9		
Control	A	60				60	58.9	mean	69.4
Site Water	B	70				70	68.9	SD	6.590036
(FR_UFR1)	C	74				74	72.9	CV	9.491377
95.2% (v/v)	D	71				71	69.9		
	E	80				80	78.9		
	F	77				77	75.9		
	G	68				68	66.9		
	H	64				64	62.9		
Control	A	59				59	57.9	mean	45.6
Site Water	B	58				58	56.9	SD	8.943274
(GH_ER2)	C	39				39	37.9	CV	19.63103
95.2% (v/v)	D	36				36	34.9		
	E	48				48	46.9		
	F	40				40	38.9		
	G	52				52	50.9		
	H	41				41	39.9		
Control	A	38				38	36.9	mean	47.9
Site Water	B	44				44	42.9	SD	8.585702
(CM_MC1)	C	60				60	58.9	CV	17.91232
95.2% (v/v)	D	49				49	47.9		
	E	43				43	41.9		
	F	59				59	57.9		
	G	42				42	40.9		
	H	57				57	55.9		
						#DIV/0!	#DIV/0!		
						#DIV/0!	#DIV/0!		
						#DIV/0!	#DIV/0!		
						#DIV/0!	#DIV/0!		

Reviewed by: _____

Date reviewed: Oct 31, 2019

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 191608
Sample ID: Teck Coal various samples pass/fail

Start Date/Time: 22-Aug-19 @ 1625h
Termination Date/Time: 25-Aug-19 @ 1625h
Initial Cell Density: 10682 cell/mL

									235000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10681.82
Control	A					#DIV/0!	#DIV/0!	mean	#DIV/0!
	B					#DIV/0!	#DIV/0!	SD	#DIV/0!
	C					#DIV/0!	#DIV/0!	CV	#DIV/0!
	D					#DIV/0!	#DIV/0!		
	A					#DIV/0!	#DIV/0!		
	B					#DIV/0!	#DIV/0!		
	C					#DIV/0!	#DIV/0!		
	D					#DIV/0!	#DIV/0!		
Site Control	A	50				50	48.9	mean	51.3
(LC_SLC)	B	38				38	36.9	SD	13.25505
95.2% (v/v)	C	68				68	66.9	CV	25.83488
	D	70				70	68.9		
	E	65				65	63.9		
	F	39				39	37.9		
	G	45				45	43.9		
	H	44				44	42.9		
FR_FRABCH	A	25				25	23.9		
95.2% (v/v)	B	36				36	34.9		
	C	24				24	22.9		
	D	27				27	25.9		
FR_FRCP1	A	44				44	42.9		
95.2% (v/v)	B	32				32	30.9		
	C	37				37	35.9		
	D	29				29	27.9		
GH_FR1	A	28				28	26.9		
95.2% (v/v)	B	23				23	21.9		
	C	24				24	22.9		
	D	33				33	31.9		
GH_ERC	A	59				59	57.9		
95.2% (v/v)	B	52				52	50.9		
	C	60				60	58.9		
	D	58				58	56.9		
CM_MC2	A	27				27	25.9		
95.2% (v/v)	B	19				19	17.9		
	C	25				25	23.9		
	D	24				24	22.9		

Reviewed by: _____

Date reviewed: Dec 31, 2019

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 191608
Sample ID: Teck Coal various samples pass/fail

Start Date/Time: 22-Aug-19 @ 1625h
Termination Date/Time: 25-Aug-19 @ 1625h
Initial Cell Density: 10682 cell/mL

									235000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10681.82
Control	A					#DIV/0!	#DIV/0!	mean	#DIV/0!
	B					#DIV/0!	#DIV/0!	SD	#DIV/0!
	C					#DIV/0!	#DIV/0!	CV	#DIV/0!
	D					#DIV/0!	#DIV/0!		
	A					#DIV/0!	#DIV/0!		
	B					#DIV/0!	#DIV/0!		
	C					#DIV/0!	#DIV/0!		
	D					#DIV/0!	#DIV/0!		
EV_MC2	A	35				35	33.9		
95.2% (v/v)	B	47				47	45.9		
	C	37				37	35.9		
	D	42				42	40.9		
EV_HC1	A	52				52	50.9		
95.2% (v/v)	B	49				49	47.9		
	C	55				55	53.9		
	D	58				58	56.9		
LC_DCDS	A	58				58	56.9		
95.2% (v/v)	B	69				69	67.9		
	C	55				55	53.9		
	D	56				56	54.9		
LC_LC3	A	28				28	26.9		
95.2% (v/v)	B	26				26	24.9		
	C	25				25	23.9		
	D	33				33	31.9		
LC_LC5	A	26				26	24.9		
95.2% (v/v)	B	29				29	27.9		
	C	26				26	24.9		
	D	28				28	26.9		
LC_LCDSSLC	A	31				31	29.9		
95.2% (v/v)	B	27				27	25.9		
	C	35				35	33.9		
	D	30				30	28.9		
	A					#DIV/0!	#DIV/0!		
	B					#DIV/0!	#DIV/0!		
	C					#DIV/0!	#DIV/0!		
	D					#DIV/0!	#DIV/0!		

Reviewed by: _____ Date reviewed: Oct. 31, 2019

CETIS Summary Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Batch ID:	02-4619-1857	**Test Type:**	Cell Growth	**Analyst:**	Jeslin Wijaya
Start Date:	22 Aug-19 ~~16:10~~ 16:35	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	25 Aug-19 ~~16:00~~ 16:35	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	53h (12.4 °C)	Teck Coal	Teck Coal Q3
GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	52h (~~7.9~~ °C) 8.2		
CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19	52h (~~8.4 °C~~) 7.6		
LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	55h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	54h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	56h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	50h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	51h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	53h ~~(7.6 °C)~~ 8.4		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	53h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	54h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	54h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	55h (8.9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	54h (7.6 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	54h (9 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	FR_FRCP1 failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	LC_LC3 failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	LC_DCDS failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	EV_HC1 failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	EV_MC2 failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	FR_UFR1 failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	LC_LC5 failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	LC_LCDSSLCC failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	GH_ERC failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	CM_MC2 failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	GH_FR1 failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	LC_SLC failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	Lab Control failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	FR_FRABCH failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	GH_ER2 failed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	4.6E-05	CM_MC1 failed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	GH_ER2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	GH_ERC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	FR_FRABCH passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9992	GH_FR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	GH_ER2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	FR_FRABCH passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	GH_FR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	GH_ERC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.6405	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1

EC Alga Growth Inhibition Test — Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	GH_ER2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	GH_ERC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	FR_FRABCH passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	GH_FR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.9342	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	GH_ERC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	GH_ER2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	GH_FR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	FR_FRABCH passed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	0.3815	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC3 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LCDSSLCC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_HC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	EV_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_DCDS passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_FR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_LC5 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRCP1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	Lab Control passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_FRABCH passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	LC_SLC passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	CM_MC1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	FR_UFR1 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ER2 passed cell yield	1
02-1154-5029	Cell Yield	Dunnett Multiple Comparison Test	1.0000	GH_ERC passed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

Cell Yield Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	N	8	49.62	43.09	56.16	35	57	2.764	7.818	15.75%	0.00%
FR_UFR1		8	69.5	63.99	75.01	59	79	2.33	6.59	9.48%	-40.05%
GH_ER2		8	45.62	38.15	53.1	35	58	3.162	8.943	19.60%	8.06%
CM_MC1		8	48	40.82	55.18	37	59	3.036	8.586	17.89%	3.27%
LC_SLC	XC	8	51.38	40.29	62.46	37	69	4.686	13.26	25.80%	-3.53%
FR_FRABCH		4	27	18.28	35.72	23	35	2.739	5.477	20.29%	45.59%
FR_FRCP1		4	34.5	24.07	44.93	28	43	3.279	6.557	19.01%	30.48%
GH_FR1		4	26	18.77	33.23	22	32	2.273	4.546	17.48%	47.61%
GH_ERC		4	56.25	50.53	61.97	51	59	1.797	3.594	6.39%	-13.35%
CM_MC2		4	22.75	17.33	28.17	18	26	1.702	3.403	14.96%	54.16%
EV_MC2		4	39.25	30.69	47.81	34	46	2.689	5.377	13.70%	20.91%
EV_HC1		4	52.5	46.34	58.66	48	57	1.936	3.873	7.38%	-5.79%
LC_DCDS		4	58.5	48.23	68.77	54	68	3.227	6.455	11.03%	-17.88%
LC_LC3		4	27	21.34	32.66	24	32	1.78	3.559	13.18%	45.59%
LC_LCDSSLCC		4	29.75	24.49	35.01	26	34	1.652	3.304	11.11%	40.05%
LC_LC5		4	26.25	23.86	28.64	25	28	0.75	1.5	5.71%	47.10%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	N	52	54	43	45	56	35	57	55
FR_UFR1		59	69	73	70	79	76	67	63
GH_ER2		58	57	38	35	47	39	51	40
CM_MC1		37	43	59	48	42	58	41	56
LC_SLC	XC	49	37	67	69	64	38	44	43
FR_FRABCH		24	35	23	26				
FR_FRCP1		43	31	36	28				
GH_FR1		27	22	23	32				
GH_ERC		58	51	59	57				
CM_MC2		26	18	24	23				
EV_MC2		34	46	36	41				
EV_HC1		51	48	54	57				
LC_DCDS		57	68	54	55				
LC_LC3		27	25	24	32				
LC_LCDSSLCC		30	26	34	29				
LC_LC5		25	28	25	27				

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	02-9074-1927	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	11 Sep-19 16:43	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	02-4619-1857	**Test Type:**	Cell Growth	**Analyst:**	Jeslin Wijaya
Start Date:	22 Aug-19 16:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	25 Aug-19 ~~16:00~~ 16:25 MG	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	02-2841-5167	22 Aug-19	22 Aug-19	16h	Teck Coal	
FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	53h (12.4 °C)		Teck Coal Q3
GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	53h (~~7.9~~ MG °C) 8.2		
CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	53h (~~8.4~~ MG °C) 7.6		
LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	56h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	55h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	56h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	50h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	51h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	53h (~~7.6~~ MG °C) 8.4		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	54h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	55h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	54h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	55h (8.9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	55h (7.6 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	54h (9 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 02-9074-1927 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:43 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed cell yield	24.56%
		GH_ER2 passed cell yield	24.56%
		CM_MC1 passed cell yield	24.56%
		LC_SLC passed cell yield	24.56%
		FR_FRABCH failed cell yield	24.56%
		FR_FRCP1 failed cell yield	24.56%
		GH_FR1 failed cell yield	24.56%
		GH_ERC passed cell yield	24.56%
		CM_MC2 failed cell yield	24.56%
		EV_MC2 passed cell yield	24.56%
		EV_HC1 passed cell yield	24.56%
		LC_DCDS passed cell yield	24.56%
		LC_LC3 failed cell yield	24.56%
		LC_LCDSSLCC failed cell yield	24.56%
		LC_LC5 failed cell yield	24.56%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	-5.37	2.688	9.95	14	CDF	1.0000	Non-Significant Effect
		GH_ER2	1.081	2.688	9.95	14	CDF	0.6501	Non-Significant Effect
		CM_MC1	0.439	2.688	9.95	14	CDF	0.8974	Non-Significant Effect
		LC_SLC	-0.4728	2.688	9.95	14	CDF	0.9945	Non-Significant Effect
		FR_FRABCH*	4.991	2.688	12.19	10	CDF	3.3E-05	Significant Effect
		FR_FRCP1*	3.336	2.688	12.19	10	CDF	0.0088	Significant Effect
		GH_FR1*	5.212	2.688	12.19	10	CDF	1.5E-05	Significant Effect
		GH_ERC	-1.461	2.688	12.19	10	CDF	1.0000	Non-Significant Effect
		CM_MC2*	5.928	2.688	12.19	10	CDF	1.4E-06	Significant Effect
		EV_MC2	2.289	2.688	12.19	10	CDF	0.1211	Non-Significant Effect
		EV_HC1	-0.6342	2.688	12.19	10	CDF	0.9972	Non-Significant Effect
		LC_DCDS	-1.958	2.688	12.19	10	CDF	1.0000	Non-Significant Effect
		LC_LC3*	4.991	2.688	12.19	10	CDF	3.3E-05	Significant Effect
		LC_LCDSSLCC*	4.384	2.688	12.19	10	CDF	3.0E-04	Significant Effect
		LC_LC5*	5.156	2.688	12.19	10	CDF	1.8E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.63	3.323	0.6179	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.63		0.5484	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15704.6	1046.97	15	19.11	<1.0E-37	Significant Effect
Error	3726.38	54.7996	68			
Total	19431		83			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.42	30.58	0.0446	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9896	0.9596	0.7452	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 02-9074-1927 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:43 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

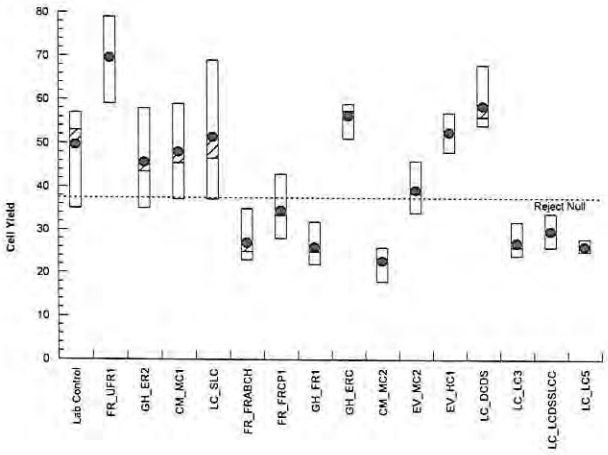
Cell Yield Summary

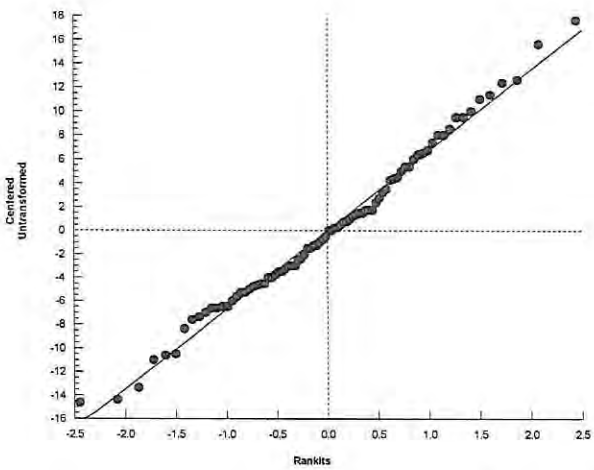
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	N	8	49.62	43.09	56.16	53	35	57	2.764	15.75%	0.00%
FR_UFR1		8	69.5	63.99	75.01	69.5	59	79	2.33	9.48%	-40.05%
GH_ER2		8	45.62	38.15	53.1	43.5	35	58	3.162	19.60%	8.06%
CM_MC1		8	48	40.82	55.18	45.5	37	59	3.036	17.89%	3.27%
LC_SLC		8	51.38	40.29	62.46	46.5	37	69	4.686	25.80%	-3.53%
FR_FRABCH		4	27	18.28	35.72	25	23	35	2.739	20.29%	45.59%
FR_FRCP1		4	34.5	24.07	44.93	33.5	28	43	3.279	19.01%	30.48%
GH_FR1		4	26	18.77	33.23	25	22	32	2.273	17.48%	47.61%
GH_ERC		4	56.25	50.53	61.97	57.5	51	59	1.797	6.39%	-13.35%
CM_MC2		4	22.75	17.33	28.17	23.5	18	26	1.702	14.96%	54.16%
EV_MC2		4	39.25	30.69	47.81	38.5	34	46	2.689	13.70%	20.91%
EV_HC1		4	52.5	46.34	58.66	52.5	48	57	1.936	7.38%	-5.79%
LC_DCDS		4	58.5	48.23	68.77	56	54	68	3.227	11.03%	-17.88%
LC_LC3		4	27	21.34	32.66	26	24	32	1.78	13.18%	45.59%
LC_LCDSSLCC		4	29.75	24.49	35.01	29.5	26	34	1.652	11.11%	40.05%
LC_LC5		4	26.25	23.86	28.64	26	25	28	0.75	5.71%	47.10%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	N	52	54	43	45	56	35	57	55
FR_UFR1		59	69	73	70	79	76	67	63
GH_ER2		58	57	38	35	47	39	51	40
CM_MC1		37	43	59	48	42	58	41	56
LC_SLC		49	37	67	69	64	38	44	43
FR_FRABCH		24	35	23	26				
FR_FRCP1		43	31	36	28				
GH_FR1		27	22	23	32				
GH_ERC		58	51	59	57				
CM_MC2		26	18	24	23				
EV_MC2		34	46	36	41				
EV_HC1		51	48	54	57				
LC_DCDS		57	68	54	55				
LC_LC3		27	25	24	32				
LC_LCDSSLCC		30	26	34	29				
LC_LC5		25	28	25	27				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-0541-9500	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	11 Sep-19 16:44	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	02-4619-1857	**Test Type:**	Cell Growth	**Analyst:**	Jeslin Wijaya
Start Date:	22 Aug-19 16:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	25 Aug-19 ~~16:00~~ 16:25 MCT	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	02-2841-5167	22 Aug-19	22 Aug-19	16h	Teck Coal	
FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	53h (12.4 °C)		Teck Coal Q3
GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	53h (~~7.9~~ MCT °C) 8.2		
CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	53h (~~8.4~~ MCT °C) 7.6		
LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	56h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	55h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	56h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	50h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	51h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	53h (~~7.6~~ MCT °C) 8.4		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	54h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	55h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	54h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	55h (8.9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	55h (7.6 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	54h (9 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 15-0541-9500 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:44 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 failed cell yield	24.56%
		GH_ER2 passed cell yield	24.56%
		CM_MC1 passed cell yield	24.56%
		LC_SLC passed cell yield	24.56%
		FR_FRABCH passed cell yield	24.56%
		FR_FRCP1 passed cell yield	24.56%
		GH_FR1 passed cell yield	24.56%
		GH_ERC passed cell yield	24.56%
		CM_MC2 passed cell yield	24.56%
		EV_MC2 passed cell yield	24.56%
		EV_HC1 passed cell yield	24.56%
		LC_DCDS passed cell yield	24.56%
		LC_LC3 passed cell yield	24.56%
		LC_LCDSSLCC passed cell yield	24.56%
		LC_LC5 passed cell yield	24.56%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1*	5.37	2.688	9.95	14	CDF	8.3E-06	Significant Effect
		GH_ER2	-1.081	2.688	9.95	14	CDF	0.9996	Non-Significant Effect
		CM_MC1	-0.439	2.688	9.95	14	CDF	0.9938	Non-Significant Effect
		LC_SLC	0.4728	2.688	9.95	14	CDF	0.8888	Non-Significant Effect
		FR_FRABCH	-4.991	2.688	12.19	10	CDF	1.0000	Non-Significant Effect
		FR_FRCP1	-3.336	2.688	12.19	10	CDF	1.0000	Non-Significant Effect
		GH_FR1	-5.212	2.688	12.19	10	CDF	1.0000	Non-Significant Effect
		GH_ERC	1.461	2.688	12.19	10	CDF	0.4515	Non-Significant Effect
		CM_MC2	-5.928	2.688	12.19	10	CDF	1.0000	Non-Significant Effect
		EV_MC2	-2.289	2.688	12.19	10	CDF	1.0000	Non-Significant Effect
		EV_HC1	0.6342	2.688	12.19	10	CDF	0.8404	Non-Significant Effect
		LC_DCDS	1.958	2.688	12.19	10	CDF	0.2236	Non-Significant Effect
		LC_LC3	-4.991	2.688	12.19	10	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLCC	-4.384	2.688	12.19	10	CDF	1.0000	Non-Significant Effect
		LC_LC5	-5.156	2.688	12.19	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.63	3.323	0.6179	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.63		0.5484	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15704.6	1046.97	15	19.11	<1.0E-37	Significant Effect
Error	3726.38	54.7996	68			
Total	19431		83			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.42	30.58	0.0446	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9896	0.9596	0.7452	Normal Distribution

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	15-0541-9500	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	11 Sep-19 16:44	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

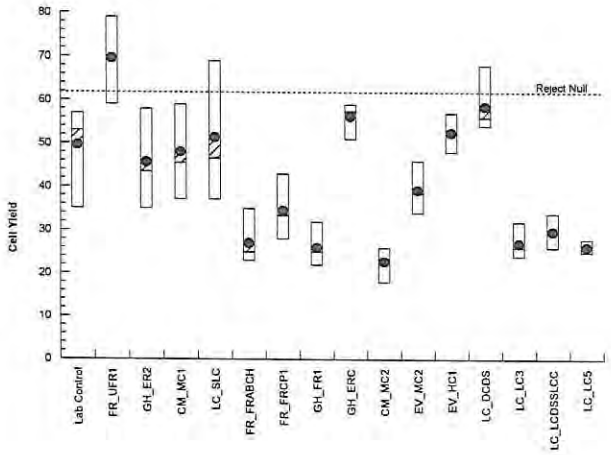
Cell Yield Summary

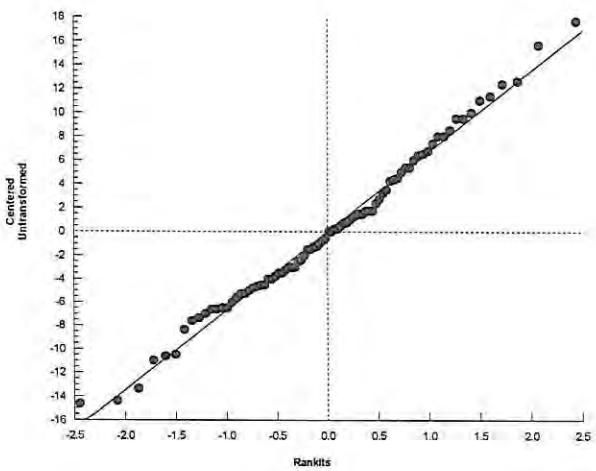
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	N	8	49.62	43.09	56.16	53	35	57	2.764	15.75%	0.00%
FR_UFR1		8	69.5	63.99	75.01	69.5	59	79	2.33	9.48%	-40.05%
GH_ER2		8	45.62	38.15	53.1	43.5	35	58	3.162	19.60%	8.06%
CM_MC1		8	48	40.82	55.18	45.5	37	59	3.036	17.89%	3.27%
LC_SLC		8	51.38	40.29	62.46	46.5	37	69	4.686	25.80%	-3.53%
FR_FRABCH		4	27	18.28	35.72	25	23	35	2.739	20.29%	45.59%
FR_FRCP1		4	34.5	24.07	44.93	33.5	28	43	3.279	19.01%	30.48%
GH_FR1		4	26	18.77	33.23	25	22	32	2.273	17.48%	47.61%
GH_ERC		4	56.25	50.53	61.97	57.5	51	59	1.797	6.39%	-13.35%
CM_MC2		4	22.75	17.33	28.17	23.5	18	26	1.702	14.96%	54.16%
EV_MC2		4	39.25	30.69	47.81	38.5	34	46	2.689	13.70%	20.91%
EV_HC1		4	52.5	46.34	58.66	52.5	48	57	1.936	7.38%	-5.79%
LC_DCDS		4	58.5	48.23	68.77	56	54	68	3.227	11.03%	-17.88%
LC_LC3		4	27	21.34	32.66	26	24	32	1.78	13.18%	45.59%
LC_LCDSSLCC		4	29.75	24.49	35.01	29.5	26	34	1.652	11.11%	40.05%
LC_LC5		4	26.25	23.86	28.64	26	25	28	0.75	5.71%	47.10%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	N	52	54	43	45	56	35	57	55
FR_UFR1		59	69	73	70	79	76	67	63
GH_ER2		58	57	38	35	47	39	51	40
CM_MC1		37	43	59	48	42	58	41	56
LC_SLC		49	37	67	69	64	38	44	43
FR_FRABCH		24	35	23	26				
FR_FRCP1		43	31	36	28				
GH_FR1		27	22	23	32				
GH_ERC		58	51	59	57				
CM_MC2		26	18	24	23				
EV_MC2		34	46	36	41				
EV_HC1		51	48	54	57				
LC_DCDS		57	68	54	55				
LC_LC3		27	25	24	32				
LC_LCDSSLCC		30	26	34	29				
LC_LC5		25	28	25	27				

Graphics





EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	10-2639-4566	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	11 Sep-19 16:46	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	02-4619-1857	**Test Type:**	Cell Growth	**Analyst:**	Jeslin Wijaya
Start Date:	22 Aug-19 16:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	25 Aug-19 ~~16:00~~ MG 16:25	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	53h (12.4 °C)	Teck Coal	Teck Coal Q3
GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	53h (~~7.9~~ MG °C) 8.2		
CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	53h (~~8.4~~ MG °C) 7.6		
LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	56h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	55h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	56h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	50h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	51h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	53h (~~7.6~~ MG °C) 8.4		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	54h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	55h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	54h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	55h (8.9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	55h (7.6 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	54h (9 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 10-2639-4566 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:46 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 failed cell yield	17.35%
		CM_MC1 failed cell yield	17.35%
		LC_SLC failed cell yield	17.35%
		FR_FRABCH failed cell yield	17.35%
		FR_FRCP1 failed cell yield	17.35%
		GH_FR1 failed cell yield	17.35%
		GH_ERC failed cell yield	17.35%
		CM_MC2 failed cell yield	17.35%
		EV_MC2 failed cell yield	17.35%
		EV_HC1 failed cell yield	17.35%
		LC_DCDS passed cell yield	17.35%
		LC_LC3 failed cell yield	17.35%
		LC_LCDSSLCC failed cell yield	17.35%
		LC_LC5 failed cell yield	17.35%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2*	6.494	2.677	9.844	14	CDF	3.1E-07	Significant Effect
FR_UFR1		CM_MC1*	5.848	2.677	9.844	14	CDF	1.6E-06	Significant Effect
		LC_SLC*	4.93	2.677	9.844	14	CDF	4.6E-05	Significant Effect
		FR_FRABCH*	9.438	2.677	12.06	10	CDF	1.9E-07	Significant Effect
		FR_FRCP1*	7.772	2.677	12.06	10	CDF	1.9E-07	Significant Effect
		GH_FR1*	9.66	2.677	12.06	10	CDF	1.9E-07	Significant Effect
		GH_ERC*	2.942	2.677	12.06	10	CDF	0.0258	Significant Effect
		CM_MC2*	10.38	2.677	12.06	10	CDF	1.9E-07	Significant Effect
		EV_MC2*	6.718	2.677	12.06	10	CDF	2.4E-07	Significant Effect
		EV_HC1*	3.775	2.677	12.06	10	CDF	0.0023	Significant Effect
		LC_DCDS	2.443	2.677	12.06	10	CDF	0.0852	Non-Significant Effect
		LC_LC3*	9.438	2.677	12.06	10	CDF	1.9E-07	Significant Effect
		LC_LCDSSLCC*	8.827	2.677	12.06	10	CDF	1.9E-07	Significant Effect
		LC_LC5*	9.605	2.677	12.06	10	CDF	1.9E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.658	3.288	0.5033	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.658		0.9049	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15443.4	1103.1	14	20.4	<1.0E-37	Significant Effect
Error	3298.5	54.0738	61			
Total	18741.9		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.29	29.14	0.0318	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9823	0.9559	0.3679	Normal Distribution

Dec 29/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 10-2639-4566 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:46 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

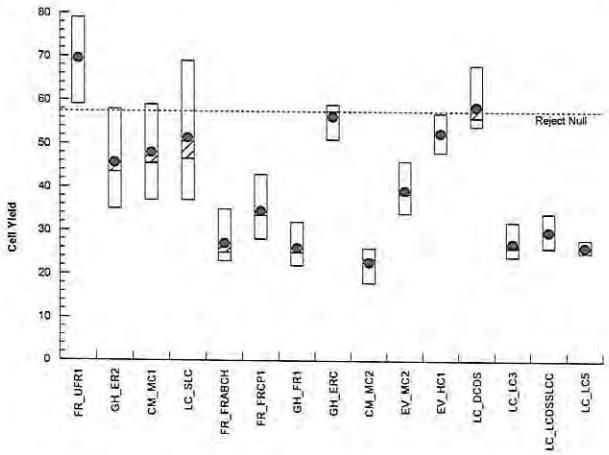
Cell Yield Summary

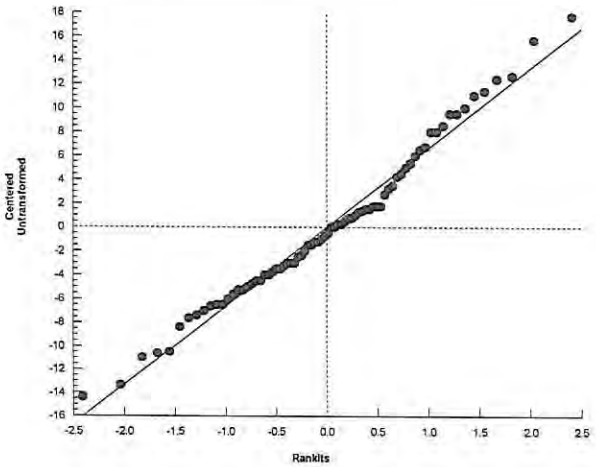
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	8	69.5	63.99	75.01	69.5	59	79	2.33	9.48%	0.00%
GH_ER2		8	45.62	38.15	53.1	43.5	35	58	3.162	19.60%	34.35%
CM_MC1		8	48	40.82	55.18	45.5	37	59	3.036	17.89%	30.94%
LC_SLC		8	51.38	40.29	62.46	46.5	37	69	4.686	25.80%	26.08%
FR_FRABCH		4	27	18.28	35.72	25	23	35	2.739	20.29%	61.15%
FR_FRCP1		4	34.5	24.07	44.93	33.5	28	43	3.279	19.01%	50.36%
GH_FR1		4	26	18.77	33.23	25	22	32	2.273	17.48%	62.59%
GH_ERC		4	56.25	50.53	61.97	57.5	51	59	1.797	6.39%	19.06%
CM_MC2		4	22.75	17.33	28.17	23.5	18	26	1.702	14.96%	67.27%
EV_MC2		4	39.25	30.69	47.81	38.5	34	46	2.689	13.70%	43.53%
EV_HC1		4	52.5	46.34	58.66	52.5	48	57	1.936	7.38%	24.46%
LC_DCDS		4	58.5	48.23	68.77	56	54	68	3.227	11.03%	15.83%
LC_LC3		4	27	21.34	32.66	26	24	32	1.78	13.18%	61.15%
LC_LCDSSLCC		4	29.75	24.49	35.01	29.5	26	34	1.652	11.11%	57.19%
LC_LC5		4	26.25	23.86	28.64	26	25	28	0.75	5.71%	62.23%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	XC	59	69	73	70	79	76	67	63
GH_ER2		58	57	38	35	47	39	51	40
CM_MC1		37	43	59	48	42	58	41	56
LC_SLC		49	37	67	69	64	38	44	43
FR_FRABCH		24	35	23	26				
FR_FRCP1		43	31	36	28				
GH_FR1		27	22	23	32				
GH_ERC		58	51	59	57				
CM_MC2		26	18	24	23				
EV_MC2		34	46	36	41				
EV_HC1		51	48	54	57				
LC_DCDS		57	68	54	55				
LC_LC3		27	25	24	32				
LC_LCDSSLCC		30	26	34	29				
LC_LC5		25	28	25	27				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	05-4052-1687	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	11 Sep-19 16:46	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	02-4619-1857	**Test Type:**	Cell Growth	**Analyst:**	Jeslin Wijaya
Start Date:	22 Aug-19 16:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	25 Aug-19 ~~16:00~~ 16:25 MC	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	53h (12.4 °C)	Teck Coal	Teck Coal Q3
GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	53h (~~7.9~~ MC °C) 8.2		
CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	53h (~~8.4~~ MC °C) 7.6		
LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	56h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	55h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	56h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	50h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	51h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	53h (~~7.6~~ MC °C) 8.4		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	54h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	55h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	54h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	55h (8.9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	55h (7.6 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	54h (9 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 05-4052-1687 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:46 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	GH_ER2 passed cell yield	17.35%
		CM_MC1 passed cell yield	17.35%
		LC_SLC passed cell yield	17.35%
		FR_FRABCH passed cell yield	17.35%
		FR_FRCP1 passed cell yield	17.35%
		GH_FR1 passed cell yield	17.35%
		GH_ERC passed cell yield	17.35%
		CM_MC2 passed cell yield	17.35%
		EV_MC2 passed cell yield	17.35%
		EV_HC1 passed cell yield	17.35%
		LC_DCDS passed cell yield	17.35%
		LC_LC3 passed cell yield	17.35%
		LC_LCDSSLCC passed cell yield	17.35%
		LC_LC5 passed cell yield	17.35%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2	-6.494	2.677	9.844	14	CDF	1.0000	Non-Significant Effect
FR_HFR1		CM_MC1	-5.848	2.677	9.844	14	CDF	1.0000	Non-Significant Effect
		LC_SLC	-4.93	2.677	9.844	14	CDF	1.0000	Non-Significant Effect
		FR_FRABCH	-9.438	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		FR_FRCP1	-7.772	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		GH_FR1	-9.66	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		GH_ERC	-2.942	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		CM_MC2	-10.38	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		EV_MC2	-6.718	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		EV_HC1	-3.775	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_DCDS	-2.443	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_LC3	-9.438	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLCC	-8.827	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_LC5	-9.605	2.677	12.06	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.658	3.288	0.5033	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.658		0.9049	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15443.4	1103.1	14	20.4	<1.0E-37	Significant Effect
Error	3298.5	54.0738	61			
Total	18741.9		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.29	29.14	0.0318	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9823	0.9559	0.3679	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 05-4052-1687 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:46 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

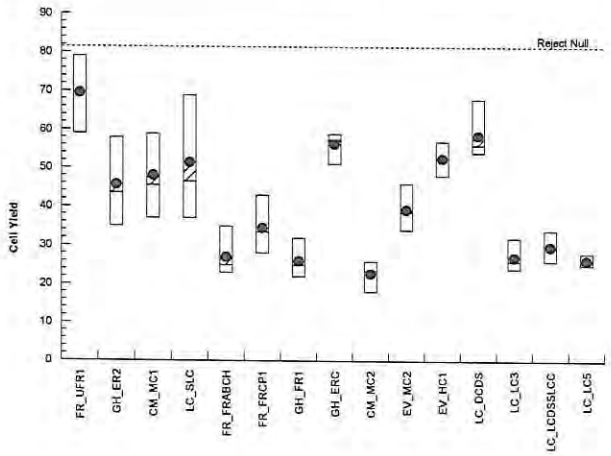
Cell Yield Summary

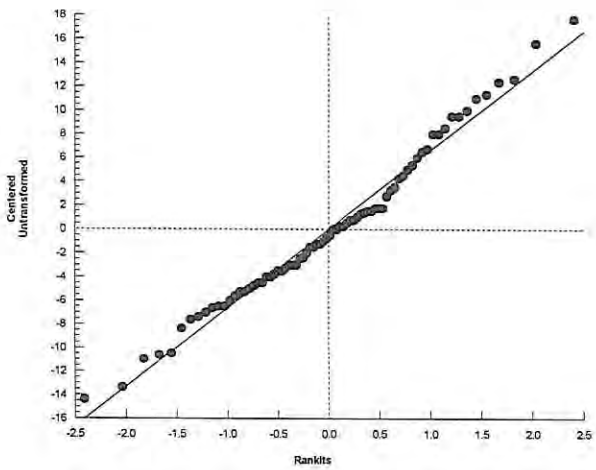
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	8	69.5	63.99	75.01	69.5	59	79	2.33	9.48%	0.00%
GH_ER2		8	45.62	38.15	53.1	43.5	35	58	3.162	19.60%	34.35%
CM_MC1		8	48	40.82	55.18	45.5	37	59	3.036	17.89%	30.94%
LC_SLC		8	51.38	40.29	62.46	46.5	37	69	4.686	25.80%	26.08%
FR_FRABCH		4	27	18.28	35.72	25	23	35	2.739	20.29%	61.15%
FR_FRCP1		4	34.5	24.07	44.93	33.5	28	43	3.279	19.01%	50.36%
GH_FR1		4	26	18.77	33.23	25	22	32	2.273	17.48%	62.59%
GH_ERC		4	56.25	50.53	61.97	57.5	51	59	1.797	6.39%	19.06%
CM_MC2		4	22.75	17.33	28.17	23.5	18	26	1.702	14.96%	67.27%
EV_MC2		4	39.25	30.69	47.81	38.5	34	46	2.689	13.70%	43.53%
EV_HC1		4	52.5	46.34	58.66	52.5	48	57	1.936	7.38%	24.46%
LC_DCDS		4	58.5	48.23	68.77	56	54	68	3.227	11.03%	15.83%
LC_LC3		4	27	21.34	32.66	26	24	32	1.78	13.18%	61.15%
LC_LCDSSLCC		4	29.75	24.49	35.01	29.5	26	34	1.652	11.11%	57.19%
LC_LC5		4	26.25	23.86	28.64	26	25	28	0.75	5.71%	62.23%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	XC	59	69	73	70	79	76	67	63
GH_ER2		58	57	38	35	47	39	51	40
CM_MC1		37	43	59	48	42	58	41	56
LC_SLC		49	37	67	69	64	38	44	43
FR_FRABCH		24	35	23	26				
FR_FRCP1		43	31	36	28				
GH_FR1		27	22	23	32				
GH_ERC		58	51	59	57				
CM_MC2		26	18	24	23				
EV_MC2		34	46	36	41				
EV_HC1		51	48	54	57				
LC_DCDS		57	68	54	55				
LC_LC3		27	25	24	32				
LC_LCDSSLCC		30	26	34	29				
LC_LC5		25	28	25	27				

Graphics





Oct 29/19

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	20-7941-6888	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	11 Sep-19 16:48	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	02-4619-1857	**Test Type:**	Cell Growth	**Analyst:**	Jeslin Wijaya
Start Date:	22 Aug-19 16:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	25 Aug-19 ~~16:00~~ 16:25 MLG	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	53h (12.4 °C)	Teck Coal	Teck Coal Q3
GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	53h (~~7.9~~ MLG °C) 8.2		
CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	53h (~~8.4~~ MLG °C) 7.6		
LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	56h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	55h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	56h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	50h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	51h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	53h (~~7.6~~ MLG °C) 8.4		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	54h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	55h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	54h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	55h (8.9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	55h (7.6 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	54h (9 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	

Analyst: MLG QA: Dec 29/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 20-7941-6888 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:48 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed cell yield	26.42%
		CM_MC1 passed cell yield	26.42%
		LC_SLC passed cell yield	26.42%
		FR_FRABCH failed cell yield	26.42%
		FR_FRCP1 passed cell yield	26.42%
		GH_FR1 failed cell yield	26.42%
		GH_ERC passed cell yield	26.42%
		CM_MC2 failed cell yield	26.42%
		EV_MC2 passed cell yield	26.42%
		EV_HC1 passed cell yield	26.42%
		LC_DCDS passed cell yield	26.42%
		LC_LC3 failed cell yield	26.42%
		LC_LCDSSLCC failed cell yield	26.42%
		LC_LC5 failed cell yield	26.42%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-6.494	2.677	9.844	14	CDF	1.0000	Non-Significant Effect
GH_ER2		CM_MC1	-0.646	2.677	9.844	14	CDF	0.9971	Non-Significant Effect
		LC_SLC	-1.564	2.677	9.844	14	CDF	1.0000	Non-Significant Effect
		FR_FRABCH*	4.136	2.677	12.06	10	CDF	7.2E-04	Significant Effect
		FR_FRCP1	2.471	2.677	12.06	10	CDF	0.0802	Non-Significant Effect
		GH_FR1*	4.358	2.677	12.06	10	CDF	3.4E-04	Significant Effect
		GH_ERC	-2.359	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		CM_MC2*	5.08	2.677	12.06	10	CDF	2.6E-05	Significant Effect
		EV_MC2	1.416	2.677	12.06	10	CDF	0.4665	Non-Significant Effect
		EV_HC1	-1.527	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_DCDS	-2.859	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_LC3*	4.136	2.677	12.06	10	CDF	7.2E-04	Significant Effect
		LC_LCDSSLCC*	3.525	2.677	12.06	10	CDF	0.0050	Significant Effect
		LC_LC5*	4.303	2.677	12.06	10	CDF	4.1E-04	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.658	3.288	0.5033	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.658		0.5484	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15443.4	1103.1	14	20.4	<1.0E-37	Significant Effect
Error	3298.5	54.0738	61			
Total	18741.9		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.29	29.14	0.0318	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9823	0.9559	0.3679	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 20-7941-6888 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:48 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

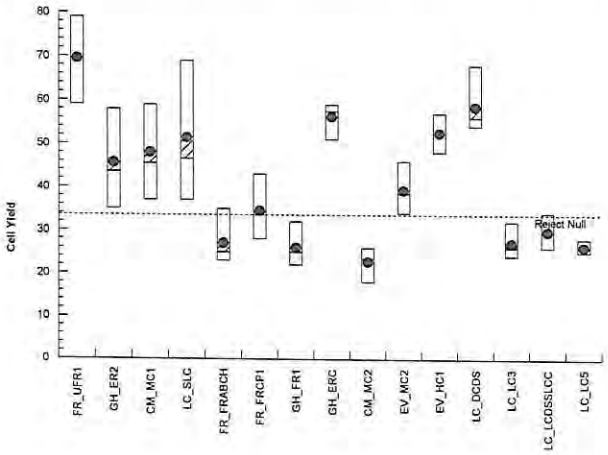
Cell Yield Summary

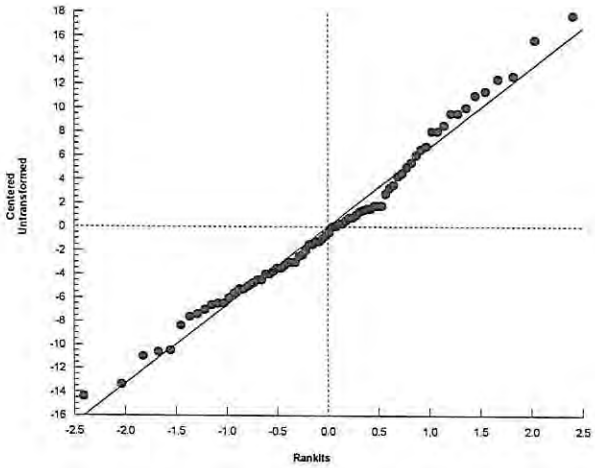
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	69.5	63.99	75.01	69.5	59	79	2.33	9.48%	0.00%
GH_ER2	XC	8	45.62	38.15	53.1	43.5	35	58	3.162	19.60%	34.35%
CM_MC1		8	48	40.82	55.18	45.5	37	59	3.036	17.89%	30.94%
LC_SLC		8	51.38	40.29	62.46	46.5	37	69	4.686	25.80%	26.08%
FR_FRABCH		4	27	18.28	35.72	25	23	35	2.739	20.29%	61.15%
FR_FRCP1		4	34.5	24.07	44.93	33.5	28	43	3.279	19.01%	50.36%
GH_FR1		4	26	18.77	33.23	25	22	32	2.273	17.48%	62.59%
GH_ERC		4	56.25	50.53	61.97	57.5	51	59	1.797	6.39%	19.06%
CM_MC2		4	22.75	17.33	28.17	23.5	18	26	1.702	14.96%	67.27%
EV_MC2		4	39.25	30.69	47.81	38.5	34	46	2.689	13.70%	43.53%
EV_HC1		4	52.5	46.34	58.66	52.5	48	57	1.936	7.38%	24.46%
LC_DCDS		4	58.5	48.23	68.77	56	54	68	3.227	11.03%	15.83%
LC_LC3		4	27	21.34	32.66	26	24	32	1.78	13.18%	61.15%
LC_LCDSSLCC		4	29.75	24.49	35.01	29.5	26	34	1.652	11.11%	57.19%
LC_LC5		4	26.25	23.86	28.64	26	25	28	0.75	5.71%	62.23%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		59	69	73	70	79	76	67	63
GH_ER2	XC	58	57	38	35	47	39	51	40
CM_MC1		37	43	59	48	42	58	41	56
LC_SLC		49	37	67	69	64	38	44	43
FR_FRABCH		24	35	23	26				
FR_FRCP1		43	31	36	28				
GH_FR1		27	22	23	32				
GH_ERC		58	51	59	57				
CM_MC2		26	18	24	23				
EV_MC2		34	46	36	41				
EV_HC1		51	48	54	57				
LC_DCDS		57	68	54	55				
LC_LC3		27	25	24	32				
LC_LCDSSLCC		30	26	34	29				
LC_LC5		25	28	25	27				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-3469-5178	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	11 Sep-19 16:48	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	02-4619-1857	**Test Type:**	Cell Growth	**Analyst:**	Jeslin Wijaya
Start Date:	22 Aug-19 16:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	25 Aug-19 ~~16:00~~ 16:25	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	53h (12.4 °C)	Teck Coal	Teck Coal Q3
GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	53h (~~7.9~~ °C) 8.2
CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	53h (~~8.4~~ °C) 7.6
LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	56h (6.1 °C)
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	55h (8.7 °C)
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	56h (9.2 °C)
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	50h (7.9 °C)
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	51h (8.6 °C)
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	53h (~~7.6~~ °C) 8.4
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	54h (9.5 °C)
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	55h (8.4 °C)
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	54h (9.4 °C)
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	55h (8.9 °C)
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	55h (7.6 °C)
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	54h (9 °C)

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 15-3469-5178 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:48 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 failed cell yield	26.42%
		CM_MC1 passed cell yield	26.42%
		LC_SLC passed cell yield	26.42%
		FR_FRABCH passed cell yield	26.42%
		FR_FRCP1 passed cell yield	26.42%
		GH_FR1 passed cell yield	26.42%
		GH_ERC passed cell yield	26.42%
		CM_MC2 passed cell yield	26.42%
		EV_MC2 passed cell yield	26.42%
		EV_HC1 passed cell yield	26.42%
		LC_DCDS failed cell yield	26.42%
		LC_LC3 passed cell yield	26.42%
		LC_LCDSSLCC passed cell yield	26.42%
		LC_LC5 passed cell yield	26.42%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1*	6.494	2.677	9.844	14	CDF	3.1E-07	Significant Effect
GH_ER2		CM_MC1	0.646	2.677	9.844	14	CDF	0.8306	Non-Significant Effect
		LC_SLC	1.564	2.677	9.844	14	CDF	0.3906	Non-Significant Effect
		FR_FRABCH	-4.136	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		FR_FRCP1	-2.471	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		GH_FR1	-4.358	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		GH_ERC	2.359	2.677	12.06	10	CDF	0.1018	Non-Significant Effect
		CM_MC2	-5.08	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		EV_MC2	-1.416	2.677	12.06	10	CDF	0.9999	Non-Significant Effect
		EV_HC1	1.527	2.677	12.06	10	CDF	0.4093	Non-Significant Effect
		LC_DCDS*	2.859	2.677	12.06	10	CDF	0.0320	Significant Effect
		LC_LC3	-4.136	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLCC	-3.525	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_LC5	-4.303	2.677	12.06	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.658	3.288	0.5033	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.658		0.5484	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15443.4	1103.1	14	20.4	<1.0E-37	Significant Effect
Error	3298.5	54.0738	61			
Total	18741.9		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.29	29.14	0.0318	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9823	0.9559	0.3679	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 15-3469-5178 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:48 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

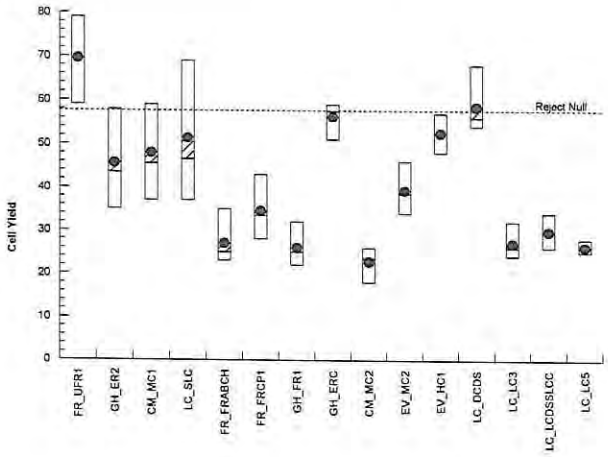
Cell Yield Summary

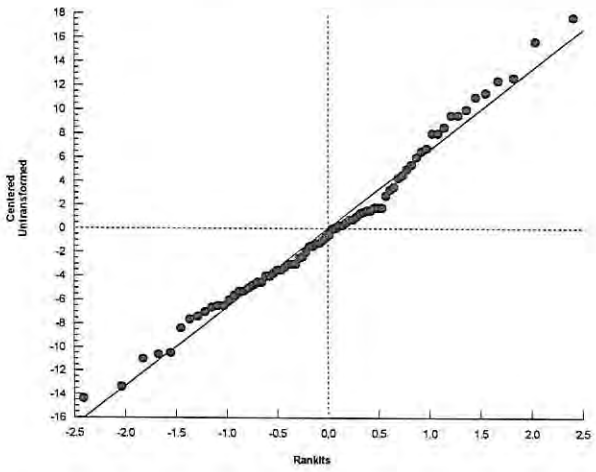
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	69.5	63.99	75.01	69.5	59	79	2.33	9.48%	0.00%
GH_ER2	XC	8	45.62	38.15	53.1	43.5	35	58	3.162	19.60%	34.35%
CM_MC1		8	48	40.82	55.18	45.5	37	59	3.036	17.89%	30.94%
LC_SLC		8	51.38	40.29	62.46	46.5	37	69	4.686	25.80%	26.08%
FR_FRABCH		4	27	18.28	35.72	25	23	35	2.739	20.29%	61.15%
FR_FRCP1		4	34.5	24.07	44.93	33.5	28	43	3.279	19.01%	50.36%
GH_FR1		4	26	18.77	33.23	25	22	32	2.273	17.48%	62.59%
GH_ERC		4	56.25	50.53	61.97	57.5	51	59	1.797	6.39%	19.06%
CM_MC2		4	22.75	17.33	28.17	23.5	18	26	1.702	14.96%	67.27%
EV_MC2		4	39.25	30.69	47.81	38.5	34	46	2.689	13.70%	43.53%
EV_HC1		4	52.5	46.34	58.66	52.5	48	57	1.936	7.38%	24.46%
LC_DCDS		4	58.5	48.23	68.77	56	54	68	3.227	11.03%	15.83%
LC_LC3		4	27	21.34	32.66	26	24	32	1.78	13.18%	61.15%
LC_LCDSSLCC		4	29.75	24.49	35.01	29.5	26	34	1.652	11.11%	57.19%
LC_LC5		4	26.25	23.86	28.64	26	25	28	0.75	5.71%	62.23%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		59	69	73	70	79	76	67	63
GH_ER2	XC	58	57	38	35	47	39	51	40
CM_MC1		37	43	59	48	42	58	41	56
LC_SLC		49	37	67	69	64	38	44	43
FR_FRABCH		24	35	23	26				
FR_FRCP1		43	31	36	28				
GH_FR1		27	22	23	32				
GH_ERC		58	51	59	57				
CM_MC2		26	18	24	23				
EV_MC2		34	46	36	41				
EV_HC1		51	48	54	57				
LC_DCDS		57	68	54	55				
LC_LC3		27	25	24	32				
LC_LCDSSLCC		30	26	34	29				
LC_LC5		25	28	25	27				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-3250-2324	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	11 Sep-19 16:49	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	02-4619-1857	**Test Type:**	Cell Growth	**Analyst:**	Jeslin Wijaya
Start Date:	22 Aug-19 16:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	25 Aug-19 ~~16:00~~ 16:25 (MG)	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	53h (12.4 °C)	Teck Coal	Teck Coal Q3
GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	53h (~~7.9 °C~~ (MG) 8.2)		
CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	53h (~~8.4 °C~~ (MG) 7.6)		
LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	56h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	55h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	56h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	50h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	51h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	53h (~~7.6 °C~~ (MG) 8.4)		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	54h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	55h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	54h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	55h (8.9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	55h (7.6 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	54h (9 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	

Analyst: MG QA: Oct-29/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 12-3250-2324 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:49 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed cell yield	25.12%
		GH_ER2 passed cell yield	25.12%
		LC_SLC passed cell yield	25.12%
		FR_FRABCH failed cell yield	25.12%
		FR_FRCP1 failed cell yield	25.12%
		GH_FR1 failed cell yield	25.12%
		GH_ERC passed cell yield	25.12%
		CM_MC2 failed cell yield	25.12%
		EV_MC2 passed cell yield	25.12%
		EV_HC1 passed cell yield	25.12%
		LC_DCDS passed cell yield	25.12%
		LC_LC3 failed cell yield	25.12%
		LC_LCDSSLCC failed cell yield	25.12%
		LC_LC5 failed cell yield	25.12%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-5.848	2.677	9.844	14	CDF	1.0000	Non-Significant Effect
CM_MC1		GH_ER2	0.646	2.677	9.844	14	CDF	0.8306	Non-Significant Effect
		LC_SLC	-0.9179	2.677	9.844	14	CDF	0.9992	Non-Significant Effect
		FR_FRABCH*	4.663	2.677	12.06	10	CDF	1.2E-04	Significant Effect
		FR_FRCP1*	2.998	2.677	12.06	10	CDF	0.0223	Significant Effect
		GH_FR1*	4.886	2.677	12.06	10	CDF	5.3E-05	Significant Effect
		GH_ERC	-1.832	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		CM_MC2*	5.607	2.677	12.06	10	CDF	3.8E-06	Significant Effect
		EV_MC2	1.943	2.677	12.06	10	CDF	0.2232	Non-Significant Effect
		EV_HC1	-0.9993	2.677	12.06	10	CDF	0.9994	Non-Significant Effect
		LC_DCDS	-2.332	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_LC3*	4.663	2.677	12.06	10	CDF	1.2E-04	Significant Effect
		LC_LCDSSLCC*	4.053	2.677	12.06	10	CDF	9.5E-04	Significant Effect
		LC_LC5*	4.83	2.677	12.06	10	CDF	6.5E-05	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.658	3.288	0.5033	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.658		0.7195	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15443.4	1103.1	14	20.4	<1.0E-37	Significant Effect
Error	3298.5	54.0738	61			
Total	18741.9		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.29	29.14	0.0318	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9823	0.9559	0.3679	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 12-3250-2324 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:49 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

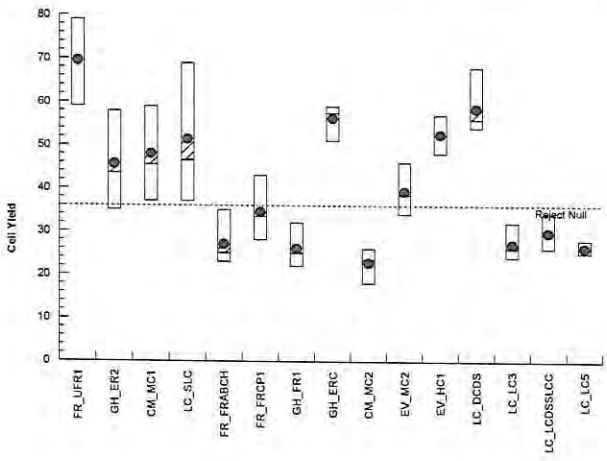
Cell Yield Summary

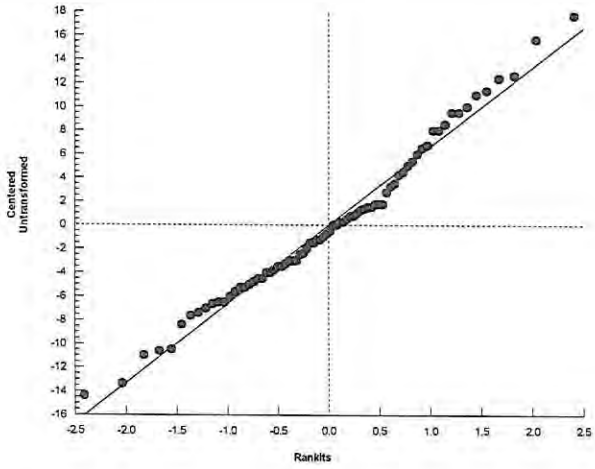
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	69.5	63.99	75.01	69.5	59	79	2.33	9.48%	0.00%
GH_ER2		8	45.62	38.15	53.1	43.5	35	58	3.162	19.60%	34.35%
CM_MC1	XC	8	48	40.82	55.18	45.5	37	59	3.036	17.89%	30.94%
LC_SLC		8	51.38	40.29	62.46	46.5	37	69	4.686	25.80%	26.08%
FR_FRABCH		4	27	18.28	35.72	25	23	35	2.739	20.29%	61.15%
FR_FRCP1		4	34.5	24.07	44.93	33.5	28	43	3.279	19.01%	50.36%
GH_FR1		4	26	18.77	33.23	25	22	32	2.273	17.48%	62.59%
GH_ERC		4	56.25	50.53	61.97	57.5	51	59	1.797	6.39%	19.06%
CM_MC2		4	22.75	17.33	28.17	23.5	18	26	1.702	14.96%	67.27%
EV_MC2		4	39.25	30.69	47.81	38.5	34	46	2.689	13.70%	43.53%
EV_HC1		4	52.5	46.34	58.66	52.5	48	57	1.936	7.38%	24.46%
LC_DCDS		4	58.5	48.23	68.77	56	54	68	3.227	11.03%	15.83%
LC_LC3		4	27	21.34	32.66	26	24	32	1.78	13.18%	61.15%
LC_LCDSSLCC		4	29.75	24.49	35.01	29.5	26	34	1.652	11.11%	57.19%
LC_LC5		4	26.25	23.86	28.64	26	25	28	0.75	5.71%	62.23%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		59	69	73	70	79	76	67	63
GH_ER2		58	57	38	35	47	39	51	40
CM_MC1	XC	37	43	59	48	42	58	41	56
LC_SLC		49	37	67	69	64	38	44	43
FR_FRABCH		24	35	23	26				
FR_FRCP1		43	31	36	28				
GH_FR1		27	22	23	32				
GH_ERC		58	51	59	57				
CM_MC2		26	18	24	23				
EV_MC2		34	46	36	41				
EV_HC1		51	48	54	57				
LC_DCDS		57	68	54	55				
LC_LC3		27	25	24	32				
LC_LCDSSLCC		30	26	34	29				
LC_LC5		25	28	25	27				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	08-5878-7299	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	11 Sep-19 16:49	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	02-4619-1857	**Test Type:**	Cell Growth	**Analyst:**	Jeslin Wijaya
Start Date:	22 Aug-19 16:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	25 Aug-19 ~~16:00~~ 16:25	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	53h (12.4 °C)	Teck Coal	Teck Coal Q3
GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	53h (~~7.9~~ °C) 8.2
CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	53h (~~8.4~~ °C) 7.6
LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	56h (6.1 °C)
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	55h (8.7 °C)
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	56h (9.2 °C)
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	50h (7.9 °C)
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	51h (8.6 °C)
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	53h (~~7.6~~ °C) 8.4
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	54h (9.5 °C)
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	55h (8.4 °C)
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	54h (9.4 °C)
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	55h (8.9 °C)
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	55h (7.6 °C)
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	54h (9 °C)

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 08-5878-7299 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:49 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 failed cell yield	25.12%
		GH_ER2 passed cell yield	25.12%
		LC_SLC passed cell yield	25.12%
		FR_FRABCH passed cell yield	25.12%
		FR_FRCP1 passed cell yield	25.12%
		GH_FR1 passed cell yield	25.12%
		GH_ERC passed cell yield	25.12%
		CM_MC2 passed cell yield	25.12%
		EV_MC2 passed cell yield	25.12%
		EV_HC1 passed cell yield	25.12%
		LC_DCDS passed cell yield	25.12%
		LC_LC3 passed cell yield	25.12%
		LC_LCDSSLCC passed cell yield	25.12%
		LC_LC5 passed cell yield	25.12%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1*	5.848	2.677	9.844	14	CDF	1.6E-06	Significant Effect
CM_MC1		GH_ER2	-0.646	2.677	9.844	14	CDF	0.9971	Non-Significant Effect
		LC_SLC	0.9179	2.677	9.844	14	CDF	0.7201	Non-Significant Effect
		FR_FRABCH	-4.663	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		FR_FRCP1	-2.998	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		GH_FR1	-4.886	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		GH_ERC	1.832	2.677	12.06	10	CDF	0.2671	Non-Significant Effect
		CM_MC2	-5.607	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		EV_MC2	-1.943	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		EV_HC1	0.9993	2.677	12.06	10	CDF	0.6817	Non-Significant Effect
		LC_DCDS	2.332	2.677	12.06	10	CDF	0.1078	Non-Significant Effect
		LC_LC3	-4.663	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLCC	-4.053	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_LC5	-4.83	2.677	12.06	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.658	3.288	0.5033	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.658		0.7195	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15443.4	1103.1	14	20.4	<1.0E-37	Significant Effect
Error	3298.5	54.0738	61			
Total	18741.9		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.29	29.14	0.0318	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9823	0.9559	0.3679	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 08-5878-7299 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:49 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

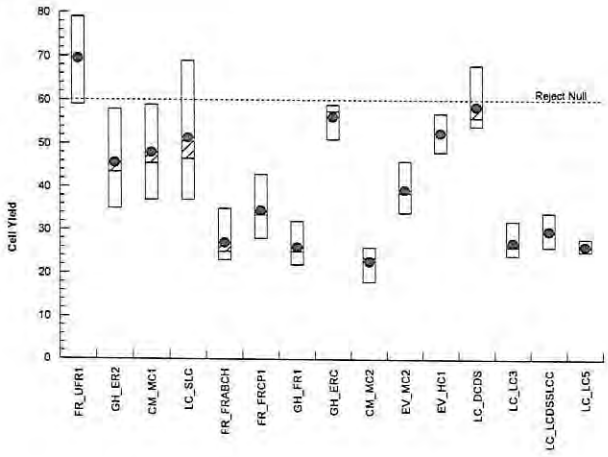
Cell Yield Summary

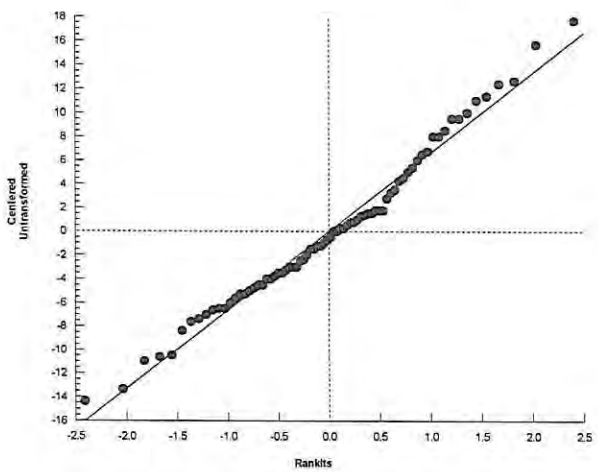
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	69.5	63.99	75.01	69.5	59	79	2.33	9.48%	0.00%
GH_ER2		8	45.62	38.15	53.1	43.5	35	58	3.162	19.60%	34.35%
CM_MC1	XC	8	48	40.82	55.18	45.5	37	59	3.036	17.89%	30.94%
LC_SLC		8	51.38	40.29	62.46	46.5	37	69	4.686	25.80%	26.08%
FR_FRABCH		4	27	18.28	35.72	25	23	35	2.739	20.29%	61.15%
FR_FRCP1		4	34.5	24.07	44.93	33.5	28	43	3.279	19.01%	50.36%
GH_FR1		4	26	18.77	33.23	25	22	32	2.273	17.48%	62.59%
GH_ERC		4	56.25	50.53	61.97	57.5	51	59	1.797	6.39%	19.06%
CM_MC2		4	22.75	17.33	28.17	23.5	18	26	1.702	14.96%	67.27%
EV_MC2		4	39.25	30.69	47.81	38.5	34	46	2.689	13.70%	43.53%
EV_HC1		4	52.5	46.34	58.66	52.5	48	57	1.936	7.38%	24.46%
LC_DCDS		4	58.5	48.23	68.77	56	54	68	3.227	11.03%	15.83%
LC_LC3		4	27	21.34	32.66	26	24	32	1.78	13.18%	61.15%
LC_LCDSSLCC		4	29.75	24.49	35.01	29.5	26	34	1.652	11.11%	57.19%
LC_LC5		4	26.25	23.86	28.64	26	25	28	0.75	5.71%	62.23%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		59	69	73	70	79	76	67	63
GH_ER2		58	57	38	35	47	39	51	40
CM_MC1	XC	37	43	59	48	42	58	41	56
LC_SLC		49	37	67	69	64	38	44	43
FR_FRABCH		24	35	23	26				
FR_FRCP1		43	31	36	28				
GH_FR1		27	22	23	32				
GH_ERC		58	51	59	57				
CM_MC2		26	18	24	23				
EV_MC2		34	46	36	41				
EV_HC1		51	48	54	57				
LC_DCDS		57	68	54	55				
LC_LC3		27	25	24	32				
LC_LCDSSLCC		30	26	34	29				
LC_LC5		25	28	25	27				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-1707-8580	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	11 Sep-19 16:50	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	02-4619-1857	**Test Type:**	Cell Growth	**Analyst:**	Jeslin Wijaya
Start Date:	22 Aug-19 16:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	25 Aug-19 ~~16:00~~ 16:25	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	53h (12.4 °C)	Teck Coal	Teck Coal Q3
GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	53h (~~7.9~~ °C) 8.2		
CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	53h (~~8.4~~ °C) 7.6		
LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	56h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	55h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	56h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	50h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	51h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	53h (~~7.6~~ °C) 8.4		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	54h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	55h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	54h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	55h (8.9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	55h (7.6 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	54h (9 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 06-1707-8580 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:50 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed cell yield	23.47%
		GH_ER2 passed cell yield	23.47%
		CM_MC1 passed cell yield	23.47%
		FR_FRABCH failed cell yield	23.47%
		FR_FRCP1 failed cell yield	23.47%
		GH_FR1 failed cell yield	23.47%
		GH_ERC passed cell yield	23.47%
		CM_MC2 failed cell yield	23.47%
		EV_MC2 failed cell yield	23.47%
		EV_HC1 passed cell yield	23.47%
		LC_DCDS passed cell yield	23.47%
		LC_LC3 failed cell yield	23.47%
		LC_LCDSSLCC failed cell yield	23.47%
		LC_LC5 failed cell yield	23.47%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-4.93	2.677	9.844	14	CDF	1.0000	Non-Significant Effect
LC_SLC		GH_ER2	1.564	2.677	9.844	14	CDF	0.3906	Non-Significant Effect
		CM_MC1	0.9179	2.677	9.844	14	CDF	0.7201	Non-Significant Effect
		FR_FRABCH*	5.413	2.677	12.06	10	CDF	7.8E-06	Significant Effect
		FR_FRCP1*	3.747	2.677	12.06	10	CDF	0.0025	Significant Effect
		GH_FR1*	5.635	2.677	12.06	10	CDF	3.5E-06	Significant Effect
		GH_ERC	-1.083	2.677	12.06	10	CDF	0.9996	Non-Significant Effect
		CM_MC2*	6.357	2.677	12.06	10	CDF	3.9E-07	Significant Effect
		EV_MC2*	2.693	2.677	12.06	10	CDF	0.0482	Significant Effect
		EV_HC1	-0.2498	2.677	12.06	10	CDF	0.9864	Non-Significant Effect
		LC_DCDS	-1.582	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_LC3*	5.413	2.677	12.06	10	CDF	7.8E-06	Significant Effect
		LC_LCDSSLCC*	4.802	2.677	12.06	10	CDF	7.2E-05	Significant Effect
		LC_LC5*	5.58	2.677	12.06	10	CDF	4.2E-06	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.658	3.288	0.5033	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.658		0.7195	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15443.4	1103.1	14	20.4	<1.0E-37	Significant Effect
Error	3298.5	54.0738	61			
Total	18741.9		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.29	29.14	0.0318	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9823	0.9559	0.3679	Normal Distribution

Oct 29/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 06-1707-8580 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:50 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

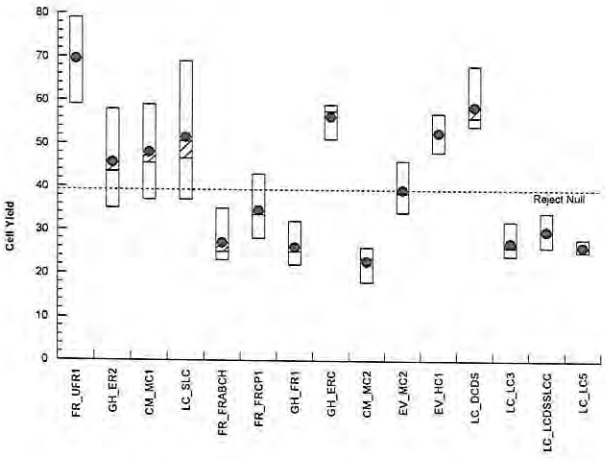
Cell Yield Summary

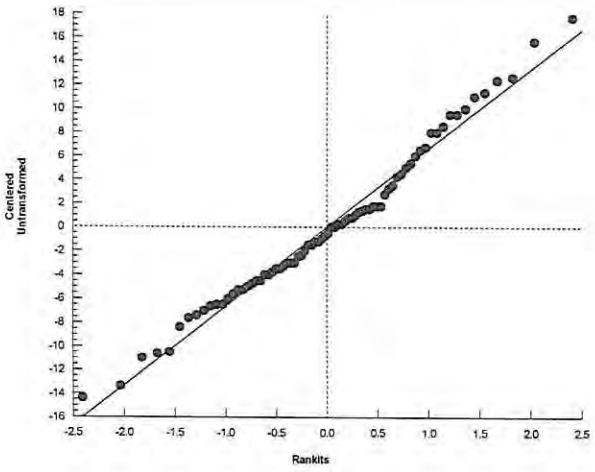
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	69.5	63.99	75.01	69.5	59	79	2.33	9.48%	0.00%
GH_ER2		8	45.62	38.15	53.1	43.5	35	58	3.162	19.60%	34.35%
CM_MC1		8	48	40.82	55.18	45.5	37	59	3.036	17.89%	30.94%
LC_SLC	XC	8	51.38	40.29	62.46	46.5	37	69	4.686	25.80%	26.08%
FR_FRABCH		4	27	18.28	35.72	25	23	35	2.739	20.29%	61.15%
FR_FRCP1		4	34.5	24.07	44.93	33.5	28	43	3.279	19.01%	50.36%
GH_FR1		4	26	18.77	33.23	25	22	32	2.273	17.48%	62.59%
GH_ERC		4	56.25	50.53	61.97	57.5	51	59	1.797	6.39%	19.06%
CM_MC2		4	22.75	17.33	28.17	23.5	18	26	1.702	14.96%	67.27%
EV_MC2		4	39.25	30.69	47.81	38.5	34	46	2.689	13.70%	43.53%
EV_HC1		4	52.5	46.34	58.66	52.5	48	57	1.936	7.38%	24.46%
LC_DCDS		4	58.5	48.23	68.77	56	54	68	3.227	11.03%	15.83%
LC_LC3		4	27	21.34	32.66	26	24	32	1.78	13.18%	61.15%
LC_LCDSSLCC		4	29.75	24.49	35.01	29.5	26	34	1.652	11.11%	57.19%
LC_LC5		4	26.25	23.86	28.64	26	25	28	0.75	5.71%	62.23%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		59	69	73	70	79	76	67	63
GH_ER2		58	57	38	35	47	39	51	40
CM_MC1		37	43	59	48	42	58	41	56
LC_SLC	XC	49	37	67	69	64	38	44	43
FR_FRABCH		24	35	23	26				
FR_FRCP1		43	31	36	28				
GH_FR1		27	22	23	32				
GH_ERC		58	51	59	57				
CM_MC2		26	18	24	23				
EV_MC2		34	46	36	41				
EV_HC1		51	48	54	57				
LC_DCDS		57	68	54	55				
LC_LC3		27	25	24	32				
LC_LCDSSLCC		30	26	34	29				
LC_LC5		25	28	25	27				

Graphics





CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-1154-5029	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	11 Sep-19 16:50	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	02-4619-1857	**Test Type:**	Cell Growth	**Analyst:**	Jeslin Wijaya
Start Date:	22 Aug-19 16:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	25 Aug-19 ~~16:00~~ 16:25 MD	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	00-8128-2512	20 Aug-19 11:23	21 Aug-19 10:30	53h (12.4 °C)	Teck Coal	Teck Coal Q3
GH_ER2	05-6136-9056	20 Aug-19 11:47	21 Aug-19 10:30	53h (~~7.9 °C~~ MD) 8.2		
CM_MC1	19-2427-5120	20 Aug-19 11:52	21 Aug-19 10:30	53h (~~8.4 °C~~ MD) 7.6		
LC_SLC	05-9304-8911	20 Aug-19 08:51	21 Aug-19 10:30	56h (6.1 °C)		
FR_FRABCH	06-6946-2260	20 Aug-19 09:46	21 Aug-19 10:30	55h (8.7 °C)		
FR_FRCP1	13-2923-0110	20 Aug-19 08:15	21 Aug-19 10:30	56h (9.2 °C)		
GH_FR1	05-4380-3694	20 Aug-19 14:34	21 Aug-19 10:30	50h (7.9 °C)		
GH_ERC	09-6379-2589	20 Aug-19 13:12	21 Aug-19 10:30	51h (8.6 °C)		
CM_MC2	07-2796-9410	20 Aug-19 11:17	21 Aug-19 10:30	53h (~~7.6 °C~~ MD) 8.4		
EV_MC2	15-4983-5182	20 Aug-19 10:55	21 Aug-19 10:30	54h (9.5 °C)		
EV_HC1	06-5038-6316	20 Aug-19 09:45	21 Aug-19 10:30	55h (8.4 °C)		
LC_DCDS	12-2512-0491	20 Aug-19 10:09	21 Aug-19 10:30	54h (9.4 °C)		
LC_LC3	09-3335-2259	20 Aug-19 09:30	21 Aug-19 10:30	55h (8.9 °C)		
LC_LCDSSLCC	12-1208-1275	20 Aug-19 09:53	21 Aug-19 10:30	55h (7.6 °C)		
LC_LC5	06-4568-6933	20 Aug-19 10:32	21 Aug-19 10:30	54h (9 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-08-2	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal	LC_SLC _WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_MON_2019-08	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-08-20	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-08-20	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q3_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q3_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 02-1154-5029 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:50 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 failed cell yield	23.47%
		GH_ER2 passed cell yield	23.47%
		CM_MC1 passed cell yield	23.47%
		FR_FRABCH passed cell yield	23.47%
		FR_FRCP1 passed cell yield	23.47%
		GH_FR1 passed cell yield	23.47%
		GH_ERC passed cell yield	23.47%
		CM_MC2 passed cell yield	23.47%
		EV_MC2 passed cell yield	23.47%
		EV_HC1 passed cell yield	23.47%
		LC_DCDS passed cell yield	23.47%
		LC_LC3 passed cell yield	23.47%
		LC_LCDSSLCC passed cell yield	23.47%
		LC_LC5 passed cell yield	23.47%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1*	4.93	2.677	9.844	14	CDF	4.6E-05	Significant Effect
LC-SLC		GH_ER2	-1.564	2.677	9.844	14	CDF	1.0000	Non-Significant Effect
		CM_MC1	-0.9179	2.677	9.844	14	CDF	0.9992	Non-Significant Effect
		FR_FRABCH	-5.413	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		FR_FRCP1	-3.747	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		GH_FR1	-5.635	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		GH_ERC	1.083	2.677	12.06	10	CDF	0.6405	Non-Significant Effect
		CM_MC2	-6.357	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		EV_MC2	-2.693	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		EV_HC1	0.2498	2.677	12.06	10	CDF	0.9342	Non-Significant Effect
		LC_DCDS	1.582	2.677	12.06	10	CDF	0.3815	Non-Significant Effect
		LC_LC3	-5.413	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLCC	-4.802	2.677	12.06	10	CDF	1.0000	Non-Significant Effect
		LC_LC5	-5.58	2.677	12.06	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.658	3.288	0.5033	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.658		0.7195	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15443.4	1103.1	14	20.4	<1.0E-37	Significant Effect
Error	3298.5	54.0738	61			
Total	18741.9		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.29	29.14	0.0318	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9823	0.9559	0.3679	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 02-1154-5029 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 11 Sep-19 16:50 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

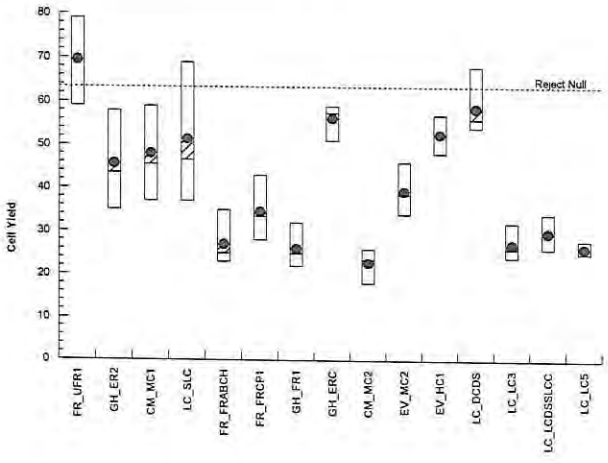
Cell Yield Summary

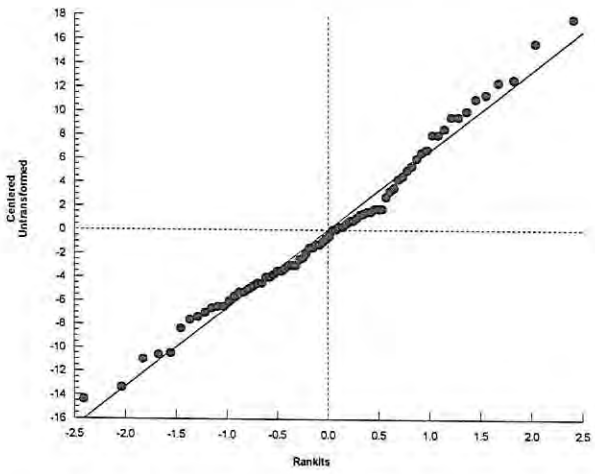
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	69.5	63.99	75.01	69.5	59	79	2.33	9.48%	0.00%
GH_ER2		8	45.62	38.15	53.1	43.5	35	58	3.162	19.60%	34.35%
CM_MC1		8	48	40.82	55.18	45.5	37	59	3.036	17.89%	30.94%
LC_SLC	XC	8	51.38	40.29	62.46	46.5	37	69	4.686	25.80%	26.08%
FR_FRABCH		4	27	18.28	35.72	25	23	35	2.739	20.29%	61.15%
FR_FRCP1		4	34.5	24.07	44.93	33.5	28	43	3.279	19.01%	50.36%
GH_FR1		4	26	18.77	33.23	25	22	32	2.273	17.48%	62.59%
GH_ERC		4	56.25	50.53	61.97	57.5	51	59	1.797	6.39%	19.06%
CM_MC2		4	22.75	17.33	28.17	23.5	18	26	1.702	14.96%	67.27%
EV_MC2		4	39.25	30.69	47.81	38.5	34	46	2.689	13.70%	43.53%
EV_HC1		4	52.5	46.34	58.66	52.5	48	57	1.936	7.38%	24.46%
LC_DCDS		4	58.5	48.23	68.77	56	54	68	3.227	11.03%	15.83%
LC_LC3		4	27	21.34	32.66	26	24	32	1.78	13.18%	61.15%
LC_LCDSSLCC		4	29.75	24.49	35.01	29.5	26	34	1.652	11.11%	57.19%
LC_LC5		4	26.25	23.86	28.64	26	25	28	0.75	5.71%	62.23%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		59	69	73	70	79	76	67	63
GH_ER2		58	57	38	35	47	39	51	40
CM_MC1		37	43	59	48	42	58	41	56
LC_SLC	XC	49	37	67	69	64	38	44	43
FR_FRABCH		24	35	23	26				
FR_FRCP1		43	31	36	28				
GH_FR1		27	22	23	32				
GH_ERC		58	51	59	57				
CM_MC2		26	18	24	23				
EV_MC2		34	46	36	41				
EV_HC1		51	48	54	57				
LC_DCDS		57	68	54	55				
LC_LC3		27	25	24	32				
LC_LCDSSLCC		30	26	34	29				
LC_LC5		25	28	25	27				

Graphics





APPENDIX C – *Hyalella azteca* toxicity test data

Hyalella azteca Water-only Test Summary Sheet

Client: Teck
Work Order No.: 191607

Start Date: Aug 22/19
Set up by: KTL

Sample Information:

Sample ID: Various - see below
Sample Date: Aug 20, 29, Sept 3, 10, 2019
Date Received: Aug 21, 28, Sept 4, 11, 2019
Sample Volume: 20L per sample each refresh

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Biosystems, Co
Date received: Aug 21/19
Age or size (Day 0): 7 d-old
% Mortality in 24 h prior to testing 0%

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA176
Stock Solution ID: n/a
Date Initiated: Aug 22/19

96-h LC50 (95% CL): 6.9 (5.6 - 8.4) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.8 (4.3 - 7.7) g/L NaCl CV (%): 15

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
Control	96.0 ± 5.5	0.46 ± 0.16
FR_UFR1	92.0 ± 8.4	0.36 ± 0.11
GH_ER2	89.1 ± 19.2	0.40 ± 0.21
CM_MC1	86.0 ± 8.9	0.49 ± 0.20
LC_SLC	98.0 ± 4.5	0.50 ± 0.14
FR_FRCP1	92.0 ± 11.0	0.34 ± 0.15
FR_FRABG1	98.0 ± 4.5	0.47 ± 0.12
GH_FR1	96.0 ± 5.5	0.51 ± 0.13

Reviewed by: [signature] Date reviewed: NN-6, 2019

Hyalella azteca Water-only Test Summary Sheet

Client: TecK
Work Order No.: 191607

Start Date: Aug 22/19
Set up by: KDL

Sample Information:

Sample ID: Various- See below
Sample Date: Aug 20, 27, Sept 3, 10, 2019
Date Received: Aug 21, 28, Sept 4, 11, 2019
Sample Volume: 20L per sample each refresh

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Biosystems, CO
Date received: Aug 21/19
Age or size (Day 0): 7-8 d
% Mortality in 24 h prior to testing 0%

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA 176
Stock Solution ID: n/a
Date Initiated: Aug 22/19

96-h LC50 (95% CL): 6.9 (5.6-8.4) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.8 (4.3-7.7) g/L NaCl CV (%): 15

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
GH-ERC	90.0 ± 12.2	0.39 ± 0.20
CM-MC2	86.0 ± 13.4	0.27 ± 0.12 *,α,β
RG-MIDA7	94.0 ± 5.5	0.49 ± 0.26
EV-MC2	100 ± 0.0	0.65 ± 0.05
EV-HCl	84.0 ± ~~21.4~~ 20.7	0.31 ~~0.31~~ ± 0.17 β
LC-LCD5 SLS5	86.0 ± 16.7	0.23 ± 0.12 *,α,β
LC-LC3	72.0 ± 16.4 *,β	0.30 ± 0.12 β
LC-LC5	78.0 ± ~~21.7~~ 21.7 β	0.35 ± 0.19

* significantly different compared to Control
β significantly different compared to reference site LC-SLC
α significantly different compared to reference site CM-MC1

Reviewed by: _____ Date reviewed: Nov 6, 2019

Hyalella azteca Water-only Test Summary Sheet

Client: TpCIC
Work Order No.: 191607

Start Date: Aug 22 19
Set up by: KJL

Sample Information:

Sample ID: Various - See below
Sample Date: Aug 20, 27, Sept 3, 10, 2019
Date Received: Aug 21, 28, Sept 4, 11, 2019
Sample Volume: 2oL per sample each refresh

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Biosystems, CO
Date received: Aug 21 19
Age or size (Day 0): 7-8d
% Mortality in 24 h prior to testing 0%

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA176
Stock Solution ID: n/a
Date Initiated: Aug 22 19

96-h LC50 (95% CL): 6.9 (5.6-8.4) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.8 (4.3-7.7) g/L NaCl CV (%): 15

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
LC-DCDS	90.0 ± 10.0	0.30 ± 0.11 a,b
EDTA Control	96.0 ± 5.5	0.61 ± 0.18
FR-FRCP1 + EDTA	84.0 ± 15.2	0.39 ± 0.20
CM-MC2 + EDTA	84.0 ± 16.7	0.38 ± 0.12
RG-MIDA6 + EDTA	84.0 ± 20.7	0.57 ± 0.21
	±	±
	±	±
	±	±

a significantly different compared to reference site LC-SLC
b significantly different compared to reference site CM-MC1

Reviewed by: [signature]

Date reviewed: Nov 6, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 191607

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	22.5	23.5	23.0	22.5	23.0	23.0	23.0	23.0	22.5	23.0	23.0	22.5	22.5	23.0
FR_UFR1	23.0	23.5	23.0	22.5	23.0	23.0	23.0	23.0	22.5	23.0	23.0	22.5	23.0	22.5
GH_ER2	22.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	22.5	23.0	23.0
CM_MC1	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	22.5	23.0	23.0
LC_SLC	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	22.5	23.0	23.0
FR_FRCP1	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	22.5	23.0	23.0
FR_FRABCH	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	22.5	23.0	23.0
GH_FR1	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	22.5	23.0	23.0
GH_ERC	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0
CM_MC2	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0
Technician Initials	KJV	KJV	KJV	AA	AA	AA	AA	KJV	KJV	KJV	KJV	KJV	KJV	JW

Thermometer: 6

Conductivity (µS)

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	423	440	423	435	425	448	425	434	426	433	423	433	427	431
FR_UFR1	389	411	410	410	397	407	397	411	400	408	424	424	424	437
GH_ER2	382	392	362	376	361	374	363	372	374	373	379	390	391	391
CM_MC1	369	399	370	380	369	380	369	380	370	379	384	392	391	390
LC_SLC	400	434	412	420	408	421	410	432	423	419	425	436	444	440
FR_FRCP1	804	810	803	810	801	799	803	800	819	787	821	829	825	834
FR_FRABCH	941	951	946	944	947	939	935	931	909	948	974	966	965	975
GH_FR1	811	820	811	816	810	817	811	822	823	816	830	848	867	850
GH_ERC	383	415	386	395	384	340	385	407	391	389	410	417	423	421
CM_MC2	1028	1043	1022	1026	1018	1018	1014	1016	1024	1000	1040	1038	1028	1029
Technician Initials	KJV	KJV	KJV	AA	AA	AA	AA	KJV	KJV	KJV	KJV	KJV	KJV	JW

Conductivity meter: 3

Comments:

Reviewed by: KJV Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 191607

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5	23.0	22.5	23.0	23.0
EV-MC2	23.5	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	22.5	23.5	22.5	23.0	23.0
EV-HCl	23.5	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.5	22.5	23.0	23.0
LC-LCDSSLSS	23.5	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.5	22.5	23.0	23.0
LC-LC3	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5	23.5	22.5	23.0	23.0
LC-LC5	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.5	22.5	23.0	23.0
LC-DCDS	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.5	22.5	23.0	23.0
Technician Initials	KJL	KJL	KJL	DL	[illegible]	[illegible]	[illegible]	KJL	KJL	KJL	KJL	KJL	[illegible]	JW

Thermometer: 6

Conductivity (µS)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	632	644	632	640	630	640	634	641	642	649	657	675	683	663
EV-MC2	640	675	660	660	661	658	649	656	656	664	676	681	768	684
EV-HCl	748	756	760	755	759	751	749	755	759	754	769	774	770	773
LC-LCDSSLSS	806	813	815	811	811	814	807	816	810	821	817	820	825	825
LC-LC3	1013	1022	1008	1011	1003	1009	1002	1027	1021	1028	1071	1083	1043	1038
LC-LC5	740	766	740	748	739	748	738	741	736	741	797	772	748	771
LC-DCDS	558	593	562	561	551	565	557	561	562	570	591	581	612	592
Technician Initials	KJL	KJL	KJL	DL	[illegible]	[illegible]	[illegible]	KJL	KJL	KJL	KJL	KJL	KJL	JW

Conductivity meter: 3

Comments:

Reviewed by: [signature]

Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191607

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	22.5	23.5	23.0	23.0	23.0	23.0	23.0	22.5	22.5	23.0	23.0	22.5	23.0	23.0
FR-FRCPI+EDTA	22.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	22.5	23.0	23.0
CM-MC2+EDTA	22.5	23.5	23.0	23.0	23.0	23.5	23.0	22.5	22.5	23.0	23.0	22.5	23.0	23.0
RG-MIDAG+EDTA	22.5	23.5	23.0	23.0	23.0	23.5	23.0	22.5	22.5	23.0	23.0	22.5	23.0	23.0
Technician Initials	KJV	KJL	KJL	[illegible]	[illegible]	[illegible]	[illegible]	KJL	KJV	KJL	KJL	KJL	KJL	JW

Thermometer: 6

Conductivity (µS)

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	424	471	420	439	424	442	424	434	429	433	424	430	429	430
FR-FRCPI+EDTA	800	810	801	807	798	797	791	805	800	812	828	829	828	833
CM-MC2+EDTA	1024	1029	1025	1027	1022	1020	1015	1048	998	1003	1046	1038	1050	1048
RG-MIDAG+EDTA	639	687	630	649	638	654	639	651	648	658	660	694	692	656
Technician Initials	KJV	KJL	KJL	[illegible]	[illegible]	[illegible]	[illegible]	KJL	KJV	KJL	KJL	KJL	KJL	JW

Conductivity meter: 3

Comments:

Reviewed by: [signature] Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 191607

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.0	23.0	23.0
FR-VFR1	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
GH-ER2	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
CM-MC1	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC-SLC	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
FR-FRCP1	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
FR-FRABCH	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
GH-FR1	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
GH-ERC	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
CM-MC2	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Technician Initials	JW	KJ	JW	M	M	MM	RC	A	A	KJL	KJL	KJL	KJL	KJL

Thermometer: 6

Conductivity (µS)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	422	435	433	427	45~~6~~24	431	425	454	427	430	425	430	430	430
FR-VFR1	390	414	407	407	401	408	401	411	409	413	407	411	405	410
GH-ER2	363	372	371	370	366	370	367	378	369	370	371	375	369	374
CM-MC1	371	390	373	375	369	374	370	381	371	379	373	373	371	377
LC-SLC	415	434	429	427	424	428	426	425	431	428	429	434	429	434
FR-FRCP1	859	862	868	862	866	860	867	857	848	862	870	842	844	832
FR-FRABCH	998	995	992	979	993	976	993	961	961	985	928	940	1004	992
GH-FR1	824	826	826	827	824	823	822	824	813	827	805	805	784	809
GH-ERC	385	404	393	394	392	395	391	396	350	396	390	397	393	401
CM-MC2	1057	1048	1046	1039	1043	1029	1042	1039	1025	1075	1002	1026	1000	1015
Technician Initials	JW	KJ	JW	M	M	MM	RC	A	A	KJL	KJL	KJL	KJL	KJL

Conductivity meter: 7-3

Comments: GH-ER2 rep A-1 hyalella got caught on siphon

Reviewed by: [signature] Date Reviewed: Oct 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191607

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
EV_MC2	23.0	23.5	23.5	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
EV_HCl	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC_LCDSSLSS	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC_LC3	23.0	23.5	23.5	23.0	23.5	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC_LC5	23.0	23.5	23.5	23.0	23.5	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC_DCDS	23.0	23.5	23.5	23.0	23.5	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Technician Initials	JW	JW	JW	[illegible]	[illegible]	[illegible]	RC	[illegible]	[illegible]	KL	KL	KL	KL	[illegible]

Thermometer: 6

Conductivity (µS)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	668	679	681	673	667	666	666	695	678	691	673	681	682	679
EV_MC2	623	644	635	639	626	628	625	635	637	630	627	635	637	630
EV_HCl	760	762	762	752	760	759	761	766	758	767	760	794	784	767
LC_LCDSSLSS	827	830	826	826	824	825	824	816	818	827	825	820	800	811
LC_LC3	1010	1011	1012	1007	1009	1001	1010	1007	1002	1012	1003	1007	998	1005
LC_LC5	758	760	753	761	750	749	752	755	745	744	750	738	742	746
LC_DCDS	664	677	678	675	663	666	665	671	670	670	665	678	673	675
Technician Initials	JW	JW	JW	[illegible]	[illegible]	[illegible]	RC	[illegible]	[illegible]	KL	KL	KL	KL	[illegible]

Conductivity meter: 3-3

Comments:

Reviewed by: [signature]

Date Reviewed: Oct 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 191607

Start Date: Aug 22/19
Termination Date: Sept 9/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	23.0	23.5	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
FR-FRCPI+EDTA	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
CM-MCZ+EDTA	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
RG-MIDAG+EDTA	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Technician Initials	JW	JW	JW	[illegible]	[illegible]	[illegible]	RC	[illegible]	[illegible]	KL	KL	KL	KL	KL

Thermometer: 6

Conductivity (µS)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	424	436	432	430	423	428	424	433	425	424	425	432	426	431
FR-FRCPI+EDTA	865	865	866	862	865	862	867	872	867	859	865	846	822	860
CM-MCZ+EDTA	1060	1060	1052	1047	1047	1038	1049	1038	1038	1018	1030	1017	1001	1015
RG-MIDAG+EDTA	671	681	682	678	668	670	669	684	671	667	670	682	678	671
Technician Initials	JW	JW	JW	[illegible]	[illegible]	[illegible]	RC	[illegible]	[illegible]	KL	KL	KL	KL	KL

Conductivity meter: 3

Comments:

Reviewed by: [signature] Date Reviewed: Dec 29, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191607

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	22.5	23.0	23.0	23.0	22.0	23.0	22.5	23.0	23.0	22.5	22.0	23.0	23.0	22.5
FR-UFR1	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.0	23.0	22.5	22.0	23.0	23.0	23.0
GH-ER2	22.5	23.0	23.0	23.0	22.5	23.0	23.0	23.0	23.0	22.5	22.0	23.0	23.0	23.0
CM-MC1	22.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5	22.0	23.0	23.0	23.0
LC-SLC	22.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5	22.0	23.0	23.0	23.0
FR-FRCP1	22.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
FR-FRABCH	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
GH-FR1	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
GH-ERC	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
CM-MC2	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
Technician Initials	KL	JW	JW	KL	KL	A	A	JW	JW	RC	RC	KL	KL	KL

Thermometer: 6

Conductivity (µS)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	423	437	437 (1)	430	424	428	423	432	424	429	425	429	426	434
FR-UFR1	391	425	425	428	422	430	424	433	425	434	415	430	416	427
GH-ER2	389	389	374	377	373	380	372	382	375	381	364	385	364	374
CM-MC1	388	~~450~~ 389	~~447~~	384	379	386	380	~~452~~ JW	388/381	389	377	389	374	385
LC-SLC	433	450	447	445	439	448	446	456	442	448	438	456	441	440
FR-FRCP1 908	~~466~~ JW	908	908	901	889	898	891	883	858	874	901	(2) 876	910	888
FR-FRABCH	1037	1037	1032	1021	1009	1001	991	1000	963	968	1036	(2) 1043 KL	1013	1007
GH-FR1	854	849	862	845	841	839	835	843	816	820	844	840	840	842
GH-ERC	396	412	405	405	399	409	398	416	401	405	392	403	403	402
CM-MC2	1100	1095	1001	1083	1079	1094	1072	1070	1050	1054	1099	1077	1077	1073
Technician Initials	KL	JW	JW	KL	KL	A	A	JW	JW	RC	RC	KL	KL	KL

(2) 991
825
407
1060

Conductivity meter: 3/3

Comments: (1) 434, 432, 379, ~~45~~ KL 386

Reviewed by: [signature]

Date Reviewed: Oct 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 1911607

Start Date: Aug 22/19
Termination Date: Sept 1/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG ①	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.0
EV_MC2	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
EV-HCl	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC-LCDSSLSS	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC-LC3	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC-LC5	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC-DCDS	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
	①23.0													
Technician Initials		JW	JW					JW	JW	RL	RL			

Thermometer: 6

Conductivity (µS)

Sample ID	Day 14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	716	722	722	720	716	734	710	732	708	723	707	725	706	709
EV_MC2	666	684	680	669	667	671	661	672	662	668	667	670	665	672
EV-HCl	769	778	774	773	769	766	770	778	773	780	767	773	770	774
LC-LCDSSLSS	853	861	852	855	850	854	850	853	827	836	852	856	860	853
LC-LC3	1076	1070	1081	1062	1073	1077	1072	1076	1060	1063	1074	1069	1067	1068
LC-LC5	772	776	792	772	764	769	746	765	739	747	773	764	764	769
LC-DCDS	678	698	700	689	684	689	685	693	689	7696	673	685	682	681
Technician Initials		JW	JW					JW	JW	RL	RL			

Conductivity meter: 1

Comments:

Reviewed by: [signature]

Date Reviewed: OCT. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: TRCIC
Work Order No.: 191607

Start Date: Aug 22/19
Termination Date: ~~Aug~~ Sept 19/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.0
FR-FRCP1+EDTA	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
CM-MC2+EDTA	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
RG-MIDAG+EDTA	23.0	23.0	23.0	23.0	22.5	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
Technician Initials	KA	JW	JW	KA	KA	A	A	JW	JW	RL	RL	CG	KA	KA

Thermometer: 6

Conductivity (µS)

Sample ID	Day 14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control ①	7/6 JW	441	433	431	426	434	422	437	430	437	425	432	428	431
FR-FRCP1+EDTA ②	3/9	903	907	898	897	900	886	898	873	880	905	914	912	904
CM-MC2+EDTA ③	8/8	1098	1106	1097	1091	1091	1087	1086	1064	1064	1102	1086	1092	1071
RG-MIDAG+EDTA ④	8/6	713	727	712	729	725	709	733	713	722	704	735	704	700
① 425														
② 903														
③ 1104														
④ 711														
Technician Initials	KA	JW	JW	KA	KA	A	A	JW	JW	RL	RL	CG	KA	KA

Conductivity meter: 3

Comments:

Reviewed by: [signature] Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191667
Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	23.0	23.0	23.0	23.0	22.0	22.5	23.0	23.0	22.0	23.0	22.0	23.0	22.0	23.0
FR_UFR1	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
GH_ER2	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	21.5	23.0	22.0	23.0
CM_MC1	22.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	21.5	23.0	22.0	23.0
LC_SLC	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.0	23.0	22.0	23.0	22.0	23.0
FR_FRCP1	22.5	23.0	23.0	23.0	23.5	22.5	23.0	23.0	23.0	23.0	22.0	23.0	22.5	23.0
FR_FRABCH	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
GH_FR1	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
GH_ERC	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
CM_MC2	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
Technician Initials	JW	KR	KR	MM	MM	JD	JD	SY	SY	SY	SY	SY	SY	SY

Thermometer: 6

Conductivity (µS)

Sample ID	Day 21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control 423	~~423~~	433	425	432	425	434	424	447	429	~~457~~ 423	424	428	423	430
FR_UFR1	370	403	429	424	429	440	424	439	431	438	335	445	430	433
GH_ER2	318	358	381	374	380	388	368	389	382	388	289	383	375	385
CM_MC1	329	366	383	377	378	389	384	388	380	365	285	368	370	377
LC_SLC	414	438	456	448	448	456	443	458	451	456	356	432	445	451
FR_FRCP1	873	929	946	930	932	928	862	926	907	895	851	919	929	925
FR_FRABCH	988	995	1053	1033	1035	1031	967	1022	993	983	961	1017	1027	1022
GH_FR1	805	839	873	861	868	869	814	866	844	837	780	853	860	862
GH_ERC	392	389	399	406	413	421	399	425	416	424	319	417	412	421
CM_MC2	1004	1078	1070	1034	1047	1037	1047	1038	1017	1015	965	1032	1042	1039
Technician Initials	JW	KR	KR	MM	MM	JD	JD	SY	SY	SY	SY	SY	SY	SY

Conductivity meter: 3

Comments:

Reviewed by: [signature] Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191607

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
EV-MC2	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0
EV-HCl	23.0	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC-LCDSSLSS	23.0	23.0	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC-LC3	23.0	23.0	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC-LC5	23.0	23.0	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
LC-DCDS	23.0	23.0	23.0	23.5	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Technician Initials	JW	KL	KL	MM	MM	SD	SD	SY	SY	SY	SY	SY	SY	SY

Thermometer: 6

Conductivity (µS)

Sample ID	Day 21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	436①	661	465	563	464	492	677	483	468	477	468	474	483	482
EV-MC2	574	606	602	601	595	608	601	670	602	615	568	594	596	600
EV-HCl	768	766	786	776	781	785	772	787	782	778	763*	772	766	774
LC-LCDSSLSS	759	834	864	854	857	861	847	860	842	937	761	832	846	852
LC-LC3	1097	1125	1181	1141	1146	1140	1162	1144	1125	1118	1055	1127	1134	1138
LC-LC5	712	772	776	766	763	766	750	764	742	732	683	745	756	756
LC-DCDS	648	708	725	717	719	726	724	733	726	725	629	702	720	722
Technician Initials	JW	KL	KL	MM	MM	SD	SD	SY	SY	SY	SY	SY	SY	SY

*685

Conductivity meter: 3

Comments: ① Double checked conductivity is correct

Reviewed by: [signature] Date Reviewed: Oct-24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 191607

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	22.0	23.0	22.0	23.0	22.0	23.0
FR_FRCP1+EDTA	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	22.0	23.0	22.0	23.0	22.0	23.0
CM_MC2+EDTA	23.0	23.0	23.0	23.5	23.0	23.0	22.5	23.0	22.0	23.0	22.0	23.0	22.0	23.0
RG_MIDAG+EDTA	23.0	23.0	23.0	23.5	23.0	23.0	23.0	23.0	22.0	23.0	22.0	23.0	22.0	23.0
Technician Initials	JW	KL	KL	MM	MM	SD	SD	SY	SY	SY	SY	SY	SY	SY

Thermometer: 6

Conductivity (µS)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	425	434	426	431	426	436	434	438	430	434	425	429	422	430
FR_FRCP1+EDTA	901	927	943	939	934	942	915	933	914	901	848	935	934	938
CM_MC2+EDTA	1013	1062	1059	1055	1049	1038	1030	1043	1027	1016	962	1020	1037	1038
RG-MIDAG+EDTA	384	~~497~~ 632	465	562	464	498	463	483	466	479	464	472	467	475
Technician Initials	JW	KL	KL	MM	MM	SD	SD	SY	SY	SY	SY	SY	SY	SY

Conductivity meter: 3

Comments:

Reviewed by: [signature] Date Reviewed: Oct. 29, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191607
~~Test Condition~~:
Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	8.4	7.0	8.1	6.3	8.3	6.1	8.3	6.7	8.3	6.9	8.3	6.7	8.4	6.3
FR_UFR1	8.6	6.9	8.0	6.3	8.1	5.9	8.1	6.8	8.0	6.9	8.1	6.7	8.2	6.0
GH_ER2	8.6	7.1	8.0	6.4	8.0	6.2	8.0	6.9	7.9	6.8	8.1	6.8	8.2	6.4
CM_MC1	8.6	7.2	8.1	6.6	8.1	6.3	7.9	6.8	7.9	6.9	8.2	6.7	8.1	6.3
LC_SLC	8.6	7.1	8.1	6.6	8.0	6.0	7.9	6.9	7.9	6.8	8.3	6.7	8.2	6.2
FR_FRCP1	8.6	7.0	8.0	6.5	8.1	5.8	7.8	6.9	8.0	6.7	8.4	6.5	8.1	6.5
FR_FRABCH	8.4	6.8	8.0	6.4	8.0	5.9	7.8	6.9	7.9	6.8	8.4	6.7	8.2	6.5
GH_FR1	8.6	6.8	8.0	6.4	8.0	6.3	7.8	7.0	7.8	6.8	8.4	6.6	8.2	6.0
GH_ERC	8.6	6.9	8.0	6.5	8.1	6.2	7.9	7.0	7.8	6.9	8.3	6.5	8.1	6.2
CM_MC2	8.6	7.1	8.0	6.4	8.1	6.2	8.0	7.0	7.8	6.8	8.5	6.6	8.1	6.4
Technician Initials	KJV	KJL	KJV	AV	A	MM	A	KJV	KM	KV	KM	KJL	KJV	JW

DO meter: 7

pH

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	7.7	7.3	7.6	7.2	7.5	7.3	7.5	7.2	7.8	7.7	7.8	7.2	7.5	7.2
FR_UFR1	7.7	7.7	7.7	7.6	7.7	7.4	7.9	7.6	8.0	7.8	8.0	7.5	8.0	7.6
GH_ER2	7.7	7.6	7.6	7.6	7.7	7.6	7.9	7.6	8.0	7.8	7.9	7.5	7.9	7.6
CM_MC1	7.6	7.6	7.7	7.6	7.7	7.6	7.9	7.6	8.0	7.8	7.9	7.4	7.9	7.6
LC_SLC	7.7	7.6	7.7	7.6	7.8	7.5	7.9	7.6	8.0	7.7	7.9	7.4	7.9	7.5
FR_FRCP1	7.8	7.8	7.8	7.8	7.8	7.8	8.1	7.9	7.9	7.7	7.9	7.7	7.8	7.8
FR_FRABCH	7.8	7.8	7.8	7.9	7.7	7.8	7.9	7.9	7.9	7.7	7.9	7.7	7.9	7.8
GH_FR1	8.0	8.0	8.0	7.9	8.0	7.9	8.1	8.0	8.1	7.9	8.1	7.8	8.1	7.8
GH_ERC	7.8	7.9	8.0	7.7	8.0	7.6	8.0	7.9	8.1	7.9	8.1	7.7	8.1	7.7
CM_MC2	8.0	7.9	7.9	7.9	8.0	7.8	7.9	7.8	7.9	7.7	7.9	7.7	7.8	7.8
Technician Initials	KJV	KJL	KJV	AV	A	MM	A	KJV	KM	KV	KM	KJL	KM	JW

pH meter: 3

Light meter: Lit-1
Light intensity (Lux): 500-940

Comments:

Reviewed by:
Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: TecIC
Work Order No.: 191607
~~Test Condition~~: IW

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	~~7.9~~ 8.6	7.1	7.9	~~8.6~~ 8.3	8.0	6.4	8.0	6.7	7.9	6.6	8.2	6.7	8.0	6.7
EV-MC2	7.9 8.6	7.1	8.0	6.2	8.1	6.2	8.1	6.8	8.0	6.7	8.3	6.6	8.0	6.1
EV-HCl	~~7.9~~ 8.6	6.9	8.0	6.1	8.0	6.3	7.9	6.7	8.0	6.8	8.3	6.7	8.1	6.6
LC-LCDSSLSS	8.6	6.9	7.9	6.3	8.0	5.9	7.9	6.7	8.0	6.8	8.4	6.5	8.0	6.2
LC-LC3	8.6	7.2	8.1	6.3	8.1	5.9	7.9	6.8	8.0	6.7	8.4	6.6	8.1	6.3
LC-LC5	8.6	7.1	8.0	6.5	8.0	6.0	7.9	6.8	8.0	6.8	8.5	6.7	8.2	6.3
LC-DCDS	8.6	7.0	8.0	6.4	8.0	6.1	7.9	6.8	7.9	6.9	8.4	6.6	8.1	6.2
Technician Initials	KJV	KJL	KJV	MM	A	DM	A	KJL	KJV	KM	KM	KJL	KJL	JW

DO meter: 3

pH

Sample ID	Day 0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	7.9	7.9	8.0	7.8	8.0	7.9	8.1	7.9	8.0	7.8	8.0	7.7	8.0	7.8
EV-MC2	7.9	7.9	7.9	7.9	8.0	7.9	8.1	7.9	8.0	7.8	7.9	7.7	8.0	7.6
EV-HCl	7.9	7.9	7.9	7.9	7.9	8.0	8.1	8.0	8.1	7.8	8.0	7.9	8.1	7.8
LC-LCDSSLSS	7.9	7.9	7.9	7.9	8.0	8.0	8.1	7.9	8.0	7.9	8.0	7.8	8.1	7.8
LC-LC3	7.7	7.9	7.8	7.9	7.9	7.9	8.0	7.9	8.1	7.8	7.8	7.8	8.0	7.8
LC-LC5	8.0	8.0	8.0	7.9	8.0	7.9	8.1	8.0	8.0	7.9	8.0	8.0	8.01	7.8
LC-DCDS	8.1	7.9	8.0	7.8	8.0	7.8	8.1	7.9	8.0	7.8	8.1	7.7	8.1	7.7
												W		
Technician Initials	KJV	KJL	KJV	M	A	MM	A	KJL	KJV	KM	KM	KJL	KJV	JW

pH meter:

Light meter: Li-1

Light intensity (Lux): 500-940

Comments:

Reviewed by: [signature]

Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191607
~~Test Condition~~: LW
Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	8.6	7.1	8.0	6.3	8.0	5.9	7.9	6.8	7.9	6.7	8.2	6.8	8.2	6.3
FR_FRCPI+EDTA	8.6	7.0	8.0	6.3	8.0	5.9	8.0	6.7	7.9	6.8	8.3	6.8	8.3	6.7
CM_MCZ+EDTA	8.6	7.0	8.0	6.4	8.0	5.8	8.0	6.6	7.9	6.9	8.2	6.7	8.2	6.4
RG_MIDAG+EDTA	8.6	7.0	8.1	6.5	8.0	5.8	8.0	6.8	7.9	6.8	8.3	6.7	8.1	6.2
Technician Initials	KL	KL	KL	K	A	MM	A	KL	KL	KL	KM	KL	KL	JW

DO meter: 3

pH

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	7.5	7.6	7.8	7.3	7.9	7.4	7.7	7.7	7.7	7.6	7.5	7.5	7.8	7.2
FR_FRCPI+EDTA	7.8	7.7	7.8	7.9	7.9	7.9	8.1	8.0	8.0	7.6	8.0	7.6	8.0	7.9
CM_MCZ+EDTA	8.0	7.9	7.9	8.0	8.0	7.9	8.0	8.0	7.9	7.8	7.8	7.7	8.0	7.8
RG_MIDAG+EDTA	7.9	7.8	7.8	7.9	8.0	7.9	8.1	8.0	8.1	7.9	7.9	7.8	8.0	7.8
Technician Initials	KL	KL	KL	K	A	MM	A	KL	KL	KL	KL	KL	KL	JW

pH meter: 3

Light meter: Lit-1
Light intensity (Lux): 500-940
Comments:
Reviewed by: [signature]
Date Reviewed: Oct-24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191607
~~Test Condition:~~ WW
Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	8.1	6.5	8.5	5.3	8.3	5.9	8.4	6.7	8.2	6.6	8.3	6.2	8.1	5.9
FR-UFR1	8.2	6.8	8.5	5.8	8.5	6.1	8.5	6.6	8.2	6.7	8.2	5.9	8.2	5.9
GH-ERC2	8.3	7.1	8.5	6.4	8.6	6.3	8.5	6.7	8.1	6.8	8.2	6.2	8.3	6.1
CM-MC1	8.5	7.2	8.5	6.2	8.6	5.9	8.6	6.6	8.2	6.9	8.0	6.3	8.2	6.1
LC-SLC	8.5	7.3	8.5	6.3	8.5	5.7	8.6	6.5	8.2	6.9	8.0	6.5	8.2	5.8
FR-FRCP1	8.5	7.3	8.5	6.5	8.5	6.1	8.5	6.6	8.1	6.7	8.0	6.3	8.4	5.8
FR-FRABCH	8.5	7.3	8.5	6.4	8.5	6.2	8.5	6.5	8.2	6.7	8.1	6.5	8.3	5.8
GH-FR1	8.5	7.3	8.5	6.3	8.5	6.0	8.5	6.5	8.1	6.8	8.0	6.6	8.4	6.5
GH-ERC	8.4	7.2	8.5	6.4	8.5	5.7	8.5	6.4	8.2	6.9	8.1	6.7	8.3	6.5
CM-MC2	8.5	7.1	8.5	6.4	8.5	5.9	8.5	6.5	8.2	6.7	8.1	6.7	8.2	6.4
Technician Initials	JW	JW	JW	M	M	MM	RC	M	M	KJL	KJL	KJL	KJL	KL

DO meter: 3-3

pH

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	7.6	7.5	8.1	7.2	7.7	7.2	7.6	7.3	7.8	7.3	7.7	7.3	~~8.2~~	7.1
FR-UFR1	8.0	8.0	8.3	7.7	8.0	7.6	7.9	7.8	7.9	7.7	7.9	7.7	8.2	7.6
GH-ERC2	7.9	8.1	8.2	7.7	8.0	7.8	8.1	7.9	8.0	7.8	8.0	7.8	8.2	7.6
CM-MC1	7.8	8.0	8.2	7.6	7.9	7.6	8.0	7.8	8.0	7.6	8.0	7.8	8.1	7.6
LC-SLC	7.9	8.0	8.2	7.7	7.9	7.6	8.0	7.9	8.1	7.6	8.0	7.8	8.1	7.6
FR-FRCP1	8.0	8.2	8.2	7.9	8.0	7.8	8.0	7.8	8.0	7.7	8.0	7.8	8.1	7.6
FR-FRABCH	7.8	8.1	8.0	7.9	7.9	7.8	7.9	7.8	8.0	7.7	7.9	7.8	8.0	8.0
GH-FR1	8.0	8.1	8.3	8.0	8.1	7.9	8.1	7.9	7.9	7.8	7.9	7.9	8.1	7.8
GH-ERC	7.9	8.1	8.2	7.9	8.0	7.7	8.0	7.9	8.0	7.6	7.9	7.9 ①	~~8.2~~	7.9
CM-MC2	7.9	8.1	8.1	7.9	8.0	8.0	8.0	8.0	8.1	7.7	8.0	7.8	8.0	7.9
Technician Initials	JW	JW	JW	M	M	MM	RC	M	M	KJL	KJL	KJL	KJL	KL

pH meter: 3-3

① 8.2

Light meter: Lit-1
Light intensity (Lux): 510-758

Comments:

Reviewed by: [signature]
Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 1911607
~~Test Condition:~~ KJV
Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	8.4	7.2	8.5	6.4	8.6	6.4	8.5	6.8	8.1	6.6	8.1	6.7	8.0	5.7
EV-MC2	8.4	7.2	8.5	6.4	8.4	6.1	8.4	6.9	8.1	6.7	8.0	6.2	8.0	5.8
EV-HCl	8.4	7.3	8.4	6.5	8.4	6.3	8.5	6.8	8.2	6.8	8.2	6.3	8.0	5.8
LC-LCDSSLSS	8.5	7.4	8.5	6.5	8.4	6.1	8.4	6.7	8.2	6.7	8.1	6.3	8.1	5.9
LC-LC3	8.5	7.1	8.5	6.3	8.5	6.2	8.4	6.7	8.1	6.6	8.0	6.4	8.3	6.4
LC-LCS	8.4	7.0	8.5	6.5	8.5	5.9	8.5	6.8	8.2	6.7	8.0	6.6	8.3	6.3
LC-DCDS	8.3	7.1	8.5	6.6	8.6	6.2	8.5	6.7	8.1	6.6	7.9	6.7	8.4	6.1
Technician Initials	JW	JW	JW	[illegible]	[illegible]	[illegible]	RC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

DO meter: 3-3

pH

Sample ID	Day 7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	7.8	8.0	8.2	8.0	8.1	7.9	8.1	8.0	8.0	7.7	8.0	7.9	8.2	7.9
EV-MC2	7.9	8.1	8.3	8.0	8.1	7.9	8.1	8.0	8.1	7.8	7.9	7.9	8.3	7.9
EV-HCl	7.9	8.2	8.3	8.0	8.1	8.1	8.1	8.0	8.0	7.8	8.0	8.0	8.3	7.9
LC-LCDSSLSS	7.9	8.1	8.2	7.9	8.1	7.9	8.1	7.9	8.0	7.8	7.9	7.9	8.1	7.9
LC-LC3	7.6	8.1	8.1	8.0	7.9	7.9	8.0	8.0	8.1	7.9	7.9	7.8	8.2	8.0
LC-LCS	8.0	8.2	8.2	8.0	8.1	8.1	8.1	8.1	8.1	7.8	7.9	7.8	8.1	7.9
LC-DCDS	8.1	8.0	8.3	7.8	8.2	7.8	8.2	8.1	8.2	7.8	8.0	7.7	8.1	7.9
Technician Initials	JW	JW	JW	[illegible]	[illegible]	[illegible]	RC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

pH meter: 3-3

Light meter: Lit-1
Light intensity (Lux): 510 - 780

Comments:

Reviewed by: [signature]
Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191607
~~Test Condition~~: KL

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	8.1	7.2	8.2	5.8	8.0	6.2	8.0	6.9	8.1	6.7	8.0	6.3	8.2	6.1
FR-FRCP1+EDTA	8.4	7.2	8.3	6.2	8.1	6.0	8.1	6.8	8.2	6.8	8.0	6.1	8.0	6.1
CM-MC2+EDTA	8.5	7.2	8.3	6.3	8.5	6.1	8.4	6.9	8.2	6.7	8.0	6.4	8.4	6.3
RG-MIDAG+EDTA	8.5	7.2	8.5	6.4	8.5	6.3	8.6	6.8	8.3	6.7	8.0	6.8	8.4	6.4
Technician Initials	JW	JW	JW	[illegible]	[illegible]	[illegible]	RC	[illegible]	[illegible]	KJL	KJL	KJL	KL	KL

DO meter: 3-3

pH

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	7.4	7.7	7.9	7.3	7.6	7.3	7.7	7.9	7.9	7.7	7.7	7.4	7.9	7.4
FR-FRCP1+EDTA	7.8	8.1	8.2	8.0	8.0	8.0	7.9	8.0	8.0	7.9	7.9	7.9	8.0	8.0
CM-MC2+EDTA	7.9	8.2	8.1	7.9	8.0	8.0	8.0	8.0	8.0	7.9	7.9	7.9	8.0	8.0
RG-MIDAG+EDTA	7.8	8.1	8.1	7.9	8.0	7.9	8.0	8.0	8.0	7.9	8.0	7.9	8.0	7.9
Technician Initials	JW	JW	JW	[illegible]	[illegible]	[illegible]	RC	[illegible]	[illegible]	KJL	KJL	KJL	KL	KL

pH meter: 3-3

Light meter: LI7-1

Light intensity (Lux): 510-780

Comments:

Reviewed by: [signature]

Date Reviewed: Oct 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191607
Test ~~Condition~~: IW

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 14 new	15 old	15 new	16 old	16 new	17 old	17 new	18 old	18 new	19 old	19 new	20 old	20 new	21 old
Control JW	288.3	6.6	8.3	5.9	8.1	6.3	~~6.8~~ 8.1	4.9	8.2	6.5	8.4	6.8	8.3	6.8
FR-UFR1	8.5	6.4	8.2	6.1	8.0	6.2	8.1	5.2	8.1	6.4	8.5	6.7	8.2	6.8
GH-ER2	8.5	6.4	8.1	5.8	8.0	6.0	8.0	6.1	8.0	6.7	8.5	6.6	8.2	6.9
CM-MC1	8.4	6.6	8.1	6.0	8.1	6.1	8.1	6.3	8.1	6.8	8.6	6.8	8.1	6.8
LC-SLC	8.5	6.7	8.2	6.1	8.2	6.2	8.0	6.2	8.1	6.7	8.5	6.8	8.2	6.7
FR-FRCP1	8.4	6.6	8.3	6.0	8.1	6.1	8.1	5.9	8.1	6.6	8.5	6.8	8.2	6.8
FR-FRABCH	8.5	6.6	8.3	6.1	8.1	6.0	8.1	6.1	8.2	6.6	8.4	6.7	8.1	6.6
GH-FR1	8.5	6.5	8.2	5.6	8.1	6.1	8.0	6.1	8.3	6.6	8.5	6.7	8.3	6.8
GH-ERC	8.4	6.7	8.3	6.1	8.0	6.2	8.1	6.2	8.3	6.8	8.6	6.8	8.3	6.8
CM-MC2	8.2	6.7	8.3	6.1	8.1	6.2	8.1	6.0	8.3	6.4	8.5	6.8	8.2	6.8
Technician Initials	IW	JW	JW	IW	IW	A	A	JW	JW	RC	RC	IW	IW	IW

DO meter: 3

pH

Sample ID	Day 14 new	15 old	15 new	16 old	16 new	17 old	17 new	18 old	18 new	19 old	19 new	20 old	20 new	21 old
Control	7.9	7.4	7.9	7.3	7.7	~~7.8~~ 7.8	7.8	6.8	7.7	7.2	7.7	7.0	7.7	6.9
FR-UFR1	8.2	7.9	8.2	7.8	8.1	~~7.8~~ 8.0	8.0	7.5	8.1	7.7	7.9	7.5	7.9	7.3
GH-ER2	8.1	7.8	8.1	7.9	8.1	8.0	8.1	7.6	8.0	7.8	7.8	7.5	7.9	7.4
CM-MC1	8.0	7.8	8.1	7.7	8.0	7.9	8.0	7.6	8.1	7.8	7.8	~~7.6~~ 7.6	7.4	7.5
LC-SLC	8.0	7.7	8.0	7.6	8.0	7.8	8.0	7.5	8.0	7.8	7.8	~~7.5~~ 7.5	7.8	7.4
FR-FRCP1	8.0	7.8	8.0	7.7	7.9	7.8	8.0	7.7	7.9	7.8	8.0	7.7	7.9	7.4
FR-FRABCH	7.9	7.8	7.9	7.7	7.8	7.8	8.1	7.8	7.8	7.9	7.9	7.8	7.9	7.6
GH-FR1	8.1	8.0	8.1	7.9	8.0	7.9	8.0	7.9	8.0	8.0	8.1	~~7.8~~ 7.8	8.0	7.6
GH-ERC	8.1	7.9	8.1	7.8	8.1	7.9	8.0	7.8	8.2	8.1	8.0	7.8	8.0	7.6
CM-MC2	8.0	8.0	~~8.7~~ 7.9	7.8	8.0	7.9	8.1	7.7	7.9	7.9	8.0	7.7	8.0	7.4
Technician Initials	IW	JW	JW	IW	IW	A	A	JW	JW	RC	RC	IW	IW	IW

pH meter: 3

Light meter: LI-1

Light intensity (Lux): 510 lux

Comments:

Reviewed by: [signature]

Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191607
~~Test Condition~~: WA
Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day 14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	8.2	6.8	8.3	6.1	7.8	6.3	8.0	5.9	8.3	6.4	8.4	6.8	8.2	6.8
EV-MC2	8.3	6.8	8.4	6.2	8.0	6.4	8.1	5.8	8.3	6.5	8.5	6.7	8.3	6.8
EV-HCl	8.3	6.7	8.3	6.2	8.1	6.3	8.0	6.0	8.2	6.5	8.5	6.6	8.3	6.7
LC-LCDSSLSS	8.3	6.7	8.3	6.1	8.1	6.4	8.1	6.1	8.3	6.6	8.5	6.6	8.3	6.5
LC-LC3	8.3	6.6	8.3	5.9	8.0	6.1	8.0	6.2	8.2	6.5	8.5	6.7	8.3	6.6
LC-LC5	8.3	6.9	8.4	5.9	8.2	6.2	8.1	6.2	8.2	6.5	8.4	6.8	8.4	6.7
LC-DCDS	8.3	6.9	8.4	6.0	8.2	6.2	8.0	6.3	8.1	6.5	8.4	6.8	8.3	6.7
Technician Initials	WA			JW	WA	~	~	JW	JW	RC	RC	WA	WA	WA

DO meter: 3

pH

Sample ID	Day 14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	8.0	7.9	8.1	7.8	8.0	7.9	8.0	7.8	8.2	7.80	8.1	7.7	8.1	7.7
EV-MC2	8.0	7.9	8.0	7.7	8.0	8.0	8.1	7.8	8.1	8.1	8.1	7.7	8.1	7.7
EV-HCl	8.1	7.9	8.1	7.7	8.0	7.9	8.0	7.9	8.2	8.2	8.1	7.8	8.1	7.8
LC-LCDSSLSS	8.0	7.9	8.1	7.8	8.0	8.0	8.0	7.8	8.0	8.1	8.1	7.8	8.0	7.8
LC-LC3	7.8	7.8	8.0	7.7	8.0	8.0	8.1	8.0	8.1	8.2	7.9	8.0	8.1	7.9
LC-LC5	8.1	7.7	8.1	7.8	8.1	8.0	8.1	8.0	8.0	8.0	8.1	8.0	8.0	7.7
LC-DCDS	8.2	7.7	8.1	7.7	8.1	8.0	8.1	7.9	8.1	8.1	8.2	8.0	8.1	8.0
Technician Initials	WA	JW	JW	WA	WA	~	~	JW	JW	RC	RC	WA	WA	WA

pH meter: 3

Light meter: LI-1
Light intensity (Lux): 500-800
Comments:
Reviewed by: [signature]
Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191607
Test ~~Condition~~:

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	8.2	6.7	8.2	6.2	8.0	6.1	8.1	5.8	8.2	6.5	8.1	6.8	8.2	6.8
FR-FRCP1 +EDTA	8.4	6.5	8.3	6.4	8.1	6.2	8.0	5.2	8.2	6.5	8.5	6.8	8.3	6.8
CM-MC2+EDTA	8.4	6.6	8.3	6.1	8.1	6.1	8.0	5.5	8.1	6.5	8.4	6.8	8.2	6.8
RG-MIDAG +EDTA	8.5	6.9	8.7	6.0	8.1	6.1	8.0	5.6	8.2	6.5	8.5	6.8	8.3	6.8
Technician Initials	[illegible]	JW	JW	[illegible]	[illegible]	[illegible]	[illegible]	JW	JW	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

DO meter: 3

pH

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	7.6	7.4	7.6	7.7	7.7	7.6	7.8	7.4	7.8	7.6	7.7	7.5	7.8	7.3
FR-FRCP1+ EDTA	7.9	7.7	8.0	7.8	8.0	8.1	8.0	7.8	8.0	8.0	8.0	7.9	8.0	7.8
CM-MC2+ EDTA	8.0	7.8	7.9	7.8	8.0	8.0	8.0	7.9	7.9	7.9	8.0	7.9	7.9	7.7
RG-MIDAG +EDTA	8.0	7.8	8.0	7.9	7.9	8.0	8.0	7.8	8.1	8.1	8.0	7.9	8.0	7.8
Technician Initials	[illegible]	JW	JW	[illegible]	[illegible]	[illegible]	[illegible]	JW	JW	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

pH meter: 3

Light meter: LH-1

Light intensity (Lux): 510 ~ 800

Comments:

Reviewed by: [illegible]

Date Reviewed: Oct-24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 191607
Test ~~Condition~~:

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	8.4	6.7	8.3	6.1	8.1	4.8	8.3	4.5	8.6	4.6	8.3	4.7	8.4	4.8
FR_UFR1	8.5	6.8	8.3	6.2	8.2	4.8	8.4	4.7	8.2	4.8	8.0	5.0	8.1	5.1
GH_ERC2	8.5	6.8	8.3	5.9	8.0	5.2	8.4	5.1	8.3	5.2	8.7	4.9	8.4	5.3
CM_MC1	8.5	6.7	8.3	6.1	8.1	4.7	8.5	4.5	8.3	4.8	8.1	4.9	8.5	5.1
LC_SLC	8.5	6.8	8.3	6.0	8.1	5.2	8.4	5.3	8.2	5.3	8.3	5.2	8.4	5.3
FR_FRCP1	8.5	6.8	8.4	5.8	8.0	4.8	8.4	4.7	8.3	4.6	8.5	4.8	8.5	4.9
FR_FRABCH	8.5	6.8	8.3	5.7	8.2	5.1	8.3	4.3	8.1	4.3	8.7	4.6	8.4	4.8
GH_FR1	8.5	6.6	8.3	5.9	8.1	5.1	8.4	4.6	8.2	4.7	8.2	4.8	8.4	4.6
GH_ERC	8.5	6.5	8.3	6.0	8.1	4.6	8.3	4.5	8.2	4.6	8.8	4.9	8.6	5.1
CM_MC2	8.5	6.8	8.4	6.3	8.2	4.5	8.4	4.7	8.3	4.6	8.5	4.8	8.6	4.9
Technician Initials	SW	KSL	KSL	MM	MM	SD	SD	SH	SH	SH	SH	SH	SH	SH	SH

DO meter: 3

pH

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	7.7	7.1	7.9	7.1	7.7	7.2	8.0	7.2	7.7	7.2	7.7	7.1	7.7	7.1
FR_UFR1	8.1	7.4	7.9	7.5	7.9	7.8	8.4	7.7	8.2	7.8	8.2	7.5	8.1	7.6
GH_ERC2	7.9	7.5	8.0	7.6	7.9	7.8	8.4	7.6	8.1	7.5	8.1	7.5	8.0	7.6
CM_MC1	7.9	7.4	8.0	7.6	7.9	7.8	8.2	7.5	8.2	7.6	8.1	7.6	8.0	7.6
LC_SLC	7.9	7.4	8.0	7.5	7.9	7.8	8.4	7.7	8.2	7.7	8.1	7.6	8.0	7.6
FR_FRCP1	7.9	7.6	7.9	7.5	7.7	8.0	8.2	7.7	8.0	7.7	8.0	7.7	7.9	7.7
FR_FRABCH	8.0	7.7	7.8	7.5	7.8	8.0	8.1	7.8	8.0	7.7	8.0	7.8	7.9	7.8
GH_FR1	8.0	7.8	8.0	7.7	8.0	8.0	8.2	7.8	8.1	7.8	8.2	7.8	8.1	7.8
GH_ERC	7.9	7.6	8.0	7.6	8.1	7.8	8.4	7.6	8.3	7.8	8.1	7.6	8.0	7.7
CM_MC2	7.9	7.6	7.9	7.6	7.9	7.9	8.3	7.7	8.0	7.7	8.1	7.7	8.0	7.8
Technician Initials	JW	KSL	KSL	MM	MM	SD	SD	SH	SH	SH	SH	SH	SH	SH	SH

pH meter: 3

Light meter: Lit-1

Light intensity (Lux): 500-720

Comments:

Reviewed by:

Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 191607
Test Condition:

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	8.5	6.9	8.4	6.5	8.1	4.5	8.3	~~4.7~~	8.2	4.5	8.1	4.4	7.9	4.8
EV-MC2	8.5	6.8	8.3	6.0	8.1	5.3	8.2	~~5.0~~	8.0	4.6	8.5	5.0	8.3	5.0
EV-HC1	8.5	6.8	8.3	6.2	8.2	4.8	8.3	4.2	8.2	4.5	8.2	4.3	8.4	4.4
LC-LCDSSLSJ	8.5	6.9	8.4	5.6	8.0	5.4	8.3	5.1	8.2	5.1 SY	8.4	5.1	8.4	5.3
LC-LC3	8.5	6.8	8.3	6.2	8.1	5.3	8.4	4.8	8.3	5.0	8.5	4.9	8.3	4.8
LC-LC5	8.5	6.7	8.3	5.7	8.1	5.8	8.1	5.2	8.3	5.5	8.6	5.3	8.5	5.5
LC-DCDS	8.5	6.8	8.3	6.3	8.1	4.8	8.1	4.3	8.0	4.7	8.4	4.8	8.2	5.0
Technician Initials	JW	KSL	KSL	UM	UM	JD	JD	SY	SY	SY	SY	SY	SY	SY

DO meter: 3

☆5.0
☆4.6

pH

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	8.0	7.7	8.1	7.7	8.0	7.8	8.4	7.6	8.1	7.6	8.2	7.5	8.1	7.5
EV-MC2	8.0	7.6	8.0	7.6	8.0	8.0	8.4	7.6	8.2	7.6	8.1	7.6	8.1	7.7
EV-HC1	8.0	7.8	8.0	7.7	8.1	8.0	8.5	7.8	8.3	7.9	8.2	7.6	8.2	7.8
LC-LCDSSLSJ	8.0	7.8	8.0	7.8	8.1	8.0	8.4	7.9	8.2	7.9	8.2	7.8	8.1	7.9
LC-LC3	7.8	7.8	7.9	7.8	8.1	8.1	8.4	8.0	8.2	8.0	8.0	7.9	8.1	7.9
LC-LC5	8.1	7.8	8.0	7.7	8.0	8.0	8.3	7.9	8.0	7.9	8.2	7.9	8.0	7.9
LC-DCDS	8.2	7.6	8.1	7.5	8.1	7.8	8.3	7.6	8.1	7.7	8.3 SY	7.5	8.1	7.6
Technician Initials	JW	KSL	KSL	UM	UM	JD	JD	SY	SY	SY	SY	SY	SY	SY

pH meter: 3

Light meter: LA-1

Light intensity (Lux): 500 - 720

Comments:

Reviewed by: [signature]

Date Reviewed: Oct. 24, 2019

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 911607
Test Condition:

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	8.3	7.7	8.3	6.2	8.2	5.0	8.5	4.7	8.4	4.8	8.6	4.9	8.2	5.0
FR-FRCPI+EDTA	8.5	6.8	8.3	6.0	8.2	5.2	8.5	4.4	8.3	4.4	8.4	4.6	8.5	4.8
CM_MC2+EDTA	8.5	6.7	8.4	6.0	8.1	5.4	8.5	4.6	8.4	4.7	8.4	4.8	8.5	5.2
RG_MIDAG+EDTA	8.5	6.8	8.4	5.9	8.1	5.0	8.5	4.7	8.5	4.5	8.3	4.7	8.2	5.0
Technician Initials	JW	KL	KL	MM	MM	JD	JD	SY	SY	SY	SY	SY	SY	SY

DO meter: 3

pH

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	7.7	7.3	7.6	7.1	7.9	7.4	8.0	7.2	7.9	7.3	7.7	7.3	7.7	7.3
FR-FRCPI+EDTA	7.9	7.8	7.9	7.6	8.0	8.0	8.2	7.7	8.1	7.8	8.1	7.6	8.0	7.8
CM_MC2+EDTA	8.0	7.7	7.9	7.6	7.7	7.9	8.2	7.8	8.0	7.8	8.2	7.8	8.0	7.6
RG_MIDAG+EDTA	8.0	7.7	7.9	7.5	7.9	7.8	8.3	7.6	8.1	7.6	8.2	7.5	8.2	7.5
Technician Initials	JW	KL	KL	MM	MM	JD	JD	SY	SY	SY	SY	SY	SY	SY

pH meter: 3

Light meter: LI-1

Light intensity (Lux): 500-720

Comments:

Reviewed by: [signature]

Date Reviewed: Oct. 24, 2019

H. azteca Water-only Toxicity Test Data Sheet

~~14~~ 28-d Survival and Weight

Client: Teck
Work Order No: 191607
Sample ID: See below

Start Date: Aug 22/19
Termination Date: ~~Sept 19/19~~
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Q3 Pan No. purple	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Control	1	A	9	0	1	CMP	1052.70	1055.06	9	MM /CMP
	2	B	9	0	1		1061.72	1064.90	9	
	3	C	10	0	0		1045.45	1051.14	10	
	4	D	10	0	0		1055.59	1062.19	10	
	5	E	10	0	0		1054.02	1063.37	10	
FR-UFR1	6	A	9	0	1	ST	1048.40	1051.60	9	
	7	B	10	0	0	ST	1063.08	1065.43	10	
	8	C	10	0	0	ST	1064.90	1070.08	10	
	9	D	~~9~~ 8	0	2	ST①	1076.01	1079.35	8	
	10	E	9	0	1	ST	1051.72	1054.56	9	
GH-ER2	11	A	5 ①	0	4②		1058.64	1059.24	5	
	12	B	10	0	0	~~CMP~~	1058.94	1063.09	10	
	13	C	10	0	0	~~CMP~~	1061.75	1067.96	10	
	14	D	10	0	0		1064.80	1067.61	10	
	15	E	9	0	1		1052.68	1057.81	9	
CM-MC1	16	A	8	0	2	CMP	1065.82	1071.43	8	
	17	B	9	0	1		1080.03	1086.27	9	
	18	C	8	0	2		1057.03	1060.79	8	
	19	D	8	0	2		1042.14	1045.10	8	
	20	E	10	0	0		1060.72	1063.04	10	

Comments: ①QA Checked by CMP ②Squished - Technician Error, removed from jar (RW)
10% RW: Pan# 17 = 1086.28, Pan# 7 = 1065.40, Pan# 2 = 1064.85, Pan# 100 = 1047.66, Pan# 91 = 1078.62, Pan# 105 = 1078.26
Pan# 81 = 978.79, Pan# 68 = 1055.78, Pan# 60 = 1072.17, Pan# 53 = 1055.85, Pan# 63 = 1057.57

Reviewed by: CMP
Date Reviewed: Oct 25, 2019

H. azteca Water-only Toxicity Test Data Sheet

14-d Survival and Weight

Client: Teck
Work Order No: 191607
Sample ID: See below

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (03 purple)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~	21	A	10	0	0	CMP	1054.80	1060.85	10	MM/CMP
LC-SLC	22	B	10	0	0	↓	1040.27	1046.61	10	↓
	23	C	10	0	0	↓	1047.31	1050.24	10	↓
	24	D	10	0	0	↓	1044.33	~~1049.22~~ 1049.54	~~9~~ 10	↓
	25	E	9	0	1	↓	1075.05	1079.02	9	↓
FR-FRCP1	26	A	10	0	0	~~CMP~~	1048.72	1054.08	10	↓
	27	B	8	0	2	~~CMP~~	1050.16	1051.54	8	↓
	28	C	10	0	0	~~CMP~~	1050.84	1053.79	10	↓
	29	D	8	0	2	~~CMP~~	1048.48	1050.54	8	↓
	30	E	10	0	0	~~CMP~~	1048.45	1052.91	10	↓
FR-FRABCH	31	A	10	0	0	JL	1058.28	1063.40	10	↓
	32	B	10	0	0	↓	1076.16	1080.86	9 ①	~~SC~~ ↓
	33	C	10	0	0	↓	1060.13	1068.84	10	~~JL~~ ↓
	34	D	9	0	1	↓	1052.03	1056.46	9	~~SC~~ ↓
	35	E	10	0	0	↓	1038.79	1045.44	10	↓
GH-FR1	36	A	~~10~~ 9	0	1	ST	1040.95	~~1045.42~~ 1046.30	~~10~~ 9	↓
	37	B	10	0	0	SI	1089.96	1095.24	10	↓
	38	C	10	0	0	ST	1064.46	1067.95	10	↓
	39	D	9	0	1	SI	1068.86	1072.66	9	↓
	40	E	10	0	0	G	1058.16	1064.96	10	↓

Comments: ① 1 organism lost in transfer

Reviewed by: [signature]

Date Reviewed: Oct. 25, 2019

H. azteca Water-only Toxicity Test Data Sheet

14-d Survival and Weight
28

Client: Teck
Work Order No: 191607
Sample ID: See below

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Q3 Pan No. purple	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~	41	A	9	0	1	CMP	1054.89	1061.97	9	MN/CMP
GH-ERC	42	B	10	0	0		1056.19	1061.63	10	
	43	C	10	0	0		1056.13	1059.95	10	
	44	D	7①	0	3		1056.66	1057.85	7	
	45	E	9	0	1		1063.77	1069.58	9	
CM-MCZ	46	A	7	0	3	JL	1063.50	1064.51	7	
	47	B	8	0	2	JL	1075.76	1079.11	8	
	48	C	8	0	2	JL	1053.56	1056.57	8	
	49	D	10	0	0	JL	1062.99	1065.56	10	
	50	E	10	0	0	JL	1069.45	1071.65	10	JL
RG-MIDAG	51	A	9	0	1		1067.97	1069.20	9	
	52	B	10	0	0		1060.16	1067.88	10	
	53	C	10	0	0		1050.03	1055.82	10	
	54	D	9	0	1		1041.24	1094.06	9	
	55	E	9	1	0		1074.72	1080.64	9	
EV-MCZ	56	A	10	0	0	CMP	1059.63	1066.36	10	
	57	B	10	0	0		1057.68	1064.69	10	
	58	C	10	0	0		1076.89	1083.13	10	
	59	D	10	0	0		1060.16	1067.06	10	
	60	E	10	0	0		1066.32	1072.15	10	

Comments: ①Checked by JL

Reviewed by: [signature]

Date Reviewed: Oct 25, 2019

H. azteca Water-only Toxicity Test Data Sheet

~~14~~ 28-d Survival and Weight

Client: Teck
Work Order No: 191607
Sample ID: See below

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (purple) 03	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~ ✓	61	A	5	0	5	ST ①	1055.46	1056.70	5	MH/CMP
EV-HCl	62	B	10	0	0	ST	1045.24	1048.95	10	
	63	C	8	0	2		1055.81	1057.56	8	
	64	D	10	0	0		1047.19	1052.85	10	
	65	E	9	0	1		~~1063.72~~ 1063.72	1065.82	9	
LC-LCDSSLSS	66	A	6	0	4	CMP ②	1046.93	1047.40	6	
	67	B	9	0	1		1053.80	1055.22	9	
	~~68~~	C	8	0	2		1053.20	1055.73	7	
	69	D	10	0	0		1036.85	1040.15	10	
	70	E	10	0	0		1059.69	1062.01	10	
LC-LC3	71	A~~Ø~~	6 ①	0	4		1052.02	1053.34	6	
	72	B	7 ①	0	3		1042.27	1043.75	7	
	73	C	7 ①	1	2		1060.72	1063.00	7	
	74	D~~Ø~~	10	0	0		1060.66	1065.64	10	
	75	E	6 ①	2	2		1051.82	1053.41	6	
LC-LC5	76	A ③	8	0	2	JL	994.79	995.88	8	
	77	B	9	0	1	JL	1062.02	1066.71	9	
	78	C	9	0	1	JL	1090.01	1093.02	9	
	79	D ③	4	0	6	JL	1070.53	1071.31	4	
	80	E	9	0	1	JL	1016.90	1022.03	9	

Comments: ① QA checked by CMP ② QA Checked by JL ③ lots of floc at bottom - no floc in other reps. JL

Reviewed by: [signature]

Date Reviewed: Dec. 20, 2019

H. azteca Water-only Toxicity Test Data Sheet

~~14~~-d Survival and Weight
28

Client: Teck
Work Order No: 191607
Sample ID: See Below

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (23 purple)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~ LC	81	A	8	0	2	ST	976.72	978.77	8	MM / CMP
LC-DCDS	82	B	9	0	1		996.41	998.86	9	
	83	C	10	0	0		1064.10	1069.07	10	
	84	D	10	0	0		1036.84	1039.46	9	
	85	E	8	0	2		1065.00	1066.85	8	
EDTA Control	86	A	~~8~~ 9	0	1	CMP	990.41	996.87	9	
	87	B	10	0	0		1046.80	1054.70	10	
	88	C	10	0	0		1063.07	1070.66	10	
	89	D	9	0	1		1065.40	1070.05	9	
	90	E	10	0	0		1062.02	1064.79	8	
FR-FRCPI+EDTA	91	A	10	0	0	ST	1073.23	1078.60	10	
	92	B	8	0	2		1050.14	1055.49	8	
	93	C	~~5~~ 6	1	3		1061.00	1063.07	6	
	94	D	9	1	0	SL	1044.52	1046.61	9	
	95	E	9	0	1		1067.84	1069.57	9	
CM-MC2+EDTA	96	A	10	0	0	ST	1063.60	1066.19	10	
	97	B	6 ①	0	4		1045.98	1047.94	6	
	98	C	8	0	2		1056.88	1060.11	8	
	99	D	10	0	0		1049.76	1055.44	10	
	100	E	8	0	2		1044.86	1047.65	8	

Comments: ① check by CMP

Reviewed by: [signature]

Date Reviewed: Oct 25, 2019

H. azteca Water-only Toxicity Test Data Sheet

~~14~~ 28-d Survival and Weight

Client: Teck
Work Order No: 1911007
Sample ID: See below

Start Date: Aug 22/19
Termination Date: Sept 19/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (purple)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~	101	A	10	0	0	CMP	1069.81	1076.95	10	MM
~~EDTA Control~~	102	B	9	0	1	↓	996.23	1002.10	9	↓
RG-MIDAG +EDTA	103	C	10	0	0		1006.17	1013.24	10	
	104	D	8	0	2		991.47	996.05	8	
	105	E	5	0	5	▷①	1077.24	1078.24	5	
		A								
		B								
		C								
		D								
		E								
		A								
		B								
		C								
		D								
		E								
		A								
		B								
		C								
		D								
		E								

Comments: ① QA Checked by ST

Reviewed by: [signature]

Date Reviewed: Oct 25, 2019

Nautilus Environmental
Water Quality Data For Ammonia

Client : Teck **Species :** H. azteca

Work Order No: 191607 **Sample Type:** Overlying ammonia

Date Measured: See below

Date	Sample ID	Temperature (°C)	pH	Total Ammonia as N (mg/L)	Unionized Ammonia (mg/L) as N	Tech. Init.
Day 0 week 1 Aug 22/19	Control	22.5	7.7	0	0	MM
↓	FR_UFR1	23.0	7.7	0	↓	↓
	GH_ER2	22.5	7.6	0		
	CM_MC1	23.0	7.6	0		
	LC_SLC	23.0	7.7	0		
	FR_FRCP1	23.0	7.8	0		
	FR_FRABCH	23.0	7.8	0		
	GH_FR1	23.0	8.0	0		
	GH_ERC	23.0	7.8	0		
	CM_MC2	23.0	8.0	0		
	RG_MIDAG	23.0	7.9	0		
	EV_HC1	23.5	7.9	0		
	LC_LCDSSLSS	23.5	7.9	0		
	LC_LC3	23.5	7.7	0		
	LC_LC5	23.5	8.0	0		
↓	LC_DCDS	23.5	8.1	0	↓	↓
	EV_MC2	23.5	7.9	0		

Ammonia Salicylate Lot #: A9099

Ammonia Cyanurate Lot #: A9049

Comments:

Reviewed by: [signature] **Date Reviewed:** Oct. 24, 2019

Nautilus Environmental
Water Quality Data For Ammonia

Client : Teck **Species :** H. azteca

Work Order No: 191607 **Sample Type:** Overlying ammonia

Date Measured: see below

Week 2

Date	Sample ID	Temperature °C	Salinity (ppt) MM	pH	Total Ammonia as N (mg/L)	Unionized Ammonia as N (mg/L)	Tech. Init.
Aug 29/19	FR-UFR1	16.5		8.0	0	0	MM
	GH-ER2	16.0		7.9	0		
	CM-MC1	14.0		7.8	0		
	LC-SLC	14.5		7.9	0		
	FR-FRCF1	16.0		8.0	0		
	FR-FRABCH	16.0		7.9	0		
	GH-FR1	16.0		8.0	0		
	GH-ERC	16.0		7.8	0		
	CM-MC2	15.0		8.1	0		
	RG-MIDAG	14.0		7.9	0		
	EV-HC1	15.0		8.0	0		
	LC-LCDSSLSS	16.0		8.0	0		
	LC-LC3	16.0		7.6	0		
	LC-LC5	16.0		8.1	0		
	LC-DCDS	18.0		8.3	0		
↓	EV-MC2	15.5		8.0	0	↓	↓

Ammonia Salicylate Lot #: A9099

Ammonia Cyanurate Lot #: A9049

Comments:

Reviewd by: [signature] **Date Reviewed:** Oct. 24, 2019

Nautilus Environmental
Water Quality Data For Ammonia

Client : Teck **Species :** H. azteca

Work Order No: 191607 **Sample Type:** Overlying ammonia

Date Measured: See below

Date	Sample ID	Temperature (°C)	pH	Total Ammonia as N (mg/L)	Unionized Ammonia (mg/L)	Tech. Init.
week 3 Sept 5/19	FR_UFR1	23.0	8.2	0.01	0.0007	CMP
	GH_ER2	22.5	8.1	0.01	0.0005	
	CM_MC1	22.5	8.0	~~0.07~~ 0.01	0.0004	
	LC_SLC	22.5	8.0	0.01	0.0004	
	FR_FRCP1	22.5	8.0	~~0.06~~ 0.05	0.0020	
	FR_FRABCH	23.0	7.9	0.00	0.0	
	GH_FR1	23.0	8.1	0.02	0.0011	
	GH_ERC	23.0	8.1	0.01	0.0005	
	CM_MC2	23.0	8.0	0.02	0.0009	
	RG_MIDAG	23.0	8.0	0.03	0.0093	
	EV_MC1	23.0	8.1	0.02	0.0011	
	LC_LCDS&LSS	23.0	8.0	0.01	0.0004	
	LC_LC3	23.0	~~8.0~~ 7.8	0.01	0.0003	
	LC_LLS	23.0	8.1	0.00	0.0	
	LC_DCDS	23.0	8.2	0.04	0.0027	
	EV_MC2	23.0	8.0	0.00	0.0	

Ammonia Salicylate Lot #: A9099

Ammonia Cyanurate Lot #: A9049

Comments:

Reviewed by: [signature] **Date Reviewed:** Dec-24, 2019

Nautilus Environmental
Water Quality Data For Ammonia

Client : Teck **Species :** H. azteca

Work Order No: 191607 **Sample Type:** Overlying ammonia

Date Measured: see below

Date	Sample ID	Temperature °C	Salinity (ppt)	pH	Total Ammonia as N (mg/L)	Unionized Ammonia as N (mg/L)	Tech. Init.
~~Day 28~~ Week 4 Sept 12/19	Control	23.0		7.7	—	—	
	FR_UFR1	23.0		8.1	~~0.02~~ 0.01	0.0005	TH
	GH_ER2	23.0		7.9	0.00	0.0	
	CM_MC1	22.5		7.9	0.01	0.0003	
	LC_SLC	23.0		7.9	0.00	0.0	
	FR_FRCP1	22.5		7.9	0.03	0.001	
	FR_FRABCH	23.0		8.0	0.01	0.0004	
	GH_FR1	23.0		8.0	0.01	0.0004	
	GH_ERC	23.0		7.9	0.01	0.0003	
	CM_MC2	23.0		7.9	0.00	0.0	
	RG_MIDAG	23.0		8.0	0.01	0.0004	
	EV_MC1	23.0		8.0	~~0.01~~ 0.02	0.0009	
	LC_LCDSSLSS	23.0		8.0	0.00	0.0	
	LC_LC3	23.0		~~8.0~~ 7.8	0.00	0.0	
	LC_LCS	23.0		8.1	0.00	0.0	
↓	LC_DCDS	23.0		8.2	0.03	0.002	
	~~EV_MC2~~	~~23.0~~		8.0	0.01	0.0004	↓

Ammonia Salicylate Lot #: A9099

Ammonia Cyanurate Lot #: A9049

Comments:

Reviewd by: **Date Reviewed:** Dec 24, 2019

Client : Teck
W.O.: 191607
Date Sep-19

Table of PKa values

	TDS (mg/L)			Salinity (g/kg)		
Temperature (°C)	*0*	*250*	*2000*	*10*	*20*	*30*
12	9.662	9.699	9.754	9.788	9.819	9.837
15	9.564	9.601	9.655	9.688	9.719	9.737
18	9.465	9.502	9.557	9.588	9.619	9.636
20	9.401	9.438	9.492	9.523	9.554	9.571
22		9.391				
23	9.307	9.344	9.398	9.426	9.459	9.476
25	9.246	9.283	9.337	9.366	9.397	9.414

Date	Sample ID	Temperature (C)	pH	Salinity (ppt)	Total Ammonia as N (mg/L)	pKa	Unionized Ammonia (mg/L N)
5-Sep-19	FR_UFR1	23	8.2		0.01	9.344	0.000670
	GH_ER2	22.5	8.1		0.01	9.391	0.000487
	CM_MC1	22.5	8		0.01	9.391	0.000391
	LC_SLC	22.5	8		0.01	9.391	0.000391
	FR_FRCP1	22.5	8		0.05	9.391	0.001953
	CFR_FRABCH	23	7.9		0.00	9.344	0.000000
	GH_FR1	23	8.1		0.02	9.344	0.001079
	GH_ERC	23	8.1		0.01	9.344	0.000539
	CM_MC2	23	8		0.02	9.344	0.000867
	RG_MIDAG	23	8		0.03	9.344	0.001300
	EV_HC1	23	8.1		0.02	9.344	0.001079
	LC_LCDSSLSS	23	8		0.01	9.344	0.000433
	LC_LC3	23	7.8		0.01	9.344	0.000278
	LC_LC5	23	8.1		0.00	9.344	0.000000
	LC_DCDS	23	8.2		0.04	9.344	0.002679
	EV_MC2	23	8		0.000	9.344	0.000000

Oct-24/19

Client : Teck
W.O.: 191607
Date Sep-19

Table of PKa values

Temperature (°C)	TDS (mg/L) 0	250	2000	Salinity (g/kg) 10	20	30
12	9.662	9.699	9.754	9.788	9.819	9.837
15	9.564	9.601	9.655	9.688	9.719	9.737
18	9.465	9.502	9.557	9.588	9.619	9.636
20	9.401	9.438	9.492	9.523	9.554	9.571
22		9.391				
23	9.307	9.344	9.398	9.426	9.459	9.476
25	9.246	9.283	9.337	9.366	9.397	9.414

Date	Sample ID	Temperature (C)	pH	Salinity (ppt)	Total Ammonia as N (mg/L)	pKa	Unionized Ammonia (mg/L N)
12-Sep-19	FR_UFR1	23	8.1		0.01	9.344	0.000539
	GH_ER2	23	7.9		0.00	9.344	0.000000
	CM_MC1	22.5	7.9		0.01	9.391	0.000313
	LC_SLC	23	7.9		0.00	9.344	0.000000
	FR_FRCP1	23	7.9		0.03	9.344	0.001042
	CFR_FRABCH	22.5	8		0.01	9.391	0.000391
	GH_FR1	23	8		0.01	9.344	0.000433
	GH_ERC	23	7.9		0.01	9.344	0.000347
	CM_MC2	23	7.9		0.00	9.344	0.000000
	RG_MIDAG	23	8		0.01	9.344	0.000433
	EV_HC1	23	8		0.02	9.344	0.000867
	LC_LCDSSLSS	23	8		0.00	9.344	0.000000
	LC_LC3	23	7.8		0.00	9.344	0.000000
	LC_LC5	23	8.1		0.00	9.344	0.000000
	LC_DCDS	23	8.2		0.03	9.344	0.002009
	EV_MC2	23	8		0.010	9.344	0.000433

Oct 24/19

Client: Teck

W.O.#: 191607

Hardness and Alkalinity Datasheet

Day 0

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Control	Aug 22/19	Aug 22/19	100	6.9	7.1	67	50	6.0	120	MM
FR_UFR1			MM ~~50~~ 25	3.9	4.2	MM ~~72~~ 144	50	7.1	142	MM
GH-ER2			50	7.4	7.7	142	50	6.1	122	MM
CM-MC1			50	7.8	8.0	152	50	6.6	132	MM
LC-SLC			50	7.5	7.9	142	50	7.7	154	MM
FR-FRCP1			50	10.4	10.6	204	50	16.9	338	MM
FR-FRABCH			50	12.1	12.3	238	50	18.2	364	MM
GH_FRI			50	11.0	11.2	216	50	17.1	342	MM
GH-ERC			50	7.2	7.5	138	50	7.1	142	MM
CM_MC2			50	11.5	11.7	226	50	19.7	394	MM
RG_MIDAG			50	8.7	8.8	172	50	11.7	234	MM
EV_MC2			50	9.6	9.7	190	50	11.3	226	MM
EV_HC1			50	10.5	10.6	208	50	11.7	234	MM
LC-LCDSSLSS			50	10.1	10.3	148	50	16.6	332	MM
LC-LC3			50	11.6	11.7	230	50	20.3	406	MM
LC_LC5			50	10.3	10.5	202	50	13.9	278	MM
LC-DCDS	↓	↓	50	7.7	7.8	152	50	10.5	210	MM

Notes:

Reviewed by: [signature]

Date Reviewed: Oct. 24, 2019

Client: Teck

W.O.#: 191607

Hardness and Alkalinity Datasheet

week 2

	Alkalinity							Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Control	Aug 29/19	Aug 29/19	50	3.5	3.6	68		50	5.8	116	MM
FR-UFR1			50	8.3	8.5	162		50	6.9	138	MM
GH-ER2			50	7.5	7.7	146		50	6.8	136	MM
CM-MC1			50	8.1	8.3	158		50	6.4	128	MM
LC-SLC			50	7.5	7.7	146		50	7.8	156	MM
FR-FRCP1			50	10.2	10.5	198		50	17.0	340	MM
FR-FRABCH			50	12.1	12.3	238		50	18.5	370	MM
GH-FRI			~~50~~ 50	10.5	10.7	206		50	15.7	314	MM
GH-ERC			50	7.9	8.0	156		50	6.3	126	MM
CM-MC2			50	11.8	12.0	232		50	16.4	328	MM
RG-MIDAG			50	9.3	9.5	182		50	12.7	254	MM
EV-HC1			50	10.5	10.7	206		50	14.6	292	MM
LC-LCDSSLSS			50	10.2	10.3	202		50	15.4	308	MM
LC-LC3			50	11.1	11.4	216		50	19.2	384	MM
LC-LCS			50	10.4	10.6	204		50	14.8	296	MM
LC-DCDS			50	7.1	7.4	136		50	11.0	220	MM
EV-MC2			50	9.5	9.7	186		50	10.5	210	MM

Notes:

Reviewed by: [signature] Date Reviewed: Oct. 24, 2019

Client: Teck

W.O.#: 191607

Hardness and Alkalinity Datasheet

Week 3

Sample ID	Alkalinity: Subsample Date	Alkalinity: Date Measured	Alkalinity: Sample Volume (mL)	Alkalinity: (mL) 0.02N HCL/H_2SO_4 used to pH 4.5	Alkalinity: (mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Alkalinity: Total Alkalinity (mg/L$CaCO_3$)	Hardness: Sample Volume (mL)	Hardness: Volume of 0.01M EDTA Used (mL)	Hardness: Total Hardness (mg/L $CaCO_3$)	Technician	
Control	Sept 4/19	Sept 17/19	50	3.7	3.8	72	50	6.4	128	JW	
FR - UFR1			50	8.4	8.6	164	50	8.5	170	SPT	
GH - ER2			50	7.7	7.9	150	50	7.5	150	SPT	
CM - MC1			50	8.4	8.6	164	50	7.4	148	SPT	
LC - SLC			50	8.2	8.4	160	50	SPT ~~8.9~~ 8.8	176	SPT	
FR - FRCP1			50	11	11.2	216	10 (1)	SPT ~~11~~ 4.3	MD 430 ~~470~~	SPT	1:10
FR - FRABCH			50	13.1	13.3	258	10 (1)	~~4.7~~ 5.7	570 ~~470~~	MD	1
GH - FRI			50	11.8	12.0	232	50	20.9	418	MD	
GH - ERC			50	8.3	8.5	162	50	8.4	168	MD	
CM - MC2		Sept 18/19	50	11.0	11.2	216	10 (1)	MD ~~5.2~~ 5.2	580	MD	
RG - MIDAG			50	9.8	10.0	192	10 (1)	MD ~~4.0~~ 4.7	470	MD	
EV - HC1			50	11.0	11.2	216	10 (1)	MD ~~5.9~~ 4.0	400	MD	
LC - LCDSSLSS			50	11.1	11.3	218	10 (1)	MD ~~5.3~~ 5.1	510	MD	
LC - LC3			50	12.3	12.5	242	10 (1)	6.2 ~~4.8~~ MD	620	MD	
LC - LC5			50	10.2	10.4	200	10 (1)	4.1	410	MD	
LC - DCDS			50	7.5	7.7	146	10 (1)	3.0	300	MD	
EV - MC2			50	10.3	10.5	202	10 (1)	3.3	330	MD	

Notes: (1) Diluted to 100 mL w/ DI H_2O

Reviewed by: [signature] Date Reviewed: Oct-24, 2019

Client: teck

W.O.#: 191607

Hardness and Alkalinity Datasheet

Day 28

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Control	Sept 19/19	Oct 10/19	50	3.6	3.7	70	50	6.7	134	SM
FR-UFR1			50	8.2	8.4	160	10①	6.1	540	SM
GH-ER2			50	7.4	7.5	146	50	8.1	162	SM
CM-MC1			50	8.0	8.1	158	50	7.8	156	SM
LC-SLC		Oct 11/19	10①	1.7	1.8	160	10①	2.2	220	
FR-FRLP1			10①	2.7	2.8	260	10①	4.9	490	
FR-FRABCH			10①	3.0	3.1	290	10①	5.1	510	
GH-FR1			10①	2.6	2.7	250	10①	5.2	520	
GH-ERC			10①	2.1	2.2	200	10①	2.8	280	
CM-MC2			10①	2.6	2.7	250	10①	4.6	460	
RG-MIDAG			10①	2.0	2.1	190	10①	3.1	310	
EV-HC1			10①	2.6	2.7	250	10①	4.2	420	
LC-LCDSSLSS			10①	2.6	2.7	250	10①	4.6	460	
LC-LC3			10①	3.1	3.2	300	10①	5.6	560	
LC-LC5			10①	2.5	2.6	240	10①	4.6	460	
LC-DLDS			10①	2.1	2.2	200	10①	4.1	410	
EV-MC2	↓	↓	10①	2.3	2.4	220	10①	3.6	360	↓

Notes: ① dilute up to 100mL with D.I water

Reviewed by: [signature]

Date Reviewed: Dec 24, 2019

CETIS Summary Report

28 Water-only

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test 28-d Hyalella survival summary **Nautilus Environmental**

Batch ID:	10-0395-8119	**Test Type:**	Growth-Survival (~~10~~d)	**Analyst:**	Karen Lee
Start Date:	22 Aug-19	**Protocol:**	EC/EPS 1/RM/33	**Diluent:**	Reconstituted Water
Ending Date:	19 Sep-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-9d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	02-2841-5167	22 Aug-19	22 Aug-19	n/a	Teck Coal	
FR_UFR1	03-0479-5102	20 Aug-19 11:23	21 Aug-19 10:30	37h (12.4 °C)		
GH_ER2	15-0818-5087	20 Aug-19 11:47	21 Aug-19 10:30	36h (8.2 °C)		
CM_MC1	03-5718-2507	20 Aug-19 11:52	21 Aug-19 10:30	36h (7.6 °C)		
LC_SLC	09-9216-2322	20 Aug-19 08:51	21 Aug-19 10:30	39h (6.1 °C)		
FR_FRCP1	00-7572-6191	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
FR_FRABCH	19-1279-2277	20 Aug-19 09:46	21 Aug-19 10:30	38h (8.7 °C)		
GH_FR1	06-3623-5994	20 Aug-19 14:34	21 Aug-19 10:30	33h (7.9 °C)		
GH_ERC	02-1254-2591	20 Aug-19 13:12	21 Aug-19 10:30	35h (8.6 °C)		
CM_MC2	00-3605-9017	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG	19-9499-7428	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		
EV_MC2	17-5879-0798	20 Aug-19 10:55	21 Aug-19 10:30	37h (9.5 °C)		
EV_HC1	14-1612-5796	20 Aug-19 09:45	21 Aug-19 10:30	38h (8.4 °C)		
LC_LCDSSLCC	01-4637-7406	20 Aug-19 09:53	21 Aug-19 10:30	38h (7.6 °C)		
LC_LC3	17-1327-4969	20 Aug-19 09:30	21 Aug-19 10:30	38h (8.9 °C)		
LC_LC5	18-4311-0527	20 Aug-19 10:32	21 Aug-19 10:30	37h (9 °C)		
LC_DCDS	19-0653-0503	20 Aug-19 10:09	21 Aug-19 10:30	38h (9.4 °C)		
EDTA control	17-3711-2476	22 Aug-19	22 Aug-19	n/a		
FR_FRCP1 + EDTA	03-0598-0531	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
CM_MC2 + EDTA	12-3609-5608	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG + EDT	11-2463-6008	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1	
GH_ER2	Water Sample	Teck Coal	GH_ER2	
CM_MC1	Water Sample	Teck Coal	CM_MC1	
LC_SLC	Water Sample	Teck Coal	LC_SLC	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH	
GH_FR1	Water Sample	Teck Coal	GH_FR1	
GH_ERC	Water Sample	Teck Coal	GH_ERC	
CM_MC2	~~Wastewater effluent~~ Water sample	Teck Coal	CM_MC2	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG	
EV_MC2	Water Sample	Teck Coal	EV_MC2	
EV_HC1	Water Sample	Teck Coal	EV_HC1	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC	
LC_LC3	Water Sample	Teck Coal	LC_LC3	
LC_LC5	Water Sample	Teck Coal	LC_LC5	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS	
EDTA control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result 28d	S
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1

28d

Hyalella 14-d Survival and Growth ~~Sediment~~ Test — Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1

28 water-only

Hyalella ~~14~~-d Survival and Growth ~~Sediment~~ Test 28-d Hyalella survival summary **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1

28d

28 Waterborne

Hyalella ~~14~~-d Survival and Growth ~~Sediment~~ Test 28-d Hyalella **Nautilus Environmental**

Survival Summary

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1

28d

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test — Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1

28d (Water-only)

Hyalella ~~14~~-d Survival and Growth ~~Sediment~~ Test — 28-d Hyalella survival summary — Nautilus Environmental

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1

28d

Hyalella 14-d Survival and Growth Sediment Test — 28-d Hyalella Survival Summary — Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	FR_FRABCH failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	CM_MC1 failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	FR_FRCP1 failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	EV_MC2 failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	GH_FR1 failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	Lab Control failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	FR_FRCP1 + EDTA failed 10d survival rat	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	RG_MIDAG + EDTA failed 10d survival rat	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	EV_HC1 failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	EDTA control failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	LC_LCDSSLCC failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	LC_LC5 failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	CM_MC2 failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	LC_SLC failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	GH_ER2 failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	GH_ERC failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	CM_MC2 + EDTA failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	LC_DCDS failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	FR_UFR1 failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	RG_MIDAG failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0188	LC_LC3 failed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1394	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1

Hyalella ~~14~~-d Survival and Growth ~~Sediment~~ Test — 28-d Hyalella Survival — Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	GH_ER2 passed 10d survival rate	1

Hyalella 14-d Survival and Growth Sediment Test — Nautilus Environmental

28-d Hyalella survival summary

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_FRCP1 + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	Lab Control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_SLC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_LC5 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_UFR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	EV_HC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_DCDS passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	RG_MIDAG passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	CM_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	CM_MC1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	GH_ERC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	EDTA control passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_FRCP1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_LCDSSLCC passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	LC_LC3 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	GH_FR1 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	RG_MIDAG + EDTA passed 10d survival r	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	EV_MC2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_FRABCH passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	CM_MC2 + EDTA passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	GH_ER2 passed 10d survival rate	1
02-7342-7353	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.8248	FR_FRCP1 + EDTA passed 10d survival r	1

Hyalella 14-d Survival and Growth Sediment Test — Nautilus Environmental

28-d Hyalella survival summaries

10d Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	N	5	0.9600	0.8920	1.0000	0.9000	1.0000	0.0245	0.0548	5.71%	0.00%
FR_UFR1		5	0.9200	0.8161	1.0000	0.8000	1.0000	0.0374	0.0837	9.09%	4.17%
GH_ER2		5	0.8911	0.6521	1.0000	0.5556	1.0000	0.0861	0.1925	21.60%	7.18%
CM_MC1		5	0.8600	0.7489	0.9711	0.8000	1.0000	0.0400	0.0894	10.40%	10.42%
LC_SLC		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	-2.08%
FR_FRCP1		5	0.9200	0.7840	1.0000	0.8000	1.0000	0.0490	0.1095	11.91%	4.17%
FR_FRABCH		5	0.9800	0.9245	1.0000	0.9000	1.0000	0.0200	0.0447	4.56%	-2.08%
GH_FR1		5	0.9600	0.8920	1.0000	0.9000	1.0000	0.0245	0.0548	5.71%	0.00%
GH_ERC		5	0.9000	0.7479	1.0000	0.7000	1.0000	0.0548	0.1225	13.61%	6.25%
CM_MC2		5	0.8600	0.6934	1.0000	0.7000	1.0000	0.0600	0.1342	15.60%	10.42%
RG_MIDAG		5	0.9400	0.8720	1.0000	0.9000	1.0000	0.0245	0.0548	5.83%	2.08%
EV_MC2		5	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	-4.17%
EV_HC1		5	0.8400	0.5825	1.0000	0.5000	1.0000	0.0927	0.2074	24.69%	12.50%
LC_LCDSSLCC		5	0.8600	0.6522	1.0000	0.6000	1.0000	0.0748	0.1673	19.46%	10.42%
LC_LC3		5	0.7200	0.5160	0.9240	0.6000	1.0000	0.0735	0.1643	22.82%	25.00%
LC_LC5		5	0.7800	0.5108	1.0000	0.4000	0.9000	0.0970	0.2168	27.79%	18.75%
LC_DCDS		5	0.9000	0.7758	1.0000	0.8000	1.0000	0.0447	0.1000	11.11%	6.25%
EDTA control		5	0.9600	0.8920	1.0000	0.9000	1.0000	0.0245	0.0548	5.71%	0.00%
FR_FRCP1 + EDTA		5	0.8400	0.6517	1.0000	0.6000	1.0000	0.0678	0.1517	18.05%	12.50%
CM_MC2 + EDTA		5	0.8400	0.6322	1.0000	0.6000	1.0000	0.0748	0.1673	19.92%	12.50%
RG_MIDAG + EDT		5	0.8400	0.5825	1.0000	0.5000	1.0000	0.0927	0.2074	24.69%	12.50%

10d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Control	N	0.9000	0.9000	1.0000	1.0000	1.0000
FR_UFR1		0.9000	1.0000	1.0000	0.8000	0.9000
GH_ER2		0.5556	1.0000	1.0000	1.0000	0.9000
CM_MC1		0.8000	0.9000	0.8000	0.8000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	0.9000
FR_FRCP1		1.0000	0.8000	1.0000	0.8000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	0.9000	1.0000
GH_FR1		0.9000	1.0000	1.0000	0.9000	1.0000
GH_ERC		0.9000	1.0000	1.0000	0.7000	0.9000
CM_MC2		0.7000	0.8000	0.8000	1.0000	1.0000
RG_MIDAG		0.9000	1.0000	1.0000	0.9000	0.9000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		0.5000	1.0000	0.8000	1.0000	0.9000
LC_LCDSSLCC		0.6000	0.9000	0.8000	1.0000	1.0000
LC_LC3		0.6000	0.7000	0.7000	1.0000	0.6000
LC_LC5		0.8000	0.9000	0.9000	0.4000	0.9000
LC_DCDS		0.8000	0.9000	1.0000	1.0000	0.8000
EDTA control		0.9000	1.0000	1.0000	0.9000	1.0000
FR_FRCP1 + EDTA		1.0000	0.8000	0.6000	0.9000	0.9000
CM_MC2 + EDTA		1.0000	0.6000	0.8000	1.0000	0.8000
RG_MIDAG + EDT		1.0000	0.9000	1.0000	0.8000	0.5000

Hyalella 14-d Survival and Growth Sediment Test **Nautilus Environmental**

10d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Control	N	9/10	9/10	10/10	10/10	10/10
FR_UFR1		9/10	10/10	10/10	8/10	9/10
GH_ER2		5/9	10/10	10/10	10/10	9/10
CM_MC1		8/10	9/10	8/10	8/10	10/10
LC_SLC		10/10	10/10	10/10	10/10	9/10
FR_FRCP1		10/10	8/10	10/10	8/10	10/10
FR_FRABCH		10/10	10/10	10/10	9/10	10/10
GH_FR1		9/10	10/10	10/10	9/10	10/10
GH_ERC		9/10	10/10	10/10	7/10	9/10
CM_MC2		7/10	8/10	8/10	10/10	10/10
RG_MIDAG		9/10	10/10	10/10	9/10	9/10
EV_MC2		10/10	10/10	10/10	10/10	10/10
EV_HC1		5/10	10/10	8/10	10/10	9/10
LC_LCDSSLCC		6/10	9/10	8/10	10/10	10/10
LC_LC3		6/10	7/10	7/10	10/10	6/10
LC_LC5		8/10	9/10	9/10	4/10	9/10
LC_DCDS		8/10	9/10	10/10	10/10	8/10
EDTA control		9/10	10/10	10/10	9/10	10/10
FR_FRCP1 + EDTA		10/10	8/10	6/10	9/10	9/10
CM_MC2 + EDTA		10/10	6/10	8/10	10/10	8/10
RG_MIDAG + EDT		10/10	9/10	10/10	8/10	5/10

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Batch ID:	03-8511-3512	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	22 Aug-19	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Reconstituted Water
Ending Date:	19 Sep-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	02-2841-5167	22 Aug-19	22 Aug-19	n/a	Teck Coal	
FR_UFR1	03-0479-5102	20 Aug-19 11:23	21 Aug-19 10:30	37h (12.4 °C)		
GH_ER2	15-0818-5087	20 Aug-19 11:47	21 Aug-19 10:30	36h (8.2 °C)		
CM_MC1	03-5718-2507	20 Aug-19 11:52	21 Aug-19 10:30	36h (7.6 °C)		
LC_SLC	09-9216-2322	20 Aug-19 08:51	21 Aug-19 10:30	39h (6.1 °C)		
FR_FRCP1	00-7572-6191	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
FR_FRABCH	19-1279-2277	20 Aug-19 09:46	21 Aug-19 10:30	38h (8.7 °C)		
GH_FR1	06-3623-5994	20 Aug-19 14:34	21 Aug-19 10:30	33h (7.9 °C)		
GH_ERC	02-1254-2591	20 Aug-19 13:12	21 Aug-19 10:30	35h (8.6 °C)		
CM_MC2	00-3605-9017	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG	19-9499-7428	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		
EV_MC2	17-5879-0798	20 Aug-19 10:55	21 Aug-19 10:30	37h (9.5 °C)		
EV_HC1	14-1612-5796	20 Aug-19 09:45	21 Aug-19 10:30	38h (8.4 °C)		
LC_LCDSSLCC	01-4637-7406	20 Aug-19 09:53	21 Aug-19 10:30	38h (7.6 °C)		
LC_LC3	17-1327-4969	20 Aug-19 09:30	21 Aug-19 10:30	38h (8.9 °C)		
LC_LC5	18-4311-0527	20 Aug-19 10:32	21 Aug-19 10:30	37h (9 °C)		
LC_DCDS	19-0653-0503	20 Aug-19 10:09	21 Aug-19 10:30	38h (9.4 °C)		
EDTA control	17-3711-2476	22 Aug-19	22 Aug-19	n/a		
FR_FRCP1 + EDTA	03-0598-0531	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
CM_MC2 + EDTA	12-3609-5608	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG + EDT	11-2463-6008	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1	
GH_ER2	Water Sample	Teck Coal	GH_ER2	
CM_MC1	Water Sample	Teck Coal	CM_MC1	
LC_SLC	Water Sample	Teck Coal	LC_SLC	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH	
GH_FR1	Water Sample	Teck Coal	GH_FR1	
GH_ERC	Water Sample	Teck Coal	GH_ERC	
CM_MC2	Wastewater effluent	Teck Coal	CM_MC2	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG	
EV_MC2	Water Sample	Teck Coal	EV_MC2	
EV_HC1	Water Sample	Teck Coal	EV_HC1	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC	
LC_LC3	Water Sample	Teck Coal	LC_LC3	
LC_LC5	Water Sample	Teck Coal	LC_LC5	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS	
EDTA control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	LC_DCDS passed mean dry weight-mg	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1454	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3267	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	CM_MC1 passed mean dry weight-mg	1

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6221	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.6690	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1366	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	LC_LC5 passed mean dry weight-mg	1

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5720	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.7278	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	LC_LC5 passed mean dry weight-mg	1

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3043	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	LC_LC3 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	CM_MC2 + EDTA failed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	FR_UFR1 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	RG_MIDAG + EDTA failed mean dry weigh	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	LC_LC5 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	RG_MIDAG failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	CM_MC2 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	EDTA control failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	EV_MC2 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	CM_MC1 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	FR_FRABCH failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	LC_LCDSSLCC failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	LC_DCDS failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	LC_SLC failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	EV_HC1 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	GH_ERC failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	GH_FR1 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	GH_ER2 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	FR_FRCP1 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	Lab Control failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0385	FR_FRCP1 + EDTA failed mean dry weigh	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.5967	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	EV_HC1 passed mean dry weight-mg	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9852	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0939	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	FR_FRABCH failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	LC_LC3 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	LC_DCDS failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	CM_MC1 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	GH_ER2 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	EDTA control failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	LC_SLC failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	GH_FR1 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	LC_LC5 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	FR_FRCP1 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	EV_HC1 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	CM_MC2 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	RG_MIDAG failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	RG_MIDAG + EDTA failed mean dry weigh	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	EV_MC2 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	Lab Control failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	FR_FRCP1 + EDTA failed mean dry weigh	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	CM_MC2 + EDTA failed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	FR_UFR1 failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	GH_ERC failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0180	LC_LCDSSLCC failed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0630	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.1888	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	CM_MC2 passed mean dry weight-mg	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.0559	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.9074	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	GH_ER2 passed mean dry weight-mg	1

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.3020	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.2121	FR_FRCP1 + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	Lab Control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	LC_SLC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	LC_LC5 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	FR_UFR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	EV_HC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	LC_DCDS passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	RG_MIDAG passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	CM_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	CM_MC1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	GH_ERC passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	EDTA control passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	FR_FRCP1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	LC_LCDSSLCC passed mean dry weight-	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	LC_LC3 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	GH_FR1 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	RG_MIDAG + EDTA passed mean dry wei	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	EV_MC2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	FR_FRABCH passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	CM_MC2 + EDTA passed mean dry weight	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	GH_ER2 passed mean dry weight-mg	1
17-5505-7666	Mean Dry Weight-mg	Equal Variance t Two-Sample Test	0.8143	FR_FRCP1 + EDTA passed mean dry wei	1

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	N	5	0.4559	0.2568	0.6551	0.2622	0.66	0.07173	0.1604	35.18%	0.00%
FR_UFR1		5	0.3572	0.2192	0.4952	0.235	0.518	0.04971	0.1112	31.12%	21.65%
GH_ER2		5	0.4014	0.145	0.6578	0.12	0.621	0.09234	0.2065	51.44%	11.96%
CM_MC1		5	0.4933	0.2394	0.7472	0.232	0.7013	0.09146	0.2045	41.45%	-8.20%
LC_SLC		5	0.4988	0.328	0.6697	0.293	0.634	0.06154	0.1376	27.58%	-9.41%
FR_FRCP1		5	0.3414	0.1588	0.524	0.1725	0.536	0.06578	0.1471	43.08%	25.12%
FR_FRABCH		5	0.4725	0.3288	0.6162	0.271	0.565	0.05176	0.1157	24.50%	-3.63%
GH_FR1		5	0.5147	0.3506	0.6788	0.349	0.68	0.0591	0.1322	25.68%	-12.90%
GH_ERC		5	0.3945	0.1442	0.6449	0.17	0.6455	0.09018	0.2016	51.11%	13.46%
CM_MC2		5	0.2733	0.122	0.4245	0.1443	0.4187	0.05447	0.1218	44.57%	40.06%
RG_MIDAG		5	0.4906	0.1659	0.8154	0.1367	0.772	0.117	0.2616	53.31%	-7.62%
EV_MC2		5	0.6542	0.5927	0.7157	0.583	0.701	0.02214	0.04951	7.57%	-43.49%
EV_HC1		5	0.3074	0.1018	0.513	0.148	0.566	0.07405	0.1656	53.86%	32.57%
LC_LCDSSLCC		5	0.2319	0.08567	0.3781	0.07833	0.3614	0.05267	0.1178	50.78%	49.13%
LC_LC3		5	0.304	0.1581	0.45	0.2114	0.498	0.05256	0.1175	38.66%	33.31%
LC_LC5		5	0.3514	0.1128	0.5899	0.1363	0.57	0.08591	0.1921	54.67%	22.93%
LC_DCDS		5	0.2985	0.1563	0.4407	0.2167	0.497	0.05122	0.1145	38.37%	34.54%
EDTA control		5	0.6136	0.3866	0.8407	0.3463	0.79	0.08179	0.1829	29.80%	-34.59%
FR_FRCP1 + EDTA		5	0.3938	0.144	0.6435	0.1922	0.6625	0.08995	0.2011	51.08%	13.63%
CM_MC2 + EDTA		5	0.3812	0.2365	0.526	0.259	0.568	0.05213	0.1166	30.58%	16.38%
RG_MIDAG + EDT		5	0.5691	0.3034	0.8348	0.2	0.714	0.0957	0.214	37.60%	-24.84%

Mean Dry Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Control	N	0.2622	0.3533	0.569	0.66	0.435
FR_UFR1		0.3	0.235	0.518	0.4175	0.3156
GH_ER2		0.12	0.415	0.621	0.281	0.57
CM_MC1		0.7013	0.6933	0.47	0.37	0.232
LC_SLC		0.605	0.634	0.293	0.521	0.4411
FR_FRCP1		0.536	0.1725	0.295	0.2575	0.446
FR_FRABCH		0.512	0.5222	0.271	0.4922	0.565
GH_FR1		0.5945	0.528	0.349	0.4222	0.68
GH_ERC		0.2311	0.544	0.382	0.17	0.6455
CM_MC2		0.1443	0.4187	0.3762	0.257	0.17
RG_MIDAG		0.1367	0.772	0.579	0.3078	0.6578
EV_MC2		0.673	0.701	0.624	0.69	0.583
EV_HC1		0.148	0.371	0.2188	0.566	0.2333
LC_LCDSSLCC		0.07833	0.1578	0.3614	0.33	0.232
LC_LC3		0.22	0.2114	0.3257	0.498	0.265
LC_LC5		0.1363	0.5211	0.3344	0.195	0.57
LC_DCDS		0.2563	0.2167	0.497	0.2911	0.2312
EDTA control		0.6622	0.79	0.753	0.5167	0.3463
FR_FRCP1 + EDTA		0.537	0.6625	0.345	0.2322	0.1922
CM_MC2 + EDTA		0.259	0.3267	0.4037	0.568	0.3488
RG_MIDAG + EDT		0.714	0.6522	0.707	0.5725	0.2

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	01-9235-8377	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	07 Oct-19 13:50	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	03-8511-3512	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	22 Aug-19	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Reconstituted Water
Ending Date:	19 Sep-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	02-2841-5167	22 Aug-19	22 Aug-19	n/a	Teck Coal	
FR_UFR1	03-0479-5102	20 Aug-19 11:23	21 Aug-19 10:30	37h (12.4 °C)		
GH_ER2	15-0818-5087	20 Aug-19 11:47	21 Aug-19 10:30	36h (8.2 °C)		
CM_MC1	03-5718-2507	20 Aug-19 11:52	21 Aug-19 10:30	36h (7.6 °C)		
LC_SLC	09-9216-2322	20 Aug-19 08:51	21 Aug-19 10:30	39h (6.1 °C)		
FR_FRCP1	00-7572-6191	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
FR_FRABCH	19-1279-2277	20 Aug-19 09:46	21 Aug-19 10:30	38h (8.7 °C)		
GH_FR1	06-3623-5994	20 Aug-19 14:34	21 Aug-19 10:30	33h (7.9 °C)		
GH_ERC	02-1254-2591	20 Aug-19 13:12	21 Aug-19 10:30	35h (8.6 °C)		
CM_MC2	00-3605-9017	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG	19-9499-7428	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		
EV_MC2	17-5879-0798	20 Aug-19 10:55	21 Aug-19 10:30	37h (9.5 °C)		
EV_HC1	14-1612-5796	20 Aug-19 09:45	21 Aug-19 10:30	38h (8.4 °C)		
LC_LCDSSLCC	01-4637-7406	20 Aug-19 09:53	21 Aug-19 10:30	38h (7.6 °C)		
LC_LC3	17-1327-4969	20 Aug-19 09:30	21 Aug-19 10:30	38h (8.9 °C)		
LC_LC5	18-4311-0527	20 Aug-19 10:32	21 Aug-19 10:30	37h (9 °C)		
LC_DCDS	19-0653-0503	20 Aug-19 10:09	21 Aug-19 10:30	38h (9.4 °C)		
EDTA control	17-3711-2476	22 Aug-19	22 Aug-19	n/a		
FR_FRCP1 + EDTA	03-0598-0531	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
CM_MC2 + EDTA	12-3609-5608	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG + EDT	11-2463-6008	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1	
GH_ER2	Water Sample	Teck Coal	GH_ER2	
CM_MC1	Water Sample	Teck Coal	CM_MC1	
LC_SLC	Water Sample	Teck Coal	LC_SLC	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH	
GH_FR1	Water Sample	Teck Coal	GH_FR1	
GH_ERC	Water Sample	Teck Coal	GH_ERC	
CM_MC2	Wastewater effluent	Teck Coal	CM_MC2	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG	
EV_MC2	Water Sample	Teck Coal	EV_MC2	
EV_HC1	Water Sample	Teck Coal	EV_HC1	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC	
LC_LC3	Water Sample	Teck Coal	LC_LC3	
LC_LC5	Water Sample	Teck Coal	LC_LC5	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS	
EDTA control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	0.3389	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.2096	Exact	1.0000	Non-Significant Effect

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 01-9235-8377 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 07 Oct-19 13:50 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		CM_MC1	0.0798	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.8788	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.3389	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.8788	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.6913	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.2180	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.0798	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.5000	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.0458	Exact	0.8248	Non-Significant Effect
		LC_LCDSSLCC	0.0798	Exact	1.0000	Non-Significant Effect
		LC_LC3*	0.0009	Exact	0.0188	Significant Effect
		LC_LC5	0.0073	Exact	0.1394	Non-Significant Effect
		LC_DCDS	0.2180	Exact	1.0000	Non-Significant Effect
		EDTA control	0.6913	Exact	1.0000	Non-Significant Effect
		FR_FRCP1 + EDTA	0.0458	Exact	0.8248	Non-Significant Effect
		CM_MC2 + EDTA	0.0458	Exact	0.8248	Non-Significant Effect
		RG_MIDAG + EDTA	0.0458	Exact	0.8248	Non-Significant Effect

Test Acceptability Criteria

		TAC Limits			
Attribute	**Test Stat**	**Lower**	**Upper**	**Overlap**	**Decision**
Control Resp	0.96	0.8	>>	Yes	Passes Criteria

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.703	3.401	0.6331	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.703		0.8992	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	N	48	2	50	0.96	0.04	-11.63%
FR_UFR1		46	4	50	0.92	0.08	-6.98%
GH_ER2		44	5	49	0.898	0.102	-4.41%
CM_MC1		43	7	50	0.86	0.14	0.0%
LC_SLC		49	1	50	0.98	0.02	-13.95%
FR_FRCP1		46	4	50	0.92	0.08	-6.98%
FR_FRABCH		49	1	50	0.98	0.02	-13.95%
GH_FR1		48	2	50	0.96	0.04	-11.63%
GH_ERC		45	5	50	0.9	0.1	-4.65%
CM_MC2		43	7	50	0.86	0.14	0.0%
RG_MIDAG		47	3	50	0.94	0.06	-9.3%
EV_MC2		50	0	50	1	0	-16.28%
EV_HC1		42	8	50	0.84	0.16	2.33%
LC_LCDSSLCC		43	7	50	0.86	0.14	0.0%
LC_LC3		36	14	50	0.72	0.28	16.28%
LC_LC5		39	11	50	0.78	0.22	9.3%
LC_DCDS		45	5	50	0.9	0.1	-4.65%
EDTA control		48	2	50	0.96	0.04	-11.63%
FR_FRCP1 + EDTA		42	8	50	0.84	0.16	2.33%
CM_MC2 + EDTA		42	8	50	0.84	0.16	2.33%
RG_MIDAG + EDTA		42	8	50	0.84	0.16	2.33%

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 01-9235-8377 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 07 Oct-19 13:50 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Control	N	0.9000	0.9000	1.0000	1.0000	1.0000
FR_UFR1		0.9000	1.0000	1.0000	0.8000	0.9000
GH_ER2		0.5556	1.0000	1.0000	1.0000	0.9000
CM_MC1		0.8000	0.9000	0.8000	0.8000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	0.9000
FR_FRCP1		1.0000	0.8000	1.0000	0.8000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	0.9000	1.0000
GH_FR1		0.9000	1.0000	1.0000	0.9000	1.0000
GH_ERC		0.9000	1.0000	1.0000	0.7000	0.9000
CM_MC2		0.7000	0.8000	0.8000	1.0000	1.0000
RG_MIDAG		0.9000	1.0000	1.0000	0.9000	0.9000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		0.5000	1.0000	0.8000	1.0000	0.9000
LC_LCDSSLCC		0.6000	0.9000	0.8000	1.0000	1.0000
LC_LC3		0.6000	0.7000	0.7000	1.0000	0.6000
LC_LC5		0.8000	0.9000	0.9000	0.4000	0.9000
LC_DCDS		0.8000	0.9000	1.0000	1.0000	0.8000
EDTA control		0.9000	1.0000	1.0000	0.9000	1.0000
FR_FRCP1 + EDTA		1.0000	0.8000	0.6000	0.9000	0.9000
CM_MC2 + EDTA		1.0000	0.6000	0.8000	1.0000	0.8000
RG_MIDAG + EDT		1.0000	0.9000	1.0000	0.8000	0.5000

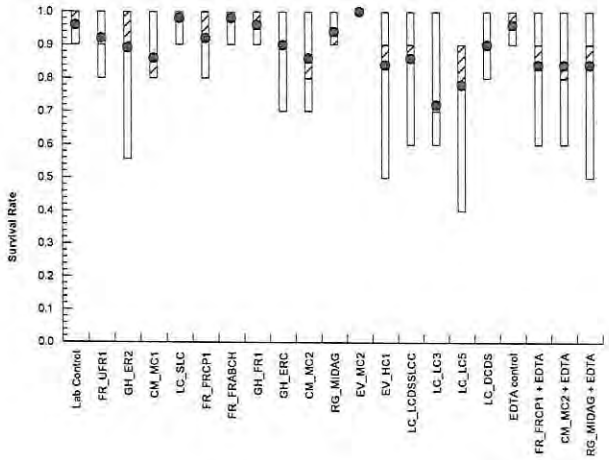
Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Control	N	9/10	9/10	10/10	10/10	10/10
FR_UFR1		9/10	10/10	10/10	8/10	9/10
GH_ER2		5/9	10/10	10/10	10/10	9/10
CM_MC1		8/10	9/10	8/10	8/10	10/10
LC_SLC		10/10	10/10	10/10	10/10	9/10
FR_FRCP1		10/10	8/10	10/10	8/10	10/10
FR_FRABCH		10/10	10/10	10/10	9/10	10/10
GH_FR1		9/10	10/10	10/10	9/10	10/10
GH_ERC		9/10	10/10	10/10	7/10	9/10
CM_MC2		7/10	8/10	8/10	10/10	10/10
RG_MIDAG		9/10	10/10	10/10	9/10	9/10
EV_MC2		10/10	10/10	10/10	10/10	10/10
EV_HC1		5/10	10/10	8/10	10/10	9/10
LC_LCDSSLCC		6/10	9/10	8/10	10/10	10/10
LC_LC3		6/10	7/10	7/10	10/10	6/10
LC_LC5		8/10	9/10	9/10	4/10	9/10
LC_DCDS		8/10	9/10	10/10	10/10	8/10
EDTA control		9/10	10/10	10/10	9/10	10/10
FR_FRCP1 + EDTA		10/10	8/10	6/10	9/10	9/10
CM_MC2 + EDTA		10/10	6/10	8/10	10/10	8/10
RG_MIDAG + EDT		10/10	9/10	10/10	8/10	5/10

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID: 01-9235-8377 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 07 Oct-19 13:50 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Graphics



Analyst: KV QA: 10-25/19

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	17-5505-7666	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Nov-19 12:08	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-8511-3512	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	22 Aug-19	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Reconstituted Water
Ending Date:	19 Sep-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	02-2841-5167	22 Aug-19	22 Aug-19	n/a	Teck Coal	
FR_UFR1	03-0479-5102	20 Aug-19 11:23	21 Aug-19 10:30	37h (12.4 °C)		
GH_ER2	15-0818-5087	20 Aug-19 11:47	21 Aug-19 10:30	36h (8.2 °C)		
CM_MC1	03-5718-2507	20 Aug-19 11:52	21 Aug-19 10:30	36h (7.6 °C)		
LC_SLC	09-9216-2322	20 Aug-19 08:51	21 Aug-19 10:30	39h (6.1 °C)		
FR_FRCP1	00-7572-6191	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
FR_FRABCH	19-1279-2277	20 Aug-19 09:46	21 Aug-19 10:30	38h (8.7 °C)		
GH_FR1	06-3623-5994	20 Aug-19 14:34	21 Aug-19 10:30	33h (7.9 °C)		
GH_ERC	02-1254-2591	20 Aug-19 13:12	21 Aug-19 10:30	35h (8.6 °C)		
CM_MC2	00-3605-9017	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG	19-9499-7428	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		
EV_MC2	17-5879-0798	20 Aug-19 10:55	21 Aug-19 10:30	37h (9.5 °C)		
EV_HC1	14-1612-5796	20 Aug-19 09:45	21 Aug-19 10:30	38h (8.4 °C)		
LC_LCDSSLCC	01-4637-7406	20 Aug-19 09:53	21 Aug-19 10:30	38h (7.6 °C)		
LC_LC3	17-1327-4969	20 Aug-19 09:30	21 Aug-19 10:30	38h (8.9 °C)		
LC_LC5	18-4311-0527	20 Aug-19 10:32	21 Aug-19 10:30	37h (9 °C)		
LC_DCDS	19-0653-0503	20 Aug-19 10:09	21 Aug-19 10:30	38h (9.4 °C)		
EDTA control	17-3711-2476	22 Aug-19	22 Aug-19	n/a		
FR_FRCP1 + EDTA	03-0598-0531	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
CM_MC2 + EDTA	12-3609-5608	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG + EDT	11-2463-6008	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1	
GH_ER2	Water Sample	Teck Coal	GH_ER2	
CM_MC1	Water Sample	Teck Coal	CM_MC1	
LC_SLC	Water Sample	Teck Coal	LC_SLC	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH	
GH_FR1	Water Sample	Teck Coal	GH_FR1	
GH_ERC	Water Sample	Teck Coal	GH_ERC	
CM_MC2	~~Wastewater effluent~~ Water Sample	Teck Coal	CM_MC2	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG	
EV_MC2	Water Sample	Teck Coal	EV_MC2	
EV_HC1	Water Sample	Teck Coal	EV_HC1	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC	
LC_LC3	Water Sample	Teck Coal	LC_LC3	
LC_LC5	Water Sample	Teck Coal	LC_LC5	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS	
EDTA control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	17-5505-7666	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Nov-19 12:08	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	48.78%
		GH_ER2 passed mean dry weight-mg	48.78%
		CM_MC1 passed mean dry weight-mg	48.78%
		LC_SLC passed mean dry weight-mg	48.78%
		FR_FRCP1 passed mean dry weight-mg	48.78%
		FR_FRABCH passed mean dry weight-mg	48.78%
		GH_FR1 passed mean dry weight-mg	48.78%
		GH_ERC passed mean dry weight-mg	48.78%
		CM_MC2 failed mean dry weight-mg	48.78%
		RG_MIDAG passed mean dry weight-mg	48.78%
		EV_MC2 passed mean dry weight-mg	48.78%
		EV_HC1 passed mean dry weight-mg	48.78%
		LC_LCDSSLCC failed mean dry weight-mg	48.78%
		LC_LC3 passed mean dry weight-mg	48.78%
		LC_LC5 passed mean dry weight-mg	48.78%
		LC_DCDS passed mean dry weight-mg	48.78%
		EDTA control passed mean dry weight-mg	48.78%
		FR_FRCP1 + EDTA passed mean dry weight-	48.78%
		CM_MC2 + EDTA passed mean dry weight-m	48.78%
		RG_MIDAG + EDTA passed mean dry weight-	48.78%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	FR_UFR1	1.131	1.86	0.162	8	CDF	0.1454	Non-Significant Effect
	GH_ER2	0.4663	1.86	0.217	8	CDF	0.3267	Non-Significant Effect
	CM_MC1	-0.3218	1.86	0.216	8	CDF	0.6221	Non-Significant Effect
	LC_SLC	-0.454	1.86	0.176	8	CDF	0.6690	Non-Significant Effect
	FR_FRCP1	1.177	1.86	0.181	8	CDF	0.1366	Non-Significant Effect
	FR_FRABCH	-0.1873	1.86	0.165	8	CDF	0.5720	Non-Significant Effect
	GH_FR1	-0.6328	1.86	0.173	8	CDF	0.7278	Non-Significant Effect
	GH_ERC	0.5327	1.86	0.214	8	CDF	0.3043	Non-Significant Effect
	CM_MC2*	2.028	1.86	0.168	8	CDF	0.0385	Significant Effect
	RG_MIDAG	-0.2531	1.86	0.255	8	CDF	0.5967	Non-Significant Effect
	EV_MC2	-2.641	1.86	0.14	8	CDF	0.9852	Non-Significant Effect
	EV_HC1	1.44	1.86	0.192	8	CDF	0.0939	Non-Significant Effect
	LC_LCDSSLCC*	2.517	1.86	0.166	8	CDF	0.0180	Significant Effect
	LC_LC3	1.708	1.86	0.165	8	CDF	0.0630	Non-Significant Effect
	LC_LC5	0.9342	1.86	0.208	8	CDF	0.1888	Non-Significant Effect
	LC_DCDS	1.786	1.86	0.164	8	CDF	0.0559	Non-Significant Effect
	EDTA control	-1.45	1.86	0.202	8	CDF	0.9074	Non-Significant Effect
	FR_FRCP1 + EDTA	0.54	1.86	0.214	8	CDF	0.3020	Non-Significant Effect
	CM_MC2 + EDTA	0.8422	1.86	0.165	8	CDF	0.2121	Non-Significant Effect
	RG_MIDAG + EDTA	-0.9467	1.86	0.222	8	CDF	0.8143	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.29993	0.0649966	20	2.443	0.0025	Significant Effect
Error	2.23489	0.0266059	84			
Total	3.53483		104			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	15.71	37.57	0.7347	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9834	0.9669	0.2149	Normal Distribution

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID: 17-5505-7666 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 01 Nov-19 12:08 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	N	5	0.4559	0.2568	0.6551	0.435	0.2622	0.66	0.07173	35.18%	0.00%
FR_UFR1		5	0.3572	0.2192	0.4952	0.3156	0.235	0.518	0.04971	31.12%	21.65%
GH_ER2		5	0.4014	0.145	0.6578	0.415	0.12	0.621	0.09234	51.44%	11.96%
CM_MC1		5	0.4933	0.2394	0.7472	0.47	0.232	0.7013	0.09146	41.45%	-8.20%
LC_SLC		5	0.4988	0.328	0.6697	0.521	0.293	0.634	0.06154	27.58%	-9.41%
FR_FRCP1		5	0.3414	0.1588	0.524	0.295	0.1725	0.536	0.06578	43.08%	25.12%
FR_FRABCH		5	0.4725	0.3288	0.6162	0.512	0.271	0.565	0.05176	24.50%	-3.63%
GH_FR1		5	0.5147	0.3506	0.6788	0.528	0.349	0.68	0.0591	25.68%	-12.90%
GH_ERC		5	0.3945	0.1442	0.6449	0.382	0.17	0.6455	0.09018	51.11%	13.46%
CM_MC2		5	0.2733	0.122	0.4245	0.257	0.1443	0.4187	0.05447	44.57%	40.06%
RG_MIDAG		5	0.4906	0.1659	0.8154	0.579	0.1367	0.772	0.117	53.31%	-7.62%
EV_MC2		5	0.6542	0.5927	0.7157	0.673	0.583	0.701	0.02214	7.57%	-43.49%
EV_HC1		5	0.3074	0.1018	0.513	0.2333	0.148	0.566	0.07405	53.86%	32.57%
LC_LCDSSLCC		5	0.2319	0.08567	0.3781	0.232	0.07833	0.3614	0.05267	50.78%	49.13%
LC_LC3		5	0.304	0.1581	0.45	0.265	0.2114	0.498	0.05256	38.66%	33.31%
LC_LC5		5	0.3514	0.1128	0.5899	0.3344	0.1363	0.57	0.08591	54.67%	22.93%
LC_DCDS		5	0.2985	0.1563	0.4407	0.2563	0.2167	0.497	0.05122	38.37%	34.54%
EDTA control		5	0.6136	0.3866	0.8407	0.6622	0.3463	0.79	0.08179	29.80%	-34.59%
FR_FRCP1 + EDTA		5	0.3938	0.144	0.6435	0.345	0.1922	0.6625	0.08995	51.08%	13.63%
CM_MC2 + EDTA		5	0.3812	0.2365	0.526	0.3488	0.259	0.568	0.05213	30.58%	16.38%
RG_MIDAG + EDT		5	0.5691	0.3034	0.8348	0.6522	0.2	0.714	0.0957	37.60%	-24.84%

Mean Dry Weight-mg Detail

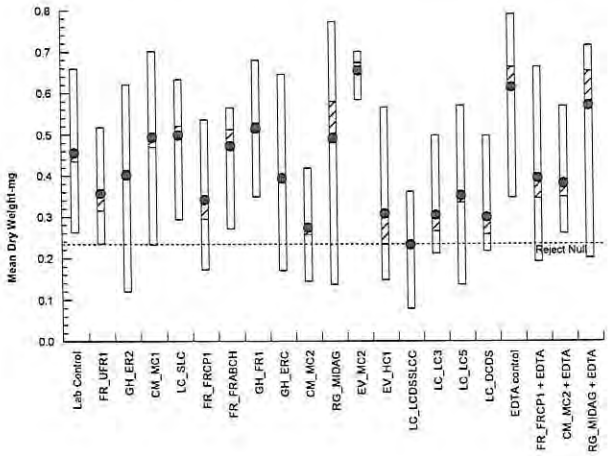
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Control	N	0.2622	0.3533	0.569	0.66	0.435
FR_UFR1		0.3	0.235	0.518	0.4175	0.3156
GH_ER2		0.12	0.415	0.621	0.281	0.57
CM_MC1		0.7013	0.6933	0.47	0.37	0.232
LC_SLC		0.605	0.634	0.293	0.521	0.4411
FR_FRCP1		0.536	0.1725	0.295	0.2575	0.446
FR_FRABCH		0.512	0.5222	0.271	0.4922	0.565
GH_FR1		0.5945	0.528	0.349	0.4222	0.68
GH_ERC		0.2311	0.544	0.382	0.17	0.6455
CM_MC2		0.1443	0.4187	0.3762	0.257	0.17
RG_MIDAG		0.1367	0.772	0.579	0.3078	0.6578
EV_MC2		0.673	0.701	0.624	0.69	0.583
EV_HC1		0.148	0.371	0.2188	0.566	0.2333
LC_LCDSSLCC		0.07833	0.1578	0.3614	0.33	0.232
LC_LC3		0.22	0.2114	0.3257	0.498	0.265
LC_LC5		0.1363	0.5211	0.3344	0.195	0.57
LC_DCDS		0.2563	0.2167	0.497	0.2911	0.2312
EDTA control		0.6622	0.79	0.753	0.5167	0.3463
FR_FRCP1 + EDTA		0.537	0.6625	0.345	0.2322	0.1922
CM_MC2 + EDTA		0.259	0.3267	0.4037	0.568	0.3488
RG_MIDAG + EDT		0.714	0.6522	0.707	0.5725	0.2

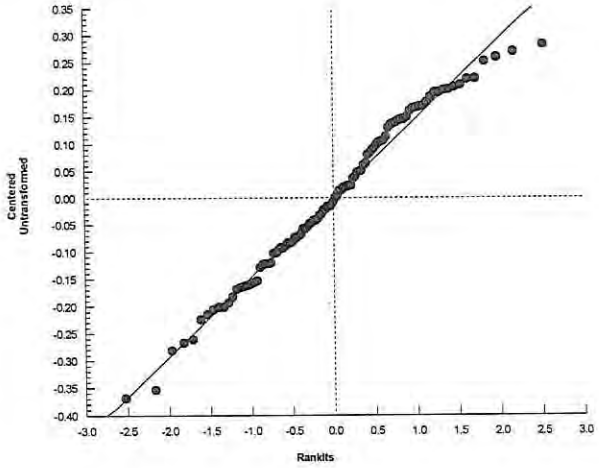
Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	17-5505-7666	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Nov-19 12:08	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	03-5767-3656	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	09 Oct-19 10:47	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	03-8511-3512	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	22 Aug-19	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Reconstituted Water
Ending Date:	19 Sep-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	03-0479-5102	20 Aug-19 11:23	21 Aug-19 10:30	37h (12.4 °C)	Teck Coal	
GH_ER2	15-0818-5087	20 Aug-19 11:47	21 Aug-19 10:30	36h (8.2 °C)		
CM_MC1	03-5718-2507	20 Aug-19 11:52	21 Aug-19 10:30	36h (7.6 °C)		
LC_SLC	09-9216-2322	20 Aug-19 08:51	21 Aug-19 10:30	39h (6.1 °C)		
FR_FRCP1	00-7572-6191	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
FR_FRABCH	19-1279-2277	20 Aug-19 09:46	21 Aug-19 10:30	38h (8.7 °C)		
GH_FR1	06-3623-5994	20 Aug-19 14:34	21 Aug-19 10:30	33h (7.9 °C)		
GH_ERC	02-1254-2591	20 Aug-19 13:12	21 Aug-19 10:30	35h (8.6 °C)		
CM_MC2	00-3605-9017	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG	19-9499-7428	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		
EV_MC2	17-5879-0798	20 Aug-19 10:55	21 Aug-19 10:30	37h (9.5 °C)		
EV_HC1	14-1612-5796	20 Aug-19 09:45	21 Aug-19 10:30	38h (8.4 °C)		
LC_LCDSSLCC	01-4637-7406	20 Aug-19 09:53	21 Aug-19 10:30	38h (7.6 °C)		
LC_LC3	17-1327-4969	20 Aug-19 09:30	21 Aug-19 10:30	38h (8.9 °C)		
LC_LC5	18-4311-0527	20 Aug-19 10:32	21 Aug-19 10:30	37h (9 °C)		
LC_DCDS	19-0653-0503	20 Aug-19 10:09	21 Aug-19 10:30	38h (9.4 °C)		
EDTA control	17-3711-2476	22 Aug-19	22 Aug-19	n/a		
FR_FRCP1 + EDTA	03-0598-0531	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
CM_MC2 + EDTA	12-3609-5608	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG + EDT	11-2463-6008	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1	
GH_ER2	Water Sample	Teck Coal	GH_ER2	
CM_MC1	Water Sample	Teck Coal	CM_MC1	
LC_SLC	Water Sample	Teck Coal	LC_SLC	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH	
GH_FR1	Water Sample	Teck Coal	GH_FR1	
GH_ERC	Water Sample	Teck Coal	GH_ERC	
CM_MC2	Wastewater effluent	Teck Coal	CM_MC2	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG	
EV_MC2	Water Sample	Teck Coal	EV_MC2	
EV_HC1	Water Sample	Teck Coal	EV_HC1	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC	
LC_LC3	Water Sample	Teck Coal	LC_LC3	
LC_LC5	Water Sample	Teck Coal	LC_LC5	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS	
EDTA control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (FR-UFR1)		GH_ER2	0.4870	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.2623	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.9719	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.6425	Exact	1.0000	Non-Significant Effect

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 03-5767-3656 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 09 Oct-19 10:47 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		FR_FRABCH	0.9719	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.8978	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.2623	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.7820	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.1783	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.2623	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.0087	Exact	0.1652	Non-Significant Effect
		LC_LC5	0.0453	Exact	0.8147	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		EDTA control	0.8978	Exact	1.0000	Non-Significant Effect
		FR_FRCP1 + EDTA	0.1783	Exact	1.0000	Non-Significant Effect
		CM_MC2 + EDTA	0.1783	Exact	1.0000	Non-Significant Effect
		RG_MIDAG + EDTA	0.1783	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	XC	46	4	50	0.92	0.08	-6.98%
GH_ER2		44	5	49	0.898	0.102	-4.41%
CM_MC1		43	7	50	0.86	0.14	0.0%
LC_SLC		49	1	50	0.98	0.02	-13.95%
FR_FRCP1		46	4	50	0.92	0.08	-6.98%
FR_FRABCH		49	1	50	0.98	0.02	-13.95%
GH_FR1		48	2	50	0.96	0.04	-11.63%
GH_ERC		45	5	50	0.9	0.1	-4.65%
CM_MC2		43	7	50	0.86	0.14	0.0%
RG_MIDAG		47	3	50	0.94	0.06	-9.3%
EV_MC2		50	0	50	1	0	-16.28%
EV_HC1		42	8	50	0.84	0.16	2.33%
LC_LCDSSLCC		43	7	50	0.86	0.14	0.0%
LC_LC3		36	14	50	0.72	0.28	16.28%
LC_LC5		39	11	50	0.78	0.22	9.3%
LC_DCDS		45	5	50	0.9	0.1	-4.65%
EDTA control		48	2	50	0.96	0.04	-11.63%
FR_FRCP1 + EDTA		42	8	50	0.84	0.16	2.33%
CM_MC2 + EDTA		42	8	50	0.84	0.16	2.33%
RG_MIDAG + EDTA		42	8	50	0.84	0.16	2.33%

Analyst: KW QA: Oct. 25/19

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 03-5767-3656 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 09 Oct-19 10:47 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	XC	0.9000	1.0000	1.0000	0.8000	0.9000
GH_ER2		0.5556	1.0000	1.0000	1.0000	0.9000
CM_MC1		0.8000	0.9000	0.8000	0.8000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	0.9000
FR_FRCP1		1.0000	0.8000	1.0000	0.8000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	0.9000	1.0000
GH_FR1		0.9000	1.0000	1.0000	0.9000	1.0000
GH_ERC		0.9000	1.0000	1.0000	0.7000	0.9000
CM_MC2		0.7000	0.8000	0.8000	1.0000	1.0000
RG_MIDAG		0.9000	1.0000	1.0000	0.9000	0.9000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		0.5000	1.0000	0.8000	1.0000	0.9000
LC_LCDSSLCC		0.6000	0.9000	0.8000	1.0000	1.0000
LC_LC3		0.6000	0.7000	0.7000	1.0000	0.6000
LC_LC5		0.8000	0.9000	0.9000	0.4000	0.9000
LC_DCDS		0.8000	0.9000	1.0000	1.0000	0.8000
EDTA control		0.9000	1.0000	1.0000	0.9000	1.0000
FR_FRCP1 + EDTA		1.0000	0.8000	0.6000	0.9000	0.9000
CM_MC2 + EDTA		1.0000	0.6000	0.8000	1.0000	0.8000
RG_MIDAG + EDT		1.0000	0.9000	1.0000	0.8000	0.5000

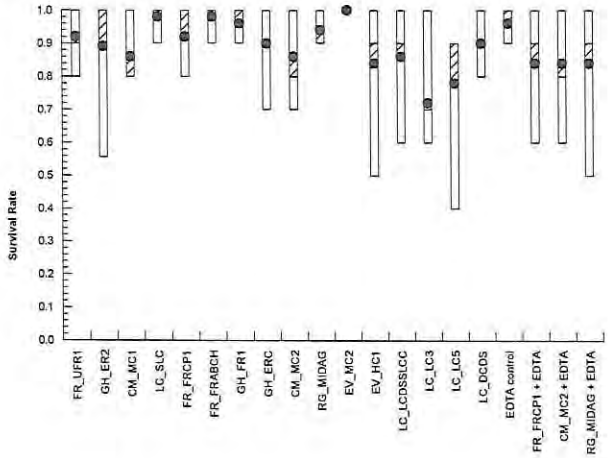
Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
GH_ER2		5/9	10/10	10/10	10/10	9/10
CM_MC1		8/10	9/10	8/10	8/10	10/10
LC_SLC		10/10	10/10	10/10	10/10	9/10
FR_FRCP1		10/10	8/10	10/10	8/10	10/10
FR_FRABCH		10/10	10/10	10/10	9/10	10/10
GH_FR1		9/10	10/10	10/10	9/10	10/10
GH_ERC		9/10	10/10	10/10	7/10	9/10
CM_MC2		7/10	8/10	8/10	10/10	10/10
RG_MIDAG		9/10	10/10	10/10	9/10	9/10
EV_MC2		10/10	10/10	10/10	10/10	10/10
EV_HC1		5/10	10/10	8/10	10/10	9/10
LC_LCDSSLCC		6/10	9/10	8/10	10/10	10/10
LC_LC3		6/10	7/10	7/10	10/10	6/10
LC_LC5		8/10	9/10	9/10	4/10	9/10
LC_DCDS		8/10	9/10	10/10	10/10	8/10
EDTA control		9/10	10/10	10/10	9/10	10/10
FR_FRCP1 + EDTA		10/10	8/10	6/10	9/10	9/10
CM_MC2 + EDTA		10/10	6/10	8/10	10/10	8/10
RG_MIDAG + EDT		10/10	9/10	10/10	8/10	5/10

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	03-5767-3656	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	09 Oct-19 10:47	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: _____ QA: Oct-25/19

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	06-5422-6746	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Nov-19 12:31	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-8511-3512	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	22 Aug-19	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Reconstituted Water
Ending Date:	19 Sep-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	03-0479-5102	20 Aug-19 11:23	21 Aug-19 10:30	37h (12.4 °C)	Teck Coal	
GH_ER2	15-0818-5087	20 Aug-19 11:47	21 Aug-19 10:30	36h (8.2 °C)		
CM_MC1	03-5718-2507	20 Aug-19 11:52	21 Aug-19 10:30	36h (7.6 °C)		
LC_SLC	09-9216-2322	20 Aug-19 08:51	21 Aug-19 10:30	39h (6.1 °C)		
FR_FRCP1	00-7572-6191	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
FR_FRABCH	19-1279-2277	20 Aug-19 09:46	21 Aug-19 10:30	38h (8.7 °C)		
GH_FR1	06-3623-5994	20 Aug-19 14:34	21 Aug-19 10:30	33h (7.9 °C)		
GH_ERC	02-1254-2591	20 Aug-19 13:12	21 Aug-19 10:30	35h (8.6 °C)		
CM_MC2	00-3605-9017	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG	19-9499-7428	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		
EV_MC2	17-5879-0798	20 Aug-19 10:55	21 Aug-19 10:30	37h (9.5 °C)		
EV_HC1	14-1612-5796	20 Aug-19 09:45	21 Aug-19 10:30	38h (8.4 °C)		
LC_LCDSSLCC	01-4637-7406	20 Aug-19 09:53	21 Aug-19 10:30	38h (7.6 °C)		
LC_LC3	17-1327-4969	20 Aug-19 09:30	21 Aug-19 10:30	38h (8.9 °C)		
LC_LC5	18-4311-0527	20 Aug-19 10:32	21 Aug-19 10:30	37h (9 °C)		
LC_DCDS	19-0653-0503	20 Aug-19 10:09	21 Aug-19 10:30	38h (9.4 °C)		
EDTA control	17-3711-2476	22 Aug-19	22 Aug-19	n/a		
FR_FRCP1 + EDTA	03-0598-0531	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
CM_MC2 + EDTA	12-3609-5608	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG + EDT	11-2463-6008	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1	
GH_ER2	Water Sample	Teck Coal	GH_ER2	
CM_MC1	Water Sample	Teck Coal	CM_MC1	
LC_SLC	Water Sample	Teck Coal	LC_SLC	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH	
GH_FR1	Water Sample	Teck Coal	GH_FR1	
GH_ERC	Water Sample	Teck Coal	GH_ERC	
CM_MC2	Wastewater effluent	Teck Coal	CM_MC2	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG	
EV_MC2	Water Sample	Teck Coal	EV_MC2	
EV_HC1	Water Sample	Teck Coal	EV_HC1	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC	
LC_LC3	Water Sample	Teck Coal	LC_LC3	
LC_LC5	Water Sample	Teck Coal	LC_LC5	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS	
EDTA control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 06-5422-6746 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 01 Nov-19 12:31 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed mean dry weight-mg	56.14%
		CM_MC1 passed mean dry weight-mg	56.14%
		LC_SLC passed mean dry weight-mg	56.14%
		FR_FRCP1 passed mean dry weight-mg	56.14%
		FR_FRABCH passed mean dry weight-mg	56.14%
		GH_FR1 passed mean dry weight-mg	56.14%
		GH_ERC passed mean dry weight-mg	56.14%
		CM_MC2 passed mean dry weight-mg	56.14%
		RG_MIDAG passed mean dry weight-mg	56.14%
		EV_MC2 passed mean dry weight-mg	56.14%
		EV_HC1 passed mean dry weight-mg	56.14%
		LC_LCDSSLCC passed mean dry weight-mg	56.14%
		LC_LC3 passed mean dry weight-mg	56.14%
		LC_LC5 passed mean dry weight-mg	56.14%
		LC_DCDS passed mean dry weight-mg	56.14%
		EDTA control passed mean dry weight-mg	56.14%
		FR_FRCP1 + EDTA passed mean dry weight-	56.14%
		CM_MC2 + EDTA passed mean dry weight-m	56.14%
		RG_MIDAG + EDTA passed mean dry weight-	56.14%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed (FR-UFR1)		GH_ER2	-0.4213	1.86	0.195	8	CDF	0.6577	Non-Significant Effect
		CM_MC1	-1.308	1.86	0.194	8	CDF	0.8863	Non-Significant Effect
		LC_SLC	-1.79	1.86	0.147	8	CDF	0.9444	Non-Significant Effect
		FR_FRCP1	0.1917	1.86	0.153	8	CDF	0.4264	Non-Significant Effect
		FR_FRABCH	-1.606	1.86	0.134	8	CDF	0.9266	Non-Significant Effect
		GH_FR1	-2.04	1.86	0.144	8	CDF	0.9621	Non-Significant Effect
		GH_ERC	-0.3624	1.86	0.192	8	CDF	0.6368	Non-Significant Effect
		CM_MC2	1.139	1.86	0.137	8	CDF	0.1439	Non-Significant Effect
		RG_MIDAG	-1.05	1.86	0.236	8	CDF	0.8378	Non-Significant Effect
		EV_MC2	-5.457	1.86	0.101	8	CDF	0.9997	Non-Significant Effect
		EV_HC1	0.5583	1.86	0.166	8	CDF	0.2960	Non-Significant Effect
		LC_LCDSSLCC	1.73	1.86	0.135	8	CDF	0.0609	Non-Significant Effect
		LC_LC3	0.7351	1.86	0.135	8	CDF	0.2416	Non-Significant Effect
		LC_LC5	0.05893	1.86	0.185	8	CDF	0.4772	Non-Significant Effect
		LC_DCDS	0.8232	1.86	0.133	8	CDF	0.2171	Non-Significant Effect
		EDTA control	-2.679	1.86	0.178	8	CDF	0.9860	Non-Significant Effect
		FR_FRCP1 + EDTA	-0.3559	1.86	0.191	8	CDF	0.6344	Non-Significant Effect
		CM_MC2 + EDTA	-0.3334	1.86	0.134	8	CDF	0.6263	Non-Significant Effect
		RG_MIDAG + EDTA	-1.965	1.86	0.201	8	CDF	0.9575	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.29278	0.0680408	19	2.553	0.0019	Significant Effect
Error	2.13198	0.0266498	80			
Total	3.42476		99			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	15.7	36.19	0.6771	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9841	0.9654	0.2735	Normal Distribution

NN 4/19

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 06-5422-6746 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 01 Nov-19 12:31 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	RS	5	0.3572	0.2192	0.4952	0.3156	0.235	0.518	0.04971	31.12%	0.00%
GH_ER2		5	0.4014	0.145	0.6578	0.415	0.12	0.621	0.09234	51.44%	-12.37%
CM_MC1		5	0.4933	0.2394	0.7472	0.47	0.232	0.7013	0.09146	41.45%	-38.10%
LC_SLC		5	0.4988	0.328	0.6697	0.521	0.293	0.634	0.06154	27.58%	-39.64%
FR_FRCP1		5	0.3414	0.1588	0.524	0.295	0.1725	0.536	0.06578	43.08%	4.43%
FR_FRABCH		5	0.4725	0.3288	0.6162	0.512	0.271	0.565	0.05176	24.50%	-32.27%
GH_FR1		5	0.5147	0.3506	0.6788	0.528	0.349	0.68	0.0591	25.68%	-44.10%
GH_ERC		5	0.3945	0.1442	0.6449	0.382	0.17	0.6455	0.09018	51.11%	-10.45%
CM_MC2		5	0.2733	0.122	0.4245	0.257	0.1443	0.4187	0.05447	44.57%	23.50%
RG_MIDAG		5	0.4906	0.1659	0.8154	0.579	0.1367	0.772	0.117	53.31%	-37.35%
EV_MC2		5	0.6542	0.5927	0.7157	0.673	0.583	0.701	0.02214	7.57%	-83.14%
EV_HC1		5	0.3074	0.1018	0.513	0.2333	0.148	0.566	0.07405	53.86%	13.94%
LC_LCDSSLCC		5	0.2319	0.08567	0.3781	0.232	0.07833	0.3614	0.05267	50.78%	35.08%
LC_LC3		5	0.304	0.1581	0.45	0.265	0.2114	0.498	0.05256	38.66%	14.89%
LC_LC5		5	0.3514	0.1128	0.5899	0.3344	0.1363	0.57	0.08591	54.67%	1.64%
LC_DCDS		5	0.2985	0.1563	0.4407	0.2563	0.2167	0.497	0.05122	38.37%	16.45%
EDTA control		5	0.6136	0.3866	0.8407	0.6622	0.3463	0.79	0.08179	29.80%	-71.78%
FR_FRCP1 + EDTA		5	0.3938	0.144	0.6435	0.345	0.1922	0.6625	0.08995	51.08%	-10.24%
CM_MC2 + EDTA		5	0.3812	0.2365	0.526	0.3488	0.259	0.568	0.05213	30.58%	-6.72%
RG_MIDAG + EDT		5	0.5691	0.3034	0.8348	0.6522	0.2	0.714	0.0957	37.60%	-59.33%

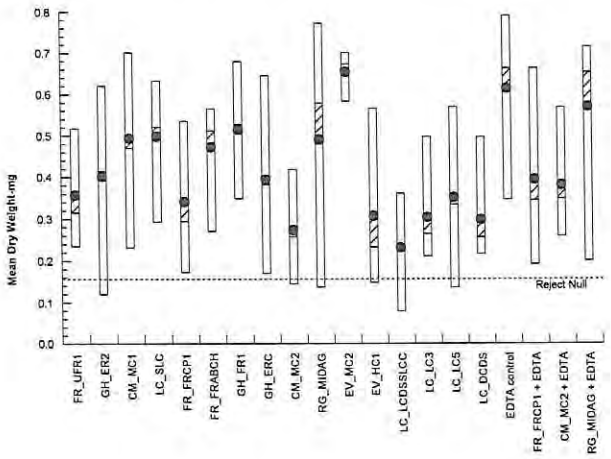
Mean Dry Weight-mg Detail

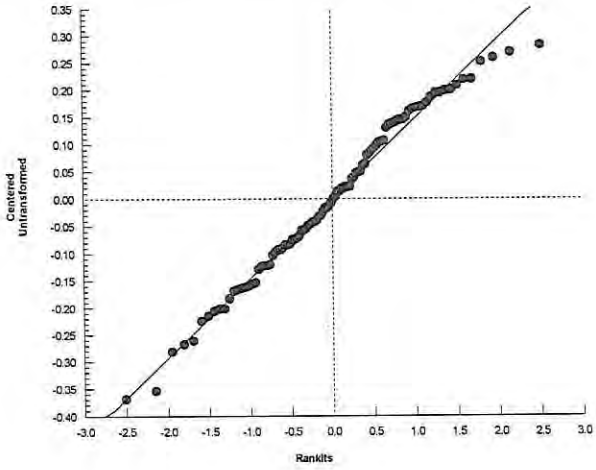
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	RS	0.3	0.235	0.518	0.4175	0.3156
GH_ER2		0.12	0.415	0.621	0.281	0.57
CM_MC1		0.7013	0.6933	0.47	0.37	0.232
LC_SLC		0.605	0.634	0.293	0.521	0.4411
FR_FRCP1		0.536	0.1725	0.295	0.2575	0.446
FR_FRABCH		0.512	0.5222	0.271	0.4922	0.565
GH_FR1		0.5945	0.528	0.349	0.4222	0.68
GH_ERC		0.2311	0.544	0.382	0.17	0.6455
CM_MC2		0.1443	0.4187	0.3762	0.257	0.17
RG_MIDAG		0.1367	0.772	0.579	0.3078	0.6578
EV_MC2		0.673	0.701	0.624	0.69	0.583
EV_HC1		0.148	0.371	0.2188	0.566	0.2333
LC_LCDSSLCC		0.07833	0.1578	0.3614	0.33	0.232
LC_LC3		0.22	0.2114	0.3257	0.498	0.265
LC_LC5		0.1363	0.5211	0.3344	0.195	0.57
LC_DCDS		0.2563	0.2167	0.497	0.2911	0.2312
EDTA control		0.6622	0.79	0.753	0.5167	0.3463
FR_FRCP1 + EDTA		0.537	0.6625	0.345	0.2322	0.1922
CM_MC2 + EDTA		0.259	0.3267	0.4037	0.568	0.3488
RG_MIDAG + EDT		0.714	0.6522	0.707	0.5725	0.2

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	06-5422-6746	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Nov-19 12:31	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	01-5998-2888	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	09 Oct-19 10:52	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	03-8511-3512	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	22 Aug-19	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Reconstituted Water
Ending Date:	19 Sep-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	03-0479-5102	20 Aug-19 11:23	21 Aug-19 10:30	37h (12.4 °C)	Teck Coal	
GH_ER2	15-0818-5087	20 Aug-19 11:47	21 Aug-19 10:30	36h (8.2 °C)		
CM_MC1	03-5718-2507	20 Aug-19 11:52	21 Aug-19 10:30	36h (7.6 °C)		
LC_SLC	09-9216-2322	20 Aug-19 08:51	21 Aug-19 10:30	39h (6.1 °C)		
FR_FRCP1	00-7572-6191	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
FR_FRABCH	19-1279-2277	20 Aug-19 09:46	21 Aug-19 10:30	38h (8.7 °C)		
GH_FR1	06-3623-5994	20 Aug-19 14:34	21 Aug-19 10:30	33h (7.9 °C)		
GH_ERC	02-1254-2591	20 Aug-19 13:12	21 Aug-19 10:30	35h (8.6 °C)		
CM_MC2	00-3605-9017	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG	19-9499-7428	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		
EV_MC2	17-5879-0798	20 Aug-19 10:55	21 Aug-19 10:30	37h (9.5 °C)		
EV_HC1	14-1612-5796	20 Aug-19 09:45	21 Aug-19 10:30	38h (8.4 °C)		
LC_LCDSSLCC	01-4637-7406	20 Aug-19 09:53	21 Aug-19 10:30	38h (7.6 °C)		
LC_LC3	17-1327-4969	20 Aug-19 09:30	21 Aug-19 10:30	38h (8.9 °C)		
LC_LC5	18-4311-0527	20 Aug-19 10:32	21 Aug-19 10:30	37h (9 °C)		
LC_DCDS	19-0653-0503	20 Aug-19 10:09	21 Aug-19 10:30	38h (9.4 °C)		
EDTA control	17-3711-2476	22 Aug-19	22 Aug-19	n/a		
FR_FRCP1 + EDTA	03-0598-0531	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
CM_MC2 + EDTA	12-3609-5608	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG + EDT	11-2463-6008	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1	
GH_ER2	Water Sample	Teck Coal	GH_ER2	
CM_MC1	Water Sample	Teck Coal	CM_MC1	
LC_SLC	Water Sample	Teck Coal	LC_SLC	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH	
GH_FR1	Water Sample	Teck Coal	GH_FR1	
GH_ERC	Water Sample	Teck Coal	GH_ERC	
CM_MC2	Wastewater effluent	Teck Coal	CM_MC2	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG	
EV_MC2	Water Sample	Teck Coal	EV_MC2	
EV_HC1	Water Sample	Teck Coal	EV_HC1	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC	
LC_LC3	Water Sample	Teck Coal	LC_LC3	
LC_LC5	Water Sample	Teck Coal	LC_LC5	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS	
EDTA control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (GH_ER2)		FR_UFR1	0.7667	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.3942	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.9875	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.7667	Exact	1.0000	Non-Significant Effect

Hyalella 28-d Survival and Growth Sediment Test — Nautilus Environmental

Analysis ID: 01-5998-2888 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 09 Oct-19 10:52 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		FR_FRABCH	0.9875	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.9473	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.6426	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.3942	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.8722	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.2900	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.3942	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.0221	Exact	0.4198	Non-Significant Effect
		LC_LC5	0.0926	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.6426	Exact	1.0000	Non-Significant Effect
		EDTA control	0.9473	Exact	1.0000	Non-Significant Effect
		FR_FRCP1 + EDTA	0.2900	Exact	1.0000	Non-Significant Effect
		CM_MC2 + EDTA	0.2900	Exact	1.0000	Non-Significant Effect
		RG_MIDAG + EDTA	0.2900	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		46	4	50	0.92	0.08	-6.98%
GH_ER2	XC	44	5	49	0.898	0.102	-4.41%
CM_MC1		43	7	50	0.86	0.14	0.0%
LC_SLC		49	1	50	0.98	0.02	-13.95%
FR_FRCP1		46	4	50	0.92	0.08	-6.98%
FR_FRABCH		49	1	50	0.98	0.02	-13.95%
GH_FR1		48	2	50	0.96	0.04	-11.63%
GH_ERC		45	5	50	0.9	0.1	-4.65%
CM_MC2		43	7	50	0.86	0.14	0.0%
RG_MIDAG		47	3	50	0.94	0.06	-9.3%
EV_MC2		50	0	50	1	0	-16.28%
EV_HC1		42	8	50	0.84	0.16	2.33%
LC_LCDSSLCC		43	7	50	0.86	0.14	0.0%
LC_LC3		36	14	50	0.72	0.28	16.28%
LC_LC5		39	11	50	0.78	0.22	9.3%
LC_DCDS		45	5	50	0.9	0.1	-4.65%
EDTA control		48	2	50	0.96	0.04	-11.63%
FR_FRCP1 + EDTA		42	8	50	0.84	0.16	2.33%
CM_MC2 + EDTA		42	8	50	0.84	0.16	2.33%
RG_MIDAG + EDTA		42	8	50	0.84	0.16	2.33%

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 01-5998-2888 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 09 Oct-19 10:52 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.9000	1.0000	1.0000	0.8000	0.9000
GH_ER2	XC	0.5556	1.0000	1.0000	1.0000	0.9000
CM_MC1		0.8000	0.9000	0.8000	0.8000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	0.9000
FR_FRCP1		1.0000	0.8000	1.0000	0.8000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	0.9000	1.0000
GH_FR1		0.9000	1.0000	1.0000	0.9000	1.0000
GH_ERC		0.9000	1.0000	1.0000	0.7000	0.9000
CM_MC2		0.7000	0.8000	0.8000	1.0000	1.0000
RG_MIDAG		0.9000	1.0000	1.0000	0.9000	0.9000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		0.5000	1.0000	0.8000	1.0000	0.9000
LC_LCDSSLCC		0.6000	0.9000	0.8000	1.0000	1.0000
LC_LC3		0.6000	0.7000	0.7000	1.0000	0.6000
LC_LC5		0.8000	0.9000	0.9000	0.4000	0.9000
LC_DCDS		0.8000	0.9000	1.0000	1.0000	0.8000
EDTA control		0.9000	1.0000	1.0000	0.9000	1.0000
FR_FRCP1 + EDTA		1.0000	0.8000	0.6000	0.9000	0.9000
CM_MC2 + EDTA		1.0000	0.6000	0.8000	1.0000	0.8000
RG_MIDAG + EDT		1.0000	0.9000	1.0000	0.8000	0.5000

Survival Rate Binomials

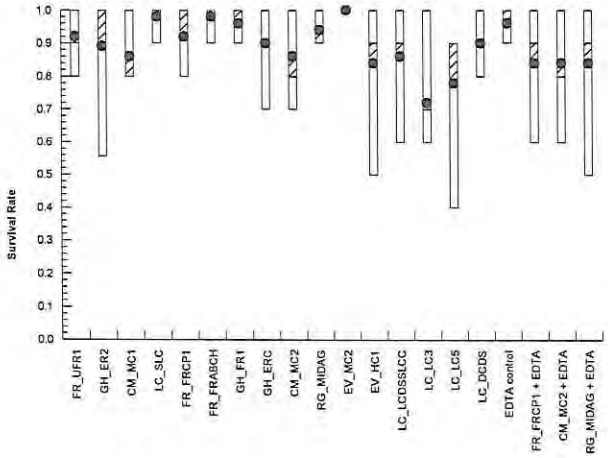
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		9/10	10/10	10/10	8/10	9/10
CM_MC1		8/10	9/10	8/10	8/10	10/10
LC_SLC		10/10	10/10	10/10	10/10	9/10
FR_FRCP1		10/10	8/10	10/10	8/10	10/10
FR_FRABCH		10/10	10/10	10/10	9/10	10/10
GH_FR1		9/10	10/10	10/10	9/10	10/10
GH_ERC		9/10	10/10	10/10	7/10	9/10
CM_MC2		7/10	8/10	8/10	10/10	10/10
RG_MIDAG		9/10	10/10	10/10	9/10	9/10
EV_MC2		10/10	10/10	10/10	10/10	10/10
EV_HC1		5/10	10/10	8/10	10/10	9/10
LC_LCDSSLCC		6/10	9/10	8/10	10/10	10/10
LC_LC3		6/10	7/10	7/10	10/10	6/10
LC_LC5		8/10	9/10	9/10	4/10	9/10
LC_DCDS		8/10	9/10	10/10	10/10	8/10
EDTA control		9/10	10/10	10/10	9/10	10/10
FR_FRCP1 + EDTA		10/10	8/10	6/10	9/10	9/10
CM_MC2 + EDTA		10/10	6/10	8/10	10/10	8/10
RG_MIDAG + EDT		10/10	9/10	10/10	8/10	5/10

Analyst: KJV QA: 002 10/19

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	01-5998-2888	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	09 Oct-19 10:52	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: _____ QA: Oct-25/19

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	08-0190-6379	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Nov-19 12:33	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-8511-3512	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	22 Aug-19	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Reconstituted Water
Ending Date:	19 Sep-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	03-0479-5102	20 Aug-19 11:23	21 Aug-19 10:30	37h (12.4 °C)	Teck Coal	
GH_ER2	15-0818-5087	20 Aug-19 11:47	21 Aug-19 10:30	36h (8.2 °C)		
CM_MC1	03-5718-2507	20 Aug-19 11:52	21 Aug-19 10:30	36h (7.6 °C)		
LC_SLC	09-9216-2322	20 Aug-19 08:51	21 Aug-19 10:30	39h (6.1 °C)		
FR_FRCP1	00-7572-6191	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
FR_FRABCH	19-1279-2277	20 Aug-19 09:46	21 Aug-19 10:30	38h (8.7 °C)		
GH_FR1	06-3623-5994	20 Aug-19 14:34	21 Aug-19 10:30	33h (7.9 °C)		
GH_ERC	02-1254-2591	20 Aug-19 13:12	21 Aug-19 10:30	35h (8.6 °C)		
CM_MC2	00-3605-9017	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG	19-9499-7428	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		
EV_MC2	17-5879-0798	20 Aug-19 10:55	21 Aug-19 10:30	37h (9.5 °C)		
EV_HC1	14-1612-5796	20 Aug-19 09:45	21 Aug-19 10:30	38h (8.4 °C)		
LC_LCDSSLCC	01-4637-7406	20 Aug-19 09:53	21 Aug-19 10:30	38h (7.6 °C)		
LC_LC3	17-1327-4969	20 Aug-19 09:30	21 Aug-19 10:30	38h (8.9 °C)		
LC_LC5	18-4311-0527	20 Aug-19 10:32	21 Aug-19 10:30	37h (9 °C)		
LC_DCDS	19-0653-0503	20 Aug-19 10:09	21 Aug-19 10:30	38h (9.4 °C)		
EDTA control	17-3711-2476	22 Aug-19	22 Aug-19	n/a		
FR_FRCP1 + EDTA	03-0598-0531	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
CM_MC2 + EDTA	12-3609-5608	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG + EDT	11-2463-6008	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1	
GH_ER2	Water Sample	Teck Coal	GH_ER2	
CM_MC1	Water Sample	Teck Coal	CM_MC1	
LC_SLC	Water Sample	Teck Coal	LC_SLC	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH	
GH_FR1	Water Sample	Teck Coal	GH_FR1	
GH_ERC	Water Sample	Teck Coal	GH_ERC	
CM_MC2	Wastewater effluent	Teck Coal	CM_MC2	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG	
EV_MC2	Water Sample	Teck Coal	EV_MC2	
EV_HC1	Water Sample	Teck Coal	EV_HC1	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC	
LC_LC3	Water Sample	Teck Coal	LC_LC3	
LC_LC5	Water Sample	Teck Coal	LC_LC5	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS	
EDTA control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 08-0190-6379 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 01 Nov-19 12:33 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	61.61%
		CM_MC1 passed mean dry weight-mg	61.61%
		LC_SLC passed mean dry weight-mg	61.61%
		FR_FRCP1 passed mean dry weight-mg	61.61%
		FR_FRABCH passed mean dry weight-mg	61.61%
		GH_FR1 passed mean dry weight-mg	61.61%
		GH_ERC passed mean dry weight-mg	61.61%
		CM_MC2 passed mean dry weight-mg	61.61%
		RG_MIDAG passed mean dry weight-mg	61.61%
		EV_MC2 passed mean dry weight-mg	61.61%
		EV_HC1 passed mean dry weight-mg	61.61%
		LC_LCDSSLCC passed mean dry weight-mg	61.61%
		LC_LC3 passed mean dry weight-mg	61.61%
		LC_LC5 passed mean dry weight-mg	61.61%
		LC_DCDS passed mean dry weight-mg	61.61%
		EDTA control passed mean dry weight-mg	61.61%
		FR_FRCP1 + EDTA passed mean dry weight-	61.61%
		CM_MC2 + EDTA passed mean dry weight-m	61.61%
		RG_MIDAG + EDTA passed mean dry weight-	61.61%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		FR_UFR1	0.4213	1.86	0.195	8	CDF	0.3423	Non-Significant Effect
(GH-ER2)		CM_MC1	-0.7073	1.86	0.242	8	CDF	0.7503	Non-Significant Effect
		LC_SLC	-0.878	1.86	0.206	8	CDF	0.7972	Non-Significant Effect
		FR_FRCP1	0.5292	1.86	0.211	8	CDF	0.3055	Non-Significant Effect
		FR_FRABCH	-0.6716	1.86	0.197	8	CDF	0.7396	Non-Significant Effect
		GH_FR1	-1.034	1.86	0.204	8	CDF	0.8343	Non-Significant Effect
		GH_ERC	0.05321	1.86	0.24	8	CDF	0.4794	Non-Significant Effect
		CM_MC2	1.195	1.86	0.199	8	CDF	0.1331	Non-Significant Effect
		RG_MIDAG	-0.5989	1.86	0.277	8	CDF	0.7171	Non-Significant Effect
		EV_MC2	-2.662	1.86	0.177	8	CDF	0.9856	Non-Significant Effect
		EV_HC1	0.794	1.86	0.220	8	CDF	0.2250	Non-Significant Effect
		LC_LCDSSLCC	1.594	1.86	0.198	8	CDF	0.0748	Non-Significant Effect
		LC_LC3	0.9164	1.86	0.198	8	CDF	0.1931	Non-Significant Effect
		LC_LC5	0.3967	1.86	0.235	8	CDF	0.3510	Non-Significant Effect
		LC_DCDS	0.9749	1.86	0.196	8	CDF	0.1791	Non-Significant Effect
		EDTA control	-1.721	1.86	0.229	8	CDF	0.9382	Non-Significant Effect
		FR_FRCP1 + EDTA	0.05904	1.86	0.24	8	CDF	0.4772	Non-Significant Effect
		CM_MC2 + EDTA	0.1902	1.86	0.197	8	CDF	0.4269	Non-Significant Effect
		RG_MIDAG + EDTA	-1.261	1.86	0.247	8	CDF	0.8787	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.29278	0.0680408	19	2.553	0.0019	Significant Effect
Error	2.13198	0.0266498	80			
Total	3.42476		99			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	15.7	36.19	0.6771	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9841	0.9654	0.2735	Normal Distribution

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 08-0190-6379 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 01 Nov-19 12:33 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		5	0.3572	0.2192	0.4952	0.3156	0.235	0.518	0.04971	31.12%	0.00%
GH_ER2	RS	5	0.4014	0.145	0.6578	0.415	0.12	0.621	0.09234	51.44%	-12.37%
CM_MC1		5	0.4933	0.2394	0.7472	0.47	0.232	0.7013	0.09146	41.45%	-38.10%
LC_SLC		5	0.4988	0.328	0.6697	0.521	0.293	0.634	0.06154	27.58%	-39.64%
FR_FRCP1		5	0.3414	0.1588	0.524	0.295	0.1725	0.536	0.06578	43.08%	4.43%
FR_FRABCH		5	0.4725	0.3288	0.6162	0.512	0.271	0.565	0.05176	24.50%	-32.27%
GH_FR1		5	0.5147	0.3506	0.6788	0.528	0.349	0.68	0.0591	25.68%	-44.10%
GH_ERC		5	0.3945	0.1442	0.6449	0.382	0.17	0.6455	0.09018	51.11%	-10.45%
CM_MC2		5	0.2733	0.122	0.4245	0.257	0.1443	0.4187	0.05447	44.57%	23.50%
RG_MIDAG		5	0.4906	0.1659	0.8154	0.579	0.1367	0.772	0.117	53.31%	-37.35%
EV_MC2		5	0.6542	0.5927	0.7157	0.673	0.583	0.701	0.02214	7.57%	-83.14%
EV_HC1		5	0.3074	0.1018	0.513	0.2333	0.148	0.566	0.07405	53.86%	13.94%
LC_LCDSSLCC		5	0.2319	0.08567	0.3781	0.232	0.07833	0.3614	0.05267	50.78%	35.08%
LC_LC3		5	0.304	0.1581	0.45	0.265	0.2114	0.498	0.05256	38.66%	14.89%
LC_LC5		5	0.3514	0.1128	0.5899	0.3344	0.1363	0.57	0.08591	54.67%	1.64%
LC_DCDS		5	0.2985	0.1563	0.4407	0.2563	0.2167	0.497	0.05122	38.37%	16.45%
EDTA control		5	0.6136	0.3866	0.8407	0.6622	0.3463	0.79	0.08179	29.80%	-71.78%
FR_FRCP1 + EDTA		5	0.3938	0.144	0.6435	0.345	0.1922	0.6625	0.08995	51.08%	-10.24%
CM_MC2 + EDTA		5	0.3812	0.2365	0.526	0.3488	0.259	0.568	0.05213	30.58%	-6.72%
RG_MIDAG + EDT		5	0.5691	0.3034	0.8348	0.6522	0.2	0.714	0.0957	37.60%	-59.33%

Mean Dry Weight-mg Detail

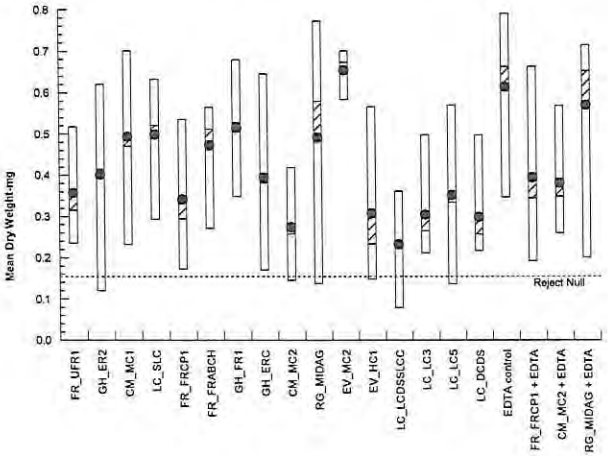
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.3	0.235	0.518	0.4175	0.3156
GH_ER2	RS	0.12	0.415	0.621	0.281	0.57
CM_MC1		0.7013	0.6933	0.47	0.37	0.232
LC_SLC		0.605	0.634	0.293	0.521	0.4411
FR_FRCP1		0.536	0.1725	0.295	0.2575	0.446
FR_FRABCH		0.512	0.5222	0.271	0.4922	0.565
GH_FR1		0.5945	0.528	0.349	0.4222	0.68
GH_ERC		0.2311	0.544	0.382	0.17	0.6455
CM_MC2		0.1443	0.4187	0.3762	0.257	0.17
RG_MIDAG		0.1367	0.772	0.579	0.3078	0.6578
EV_MC2		0.673	0.701	0.624	0.69	0.583
EV_HC1		0.148	0.371	0.2188	0.566	0.2333
LC_LCDSSLCC		0.07833	0.1578	0.3614	0.33	0.232
LC_LC3		0.22	0.2114	0.3257	0.498	0.265
LC_LC5		0.1363	0.5211	0.3344	0.195	0.57
LC_DCDS		0.2563	0.2167	0.497	0.2911	0.2312
EDTA control		0.6622	0.79	0.753	0.5167	0.3463
FR_FRCP1 + EDTA		0.537	0.6625	0.345	0.2322	0.1922
CM_MC2 + EDTA		0.259	0.3267	0.4037	0.568	0.3488
RG_MIDAG + EDT		0.714	0.6522	0.707	0.5725	0.2

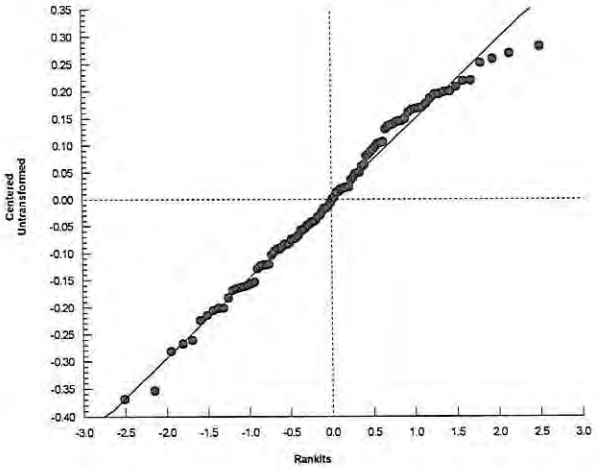
Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	08-0190-6379	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Nov-19 12:33	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	12-2009-2318	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	09 Oct-19 10:57	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	03-8511-3512	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	22 Aug-19	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Reconstituted Water
Ending Date:	19 Sep-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	03-0479-5102	20 Aug-19 11:23	21 Aug-19 10:30	37h (12.4 °C)	Teck Coal	
GH_ER2	15-0818-5087	20 Aug-19 11:47	21 Aug-19 10:30	36h (8.2 °C)		
CM_MC1	03-5718-2507	20 Aug-19 11:52	21 Aug-19 10:30	36h (7.6 °C)		
LC_SLC	09-9216-2322	20 Aug-19 08:51	21 Aug-19 10:30	39h (6.1 °C)		
FR_FRCP1	00-7572-6191	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
FR_FRABCH	19-1279-2277	20 Aug-19 09:46	21 Aug-19 10:30	38h (8.7 °C)		
GH_FR1	06-3623-5994	20 Aug-19 14:34	21 Aug-19 10:30	33h (7.9 °C)		
GH_ERC	02-1254-2591	20 Aug-19 13:12	21 Aug-19 10:30	35h (8.6 °C)		
CM_MC2	00-3605-9017	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG	19-9499-7428	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		
EV_MC2	17-5879-0798	20 Aug-19 10:55	21 Aug-19 10:30	37h (9.5 °C)		
EV_HC1	14-1612-5796	20 Aug-19 09:45	21 Aug-19 10:30	38h (8.4 °C)		
LC_LCDSSLCC	01-4637-7406	20 Aug-19 09:53	21 Aug-19 10:30	38h (7.6 °C)		
LC_LC3	17-1327-4969	20 Aug-19 09:30	21 Aug-19 10:30	38h (8.9 °C)		
LC_LC5	18-4311-0527	20 Aug-19 10:32	21 Aug-19 10:30	37h (9 °C)		
LC_DCDS	19-0653-0503	20 Aug-19 10:09	21 Aug-19 10:30	38h (9.4 °C)		
EDTA control	17-3711-2476	22 Aug-19	22 Aug-19	n/a		
FR_FRCP1 + EDTA	03-0598-0531	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
CM_MC2 + EDTA	12-3609-5608	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG + EDT	11-2463-6008	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1	
GH_ER2	Water Sample	Teck Coal	GH_ER2	
CM_MC1	Water Sample	Teck Coal	CM_MC1	
LC_SLC	Water Sample	Teck Coal	LC_SLC	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH	
GH_FR1	Water Sample	Teck Coal	GH_FR1	
GH_ERC	Water Sample	Teck Coal	GH_ERC	
CM_MC2	Wastewater effluent	Teck Coal	CM_MC2	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG	
EV_MC2	Water Sample	Teck Coal	EV_MC2	
EV_HC1	Water Sample	Teck Coal	EV_HC1	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC	
LC_LC3	Water Sample	Teck Coal	LC_LC3	
LC_LC5	Water Sample	Teck Coal	LC_LC5	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS	
EDTA control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (CM_MC1)		FR_UFR1	0.9001	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.8118	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.9971	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.9001	Exact	1.0000	Non-Significant Effect

Analyst: KL QA: OCT-28/19

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	12-2009-2318	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	09 Oct-19 10:57	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		FR_FRABCH	0.9971	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.9846	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.8217	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.6129	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.9542	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.6129	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.0698	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.2178	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.8217	Exact	1.0000	Non-Significant Effect
		EDTA control	0.9846	Exact	1.0000	Non-Significant Effect
		FR_FRCP1 + EDTA	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC2 + EDTA	0.5000	Exact	1.0000	Non-Significant Effect
		RG_MIDAG + EDTA	0.5000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		46	4	50	0.92	0.08	-6.98%
GH_ER2		44	5	49	0.898	0.102	-4.41%
CM_MC1	XC	43	7	50	0.86	0.14	0.0%
LC_SLC		49	1	50	0.98	0.02	-13.95%
FR_FRCP1		46	4	50	0.92	0.08	-6.98%
FR_FRABCH		49	1	50	0.98	0.02	-13.95%
GH_FR1		48	2	50	0.96	0.04	-11.63%
GH_ERC		45	5	50	0.9	0.1	-4.65%
CM_MC2		43	7	50	0.86	0.14	0.0%
RG_MIDAG		47	3	50	0.94	0.06	-9.3%
EV_MC2		50	0	50	1	0	-16.28%
EV_HC1		42	8	50	0.84	0.16	2.33%
LC_LCDSSLCC		43	7	50	0.86	0.14	0.0%
LC_LC3		36	14	50	0.72	0.28	16.28%
LC_LC5		39	11	50	0.78	0.22	9.3%
LC_DCDS		45	5	50	0.9	0.1	-4.65%
EDTA control		48	2	50	0.96	0.04	-11.63%
FR_FRCP1 + EDTA		42	8	50	0.84	0.16	2.33%
CM_MC2 + EDTA		42	8	50	0.84	0.16	2.33%
RG_MIDAG + EDTA		42	8	50	0.84	0.16	2.33%

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 12-2009-2318 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 09 Oct-19 10:57 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.9000	1.0000	1.0000	0.8000	0.9000
GH_ER2		0.5556	1.0000	1.0000	1.0000	0.9000
CM_MC1	XC	0.8000	0.9000	0.8000	0.8000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	0.9000
FR_FRCP1		1.0000	0.8000	1.0000	0.8000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	0.9000	1.0000
GH_FR1		0.9000	1.0000	1.0000	0.9000	1.0000
GH_ERC		0.9000	1.0000	1.0000	0.7000	0.9000
CM_MC2		0.7000	0.8000	0.8000	1.0000	1.0000
RG_MIDAG		0.9000	1.0000	1.0000	0.9000	0.9000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		0.5000	1.0000	0.8000	1.0000	0.9000
LC_LCDSSLCC		0.6000	0.9000	0.8000	1.0000	1.0000
LC_LC3		0.6000	0.7000	0.7000	1.0000	0.6000
LC_LC5		0.8000	0.9000	0.9000	0.4000	0.9000
LC_DCDS		0.8000	0.9000	1.0000	1.0000	0.8000
EDTA control		0.9000	1.0000	1.0000	0.9000	1.0000
FR_FRCP1 + EDTA		1.0000	0.8000	0.6000	0.9000	0.9000
CM_MC2 + EDTA		1.0000	0.6000	0.8000	1.0000	0.8000
RG_MIDAG + EDT		1.0000	0.9000	1.0000	0.8000	0.5000

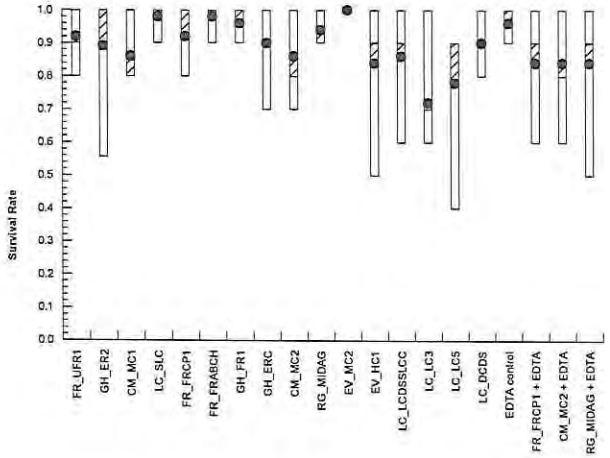
Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		9/10	10/10	10/10	8/10	9/10
GH_ER2		5/9	10/10	10/10	10/10	9/10
LC_SLC		10/10	10/10	10/10	10/10	9/10
FR_FRCP1		10/10	8/10	10/10	8/10	10/10
FR_FRABCH		10/10	10/10	10/10	9/10	10/10
GH_FR1		9/10	10/10	10/10	9/10	10/10
GH_ERC		9/10	10/10	10/10	7/10	9/10
CM_MC2		7/10	8/10	8/10	10/10	10/10
RG_MIDAG		9/10	10/10	10/10	9/10	9/10
EV_MC2		10/10	10/10	10/10	10/10	10/10
EV_HC1		5/10	10/10	8/10	10/10	9/10
LC_LCDSSLCC		6/10	9/10	8/10	10/10	10/10
LC_LC3		6/10	7/10	7/10	10/10	6/10
LC_LC5		8/10	9/10	9/10	4/10	9/10
LC_DCDS		8/10	9/10	10/10	10/10	8/10
EDTA control		9/10	10/10	10/10	9/10	10/10
FR_FRCP1 + EDTA		10/10	8/10	6/10	9/10	9/10
CM_MC2 + EDTA		10/10	6/10	8/10	10/10	8/10
RG_MIDAG + EDT		10/10	9/10	10/10	8/10	5/10

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	12-2009-2318	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	09 Oct-19 10:57	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: _____ QA: _____ 10-25-19

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	00-0531-3298	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Nov-19 12:34	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-8511-3512	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	22 Aug-19	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Reconstituted Water
Ending Date:	19 Sep-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	03-0479-5102	20 Aug-19 11:23	21 Aug-19 10:30	37h (12.4 °C)	Teck Coal	
GH_ER2	15-0818-5087	20 Aug-19 11:47	21 Aug-19 10:30	36h (8.2 °C)		
CM_MC1	03-5718-2507	20 Aug-19 11:52	21 Aug-19 10:30	36h (7.6 °C)		
LC_SLC	09-9216-2322	20 Aug-19 08:51	21 Aug-19 10:30	39h (6.1 °C)		
FR_FRCP1	00-7572-6191	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
FR_FRABCH	19-1279-2277	20 Aug-19 09:46	21 Aug-19 10:30	38h (8.7 °C)		
GH_FR1	06-3623-5994	20 Aug-19 14:34	21 Aug-19 10:30	33h (7.9 °C)		
GH_ERC	02-1254-2591	20 Aug-19 13:12	21 Aug-19 10:30	35h (8.6 °C)		
CM_MC2	00-3605-9017	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG	19-9499-7428	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		
EV_MC2	17-5879-0798	20 Aug-19 10:55	21 Aug-19 10:30	37h (9.5 °C)		
EV_HC1	14-1612-5796	20 Aug-19 09:45	21 Aug-19 10:30	38h (8.4 °C)		
LC_LCDSSLCC	01-4637-7406	20 Aug-19 09:53	21 Aug-19 10:30	38h (7.6 °C)		
LC_LC3	17-1327-4969	20 Aug-19 09:30	21 Aug-19 10:30	38h (8.9 °C)		
LC_LC5	18-4311-0527	20 Aug-19 10:32	21 Aug-19 10:30	37h (9 °C)		
LC_DCDS	19-0653-0503	20 Aug-19 10:09	21 Aug-19 10:30	38h (9.4 °C)		
EDTA control	17-3711-2476	22 Aug-19	22 Aug-19	n/a		
FR_FRCP1 + EDTA	03-0598-0531	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
CM_MC2 + EDTA	12-3609-5608	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG + EDT	11-2463-6008	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1	
GH_ER2	Water Sample	Teck Coal	GH_ER2	
CM_MC1	Water Sample	Teck Coal	CM_MC1	
LC_SLC	Water Sample	Teck Coal	LC_SLC	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH	
GH_FR1	Water Sample	Teck Coal	GH_FR1	
GH_ERC	Water Sample	Teck Coal	GH_ERC	
CM_MC2	Wastewater effluent	Teck Coal	CM_MC2	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG	
EV_MC2	Water Sample	Teck Coal	EV_MC2	
EV_HC1	Water Sample	Teck Coal	EV_HC1	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC	
LC_LC3	Water Sample	Teck Coal	LC_LC3	
LC_LC5	Water Sample	Teck Coal	LC_LC5	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS	
EDTA control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Hyalella 28-d Survival and Growth Sediment Test — Nautilus Environmental

Analysis ID: 00-0531-3298 Endpoint: Mean Dry Weight-mg CETIS Version: CETISv1.9.4
Analyzed: 01 Nov-19 12:34 Analysis: Parametric-Two Sample Status Level: 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	49.90%
		GH_ER2 passed mean dry weight-mg	49.90%
		LC_SLC passed mean dry weight-mg	49.90%
		FR_FRCP1 passed mean dry weight-mg	49.90%
		FR_FRABCH passed mean dry weight-mg	49.90%
		GH_FR1 passed mean dry weight-mg	49.90%
		GH_ERC passed mean dry weight-mg	49.90%
		CM_MC2 failed mean dry weight-mg	49.90%
		RG_MIDAG passed mean dry weight-mg	49.90%
		EV_MC2 passed mean dry weight-mg	49.90%
		EV_HC1 passed mean dry weight-mg	49.90%
		LC_LCDSSLCC failed mean dry weight-mg	49.90%
		LC_LC3 passed mean dry weight-mg	49.90%
		LC_LC5 passed mean dry weight-mg	49.90%
		LC_DCDS failed mean dry weight-mg	49.90%
		EDTA control passed mean dry weight-mg	49.90%
		FR_FRCP1 + EDTA passed mean dry weight-	49.90%
		CM_MC2 + EDTA passed mean dry weight-m	49.90%
		RG_MIDAG + EDTA passed mean dry weight-	49.90%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		FR_UFR1	1.308	1.86	0.194	8	CDF	0.1137	Non-Significant Effect
(CM-MC1)		GH_ER2	0.7073	1.86	0.242	8	CDF	0.2497	Non-Significant Effect
		LC_SLC	-0.04989	1.86	0.205	8	CDF	0.5193	Non-Significant Effect
		FR_FRCP1	1.349	1.86	0.21	8	CDF	0.1072	Non-Significant Effect
		FR_FRABCH	0.1983	1.86	0.195	8	CDF	0.4239	Non-Significant Effect
		GH_FR1	-0.1967	1.86	0.203	8	CDF	0.5755	Non-Significant Effect
		GH_ERC	0.7692	1.86	0.239	8	CDF	0.2319	Non-Significant Effect
		CM_MC2*	2.067	1.86	0.198	8	CDF	0.0363	Significant Effect
		RG_MIDAG	0.01803	1.86	0.276	8	CDF	0.4930	Non-Significant Effect
		EV_MC2	-1.71	1.86	0.175	8	CDF	0.9372	Non-Significant Effect
		EV_HC1	1.58	1.86	0.219	8	CDF	0.0764	Non-Significant Effect
		LC_LCDSSLCC*	2.477	1.86	0.196	8	CDF	0.0191	Significant Effect
		LC_LC3	1.794	1.86	0.196	8	CDF	0.0552	Non-Significant Effect
		LC_LC5	1.131	1.86	0.233	8	CDF	0.1453	Non-Significant Effect
		LC_DCDS*	1.859	1.86	0.195	8	CDF	0.0500	Significant Effect
		EDTA control	-0.9806	1.86	0.228	8	CDF	0.8222	Non-Significant Effect
		FR_FRCP1 + EDTA	0.7759	1.86	0.239	8	CDF	0.2301	Non-Significant Effect
		CM_MC2 + EDTA	1.065	1.86	0.196	8	CDF	0.1590	Non-Significant Effect
		RG_MIDAG + EDTA	-0.5728	1.86	0.246	8	CDF	0.7087	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.29278	0.0680408	19	2.553	0.0019	Significant Effect
Error	2.13198	0.0266498	80			
Total	3.42476		99			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	15.7	36.19	0.6771	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9841	0.9654	0.2735	Normal Distribution

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 00-0531-3298 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 01 Nov-19 12:34 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		5	0.3572	0.2192	0.4952	0.3156	0.235	0.518	0.04971	31.12%	0.00%
GH_ER2		5	0.4014	0.145	0.6578	0.415	0.12	0.621	0.09234	51.44%	-12.37%
CM_MC1	RS	5	0.4933	0.2394	0.7472	0.47	0.232	0.7013	0.09146	41.45%	-38.10%
LC_SLC		5	0.4988	0.328	0.6697	0.521	0.293	0.634	0.06154	27.58%	-39.64%
FR_FRCP1		5	0.3414	0.1588	0.524	0.295	0.1725	0.536	0.06578	43.08%	4.43%
FR_FRABCH		5	0.4725	0.3288	0.6162	0.512	0.271	0.565	0.05176	24.50%	-32.27%
GH_FR1		5	0.5147	0.3506	0.6788	0.528	0.349	0.68	0.0591	25.68%	-44.10%
GH_ERC		5	0.3945	0.1442	0.6449	0.382	0.17	0.6455	0.09018	51.11%	-10.45%
CM_MC2		5	0.2733	0.122	0.4245	0.257	0.1443	0.4187	0.05447	44.57%	23.50%
RG_MIDAG		5	0.4906	0.1659	0.8154	0.579	0.1367	0.772	0.117	53.31%	-37.35%
EV_MC2		5	0.6542	0.5927	0.7157	0.673	0.583	0.701	0.02214	7.57%	-83.14%
EV_HC1		5	0.3074	0.1018	0.513	0.2333	0.148	0.566	0.07405	53.86%	13.94%
LC_LCDSSLCC		5	0.2319	0.08567	0.3781	0.232	0.07833	0.3614	0.05267	50.78%	35.08%
LC_LC3		5	0.304	0.1581	0.45	0.265	0.2114	0.498	0.05256	38.66%	14.89%
LC_LC5		5	0.3514	0.1128	0.5899	0.3344	0.1363	0.57	0.08591	54.67%	1.64%
LC_DCDS		5	0.2985	0.1563	0.4407	0.2563	0.2167	0.497	0.05122	38.37%	16.45%
EDTA control		5	0.6136	0.3866	0.8407	0.6622	0.3463	0.79	0.08179	29.80%	-71.78%
FR_FRCP1 + EDTA		5	0.3938	0.144	0.6435	0.345	0.1922	0.6625	0.08995	51.08%	-10.24%
CM_MC2 + EDTA		5	0.3812	0.2365	0.526	0.3488	0.259	0.568	0.05213	30.58%	-6.72%
RG_MIDAG + EDT		5	0.5691	0.3034	0.8348	0.6522	0.2	0.714	0.0957	37.60%	-59.33%

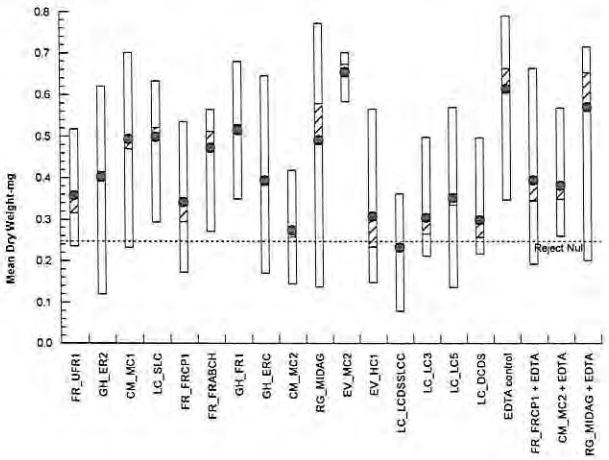
Mean Dry Weight-mg Detail

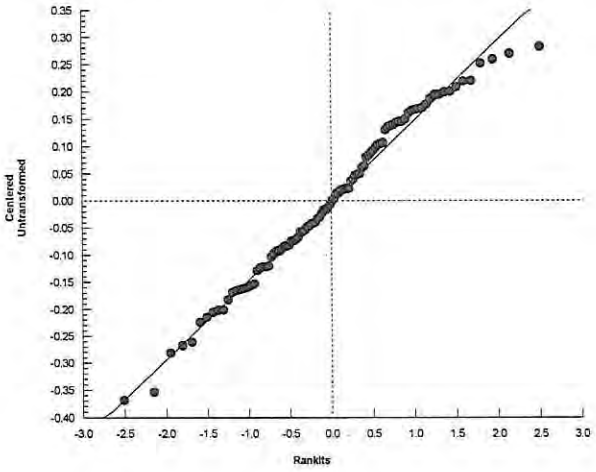
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.3	0.235	0.518	0.4175	0.3156
GH_ER2		0.12	0.415	0.621	0.281	0.57
CM_MC1	RS	0.7013	0.6933	0.47	0.37	0.232
LC_SLC		0.605	0.634	0.293	0.521	0.4411
FR_FRCP1		0.536	0.1725	0.295	0.2575	0.446
FR_FRABCH		0.512	0.5222	0.271	0.4922	0.565
GH_FR1		0.5945	0.528	0.349	0.4222	0.68
GH_ERC		0.2311	0.544	0.382	0.17	0.6455
CM_MC2		0.1443	0.4187	0.3762	0.257	0.17
RG_MIDAG		0.1367	0.772	0.579	0.3078	0.6578
EV_MC2		0.673	0.701	0.624	0.69	0.583
EV_HC1		0.148	0.371	0.2188	0.566	0.2333
LC_LCDSSLCC		0.07833	0.1578	0.3614	0.33	0.232
LC_LC3		0.22	0.2114	0.3257	0.498	0.265
LC_LC5		0.1363	0.5211	0.3344	0.195	0.57
LC_DCDS		0.2563	0.2167	0.497	0.2911	0.2312
EDTA control		0.6622	0.79	0.753	0.5167	0.3463
FR_FRCP1 + EDTA		0.537	0.6625	0.345	0.2322	0.1922
CM_MC2 + EDTA		0.259	0.3267	0.4037	0.568	0.3488
RG_MIDAG + EDT		0.714	0.6522	0.707	0.5725	0.2

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	00-0531-3298	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Nov-19 12:34	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Analyst: _____ QA: NN 4/19

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	06-6890-8561	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	09 Oct-19 10:58	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	03-8511-3512	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	22 Aug-19	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Reconstituted Water
Ending Date:	19 Sep-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	03-0479-5102	20 Aug-19 11:23	21 Aug-19 10:30	37h (12.4 °C)	Teck Coal	
GH_ER2	15-0818-5087	20 Aug-19 11:47	21 Aug-19 10:30	36h (8.2 °C)		
CM_MC1	03-5718-2507	20 Aug-19 11:52	21 Aug-19 10:30	36h (7.6 °C)		
LC_SLC	09-9216-2322	20 Aug-19 08:51	21 Aug-19 10:30	39h (6.1 °C)		
FR_FRCP1	00-7572-6191	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
FR_FRABCH	19-1279-2277	20 Aug-19 09:46	21 Aug-19 10:30	38h (8.7 °C)		
GH_FR1	06-3623-5994	20 Aug-19 14:34	21 Aug-19 10:30	33h (7.9 °C)		
GH_ERC	02-1254-2591	20 Aug-19 13:12	21 Aug-19 10:30	35h (8.6 °C)		
CM_MC2	00-3605-9017	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG	19-9499-7428	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		
EV_MC2	17-5879-0798	20 Aug-19 10:55	21 Aug-19 10:30	37h (9.5 °C)		
EV_HC1	14-1612-5796	20 Aug-19 09:45	21 Aug-19 10:30	38h (8.4 °C)		
LC_LCDSSLCC	01-4637-7406	20 Aug-19 09:53	21 Aug-19 10:30	38h (7.6 °C)		
LC_LC3	17-1327-4969	20 Aug-19 09:30	21 Aug-19 10:30	38h (8.9 °C)		
LC_LC5	18-4311-0527	20 Aug-19 10:32	21 Aug-19 10:30	37h (9 °C)		
LC_DCDS	19-0653-0503	20 Aug-19 10:09	21 Aug-19 10:30	38h (9.4 °C)		
EDTA control	17-3711-2476	22 Aug-19	22 Aug-19	n/a		
FR_FRCP1 + EDTA	03-0598-0531	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
CM_MC2 + EDTA	12-3609-5608	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG + EDT	11-2463-6008	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1	
GH_ER2	Water Sample	Teck Coal	GH_ER2	
CM_MC1	Water Sample	Teck Coal	CM_MC1	
LC_SLC	Water Sample	Teck Coal	LC_SLC	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH	
GH_FR1	Water Sample	Teck Coal	GH_FR1	
GH_ERC	Water Sample	Teck Coal	GH_ERC	
CM_MC2	Wastewater effluent	Teck Coal	CM_MC2	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG	
EV_MC2	Water Sample	Teck Coal	EV_MC2	
EV_HC1	Water Sample	Teck Coal	EV_HC1	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC	
LC_LC3	Water Sample	Teck Coal	LC_LC3	
LC_LC5	Water Sample	Teck Coal	LC_LC5	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS	
EDTA control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (LC_SLC)		FR_UFR1	0.1811	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.0976	Exact	0.9757	Non-Significant Effect
		CM_MC1	0.0297	Exact	0.3864	Non-Significant Effect
		FR_FRCP1	0.1811	Exact	1.0000	Non-Significant Effect

Analyst: KM QA: 10-25/19

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID: 06-6890-8561 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 09 Oct-19 10:58 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		FR_FRABCH	0.7525	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.5000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.1022	Exact	0.9198	Non-Significant Effect
		CM_MC2	0.0297	Exact	0.3864	Non-Significant Effect
		RG_MIDAG	0.3087	Exact	1.0000	Non-Significant Effect
		EV_MC2	1.0000	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.0154	Exact	0.2623	Non-Significant Effect
		LC_LCDSSLCC	0.0297	Exact	0.3864	Non-Significant Effect
		LC_LC3*	0.0002	Exact	0.0037	Significant Effect
		LC_LC5*	0.0019	Exact	0.0341	Significant Effect
		LC_DCDS	0.1022	Exact	0.9198	Non-Significant Effect
		EDTA control	0.5000	Exact	1.0000	Non-Significant Effect
		FR_FRCP1 + EDTA	0.0154	Exact	0.2623	Non-Significant Effect
		CM_MC2 + EDTA	0.0154	Exact	0.2623	Non-Significant Effect
		RG_MIDAG + EDTA	0.0154	Exact	0.2623	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		46	4	50	0.92	0.08	-6.98%
GH_ER2		44	5	49	0.898	0.102	-4.41%
CM_MC1		43	7	50	0.86	0.14	0.0%
LC_SLC	XC	49	1	50	0.98	0.02	-13.95%
FR_FRCP1		46	4	50	0.92	0.08	-6.98%
FR_FRABCH		49	1	50	0.98	0.02	-13.95%
GH_FR1		48	2	50	0.96	0.04	-11.63%
GH_ERC		45	5	50	0.9	0.1	-4.65%
CM_MC2		43	7	50	0.86	0.14	0.0%
RG_MIDAG		47	3	50	0.94	0.06	-9.3%
EV_MC2		50	0	50	1	0	-16.28%
EV_HC1		42	8	50	0.84	0.16	2.33%
LC_LCDSSLCC		43	7	50	0.86	0.14	0.0%
LC_LC3		36	14	50	0.72	0.28	16.28%
LC_LC5		39	11	50	0.78	0.22	9.3%
LC_DCDS		45	5	50	0.9	0.1	-4.65%
EDTA control		48	2	50	0.96	0.04	-11.63%
FR_FRCP1 + EDTA		42	8	50	0.84	0.16	2.33%
CM_MC2 + EDTA		42	8	50	0.84	0.16	2.33%
RG_MIDAG + EDTA		42	8	50	0.84	0.16	2.33%

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 06-6890-8561 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 09 Oct-19 10:58 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Survival Rate Detail

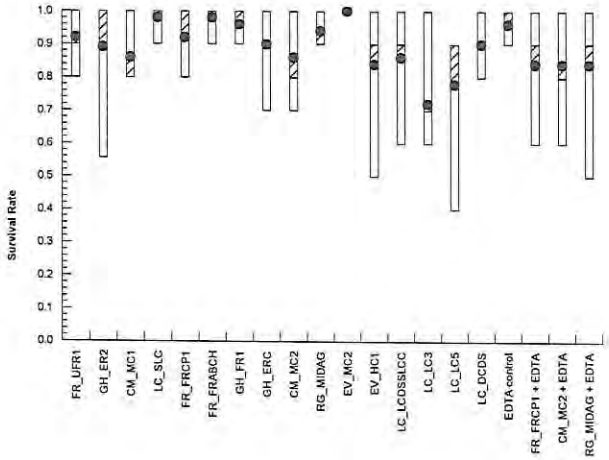
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.9000	1.0000	1.0000	0.8000	0.9000
GH_ER2		0.5556	1.0000	1.0000	1.0000	0.9000
CM_MC1		0.8000	0.9000	0.8000	0.8000	1.0000
LC_SLC	XC	1.0000	1.0000	1.0000	1.0000	0.9000
FR_FRCP1		1.0000	0.8000	1.0000	0.8000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	0.9000	1.0000
GH_FR1		0.9000	1.0000	1.0000	0.9000	1.0000
GH_ERC		0.9000	1.0000	1.0000	0.7000	0.9000
CM_MC2		0.7000	0.8000	0.8000	1.0000	1.0000
RG_MIDAG		0.9000	1.0000	1.0000	0.9000	0.9000
EV_MC2		1.0000	1.0000	1.0000	1.0000	1.0000
EV_HC1		0.5000	1.0000	0.8000	1.0000	0.9000
LC_LCDSSLCC		0.6000	0.9000	0.8000	1.0000	1.0000
LC_LC3		0.6000	0.7000	0.7000	1.0000	0.6000
LC_LC5		0.8000	0.9000	0.9000	0.4000	0.9000
LC_DCDS		0.8000	0.9000	1.0000	1.0000	0.8000
EDTA control		0.9000	1.0000	1.0000	0.9000	1.0000
FR_FRCP1 + EDTA		1.0000	0.8000	0.6000	0.9000	0.9000
CM_MC2 + EDTA		1.0000	0.6000	0.8000	1.0000	0.8000
RG_MIDAG + EDT		1.0000	0.9000	1.0000	0.8000	0.5000

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		9/10	10/10	10/10	8/10	9/10
GH_ER2		5/9	10/10	10/10	10/10	9/10
CM_MC1		8/10	9/10	8/10	8/10	10/10
FR_FRCP1		10/10	8/10	10/10	8/10	10/10
FR_FRABCH		10/10	10/10	10/10	9/10	10/10
GH_FR1		9/10	10/10	10/10	9/10	10/10
GH_ERC		9/10	10/10	10/10	7/10	9/10
CM_MC2		7/10	8/10	8/10	10/10	10/10
RG_MIDAG		9/10	10/10	10/10	9/10	9/10
EV_MC2		10/10	10/10	10/10	10/10	10/10
EV_HC1		5/10	10/10	8/10	10/10	9/10
LC_LCDSSLCC		6/10	9/10	8/10	10/10	10/10
LC_LC3		6/10	7/10	7/10	10/10	6/10
LC_LC5		8/10	9/10	9/10	4/10	9/10
LC_DCDS		8/10	9/10	10/10	10/10	8/10
EDTA control		9/10	10/10	10/10	9/10	10/10
FR_FRCP1 + EDTA		10/10	8/10	6/10	9/10	9/10
CM_MC2 + EDTA		10/10	6/10	8/10	10/10	8/10
RG_MIDAG + EDT		10/10	9/10	10/10	8/10	5/10

Analysis ID:	06-6890-8561	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	09 Oct-19 10:58	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: _____ QA: 10-25-19

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	17-5823-2455	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Nov-19 12:35	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	03-8511-3512	**Test Type:**	Survival-Growth	**Analyst:**	Karen Lee
Start Date:	22 Aug-19	**Protocol:**	EPA/600/R-99/064 (2000)	**Diluent:**	Reconstituted Water
Ending Date:	19 Sep-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	03-0479-5102	20 Aug-19 11:23	21 Aug-19 10:30	37h (12.4 °C)	Teck Coal	
GH_ER2	15-0818-5087	20 Aug-19 11:47	21 Aug-19 10:30	36h (8.2 °C)		
CM_MC1	03-5718-2507	20 Aug-19 11:52	21 Aug-19 10:30	36h (7.6 °C)		
LC_SLC	09-9216-2322	20 Aug-19 08:51	21 Aug-19 10:30	39h (6.1 °C)		
FR_FRCP1	00-7572-6191	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
FR_FRABCH	19-1279-2277	20 Aug-19 09:46	21 Aug-19 10:30	38h (8.7 °C)		
GH_FR1	06-3623-5994	20 Aug-19 14:34	21 Aug-19 10:30	33h (7.9 °C)		
GH_ERC	02-1254-2591	20 Aug-19 13:12	21 Aug-19 10:30	35h (8.6 °C)		
CM_MC2	00-3605-9017	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG	19-9499-7428	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		
EV_MC2	17-5879-0798	20 Aug-19 10:55	21 Aug-19 10:30	37h (9.5 °C)		
EV_HC1	14-1612-5796	20 Aug-19 09:45	21 Aug-19 10:30	38h (8.4 °C)		
LC_LCDSSLCC	01-4637-7406	20 Aug-19 09:53	21 Aug-19 10:30	38h (7.6 °C)		
LC_LC3	17-1327-4969	20 Aug-19 09:30	21 Aug-19 10:30	38h (8.9 °C)		
LC_LC5	18-4311-0527	20 Aug-19 10:32	21 Aug-19 10:30	37h (9 °C)		
LC_DCDS	19-0653-0503	20 Aug-19 10:09	21 Aug-19 10:30	38h (9.4 °C)		
EDTA control	17-3711-2476	22 Aug-19	22 Aug-19	n/a		
FR_FRCP1 + EDTA	03-0598-0531	20 Aug-19 08:15	21 Aug-19 10:30	40h (9.2 °C)		
CM_MC2 + EDTA	12-3609-5608	20 Aug-19 11:17	21 Aug-19 10:30	37h (8.4 °C)		
RG_MIDAG + EDT	11-2463-6008	20 Aug-19 10:30	21 Aug-19 10:30	38h (8.4 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1	
GH_ER2	Water Sample	Teck Coal	GH_ER2	
CM_MC1	Water Sample	Teck Coal	CM_MC1	
LC_SLC	Water Sample	Teck Coal	LC_SLC	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH	
GH_FR1	Water Sample	Teck Coal	GH_FR1	
GH_ERC	Water Sample	Teck Coal	GH_ERC	
CM_MC2	Wastewater effluent	Teck Coal	CM_MC2	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG	
EV_MC2	Water Sample	Teck Coal	EV_MC2	
EV_HC1	Water Sample	Teck Coal	EV_HC1	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC	
LC_LC3	Water Sample	Teck Coal	LC_LC3	
LC_LC5	Water Sample	Teck Coal	LC_LC5	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS	
EDTA control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 17-5823-2455 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 01 Nov-19 12:35 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	42.41%
		GH_ER2 passed mean dry weight-mg	42.41%
		CM_MC1 passed mean dry weight-mg	42.41%
		FR_FRCP1 passed mean dry weight-mg	42.41%
		FR_FRABCH passed mean dry weight-mg	42.41%
		GH_FR1 passed mean dry weight-mg	42.41%
		GH_ERC passed mean dry weight-mg	42.41%
		CM_MC2 failed mean dry weight-mg	42.41%
		RG_MIDAG passed mean dry weight-mg	42.41%
		EV_MC2 passed mean dry weight-mg	42.41%
		EV_HC1 failed mean dry weight-mg	42.41%
		LC_LCDSSLCC failed mean dry weight-mg	42.41%
		LC_LC3 failed mean dry weight-mg	42.41%
		LC_LC5 passed mean dry weight-mg	42.41%
		LC_DCDS failed mean dry weight-mg	42.41%
		EDTA control passed mean dry weight-mg	42.41%
		FR_FRCP1 + EDTA passed mean dry weight-	42.41%
		CM_MC2 + EDTA passed mean dry weight-m	42.41%
		RG_MIDAG + EDTA passed mean dry weight-	42.41%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Reference Sed		FR_UFR1	1.79	1.86	0.147	8	CDF	0.0556	Non-Significant Effect
(LC-SLC)		GH_ER2	0.878	1.86	0.206	8	CDF	0.2028	Non-Significant Effect
		CM_MC1	0.04989	1.86	0.205	8	CDF	0.4807	Non-Significant Effect
		FR_FRCP1	1.748	1.86	0.168	8	CDF	0.0593	Non-Significant Effect
		FR_FRABCH	0.3275	1.86	0.15	8	CDF	0.3758	Non-Significant Effect
		GH_FR1	-0.1865	1.86	0.159	8	CDF	0.5717	Non-Significant Effect
		GH_ERC	0.9553	1.86	0.203	8	CDF	0.1837	Non-Significant Effect
		CM_MC2*	2.745	1.86	0.153	8	CDF	0.0126	Significant Effect
		RG_MIDAG	0.06186	1.86	0.246	8	CDF	0.4761	Non-Significant Effect
		EV_MC2	-2.376	1.86	0.122	8	CDF	0.9776	Non-Significant Effect
		EV_HC1*	1.988	1.86	0.179	8	CDF	0.0410	Significant Effect
		LC_LCDSSLCC*	3.295	1.86	0.151	8	CDF	0.0055	Significant Effect
		LC_LC3*	2.407	1.86	0.151	8	CDF	0.0214	Significant Effect
		LC_LC5	1.395	1.86	0.197	8	CDF	0.1002	Non-Significant Effect
		LC_DCDS*	2.503	1.86	0.149	8	CDF	0.0184	Significant Effect
		EDTA control	-1.122	1.86	0.190	8	CDF	0.8527	Non-Significant Effect
		FR_FRCP1 + EDTA	0.9637	1.86	0.203	8	CDF	0.1817	Non-Significant Effect
		CM_MC2 + EDTA	1.458	1.86	0.15	8	CDF	0.0915	Non-Significant Effect
		RG_MIDAG + EDTA	-0.6181	1.86	0.212	8	CDF	0.7231	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.29278	0.0680408	19	2.553	0.0019	Significant Effect
Error	2.13198	0.0266498	80			
Total	3.42476		99			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	15.7	36.19	0.6771	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9841	0.9654	0.2735	Normal Distribution

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 17-5823-2455 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 01 Nov-19 12:35 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		5	0.3572	0.2192	0.4952	0.3156	0.235	0.518	0.04971	31.12%	0.00%
GH_ER2		5	0.4014	0.145	0.6578	0.415	0.12	0.621	0.09234	51.44%	-12.37%
CM_MC1		5	0.4933	0.2394	0.7472	0.47	0.232	0.7013	0.09146	41.45%	-38.10%
LC_SLC	RS	5	0.4988	0.328	0.6697	0.521	0.293	0.634	0.06154	27.58%	-39.64%
FR_FRCP1		5	0.3414	0.1588	0.524	0.295	0.1725	0.536	0.06578	43.08%	4.43%
FR_FRABCH		5	0.4725	0.3288	0.6162	0.512	0.271	0.565	0.05176	24.50%	-32.27%
GH_FR1		5	0.5147	0.3506	0.6788	0.528	0.349	0.68	0.0591	25.68%	-44.10%
GH_ERC		5	0.3945	0.1442	0.6449	0.382	0.17	0.6455	0.09018	51.11%	-10.45%
CM_MC2		5	0.2733	0.122	0.4245	0.257	0.1443	0.4187	0.05447	44.57%	23.50%
RG_MIDAG		5	0.4906	0.1659	0.8154	0.579	0.1367	0.772	0.117	53.31%	-37.35%
EV_MC2		5	0.6542	0.5927	0.7157	0.673	0.583	0.701	0.02214	7.57%	-83.14%
EV_HC1		5	0.3074	0.1018	0.513	0.2333	0.148	0.566	0.07405	53.86%	13.94%
LC_LCDSSLCC		5	0.2319	0.08567	0.3781	0.232	0.07833	0.3614	0.05267	50.78%	35.08%
LC_LC3		5	0.304	0.1581	0.45	0.265	0.2114	0.498	0.05256	38.66%	14.89%
LC_LC5		5	0.3514	0.1128	0.5899	0.3344	0.1363	0.57	0.08591	54.67%	1.64%
LC_DCDS		5	0.2985	0.1563	0.4407	0.2563	0.2167	0.497	0.05122	38.37%	16.45%
EDTA control		5	0.6136	0.3866	0.8407	0.6622	0.3463	0.79	0.08179	29.80%	-71.78%
FR_FRCP1 + EDTA		5	0.3938	0.144	0.6435	0.345	0.1922	0.6625	0.08995	51.08%	-10.24%
CM_MC2 + EDTA		5	0.3812	0.2365	0.526	0.3488	0.259	0.568	0.05213	30.58%	-6.72%
RG_MIDAG + EDT		5	0.5691	0.3034	0.8348	0.6522	0.2	0.714	0.0957	37.60%	-59.33%

Mean Dry Weight-mg Detail

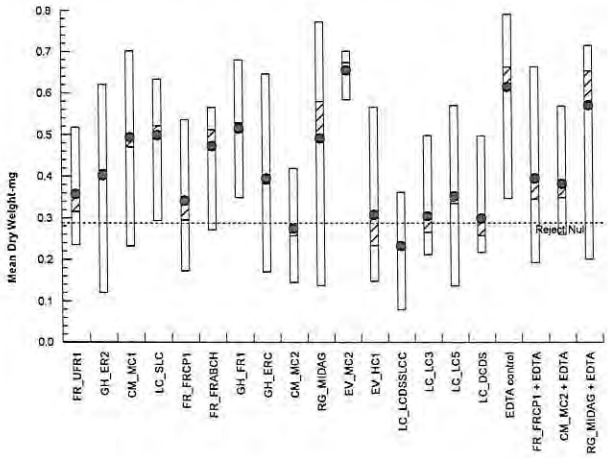
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.3	0.235	0.518	0.4175	0.3156
GH_ER2		0.12	0.415	0.621	0.281	0.57
CM_MC1		0.7013	0.6933	0.47	0.37	0.232
LC_SLC	RS	0.605	0.634	0.293	0.521	0.4411
FR_FRCP1		0.536	0.1725	0.295	0.2575	0.446
FR_FRABCH		0.512	0.5222	0.271	0.4922	0.565
GH_FR1		0.5945	0.528	0.349	0.4222	0.68
GH_ERC		0.2311	0.544	0.382	0.17	0.6455
CM_MC2		0.1443	0.4187	0.3762	0.257	0.17
RG_MIDAG		0.1367	0.772	0.579	0.3078	0.6578
EV_MC2		0.673	0.701	0.624	0.69	0.583
EV_HC1		0.148	0.371	0.2188	0.566	0.2333
LC_LCDSSLCC		0.07833	0.1578	0.3614	0.33	0.232
LC_LC3		0.22	0.2114	0.3257	0.498	0.265
LC_LC5		0.1363	0.5211	0.3344	0.195	0.57
LC_DCDS		0.2563	0.2167	0.497	0.2911	0.2312
EDTA control		0.6622	0.79	0.753	0.5167	0.3463
FR_FRCP1 + EDTA		0.537	0.6625	0.345	0.2322	0.1922
CM_MC2 + EDTA		0.259	0.3267	0.4037	0.568	0.3488
RG_MIDAG + EDT		0.714	0.6522	0.707	0.5725	0.2

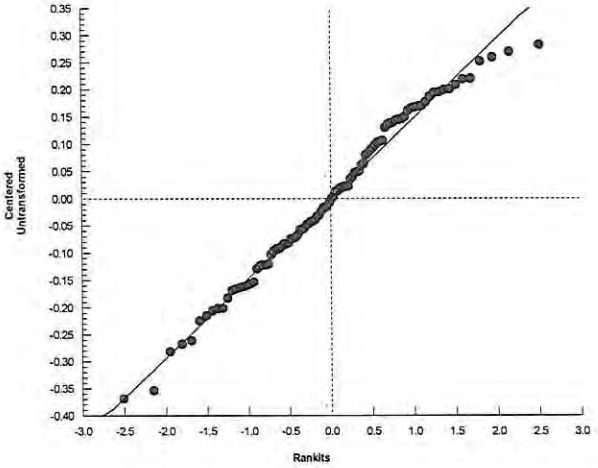
Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	17-5823-2455	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	01 Nov-19 12:35	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Analyst: EJ QA: NN-4/19

APPENDIX D – *Pimephales promelas* toxicity test data

32-d Fathead Minnow Survival and Growth Test

Client:	Teck	Test Date:	23-Aug-19
Work Order No.:	NA	Test Species:	*Pimephales promelas*

Sample Information:

Sample ID:	Various - see table below
Sample Date:	Tuesday, August 20, 2019
Date Received:	Wednesday, August 21, 2019
Sample Volume:	

Dilution Water:

Type:	Dechlorinated Tap Water (amended with 4 mg/L KCl)
Temperature (°C):	24°C
pH:	8.1
Dissolved Oxygen (mg/L):	7.3
Hardness (mg/L CaCO3):	162
Alkalinity (mg/L CaCO3):	132

Test Organism Information:

		Mortality prior to test initiation:	N/A
Batch No:	20190822FM	Swim bladder inflated at test initiation? (Y/N):	N/A
Source:	Aquatic Biosystems	Breeding stock mortality during the week	
Age:	<24 hours post fertilization	prior to test initiation (%):	N/A
Receipt temperature:	25.6°C	Breeding stock mortality on weekly basis:	N/A
Acclimation Rate:	N/A	Incidence of disease:	No

NaCl Reference Toxicant Results:

Reference Toxicant ID:	QA186
Stock Solution ID:	NA
Date Initiated:	August 26, 2019
7-d EC50 (95% CL):	6.5 (5.8 - 7.2) g/L NaCl
7-d IC50 (95% CL):	4.6 (4.1 - 5.0) g/L NaCl

Survival

Reference Toxicant Mean and Range: 6.6 (4.1 - 10.5) g/L NaCl (15.6 % CV)

Biomass

Reference Toxicant Mean and Range: 3.9 (2.5 - 6.1) g/L NaCl (14.7% CV)

Test Results:

Sample ID	32-d Survival (%) (Mean ± SD)		Length (mm) (Mean ± SD)	Biomass (mg) (Mean ± SD)	Hatch (%) (Mean ± SD)
Control	91.7 ± 6.4		10.4 ± 0.3	2.44 ± 0.10	100 ± 0
Control 15	98.3 ± 3.3		10.2 ± 0.2	2.25 ± 0.24	100 ± 0
Control 20	96.7 ± 3.8		10.2 ± 0.2	2.43 ± 0.16	100 ± 0
FR_FRCP1 †	61.7 ± 16.7 §, 1		11.1 ± 0.9	2.07 ± 0.19 §	100 ± 0
FR_FRABCH †	71.2 ± 23.8 §		10.9 ± 1.2	2.26 ± 0.18	98.3 ± 3.3
FR_UFR1 ‡	86.7 ± 12.2 *		10.3 ± 0.4	2.20 ± 0.08	100 ± 0
GH_FR1 †	83.3 ± 17.6 §		10.4 ± 0.5	2.31 ± 0.18	98.3 ± 3.3
GH_ERC †	78.3 ± 10.0 *		10.7 ± 0.4	2.37 ± 0.14	98.3 ± 3.3
GH_ER2 ‡	68.3 ± 30.5 *		10.6 ± 0.4	2.00 ± 0.52	98.3 ± 3.3

‡ = 15 ug/L Cu

† = 20 µg/L Cu

* Indicates results that were significantly lower relative to 15 ug/L copper-treated laboratory control

§ Indicates results that were significantly lower relative to 20 ug/L copper-treated lab control

[1] Indicates results that were significantly lower relative to 15 ug/L copper-treated site control FR_UFR1

[2] Indicates results that were significantly lower relative to 15 ug/L copper-treated site control CM_MC1

[3] Indicates results that were significantly lower relative to15 ug/L copper-treated site control GH_ER2

[4] Indicates results that were significantly lower relative to 15 ug/L copper-treated site control LC_SLC

Reviewed by: _____ Date reviewed: Jan. 28, 2020

32-d Fathead Minnow Survival and Growth Test

Test Results:

Sample ID	32-d Survival (%) (Mean ±	Length (mm) (Mean ± SD)	Biomass (mg) (Mean	Hatch (%)
Control	91.7 ± 6.4	10.4 ± 0.3	2.44 ± 0.10	100 ± 0
Control 15	98.3 ± 3.3	10.2 ± 0.2	2.25 ± 0.24	100 ± 0
Control 20	96.7 ± 3.8	10.2 ± 0.2	2.43 ± 0.16	100 ± 0
EV_HC1 †	80.0 ± 17.2 §	10.3 ± 0.2	2.06 ± 0.33 §	100 ± 0
EV_MC2 †	75.0 ± 23.3 §	10.6 ± 0.8	2.16 ± 0.32	98.3 ± 3.3
CM_MC2 †	26.7 ± 12.2 §, 1,2,3,4	13.0 ± 2.1	1.36 ± 0.11 §, 1, 2, 3, 4	98.3 ± 3.3
CM_MC1 ‡	75.0 ± 18.4 *	10.6 ± 0.6	2.16 ± 0.22	98.3 ± 3.3
LC_LCDSSLCC †	61.7 ± 11.4 §, 1	10.6 ± 0.6	1.79 ± 0.21 §, 1, 2, 4	100 ± 0
LC_SLC ‡	61.7 ± 22.0 *, 1	9.7 ± 0.5 2, 3	1.52 ± 0.61 *, 1, 2	100 ± 0
LC_LC3 †	91.7 ± 12.6	10.7 ± 0.3	2.32 ± 0.11	100 ± 0
LC_DCDS †	73.3 ± 18.9 §	10.0 ± 0.2 3	1.87 ± 0.33 §, 1	98.3 ± 3.3
LC_LC5 †	86.7 ± 9.4	9.9 ± 0.5 3	2.04 ± 0.13 §, 1	100 ± 0

‡ + 15 ug/L Cu
† + 20 µg/L Cu

* Indicates results that were significantly lower relative to 15 ug/L copper-treated laboratory control
§ Indicates results that were significantly lower relative to 20 ug/L copper-treated lab control
[1] Indicates results that were significantly lower relative to 15 ug/L copper-treated site control FR_UFR1
[2] Indicates results that were significantly lower relative to 15 ug/L copper-treated site control CM_MC1
[3] Indicates results that were significantly lower relative to15 ug/L copper-treated site control GH_ER2
[4] Indicates results that were significantly lower relative to 15 ug/L copper-treated site control LC_SLC

Reviewed by: _____ Date reviewed: Jan 28, 2020

Sample ID	Teck Site	Teck ID	Cu
1819-1849	Teck Q3 32-Day (FRO)	FR_FRCP1	20 ug/L
1819-1850	Teck Q3 32-Day (FRO)	FR_FRABCH	20 ug/L
1819-1851	Teck Q3 32-Day (FRO)	FR_UFR1	15 ug/L
1819-1852	Teck Q3 32-Day (GHO)	GH_FR1	20 ug/L
1819-1853	Teck Q3 32-Day (GHO)	GH_ERC	15 ug/L
1819-1854	Teck Q3 32-Day (GHO)	GH_ER2	15 ug/L
1819-1855	Teck Q3 32-Day (EVO)	EV_HC1	20 ug/L
1819-1856	Teck Q3 32-Day (EVO)	EV_MC2	20 ug/L
1819-1857	Teck Q3 32-Day (CMO)	CM_MC2	20 ug/L
1819-1858	Teck Q3 32-Day (CMO)	CM_MC1	15 ug/L
1819-1859	Teck Q3 32-Day (LCO)	LC_LCDSSLCC	20 ug/L
1819-1860	Teck Q3 32-Day (LCO)	LC_SLC	15 ug/L
1819-1861	Teck Q3 32-Day (LCO)	LC_LC3	20 ug/L
1819-1862	Teck Q3 32-Day (LCO)	LC_DCDS	20 ug/L
1819-1863	Teck Q3 32-Day (LCO)	LC_LC5	20 ug/L

15 ug/L + CTLS.

2019/08/

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Organism Information

Source: ABS Batch: 20190822FM-ELS Egg Stage: 13 somites Organisms Received in Good Condition: Yes or No

Test Log

Date	Day	Time	Technicians	Chem Cart Used	Fed AM	Fed PM	Sample Pre-Aeration Time	Bench Sheet Review First
2019/08/22	0	1440	ST/SS/CB/ML	2	–	–	60 min	–
2019/08/23	1	1215	KK	2	–	–	60min	MW
2019/08/24	2	1480	KK	2	–	–	60min	AW
2019/08/25	3	1155	CB	2	–	–	60mins	LC
2019/08/26	4	1135	CB	2	–	✓	60 mins	EP
2019/08/27	5	1200	CB	2	✓	✓	60 mins	EP
2019/08/28	6	1000	ST	2	✓	✓	60 mins	MF
2019/08/29	7	1120	CB	2	✓	✓	60 mins	MF
2019/08/30	8	1130	ST	2	✓	✓	60 mins	MF
2019/08/31	9	1105	KK	2	✓	✓	60mins	AW
2019/09/01	10	1225	CB	2	✓	✓ CB	60 mins	SC
2019/09/02	11	1110	CB	2	✓	✓	60 mins	SS
2019/09/03	12	1035	ST	2	✓	✓	60 mins	SC
2019/09/04	13	1025	CB	2	✓	✓	60 mins	EP
2019/09/05	14	1050	ST	2	✓	✓	60mins	EP
2019/09/06	15	1030	ST	2	✓	✓	60 mins	AW
2019/09/07	16	1110	KK	2	✓	✓	60 mins	MF
2019/09/08	17	1035	CB	2	✓	✓	60 mins	SC
2019/09/09	18	1145	ST	2	✓	✓	60 mins	SC
2019/09/10	19	1115	KK	2	✓	✓	60mins	MW
2019/09/11	20	1200	ST	2	✓	–	60 mins	MF
2019/09/12	21	1100	ST	2	✓	✓	60 mins	LF
2019/09/13	22	1220	KK	2	✓	✓	60mins	MF
2019/09/14	23	1160	KK	2	✓	✓	60mins	MF
2019/09/15	24	1155	ST	2	✓	✓	60mins	MW
2019/09/16	25	1145	KK	2	✓	✓	60mins	AW
2019/09/17	26	1055	ST	2	✓	–	60 mins	AW
2019/09/18	27	1480	KK	2	✓	✓	60mins	MF
2019/09/19	28	1130	KK	2	✓	✓	60mins	ST
2019/09/20	29	1145	KK	2	✓	✓	60mins	MF
2019/09/21	30	1317	CB	2	✓	✓	60 mins	MG
2019/09/22	31	1500	ST	2	✓	✓	60 mins	LF
2019/09/23	32	1110	ST	2	–	–	–	MW

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	CTL		CTL-15		CTL-20		1851		1853		1854		1858		1860	
	Day 1		Day 1		Day 1		Day 1		Day 1		Day 1		Day 1		Day 1	
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos
a	15	0	13	2	15	0	15	0	15	0	14	1	15	0	15	0
b	12	3	13	2	12	3	15	0	15	0	14	1	14	1	15	0
c	15	0	13	2	14	1	15	0	14	1	15	0	14	1	13	2
d	13	2	15	0	14	1	15	0	15	0	15	0	15	0	13	2
e	29	1	30	0	28	2	29	1	30	0	30	0	30	0	29	1
f	27	3	30	0	30	0	30	0	30	0	30	0	30	0	30	0

Comments/Observations:

Number of Alive Embryos and Hatched Organisms

	CTL			CTL-15			CTL-20			1851		
	Day 2			Day 2			Day 2			Day 2		
replicate	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15
a	13	2	15	13	0	15	15	0	15	13	2	15
b	14	0	15	13	0	15	12	0	15	14	1	15
c	13	0	15	11	2	15	13	1	15	14	1	15
d	11	2	15	13	2	15	13	2	15	14	1	15
e	29	0		30	0		28	2		29	0	
f	27	0		30	0		30	0		30	0	

	1853			1854			1858			1860		
	Day 2			Day 2			Day 2			Day 2		
replicate	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15
a	13	2	15	10	4	15	15	0	15	14	1	15
b	12	3	15	13	2	15	14	0	15	14	1	15
c	10	4	15	15	0	15	14	0	15	13	2	15
d	15	0	15	13	2	15	13	2	15	13	0	15
e	30	0		30	0		30	0		29	0	
f	30	0		30	0		30	0		30	0	

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

CTL — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	14	0	14	0
b	8	0	8	0
c	12	0	3	0
d	6	0	9	0

CTL-15 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	10	0	5	0
b	9	0	6	0
c	9	0	6	0
d	6	0	9	0

CTL-20 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	6	0	9	0
b	6	0	9	0
c	6	0	9	0
d	5	0	10	0

1851 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	11	0	4	0
b	12	0	3	0
c	11	0	4	0
d	14	0	1	0

1853 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	4	0	11	0
b	8	0	7	0
c	9	0	6	0
d	2	0	13	0

1854 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	12	0	3	0
b	8	0	7	0
c	11	0	4	0
d	8	0	7	0

1858 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	11	0	4	0
b	12	0	3	0
c	12	0	3	0
d	9	1	5	0

1860 — Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	11	0	4	0
b	10	0	5	0
c	7	0	8	0
d	7	0	8	0

CTL — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	1	0	14	0
d	0	0	15	0

CTL-15 — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	1	0	14	0
c	0	0	15	0
d	1	0	14	0

CTL-20 — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	2	0	13	0
b	1	0	14	0
c	0	0	15	0
d	0	0	15	0

1851 — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	1	0	14	0
d	1	0	14	0

1853 — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	1	1	13	0
c	3	0	11	1
d	0	0	15	0

1854 — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	3	0	12	0
b	0	0	15	0
c	2	0	13	0
d	2	0	12	0

1858 — Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	1	0	14	0
b	0	0	15	0
c	0	0	15	0
d	0	0	14	0

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

1860

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	2	0	13	0

11

CTL

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

CTL-15

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

CTL-20

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

1851

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	14	1

1853

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	14	0
c	0	0	13	1
d	0	0	15	0

1854

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	1	12	2
d	0	0	15(1)	0

1858

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15(1)	0
c	0	0	15(1)	0
d	0	0	14	0

1860

Day 5

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15(1)	0
d	0	0	15	0

Reviewed By: JO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client Tec164

Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

CTL

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

CTL-15

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

CTL-20

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

1851

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	14	~~0~~ 1 LO
c	0	0	15	0
d	0	0	14	0

1853

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	14	0
c	0	0	13	0
d	0	0	15	0

1854

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	12	0
d	0	0	15(1)	0

1858

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	14	~~0~~ 1 LO
d	0	0	14	0

1860

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15(1)	0
b	0	0	15	0
c	0	0	15(1)	0
d	0	0	15(1)	0

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Number of Alive Embryos and Hatched Organisms

replicate	CTL Day 7 Alive Hatched	CTL-15 Day 7 Alive Hatched	CTL-20 Day 7 Alive Hatched	1851 Day 7 Alive Hatched	1853 Day 7 Alive Hatched	1854 Day 7 Alive Hatched	1858 Day 7 Alive Hatched	1860 Day 7 Alive Hatched
a	15(1)	15	15	15	15	15	15	15
b	15	15	15(1)	14	14	15(1)	15	15
c	15	15	15	15	13	12	14	15
d	15	15	15	14	15	15(1)	14	15

Comments/Observations:

replicate	CTL Day 8 Alive Hatched	CTL-15 Day 8 Alive Hatched	CTL-20 Day 8 Alive Hatched	1851 Day 8 Alive Hatched	1853 Day 8 Alive Hatched	1854 Day 8 Alive Hatched	1858 Day 8 Alive Hatched	1860 Day 8 Alive Hatched
a	14	15	15	15	15	15	15	15
b	15	15	15(1)	14	14	15(2)	15	15
c	15	15	15	15	13	12	14	15
d	15	15	15	14	15	15	14	15

Comments/Observations:

replicate	CTL Day 9 Alive Hatched	CTL-15 Day 9 Alive Hatched	CTL-20 Day 9 Alive Hatched	1851 Day 9 Alive Hatched	1853 Day 9 Alive Hatched	1854 Day 9 Alive Hatched	1858 Day 9 Alive Hatched	1860 Day 9 Alive Hatched
a	14	15	15	15	15	15	15	15
b	15	15	15(1)	14	14	15(2)	15	15
c	15(1)	15	15(1)	15	13	12	14	15(1)
d	15	15	15	14	15	15	14	15(1)

Comments/Observations:

replicate	CTL Day 10 Alive Hatched	CTL-15 Day 10 Alive Hatched	CTL-20 Day 10 Alive Hatched	1851 Day 10 Alive Hatched	1853 Day 10 Alive Hatched	1854 Day 10 Alive Hatched	1858 Day 10 Alive Hatched	1860 Day 10 Alive Hatched
a	14	15	15	15	15	15	15	15
b	15	15	15	14	14	15(1)	15	15
c	15(1)	15	15	15	13	12	14	15
d	15	15	15	14	15	15	14	15

Comments/Observations:

Reviewed By: ND Date Reviewed: 2019/10/18

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Number of Alive Embryos and Hatched Organisms

replicate	CTL Day 11 Alive Hatched	CTL-15 Day 11 Alive Hatched	CTL-20 Day 11 Alive Hatched	1851 Day 11 Alive Hatched	1853 Day 11 Alive Hatched	1854 Day 11 Alive Hatched	1858 Day 11 Alive Hatched	1860 Day 11 Alive Hatched
a	14	15	15	15	15	15	15	15
b	15	15	15	13*	14	13	15	15
c	15	15	15	15	13	12	14	15
d	15	15	15	14	15	15	14	15

Comments/Observations: * Microbial growth

replicate	CTL Day 12 Alive Hatched	CTL-15 Day 12 Alive Hatched	CTL-20 Day 12 Alive Hatched	1851 Day 12 Alive Hatched	1853 Day 12 Alive Hatched	1854 Day 12 Alive Hatched	1858 Day 12 Alive Hatched	1860 Day 12 Alive Hatched
a	14	15	15	15	15	15	15	15
b	15	15	15	13	14	15(1)	15	15
c	14	15	15(1)	15	13	12	14	15
d	15	15	15	14	15(1)	15(1)	14	15

Comments/Observations:

replicate	CTL Day 13 Alive Hatched	CTL-15 Day 13 Alive Hatched	CTL-20 Day 13 Alive Hatched	1851 Day 13 Alive Hatched	1853 Day 13 Alive Hatched	1854 Day 13 Alive Hatched	1858 Day 13 Alive Hatched	1860 Day 13 Alive Hatched
a	14	15	15	15	15	15	15	15
b	15	15	15	13	14	15(1)	15	15
c	13 14	15	13(1)	15	13	12	14	15
d	15	15	15	14	15	15	14	15

Comments/Observations:

replicate	CTL Day 14 Alive Hatched	CTL-15 Day 14 Alive Hatched	CTL-20 Day 14 Alive Hatched	1851 Day 14 Alive Hatched	1853 Day 14 Alive Hatched	1854 Day 14 Alive Hatched	1858 Day 14 Alive Hatched	1860 Day 14 Alive Hatched
a	14	15	15	15	15	15	15	15
b	15	15	15	12	14	15(2)	15	15
c	14	15	14	15	13	12	14	15
d	15	15(1)	15	14	15	15	14	15

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Number of Alive Embryos and Hatched Organisms

replicate	CTL Day 15 Alive Hatched	CTL-15 Day 15 Alive Hatched	CTL-20 Day 15 Alive Hatched	1851 Day 15 Alive Hatched	1853 Day 15 Alive Hatched	1854 Day 15 Alive Hatched	1858 Day 15 Alive Hatched	1860 Day 15 Alive Hatched
a	14	15	15	15	15	15	15	15
b	14	15	15	12	14	15(2)	13	15
c	14	15	14	15	13	12	14	15
d	15	15(1)	15	14	15	15	14	15

Comments/Observations:

replicate	CTL Day 16 Alive Hatched	CTL-15 Day 16 Alive Hatched	CTL-20 Day 16 Alive Hatched	1851 Day 16 Alive Hatched	1853 Day 16 Alive Hatched	1854 Day 16 Alive Hatched	1858 Day 16 Alive Hatched	1860 Day 16 Alive Hatched
a	14	15	15	15	15	15	15	15
b	14	15	15	12	14	15(1)	15	15
c	14	15	14	15	13	12	14	15(2)
d	15	15	15	14	15(1)	15	14	15

Comments/Observations:

replicate	CTL Day 17 Alive Hatched	CTL-15 Day 17 Alive Hatched	CTL-20 Day 17 Alive Hatched	1851 Day 17 Alive Hatched	1853 Day 17 Alive Hatched	1854 Day 17 Alive Hatched	1858 Day 17 Alive Hatched	1860 Day 17 Alive Hatched
a	14	15	15	15	15	10	14	15
b	14	15	15	12	14	14	15	15
c	14	15	14	15	13	12	14	15(2)
d	15	15	15	14	15(1)	15	14	15

Comments/Observations:

replicate	CTL Day 18 Alive Hatched	CTL-15 Day 18 Alive Hatched	CTL-20 Day 18 Alive Hatched	1851 Day 18 Alive Hatched	1853 Day 18 Alive Hatched	1854 Day 18 Alive Hatched	1858 Day 18 Alive Hatched	1860 Day 18 Alive Hatched
a	14	15	15	15	15(2)	9	11	15
b	13	15	15	12	14	14(1)	15	15
c	14	15	14	15	13	12	14	15(2)
d	15	15	15	14	15(1)	15	13/14 ST	15

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/Mar/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Number of Alive Embryos and Hatched Organisms

replicate	CTL Day 19 Alive Hatched	CTL-15 Day 19 Alive Hatched	CTL-20 Day 19 Alive Hatched	1851 Day 19 Alive Hatched	1853 Day 19 Alive Hatched	1854 Day 19 Alive Hatched	1858 Day 19 Alive Hatched	1860 Day 19 Alive Hatched
a	14	15	15	15	15	9	10	15
b	13	15	15	12	14	14	15	15
c	14	15	14	15	13	12	14	15 st 14
d	15	15	15	15	15(2)	15	14	15

Comments/Observations:

replicate	CTL Day 20 Alive Hatched	CTL-15 Day 20 Alive Hatched	CTL-20 Day 20 Alive Hatched	1851 Day 20 Alive Hatched	1853 Day 20 Alive Hatched	1854 Day 20 Alive Hatched	1858 Day 20 Alive Hatched	1860 Day 20 Alive Hatched
a	14	15	15	15	15	9	10	15
b	13	15	15	12	14	14(1)	15	15
c	14	15	14	15	13	12	14	13
d	15	15	15	14	14(1)	15(1)	14	15

Comments/Observations:

replicate	CTL Day 21 Alive Hatched	CTL-15 Day 21 Alive Hatched	CTL-20 Day 21 Alive Hatched	1851 Day 21 Alive Hatched	1853 Day 21 Alive Hatched	1854 Day 21 Alive Hatched	1858 Day 21 Alive Hatched	1860 Day 21 Alive Hatched
a	14	15 st	15	15	15	9	10	15
b	13	15st	14	12	14	14(1)	15	15
c	14	15(1)	14	15	13	12	14	13
d	15	15	15	14	14(1)	15(1)	14	15

Comments/Observations:

replicate	CTL Day 22 Alive Hatched	CTL-15 Day 22 Alive Hatched	CTL-20 Day 22 Alive Hatched	1851 Day 22 Alive Hatched	1853 Day 22 Alive Hatched	1854 Day 22 Alive Hatched	1858 Day 22 Alive Hatched	1860 Day 22 Alive Hatched
a	14	15	15	15	15	9	10	15
b	13	15	14	12	14	13	15	14
c	14	14	14	15	13	12	11	12
d	15	15	15	14	12	15(1)	14	15

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Number of Alive Embryos and Hatched Organisms

replicate	CTL Day 23 Alive Hatched	CTL-15 Day 23 Alive Hatched	CTL-20 Day 23 Alive Hatched	1851 Day 23 Alive Hatched	1853 Day 23 Alive Hatched	1854 Day 23 Alive Hatched	1858 Day 23 Alive Hatched	1860 Day 23 Alive Hatched
a	14	15	15	15	15	6	10	15
b	13	15	14	12	14	13	15	13
c	14	14	14	15	13	12	10	12
d	15	15	15	14	12	15(1)	14	14

Comments/Observations:

replicate	CTL Day 24 Alive Hatched	CTL-15 Day 24 Alive Hatched	CTL-20 Day 24 Alive Hatched	1851 Day 24 Alive Hatched	1853 Day 24 Alive Hatched	1854 Day 24 Alive Hatched	1858 Day 24 Alive Hatched	1860 Day 24 Alive Hatched
a	13	15	15	15	15	6	10	15
b	13	15	14	12	14	13	15	11
c	14	14	14	15	13	12(1)	9	12
d	15	15	15	14	12(1)	15(1)	14	14

Comments/Observations:

replicate	CTL Day 25 Alive Hatched	CTL-15 Day 25 Alive Hatched	CTL-20 Day 25 Alive Hatched	1851 Day 25 Alive Hatched	1853 Day 25 Alive Hatched	1854 Day 25 Alive Hatched	1858 Day 25 Alive Hatched	1860 Day 25 Alive Hatched
a	13	15	15	15	14	6	10	15
b	13	15	14	12	13	13	15	11
c	14	14	14	15	13	12(1)	8	12
d	15	15	15	B14**	12	15(1)	14	14(1)

Comments/Observations:

replicate	CTL Day 26 Alive Hatched	CTL-15 Day 26 Alive Hatched	CTL-20 Day 26 Alive Hatched	1851 Day 26 Alive Hatched	1853 Day 26 Alive Hatched	1854 Day 26 Alive Hatched	1858 Day 26 Alive Hatched	1860 Day 26 Alive Hatched
a	13	15	15	15	14	6	10	14
b	13	15	14	11	13	13	15	11
c	14	14	14	15	13	12(1)	8	12
d	15	15	15	13	12	15(1)	14	14

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Number of Alive Embryos and Hatched Organisms

replicate	CTL Day 27 Alive Hatched	CTL-15 Day 27 Alive Hatched	CTL-20 Day 27 Alive Hatched	1851 Day 27 Alive Hatched	1853 Day 27 Alive Hatched	1854 Day 27 Alive Hatched	1858 Day 27 Alive Hatched	1860 Day 27 Alive Hatched
a	13	15	15	15	12(1)	6	10	13
b	13	15	14	11	13	13	15	13
c	14	14	14	15	13	12	8	12
d	15	15	15	13	12	15	14	14

Comments/Observations:

replicate	CTL Day 28 Alive Hatched	CTL-15 Day 28 Alive Hatched	CTL-20 Day 28 Alive Hatched	1851 Day 28 Alive Hatched	1853 Day 28 Alive Hatched	1854 Day 28 Alive Hatched	1858 Day 28 Alive Hatched	1860 Day 28 Alive Hatched
a	13	15	15	15	12(1)	4	10	11
b	13	15	14	11	13	13	14	10
c	14	14	14	15	13	12	8	9(1)
d	15	15	15	13	12	15(1)	14	14

Comments/Observations:

replicate	CTL Day 29 Alive Hatched	CTL-15 Day 29 Alive Hatched	CTL-20 Day 29 Alive Hatched	1851 Day 29 Alive Hatched	1853 Day 29 Alive Hatched	1854 Day 29 Alive Hatched	1858 Day 29 Alive Hatched	1860 Day 29 Alive Hatched
a	13	15	15	15	12(1)	4	10	11
b	13	15	14	11	13	13	13	9
c	14	14	14	15	13	11	8	9
d	15	15	15	13	12(1)	15(1)	14	14

Comments/Observations:

replicate	CTL Day 30 Alive Hatched	CTL-15 Day 30 Alive Hatched	CTL-20 Day 30 Alive Hatched	1851 Day 30 Alive Hatched	1853 Day 30 Alive Hatched	1854 Day 30 Alive Hatched	1858 Day 30 Alive Hatched	1860 Day 30 Alive Hatched
a	13	15	15	15	11	4	10	10
b	13	15	14	11	13	13	13	8
c	14	14	14	15	13	11	8	9
d	15	15	15	13	12	15	14	14

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/07

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Number of Alive Embryos and Hatched Organisms

replicate	CTL Day 31 Alive Hatched	CTL-15 Day 31 Alive Hatched	CTL-20 Day 31 Alive Hatched	1851 Day 31 Alive Hatched	1853 Day 31 Alive Hatched	1854 Day 31 Alive Hatched	1858 Day 31 Alive Hatched	1860 Day 31 Alive Hatched
a	13	15	15	15	10	4	10	10
b	13	15	14	11	13	11	13	7
c	14	14	14	15	13	11	8	9
d	15	13	15	13	12	15	14	13

Comments/Observations:

replicate	CTL Day 32 Alive Hatched	CTL-15 Day 32 Alive Hatched	CTL-20 Day 32 Alive Hatched	1851 Day 32 Alive Hatched	1853 Day 32 Alive Hatched	1854 Day 32 Alive Hatched	1858 Day 32 Alive Hatched	1860 Day 32 Alive Hatched
a	13	15	15	14	10	4	10	10
b	13	15	14	11	13	11	13	5
c	14	14	14	15	13	11	8	9
d	15	15	15	12	11	15	14	13

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/23

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

New Solutions

pH (units)

Conc. (%) / Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
0	7.7	8.0	8.1	8.1	8.1	8.1	8.1	8.1
1	8.1	8.1	8.1	7.9	7.9	7.9	7.9	7.7
2	8.1	8.1	8.1	8.0	8.1	7.9	8.2	8.2
3	8.1	8.3	8.1	8.1	8.1	8.0	8.3	8.2
4	8.1	8.1	8.1	8.0	8.1	8.1	8.2	8.2
5	8.1	8.1	8.1	8.2	8.2	8.1	8.2	8.2
6	8.2	8.3	8.2	8.1	8.1	8.2	8.2	8.2
7	8.1	8.3	8.3	8.3	8.1	8.1	8.2	8.2
8	8.2	8.2	8.3	8.3	8.3	8.2	8.3	8.3

Conductance (µS/cm)

Conc. (%) / Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
0	355	380	381	308	302	276	279	321
1	361	380	385	350	310	284	290	337
2	370	379	377	355	320	294	313	357
3	316	393	378	316	322	299	321	365
4	312	393	341	324	338	297	331	369
5	340	336	388	339	348	298	338	361
6	377	398	402	327	318	288	308	341
7	371	390	398	369	360	304	345	388
8	393	411	414	331	315	293	297	365

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Conc. (%) / Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
0	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
1	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
2	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
4	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
5	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
6	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
7	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
8	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3

Temperature (°C)

Conc. (%) / Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
0	24	24	24	24	24	24	24	24
1	24	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24	24
4	24	24	24	24	24	24	24	24
5	24	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24	24
7	24	24	24	24	24	24	24	24
8	24	24	24	24	24	24	24	24

Old Solutions

pH (units)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
0								
1	8.2	8.2	8.2	8.3	8.2	8.2	8.2	8.2
2	8.2	8.2	8.3	8.3	8.3	8.2	8.2	8.2
3	8.3	8.3	8.3	8.3	8.3	8.3	8.2	8.2
4	8.3	8.3	8.3	8.3	8.3	8.2	8.2	8.3
5	7.7	7.8	8.1	8.2	8.3	8.2	8.2	8.3
6	7.8	7.9	8.0	8.1	8.1	8.1	8.1	8.1
7	7.9	8.0	8.1	8.1	8.2	8.2	8.1	8.1
8	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2

Conductance (µS/cm)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
0								
1	360	380	390	344	321	286	299	358
2	360	387	391	348	325	297	295	337
3	308	393	392	330	316	299	301	340
4	353	364	381	315	301	278	282	316
5	378	374	413	333	320	302	301	346
6	385	406	409	209	331	311	315	354
7	362	407	414	358	338	310	317	357
8	360	405	410	352	337	315	317	365

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
0								
1	7.3	7.3	7.3	7.3	7.2	7.3	7.3	7.3
2	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
3	7.0	7.0	7.0	7.2	7.3	7.2	7.3	7.0
4	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
5	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
6	7.2	7.1	7.2	7.2	7.2	7.2	7.2	7.2
7	7.1	7.0	6.8	6.9	7.0	6.9	6.9	6.9
8	7.2	7.0	7.0	7.1	7.2	7.2	7.2	7.1

Temperature (°C)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
0								
1	24	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24	24
4	24	24	24	24	24	24	24	24
5	24	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24	24
7	24	24	24	24	24	24	24	24
8	24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: KD Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

New Solutions

pH (units)

Conc. (%) / Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
9	8.1	8.1	8.1	8.4	8.4	8.4	8.4	8.3
10	8.1	8.1	8.1	8.3	8.2	8.3	8.3	8.3
11	8.0	7.9	8.3	8.3	8.3	8.3	8.4	8.3
12	8.2	8.2	8.2	8.2	8.2	8.1	8.3	8.2
13	8.2	8.2	8.1	8.0	8.3	8.2	8.3	8.3
14	7.8	8.0	8.1	8.2	8.3	8.3	8.3	8.3
15	8.2	8.2	8.2	8.3	8.3	8.3	8.3	8.3
16	8.1	8.1	8.1	8.4	8.4	8.3	8.4	8.4
17	8.1	8.1	8.1	8.3	8.3	8.3	8.4	8.3

Conductance (µS/cm)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
9	379	398	401	347	334	301	335	390
10	381	391	403	369	352	309	370	390
11	380	364	383	382	361	314	363	394
12	330	327	347	330	308	272	301	353
13	343	389	399	240	354	303	335	377
14	375	355	361	339	307	277	302	366
15	332	343	351	323	296	253	289	332
16	340	351	355	340	321	281	309	355
17	346	360	371	369	332	290	331	378

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
9	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
10	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
11	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
12	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
13	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
14	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
15	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
16	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
17	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3

Temperature (°C)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
9	24	24	24	24	24	24	24	24
10	24	24	24	24	24	24	24	24
11	24	24	24	24	24	24	24	24
12	24	24	24	24	24	24	24	24
13	24	24	24	24	24	24	24	24
14	24	24	24	24	24	24	24	24
15	24	24	24	24	24	24	24	24
16	24	24	24	24	24	24	24	24
17	24	24	24	24	24	24	24	24

Old Solutions

pH (units)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
9	8.1	8.2	8.2	8.2	8.2	8.2	8.2	8.2
10	7.7	7.8	7.9	8.0	8.0	8.0	8.0	8.0
11	8.0	8.0	8.1	8.2	8.2	8.2	8.2	8.2
12	7.9	7.9	7.9	8.0	8.1	8.0	8.0	8.0
13	8.1	8.0	8.0	8.1	8.1	8.1	8.1	8.1
14	8.0	8.0	8.0	8.1	8.0	8.1	8.1	8.1
15	7.8	7.8	7.8	7.9	8.0	8.0	8.0	8.0
16	7.9	8.0	8.0	8.1	8.1	8.1	8.1	8.0
17	8.1	8.0	8.0	8.1	8.2	8.1	8.2	8.2

Conductance (µS/cm)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
9	397	415	427	353	340	314	317	369
10	349	427	426	357	341	318	319	372
11	344	409	430	355	333	313	315	368
12	349	398	408	357	341	318	320	368
13	378	384	383	339	347	305	303	303
14	348	369	378	327	326	309	306	354
15	328	349	361	334	311	289	294	349
16	300	358	361	334	315	289	297	349
17	369	368	369	337	316	286	296	351

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
9	6.8	6.7	6.8	7.0	7.1	6.8	7.1	6.7
10	6.6	6.6	6.4	6.4	6.5	6.8	6.6	6.6
11	6.7	6.9	6.5	6.3	6.9	7.0	7.0	7.0
12	6.8	6.7	6.1	6.5	6.2	6.3	6.5	6.4
13	7.0	6.7	6.7	6.8	6.8	6.7	6.8	6.8
14	6.4	6.3	6.0	6.2	6.5	6.3	6.3	6.2
15	6.8	6.8	6.6	6.7	6.7	6.7	6.7	6.4
16	6.6	6.2	6.1	6.8	6.7	6.5	6.6	6.4
17	6.6	6.4	6.4	6.6	6.6	6.6	6.5	6.4

Temperature (°C)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
9	24	24	24	24	24	24	24	24
10	24	24	24	24	24	24	24	24
11	24	24	24	24	24	24	24	24
12	24	24	24	24	24	24	24	24
13	24	24	24	24	24	24	24	24
14	24	24	24	24	24	24	24	24
15	24	24	24	24	24	24	24	24
16	24	24	24	24	24	24	24	24
17	24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: W Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

New Solutions

Conc. (%) / Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860

pH (units)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
18								
19								
20								
21								
22								
23								
24								
25								
26								

Conductance (µS/cm)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
18								
19								
20								
21								
22								
23								
24								
25								
26								

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
18								
19								
20								
21								
22								
23								
24								
25								
26								

Temperature (°C)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
18								
19								
20								
21								
22								
23								
24								
25								
26								

Old Solutions

	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860

pH (units)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
18								
19								
20								
21								
22								
23								
24								
25								
26								

Conductance (µS/cm)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
18								
19								
20								
21								
22								
23								
24								
25								
26								

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
18								
19								
20								
21								
22								
23								
24								
25								
26								

Temperature (°C)

Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
18								
19								
20								
21								
22								
23								
24								
25								
26								

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: [illegible] Date Reviewed: 2019/10/08

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

New Solutions

Conc. (%) / Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
pH (units)								
27	8.2	8.2	8.2	8.3	8.2	8.2	8.3	8.3
28	8.1	8.1	8.1	8.4	8.3	8.3	8.3	8.3
29	8.4	8.4	8.1	8.3	8.3	8.2	8.3	8.3
30	8.4	8.4	8.2	8.4	8.3	8.2	8.3	8.3
31	8.2	8.3	8.3	8.4	8.3	8.2	8.3	8.2
32								
Conductance (µS/cm)								
27	361	361	347	358	327	279	312	349
28	340	370	331	361	357	287	336	360
29	371	361	360	355	351	285	336	350
30	368	377	390	351	347	290	338	347
31	357	341	343	341	316	277	302	361
32								
Dissolved Oxygen (mg/L) (**40-100% saturation**)								
27	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
28	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
29	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
30	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
31	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
32								
Temperature (°C)								
27	24	24	24	24	24	24	24	24
28	24	24	24	24	24	24	24	24
29	24	24	24	24	24	24	24	24
30	24	24	24	24	24	24	24	24
31	24	24	24	24	24	24	24	24
32								

Old Solutions

Conc. (%) / Day	CTL	CTL-15	CTL-20	1851	1853	1854	1858	1860
pH (units)								
27	7.8	7.8	7.7	7.8	7.8	7.8	7.8	7.8
28	7.9	7.8	7.8	7.9	8.0	7.9	7.9	8.0
29	7.8	7.8	7.8	7.8	8.0	8.0	8.0	8.0
30	7.8	7.7	7.6	7.8	7.9	7.9	8.0	7.9
31	7.9	7.7	7.7	7.8	7.9	7.9	7.8	7.9
32	7.8	7.8	7.7	7.7	7.9	7.9	8.0	7.9
Conductance (µS/cm)								
27	372	350	358	342	316	290	288	337
28	372	354	359	339	315	286	289	331
29	371	361	357	339	320	292	279	341
30	396	362	357	339	320	294	292	340
31	379	361	362	340	323	298	294	334
32	370	365	357	339	322	296	293	339
Dissolved Oxygen (mg/L) (**40-100% saturation**)								
27	5.3	5.1	5.1	5.0	5.2	5.2	5.3	5.3
28	5.3	5.4	5.0	5.0	5.0	5.2	5.0	5.2
29	5.3	5.5	5.0	5.0	6.1	6.1	6.1	5.9
30	4.8	4.5	4.2	4.5	4.9	5.2	4.8	4.6
31	5.4	5.3	5.4	5.1	5.3	5.3	5.5	5.6
32	6.1	6.1	6.1	5.6	5.8	6.3	6.2	6.1
Temperature (°C)								
27	24	24	24	24	24	24	24	24
28	24	24	24	24	24	24	24	24
29	24	24	24	24	24	24	24	24
30	25	25	25	25	25	25	25	25
31	24	24	24	24	24	24	24	24
32	24	24	24	24	24	24	24	24

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: LO Date Reviewed: 2015/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc.

CTL

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	8	N	9	N	8	N	12	N
2	10		9		12		8	
3	8		13		11		9	
4	11		10		10		9	
5	12		10		11		12	
6	13		11		14		11	
7	10		12		9		10	A-S
8	10		12		10		9	N
9	11		11		11		11	
10	12		9		10		8	
11	12		10		18		9	
12	10		11		10		10	
13	10		10		11		10	
14	–	–	–	–	10		10	
15	~	–	~	–	~	–	9	

Comments: ave 10.58 | 10.54 | 10.5 | 9.87

CTL-15

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	10	N	8	N	9	N	10	N
2	10		8		9		10	
3	10		10		10		9	
4	12		9		9		12	
5	10		10		10		10	
6	8		12		11		10	
7	10		10		12		9	
8	10		11		11		11	
9	10		10		11		10	
10	10		10		9		10	
11	10		11	A-S	10		11	
12	10		10	N	10		10	
13	11		9		13		9	
14	12		9		12		12	
15	12		12		–	–	9	

Comments: ave 10.33 | 9.93 | 10.43 | 10.13

Reviewed By: W Date Reviewed: 2019/10/30

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **CTL-20**

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	9	N	11	N	11	N	13	N
2	9		9		11		12	
3	11		10		9		12	
4	11		9		8		9	
5	13		9		8		9	
6	9		10		10		8	
7	10		11		10		11	
8	9		13		9		12	
9	10		10		10		9	
10	10		11		10		11	
11	11		8		13		12	
12	11		8		10		7	
13	11		9		11		9	
14	10		11		11		10	
15	12		–		–		11	

Comments Ave 10.4 | 9.93 | 10.14 | 10.33

1851

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	8	N	9	N	10	N	10	N
2	12		9		10		10	
3	7		8		10		12	
4	12		10		10		11	
5	11		9		9		13	
6	8		12		9		10	
7	12		12		9		10	
8	10		11		11		10	
9	10		11		10		11	
10	10		12		10		10	
11	10		11		10		11	
12	10		–		10		12	
13	9		–		9		–	
14	11		–		12		–	
15	–		–		10		–	

Comments Ave: 10.0 | 10.3 | 9.93 | 10.83

Reviewed By: LO Date Reviewed: Aug/10/30

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **1853**

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	9	N	9	N	11	N	12	N
2	9		9		10		10	
3	10		12		9		11	
4	12		11		8		12	
5	13		9		13		11	
6	11		10		12		12	
7	11		10		14		12	
8	11		11		11		10	
9	12		8		13		8	
10	11		8		9		12	
11	Hst	-	11		10		12	
12	-	-	12		8		-	-
13	-	-	11	-	11	-	-	-
14	-	-	-	-	-	-	-	-
15	-	-	-	-	-	-	-	-

Comments: ave. 10.9 | 10.08 | 10.69 | 11.09

1854

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	11	N	11	N	12	N	13	N
2	10		12		10		12	
3	10		11		11		7	
4	13		12		10		7	
5	-	-	10		12		11	
6	-	-	11		11		12	
7	-	-	10		11		12	
8	-	-	11		11		12	
9	-	-	10		8		10	
10	-	-	9		12		10	
11	-	-	9		10		8	
12	-	-	-	-	-	-	8	
13	-	-	-	-	-	-	9	
14	-	-	-	-	-	-	10	
15	-	-	-	-	-	-	10	

Comments: ave 11.0 | 10.55 | 10.73 | 10.07

Reviewed By: VO Date Reviewed: 2019/10/30

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: CTL, CTL-15, CTL-20, 1819-1851, 1819-1853, 1819-1854, 1858, 1819-1860

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **1858**

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	12	N	9	N	14	N	12	N
2	11		10		9		13	
3	9		11		12		13	
4	9		9		13		11	
5	9		11		10		9	
6	10		10		12		10	
7	11		10		10		10	
8	10		8		11		13	
9	12		12		–		11	
10	13		10		–		8	
11	–		10		–		10	
12	–		10		–		10	
13	–		8		–		12	
14	–		–		–		6	
15	–		–		–		–	

Comments ave 10.6 | 9.85 | 11.4 | 10.5

Conc. **1860**

Fish	Rep A Length (mm)	Rep A Normal/ Abnormal	Rep B Length (mm)	Rep B Normal/ Abnormal	Rep C Length (mm)	Rep C Normal/ Abnormal	Rep D Length (mm)	Rep D Normal/ Abnormal
1	7	N	8	N	8	N	9	N
2	8		9		8		8	
3	9		9		11		8	
4	9		18		12		12	
5	10		18		14		13	
6	12		–		9		11	
7	7		–		9		10	
8	9		–		12		9	
9	11		–		10		11	
10	11		–		–		8	
11	–		–		–		11	
12	–		–		–		10	
13	–		–		–		9	
14	–		–		–		–	
15	–		–		–		–	

Comments ave 9.3 | 9.2 | 10.3 | 9.85

Reviewed By: JO Date Reviewed: 2019/10/30

20 ug/L

Pond labelled 2019/08/27

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Organism Information

Source: ABS Batch: 20190822FM-ELS Egg Stage: 13 50 miles Organisms Received in Good Condition: Yes or No

Test Log

Date	Day	Time	Technicians	Chem Cart Used	Fed AM	Fed PM	Sample Pre-Aeration Time	Bench Sheet Review First
2019/08/22	0	1400	CB/ML/ST/SS	2	–	–	60 min	–
2019/08/23	1	1100	KK	2	–	–	60 min	MW
2019/08/24	2	1330	KK	2	–	–	60 min	AW
2019/08/25	3	1050	CB	2	–	–	60 mins	LC
2019/08/26	4	1035	CB	2	–	✓	60 mins	ED
2019/08/27	5	0940	CB	2	✓	✓	60 mins	ED
2019/08/28	6	1040	ST	2	✓	✓	60 mins	MF
2019/08/29	7	1025	CB	2	✓	✓	60 mins	MF
2019/08/30	8	1030	ST	2	✓	✓	60 mins	MF
2019/08/31	9	1030	KK	2	✓	✓	60 mins	AW
2019/09/01	10	1145	CB	2	✓	✓ CB	60 mins	SC
2019/09/02	11	1035	CB	2	✓	✓	60 mins	SS
2019/09/03	12	1100	ST	2	✓	✓	60 mins	SC
2019/09/04	13	0955	CB	2	✓	✓	60 mins	ED
2019/09/05	14	1030	ST	2	✓	✓	60 mins	ED
2019/09/06	15	1000	ST	2	✓	✓	60 mins	AW
2019/09/07	16	1030	KK	2	✓	✓	60 mins	MF
2019/09/08	17	1000	CB	2	✓	✓	60 mins	SC
2019/09/09	18	1100	ST	2	✓	✓	60 mins	SC
2019/09/10	19	1045	KK	2	✓	✓	60 mins	MW
2019/09/11	20	1100	ST	2	✓	✓	60 mins	MF
2019/09/12	21	1125	ST	2	✓	✓	60 mins	AW
2019/09/13	22	1200	KK	2	✓	✓	60 mins	MF
2019/09/14	23	1030	KK	2	✓	✓	60 mins	MF
2019/09/15	24	1130	ST	2	✓	✓	60 mins	MW
2019/09/16	25	1100	KK	2	✓	✓	60 mins	AW
2019/09/17	26	1025	ST	2	✓	✓	60 mins	AW
2019/09/18	27	1000	KK	2	✓	✓	60 mins	MF
2019/09/19	28	1100	KK	2	✓	✓	60 mins	ST
2019/09/20	29	1100	KK	2	✓	✓	60 mins	MF
2019/09/21	30	1255	CB	2	✓	✓	60 mins	MG
2019/09/22	31	1235	ST	2	✓	✓	60 mins	LF
2019/09/23	32	1110	KK	2	✓	–	–	MW

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

	1849 Day 1		1850 Day 1		1852 Day 1		1855 Day 1		1856 Day 1	
replicate	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos	Alive Embryos	Dead Embryos
a	13	2	15	0	14	1	15	0	12	3
b	15	0	13	2	14	1	15	0	13	2
c	11	4	12	3	13	2	13	02	13	2
d	11	4	12	3	14	1	12	3	14	1
e	26	4	26	4	30	0	29	1	29	1
f	27	3	30	0	29	1	29	1	30	0

Comments/Observations:

Number of Alive Embryos and Hatched Organisms

	1849 Day 2			1850 Day 2			1852 Day 2			1855 Day 2		
replicate	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15	Alive Embryos	Dead Embryos	Cull to 15
a	11	12	15	14	1	15	12	2	15	15	0	15
b	13	2	15	13	0	15	14	0	15	14	1	15
c	11	0	15	10	3 2	15	13	0	15	10	3	15
d	11	0	15	6	0	15	13	1	15	11	1	15
e	26	0		15	15 9 10		25	4 10 5		29	0	
f	27	0		29	0 1 10		29	0		29	0	

	1856 Day 2		
replicate	Alive Embryos	Dead Embryos	Cull to 15
a	9	3*	15
b	11	2	15
c	12	1*	15
d	12	2	15
e	29	0	
f	30	0	

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Comments/Observations:
1850 rep B, eggs coated in debris. *Microbial growth.

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

1849

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	4	~~0~~ 1	~~5~~ 11	0
b	8	0	7	0
c	5	0	10	0
d	5	0	10	0

1850

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	3	0	12	0
b	6	0	9	0
c	3	0	11	1
d	9	1	5	0

1852

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	14	0	1	0
b	12	0	3	0
c	12	0	3	0
d	13	0	2	0

1855

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	9	0	6	0
b	13	0	2	0
c	13	0	2	0
d	11	0	4	0

1856

Day 3

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	12	0	3	0
b	13	0	2	0
c	9	0	6	0
d	13	0	2	0

1849

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14	1
b	0	0	15	0
c	1	0	13	1
d	0	0	15	0

1850

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	1	0	13	1
b	1	0	14	0
c	0	0	14	0
d	1	0	13	0

1852

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	1	0	14	0
b	0	0	15	0
c	1	0	14	0
d	1	0	14	0

1855

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	2	0	13	0
b	3	0	12	0
c	6	0	9	0
d	0	0	15	0

1856

Day 4

	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	~~0~~ 1	0	8	0
c	0	0	15	0
d	1	0	14	0

Reviewed By: LO Date Reviewed: 2019/04/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

1849

	Day 5			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14	0
b	0	0	15	0
c	0	0	13(1)	1
d	0	0	13	2

1850

	Day 5			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	13	1
b	0	0	15	0
c	0	0	14	0
d	0	0	14	0

1852

	Day 5			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	~~0~~ 0	~~0~~ 1	14	0
d	0	0	15	0

1855

	Day 5			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

1856

	Day 5			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	14	0
c	0	0	15	0
d	0	0	15	0

Reviewed By: JD Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client Tec164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

1849

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14(1)	0
b	0	0	15(1)	0
c	0	0	13(1)	0
d	0	0	13(1)	0

1850

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	12(2)	1 ST
b	0	0	15	0
c	0	0	14	0
d	0	0	14	0

1852

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14(1)	1 ST
b	0	0	15(1)	0
c	0	0	14	0
d	0	0	15(1)	0

1855

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15(1)	0

1856

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	13	1 ST
c	0	0	15	0
d	0	0	15(1)	0

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Number of Alive Embryos and Hatched Organisms

replicate	1849 Day 7 Alive Hatched	1850 Day 7 Alive Hatched	1852 Day 7 Alive Hatched	1855 Day 7 Alive Hatched	1856 Day 7 Alive Hatched
a	11*	12	14(1)	15	15
b	15*	14*	15	15	13
c	13(2)*	14	14	15	15
d	13(1)*	14	15	14	15(1)

Comments/Observations: * Microbial growth

replicate	1849 Day 8 Alive Hatched	1850 Day 8 Alive Hatched	1852 Day 8 Alive Hatched	1855 Day 8 Alive Hatched	1856 Day 8 Alive Hatched
a	9*	11*(3)	13(2)	15	15
b	15(1)*	12(1)*	15	15	12
c	13(2)*	14	14	15	15
d	12*	14	15(1)	14	15

Comments/Observations: * Microbial growth

replicate	1849 Day 9 Alive Hatched	1850 Day 9 Alive Hatched	1852 Day 9 Alive Hatched	1855 Day 9 Alive Hatched	1856 Day 9 Alive Hatched
a	9(1)	11	13(12(1)	15	15
b	15(1)	10*	15	15	12
c	12(2)	14	14	15	15
d	11*	14	15(1)	14	15

Comments/Observations: * Microbial growth.

replicate	1849 Day 10 Alive Hatched	1850 Day 10 Alive Hatched	1852 Day 10 Alive Hatched	1855 Day 10 Alive Hatched	1856 Day 10 Alive Hatched
a	8*	11	11	15	15
b	13*	9(2)*	15	15	12
c	11*	14	14	15	15
d	10*	14	15(1)	14	15

Comments/Observations: * Microbial growth

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Number of Alive Embryos and Hatched Organisms

replicate	1849 Day 11 Alive Hatched	1850 Day 11 Alive Hatched	1852 Day 11 Alive Hatched	1855 Day 11 Alive Hatched	1856 Day 11 Alive Hatched
a	7*	11	11	15	15
b	12*	16*	15	15	12
c	11(1)	14	14	15	15
d	10	14	15	14	15

Comments/Observations: * Microbial growth

replicate	1849 Day 12 Alive Hatched	1850 Day 12 Alive Hatched	1852 Day 12 Alive Hatched	1855 Day 12 Alive Hatched	1856 Day 12 Alive Hatched
a	7*	11	11	15	15
b	12*	6	15	15	12
c	11(1)*	14	14	15	15
d	10	14	15	14	15

Comments/Observations:

replicate	1849 Day 13 Alive Hatched	1850 Day 13 Alive Hatched	1852 Day 13 Alive Hatched	1855 Day 13 Alive Hatched	1856 Day 13 Alive Hatched
a	7	11	11	15	15
b	12	6	15	15	12
c	11(1)	14	14	15	15
d	10	14	15	14	15

Comments/Observations:

replicate	1849 Day 14 Alive Hatched	1850 Day 14 Alive Hatched	1852 Day 14 Alive Hatched	1855 Day 14 Alive Hatched	1856 Day 14 Alive Hatched
a	7	11	11	15	15
b	12	6	15	15	12
c	11(1)	14	14	15	15
d	10	14	15	14	15

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Number of Alive Embryos and Hatched Organisms

	1849	1850	1852	1855	1856
	Day 15	Day 15	Day 15	Day 15	Day 15
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	7	11	11(1)	15	15
b	12	6	15	15	12
c	11(1)	14	14	15	15
d	10	14	15	14	13

Comments/Observations:

	1849	1850	1852	1855	1856
	Day 16	Day 16	Day 16	Day 16	Day 16
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	9	11	11(1)	15	15
b	12	6	15	15	9
c	11(3)(1)	14	14(1)	15	15
d	10	14	15	14	15

Comments/Observations:

	1849	1850	1852	1855	1856
	Day 17	Day 17	Day 17	Day 17	Day 17
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	7	10	11	15	15
b	12	6	15	15	6
c	11(3)	14	14	15	15
d	10	14	15	14	15

Comments/Observations:

	1849	1850	1852	1855	1856
	Day 18	Day 18	Day 18	Day 18	Day 18
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	7	10	11(2)	15	15
b	12	6	15	15	6
c	11(1)	14	13	15	15
d	10	14	15	14	15

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Number of Alive Embryos and Hatched Organisms

replicate	1849 Day 19 Alive Hatched	1850 Day 19 Alive Hatched	1852 Day 19 Alive Hatched	1855 Day 19 Alive Hatched	1856 Day 19 Alive Hatched
a	7	10	11(1)	15	15
b	12	6	15	15	6
c	11(1)	14	B14(1)	15	15
d	10	14	15	14	15

Comments/Observations:

replicate	1849 Day 20 Alive Hatched	1850 Day 20 Alive Hatched	1852 Day 20 Alive Hatched	1855 Day 20 Alive Hatched	1856 Day 20 Alive Hatched
a	7	10	10	15	15
b	12	6	15	15	6
c	11(1)	14	13(1)	14	15
d	10	14	15	14	15

Comments/Observations:

replicate	1849 Day 21 Alive Hatched	1850 Day 21 Alive Hatched	1852 Day 21 Alive Hatched	1855 Day 21 Alive Hatched	1856 Day 21 Alive Hatched
a	7	10	10(2)	15	15
b	12	6	15	15	6
c	11(1)	14	13(1)	14	15
d	10	14	15	14	15

Comments/Observations:

replicate	1849 Day 22 Alive Hatched	1850 Day 22 Alive Hatched	1852 Day 22 Alive Hatched	1855 Day 22 Alive Hatched	1856 Day 22 Alive Hatched
a	7	10	10	15	15
b	12	6	15(1)	15	6
c	11(1)	14	13(1)	14	15
d	10	14	15	14	15

Comments/Observations:

Reviewed By: W Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Number of Alive Embryos and Hatched Organisms

replicate	1849 Day 23 Alive Hatched	1850 Day 23 Alive Hatched	1852 Day 23 Alive Hatched	1855 Day 23 Alive Hatched	1856 Day 23 Alive Hatched
a	7	10	10	15	15
b	12	6	15	15	6
c	11(1)	14	13(1)	14	15
d	10	14	15	14	15

Comments/Observations:

replicate	1849 Day 24 Alive Hatched	1850 Day 24 Alive Hatched	1852 Day 24 Alive Hatched	1855 Day 24 Alive Hatched	1856 Day 24 Alive Hatched
a	7	10	10	15	15
b	12	6	15	15	6
c	11(1)	14	12	14	15
d	10	14	15	14	15

Comments/Observations:

replicate	1849 Day 25 Alive Hatched	1850 Day 25 Alive Hatched	1852 Day 25 Alive Hatched	1855 Day 25 Alive Hatched	1856 Day 25 Alive Hatched
a	7	10	10	14	15
b	12	6	14	15	6
c	11(1)	14	12	13	15
d	10	14	15(1)	13	15

Comments/Observations:

replicate	1849 Day 26 Alive Hatched	1850 Day 26 Alive Hatched	1852 Day 26 Alive Hatched	1855 Day 26 Alive Hatched	1856 Day 26 Alive Hatched
a	7(1)	10	10	14	15
b	12	6	14	15	6
c	10	13*	12	13	15
d	10	14	15(1)	13	15

Comments/Observations: * killed by feeder

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Number of Alive Embryos and Hatched Organisms

replicate	1849 Day 27 Alive Hatched	1850 Day 27 Alive Hatched	1852 Day 27 Alive Hatched	1855 Day 27 Alive Hatched	1856 Day 27 Alive Hatched
a	7(1)	10	10	12	15
b	12	6	14	15	6
c	10	13	12	12	15
d	10	14	15(1)	13	15

Comments/Observations:

replicate	1849 Day 28 Alive Hatched	1850 Day 28 Alive Hatched	1852 Day 28 Alive Hatched	1855 Day 28 Alive Hatched	1856 Day 28 Alive Hatched
a	7(1)	10	10	12	15
b	12	6	14	15	6
c	10	13	12	12	15
d	10	14	15(1)	13	15

Comments/Observations:

replicate	1849 Day 29 Alive Hatched	1850 Day 29 Alive Hatched	1852 Day 29 Alive Hatched	1855 Day 29 Alive Hatched	1856 Day 29 Alive Hatched
a	7(1)	10	10	12	15
b	12	6	14	15	6
c	10(1)	13	12	11	14
d	10	14	15(1)	13	13

Comments/Observations:

replicate	1849 Day 30 Alive Hatched	1850 Day 30 Alive Hatched	1852 Day 30 Alive Hatched	1855 Day 30 Alive Hatched	1856 Day 30 Alive Hatched
a	7	10	9	12	15
b	12	6	14	15	6
c	10	13	12	10	14
d	9	14	15(1)	13	13

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Number of Alive Embryos and Hatched Organisms

replicate	1849 Day 31 Alive Hatched	1850 Day 31 Alive Hatched	1852 Day 31 Alive Hatched	1855 Day 31 Alive Hatched	1856 Day 31 Alive Hatched
a	6	10	9	12	15
b	12	6	14	15	6
c	10	13	12	9	14
d	9	14	15	13	13

Comments/Observations:

replicate	1849 Day 32 Alive Hatched	1850 Day 32 Alive Hatched	1852 Day 32 Alive Hatched	1855 Day 32 Alive Hatched	1856 Day 32 Alive Hatched
a	10	10	9	11	13
b	12	6	14	15	6
c	10	13	12	9	13
d	9	13	15	13	13

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

New Solutions

pH (units)

Conc. (%) / Day	1849	1850	1852	1855	1856			
0	7.6	8.1	8.2	8.1	8.1			
1	e.0	8.0	e.1	e.1	8.2			
2	e.0	e.0	8.1	8.1	e.1			
3	8.1	8.0	8.2	8.1	8.1			
4	8.1	8.0	8.1	8.1	8.2			
5	8.1	8.1	8.2	8.2	8.2			
6	8.6	7.9	8.1	8.1	8.1			
7	8.1	8.0	8.2	8.1	8.2			
8	8.3	8.2	8.3	8.3	8.3			

Conductance (µS/cm)

Day								
0	733	717	702	621	544			
1	704	694	707	659	573			
2	726	693	702	646	570			
3	705	807	698	643	574			
4	703	832	685	631	571			
5	727	832	680	636	579			
6	695	819	681	628	569			
7	701	803	713	666	584			
8	765	865	688	640	541			

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day								
0	7.3	7.3	7.3	7.3	7.3			
1	7.3	7.3	7.3	7.3	7.3			
2	7.3	7.3	7.3	7.3	7.3			
3	7.3	7.3	7.3	7.3	7.3			
4	7.3	7.3	7.3	7.3	7.3			
5	7.3	7.3	7.3	7.3	7.3			
6	7.3	7.3	7.3	7.3	7.3			
7	7.3	7.3	7.3	7.3	7.3			
8	7.3	7.3	7.3	7.3	7.3			

Temperature (°C)

Day								
0	24	24	24	24	24			
1	24	24	24	24	24			
2	24	24	24	24	24			
3	24	24	24	24	24			
4	24	24	24	24	24			
5	24	24	24	24	24			
6	24	24	24	24	24			
7	24	24	24	24	24			
8	24	24	24	24	24			

Old Solutions

pH (units)

Day	1849	1850	1852	1855	1856			
0								
1	7.9	7.9	8.2	8.3	8.3			
2	8.1	8.0	8.2	8.3	8.3			
3	8.1	8.1	8.3	8.3	8.3			
4	7.9	8.0	8.2	8.3	8.3			
5	8.2	8.1	8.2	8.4	8.4			
6	8.0	8.0	8.1	8.2	8.2			
7	8.0	8.0	8.1	8.3	8.2			
8	7.9	7.9	8.1	8.2	8.2			

Conductance (µS/cm)

Day								
0								
1	691	813	711	655	575			
2	653	809	729	691	586			
3	688	814	717	707	585			
4	688	789	689	631	562			
5	671	810	722	672	588			
6	701	828	729	672	589			
7	728	843	754	690	612			
8	726	881	769	703	588			

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day								
0								
1	7.3	7.3	7.3	7.2	7.3			
2	7.3	7.3	7.3	7.3	7.3			
3	7.3	7.3	7.3	7.3	7.3			
4	6.9	7.1	7.2	7.3	7.3			
5	7.3	7.2	7.2	7.2	7.3			
6	7.1	7.2	7.1	7.3	7.3			
7	6.6	6.8	6.8	6.9	6.9			
8	7.0	7.0	7.1	7.1	7.0			

Temperature (°C)

Day								
0								
1	24	24	24	24	24			
2	24	24	24	24	24			
3	24	24	24	24	24			
4	24	24	24	24	24			
5	24	24	24	24	24			
6	24	24	24	24	24			
7	24	24	24	24	24			
8	24	24	24	24	24			

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: W Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

New Solutions

Conc. (%) / Day	1849	1850	1852	1855	1856			

pH (units)

Day								
9	8.1	8.2	8.4	8.4	8.3			
10	8.2	8.1	8.3	8.2	8.2			
11	8.2	8.2	8.3	8.3	8.3			
12	7.9	8.0	8.2	8.2	8.2			
13	8.2	8.1	8.2	8.3	8.2			
14	8.2	8.2	8.3	8.3	8.3			
15	7.9	8.1	8.2	8.3	8.3			
16	8.0	8.2	8.4	8.3	8.3			
17	8.2	8.2	8.3	8.2	8.3			

Conductance (µS/cm)

Day								
9	809	911	735	676	580			
10	782	896	722	669	604			
11	764	901	737	641	569			
12	750	851	703	637	543			
13	753	861	728	628	539			
14	751	853	618	611	578			
15	721	790	636	598	527			
16	733	855	701	603	541			
17	735	849	669	599	555			

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day								
9	7.3	7.3	7.3	7.3	7.3			
10	7.3	7.3	7.3	7.3	7.3			
11	7.3	7.3	7.3	7.3	7.3			
12	7.3	7.3	7.3	7.3	7.3			
13	7.3	7.3	7.3	7.3	7.3			
14	7.3	7.3	7.3	7.3	7.3			
15	7.3	7.3	7.3	7.3	7.3			
16	7.3	7.3	7.3	7.3	7.3			
17	7.3	7.3	7.3	7.3	7.3			

Temperature (°C)

Day								
9	24	24	24	24	24			
10	24	24	24	24	24			
11	24	24	24	24	24			
12	24	24	24	24	24			
13	24	24	24	24	24			
14	24	24	24	24	24			
15	24	24	24	24	24			
16	24	24	24	24	24			
17	24	24	24	24	24			

Old Solutions

1849	1850	1852	1855	1856			

pH (units)

Day								
9	8.1	8.0	8.2	8.3	8.3			
10	7.9	7.8	7.9	8.1	8.1			
11	7.8	7.9	8.1	8.2	8.2			
12	7.6	7.7	7.9	8.0	8.1			
13	8.1	8.0	8.1	8.2	8.2			
14	8.0	8.0	8.1	8.2	8.2			
15	8.0	7.9	7.9	8.0	8.2			
16	8.0	7.9	8.0	8.2	8.2			
17	8.0	8.0	8.0	8.3	8.3			

Conductance (µS/cm)

Day								
9	783	891	700	701	572			
10	866	900	760	700	587			
11	771	879	761	703	580			
12	750	882	758	706	584			
13	738	801	725	691	555			
14	714	833	724	673	557			
15	722	829	723	662	572			
16	730	840	695	655	561			
17	738	838	708	657	573			

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day								
9	7.0	6.7	7.3	6.9	7.2			
10	6.5	6.8	6.9	6.5	6.6			
11	6.6	6.7	6.7	6.8	6.5			
12	6.4	6.3	6.9	6.9	6.3			
13	7.2	7.1	6.9	6.9	7.1			
14	6.8	6.7	6.4	6.5	6.6			
15	6.7	6.2	6.5	7.2	6.5			
16	7.0	10.5	6.9	7.0	6.8			
17	6.7	6.9	7.0	7.1	6.8			

Temperature (°C)

Day								
9	24	24	24	24	24			
10	24	24	24	24	24			
11	24	24	24	24	24			
12	24	24	24	24	24			
13	24	24	24	24	24			
14	24	24	24	24	24			
15	24	24	24	24	24			
16	24	24	24	24	24			
17	24	24	24	24	24			

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: W Date Reviewed: Aug 10/15

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

New Solutions

Conc. (%) / Day	1849	1850	1852	1855	1856			

pH (units)

Day								
18	8.3	8.2	8.3	8.3	8.3			
19	8.2	8.1	8.3	8.3	8.3			
20	8.2	8.1	8.3	8.3	8.3			
21	8.2	8.2	8.3	8.3	8.3			
22	8.2	8.1	8.3	8.3	8.2			
23	8.1	8.0	8.1	8.2	8.2			
24	8.2	8.2	8.3	8.3	8.2			
25	8.2	8.2	8.3	8.3	8.2			
26	8.3	8.3	8.4	8.3	8.4			

Conductance (µS/cm)

Day								
18	938	811	649	591	534			
19	731	600	615	603	501			
20	717	823	649	615	532			
21	735	820	644	607	477			
22	705	856	664	626	476			
23	731	854	664	610	478			
24	729	833	668	604	477			
25	744	841	670	609	478			
26	742	820	669	592	469			

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day								
18	7.3	7.3	7.3	7.3	7.3			
19	7.3	7.3	7.3	7.3	7.3			
20	7.3	7.3	7.3	7.3	7.3			
21	7.3	7.3	7.3	7.3	7.3			
22	7.3	7.3	7.3	7.3	7.3			
23	7.3	7.3	7.3	7.3	7.3			
24	7.3	7.3	7.3	7.3	7.3			
25	7.3	7.3	7.3	7.3	7.3			
26	7.3	7.3	7.3	7.3	7.3			

Temperature (°C)

Day								
18	24	24	24	24	24			
19	24	24	24	24	24			
20	24	24	24	24	24			
21	24	24	24	24	24			
22	24	24	24	24	24			
23	24	24	24	24	24			
24	24	24	24	24	24			
25	24	24	24	24	24			
26	24	24	24	24	24			

Old Solutions

1849	1850	1852	1855	1856			

pH (units)

18	7.9	7.5	7.7	8.1	8.2	~~8.0~~	~~8.0~~	ST
19	7.7	7.9	8.1	8.3	8.2			
20	8.0	8.0	8.0	8.1	8.1			
21	8.0	7.9	7.9	8.1	8.1			
22	8.0	7.9	8.0	8.1	8.0			
23	8.0	8.0	8.1	8.1	8.1			
24	8.0	7.9	8.0	8.1	8.2			
25	8.1	7.9	8.0	8.1	8.1			
26	8.0	7.9	8.0	8.1	8.1			

Conductance (µS/cm)

18	707	836	713	659	577	~~885~~	~~735~~	ST
19	731	835	712	671	572			
20	700	810	696	638	562			
21	693	811	703	641	567			
22	710	835	717	660	562			
23	761	834	712	636	564			
24	737	836	721	648	563			
25	760	849	715	649	571			
26	717	826	712	643	561			

Dissolved Oxygen (mg/L) (**40-100% saturation**)

18	7.2	6.8	6.6	6.7	6.6	~~6.9~~	~~6.4~~	ST
19	6.7	6.7	6.6	6.3	6.5			
20	6.4	6.4	6.3	6.5	6.4			
21	6.7	6.5	5.9	5.9	5.7			
22	10.5	10.1	10.3	10.0	10.2			
23	10.3	10.3	10.3	10.1	10.1			
24	6.2	6.2	6.2	6.4	6.0			
25	6.0	6.2	6.0	5.9	6.0			
26	6.1	6.0	6.2	5.9	6.4			

Temperature (°C)

18	24	24	24	24	24	~~24~~	~~24~~	~~24~~ ST
19	24	24	24	24	24			
20	24	24	24	24	24			
21	24	24	24	24	24			
22	24	24	24	24	24			
23	24	24	24	24	24			
24	24	24	24	24	24			
25	24	24	24	24	24			
26	24	24	24	24	24			

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

New Solutions

Conc. (%) / Day	1849	1850	1852	1855	1856			
pH (units)								
27	8.2	8.1	8.1	8.2	8.2			
28	8.2	8.2	8.2	8.3	8.2			
29	8.1	7.8	8.2	8.3	8.3			
30	8.2	8.1	8.3	8.3	8.4			
31	8.2	8.2	8.3	8.3	8.4			
32								
Conductance (µS/cm)								
27	747	846	661	597	477			
28	715	850	684	605	552			
29	704	857	666	605	547			
30	736	858	686	614	549			
31	729	829	655	577	519			
32								
Dissolved Oxygen (mg/L) (40-100% saturation)								
27	7.3	7.3	7.3	7.3	7.3			
28	7.3	7.3	7.3	7.3	7.3			
29	7.3	7.3	7.3	7.3	7.3			
30	7.3	7.3	7.3	7.3	7.3			
31	7.3	7.3	7.3	7.3	7.3			
32								
Temperature (°C)								
27	24	24	24	24	24			
28	24	24	24	24	24			
29	24	24	24	24	24			
30	24	24	24	24	24			
31	24	24	24	24	24			
32								

Old Solutions

Conc. (%) / Day	1849	1850	1852	1855	1856			
pH (units)								
27	7.3	7.7	7.8	8.0	8.0			
28	7.8	7.9	7.9	8.0	8.0			
29	8.0	7.9	7.9	8.2	8.1			
30	7.8	7.8	7.9	8.2	8.1			
31	7.8	7.8	7.9	8.0	8.1			
32	7.9	7.9	7.9	8.0	8.0			
Conductance (µS/cm)								
27	727	831	716	641	637			
28	728	821	718	642	492			
29	735	838	846	652	560			
30	698	848	709	646	564			
31	710	828	704	648	566			
32	715	826	708	650	572			
Dissolved Oxygen (mg/L) (40-100% saturation)								
27	5.5	5.6	5.4	5.1	5.2			
28	6.0	5.6	5.6	5.5	5.5			
29	5.8	5.8	5.9	6.1	5.7			
30	5.1	5.2	5.0	5.4	5.6			
31	5.8	5.6	5.5	5.8	5.8			
32	5.7	5.6	6.1	5.3	5.2			
Temperature (°C)								
27	24	24	24	24	24			
28	24	24	24	24	24			
29	24	24	24	24	24			
30	25	25	25	25	25			
31	24	24	24	24	24			
32	24	24	24	24	24			

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: WO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **1849**

Fish	Replicate # A Length (mm)	Normal/ Abnormal	Replicate # B Length (mm)	Normal/ Abnormal	Replicate # C Length (mm)	Normal/ Abnormal	Replicate # D Length (mm)	Normal/ Abnormal
1	9	N	10	N	8	N	11	N
2	9	N	10		9		11	
3	12		11		10		11	
4	13		9		11		12	
5	11		9		10		10	
6	16		8		13		13	
7	–	–	9		9		13	
8	–	–	11		10		12	
9	–	–	12		14		12	
10	–	–	12		13		–	–
11	–	–	12		–	–	–	–
12	–	–	8		–	–	–	–
13	–	–	–	–	–	–	–	–
14	–	–	–	–	–	–	–	–
15	–	–	–	–	–	–	–	–

Comments ave 12.0 | 10.0 | 10.7 | 11.67

1850

Fish	Replicate # A Length (mm)	Normal/ Abnormal	Replicate # B Length (mm)	Normal/ Abnormal	Replicate # C Length (mm)	Normal/ Abnormal	Replicate # D Length (mm)	Normal/ Abnormal
1	9	N	12	N	8	N	7	N
2	10		12		9		9	
3	13		13		9		9	
4	8		13		9		9	
5	10		13		9		10	
6	11		14		10		10	
7	11		–	–	10		10	
8	11		–	–	10		11	
9	12		–	–	11		11	
10	12		–	–	11		11	
11	–	–	–	–	11		12	
12	–	–	–	–	12		12	
13	–	–	–	–	12		13	
14	–	–	–	–	–	–	–	–
15	–	–	–	–	–	–	–	–

Comments ave 10.7 | 12.67 | 10.08 | 10.31

Reviewed By: JW Date Reviewed: 2015/10/30

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **1852**

Replicate # A			Replicate # B			Replicate # C			Replicate # D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	8	N	1	8	N	1	9	N	1	8	N
2	9	↓	2	9	↓	2	9	↓	2	9	↓
3	9		3	9		3	9		3	9	
4	10		4	9		4	10		4	9	
5	12		5	9		5	11		5	9	
6	12		6	9		6	11		6	9	
7	13		7	10		7	11		7	10	
8	13		8	10		8	11		8	10	
9	13	↓	9	10		9	11		9	10	
10	–	–	10	10		10	12		10	10	
11	–	–	11	11		11	12		11	10	
12	–	–	12	12		12	13	↓	12	11	
13	–	–	13	12		13	–	–	13	12	
14	–	–	14	12	↓	14	–	–	14	12	
15	–	–	15	–	–	15	–	–	15	13	↓

Comments ave 11 | 10 | 10.75 | 9.93

1855

Replicate # A			Replicate # B			Replicate # C			Replicate # D		
Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal	Fish	Length (mm)	Normal/ Abnormal
1	9	N	1	9	N	1	8	N	1	9	N
2	9	↓	2	9	↓	2	9	↓	2	9	↓
3	9		3	9		3	10		3	9	
4	10		4	9		4	10		4	9	
5	10		5	9		5	10		5	10	
6	10		6	9		6	10		6	10	
7	10		7	10		7	11		7	10	
8	10		8	10		8	11		8	11	
9	11		9	10		9	11	↓	9	11	
10	13		10	10		10	–	–	10	12	
11	13	↓	11	12		11	–	–	11	12	
12	–	–	12	12		12	–	–	12	12	
13	–	–	13	12		13	–	–	13	13	↓
14	–	–	14	13		14	–	–	14		
15	–	–	15	13	↓	15	–	–	15	–	–

Comments ave 10.27 | 10.4 | 10 | 10.54

Reviewed By: W Date Reviewed: 2019/10/30

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1849, 1819-1850, 1819-1852, 1819-1855, 1819-1856

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **1856**

Replicate # A		
Fish	Length (mm)	Normal/ Abnormal
1	9	N
2	9	
3	9	
4	9	
5	9	
6	9	
7	10	
8	10	
9	10	
10	10	
11	11	
12	11	
13	13	
14	–	–
15	–	–

Replicate # B		
Fish	Length (mm)	Normal/ Abnormal
1	9	
2	10	
3	11	
4	13	
5	13	
6	14	↓
7	–	–
8	–	–
9	–	–
10	–	–
11	–	–
12	–	–
13	–	–
14	–	–
15	–	–

Replicate # C		
Fish	Length (mm)	Normal/ Abnormal
1	8	N
2	9	
3	9	
4	9	
5	9	
6	9	
7	10	
8	10	
9	10	
10	11	
11	11	
12	12	
13	12	↓
14	–	–
15	–	–

Replicate # D		
Fish	Length (mm)	Normal/ Abnormal
1	10	N
2		
3		
4		
5		
6	↓	
7	11	
8	11	
9	11	
10	11	
11	12	
12	12	
13	13	↓
14	–	–
15	–	–

Comments

ave 9.92 | 11.5 | 9.92 | 10.85

NAUTILUS ENVIRONMENTAL

20ug/L Pans labelled 2019/0

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Organism Information

Source: ABS Batch: 20190822FM-ELS Egg Stage: 13 somites Organisms Received in Good Condition: (Yes) or No

Test Log

Date	Day	Time	Technicians	Chem Cart Used	Fed AM	Fed PM	Sample Pre-Aeration Time	Bench Sheet Review First
2019/08/22	0	1400	ST/SS/KK/ML	2	—	—	60 min	—
2019/08/23	1	1130	KK	2	—	—	60 min	MW
2019/08/24	2	1405	KK	2	—	—	60 min	AW
2019/08/25	3	1115	CB	2	—	—	60 mins	LC
2019/08/26	4	1102	CB	2	—	✓	60 mins	ED
2019/08/27	5	1015	CB	2	✓	✓	60 mins	ED
2019/08/28	6	1105	ST	2	✓	✓	60 mins	ME
2019/08/29	7	1055	CB	2	✓	✓	60 mins	MF
2019/08/30	8	1030	ST	2	✓	✓	60 mins	MF
2019/08/31	9	1040	KK	2	✓	✓	60 mins	AW
2019/09/01	10	1200	CB	2	✓	— CB	60 mins	SC
2019/09/02	11	1050	CB	2	✓	✓	60 mins	SS
2019/09/03	12	1115	ST	2	✓	✓	60 mins	SC
2019/09/04	13	1008	CB	2	✓	✓	60 mins	ED
2019/09/05	14	1035	ST	2	✓	✓	60 mins	ED
2019/09/06	15	1015	ST	2	✓	✓	60 mins	AW
2019/09/07	16	1100	KK	2	✓	✓	60 mins	MF
2019/09/08	17	1025	CB	2	✓	✓	60 mins	SC
2019/09/09	18	1120	ST	2	✓	✓	60 mins	SC
2019/09/10	19	1100	KK	2	✓	✓	60 mins	MW
2019/09/11	20	1125	ST	2	✓	✓	60 mins	MF
2019/09/12	21	1140	ST	2	✓	✓	60 mins	LF
2019/09/13	22	1200	KK	2	✓	✓	60 mins	ME
2019/09/14	23	1080	KK	2	✓	✓	60 mins	MF
2019/09/15	24	1145	ST	2	✓	✓	60 mins	MW
2019/09/16	25	1130	KK	2	✓	✓	60 mins	AW
2019/09/17	26	1045	ST	2	✓	✓	60 mins	AW
2019/09/18	27	1105	KK	2	✓	✓	60 mins	MF
2019/09/19	28	1115	KK	2	✓	✓	60 mins	ST
2019/09/20	29	1115	KK	2	✓	✓	60 mins	MF
2019/09/21	30	1308	CB	2	✓	✓	60 mins	MG
2019/09/22	31	1255	ST	2	✓	✓	60 mins	LF
2019/09/23	32	1230	KK/ST	2	—	—	—	MW

Reviewed By: LO Date Reviewed: 2019/10/08

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

Number of Alive Embryos and Hatched Organisms

replicate	1857 Day 1 Alive Embryos	1857 Day 1 Dead Embryos	1859 Day 1 Alive Embryos	1859 Day 1 Dead Embryos	1861 Day 1 Alive Embryos	1861 Day 1 Dead Embryos	1862 Day 1 Alive Embryos	1862 Day 1 Dead Embryos	1863 Day 1 Alive Embryos	1863 Day 1 Dead Embryos
a	14	1	14	1	15	0	15	0	14	1
b	12	3	14	1	15	0	15	0	15	0
c	14	1	15	0	14	1	15	0	15	0
d	13	2	13	2	13	2	15	0	30	0
e	20	0	26	4	20	4	30	0	28	2
f	30	0	25	5	30	0				

Comments/Observations:

Number of Alive Embryos and Hatched Organisms

replicate	1857 Day 2 Alive Embryos	1857 Day 2 Dead Embryos	1857 Day 2 Cull to 15	1859 Day 2 Alive Embryos	1859 Day 2 Dead Embryos	1859 Day 2 Cull to 15	1861 Day 2 Alive Embryos	1861 Day 2 Dead Embryos	1861 Day 2 Cull to 15	1862 Day 2 Alive Embryos	1862 Day 2 Dead Embryos	1862 Day 2 Cull to 15
a	12	2	15	14	0	15	14	1	15	14	1	15
b	12	0	15	12	2	15	14	1	15	14	1	15
c	14	0	15	15	0	15	13	1	15	15	0	15
d	13	0	15	11	2	15	13	0	15	12	3	15
e	30	0		26	0		20	0		30	0	
f	30	0		25	0		30	0		30	0	

replicate	1863 Day 2 Alive Embryos	1863 Day 2 Dead Embryos	1863 Day 2 Cull to 15
a	13	1	15
b	15	0	15
c	15	0	15
d	15	0	15
e	30	0	
f	28	0	

Day 2 - Poor looking and dead embryos in replicates a, b, c and d are replaced with healthy embryos from replicates e and f. Replicates e and f are discarded after day 2

Comments/Observations:

Reviewed By: JD Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

1857

	Day 3			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	12	0	3	0
b	15	0	0	0
c	11	0	4	0
d	12	0	3	0

1859

	Day 3			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	9	0	6	0
b	12	0	3	0
c	12	0	3	0
d	15	0	0	0

1861

	Day 3			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	10	0	5	0
b	14	0	1	0
c	12	0	3	0
d	9	0	6	0

1862

	Day 3			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	11	1	3	0
b	10	0	5	0
c	13	0	2	0
d	12	0	3	0

1863

	Day 3			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	12	0	3	0
b	15	0	0	0
c	12	0	3	0
d	12	0	3	0

1859
~~1857~~ CB

	Day 4			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	1	0	14	0
c	4	0	11	0
d	9	0	6	0

1857
~~1855~~ CB

	Day 4			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	1	13	1
b	4	0	11	0
c	2	0	13	0
d	3	0	12	0

1861

	Day 4			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	2	0	13	0
b	0	0	15	0
c	1	0	14	0
d	2	0	13	0

1862

	Day 4			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14	0
b	0	0	15	0
c	5	0	10	0
d	2	0	13	0

1863

	Day 4			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	3	0	12	0
b	7	0	8	0
c	2	0	13	0
d	4	0	11	0

Reviewed By: W Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Control hatching success must be >66% (≥10 per replicate). Post hatch survival must be >70%.

1857

	Day 5			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	13	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15(1)	0

1859

	Day 5			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14(6)1	
b	0	0	15(2)	0
c	0	0	15(6)	0
d	0	0	15(2)	0

1861

	Day 5			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

1862

	Day 5			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	14	0
b	0	0	15	0
c	0	0	15	0
d	0	0	15	0

1863

	Day 5			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	13	2
b	0	0	15	0
c	0	0	15	0
d	0	0	15(1)	0

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client Tec164 Sample: 1819-0820, 1819-0821, 1819-0822, 1819-0823, 1819-0824, 1819-0825, 1819-0826, 1819-0827

1857

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	6	13(1)*	0
b	0	0	12(3)	0 3 LO
c	0	0	15(1)	0
d	0	0	12(2)*	0 3 LO

1859

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	10(1)	0 3 LO
b	0	0	13(2)	0 2 LO
c	0	0	13(2)	0 2 LO
d	0	0	14(2)	0 1 LO

1861

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	15	0
b	0	0	15(1)	0
c	0	0	15	0
d	0	0	15	0

1862

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	13	0 1 LO
b	0	0	15(1)	0
c	0	0	14(0)	0
d	0	0	15(1)	0

1863

	Day 6			
	Alive Embryos	Dead Embryos	Alive Hatched	Dead Hatched
a	0	0	13	0
b	0	0	15	0
c	0	0	15	0
d	0	0	14	0 1 LO

* some microbial growth

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Number of Alive Embryos and Hatched Organisms

	1857	1859	1861	1862	1863
	Day 7	Day 7	Day 7	Day 7	Day 7
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	12*	9*.	15.	12.	13(1).
b	11*	12*	15	15	15
c	15	11*	15	15	15
d	11*	14(2)	15(1)	15	14

Comments/Observations: * Microbial growth

	1857	1859	1861	1862	1863
	Day 8	Day 8	Day 8	Day 8	Day 8
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	12(1)*	9*	15(1)	12(3)	13(1)
b	11(1)*	12(2)*	15(1)	15(1)	15.
c	13*	11	15	15	15
d	6*	14(4)	15(1)	15	14

Comments/Observations: * Microbial growth

	1857	1859	1861	1862	1863
	Day 9	Day 9	Day 9	Day 9	Day 9
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	9(2)*	9(2)	15(1)	12(5)	13(1)
b	11	12(1)	15	15(3)	15
c	13	11	15	15	15
d	3*	14(3)	15(1)	15	14

Comments/Observations: * Microbial growth.

	1857	1859	1861	1862	1863
	Day 10	Day 10	Day 10	Day 10	Day 10
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	7*	9(2)	15(2)	12(2)	13*12
b	10*	12(1)	15	15(1)	15
c	9*	11	15	15	15
d	3	14(3)	15	15	13

Comments/Observations: * Microbial growth

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Number of Alive Embryos and Hatched Organisms

replicate	1857 Day 11 Alive Hatched	1859 Day 11 Alive Hatched	1861 Day 11 Alive Hatched	1862 Day 11 Alive Hatched	1863 Day 11 Alive Hatched
a	7	8(1)	14(1)	12(3)	12
b	9*	12(1)	15	15(1)	15
c	8*	~~13(1)~~	15	15	15
d	2*	14(3)	15	15	13

Comments/Observations: * Microbial growth

replicate	1857 Day 12 Alive Hatched	1859 Day 12 Alive Hatched	1861 Day 12 Alive Hatched	1862 Day 12 Alive Hatched	1863 Day 12 Alive Hatched
a	6*	7	13(1)	12(4)	12
b	9*	11	15(2)	14	15
c	8*	10	15(1)	15	15
d	2*	13(2)	15(1)	15	13

Comments/Observations: * Microbial growth

replicate	1857 Day 13 Alive Hatched	1859 Day 13 Alive Hatched	1861 Day 13 Alive Hatched	1862 Day 13 Alive Hatched	1863 Day 13 Alive Hatched
a	5*	7	13	11(2)	12
b	9(1)*	11	15	14	15
c	7(1)*	10	15	15	15
d	2*	12(1)	15(1)	15	13

Comments/Observations: * Microbial growth

replicate	1857 Day 14 Alive Hatched	1859 Day 14 Alive Hatched	1861 Day 14 Alive Hatched	1862 Day 14 Alive Hatched	1863 Day 14 Alive Hatched
a	5(1)*	7	13	9	12
b	8(1)*	11	15(1)	14	15
c	6*	10	15	15	15
d	2*	11(2)	15	15	13

Comments/Observations: * Microbial growth

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Number of Alive Embryos and Hatched Organisms

	1857	1859	1861	1862	1863
	Day 15	Day 15	Day 15	Day 15	Day 15
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	5*	7	13	9(1)	12
b	8	11	15(1)	14	15
c	6	10	15	15	15
d	2*	11(1)	15	15	13

Comments/Observations: * Microbial growth

	1857	1859	1861	1862	1863
	Day 16	Day 16	Day 16	Day 16	Day 16
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	5	7	13	9	12
b	7*	11	15(1)	14	15
c	6	10	15	15(1)	15
d	2	11(1)	15	15	13

Comments/Observations: * Microbial growth.

	1857	1859	1861	1862	1863
	Day 17	Day 17	Day 17	Day 17	Day 17
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	5	7	13	8	12
b	7	11	14	14	15
c	6	10	15	14	15
d	2	11(1)	15	15	13

Comments/Observations:

	1857	1859	1861	1862	1863
	Day 18	Day 18	Day 18	Day 18	Day 18
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	5(1)	7(1)	13	8(1)	12
b	7(1)	11	14	13	15
c	6(1)	10	15	13	15
d	2	11(2)	15	14	13

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Number of Alive Embryos and Hatched Organisms

	1857	1859	1861	1862	1863
	Day 19	Day 19	Day 19	Day 19	Day 19
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	4(1)	7	13	8	12
b	7(1)	11	14	13	15
c	5	10	15	12	15
d	2	11(2)	15	14	13

Comments/Observations:

	1857	1859	1861	1862	1863
	Day 20	Day 20	Day 20	Day 20	Day 20
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	4(1)	7	13	8	12
b	7(1)	11	14	13	15
c	5	10	15	12	15
d	2	11(2)	15	14	12

Comments/Observations:

	1857	1859	1861	1862	1863
	Day 21	Day 21	Day 21	Day 21	Day 21
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	3	7	13	8	12
b	7(1)	11	14(1)	13	15
c	5	10	15	12	15
d	2	11(2)	15	14	12

Comments/Observations:

	1857	1859	1861	1862	1863
	Day 22	Day 22	Day 22	Day 22	Day 22
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	3	7	13	8	12
b	7	11	14(1)	13	15
c	5	10	15	12	15
d	2	11(2)	15	14	12

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Number of Alive Embryos and Hatched Organisms

	1857	1859	1861	1862	1863
	Day 23	Day 23	Day 23	Day 23	Day 23
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	3	7	13	8	12
b	7	11	14(1)	13	15
c	5	10	15	12	15
d	2	10(1)	15	14	12

Comments/Observations:

	1857	1859	1861	1862	1863
	Day 24	Day 24	Day 24	Day 24	Day 24
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	3	7	13	8	12
b	6	11	14(1)	13	15
c	5	10	15	12	15
d	2	10(1)	15	14	12

Comments/Observations:

	1857	1859	1861	1862	1863
	Day 25	Day 25	Day 25	Day 25	Day 25
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	3	7	13	8	12
b	6	11	14(1)	13	15
c	5	10	15	12	15
d	2	10(1)	15	14	12

Comments/Observations:

	1857	1859	1861	1862	1863
	Day 26	Day 26	Day 26	Day 26	Day 26
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	3	7(1)	13	8	12
b	6	11	14(1)	13	15
c	5	10	15	11/4	15
d	2	10(1)	15	14	12

Comments/Observations:

Reviewed By: LO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Number of Alive Embryos and Hatched Organisms

	1857	1859	1861	1862	1863
	Day 27	Day 27	Day 27	Day 27	Day 27
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	3	7	13	8	12
b	6	11	14	13	15
c	5	10	15	11	15
d	2	10(1)	15	14	12

Comments/Observations:

	1857	1859	1861	1862	1863
	Day 28	Day 28	Day 28	Day 28	Day 28
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	3	7	12	8	12
b	6	11(1)	14	13	15
c	5	10	15	11	15
d	2	10(1)	15	13	12

Comments/Observations:

	1857	1859	1861	1862	1863
	Day 29	Day 29	Day 29	Day 29	Day 29
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	3	7	12	7	12
b	6	11(1)	14(1)	13	14
c	5(1)	10	15	11	15
d	2	10(1)	15	13	12

Comments/Observations:

	1857	1859	1861	1862	1863
	Day 30	Day 30	Day 30	Day 30	Day 30
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	3	7	12	7	12
b	6	11	14	13	14
c	5	10	15	11	15
d	2	9	15	13	12

Comments/Observations:

Reviewed By: KD Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Number of Alive Embryos and Hatched Organisms

	1857	1859	1861	1862	1863
	Day 31	Day 31	Day 31	Day 31	Day 31
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	3	7	11	7	12
b	6	11	14	13	14
c	5	10	14/15	11	15
d	2	9	15	13	12

Comments/Observations:

	1857	1859	1861	1862	1863
	Day 32	Day 32	Day 32	Day 32	Day 32
replicate	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched	Alive Hatched
a	3	7	11	7	12
b	6	11	14/13/14	13	13
c	5	10	15	11	15
d	2	9	15	13	12

Comments/Observations:

Reviewed By: JD Date Reviewed: 2019/10/23

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

New Solutions

Conc. (%) / Day	1857	1859	1861	1862	1863			
pH (units)								
0	8.1	8.2	8.1	8.1	8.2			
1	7.9	7.8	7.8	8.0	8.1			
2	8.2	8.0	7.8	8.1	8.1	8.2		
3	8.2	8.1	8.1	8.2	8.2			
4	8.1	8.2	8.1	8.2	8.3			
5	8.1	8.2	8.1	8.2	8.3			
6	8.1	8.1	8.1	8.2	8.3			
7	8.2	8.1	8.1	8.2	8.3			
8	8.3	8.3	8.1	8.2	8.3			
Conductance (µS/cm)								
0	884	676	860	617	457			
1	920	775	907	657	481			
2	701	701	661	654	490			
3	880	781	908	871	689	489		
4	891	691	889	649	495			
5	900	702	901	651	481			
6	902	680	873	654	470			
7	935	732	905	611	678			
8	785	713	867	575	693			
Dissolved Oxygen (mg/L) (40-100% saturation)								
0	7.3	7.3	7.3	7.3	7.2			
1	7.3	7.3	7.3	7.3	7.3			
2	7.3	7.3	7.3	7.3	7.3			
3	7.3	7.3	7.3	7.3	7.3			
4	7.3	7.3	7.3	7.3	7.3			
5	7.3	7.3	7.3	7.3	7.3			
6	7.3	7.3	7.3	7.3	7.3			
7	7.3	7.3	7.3	7.3	7.3			
8	7.3	7.3	7.3	7.3	7.3			
Temperature (°C)								
0	24	24	24	24	24			
1	24	24	24	24	24			
2	24	24	24	24	24			
3	24	24	24	24	24			
4	24	24	24	24	24			
5	24	24	24	24	24			
6	24	24	24	24	24			
7	24	24	24	24	24			
8	24	24	24	24	24			

Old Solutions

	1857	1859	1861	1862	1863			
pH (units)								
0	8							
1	8.1	8.3	8.2	8.2	8.2			
2	8.1	8.2	8.2	8.3	8.3			
3	8.1	8.2	8.2	8.3	8.3			
4	8.1	8.2	8.2	8.2	8.3			
5	8.1	8.2	8.2	8.2	8.3			
6	8.1	8.1	8.2	8.2	8.3			
7	8.0	8.1	8.2	8.2	8.1			
8	8.2	8.1	8.2	8.2	8.2			
Conductance (µS/cm)								
0			900					
1	893	715	681	651	463			
2	907	775	901	685	502			
3	887	728	895	669	503			
4	825	715	837	684	485			
5	892	729	899	655	504			
6	905	728	932	661	501			
7	902	752	928	687	536			
8	942	775	930	655	672			
Dissolved Oxygen (mg/L) (40-100% saturation)								
0								
1	7.2	7.2	7.3	7.3	7.3			
2	7.3	7.3	7.3	7.3	7.3			
3	7.3	7.3	7.3	7.3	7.3			
4	7.3	7.3	7.3	7.3	7.3			
5	7.2	7.3	7.2	7.3	7.2			
6	7.3	7.3	7.2	7.3	7.2			
7	6.8	6.9	6.1	6.8	6.8			
8	6.7	6.8	7.0	7.0	7.0			
Temperature (°C)								
0								
1	24	24	24	24	24			
2	24	24	24	24	24			
3	24	24	24	24	24			
4	24	24	24	24	24			
5	24	24	24	24	24			
6	24	24	24	24	24			
7	24	24	24	24	24			
8	24	24	24	24	24			

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: W Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

New Solutions

Conc. (%) / Day	1857	1859	1861	1862	1863			
pH (units)								
9	8.3	8.3	8.2	8.3	8.3			
10	8.2	8.2	8.1	8.3	8.3			
11	8.2	8.3	8.2	8.3	8.3			
12	8.2	8.2	8.1	8.1	8.2			
13	8.3	8.2	8.1	8.2	8.3			
14	8.2	8.3	8.0	8.3	8.3			
15	8.2	8.2	8.2	8.3	8.3			
16	8.2	8.4	8.3	8.4	8.3			
17	8.2	8.3	8.2	8.3	8.3			
Conductance (µS/cm)								
9	952	742	913	691	664			
10	960	733	892	624	612			
11	927	735	891	632	614			
12	824	719	869	589	651			
13	882	697	861	599	646			
14	915	715	894	568	615			
15	883	673	841	575	590			
16	922	710	900	620	625			
17	892	689	880	585	623			
Dissolved Oxygen (mg/L) (40-100% saturation)								
9	7.3	7.3	7.3	7.3	7.3			
10	7.3	7.3	7.3	7.3	7.3			
11	7.3	7.3	7.3	7.3	7.3			
12	7.3	7.3	7.3	7.3	7.3			
13	7.3	7.3	7.3	7.3	7.3			
14	7.3	7.3	7.3	7.3	7.3			
15	7.3	7.3	7.3	7.3	7.3			
16	7.3	7.3	7.3	7.3	7.3			
17	7.3	7.3	7.3	7.3	7.3			
Temperature (°C)								
9	24	24	24	24	24			
10	24	24	24	24	24			
11	24	24	24	24	24			
12	24	24	24	24	24			
13	24	24	24	24	24			
14	24	24	24	24	24			
15	24	24	24	24	24			
16	24	24	24	24	24			
17	24	24	24	24	24			

Old Solutions

	1857	1859	1861	1862	1863			
pH (units)								
9	8.0	8.2	8.2	8.2	8.2			
10	7.9	7.9	8.1	8.1	8.0			
11	8.0	8.1	8.1	8.2	8.1			
12	8.0	8.0	8.1	8.1	8.0			
13	8.1	8.1	8.2	8.2	8.2			
14	8.1	8.2	8.2	8.2	8.1			
15	8.0	8.0	8.1	8.1	8.1			
16	8.1	8.1	8.2	8.2	8.1			
17	8.1	8.1	8.2	8.3	8.1			
Conductance (µS/cm)								
9	923	726	931	604	600			
10	918	709	928	604	609			
11	929	709	929	645	691			
12	917	768	932	646	689			
13	874	741	894	620	651			
14	860	733	888	622	661			
15	883	734	902	618	644			
16	902	737	909	613	637			
17	900	735	916	621	641			
Dissolved Oxygen (mg/L) (40-100% saturation)								
9	7.2	7.3	7.0	7.3	7.3			
10	6.6	6.4	6.5	6.5	6.5			
11	6.2	6.0	6.6	6.7	6.7			
12	6.3	6.3	6.3	6.2	6.1			
13	7.1	7.1	7.1	7.1	7.1			
14	6.3	6.6	6.5	6.6	6.6			
15	6.7	6.7	6.8	6.7	6.6			
16	6.9	6.8	6.5	6.5	6.6			
17	7.1	7.0	6.9	7.2	6.9			
Temperature (°C)								
9	24	24	24	24	24			
10	24	24	24	24	24			
11	24	24	24	24	24			
12	24	24	24	24	24			
13	24	24	24	24	24			
14	24	24	24	24	24			
15	24	24	24	24	24			
16	24	24	24	24	24			
17	24	24	24	24	24			

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: NO Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

New Solutions

Conc. (%) / Day	1857	1859	1861	1862	1863			
pH (units)								
18	8.4	8.3	8.0	8.2	8.3			
19	e2	e3	e3	e3	e3			
20	8.2	8.3	8.3	8.3	8.2			
21	8.2	8.3	8.2	8.3	8.3			
22	e2	e3	e1	e3	e2			
23	e1	e3	e2	e3	e2			
24	8.2	8.3	8.1	8.3	8.4			
25	e2	e2	e2	e3	e2			
26	8.3	8.2	8.2	8.3	8.3			
Conductance (µS/cm)								
18	871	677	872	539	607			
19	911	704	856	565	631			
20	860	672	853	561	603			
21	839	674	901	534	604			
22	e46	e61	922	596	617			
23	556	617	930	600	609			
24	829	667	811	581	618			
25	e30	e56	905	605	603			
26	806	663	901	583	589			
Dissolved Oxygen (mg/L) (40-100% saturation)								
18	7.3	7.3	7.3	7.3	7.3			
19	7.3	7.3	7.3	7.3	7.3			
20	7.3	7.3	7.3	7.3	7.3			
21	7.3	7.3	7.3	7.3	7.3			
22	7.3	7.3	7.3	7.3	7.3			
23	7.3	7.3	7.3	7.3	7.3			
24	7.3	7.3	7.3	7.3	7.3			
25	7.3	7.3	7.3	7.3	7.3			
26	7.3	9.3	7.3	7.3	7.3			
Temperature (°C)								
18	24	24	24	24	24			
19	24	24	24	24	24			
20	24	24	24	24	24			
21	24	24	24	24	24			
22	24	24	24	24	24			
23	24	24	24	24	24			
24	24	24	24	24	24			
25	24	24	24	24	24			
26	24	24	24	24	24			

Old Solutions

	1857	1859	1861	1862	1863			
pH (units)								
18	8.0	8.0	8.2	8.1	8.1			
19	e0	e1	e1	e2	e1			
20	8.0	8.1	8.1	8.1	8.0			
21	7.9	8.0	8.1	8.1	8.0			
22	e0	e1	e1	e0	e0			
23	e0	e1	e2	e2	e0			
24	8.1	8.0	8.1	8.2	8.1			
25	e1	7.9	8.0	8.1	e1			
26	8.0	8.0	8.1	8.1	8.0			
Conductance (µS/cm)								
18	885	735	916	620	661			
19	900	771	949	641	685			
20	841	715	875	604	631			
21	843	718	887	608	629			
22	e46	743	931	625	634			
23	e25	709	864	623	628			
24	828	709	916	626	634			
25	904	733	935	622	634			
26	828	706	738	631	633			
Dissolved Oxygen (mg/L) (40-100% saturation)								
18	6.9	6.4	6.4	6.4	6.5			
19	6.9	6.7	6.9	6.9	6.8			
20	6.9	6.9	6.4	6.3	6.4			
21	7.1	6.8	6.2	6.2	6.3			
22	6.9	6.9	6.4	6.4	6.3			
23	7.1	6.5	6.4	6.5	6.5			
24	6.1	6.6	6.5	6.3	6.3			
25	6.9	6.5	6.4	6.3	6.4			
26	6.7	6.6	6.4	6.2	6.3			
Temperature (°C)								
18	24	24	24	24	24			
19	24	24	24	24	24			
20	24	24	24	24	24			
21	24	24	24	24	24			
22	24	24	24	24	24			
23	24	24	24	24	24			
24	24	24	24	24	24			
25	24	24	24	24	24			
26	24	24	24	24	24			

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: W Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

New Solutions

Conc. (%) / Day	1857	1859	1861	1862	1863			
pH (units)								
27	e2	e2	8.3	e2	e2			
28	e.1	e.2	e.1	e3	e.4			
29	e2	e3	62	e3	e3			
30	8.2	8.3	8.1	8.3	8.4			
31	8.2	8.4	8.0	8.2	8.3			
32								
Conductance (µS/cm)								
27	635	649	911	604	609			
28	607	620	866	597	603			
29	614	621	609	591	612			
30	887	634	609	591	615			
31	875	672	928	552	590			
32								
Dissolved Oxygen (mg/L) (40-100% saturation)								
27	7.3	7.3	7.3	7.3	7.3			
28	7.3	7.3	7.3	7.3	7.3			
29	7.3	7.3	7.3	7.3	7.3			
30	7.3	7.3	7.3	7.3	7.3			
31	7.3	7.3	7.3	7.3	7.3			
32								
Temperature (°C)								
27	24	24	24	24	24			
28	24	24	24	24	24			
29	24	24	24	24	24			
30	24	24	24	24	24			
31	24	24	24	24	24			
32								

Old Solutions

Conc. (%) / Day	1857	1859	1861	1862	1863			
pH (units)								
27	7.9	8.0	7.9	7.9	7.9			
28	7.9	8.1	8.1	8.0	8.0			
29	7.9	8.1	8.1	8.0	8.0			
30	8.0	8.0	8.1	8.0	7.9			
31	7.9	8.0	8.1	8.0	7.9			
32	7.9	8.0	8.0	8.0	7.9			
Conductance (µS/cm)								
27	847	713	941	630	640			
28	820	708	935	640	629			
29	880	719	948	645	637			
30	858	724	926	625	641			
31	866	727	917	621	637			
32	876	726	926	615	762			
Dissolved Oxygen (mg/L) (40-100% saturation)								
27	6.0	5.8	5.5	5.5	5.6			
28	6.0	5.7	5.3	5.2	5.8			
29	6.05	6.1	5.9	5.8	5.4			
30	5.4	5.4	5.4	5.2	5.3			
31	6.2	6.2	5.7	5.6	5.8			
32	5.7	5.8	5.2	5.1	4.7			
Temperature (°C)								
27	24	24	24	24	24			
28	24	24	24	24	24			
29	24	24	24	24	24			
30	25	25	25	25	25			
31	24	24	24	24	24			
32	24	24	24	24	24			

DO Levels (60-100% saturation) -
4.4 to 7.3 mg/L at 24°C
4.5 to 7.2 mg/L at 25°C
4.3 to 7.1 mg/L at 26°C

Comments:

Reviewed By: JP Date Reviewed: 2019/10/03

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **1857**

Fish	Replicate # A Length (mm)	Normal/ Abnormal	Replicate # B Length (mm)	Normal/ Abnormal	Replicate # C Length (mm)	Normal/ Abnormal	Replicate # D Length (mm)	Normal/ Abnormal
1	11	N	10	N	9	N	16	N
2	14		10		10		15	N
3	15		10		13		—	—
4	—		11		14		—	—
5	—		12		11		—	—
6	—		13		—	—	—	—
7	—	—	—	—	—	—	—	—
8	—	—	—	—	—	—	—	—
9	—	—	—	—	—	—	—	—
10	—	—	—	—	—	—	—	—
11	—	—	—	—	—	—	—	—
12	—	—	—	—	—	—	—	—
13	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—
15	—	—	—	—	—	—	—	—

Comments

ave 14 | 11 | 11.4 | 15.5

Conc. **1859**

Fish	Replicate # A Length (mm)	Normal/ Abnormal	Replicate # B Length (mm)	Normal/ Abnormal	Replicate # C Length (mm)	Normal/ Abnormal	Replicate # D Length (mm)	Normal/ Abnormal
1	12	A:S	7	N	9	N	10	N
2	9	N	9		10		10	
3	9		9		10		10	
4	11		9		10		11	
5	12		11		11		11	
6	12		11		11		11	
7	12		13		11		12	
8	—	—	9		11		12	
9	—	—	9		12		12	
10	—	—	10		12		—	—
11	—	—	11		—	—	—	—
12	—	—	—	—	—	—	—	—
13	—	—	—	—	—	—	—	—
14	—	—	—	—	—	—	—	—
15	—	—	—	—	—	—	—	—

Comments

ave: 11 | 9.82 | 10.7 | 11

Reviewed By: W Date Reviewed: 2019/10/30

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **1861**

Fish	Replicate # A Length (mm)	Normal/ Abnormal	Replicate # B Length (mm)	Normal/ Abnormal	Replicate # C Length (mm)	Normal/ Abnormal	Replicate # D Length (mm)	Normal/ Abnormal
1	9	N	7	N	10	N	9	N
2			10					
3			10					
4			10					
5			10				10	
6	11		11					
7	12		11					
8	12		11		11			
9	12		11				11	
10	13		13					
11	13		13					
12	—	—	13				12	
13	—	—	13		12			
14	—	—	11					
15	—	—	—	—	12			

Comments: A ave: 10.73 | B 11 | C 10.6 | D 10.4

1862

Fish	Replicate # A Length (mm)	Normal/ Abnormal	Replicate # B Length (mm)	Normal/ Abnormal	Replicate # C Length (mm)	Normal/ Abnormal	Replicate # D Length (mm)	Normal/ Abnormal
1	10	N	7	N	11	N	9	N
2	8		10		10		12	
3	10		9		10		11	
4	10		7		10		10	
5	9		9		7		10	
6	14		12		9		11	
7	11		11		9		9	
8	—	—	9		9		9	
9	—	—	12		10		9	
10	—	—	12		11		9	
11	—	—	9		11		12	
12	—	—	11		—		11	
13	—	—	12		—		10	
14	—	—	—	—	—	—	—	—
15	—	—	—	—	—	—	—	—

Comments: A ave: 10.14 | B 9.85 | C 9.73 | D 10.15

Reviewed By: LD Date Reviewed: 2019/10/30

NAUTILUS ENVIRONMENTAL

Fathead Minnow Bench Sheet

Method FMD 32 Day ELS Client TEC164 Sample: 1819-1857, 1819-1859, 1819-1861, 1819-1862, 1819-1863

Test Termination

For normal/abnormal column, use the following notation:

N=Normal, A= Abnormal And note location: H=head, O=oral, E=eyes, G=gills, F=fins, S=spine

Conc. **1863**

Fish	A Length (mm)	A Normal/ Abnormal	B Length (mm)	B Normal/ Abnormal	C Length (mm)	C Normal/ Abnormal	D Length (mm)	D Normal/ Abnormal
1	13	N	9	N	11	N	10	N
2	10		8		8		10	
3	12		13		9		9	
4	9		10		9		10	
5	10		8		11		11	
6	8		9		10		8	
7	8		12		8		10	
8	11		12		12		9	
9	12		10		12		12	
10	12		8		7		8	
11	10		11		9		11	
12	11		10		9		12	
13	—		9		9		—	
14	—		—		7		—	
15	—		—		10		—	

Comments

A: 10.42 B: 9.92 C: 9.2 D: 9.92

0

Fish	A Length (mm)	A Normal/ Abnormal	B Length (mm)	B Normal/ Abnormal	C Length (mm)	C Normal/ Abnormal	D Length (mm)	D Normal/ Abnormal
1								
2								
3								
4								
5								
6								
7								
8								
9								
10								
11								
12								
13								
14								
15								

Comments

Reviewed By: _____ Date Reviewed: _____

NAUTILUS ENVIRONMENTAL

Organism Weights Bench Sheet

Client TEC1164 Sample Cu-15 Organism FM Batch 20190822FM

	Item Weighed	Date	Initials	Balance*
Initial Weight (mg):	dried pan	2019/08/28	AW	Mettler
Final Weight (mg):	dried pan + organisms	2019/09/27	AD	1

* same balance must be used for initial and final weights
* for FM/HA/CT, must use scale with 0.01 mg accuracy

Concentration

Replicate	CTL UNT		CTL-15		CTL-20		1851		1853		1854	
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
a	1014.31	1049.34	1012.03	1045.69	1014.46	1051.09	1033.57	1066.40	1021.21	1054.62	1019.91	1038.69
b	1027.64	1063.69	1019.81	1048.86	1024.87	1059.43	1029.83	1062.59	1015.18	1049.70	998.02	1029.09
c	1022.02	1060.78	1012.14	1050.06	1028.75	1063.53	1026.72	1061.45	1013.72	1052.12	1012.27	1045.46
d	1021.49	1057.97	1031.25	1065.55	1022.58	1062.48	998.96	1030.69	1001.92	1037.61	1010.13	1047.00
e												

Concentration

Replicate	1858		1860									
	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final	Initial	Final
a	~~1010.11~~ AW	1063.03	1008.58	1030.44								
b	1014.74	1044.57	1000.24	~~1010.37~~ AD								
c	1006.27	1036.57	993.75	1020.99								
d	1010.11	~~1046.89~~ AD	1030.27	1061.90								
e	1030.60											
	(d) 1047.02		(h) 1010.53									

Balance Calibration Check:

	Initial	Final
first pan weighed:	CTL UNT D	1858 A
weight of first pan:	1021.49	1063.03
first pan after all other pans weighed:	1021.50	1063.04

% difference <5%: Yes/No Yes/No

% difference = $\frac{\text{(initial weight - reweight)}}{\text{(initial weight + reweight) / 2)}} \times 100\%$

Test Validity Met: Yes/No/NA

Results are Logical:** Yes/No

** no negative numbers, consistent values across replicates

If "no" is circled for any parameter, notify Lab Supervisor/ QA Group to determine appropriate action

Reviewed By: JD Date Reviewed: 2019/10/30

NAUTILUS ENVIRONMENTAL

Organism Weights Bench Sheet

Client TEC164 Sample 32-day Cv-203 Organism FM Batch 20190822FM

	Item Weighed	Date	Initials	Balance*
Initial Weight (mg):	dried pan	2019/08/28	AW	Mettler 1
Final Weight (mg):	dried pan + organisms	2019/09/27	AD	1

* same balance must be used for initial and final weights
* for FM/HA/CT, must use scale with 0.01 mg accuracy

Concentration

Replicate	1849 Initial	1849 Final	1850 Initial	1850 Final	1852 Initial	1852 Final	1855 Initial	1855 Final	1856 Initial	1856 Final	1857 Initial	1857 Final
a	1018.70	1049.44	1024.57	1057.11	1030.35	1066.07	1017.92	1046.94	1017.62	1050.34	1004.79	1026.04
b	1023.21	1051.37	1022.81	1055.03	1009.59	1045.50	1030.52	1063.59	1036.10	1062.24	1017.81	1036.59
c	1027.22	1057.68	1025.16	1055.83	1027.58	1058.82	1033.33	1058.47	1026.16	1059.12	1034.30	1053.46
d	1012.31	1047.30	1017.59	1055.36	1028.92	1059.52	1011.08	1047.53	1020.98	1058.75	1030.24	1052.61
e												

Concentration

Replicate	1859 Initial	1859 Final	1861 Initial	1861 Final	1862 Initial	1862 Final	1863 Initial	1863 Final				
a	1002.42	1030.07	1003.19	1036.90	1011.47	1034.78	997.87	1029.16	Initial	Final	Initial	Final
b	1006.29	1030.14	1007.71	1043.45	997.54	1026.86	1016.21	~~1046.8~~ NO				
c	994.09	1020.21	993.41	1030.14	1011.07	1036.25	1019.56	1051.80				
d	998.61	1029.78	1006.22	1039.26	1010.69	1045.04	1006.62	1034.51				
e								(a)1047.05				

Balance Calibration Check:

	Initial	Final
first pan weighed:	1849 D	1857 D
weight of first pan:	1012.31	1052.61
first pan after all other pans weighed:	1012.32	1052.56
% difference <5%:	**Yes/No**	**Yes/No**

Test Validity Met: Yes/No/NA

Results are Logical:** Yes/No

** no negative numbers, consistent values across replicates

$$\% \text{ difference} = \frac{(\text{initial weight} - \text{reweight})}{(\text{initial weight} + \text{reweight}) / 2)} \times 100\%$$

If "no" is circled for any parameter, notify Lab Supervisor/ QA Group to determine appropriate action

Reviewed By: VO Date Reviewed: 2019/10/30

CETIS Summary Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Batch ID:	00-6756-6431	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-5263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
FR_FRCP1	04-8034-7382	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)		
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	48h (15 °C)		
GH_ERC	12-0073-7820	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5696	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-0	
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-2	
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-19	
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1

Fathead minnow (Pimephales promelas) 32-d survival and growth test
Nautilus Environmental Calgary

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 20 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control 15 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed hatch rate	1
07-3427-7376	Hatch Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed hatch rate	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	LC_SLC passed length	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9800	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8965	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	CM_MC1 passed length	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	Control 15 passed length	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.8220	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9159	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9751	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	EV_HC1 passed length	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9330	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.0670	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	GH_ERC passed length	1

Fathead minnow (Pimephales promelas) 32-d survival and growth test

Nautilus Environmental Calgary

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.9880	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	FR_FRCP1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	1.0000	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	LC_DCDS passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	LC_LC5 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	LC_SLC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	Control 20 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	LC_LCDSSLCC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	LC_LC3 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	FR_UFR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	Control passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	CM_MC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	CM_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1760	Control 15 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	FR_FRABCH passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	GH_FR1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	GH_ERC passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	GH_ER2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	EV_HC1 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	EV_MC2 passed length	1
04-0046-4625	Length	Equal Variance t Two-Sample Test	0.1780	FR_FRCP1 passed length	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	GH_ER2 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	FR_FRABCH passed mean dry biomass-m	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	LC_SLC passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	LC_LCDSSLCC passed mean dry biomass	1

Fathead minnow (Pimephales promelas) 32-d survival and growth test
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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	FR_UFR1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	FR_FRCP1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	CM_MC1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	GH_FR1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	CM_MC2 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	EV_MC2 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	LC_LC5 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	LC_LC3 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	GH_ERC passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	EV_HC1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	Control passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	Control 15 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	LC_DCDS passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7260	Control 20 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	CM_MC1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	GH_ERC passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	Control passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	LC_LC5 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	CM_MC2 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	FR_UFR1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	LC_SLC passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	EV_MC2 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	LC_LC3 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	GH_FR1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	Control 15 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	LC_DCDS passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	GH_ER2 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	FR_FRCP1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	LC_LCDSSLCC passed mean dry biomass	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	FR_FRABCH passed mean dry biomass-m	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	EV_HC1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.7856	Control 20 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	LC_LC5 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	EV_HC1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	LC_SLC passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	EV_MC2 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	LC_DCDS passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	CM_MC1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	LC_LC3 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	LC_LCDSSLCC passed mean dry biomass	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	CM_MC2 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	Control 20 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	GH_ER2 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	Control passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	FR_UFR1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	Control 15 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	GH_ERC passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	FR_FRABCH passed mean dry biomass-m	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	FR_FRCP1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.2092	GH_FR1 passed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	LC_LCDSSLCC failed mean dry biomass-	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	FR_UFR1 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	FR_FRCP1 failed mean dry biomass-mg	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	LC_SLC failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	FR_FRABCH failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	LC_LC3 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	Control 15 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	LC_DCDS failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	Control failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	LC_LC5 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	Control 20 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	GH_ER2 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	CM_MC1 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	EV_HC1 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	CM_MC2 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	GH_FR1 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	GH_ERC failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	4.2E-04	EV_MC2 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	GH_FR1 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	LC_LC5 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	EV_HC1 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	LC_DCDS failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	GH_ERC failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	Control failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	LC_LC3 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	FR_FRCP1 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	Control 15 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	CM_MC1 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	LC_SLC failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	Control 20 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	CM_MC2 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	FR_UFR1 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	LC_LCDSSLCC failed mean dry biomass-	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	FR_FRABCH failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	GH_ER2 failed mean dry biomass-mg	1
13-9327-2355	Mean Dry Biomass-mg	Equal Variance t Two-Sample Test	0.0344	EV_MC2 failed mean dry biomass-mg	1

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Hatch Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	LC	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
Control 15	N	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
Control 20	MC	4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_FRCP1		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_FRABCH		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
FR_UFR1		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
GH_FR1		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
GH_ERC		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
GH_ER2		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
EV_HC1		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
EV_MC2		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
CM_MC2		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
CM_MC1		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
LC_LCDSSLCC		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_SLC		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_LC3		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_DCDS		4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	1.67%
LC_LC5		4	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Length Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	LC	4	10.37	9.837	10.91	9.67	10.58	0.1683	0.3366	3.25%	0.00%
Control 15	N	4	10.21	9.852	10.56	9.93	10.43	0.1109	0.2217	2.17%	1.61%
Control 20	MC	4	10.2	9.864	10.54	9.93	10.4	0.1054	0.2109	2.07%	1.66%
FR_FRCP1		4	11.09	9.639	12.55	10	12	0.4569	0.9137	8.24%	-6.94%
FR_FRABCH		4	10.94	9.06	12.82	10.08	12.67	0.5907	1.181	10.80%	-5.47%
FR_UFR1		4	10.28	9.624	10.94	9.93	10.83	0.2061	0.4122	4.01%	0.89%
GH_FR1		4	10.42	9.567	11.27	9.93	11	0.269	0.536	5.14%	-0.46%
GH_ERC		4	10.69	9.993	11.39	10.08	11.09	0.2191	0.4383	4.10%	-3.06%
GH_ER2		4	10.59	9.965	11.21	10.07	11	0.1957	0.3914	3.70%	-2.07%
EV_HC1		4	10.3	9.937	10.67	10	10.54	0.1149	0.2298	2.23%	0.67%
EV_MC2		4	10.55	9.32	11.78	9.92	11.5	0.3859	0.7716	7.32%	-1.69%
CM_MC2		4	12.97	9.561	16.39	11	15.5	1.073	2.145	16.53%	-25.09%
CM_MC1		4	10.59	9.576	11.6	9.85	11.4	0.3178	0.6356	6.00%	-2.07%
LC_LCDSSLCC		4	10.63	9.742	11.52	9.82	11	0.2791	0.5582	5.25%	-2.40%
LC_SLC		4	9.67	8.835	10.5	9.2	10.33	0.2623	0.5247	5.43%	6.77%
LC_LC3		4	10.68	10.28	11.08	10.4	11	0.1257	0.2514	2.35%	-2.99%
LC_DCDS		4	9.967	9.632	10.3	9.73	10.15	0.1054	0.2108	2.11%	3.90%
LC_LC5		4	9.865	9.066	10.66	9.2	10.42	0.251	0.5021	5.09%	4.89%

Fathead minnow (Pimephales promelas) 32-d survival and growth test
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Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	LC	4	2.439	2.272	2.606	2.335	2.584	0.05251	0.105	4.31%	0.00%
Control 15	N	4	2.249	1.863	2.635	1.937	2.528	0.1214	0.2428	10.80%	7.78%
Control 20	MC	4	2.431	2.169	2.693	2.304	2.66	0.08231	0.1646	6.77%	0.31%
FR_FRCP1		4	2.073	1.77	2.375	1.877	2.333	0.0949	0.1898	9.16%	15.01%
FR_FRABCH		4	2.257	1.978	2.535	2.148	2.518	0.0876	0.1752	7.76%	7.47%
FR_UFR1		4	2.201	2.068	2.333	2.115	2.315	0.04169	0.08337	3.79%	9.75%
GH_FR1		4	2.308	2.023	2.593	2.04	2.416	0.08956	0.1791	7.76%	5.36%
GH_ERC		4	2.368	2.141	2.596	2.227	2.56	0.07152	0.143	6.04%	2.88%
GH_ER2		4	1.998	1.167	2.83	1.252	2.458	0.2613	0.5227	26.15%	18.05%
EV_HC1		4	2.061	1.541	2.582	1.676	2.43	0.1636	0.3271	15.87%	15.47%
EV_MC2		4	2.16	1.653	2.667	1.743	2.518	0.1592	0.3184	14.74%	11.43%
CM_MC2		4	1.359	1.178	1.541	1.252	1.491	0.05698	0.114	8.38%	44.26%
CM_MC1		4	2.158	1.815	2.501	1.969	2.461	0.1078	0.2155	9.99%	11.52%
LC_LCDSSLCC		4	1.792	1.456	2.127	1.59	2.078	0.1056	0.2111	11.79%	26.54%
LC_SLC		4	1.517	0.5389	2.495	0.666	2.109	0.3074	0.6147	40.52%	37.79%
LC_LC3		4	2.32	2.138	2.503	2.203	2.449	0.05739	0.1148	4.95%	4.85%
LC_DCDS		4	1.669	1.35	2.389	1.554	2.29	0.1633	0.3266	17.47%	23.35%
LC_LC5		4	2.038	1.639	2.237	1.859	2.149	0.06255	0.1251	6.14%	16.44%

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Hatch Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	1.0000	1.0000	1.0000	1.0000
Control 15	N	1.0000	1.0000	1.0000	1.0000
Control 20	MC	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	0.9333
FR_UFR1		1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	0.9333	1.0000
GH_ERC		1.0000	0.9333	1.0000	1.0000
GH_ER2		1.0000	1.0000	0.9333	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	0.9333	1.0000	1.0000
CM_MC2		0.9333	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	0.9333
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_DCDS		0.9333	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000

Length Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	10.58	10.54	10.5	9.87
Control 15	N	10.33	9.93	10.43	10.13
Control 20	MC	10.4	9.93	10.14	10.33
FR_FRCP1		12	10	10.7	11.67
FR_FRABCH		10.7	12.67	10.08	10.31
FR_UFR1		10	10.36	9.93	10.83
GH_FR1		11	10	10.75	9.93
GH_ERC		10.9	10.08	10.69	11.09
GH_ER2		11	10.55	10.73	10.07
EV_HC1		10.27	10.4	10	10.54
EV_MC2		9.92	11.5	9.92	10.85
CM_MC2		14	11	11.4	15.5
CM_MC1		10.6	9.85	11.4	10.5
LC_LCDSSLCC		11	9.82	10.7	11
LC_SLC		9.3	9.2	10.33	9.85
LC_LC3		10.73	11	10.6	10.4
LC_DCDS		10.14	9.85	9.73	10.15
LC_LC5		10.42	9.92	9.2	9.92

Fathead minnow (Pimephales promelas) 32-d survival and growth test

Nautilus Environmental Calgary

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	2.335	2.403	2.584	2.432
Control 15	N	2.244	1.937	2.528	2.267
Control 20	MC	2.442	2.304	2.319	2.66
FR_FRCP1		2.049	1.877	2.031	2.333
FR_FRABCH		2.169	2.148	2.191	2.518
FR_UFR1		2.189	2.184	2.315	2.115
GH_FR1		2.381	2.394	2.416	2.04
GH_ERC		2.227	2.301	2.56	2.385
GH_ER2		1.252	2.071	2.213	2.458
EV_HC1		1.935	2.205	1.676	2.43
EV_MC2		2.181	1.743	2.197	2.518
CM_MC2		1.417	1.252	1.277	1.491
CM_MC1		2.162	1.989	2.02	2.461
LC_LCDSSLCC		1.81	1.59	1.688	2.078
LC_SLC		1.457	0.686	1.816	2.109
LC_LC3		2.247	2.383	2.449	2.203
LC_DCDS		1.554	1.955	1.679	2.29
LC_LC5		2.086	2.056	2.149	1.859

Hatch Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	15/15	15/15	15/15	15/15
Control 15	N	15/15	15/15	15/15	15/15
Control 20	MC	15/15	15/15	15/15	15/15
FR_FRCP1		15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	15/15	14/15
FR_UFR1		15/15	15/15	15/15	15/15
GH_FR1		15/15	15/15	14/15	15/15
GH_ERC		15/15	14/15	15/15	15/15
GH_ER2		15/15	15/15	14/15	15/15
EV_HC1		15/15	15/15	15/15	15/15
EV_MC2		15/15	14/15	15/15	15/15
CM_MC2		14/15	15/15	15/15	15/15
CM_MC1		15/15	15/15	15/15	14/15
LC_LCDSSLCC		15/15	15/15	15/15	15/15
LC_SLC		15/15	15/15	15/15	15/15
LC_LC3		15/15	15/15	15/15	15/15
LC_DCDS		14/15	15/15	15/15	15/15
LC_LC5		15/15	15/15	15/15	15/15

CETIS Summary Report

Report Date: 26 Nov-19 08:15 (p 1 of 8)
Test Code/ID: Control_B / 09-2023-6021

Hyalella 10-d Survival and Growth Sediment Test

Nautilus Environmental Calgary

Batch ID:	07-6055-8649	Test Type:	Survival-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	EPA/600/R-99/064 (2000)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Hyalella azteca	Brine:	
Test Length:	32d 0h	Taxon:	Malacostraca	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)		
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	15-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	49h (14.5 °C)		
GH_ER2	06-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (11.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.6 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:31	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:02	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-09	
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-09-	
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_03_W	
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_03_W	
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_LC5 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_DCDS failed survival rate	1

Hyalella 10-d Survival and Growth Sediment Test
Nautilus Environmental Calgary

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-04	LC_LC5 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	LC_LC5 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	LC_LC5 failed survival rate	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0168	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	LC_LC5 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0029	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	LC_LC5 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.7E-05	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	LC_LC5 failed survival rate	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0051	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	LC_LC5 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.0E-17	LC_LC5 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	LC_LC5 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	EV_HC1 failed survival rate	1

Hyalella 10-d Survival and Growth Sediment Test
Nautilus Environmental Calgary

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.6E-04	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_LC5 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_LC5 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.9E-06	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	EV_HC1 passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	CM_MC2 passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	Control passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	EV_MC2 passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	LC_LC5 passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	Control 20 passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	GH_ER2 passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	GH_FR1 passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	CM_MC1 passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	GH_ERC passed survival rate	1

Hyalella-10-d Survival and Growth Sediment Test SS SS Nautilus Environmental Calgary

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	LC_DCDS passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	FR_FRCP1 passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	LC_LCDSSLCC passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	FR_UFR1 passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	Control 15 passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	LC_SLC passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	FR_FRABCH passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.1034	LC_LC3 passed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	EV_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	4.4E-04	LC_LC5 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	LC_LC3 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	LC_LCDSSLCC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	LC_DCDS failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	CM_MC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	LC_SLC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	CM_MC2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	Control failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	GH_ER2 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	EV_HC1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	LC_LC5 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	GH_ERC failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	GH_FR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	FR_UFR1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	FR_FRABCH failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	Control 15 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	FR_FRCP1 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	Control 20 failed survival rate	1
02-5595-7325	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0483	EV_MC2 failed survival rate	1

Test Acceptability

Analysis ID	Endpoint	Attribute	Test Stat	TAC Limits Lower	TAC Limits Upper	Overlap	Decision
02-5595-7325	Survival Rate	Control Resp	0.9833	0.8	>>	Yes	Passes Criteria

Hyalella 10-d Survival and Growth Sediment Test
Nautilus Environmental Calgary

32d Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	LC	4	0.9167	0.8151	1.0000	0.8667	1.0000	0.0319	0.0638	6.96%	0.00%
Control 15	N	4	0.9833	0.9303	1.0000	0.9333	1.0000	0.0167	0.0333	3.39%	-7.27%
Control 20	MC	4	0.9667	0.9054	1.0000	0.9333	1.0000	0.0193	0.0385	3.98%	-5.45%
FR_FRCP1		4	0.6167	0.3515	0.8819	0.4000	0.8000	0.0833	0.1667	27.03%	32.73%
FR_FRABCH		4	0.7155	0.3365	1.0000	0.4000	0.9286	0.1191	0.2382	33.29%	21.95%
FR_UFR1		4	0.8667	0.6730	1.0000	0.7333	1.0000	0.0609	0.1217	14.04%	5.45%
GH_FR1		4	0.8333	0.5527	1.0000	0.6000	1.0000	0.0882	0.1764	21.17%	9.09%
GH_ERC		4	0.7833	0.6242	0.9425	0.6667	0.8667	0.0500	0.1000	12.77%	14.55%
GH_ER2		4	0.6833	0.1982	1.0000	0.2667	1.0000	0.1524	0.3049	44.62%	25.45%
EV_HC1		4	0.8000	0.5261	1.0000	0.6000	1.0000	0.0861	0.1721	21.52%	12.73%
EV_MC2		4	0.7500	0.3787	1.0000	0.4000	0.8667	0.1167	0.2333	31.11%	18.18%
CM_MC2		4	0.2667	0.0730	0.4603	0.1333	0.4000	0.0609	0.1217	45.64%	70.91%
CM_MC1		4	0.7500	0.4579	1.0000	0.5333	0.9333	0.0918	0.1836	24.48%	18.18%
LC_LCDSSLCC		4	0.6167	0.4355	0.7978	0.4667	0.7333	0.0569	0.1139	18.46%	32.73%
LC_SLC		4	0.6167	0.2662	0.9672	0.3333	0.8667	0.1101	0.2203	35.72%	32.73%
LC_LC3		4	0.9167	0.7159	1.0000	0.7333	1.0000	0.0631	0.1262	13.77%	0.00%
LC_DCDS		4	0.7333	0.4333	1.0000	0.4667	0.8667	0.0943	0.1886	25.71%	20.00%
LC_LC5		4	0.8667	0.7168	1.0000	0.8000	1.0000	0.0471	0.0943	10.88%	5.45%

32d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	0.8667	0.8667	0.9333	1.0000
Control 15	N	1.0000	1.0000	0.9333	1.0000
Control 20	MC	1.0000	0.9333	0.9333	1.0000
FR_FRCP1		0.4000	0.8000	0.6667	0.6000
FR_FRABCH		0.6667	0.4000	0.9286	0.8667
FR_UFR1		0.9333	0.7333	1.0000	0.8000
GH_FR1		0.6000	0.9333	0.8000	1.0000
GH_ERC		0.6667	0.8667	0.8667	0.7333
GH_ER2		0.2667	0.7333	0.7333	1.0000
EV_HC1		0.7333	1.0000	0.6000	0.8667
EV_MC2		0.8667	0.4000	0.8667	0.8667
CM_MC2		0.2000	0.4000	0.3333	0.1333
CM_MC1		0.6667	0.8667	0.5333	0.9333
LC_LCDSSLCC		0.4667	0.7333	0.6667	0.6000
LC_SLC		0.6667	0.3333	0.6000	0.8667
LC_LC3		0.7333	0.9333	1.0000	1.0000
LC_DCDS		0.4667	0.8667	0.7333	0.8667
LC_LC5		0.8000	0.8667	1.0000	0.8000

Hyalella 10-d Survival and Growth Sediment Test
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32d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	13/15	13/15	14/15	15/15
Control 15	N	15/15	15/15	14/15	15/15
Control 20	MC	15/15	14/15	14/15	15/15
FR_FRCP1		6/15	12/15	10/15	9/15
FR_FRABCH		10/15	6/15	13/14	13/15
FR_UFR1		14/15	11/15	15/15	12/15
GH_FR1		9/15	14/15	12/15	15/15
GH_ERC		10/15	13/15	13/15	11/15
GH_ER2		4/15	11/15	11/15	15/15
EV_HC1		11/15	15/15	9/15	13/15
EV_MC2		13/15	6/15	13/15	13/15
CM_MC2		3/15	6/15	5/15	2/15
CM_MC1		10/15	13/15	8/15	14/15
LC_LCDSSLCC		7/15	11/15	10/15	9/15
LC_SLC		10/15	5/15	9/15	13/15
LC_LC3		11/15	14/15	15/15	15/15
LC_DCDS		7/15	13/15	11/15	13/15
LC_LC5		12/15	13/15	15/15	12/15

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	10-4502-7446	**Endpoint:**	Hatch Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-19 16:05	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	16-0745-3546	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2959	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	15-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	(20 Aug)
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	(20 Aug)
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	(15 Aug)
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	(20 Aug)
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	(15 Aug)
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	(15 Aug)
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	(20 Aug)
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	(20 Aug)
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	(20 Aug)
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	(15 Aug)
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	(20 Aug)
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	(15 Aug)
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	(20 Aug)
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	(20 Aug)
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	(20 Aug)

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (FR_UFR1)		FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.5000	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.5000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.5000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 10-4502-7446 Endpoint: Hatch Rate CETIS Version: CETISv1.9.4
Analyzed: 20 Nov-19 16:05 Analysis: STP 2xK Contingency Tables Status Level: 1

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.352	3.2	0.9827	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.352		1.0000	Non-Significant Trend in Controls

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_FRCP1		60	0	60	1	0	0.0%
FR_FRABCH		59	1	60	0.9833	0.01667	1.67%
FR_UFR1	XC	60	0	60	1	0	0.0%
GH_FR1		59	1	60	0.9833	0.01667	1.67%
GH_ERC		59	1	60	0.9833	0.01667	1.67%
GH_ER2		59	1	60	0.9833	0.01667	1.67%
EV_HC1		60	0	60	1	0	0.0%
EV_MC2		59	1	60	0.9833	0.01667	1.67%
CM_MC2		59	1	60	0.9833	0.01667	1.67%
CM_MC1		59	1	60	0.9833	0.01667	1.67%
LC_LCDSSLCC		60	0	60	1	0	0.0%
LC_SLC		60	0	60	1	0	0.0%
LC_LC3		60	0	60	1	0	0.0%
LC_DCDS		59	1	60	0.9833	0.01667	1.67%
LC_LC5		60	0	60	1	0	0.0%

Hatch Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	0.9333
FR_UFR1	XC	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	0.9333	1.0000
GH_ERC		1.0000	0.9333	1.0000	1.0000
GH_ER2		1.0000	1.0000	0.9333	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	0.9333	1.0000	1.0000
CM_MC2		0.9333	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	0.9333
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_DCDS		0.9333	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000

Fathead minnow (Pimephales promelas) 32-d survival and growth test

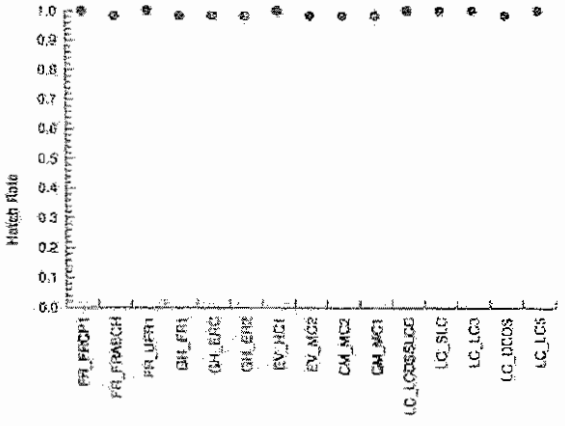
Nautilus Environmental Calgary

Analysis ID: 10-4502-7446 Endpoint: Hatch Rate CETIS Version: CETISv1.9.4
Analyzed: 20 Nov-19 16:05 Analysis: STP 2xK Contingency Tables Status Level: 1

Hatch Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	15/15	14/15
FR_UFR1	XC	15/15	15/15	15/15	15/15
GH_FR1		15/15	15/15	14/15	15/15
GH_ERC		15/15	14/15	15/15	15/15
GH_ER2		15/15	15/15	14/15	15/15
EV_HC1		15/15	15/15	15/15	15/15
EV_MC2		15/15	14/15	15/15	15/15
CM_MC2		14/15	15/15	15/15	15/15
CM_MC1		15/15	15/15	15/15	14/15
LC_LCDSSLCC		15/15	15/15	15/15	15/15
LC_SLC		15/15	15/15	15/15	15/15
LC_LC3		15/15	15/15	15/15	15/15
LC_DCDS		14/15	15/15	15/15	15/15
LC_LC5		15/15	15/15	15/15	15/15

Graphics



Analyst: SS QA: Dec 23/19

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	05-7707-1270	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.9.4
Analyzed:	09 Dec-19 14:06	Analysis:	Parametric-Two Sample	Status Level:	1
Batch ID:	06-9565-9632	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
EV_HC1	12-0828-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.6 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-0	
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-2	
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-19	
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 05-7707-1270 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.4
Analyzed: 09 Dec-19 14:06 Analysis: Parametric-Two Sample Status Level: 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRCP1 passed mean dry biomass-mg	6.64%
		FR_FRABCH passed mean dry biomass-mg	6.64%
		GH_FR1 passed mean dry biomass-mg	6.64%
		GH_ERC passed mean dry biomass-mg	6.64%
		GH_ER2 passed mean dry biomass-mg	6.64%
		EV_HC1 passed mean dry biomass-mg	6.64%
		EV_MC2 passed mean dry biomass-mg	6.64%
		CM_MC2 failed mean dry biomass-mg	6.64%
		CM_MC1 passed mean dry biomass-mg	6.64%
		LC_LCDSSLCC failed mean dry biomass-mg	6.64%
		LC_SLC failed mean dry biomass-mg	6.64%
		LC_LC3 passed mean dry biomass-mg	6.64%
		LC_DCDS failed mean dry biomass-mg	6.64%
		LC_LC5 failed mean dry biomass-mg	6.64%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRCP1	1.238	1.943	0.201	6	CDF	0.1310	Non-Significant Effect
(FR_uFR1)		FR_FRABCH	-0.5739	1.943	0.189	6	CDF	0.7066	Non-Significant Effect
		GH_FR1	-1.083	1.943	0.192	6	CDF	0.8398	Non-Significant Effect
		GH_ERC	-2.023	1.943	0.161	6	CDF	0.9553	Non-Significant Effect
		GH_ER2	0.7646	1.943	0.514	6	CDF	0.2368	Non-Significant Effect
		EV_HC1	0.8265	1.943	0.328	6	CDF	0.2201	Non-Significant Effect
		EV_MC2	0.2491	1.943	0.32	6	CDF	0.4058	Non-Significant Effect
		CM_MC2*	11.92	1.943	0.137	6	CDF	1.1E-05	Significant Effect
		CM_MC1	0.3722	1.943	0.225	6	CDF	0.3613	Non-Significant Effect
		LC_LCDSSLCC*	3.606	1.943	0.221	6	CDF	0.0056	Significant Effect
		LC_SLC*	2.205	1.943	0.603	6	CDF	0.0348	Significant Effect
		LC_LC3	-1.685	1.943	0.138	6	CDF	0.9285	Non-Significant Effect
		LC_DCDS*	1.967	1.943	0.323	6	CDF	0.0484	Significant Effect
		LC_LC5*	2.171	1.943	0.146	6	CDF	0.0365	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.329	3.2	0.0288	Outlier Detected
Control Trend	Mann-Kendall Trend Test	3.329		0.7391	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.75634	0.339739	14	4.159	1.3E-04	Significant Effect
Error	3.67551	0.0816779	45			
Total	8.43185		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.68	29.14	0.0284	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9484	0.9459	0.0131	Normal Distribution

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 05-7707-1270 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.4
Analyzed: 09 Dec-19 14:06 Analysis: Parametric-Two Sample Status Level: 1

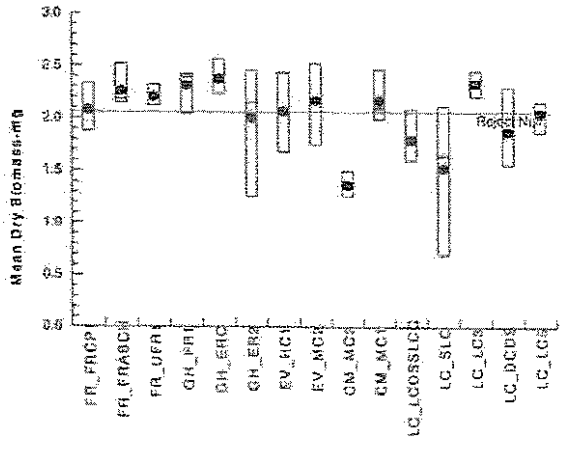
Mean Dry Biomass-mg Summary

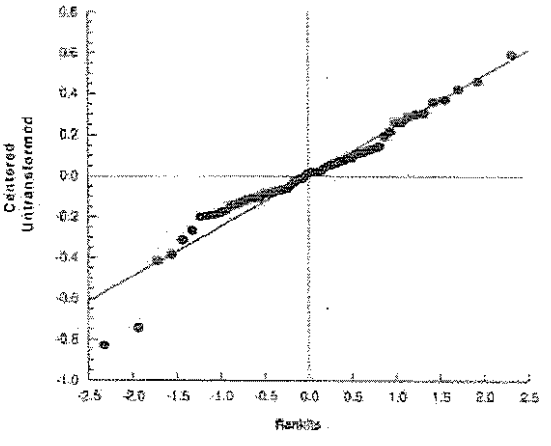
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_FRCP1		4	2.073	1.77	2.375	2.04	1.877	2.333	0.0949	9.16%	0.00%
FR_FRABCH		4	2.257	1.978	2.535	2.18	2.148	2.518	0.0876	7.76%	-8.88%
FR_UFR1	XC	4	2.201	2.068	2.333	2.166	2.115	2.315	0.04169	3.79%	-6.19%
GH_FR1		4	2.308	2.023	2.593	2.386	2.04	2.416	0.08956	7.76%	-11.35%
GH_ERC		4	2.368	2.141	2.596	2.343	2.227	2.56	0.07152	6.04%	-14.27%
GH_ER2		4	1.998	1.167	2.83	2.142	1.252	2.458	0.2613	26.15%	3.57%
EV_HC1		4	2.061	1.541	2.582	2.07	1.676	2.43	0.1636	15.87%	0.54%
EV_MC2		4	2.16	1.653	2.667	2.189	1.743	2.518	0.1592	14.74%	-4.21%
CM_MC2		4	1.359	1.178	1.541	1.347	1.252	1.491	0.05698	8.38%	34.41%
CM_MC1		4	2.158	1.815	2.501	2.091	1.989	2.461	0.1078	9.99%	-4.12%
LC_LCDSSLCC		4	1.792	1.456	2.127	1.749	1.59	2.078	0.1056	11.79%	13.56%
LC_SLC		4	1.517	0.5389	2.495	1.637	0.686	2.109	0.3074	40.52%	26.80%
LC_LC3		4	2.32	2.138	2.503	2.315	2.203	2.449	0.05739	4.95%	-11.96%
LC_DCDS		4	1.869	1.35	2.389	1.817	1.554	2.29	0.1633	17.47%	9.80%
LC_LC5		4	2.038	1.839	2.237	2.071	1.859	2.149	0.06255	6.14%	1.68%

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		2.049	1.877	2.031	2.333
FR_FRABCH		2.169	2.148	2.191	2.518
FR_UFR1	XC	2.169	2.184	2.315	2.115
GH_FR1		2.381	2.394	2.416	2.04
GH_ERC		2.227	2.301	2.56	2.385
GH_ER2		1.252	2.071	2.213	2.458
EV_HC1		1.935	2.205	1.676	2.43
EV_MC2		2.161	1.743	2.197	2.518
CM_MC2		1.417	1.252	1.277	1.491
CM_MC1		2.162	1.989	2.02	2.461
LC_LCDSSLCC		1.81	1.59	1.688	2.078
LC_SLC		1.457	0.686	1.816	2.109
LC_LC3		2.247	2.383	2.449	2.203
LC_DCDS		1.554	1.955	1.679	2.29
LC_LC5		2.086	2.056	2.149	1.859

Graphics





Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	08-9179-7516	Endpoint:	Length	CETIS Version:	CETISv1.9.4
Analyzed:	22 Nov-19 15:53	Analysis:	Parametric-Two Sample	Status Level:	1
Batch ID:	06-9565-9632	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	36h (11.8 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 11:00	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 11:00	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 11:00	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 11:00	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	(20 ug/L)
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	(20 ug/L)
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	(15 ug/L)
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	(20 ug/L)
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	(15 ug/L)
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	(15 ug/L)
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	(20 ug/L)
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	(20 ug/L)
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	(20 ug/L)
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	(15 ug/L)
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	(20 ug/L)
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	(15 ug/L)
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	(20 ug/L)
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	(20 ug/L)
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	(20 ug/L)

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 08-9179-7516 Endpoint: Length CETIS Version: CETISv1.9.4
Analyzed: 22 Nov-19 15:53 Analysis: Parametric-Two Sample Status Level: 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRCP1 passed length	6.37%
		FR_FRABCH passed length	6.37%
		GH_FR1 passed length	6.37%
		GH_ERC passed length	6.37%
		GH_ER2 passed length	6.37%
		EV_HC1 passed length	6.37%
		EV_MC2 passed length	6.37%
		CM_MC2 passed length	6.37%
		CM_MC1 passed length	6.37%
		LC_LCDSSLCC passed length	6.37%
		LC_SLC passed length	6.37%
		LC_LC3 passed length	6.37%
		LC_DCDS passed length	6.37%
		LC_LC5 passed length	6.37%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRCP1	-1.621	2.132	1.068	4	CDF	0.9098	Non-Significant Effect
(FR_UFR1)		FR_FRABCH	-1.055	2.353	1.472	3	CDF	0.8156	Non-Significant Effect
		GH_FR1	-0.4141	2.015	0.681	5	CDF	0.6520	Non-Significant Effect
		GH_ERC	-1.383	2.015	0.606	5	CDF	0.8845	Non-Significant Effect
		GH_ER2	-1.082	2.015	0.573	5	CDF	0.8356	Non-Significant Effect
		EV_HC1	-0.09534	2.132	0.503	4	CDF	0.5357	Non-Significant Effect
		EV_MC2	-0.6115	2.132	0.933	4	CDF	0.7131	Non-Significant Effect
		CM_MC2	-2.467	2.353	2.571	3	CDF	0.9549	Non-Significant Effect
		CM_MC1	-0.8118	2.015	0.763	5	CDF	0.7731	Non-Significant Effect
		LC_LCDSSLCC	-1.009	2.015	0.699	5	CDF	0.8203	Non-Significant Effect
		LC_SLC	1.828	2.015	0.672	5	CDF	0.0635	Non-Significant Effect
		LC_LC3	-1.667	2.132	0.515	4	CDF	0.9146	Non-Significant Effect
		LC_DCDS	1.35	2.132	0.494	4	CDF	0.1242	Non-Significant Effect
		LC_LC5	1.278	2.015	0.655	5	CDF	0.1287	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.608	3.2	0.0079	Outlier Detected
Control Trend	Mann-Kendall Trend Test	3.608		0.7391	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	32.1695	2.29782	14	3.578	5.7E-04	Significant Effect
Error	28.9031	0.642292	45			
Total	61.0727		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	32.99	29.14	0.0029	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9505	0.9459	0.0165	Normal Distribution

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 08-9179-7516 Endpoint: Length CETIS Version: CETISv1.9.4
Analyzed: 22 Nov-19 15:53 Analysis: Parametric-Two Sample Status Level: 1

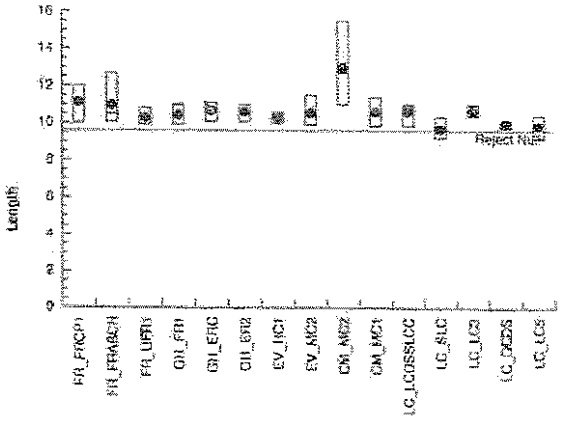
Length Summary

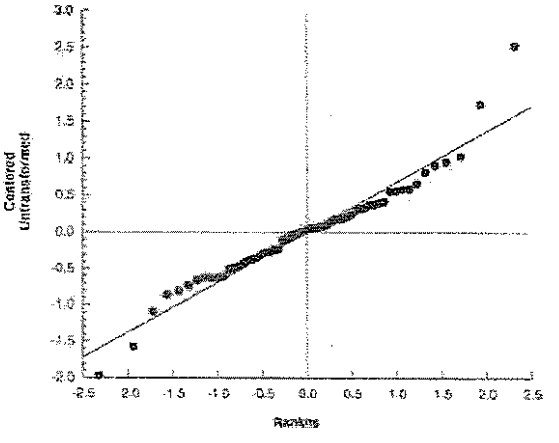
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_FRCP1		4	11.09	9.639	12.55	11.18	10	12	0.4569	8.24%	0.00%
FR_FRABCH		4	10.94	9.06	12.82	10.51	10.08	12.67	0.5907	10.80%	1.37%
FR_UFR1	XC	4	10.28	9.624	10.94	10.18	9.93	10.83	0.2061	4.01%	7.32%
GH_FR1		4	10.42	9.567	11.27	10.38	9.93	11	0.268	5.14%	6.06%
GH_ERC		4	10.69	9.993	11.39	10.8	10.08	11.09	0.2191	4.10%	3.63%
GH_ER2		4	10.59	9.965	11.21	10.64	10.07	11	0.1957	3.70%	4.55%
EV_HC1		4	10.3	9.937	10.67	10.34	10	10.54	0.1149	2.23%	7.12%
EV_MC2		4	10.55	9.32	11.78	10.39	9.92	11.5	0.3858	7.32%	4.91%
CM_MC2		4	12.97	9.561	16.39	12.7	11	15.5	1.073	16.53%	-16.97%
CM_MC1		4	10.59	9.576	11.6	10.55	9.85	11.4	0.3178	6.00%	4.55%
LC_LCDSSLCC		4	10.63	9.742	11.52	10.85	9.82	11	0.2791	5.25%	4.17%
LC_SLC		4	9.67	8.835	10.5	9.575	9.2	10.33	0.2623	5.43%	12.82%
LC_LC3		4	10.63	10.28	11.08	10.66	10.4	11	0.1257	2.35%	3.70%
LC_DCDS		4	9.967	9.632	10.3	9.995	9.73	10.15	0.1054	2.11%	10.14%
LC_LC5		4	9.866	9.066	10.66	9.92	9.2	10.42	0.251	5.09%	11.07%

Length Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		12	10	10.7	11.67
FR_FRABCH		10.7	12.67	10.08	10.31
FR_UFR1	XC	10	10.36	9.93	10.83
GH_FR1		11	10	10.75	9.93
GH_ERC		10.9	10.08	10.69	11.09
GH_ER2		11	10.55	10.73	10.07
EV_HC1		10.27	10.4	10	10.54
EV_MC2		9.92	11.5	9.92	10.85
CM_MC2		14	11	11.4	15.5
CM_MC1		10.6	9.85	11.4	10.5
LC_LCDSSLCC		11	9.82	10.7	11
LC_SLC		9.3	9.2	10.33	9.85
LC_LC3		10.73	11	10.6	10.4
LC_DCDS		10.14	9.85	9.73	10.15
LC_LC5		10.42	9.92	9.2	9.92

Graphics





CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	07-5001-6488	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-19 16:07	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	16-0745-3546	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-5034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	49h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	(20ug/L)
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	(20ug/L)
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	(15ug/L)
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	(20ug/L)
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	(15ug/L)
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	(15ug/L)
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	(20ug/L)
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	(20ug/L)
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	(20ug/L)
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	(15ug/L)
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	(20ug/L)
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	(15ug/L)
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	(20ug/L)
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	(20ug/L)
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	(20ug/L)

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRCP1*	0.0016	Exact	0.0203	Significant Effect
(FR_UCR1)		FR_FRABCH	0.0317	Exact	0.2654	Non-Significant Effect
		GH_FR1	0.3995	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.1684	Exact	0.8419	Non-Significant Effect
		GH_ER2	0.0138	Exact	0.1382	Non-Significant Effect
		EV_HC1	0.2316	Exact	0.9263	Non-Significant Effect
		EV_MC2	0.0816	Exact	0.5711	Non-Significant Effect
		CM_MC2*	0.0000	Exact	1.7E-10	Significant Effect
		CM_MC1	0.0816	Exact	0.5711	Non-Significant Effect
		LC_LCDSSLCC*	0.0016	Exact	0.0203	Significant Effect
		LC_SLC*	0.0016	Exact	0.0203	Significant Effect
		LC_LC3	0.8803	Exact	0.8803	Non-Significant Effect
		LC_DCDS	0.0545	Exact	0.4357	Non-Significant Effect
		LC_LC5	0.6054	Exact	1.0000	Non-Significant Effect

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 07-5001-6488 Endpoint: Survival Rate CETIS Version: CETISv1.9.4
Analyzed: 20 Nov-19 16:07 Analysis: STP 2xK Contingency Tables Status Level: 1

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.441	3.2	0.7519	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.441		1.0000	Non-Significant Trend in Controls

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_FRCP1		37	23	60	0.6167	0.3833	28.85%
FR_FRABCH		42	17	59	0.7119	0.2881	17.86%
FR_UFR1	XC	52	8	60	0.8667	0.1333	0.0%
GH_FR1		50	10	60	0.8333	0.1667	3.85%
GH_ERC		47	13	60	0.7833	0.2167	9.62%
GH_ER2		41	19	60	0.6833	0.3167	21.15%
EV_HC1		48	12	60	0.8	0.2	7.69%
EV_MC2		45	15	60	0.75	0.25	13.46%
CM_MC2		16	44	60	0.2667	0.7333	69.23%
CM_MC1		45	15	60	0.75	0.25	13.46%
LC_LCDSSLCC		37	23	60	0.6167	0.3833	28.85%
LC_SLC		37	23	60	0.6167	0.3833	28.85%
LC_LC3		55	5	60	0.9167	0.08333	-5.77%
LC_DCDS		44	16	60	0.7333	0.2667	15.38%
LC_LC5		52	8	60	0.8667	0.1333	0.0%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		0.4000	0.6000	0.6667	0.6000
FR_FRABCH		0.6667	0.4000	0.9286	0.8667
FR_UFR1	XC	0.9333	0.7333	1.0000	0.8000
GH_FR1		0.6000	0.9333	0.8000	1.0000
GH_ERC		0.6667	0.8667	0.8667	0.7333
GH_ER2		0.2667	0.7333	0.7333	1.0000
EV_HC1		0.7333	1.0000	0.6000	0.8667
EV_MC2		0.8667	0.4000	0.8667	0.8667
CM_MC2		0.2000	0.4000	0.3333	0.1333
CM_MC1		0.6667	0.8667	0.5333	0.9333
LC_LCDSSLCC		0.4667	0.7333	0.6667	0.6000
LC_SLC		0.6667	0.3333	0.6000	0.8667
LC_LC3		0.7333	0.9333	1.0000	1.0000
LC_DCDS		0.4667	0.8667	0.7333	0.8667
LC_LC5		0.8000	0.8667	1.0000	0.8000

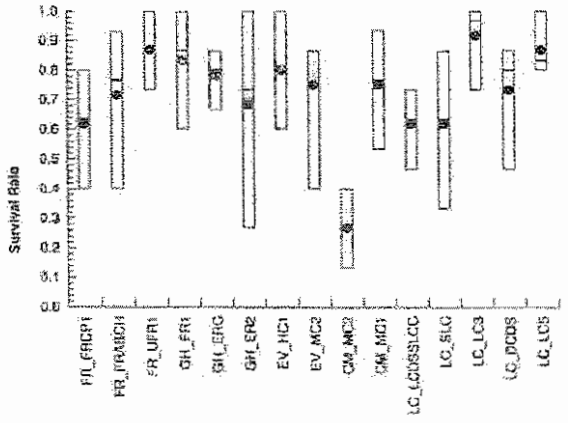
Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 07-5001-6488 Endpoint: Survival Rate CETIS Version: CETISv1.9.4
Analyzed: 20 Nov-19 16:07 Analysis: STP 2xK Contingency Tables Status Level: 1

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		6/15	12/15	10/15	9/15
FR_FRABCH		10/15	6/15	13/14	13/15
FR_UFR1	XC	14/15	11/15	15/15	12/15
GH_FR1		9/15	14/15	12/15	15/15
GH_ERC		10/15	13/15	13/15	11/15
GH_ER2		4/15	11/15	11/15	15/15
EV_HC1		11/15	15/15	9/15	13/15
EV_MC2		13/15	6/15	13/15	13/15
CM_MC2		3/15	6/15	5/15	2/15
CM_MC1		10/15	13/15	8/15	14/15
LC_LCDSSLCC		7/15	11/15	10/15	9/15
LC_SLC		10/15	5/15	9/15	13/15
LC_LC3		11/15	14/15	15/15	15/15
LC_DCDS		7/15	13/15	11/15	13/15
LC_LC5		12/15	13/15	15/15	12/15

Graphics



CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	00-1473-7554	Endpoint:	Hatch Rate	CETIS Version:	CETISv1.9.4
Analyzed:	20 Nov-19 16:27	Analysis:	STP 2xK Contingency Tables	Status Level:	1
Batch ID:	14-2190-8081	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5545	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	(20 ug/L)
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	(20 ug/L)
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	(15 ug/L)
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	(20 ug/L)
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	(15 ug/L)
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	(15 ug/L)
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_08_W	(20 ug/L)
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_08_W	(20 ug/L)
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	(20 ug/L)
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	(15 ug/L)
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	(20 ug/L)
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	(15 ug/L)
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	(20 ug/L)
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	(20 ug/L)
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	(20 ug/L)

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (GH_ER2)		FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.7521	Exact	1.0000	Non-Significant Effect
		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.7521	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.7521	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.7521	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.7521	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.7521	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.7521	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 00-1473-7554 Endpoint: Hatch Rate CETIS Version: CETISv1.9.4
Analyzed: 20 Nov-19 16:27 Analysis: STP 2xK Contingency Tables Status Level: 1

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.352	3.2	0.9827	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.352		0.4783	Non-Significant Trend in Controls

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_FRCP1		60	0	60	1	0	-1.7%
FR_FRABCH		59	1	60	0.9833	0.01667	0.0%
FR_UFR1		60	0	60	1	0	-1.7%
GH_FR1		59	1	60	0.9833	0.01667	0.0%
GH_ERC		59	1	60	0.9833	0.01667	0.0%
GH_ER2	XC	59	1	60	0.9833	0.01667	0.0%
EV_HC1		60	0	60	1	0	-1.7%
EV_MC2		59	1	60	0.9833	0.01667	0.0%
CM_MC2		59	1	60	0.9833	0.01667	0.0%
CM_MC1		59	1	60	0.9833	0.01667	0.0%
LC_LCDSSLCC		60	0	60	1	0	-1.7%
LC_SLC		60	0	60	1	0	-1.7%
LC_LC3		60	0	60	1	0	-1.7%
LC_DCDS		59	1	60	0.9833	0.01667	0.0%
LC_LC5		60	0	60	1	0	-1.7%

Hatch Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	0.9333
FR_UFR1		1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	0.9333	1.0000
GH_ERC		1.0000	0.9333	1.0000	1.0000
GH_ER2	XC	1.0000	1.0000	0.9333	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	0.9333	1.0000	1.0000
CM_MC2		0.9333	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	0.9333
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_DCDS		0.9333	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000

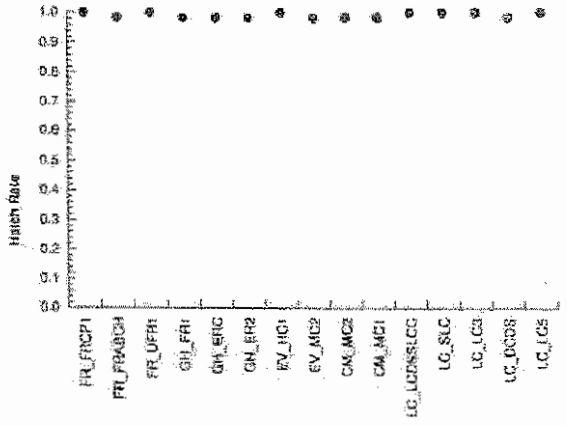
Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	00-1473-7554	Endpoint:	Hatch Rate	CETIS Version:	CETISv1.9.4
Analyzed:	20 Nov-19 16:27	Analysis:	STP 2xK Contingency Tables	Status Level:	1

Hatch Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	15/15	14/15
FR_UFR1		15/15	15/15	15/15	15/15
GH_FR1		15/15	15/15	14/15	15/15
GH_ERC		15/15	14/15	15/15	15/15
GH_ER2	XC	15/15	15/15	14/15	15/15
EV_HC1		15/15	15/15	15/15	15/15
EV_MC2		15/15	14/15	15/15	15/15
CM_MC2		14/15	15/15	15/15	15/15
CM_MC1		15/15	15/15	15/15	14/15
LC_LCDSSLCC		15/15	15/15	15/15	15/15
LC_SLC		15/15	15/15	15/15	15/15
LC_LC3		15/15	15/15	15/15	15/15
LC_DCDS		14/15	15/15	15/15	15/15
LC_LC5		15/15	15/15	15/15	15/15

Graphics



Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	19-0091-4945	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.9.4
Analyzed:	09 Dec-19 14:11	Analysis:	Parametric-Two Sample	Status Level:	1
Batch ID:	07-5666-1678	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	46h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
EV_HC1	12-0828-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	39h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-0	
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-2	
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-19	
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 19-0091-4945 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.4
Analyzed: 09 Dec-19 14:11 Analysis: Parametric-Two Sample Status Level: 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRCP1 passed mean dry biomass-mg	26.13%
		FR_FRABCH passed mean dry biomass-mg	26.13%
		FR_UFR1 passed mean dry biomass-mg	26.13%
		GH_FR1 passed mean dry biomass-mg	26.13%
		GH_ERC passed mean dry biomass-mg	26.13%
		EV_HC1 passed mean dry biomass-mg	26.13%
		EV_MC2 passed mean dry biomass-mg	26.13%
		CM_MC2 failed mean dry biomass-mg	26.13%
		CM_MC1 passed mean dry biomass-mg	26.13%
		LC_LCDSSLCC passed mean dry biomass-m	26.13%
		LC_SLC passed mean dry biomass-mg	26.13%
		LC_LC3 passed mean dry biomass-mg	26.13%
		LC_DCDS passed mean dry biomass-mg	26.13%
		LC_LC5 passed mean dry biomass-mg	26.13%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRCP1	-0.2662	1.943	0.540	6	CDF	0.6005	Non-Significant Effect
(GH-EV2)		FR_FRABCH	-0.9361	1.943	0.536	6	CDF	0.8073	Non-Significant Effect
		FR_UFR1	-0.7646	1.943	0.514	6	CDF	0.7632	Non-Significant Effect
		GH_FR1	-1.12	1.943	0.537	6	CDF	0.8472	Non-Significant Effect
		GH_ERC	-1.365	1.943	0.527	6	CDF	0.8894	Non-Significant Effect
		EV_HC1	-0.2036	1.943	0.599	6	CDF	0.5774	Non-Significant Effect
		EV_MC2	-0.5272	1.943	0.595	6	CDF	0.6915	Non-Significant Effect
		CM_MC2*	2.39	1.943	0.52	6	CDF	0.0270	Significant Effect
		CM_MC1	-0.5637	1.943	0.549	6	CDF	0.7033	Non-Significant Effect
		LC_LCDSSLCC	0.7344	1.943	0.548	6	CDF	0.2452	Non-Significant Effect
		LC_SLC	1.193	1.943	0.784	6	CDF	0.1389	Non-Significant Effect
		LC_LC3	-1.203	1.943	0.52	6	CDF	0.8628	Non-Significant Effect
		LC_DCDS	0.4191	1.943	0.599	6	CDF	0.3449	Non-Significant Effect
		LC_LC5	-0.1456	1.943	0.522	6	CDF	0.5556	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.329	3.2	0.0288	Outlier Detected
Control Trend	Mann-Kendall Trend Test	3.329		0.0435	Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.75634	0.339739	14	4.159	1.3E-04	Significant Effect
Error	3.67551	0.0816779	45			
Total	8.43185		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.69	29.14	0.0284	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9484	0.9459	0.0131	Normal Distribution

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 19-0091-4945 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.4
Analyzed: 09 Dec-19 14:11 Analysis: Parametric-Two Sample Status Level: 1

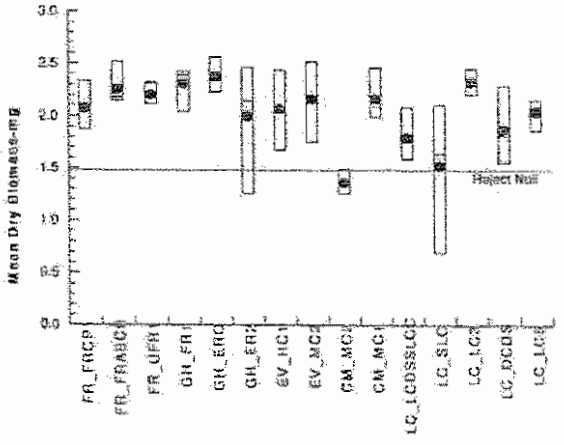
Mean Dry Biomass-mg Summary

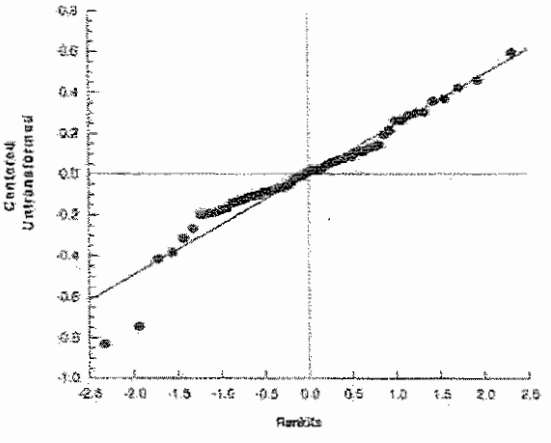
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_FRCP1		4	2.073	1.77	2.375	2.04	1.877	2.333	0.0949	9.16%	0.00%
FR_FRABCH		4	2.257	1.978	2.535	2.18	2.148	2.518	0.0676	7.76%	-8.88%
FR_UFR1		4	2.201	2.068	2.333	2.186	2.115	2.315	0.04169	3.79%	-6.19%
GH_FR1		4	2.308	2.023	2.593	2.388	2.04	2.416	0.08956	7.76%	-11.35%
GH_ERC		4	2.368	2.141	2.596	2.343	2.227	2.56	0.07152	6.04%	-14.27%
GH_ER2	XC	4	1.998	1.167	2.83	2.142	1.252	2.458	0.2613	26.15%	3.57%
EV_HC1		4	2.061	1.541	2.582	2.07	1.676	2.43	0.1636	15.87%	0.54%
EV_MC2		4	2.16	1.653	2.667	2.189	1.743	2.518	0.1592	14.74%	-4.21%
CM_MC2		4	1.359	1.178	1.541	1.347	1.252	1.491	0.05698	8.38%	34.41%
CM_MC1		4	2.158	1.815	2.501	2.091	1.989	2.461	0.1078	9.99%	-4.12%
LC_LCDSSLCC		4	1.792	1.456	2.127	1.749	1.59	2.078	0.1056	11.79%	13.56%
LC_SLC		4	1.517	0.5389	2.495	1.637	0.686	2.109	0.3074	40.52%	26.80%
LC_LC3		4	2.32	2.138	2.503	2.315	2.203	2.449	0.05739	4.95%	-11.96%
LC_DCDS		4	1.869	1.35	2.389	1.817	1.554	2.29	0.1633	17.47%	9.80%
LC_LC5		4	2.038	1.839	2.237	2.071	1.859	2.149	0.06255	6.14%	1.68%

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		2.049	1.877	2.031	2.333
FR_FRABCH		2.169	2.148	2.191	2.518
FR_UFR1		2.189	2.184	2.315	2.115
GH_FR1		2.381	2.394	2.416	2.04
GH_ERC		2.227	2.301	2.56	2.385
GH_ER2	XC	1.252	2.071	2.213	2.458
EV_HC1		1.935	2.205	1.676	2.43
EV_MC2		2.161	1.743	2.197	2.518
CM_MC2		1.417	1.252	1.277	1.491
CM_MC1		2.162	1.989	2.02	2.461
LC_LCDSSLCC		1.81	1.59	1.688	2.078
LC_SLC		1.457	0.686	1.816	2.109
LC_LC3		2.247	2.363	2.449	2.203
LC_DCDS		1.554	1.955	1.679	2.29
LC_LC5		2.086	2.056	2.149	1.659

Graphics





Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	20-6274-4603	**Endpoint:**	Length	**CETIS Version:**	CETISv1.9.4
Analyzed:	22 Nov-19 15:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	07-5668-1678	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 11:00	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 11:00	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 11:00	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 11:00	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	(20ug/L)
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	(20ug/L)
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	(15ug/L)
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	(20ug/L)
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	(15ug/L)
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	(15ug/L)
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	(20ug/L)
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	(20ug/L)
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	(20ug/L)
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	(15ug/L)
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	(20ug/L)
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	(15ug/L)
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	(20ug/L)
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	(20ug/L)
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	(20ug/L)

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 20-6274-4663 Endpoint: Length CETIS Version: CETISv1.9.4
Analyzed: 22 Nov-19 15:54 Analysis: Parametric-Two Sample Status Level: 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRCP1 passed length	6.06%
		FR_FRABCH passed length	6.06%
		FR_UFR1 passed length	6.06%
		GH_FR1 passed length	6.06%
		GH_ERC passed length	6.06%
		EV_HC1 passed length	6.06%
		EV_MC2 passed length	6.06%
		CM_MC2 passed length	6.06%
		CM_MC1 passed length	6.06%
		LC_LCDSSLCC passed length	6.06%
		LC_SLC failed length	6.06%
		LC_LC3 passed length	6.06%
		LC_DCDS failed length	6.06%
		LC_LC5 failed length	6.06%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRCP1	-1.016	2.132	1.06	4	CDF	0.8165	Non-Significant Effect
(GH - ER2)		FR_FRABCH	-0.5665	2.353	1.464	3	CDF	0.6947	Non-Significant Effect
		FR_UFR1	1.082	2.015	0.573	5	CDF	0.1644	Non-Significant Effect
		GH_FR1	0.5047	2.015	0.669	5	CDF	0.3176	Non-Significant Effect
		GH_ERC	-0.3489	2.015	0.592	5	CDF	0.6293	Non-Significant Effect
		EV_HC1	1.256	2.132	0.484	4	CDF	0.1388	Non-Significant Effect
		EV_MC2	0.09246	2.132	0.922	4	CDF	0.4654	Non-Significant Effect
		CM_MC2	-2.19	2.353	2.566	3	CDF	0.9419	Non-Significant Effect
		CM_MC1	-6.4E-07	2.132	0.796	4	CDF	0.5000	Non-Significant Effect
		LC_LCDSSLCC	-0.1247	2.015	0.687	5	CDF	0.5472	Non-Significant Effect
		LC_SLC*	2.603	2.015	0.66	5	CDF	0.0169	Significant Effect
		LC_LC3	-0.4084	2.015	0.469	5	CDF	0.6501	Non-Significant Effect
		LC_DCDS*	2.789	2.132	0.474	4	CDF	0.0247	Significant Effect
		LC_LC5*	2.27	2.015	0.641	5	CDF	0.0362	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.608	3.2	0.0079	Outlier Detected
Control Trend	Mann-Kendall Trend Test	3.608		0.3043	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	32.1695	2.29782	14	3.578	5.7E-04	Significant Effect
Error	28.9031	0.642292	45			
Total	61.0727		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	32.99	29.14	0.0029	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9505	0.9459	0.0165	Normal Distribution

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 20-6274-4663 Endpoint: Length CETIS Version: CETISv1.9.4
Analyzed: 22 Nov-19 15:54 Analysis: Parametric-Two Sample Status Level: 1

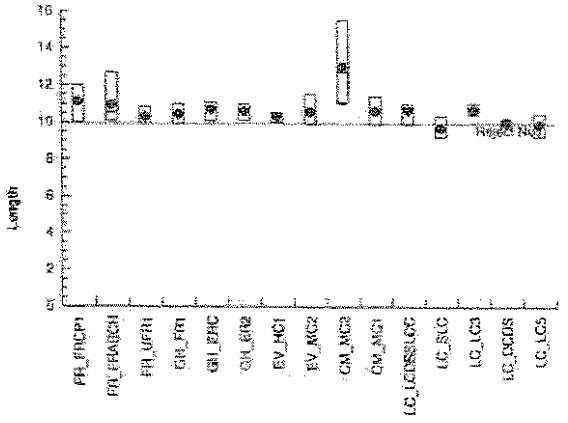
Length Summary

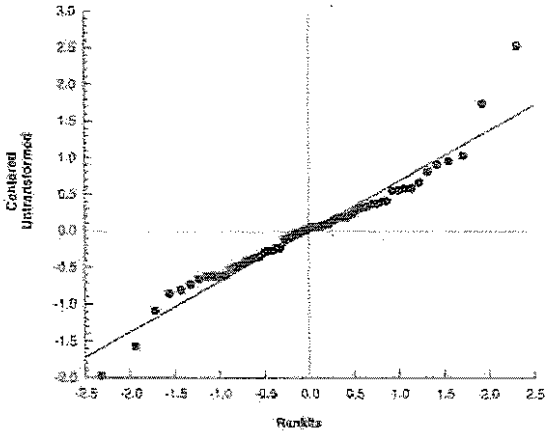
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_FRCP1		4	11.09	9.639	12.55	11.18	10	12	0.4569	8.24%	0.00%
FR_FRABCH		4	10.94	9.06	12.82	10.51	10.08	12.67	0.5907	10.80%	1.37%
FR_UFR1		4	10.28	9.624	10.94	10.18	9.93	10.83	0.2061	4.01%	7.32%
GH_FR1		4	10.42	9.567	11.27	10.38	9.93	11	0.268	5.14%	6.06%
GH_ERC		4	10.69	9.993	11.39	10.8	10.08	11.09	0.2191	4.10%	3.63%
GH_ER2	XC	4	10.59	9.965	11.21	10.64	10.07	11	0.1957	3.70%	4.55%
EV_HC1		4	10.3	9.937	10.67	10.34	10	10.54	0.1149	2.23%	7.12%
EV_MC2		4	10.55	9.32	11.78	10.39	9.92	11.5	0.3858	7.32%	4.91%
CM_MC2		4	12.97	9.561	16.39	12.7	11	15.5	1.073	16.53%	-16.97%
CM_MC1		4	10.59	9.576	11.6	10.55	9.85	11.4	0.3178	6.00%	4.55%
LC_LCDSSLCC		4	10.63	9.742	11.52	10.85	9.82	11	0.2791	5.25%	4.17%
LC_SLC		4	9.67	8.835	10.5	9.575	9.2	10.33	0.2623	5.43%	12.82%
LC_LC3		4	10.68	10.26	11.08	10.66	10.4	11	0.1257	2.35%	3.70%
LC_DCDS		4	9.967	9.632	10.3	9.995	9.73	10.15	0.1054	2.11%	10.14%
LC_LC5		4	9.865	9.066	10.66	9.92	9.2	10.42	0.251	5.09%	11.07%

Length Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		12	10	10.7	11.67
FR_FRABCH		10.7	12.67	10.08	10.31
FR_UFR1		10	10.36	9.93	10.83
GH_FR1		11	10	10.75	9.93
GH_ERC		10.9	10.08	10.69	11.09
GH_ER2	XC	11	10.55	10.73	10.07
EV_HC1		10.27	10.4	10	10.54
EV_MC2		9.92	11.5	9.92	10.85
CM_MC2		14	11	11.4	15.5
CM_MC1		10.6	9.85	11.4	10.5
LC_LCDSSLCC		11	9.82	10.7	11
LC_SLC		9.3	9.2	10.33	9.65
LC_LC3		10.73	11	10.6	10.4
LC_DCDS		10.14	9.85	9.73	10.15
LC_LC5		10.42	9.92	9.2	9.92

Graphics





CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	03-5691-9540	Endpoint:	Survival Rate	CETIS Version:	CETISv1.9.4
Analyzed:	20 Nov-19 16:26	Analysis:	STP 2xK Contingency Tables	Status Level:	1
Batch ID:	14-2190-9081	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	46h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	46h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	46h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	46h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	(20 ug/L)
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	(20 ug/L)
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	(15 ug/L)
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	(20 ug/L)
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	(15 ug/L)
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	(15 ug/L)
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	(20 ug/L)
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	(20 ug/L)
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	(70 ug/L)
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	(15 ug/L)
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	(20 ug/L)
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	(15 ug/L)
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	(20 ug/L)
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	(20 ug/L)
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	(20 ug/L)

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (GH_ER2)		FR_FRCP1	0.2831	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.7536	Exact	1.0000	Non-Significant Effect
		FR_UFR1	0.9960	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.9840	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.9261	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.9528	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.8444	Exact	1.0000	Non-Significant Effect
		CM_MC2*	0.0000	Exact	6.1E-05	Significant Effect
		CM_MC1	0.8444	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.2831	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.2831	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.9998	Exact	0.9998	Non-Significant Effect
		LC_DCDS	0.7893	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.9960	Exact	1.0000	Non-Significant Effect

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 03-5691-9540 Endpoint: Survival Rate CETIS Version: CETISv1.9.4
Analyzed: 20 Nov-19 15:28 Analysis: STP 2xK Contingency Tables Status Level: 1

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.396	3.2	0.8624	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.396		0.3043	Non-Significant Trend in Controls

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_FRCP1		37	23	60	0.6167	0.3833	9.76%
FR_FRABCH		42	16	58	0.7119	0.2759	-5.97%
FR_UFR1		52	8	60	0.8667	0.1333	-26.83%
GH_FR1		50	10	60	0.8333	0.1667	-21.95%
GH_ERC		47	13	60	0.7833	0.2167	-14.63%
GH_ER2	XC	41	19	60	0.6833	0.3167	0.0%
EV_HC1		48	12	60	0.8	0.2	-17.07%
EV_MC2		45	15	60	0.75	0.25	-9.76%
CM_MC2		16	44	60	0.2667	0.7333	60.98%
CM_MC1		45	15	60	0.75	0.25	-9.76%
LC_LCDSSLCC		37	23	60	0.6167	0.3833	9.76%
LC_SLC		37	23	60	0.6167	0.3833	9.76%
LC_LC3		55	5	60	0.9167	0.08333	-34.15%
LC_DCDS		44	16	60	0.7333	0.2667	-7.32%
LC_LC5		52	8	60	0.8667	0.1333	-26.83%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		0.4000	0.8000	0.6667	0.6000
FR_FRABCH		0.6667	0.4000	1.0000	0.8667
FR_UFR1		0.9333	0.7333	1.0000	0.8000
GH_FR1		0.6000	0.9333	0.8000	1.0000
GH_ERC		0.6667	0.8667	0.8667	0.7333
GH_ER2	XC	0.2667	0.7333	0.7333	1.0000
EV_HC1		0.7333	1.0000	0.6000	0.8667
EV_MC2		0.8667	0.4000	0.8667	0.8667
CM_MC2		0.2000	0.4000	0.3333	0.1333
CM_MC1		0.6667	0.8667	0.5333	0.9333
LC_LCDSSLCC		0.4667	0.7333	0.6667	0.6000
LC_SLC		0.6667	0.3333	0.6000	0.8667
LC_LC3		0.7333	0.9333	1.0000	1.0000
LC_DCDS		0.4667	0.8667	0.7333	0.8667
LC_LC5		0.8000	0.8667	1.0000	0.8000

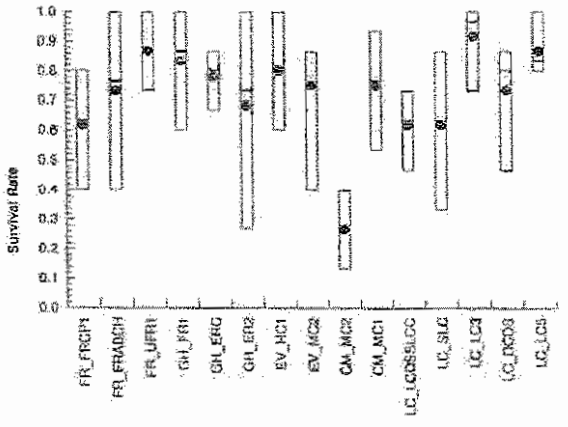
Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	03-5691-9540	Endpoint:	Survival Rate	CETIS Version:	CETISv1.9.4
Analyzed:	20 Nov-19 16:28	Analysis:	STP 2xK Contingency Tables	Status Level:	1

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		6/15	12/15	10/15	9/15
FR_FRABCH		10/15	6/15	13/15	13/15
FR_UFR1		14/15	11/15	15/15	12/15
GH_FR1		9/15	14/15	12/15	15/15
GH_ERC		10/15	13/15	13/15	11/15
GH_ER2	XC	4/15	11/15	11/15	15/15
EV_HC1		11/15	15/15	9/15	13/15
EV_MC2		13/15	6/15	13/15	13/15
CM_MC2		3/15	6/15	5/15	2/15
CM_MC1		10/15	13/15	8/15	14/15
LC_LCDSSLCC		7/15	11/15	10/15	9/15
LC_SLC		10/15	5/15	9/15	13/15
LC_LC3		11/15	14/15	15/15	15/15
LC_DCDS		7/15	13/15	11/15	13/15
LC_LC5		12/15	13/15	15/15	12/15

Graphics



CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	02-9150-4938	**Endpoint:**	Hatch Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-19 16:36	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	02-0179-4918	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	[illegible]
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	[illegible]
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	[illegible]
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	[illegible]
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	[illegible]
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	[illegible]
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	[illegible]
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	[illegible]
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	[illegible]
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	[illegible]
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	[illegible]
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	[illegible]
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	[illegible]
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	[illegible]
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	[illegible]

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
(CM-MC1)		FR_FRABCH	0.7521	Exact	1.0000	Non-Significant Effect
		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.7521	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.7521	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.7521	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.7521	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.7521	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.7521	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 02-9150-4936 Endpoint: Hatch Rate CETIS Version: CETISv1.9.4
Analyzed: 20 Nov-19 16:36 Analysis: STP 2xK Contingency Tables Status Level: 1

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.352	3.2	0.9827	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.352		0.2174	Non-Significant Trend in Controls

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_FRCP1		60	0	60	1	0	-1.7%
FR_FRABCH		59	1	60	0.9833	0.01667	0.0%
FR_UFR1		60	0	60	1	0	-1.7%
GH_FR1		59	1	60	0.9833	0.01667	0.0%
GH_ERC		59	1	60	0.9833	0.01667	0.0%
GH_ER2		59	1	60	0.9833	0.01667	0.0%
EV_HC1		60	0	60	1	0	-1.7%
EV_MC2		59	1	60	0.9833	0.01667	0.0%
CM_MC2		59	1	60	0.9833	0.01667	0.0%
CM_MC1	XC	59	1	60	0.9833	0.01667	0.0%
LC_LCDSSLCC		60	0	60	1	0	-1.7%
LC_SLC		60	0	60	1	0	-1.7%
LC_LC3		60	0	60	1	0	-1.7%
LC_DCDS		59	1	60	0.9833	0.01667	0.0%
LC_LC5		60	0	60	1	0	-1.7%

Hatch Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	0.9333
FR_UFR1		1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	0.9333	1.0000
GH_ERC		1.0000	0.9333	1.0000	1.0000
GH_ER2		1.0000	1.0000	0.9333	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	0.9333	1.0000	1.0000
CM_MC2		0.9333	1.0000	1.0000	1.0000
CM_MC1	XC	1.0000	1.0000	1.0000	0.9333
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_DCDS		0.9333	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000

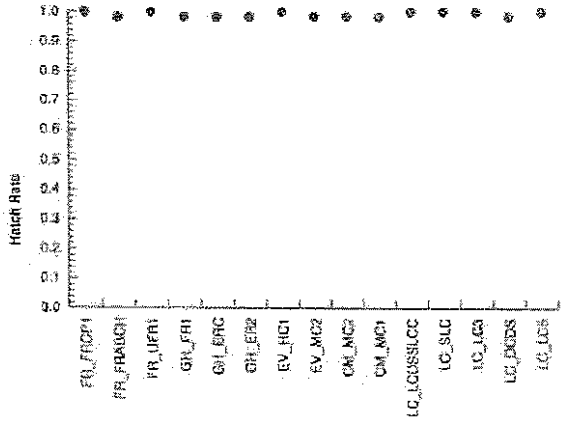
Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	02-5150-4936	**Endpoint:**	Hatch Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-19 16:36	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Hatch Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	15/15	14/15
FR_UFR1		15/15	15/15	15/15	15/15
GH_FR1		15/15	15/15	14/15	15/15
GH_ERC		15/15	14/15	15/15	15/15
GH_ER2		15/15	15/15	14/15	15/15
EV_HC1		15/15	15/15	15/15	15/15
EV_MC2		15/15	14/15	15/15	15/15
CM_MC2		14/15	15/15	15/15	15/15
CM_MC1	XC	15/15	15/15	15/15	14/15
LC_LCDSSLCC		15/15	15/15	15/15	15/15
LC_SLC		15/15	15/15	15/15	15/15
LC_LC3		15/15	15/15	15/15	15/15
LC_DCDS		14/15	15/15	15/15	15/15
LC_LC5		15/15	15/15	15/15	15/15

Graphics



Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	08-6251-9891	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Dec-19 8:23	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	14-4259-2566	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-5263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)		
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-0	
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-2	
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019-	
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-19	
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	

Analyst: SS QA: Dec 23/19

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 08-6251-9691 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.4
Analyzed: 20 Dec-19 8:23 Analysis: Parametric-Two Sample Status Level: 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRCP1 passed mean dry biomass-mg	11.80%
		FR_FRABCH passed mean dry biomass-mg	11.80%
		FR_UFR1 passed mean dry biomass-mg	11.80%
		GH_FR1 passed mean dry biomass-mg	11.80%
		GH_ERC passed mean dry biomass-mg	11.80%
		GH_ER2 passed mean dry biomass-mg	11.80%
		EV_HC1 passed mean dry biomass-mg	11.80%
		EV_MC2 passed mean dry biomass-mg	11.80%
		CM_MC2 failed mean dry biomass-mg	11.80%
		LC_LCDSSLCC failed mean dry biomass-mg	11.80%
		LC_SLC failed mean dry biomass-mg	11.80%
		LC_LC3 passed mean dry biomass-mg	11.80%
		LC_DCDS passed mean dry biomass-mg	11.80%
		LC_LC5 passed mean dry biomass-mg	11.80%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control (CER - MC1)	FR_FRCP1	1.144	1.943	0.299	6	CDF	0.1480	Non-Significant Effect
	FR_FRABCH	-0.05129	1.943	0.291	6	CDF	0.5196	Non-Significant Effect
	FR_UFR1	0.374	1.943	0.249	6	CDF	0.3606	Non-Significant Effect
	GH_FR1	-0.3911	1.943	0.293	6	CDF	0.6454	Non-Significant Effect
	GH_ERC	-0.8481	1.943	0.274	6	CDF	0.7856	Non-Significant Effect
	GH_ER2	0.8687	1.943	0.56	6	CDF	0.2092	Non-Significant Effect
	EV_HC1	0.9206	1.943	0.396	6	CDF	0.1964	Non-Significant Effect
	EV_MC2	0.4445	1.943	0.389	6	CDF	0.3361	Non-Significant Effect
	CM_MC2*	6.633	1.943	0.261	6	CDF	2.8E-04	Significant Effect
	LC_LCDSSLCC*	2.843	1.943	0.313	6	CDF	0.0147	Significant Effect
	LC_SLC*	2.215	1.943	0.642	6	CDF	0.0344	Significant Effect
	LC_LC3	-0.5325	1.943	0.261	6	CDF	0.6932	Non-Significant Effect
	LC_DCDS	1.865	1.943	0.395	6	CDF	0.0557	Non-Significant Effect
	LC_LC5	1.546	1.943	0.265	6	CDF	0.0865	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.313	3.2	0.0310	Outlier Detected
Control Trend	Mann-Kendall Trend Test	3.313		0.7391	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.87893	0.348495	14	4.224	1.1E-04	Significant Effect
Error	3.713	0.0825111	45			
Total	8.59193		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	25.45	29.14	0.0304	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.951	0.9459	0.0173	Normal Distribution

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	08-6251-9891	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.9.4
Analyzed:	20 Dec-19 8:23	Analysis:	Parametric-Two Sample	Status Level:	1

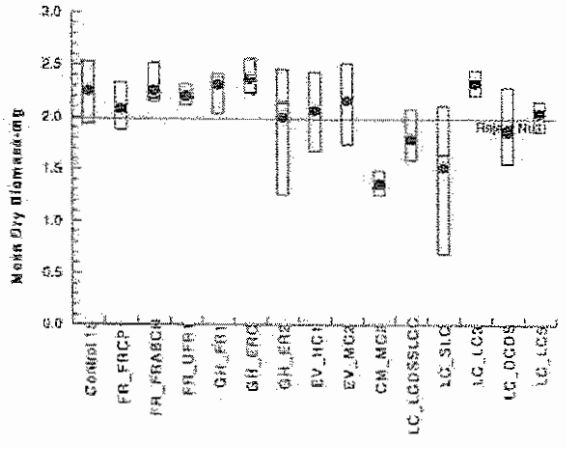
Mean Dry Biomass-mg Summary

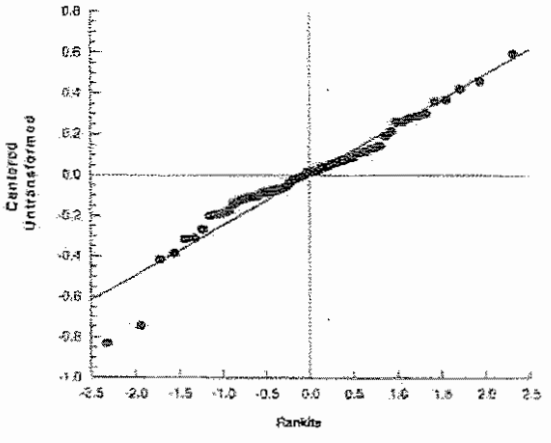
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 15	N	4	2.249	1.863	2.635	2.265	1.937	2.528	0.1214	10.80%	0.00%
FR_FRCP1		4	2.073	1.77	2.375	2.04	1.877	2.333	0.0949	9.16%	7.84%
FR_FRABCH		4	2.257	1.978	2.535	2.18	2.148	2.518	0.0876	7.76%	-0.34%
FR_UFR1		4	2.201	2.068	2.333	2.186	2.115	2.315	0.04169	3.79%	2.13%
GH_FR1		4	2.308	2.023	2.593	2.388	2.04	2.416	0.08956	7.76%	-2.62%
GH_ERC		4	2.368	2.141	2.596	2.343	2.227	2.56	0.07152	6.04%	-5.31%
GH_ER2		4	1.998	1.167	2.83	2.142	1.252	2.458	0.2613	26.15%	11.13%
EV_HC1		4	2.061	1.541	2.582	2.07	1.676	2.43	0.1636	15.87%	8.34%
EV_MC2		4	2.16	1.653	2.667	2.189	1.743	2.518	0.1592	14.74%	3.96%
CM_MC2		4	1.359	1.178	1.541	1.347	1.252	1.491	0.05698	8.38%	39.55%
LC_LCDSSLCC		4	1.792	1.456	2.127	1.749	1.59	2.078	0.1056	11.79%	20.34%
LC_SLC		4	1.517	0.5389	2.495	1.637	0.686	2.109	0.3074	40.52%	32.54%
LC_LC3		4	2.32	2.138	2.503	2.315	2.203	2.449	0.05739	4.95%	-3.18%
LC_DCDS		4	1.869	1.35	2.389	1.817	1.554	2.29	0.1633	17.47%	16.88%
LC_LC5		4	2.038	1.839	2.237	2.071	1.859	2.149	0.06255	6.14%	9.39%

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	2.244	1.937	2.528	2.287
FR_FRCP1		2.049	1.877	2.031	2.333
FR_FRABCH		2.169	2.148	2.191	2.518
FR_UFR1		2.189	2.184	2.315	2.115
GH_FR1		2.381	2.394	2.416	2.04
GH_ERC		2.227	2.301	2.56	2.385
GH_ER2		1.252	2.071	2.213	2.458
EV_HC1		1.935	2.205	1.676	2.43
EV_MC2		2.181	1.743	2.197	2.518
CM_MC2		1.417	1.252	1.277	1.491
LC_LCDSSLCC		1.81	1.59	1.688	2.078
LC_SLC		1.457	0.686	1.816	2.109
LC_LC3		2.247	2.383	2.449	2.203
LC_DCDS		1.554	1.955	1.679	2.29
LC_LC5		2.086	2.056	2.149	1.859

Graphics





CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	10-8160-7444	**Endpoint:**	Length	**CETIS Version:**	CETISv1.9.4
Analyzed:	22 Nov-19 15:57	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	14-4259-2566	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 11:00	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 11:00	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 11:00	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 11:00	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	(20 ug/L)
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	(20 ug/L)
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	(15 ug/L)
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	(20 ug/L)
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	(15 ug/L)
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	(15 ug/L)
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	(20 ug/L)
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	(20 ug/L)
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	(20 ug/L)
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	(15 ug/L)
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	(20 ug/L)
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	(15 ug/L)
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	(20 ug/L)
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	(20 ug/L)
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	(20 ug/L)

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 10-9160-7444 Endpoint: Length CETIS Version: CETISv1.9.4
Analyzed: 22 Nov-19 15:57 Analysis: Parametric-Two Sample Status Level: 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRCP1 passed length	7.71%
		FR_FRABCH passed length	7.71%
		FR_UFR1 passed length	7.71%
		GH_FR1 passed length	7.71%
		GH_ERC passed length	7.71%
		GH_ER2 passed length	7.71%
		EV_HC1 passed length	7.71%
		EV_MC2 passed length	7.71%
		CM_MC2 passed length	7.71%
		LC_LCDSSLCC passed length	7.71%
		LC_SLC failed length	7.71%
		LC_LC3 passed length	7.71%
		LC_DCDS passed length	7.71%
		LC_LC5 passed length	7.71%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control (CM-MC1)		FR_FRCP1	-0.9074	2.015	1.121	5	CDF	0.7971	Non-Significant Effect
		FR_FRABCH	-0.5255	2.132	1.43	4	CDF	0.6865	Non-Significant Effect
		FR_UFR1	0.8118	2.015	0.763	5	CDF	0.2269	Non-Significant Effect
		GH_FR1	0.4029	2.015	0.838	5	CDF	0.3518	Non-Significant Effect
		GH_ERC	-0.2655	2.015	0.778	5	CDF	0.5994	Non-Significant Effect
		GH_ER2	5.39E-07	2.132	0.796	4	CDF	0.5000	Non-Significant Effect
		EV_HC1	0.8434	2.353	0.795	3	CDF	0.2305	Non-Significant Effect
		EV_MC2	0.08002	2.015	1.007	5	CDF	0.4697	Non-Significant Effect
		CM_MC2	-2.134	2.353	2.633	3	CDF	0.9387	Non-Significant Effect
		LC_LCDSSLCC	-0.1005	2.015	0.852	5	CDF	0.5381	Non-Significant Effect
		LC_SLC*	2.227	2.015	0.830	5	CDF	0.0382	Significant Effect
		LC_LC3	-0.278	2.353	0.804	3	CDF	0.6005	Non-Significant Effect
		LC_DCDS	1.852	2.353	0.788	3	CDF	0.0806	Non-Significant Effect
		LC_LC5	1.784	2.015	0.616	5	CDF	0.0672	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.608	3.2	0.0079	Outlier Detected
Control Trend	Mann-Kendall Trend Test	3.608		1.0000	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	32.1695	2.29782	14	3.578	5.7E-04	Significant Effect
Error	28.9031	0.642292	45			
Total	61.0727		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	32.99	29.14	0.0029	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9505	0.9459	0.0165	Normal Distribution

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 10-9160-7444 Endpoint: Length CETIS Version: CETISv1.9.4
Analyzed: 22 Nov-19 15:57 Analysis: Parametric-Two Sample Status Level: 1

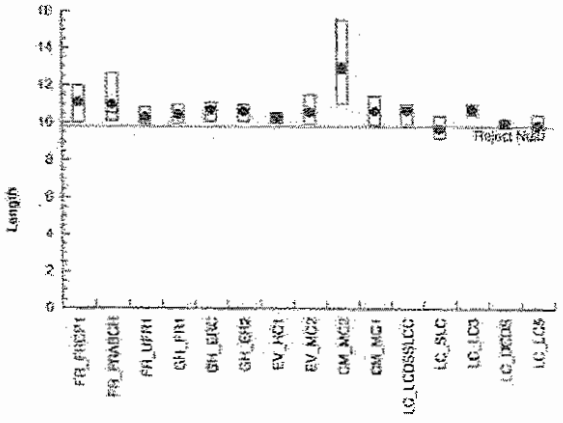
Length Summary

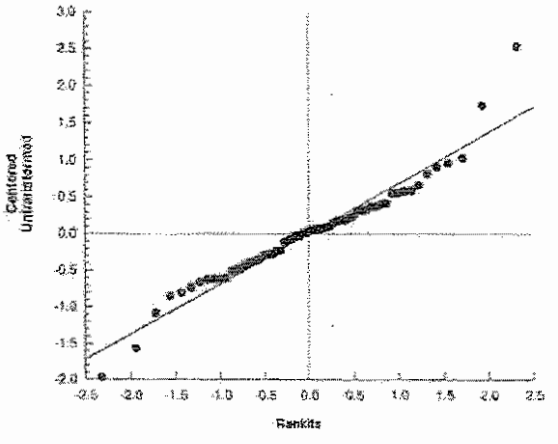
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_FRCP1		4	11.09	9.639	12.55	11.18	10	12	0.4569	8.24%	0.00%
FR_FRABCH		4	10.94	9.06	12.82	10.51	10.08	12.67	0.5907	10.80%	1.37%
FR_UFR1		4	10.28	9.624	10.94	10.18	9.93	10.83	0.2061	4.01%	7.32%
GH_FR1		4	10.42	9.567	11.27	10.38	9.93	11	0.268	5.14%	6.06%
GH_ERC		4	10.69	9.993	11.39	10.8	10.08	11.09	0.2191	4.10%	3.63%
GH_ER2		4	10.59	9.965	11.21	10.64	10.07	11	0.1957	3.70%	4.55%
EV_HC1		4	10.3	9.937	10.67	10.34	10	10.54	0.1149	2.23%	7.12%
EV_MC2		4	10.55	9.32	11.78	10.39	9.92	11.5	0.3858	7.32%	4.91%
CM_MC2		4	12.97	9.561	16.39	12.7	11	15.5	1.073	16.53%	-16.97%
CM_MC1	XC	4	10.59	9.576	11.6	10.55	9.85	11.4	0.3178	6.00%	4.55%
LC_LCDSSLCC		4	10.63	9.742	11.52	10.85	9.82	11	0.2791	5.25%	4.17%
LC_SLC		4	9.67	8.835	10.5	9.575	9.2	10.33	0.2623	5.43%	12.82%
LC_LC3		4	10.68	10.28	11.08	10.66	10.4	11	0.1257	2.35%	3.70%
LC_DCDS		4	9.967	9.632	10.3	9.995	9.73	10.15	0.1054	2.11%	10.14%
LC_LC5		4	9.865	9.066	10.66	9.92	9.2	10.42	0.251	5.09%	11.07%

Length Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		12	10	10.7	11.67
FR_FRABCH		10.7	12.67	10.08	10.31
FR_UFR1		10	10.36	9.93	10.83
GH_FR1		11	10	10.75	9.93
GH_ERC		10.9	10.08	10.69	11.09
GH_ER2		11	10.55	10.73	10.07
EV_HC1		10.27	10.4	10	10.54
EV_MC2		9.92	11.5	9.92	10.85
CM_MC2		14	11	11.4	15.5
CM_MC1	XC	10.6	9.85	11.4	10.5
LC_LCDSSLCC		11	9.82	10.7	11
LC_SLC		9.3	9.2	10.33	9.85
LC_LC3		10.73	11	10.6	10.4
LC_DCDS		10.14	9.85	9.73	10.15
LC_LC5		10.42	9.92	9.2	9.92

Graphics





Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	17-5738-4062	Endpoint:	Survival Rate	CETIS Version:	CETISv1.9.4
Analyzed:	20 Nov-19 16:37	Analysis:	STP 2xK Contingency Tables	Status Level:	1
Batch ID:	02-0179-4918	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	(20 mg/L)
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	(20 mg/L)
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	(5 mg/L)
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	(20 mg/L)
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	(5 mg/L)
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	(5 mg/L)
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	(20 mg/L)
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	(20 mg/L)
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	(20 mg/L)
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	(5 mg/L)
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	(20 mg/L)
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	(5 mg/L)
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	(20 mg/L)
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	(2.5 mg/L)
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	(20 mg/L)

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRCP1	0.0846	Exact	1.0000	Non-Significant Effect
(Control)		FR_FRABCH	0.3956	Exact	1.0000	Non-Significant Effect
		FR_UFR1	0.9690	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.9116	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.7411	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.2719	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.8069	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.5833	Exact	1.0000	Non-Significant Effect
		CM_MC2*	0.0000	Exact	1.3E-06	Significant Effect
		LC_LCDSSLCC	0.0846	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.0846	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.9970	Exact	0.9970	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.9690	Exact	1.0000	Non-Significant Effect

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 17-5738-4062 Endpoint: Survival Rate CETIS Version: CETISv1.9.4
Analyzed: 20 Nov-19 16:37 Analysis: STP 2xK Contingency Tables Status Level: 1

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.441	3.2	0.7519	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.441		0.7391	Non-Significant Trend in Controls

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_FRCP1		37	23	60	0.6167	0.3833	17.78%
FR_FRABCH		42	17	59	0.7119	0.2881	5.09%
FR_UFR1		52	8	60	0.8667	0.1333	-15.56%
GH_FR1		50	10	60	0.8333	0.1667	-11.11%
GH_ERC		47	13	60	0.7833	0.2167	-4.44%
GH_ER2		41	19	60	0.6833	0.3167	8.89%
EV_HC1		48	12	60	0.8	0.2	-6.67%
EV_MC2		45	15	60	0.75	0.25	0.0%
CM_MC2		16	44	60	0.2667	0.7333	64.44%
CM_MC1	XC	45	15	60	0.75	0.25	0.0%
LC_LCDSSLCC		37	23	60	0.6167	0.3833	17.78%
LC_SLC		37	23	60	0.6167	0.3833	17.78%
LC_LC3		55	5	60	0.9167	0.08333	-22.22%
LC_DCDS		44	16	60	0.7333	0.2667	2.22%
LC_LC5		52	8	60	0.8667	0.1333	-15.56%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		0.4000	0.8000	0.6667	0.6000
FR_FRABCH		0.6667	0.4000	0.9286	0.8667
FR_UFR1		0.9333	0.7333	1.0000	0.8000
GH_FR1		0.6000	0.9333	0.8000	1.0000
GH_ERC		0.6667	0.8667	0.8667	0.7333
GH_ER2		0.2667	0.7333	0.7333	1.0000
EV_HC1		0.7333	1.0000	0.6000	0.8667
EV_MC2		0.8667	0.4000	0.8667	0.8667
CM_MC2		0.2000	0.4000	0.3333	0.1333
CM_MC1	XC	0.6667	0.8667	0.5333	0.9333
LC_LCDSSLCC		0.4667	0.7333	0.6667	0.6000
LC_SLC		0.6667	0.3333	0.6000	0.8667
LC_LC3		0.7333	0.9333	1.0000	1.0000
LC_DCDS		0.4667	0.8667	0.7333	0.8667
LC_LC5		0.8000	0.8667	1.0000	0.8000

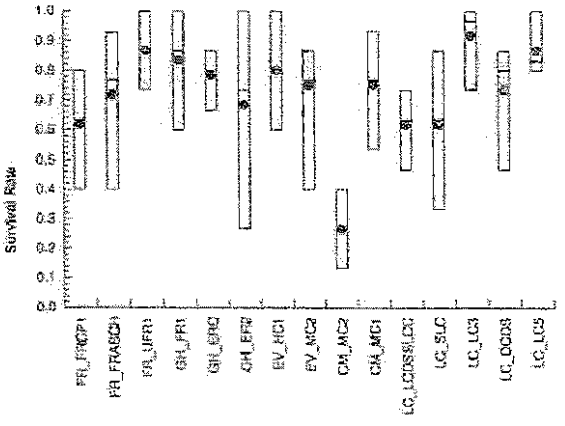
Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 17-5738-4062 | Endpoint: Survival Rate | CETIS Version: CETISv1.9.4
Analyzed: 20-Nov-19 16:37 | Analysis: STP 2xK Contingency Tables | Status Level: 1

Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		6/15	12/15	10/15	9/15
FR_FRABCH		10/15	6/15	13/14	13/15
FR_UFR1		14/15	11/15	15/15	12/15
GH_FR1		9/15	14/15	12/15	15/15
GH_ERC		10/15	13/15	13/15	11/15
GH_ER2		4/15	11/15	11/15	15/15
EV_HC1		11/15	15/15	9/15	13/15
EV_MC2		13/15	6/15	13/15	13/15
CM_MC2		3/15	6/15	5/15	2/15
CM_MC1	XC	10/15	13/15	8/15	14/15
LC_LCDSSLCC		7/15	11/15	10/15	9/15
LC_SLC		10/15	5/15	9/15	13/15
LC_LC3		11/15	14/15	15/15	15/15
LC_DCDS		7/15	13/15	11/15	13/15
LC_LC5		12/15	13/15	15/15	12/15

Graphics



CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	12-4789-1342	Endpoint:	Hatch Rate	CETIS Version:	CETISv1.9.4
Analyzed:	20 Nov-19 16:46	Analysis:	STP 2xK Contingency Tables	Status Level:	1
Batch ID:	14-9487-6717	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19 [illegible]	21 Aug-19	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19 [illegible]	21 Aug-19	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19 [illegible]	21 Aug-19	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19 [illegible]	21 Aug-19	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	(20 Aug/L)
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	(20 Aug/L)
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	(15 Aug/L)
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	(20 Aug/L)
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	(15 Aug/L)
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	(15 Aug/L)
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	(20 Aug/L)
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	(20 Aug/L)
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	(20 Aug/L)
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	(15 Aug/L)
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	(20 Aug/L)
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	(15 Aug/L)
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	(15 Aug/L)
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	(15 Aug/L)
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	(15 Aug/L)

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
(LC-SLC)		FR_FRABCH	0.5000	Exact	1.0000	Non-Significant Effect
		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.5000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.5000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 12-4769-1342 Endpoint: Hatch Rate CETIS Version: CETISv1.9.4
Analyzed: 20 Nov-19 16:46 Analysis: STP 2xK Contingency Tables Status Level: 1

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.352	3.2	0.9527	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.352		1.0000	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_FRCP1		60	0	60	1	0	0.0%
FR_FRABCH		59	1	60	0.9833	0.01667	1.67%
FR_UFR1		60	0	60	1	0	0.0%
GH_FR1		59	1	60	0.9833	0.01667	1.67%
GH_ERC		59	1	60	0.9833	0.01667	1.67%
GH_ER2		59	1	60	0.9833	0.01667	1.67%
EV_HC1		60	0	60	1	0	0.0%
EV_MC2		59	1	60	0.9833	0.01667	1.67%
CM_MC2		59	1	60	0.9833	0.01667	1.67%
CM_MC1		59	1	60	0.9833	0.01667	1.67%
LC_LCDSSLCC		60	0	60	1	0	0.0%
LC_SLC	XC	60	0	60	1	0	0.0%
LC_LC3		60	0	60	1	0	0.0%
LC_DCDS		59	1	60	0.9833	0.01667	1.67%
LC_LC5		60	0	60	1	0	0.0%

Hatch Rate Detail

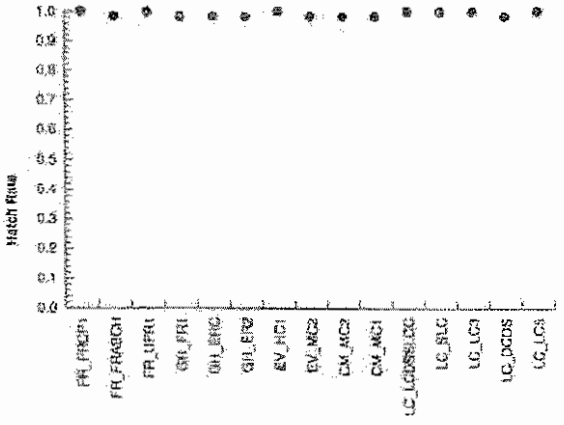
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	0.9333
FR_UFR1		1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	0.9333	1.0000
GH_ERC		1.0000	0.9333	1.0000	1.0000
GH_ER2		1.0000	1.0000	0.9333	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	0.9333	1.0000	1.0000
CM_MC2		0.9333	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	0.9333
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000
LC_SLC	XC	1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_DCDS		0.9333	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000

Analysis ID: 12-4789-1342 Endpoint: Hatch Rate CETIS Version: CETISv1.9.4
Analyzed: 20 Nov-19 16:46 Analysis: STP 2xK Contingency Tables Status Level: 1

Hatch Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	15/15	14/15
FR_UFR1		15/15	15/15	15/15	15/15
GH_FR1		15/15	15/15	14/15	15/15
GH_ERC		15/15	14/15	15/15	15/15
GH_ER2		15/15	15/15	14/15	15/15
EV_HC1		15/15	15/15	15/15	15/15
EV_MC2		15/15	14/15	15/15	15/15
CM_MC2		14/15	15/15	15/15	15/15
CM_MC1		15/15	15/15	15/15	14/15
LC_LCDSSLCC		15/15	15/15	15/15	15/15
LC_SLC	XC	15/15	15/15	15/15	15/15
LC_LC3		15/15	15/15	15/15	15/15
LC_DCDS		14/15	15/15	15/15	15/15
LC_LC5		15/15	15/15	15/15	15/15

Graphics



Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	06-6281-1582	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.9.4
Analyzed:	20 Dec-19 8:25	Analysis:	Parametric-Two Sample	Status Level:	1
Batch ID:	16-5336-3311	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatox, CA

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)		
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19	48h (15 °C)		
GH_ERC	12-0073-7520	20 Aug-19	21 Aug-19	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5686	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-6126-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	19-3223-9303	20 Aug-19	21 Aug-19	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-0	
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-2	
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-19	
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	

Analyst: SS QA: Dec-23/19

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 06-6281-1582 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.4
Analyzed: 20 Dec-19 8:25 Analysis: Parametric-Two Sample Status Level: 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRCP1 passed mean dry biomass-mg	11.80%
		FR_FRABCH passed mean dry biomass-mg	11.80%
		FR_UFR1 passed mean dry biomass-mg	11.80%
		GH_FR1 passed mean dry biomass-mg	11.80%
		GH_ERC passed mean dry biomass-mg	11.80%
		GH_ER2 passed mean dry biomass-mg	11.80%
		EV_HC1 passed mean dry biomass-mg	11.80%
		EV_MC2 passed mean dry biomass-mg	11.80%
		CM_MC2 failed mean dry biomass-mg	11.80%
		CM_MC1 passed mean dry biomass-mg	11.80%
		LC_LCDSSLCC failed mean dry biomass-mg	11.80%
		LC_LC3 passed mean dry biomass-mg	11.80%
		LC_DCDS passed mean dry biomass-mg	11.80%
		LC_LC5 passed mean dry biomass-mg	11.80%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control (LC-SLC)		FR_FRCP1	1.144	1.943	0.299	6	CDF	0.1480	Non-Significant Effect
		FR_FRABCH	-0.05129	1.943	0.291	6	CDF	0.5196	Non-Significant Effect
		FR_UFR1	0.374	1.943	0.249	6	CDF	0.3606	Non-Significant Effect
		GH_FR1	-0.3911	1.943	0.293	6	CDF	0.6454	Non-Significant Effect
		GH_ERC	-0.8481	1.943	0.274	6	CDF	0.7856	Non-Significant Effect
		GH_ER2	0.8687	1.943	0.56	6	CDF	0.2092	Non-Significant Effect
		EV_HC1	0.9206	1.943	0.356	6	CDF	0.1964	Non-Significant Effect
		EV_MC2	0.4445	1.943	0.369	6	CDF	0.3361	Non-Significant Effect
		CM_MC2*	6.633	1.943	0.261	6	CDF	2.8E-04	Significant Effect
		CM_MC1	0.5603	1.943	0.315	6	CDF	0.2977	Non-Significant Effect
		LC_LCDSSLCC*	2.843	1.943	0.313	6	CDF	0.0147	Significant Effect
		LC_LC3	-0.5325	1.943	0.261	6	CDF	0.6932	Non-Significant Effect
		LC_DCDS	1.865	1.943	0.395	6	CDF	0.0557	Non-Significant Effect
		LC_LC5	1.546	1.943	0.265	6	CDF	0.0865	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.476	3.2	0.0148	Outlier Detected
Control Trend	Mann-Kendall Trend Test	3.478		0.7391	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.7412	0.267229	14	4.423	6.8E-05	Significant Effect
Error	2.71876	0.0604168	45			
Total	6.45996		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	18.53	29.14	0.1837	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.971	0.9459	0.1639	Normal Distribution

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 06-6281-1582 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.4
Analyzed: 20 Dec-19 8:25 Analysis: Parametric-Two Sample Status Level: 1

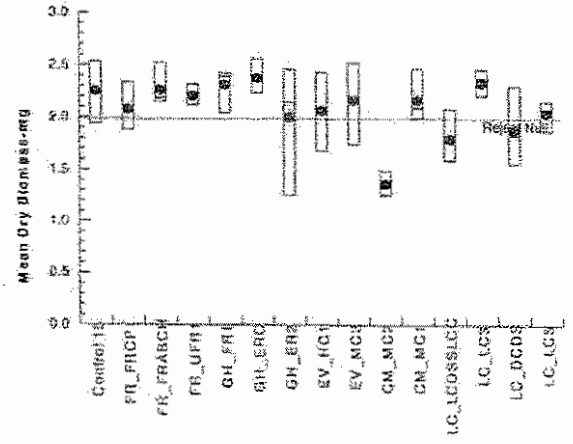
Mean Dry Biomass-mg Summary

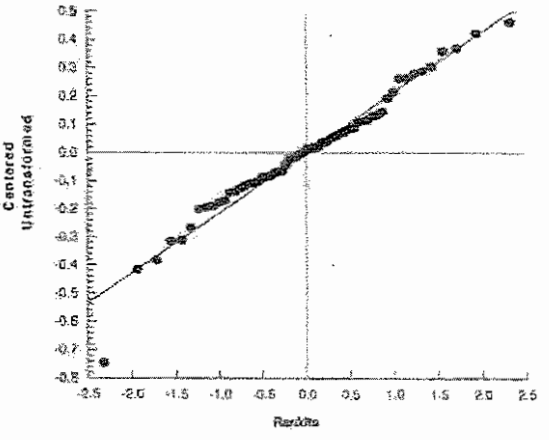
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 15	N	4	2.249	1.863	2.635	2.265	1.937	2.528	0.1214	10.80%	0.00%
FR_FRCP1		4	2.073	1.77	2.375	2.04	1.877	2.333	0.0949	9.16%	7.84%
FR_FRABCH		4	2.257	1.976	2.535	2.18	2.148	2.518	0.0876	7.76%	-0.34%
FR_UFR1		4	2.201	2.068	2.333	2.186	2.115	2.315	0.04169	3.79%	2.13%
GH_FR1		4	2.308	2.023	2.593	2.388	2.04	2.416	0.08955	7.76%	-2.62%
GH_ERC		4	2.368	2.141	2.596	2.343	2.227	2.56	0.07152	6.04%	-5.31%
GH_ER2		4	1.998	1.167	2.83	2.142	1.252	2.458	0.2613	26.15%	11.13%
EV_HC1		4	2.061	1.541	2.582	2.07	1.676	2.43	0.1636	15.87%	8.34%
EV_MC2		4	2.16	1.653	2.667	2.189	1.743	2.518	0.1592	14.74%	3.96%
CM_MC2		4	1.359	1.178	1.541	1.347	1.252	1.491	0.05698	8.38%	39.55%
CM_MC1		4	2.158	1.815	2.501	2.091	1.989	2.461	0.1078	9.99%	4.05%
LC_LCDSSLCC		4	1.792	1.456	2.127	1.749	1.59	2.078	0.1056	11.79%	20.34%
LC_LC3		4	2.32	2.138	2.503	2.315	2.203	2.449	0.05739	4.95%	-3.18%
LC_DCDS		4	1.869	1.35	2.389	1.817	1.554	2.29	0.1633	17.47%	16.88%
LC_LC5		4	2.038	1.839	2.237	2.071	1.859	2.149	0.06255	6.14%	9.39%

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	2.244	1.937	2.528	2.287
FR_FRCP1		2.049	1.877	2.031	2.333
FR_FRABCH		2.169	2.148	2.191	2.518
FR_UFR1		2.189	2.184	2.315	2.115
GH_FR1		2.381	2.394	2.416	2.04
GH_ERC		2.227	2.301	2.56	2.385
GH_ER2		1.252	2.071	2.213	2.458
EV_HC1		1.935	2.205	1.676	2.43
EV_MC2		2.181	1.743	2.197	2.518
CM_MC2		1.417	1.252	1.277	1.491
CM_MC1		2.162	1.989	2.02	2.461
LC_LCDSSLCC		1.81	1.59	1.688	2.078
LC_LC3		2.247	2.383	2.449	2.203
LC_DCDS		1.554	1.955	1.679	2.29
LC_LC5		2.086	2.056	2.149	1.859

Graphics





CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	08-4206-4077	**Endpoint:**	Length	**CETIS Version:**	CETISv1.9.4
Analyzed:	22 Nov-19 15:59	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	16-5336-3311	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatox, CA

Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-5034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	(20 ug/L)
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	(20 ug/L)
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	(15 ug/L)
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	(20 ug/L)
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	(215 ug/L)
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	(15 ug/L)
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	(20 ug/L)
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	(20 ug/L)
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	(20 ug/L)
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	(15 ug/L)
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	(20 ug/L)
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	(15 ug/L)
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	(20 ug/L)
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	(20 ug/L)
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	(20 ug/L)

Analyst: SS QA: Dec-23/19

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 06-4206-4077 Endpoint: Length CETIS Version: CETISv1.9.4
Analyzed: 22 Nov-19 15:59 Analysis: Parametric-Two Sample Status Level: 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRCP1 passed length	7.30%
		FR_FRABCH passed length	7.30%
		FR_UFR1 passed length	7.30%
		GH_FR1 passed length	7.30%
		GH_ERC passed length	7.30%
		GH_ER2 passed length	7.30%
		EV_HC1 passed length	7.30%
		EV_MC2 passed length	7.30%
		CM_MC2 passed length	7.30%
		CM_MC1 passed length	7.30%
		LC_LCDSSLCC passed length	7.30%
		LC_LC3 passed length	7.30%
		LC_DCDS passed length	7.30%
		LC_LC5 passed length	7.30%

Equal Variance t Two-Sample Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control	FR_FRCP1	-2.7	1.943	1.024	6	CDF	0.9822	Non-Significant Effect
(LC - SLC)	FR_FRABCH	-1.965	1.943	1.256	6	CDF	0.9515	Non-Significant Effect
	FR_UFR1	-1.828	1.943	0.648	6	CDF	0.9414	Non-Significant Effect
	GH_FR1	-2	1.943	0.729	6	CDF	0.9538	Non-Significant Effect
	GH_ERC	-2.984	1.943	0.664	6	CDF	0.9877	Non-Significant Effect
	GH_ER2	-2.803	1.943	0.639	6	CDF	0.9845	Non-Significant Effect
	EV_HC1	-2.208	1.943	0.557	6	CDF	0.9654	Non-Significant Effect
	EV_MC2	-1.881	1.943	0.907	6	CDF	0.9455	Non-Significant Effect
	CM_MC2	-2.993	1.943	2.146	6	CDF	0.9879	Non-Significant Effect
	CM_MC1	-2.227	1.943	0.801	6	CDF	0.9662	Non-Significant Effect
	LC_LCDSSLCC	-2.506	1.943	0.744	6	CDF	0.9769	Non-Significant Effect
	LC_LC3	-3.481	1.943	0.565	6	CDF	0.9934	Non-Significant Effect
	LC_DCDS	-1.052	1.943	0.549	6	CDF	0.8334	Non-Significant Effect
	LC_LC5	-0.537	1.943	0.706	6	CDF	0.6947	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.608	3.2	0.0079	Outlier Detected
Control Trend	Mann-Kendall Trend Test	3.606		0.7391	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	32.1695	2.29782	14	3.578	5.7E-04	Significant Effect
Error	28.9031	0.642292	45			
Total	61.0727		59			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	32.99	29.14	0.0029	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9505	0.9459	0.0165	Normal Distribution

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 06-4206-4077 Endpoint: Length CETIS Version: CETISv1.9.4
Analyzed: 22 Nov-19 15:59 Analysis: Parametric-Two Sample Status Level: 1

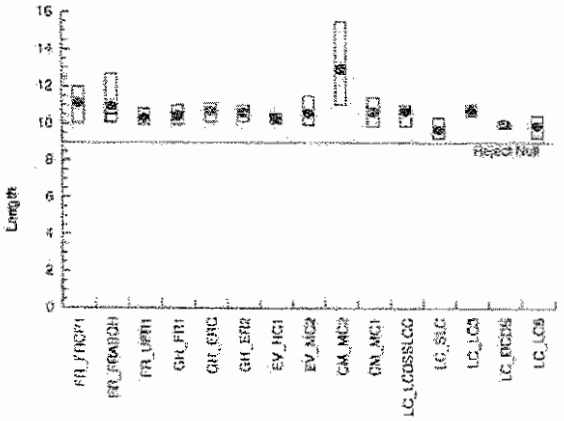
Length Summary

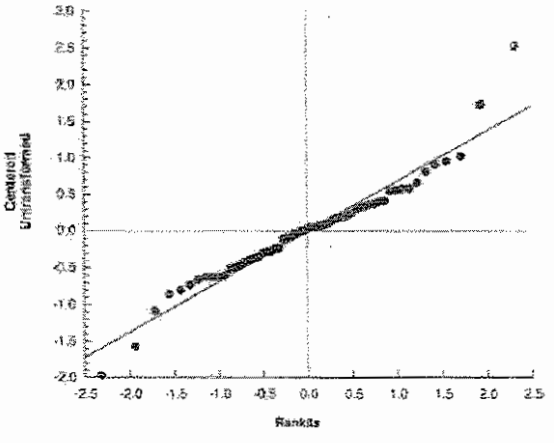
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_FRCP1		4	11.09	9.639	12.55	11.18	10	12	0.4569	8.24%	0.00%
FR_FRABCH		4	10.94	9.06	12.82	10.51	10.08	12.67	0.5907	10.80%	1.37%
FR_UFR1		4	10.28	9.624	10.94	10.18	9.93	10.83	0.2061	4.01%	7.32%
GH_FR1		4	10.42	9.567	11.27	10.38	9.93	11	0.268	5.14%	6.06%
GH_ERC		4	10.69	9.993	11.39	10.8	10.08	11.09	0.2191	4.10%	3.63%
GH_ER2		4	10.59	9.865	11.31	10.64	10.07	11	0.1957	3.70%	4.55%
EV_HC1		4	10.3	9.937	10.67	10.34	10	10.54	0.1149	2.23%	7.12%
EV_MC2		4	10.55	9.32	11.78	10.39	9.92	11.5	0.3658	7.32%	4.91%
CM_MC2		4	12.97	9.561	16.39	12.7	11	15.5	1.073	16.53%	-16.97%
CM_MC1		4	10.59	9.576	11.6	10.55	9.85	11.4	0.3178	6.00%	4.55%
LC_LCDSSLCC		4	10.63	9.742	11.52	10.85	9.82	11	0.2791	5.25%	4.17%
LC_SLC	XC	4	9.67	8.835	10.5	9.575	9.2	10.33	0.2623	5.43%	12.82%
LC_LC3		4	10.68	10.28	11.08	10.68	10.4	11	0.1257	2.35%	3.70%
LC_DCDS		4	9.967	9.632	10.3	9.995	9.73	10.15	0.1054	2.11%	10.14%
LC_LC5		4	9.865	9.066	10.66	9.92	9.2	10.42	0.251	5.09%	11.07%

Length Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		12	10	10.7	11.67
FR_FRABCH		10.7	12.67	10.08	10.31
FR_UFR1		10	10.36	9.93	10.83
GH_FR1		11	10	10.75	9.93
GH_ERC		10.9	10.08	10.69	11.09
GH_ER2		11	10.55	10.73	10.07
EV_HC1		10.27	10.4	10	10.54
EV_MC2		9.92	11.5	9.92	10.85
CM_MC2		14	11	11.4	15.5
CM_MC1		10.6	9.85	11.4	10.5
LC_LCDSSLCC		11	9.82	10.7	11
LC_SLC	XC	9.3	9.2	10.33	9.85
LC_LC3		10.73	11	10.6	10.4
LC_DCDS		10.14	9.85	9.73	10.15
LC_LC5		10.42	9.92	9.2	9.92

Graphics





CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	12-5032-3452	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-19 16:47	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	14-9487-6717	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_FRCP1	04-6034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)	Teck Coal Ltd	
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	36h (11.9 °C)		
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	48h (15 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5898	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_LCDSSLCC	12-8177-2462	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	(20ug/L)
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	(20ug/L)
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	(15ug/L)
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	(20ug/L)
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	(15ug/L)
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	(15ug/L)
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	(20ug/L)
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	(20ug/L)
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	(20ug/L)
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	(15ug/L)
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	(20ug/L)
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	(15ug/L)
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	(20ug/L)
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	(20ug/L)
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	(20ug/L)

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		FR_FRCP1	0.5744	Exact	1.0000	Non-Significant Effect
LC-5		FR_FRABCH	0.9022	Exact	1.0000	Non-Significant Effect
(LC-SLC)		FR_UFR1	0.9997	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.9981	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.9862	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.8307	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.9924	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.9617	Exact	1.0000	Non-Significant Effect
		CM_MC2*	0.0001	Exact	0.0014	Significant Effect
		CM_MC1	0.9617	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.5744	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.9408	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.9997	Exact	1.0000	Non-Significant Effect

Analyst: SS QA: Dec-23/19

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 12-5032-3452 Endpoint: Survival Rate CETIS Version: CETISv1.9.4
Analyzed: 20 Nov-19 16:47 Analysis: STP 2xK Contingency Tables Status Level: 1

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.441	3.2	0.7519	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.441		0.7391	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_FRCP1		37	23	60	0.6167	0.3833	0.0%
FR_FRABCH		42	17	59	0.7119	0.2881	-15.44%
FR_UFR1		52	8	60	0.8667	0.1333	-40.54%
GH_FR1		50	10	60	0.8333	0.1667	-35.14%
GH_ERC		47	13	60	0.7833	0.2167	-27.03%
GH_ER2		41	19	60	0.6833	0.3167	-10.81%
EV_HC1		48	12	60	0.8	0.2	-29.73%
EV_MC2		45	15	60	0.75	0.25	-21.62%
CM_MC2		16	44	60	0.2667	0.7333	56.76%
CM_MC1		45	15	60	0.75	0.25	-21.62%
LC_LCDSSLCC		37	23	60	0.6167	0.3833	0.0%
LC_SLC	XC	37	23	60	0.6167	0.3833	0.0%
LC_LC3		55	5	60	0.9167	0.08333	-48.65%
LC_DCDS		44	16	60	0.7333	0.2667	-18.92%
LC_LC5		52	8	60	0.8667	0.1333	-40.54%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		0.4000	0.8000	0.6667	0.6000
FR_FRABCH		0.6667	0.4000	0.9286	0.8667
FR_UFR1		0.9333	0.7333	1.0000	0.8000
GH_FR1		0.6000	0.9333	0.8000	1.0000
GH_ERC		0.6667	0.8667	0.8667	0.7333
GH_ER2		0.2667	0.7333	0.7333	1.0000
EV_HC1		0.7333	1.0000	0.6000	0.8667
EV_MC2		0.8667	0.4000	0.8667	0.8667
CM_MC2		0.2000	0.4000	0.3333	0.1333
CM_MC1		0.6667	0.8667	0.5333	0.9333
LC_LCDSSLCC		0.4667	0.7333	0.6667	0.6000
LC_SLC	XC	0.6667	0.3333	0.6000	0.8667
LC_LC3		0.7333	0.9333	1.0000	1.0000
LC_DCDS		0.4667	0.8667	0.7333	0.8667
LC_LC5		0.8000	0.8667	1.0000	0.8000

Analyst: SS QA: Dec-23/19

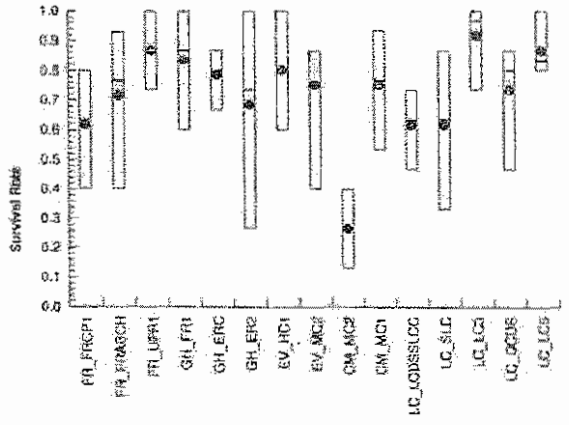
Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	12-5032-3452	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-19 16:47	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_FRCP1		6/15	12/15	10/15	9/15
FR_FRABCH		10/15	6/15	13/14	13/15
FR_UFR1		14/15	11/15	15/15	12/15
GH_FR1		9/15	14/15	12/15	15/15
GH_ERC		10/15	13/15	13/15	11/15
GH_ER2		4/15	11/15	11/15	15/15
EV_HC1		11/15	15/15	9/15	13/15
EV_MC2		13/15	6/15	13/15	13/15
CM_MC2		3/15	6/15	5/15	2/15
CM_MC1		10/15	13/15	8/15	14/15
LC_LCDSSLCC		7/15	11/15	10/15	9/15
LC_SLC	XC	10/15	5/15	9/15	13/15
LC_LC3		11/15	14/15	15/15	15/15
LC_DCDS		7/15	13/15	11/15	13/15
LC_LC5		12/15	13/15	15/15	12/15

Graphics



Analyst: SS QA: Dec 23/19

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	03-2047-5725	**Endpoint:**	Hatch Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	19 Nov-19 15:33	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	07-3591-4724	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	20-2483-8260	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a		
Control 20	16-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal Ltd	Laboratory Control	
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Fisher Exact/Bonferroni-Holm Test CTT

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	1.0000	Exact	1.0000	Non-Significant Effect
		Method Control	1.0000	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			1.0000	Non-Significant Trend in Controls

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control	LC	60	0	60	1	0	0.0%
Control 15	N	60	0	60	1	0	0.0%
Control 20	MC	60	0	60	1	0	0.0%

Hatch Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	1.0000	1.0000	1.0000	1.0000
Control 15	N	1.0000	1.0000	1.0000	1.0000
Control 20	MC	1.0000	1.0000	1.0000	1.0000

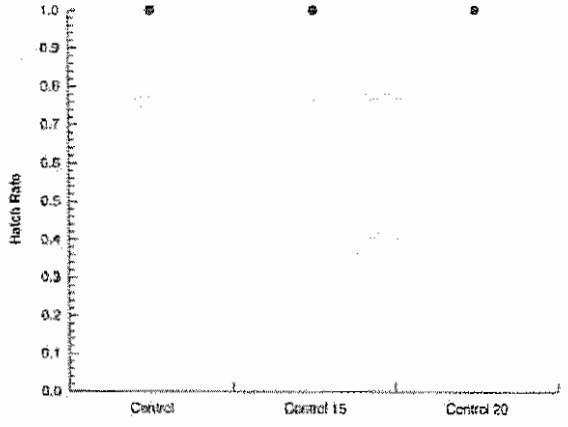
Hatch Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	15/15	15/15	15/15	15/15
Control 15	N	15/15	15/15	15/15	15/15
Control 20	MC	15/15	15/15	15/15	15/15

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	03-2047-5725	Endpoint:	Hatch Rate	CETIS Version:	CETISv1.9.4
Analyzed:	19 Nov-19 15:33	Analysis:	STP 2xK Contingency Tables	Status Level:	1

Graphics



Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	06-5289-4076	Endpoint:	Hatch Rate	CETIS Version:	CETISv1.9.4
Analyzed:	19 Nov-19 15:05	Analysis:	STP 2xK Contingency Tables	Status Level:	1
Batch ID:	07-3591-4724	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	20-2483-8260	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a		
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal Ltd	Laboratory Control	
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Fisher Exact/Bonferroni Adj Test CCT

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	1.0000	Exact	1.0000	Non-Significant Effect
		Method Control	1.0000	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			1.0000	Non-Significant Trend in Controls

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control	LC	60	0	60	1	0	0.0%
Control 15	N	60	0	60	1	0	0.0%
Control 20	MC	60	0	60	1	0	0.0%

Hatch Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	1.0000	1.0000	1.0000	1.0000
Control 15	N	1.0000	1.0000	1.0000	1.0000
Control 20	MC	1.0000	1.0000	1.0000	1.0000

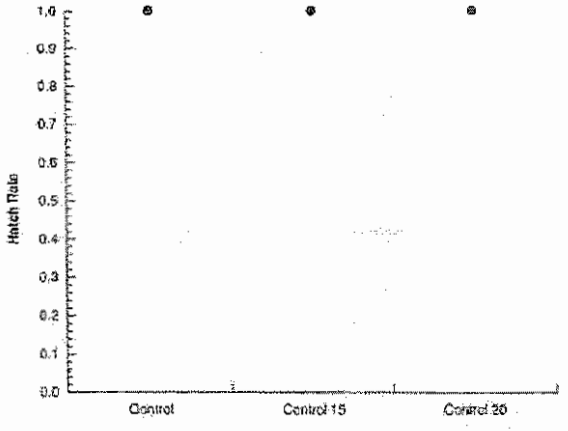
Hatch Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	15/15	15/15	15/15	15/15
Control 15	N	15/15	15/15	15/15	15/15
Control 20	MC	15/15	15/15	15/15	15/15

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	06-5289-4076	**Endpoint:**	Hatch Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	19 Nov-19 15:05	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	16-5244-8531	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	19 Nov-19 15:06	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	07-3591-4724	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA

Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	20-2483-8260	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a		
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal Ltd	Laboratory Control	
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	Control 15 passed mean dry biomass-mg	7.78%
		Control 20 passed mean dry biomass-mg	7.78%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	1.435	1.943	0.257	6	CDF	0.1006	Non-Significant Effect
		Method Control	0.07679	1.943	0.19	6	CDF	0.4706	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.918	2.412	0.4496	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	1.918		0.3043	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0924502	0.0462251	2	1.428	0.2892	Non-Significant Effect
Error	0.29124	0.03236	9			
Total	0.38369		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	1.708	9.21	0.4256	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9621	0.8025	0.8130	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	LC	4	2.439	2.272	2.606	2.418	2.335	2.584	0.05251	4.31%	0.00%
Control 15	N	4	2.249	1.863	2.635	2.265	1.937	2.528	0.1214	10.80%	7.78%
Control 20	MC	4	2.431	2.169	2.693	2.38	2.304	2.66	0.08231	6.77%	0.31%

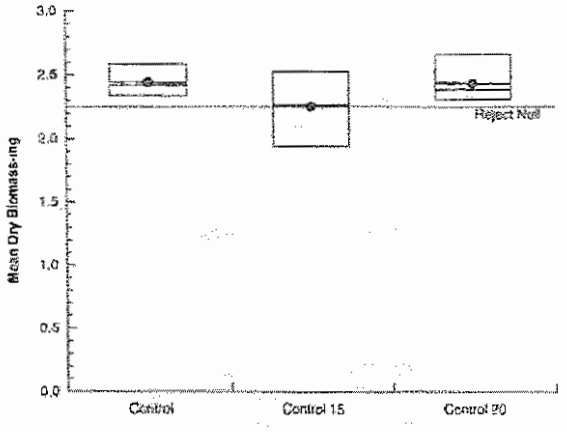
Mean Dry Biomass-mg Detail

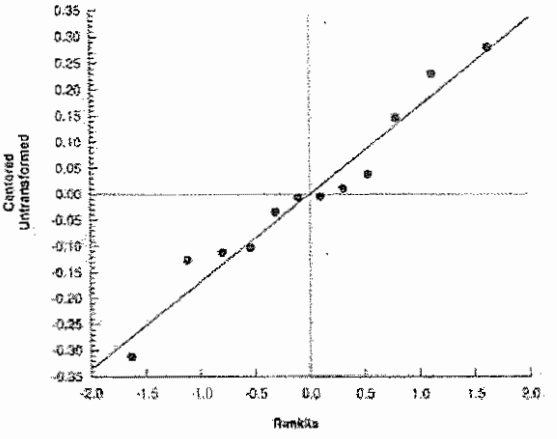
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	2.335	2.403	2.584	2.432
Control 15	N	2.244	1.937	2.528	2.287
Control 20	MC	2.442	2.304	2.319	2.66

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	16-5244-8531	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	19 Nov-19 15:06	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Analyst: SS QA: Dec 23/19

CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	07-3475-8517	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	19 Nov-19 15:34	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	07-3591-4724	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	20-2483-8260	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a		
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal Ltd	Laboratory Control	
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	Control 15 passed mean dry biomass-mg	7.78%
		Control 20 passed mean dry biomass-mg	7.78%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	-1.435	1.943	0.257	6	CDF	0.8994	Non-Significant Effect
		Method Control	-0.07679	1.943	0.19	6	CDF	0.5294	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.918	2.412	0.4496	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	1.918		0.3043	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0924502	0.0462251	2	1.428	0.2892	Non-Significant Effect
Error	0.29124	0.03236	9			
Total	0.38369		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	1.708	9.21	0.4256	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9621	0.8025	0.8130	Normal Distribution

Mean Dry Biomass-mg Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	LC	4	2.439	2.272	2.606	2.418	2.335	2.584	0.05251	4.31%	0.00%
Control 15	N	4	2.249	1.863	2.635	2.265	1.937	2.528	0.1214	10.80%	7.78%
Control 20	MC	4	2.431	2.169	2.693	2.38	2.304	2.66	0.08231	6.77%	0.31%

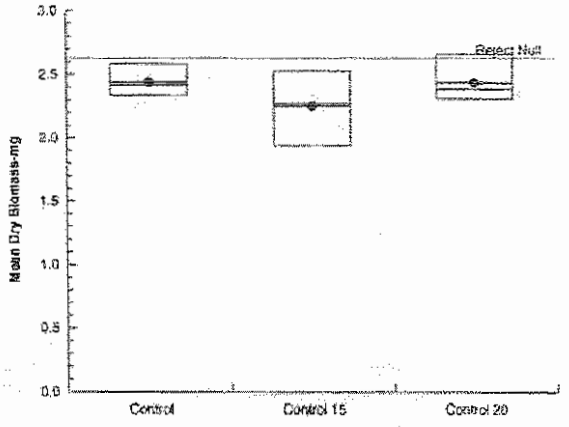
Mean Dry Biomass-mg Detail

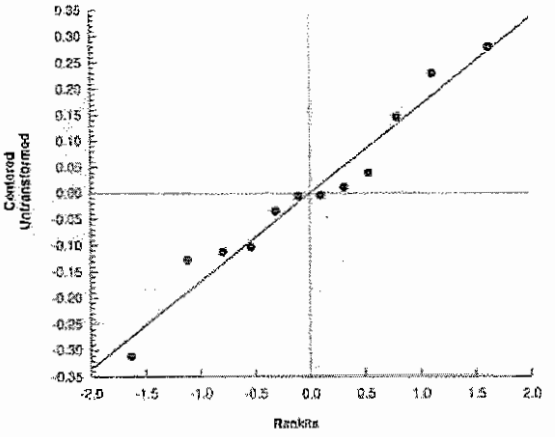
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	2.335	2.403	2.584	2.432
Control 15	N	2.244	1.937	2.528	2.287
Control 20	MC	2.442	2.304	2.319	2.66

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	07-3475-8517	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.9.4
Analyzed:	19 Nov-19 15:34	Analysis:	Parametric-Two Sample	Status Level:	1

Graphics





Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	20-3632-4382	Endpoint:	Length	CETIS Version:	CETISv1.9.4
Analyzed:	22 Nov-19 11:53	Analysis:	Parametric-Two Sample	Status Level:	1
Batch ID:	00-6756-6431	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	01-0038-7384	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a		
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal Ltd	Control	
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	Control 15 passed length	3.72%
		Control 20 passed length	3.72%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	0.8311	1.943	0.392	6	CDF	0.2189	Non-Significant Effect
		Method Control	0.8686	1.943	0.386	6	CDF	0.2092	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.115	2.412	0.2163	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.115		0.0435	Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0771165	0.0385583	2	0.559	0.5904	Non-Significant Effect
Error	0.620775	0.068975	9			
Total	0.697891		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	0.735	9.21	0.6924	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.847	0.8025	0.0337	Normal Distribution

Length Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	LC	4	10.37	9.837	10.91	10.52	9.87	10.58	0.1683	3.25%	0.00%
Control 15	N	4	10.21	9.852	10.56	10.23	9.93	10.43	0.1109	2.17%	1.61%
Control 20	MC	4	10.2	9.864	10.54	10.24	9.93	10.4	0.1054	2.07%	1.66%

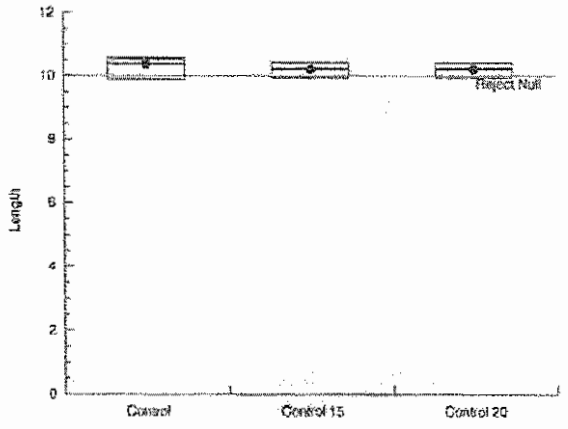
Length Detail

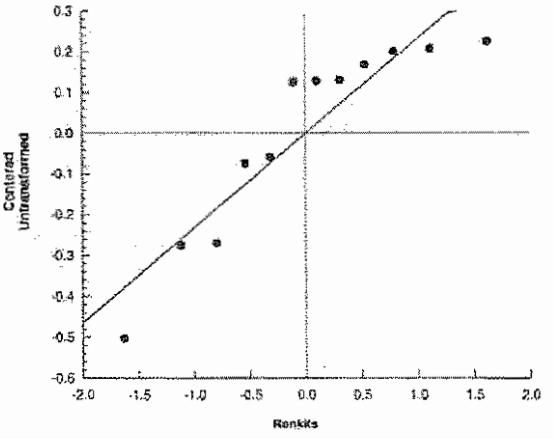
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	10.58	10.54	10.5	9.87
Control 15	N	10.33	9.93	10.43	10.13
Control 20	MC	10.4	9.93	10.14	10.33

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	20-3632-4382	Endpoint:	Length	CETIS Version:	CETISv1.9.4
Analyzed:	22 Nov-19 11:53	Analysis:	Parametric-Two Sample	Status Level:	1

Graphics





CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	19-1296-0646	**Endpoint:**	Length	**CETIS Version:**	CETISv1.9.4
Analyzed:	22 Nov-19 11:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	00-6756-6431	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA

Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	01-0038-7384	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a		
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal Ltd	Control	
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	Control 15 passed length	3.72%
		Control 20 passed length	3.72%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	-0.8311	1.943	0.392	6	CDF	0.7811	Non-Significant Effect
		Method Control	-0.8686	1.943	0.386	6	CDF	0.7908	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.115	2.412	0.2163	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.115		0.0435	Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0771165	0.0385583	2	0.559	0.5904	Non-Significant Effect
Error	0.620775	0.068975	9			
Total	0.697891		11			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	0.735	9.21	0.6924	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.847	0.6025	0.0397	Normal Distribution

Length Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	LC	4	10.37	9.837	10.91	10.52	9.87	10.58	0.1683	3.25%	0.00%
Control 15	N	4	10.21	9.852	10.56	10.23	9.93	10.43	0.1109	2.17%	1.61%
Control 20	MC	4	10.2	9.864	10.54	10.24	9.93	10.4	0.1054	2.07%	1.66%

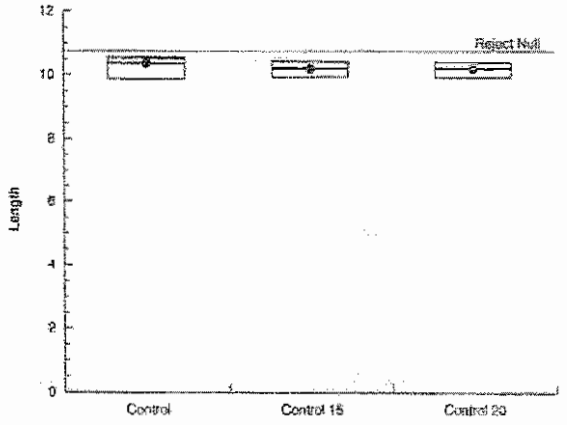
Length Detail

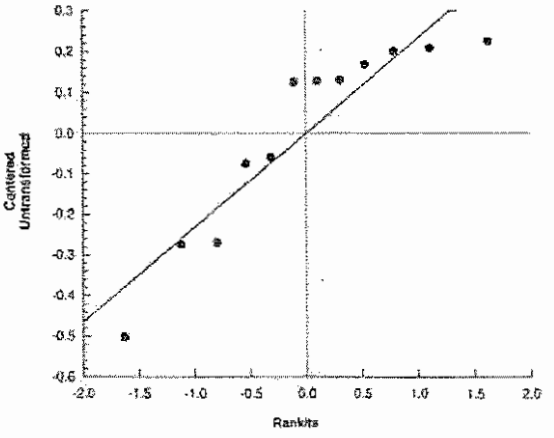
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	10.58	10.54	10.5	9.87
Control 15	N	10.33	9.93	10.43	10.13
Control 20	MC	10.4	9.93	10.14	10.33

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	19-1236-0646	**Endpoint:**	Length	**CETIS Version:**	CETISv1.9.4
Analyzed:	22 Nov-19 11:54	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	18-9692-5673	Endpoint:	Survival Rate	CETIS Version:	CETISv1.9.4
Analyzed:	19 Nov-19 15:04	Analysis:	STP 2xK Contingency Tables	Status Level:	1
Batch ID:	07-3591-4724	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	20-2483-8260	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a		
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal Ltd	Laboratory Control	
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Fisher Exact/Bonferroni Adj Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	0.9863	Exact	1.0000	Non-Significant Effect
		Method Control	0.9430	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.932	2.412	0.4295	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	1.932		0.3043	Non-Significant Trend in Controls

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control	LC	55	5	60	0.9167	0.08333	0.0%
Control 15	N	59	1	60	0.9833	0.01667	-7.27%
Control 20	MC	58	2	60	0.9667	0.03333	-5.46%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	0.8667	0.8667	0.9333	1.0000
Control 15	N	1.0000	1.0000	0.9333	1.0000
Control 20	MC	1.0000	0.9333	0.9333	1.0000

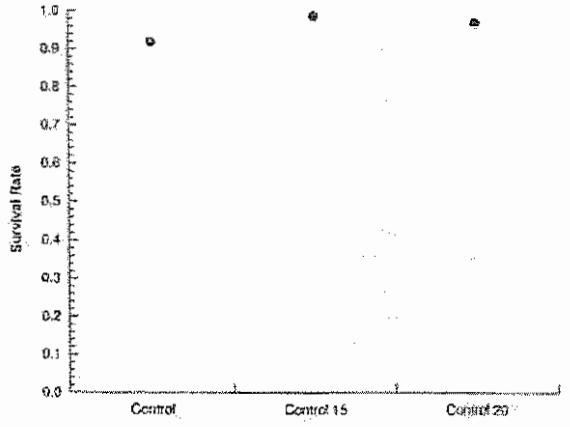
Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	13/15	13/15	14/15	15/15
Control 15	N	15/15	15/15	14/15	15/15
Control 20	MC	15/15	14/15	14/15	15/15

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	18-9692-5673	Endpoint:	Survival Rate	CETIS Version:	CETISv1.9.4
Analyzed:	19 Nov-19 15:04	Analysis:	STP 2xK Contingency Tables	Status Level:	1

Graphics



Analyst: SS QA: Dec-23/19

CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	10-2850-5947	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	19 Nov-19 15:32	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	07-3591-4724	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	20-2483-8260	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 15	10-6283-5019	22 Aug-19	22 Aug-19	n/a		
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	Water Sample	Teck Coal Ltd	Laboratory Control	
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Fisher Exact/Bonferroni-Holm Test C < T

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Lab Control		Negative Control	0.1034	Exact	0.2068	Non-Significant Effect
		Method Control	0.2195	Exact	0.2195	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.932	2.412	0.4295	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	1.932		0.3043	Non-Significant Trend in Controls

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control	LC	55	5	60	0.9167	0.08333	0.0%
Control 15	N	59	1	60	0.9833	0.01667	-7.27%
Control 20	MC	58	2	60	0.9667	0.03333	-5.46%

Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	0.8667	0.8667	0.9333	1.0000
Control 15	N	1.0000	1.0000	0.9333	1.0000
Control 20	MC	1.0000	0.9333	0.9333	1.0000

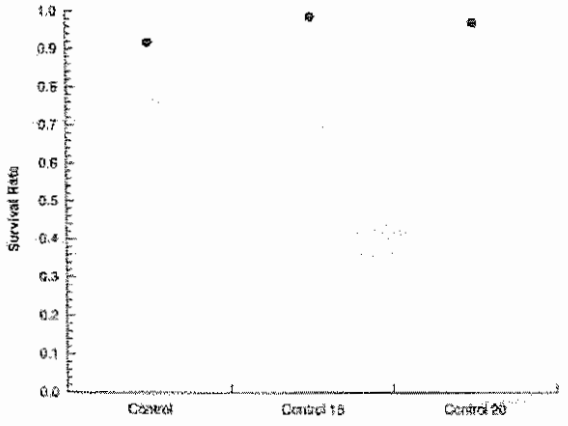
Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	LC	13/15	13/15	14/15	15/15
Control 15	N	15/15	15/15	14/15	15/15
Control 20	MC	15/15	14/15	14/15	15/15

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	10-2850-5947	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	19 Nov-19 15:32	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Dec 23/19

CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	18-8026-9054	**Endpoint:**	Hatch Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 14:03	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	00-6756-6431	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Fisher Exact/Bonferroni-Holm Test CPT

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		Method Control	1.0000	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			1.0000	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 15	N	60	0	60	1	0	0.0%
Control 20	MC	60	0	60	1	0	0.0%

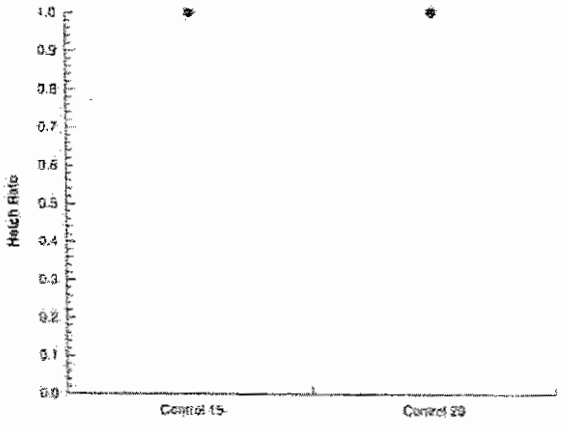
Hatch Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	1.0000	1.0000	1.0000	1.0000
Control 20	MC	1.0000	1.0000	1.0000	1.0000

Hatch Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	15/15	15/15	15/15	15/15
Control 20	MC	15/15	15/15	15/15	15/15

Graphics



CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	02-9143-1169	**Endpoint:**	Hatch Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 14:04	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	00-6756-6431	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Fisher Exact/Bonferroni-Holm Test C<T

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		Method Control	1.0000	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			1.0000	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 15	N	60	0	60	1	0	0.0%
Control 20	MC	60	0	60	1	0	0.0%

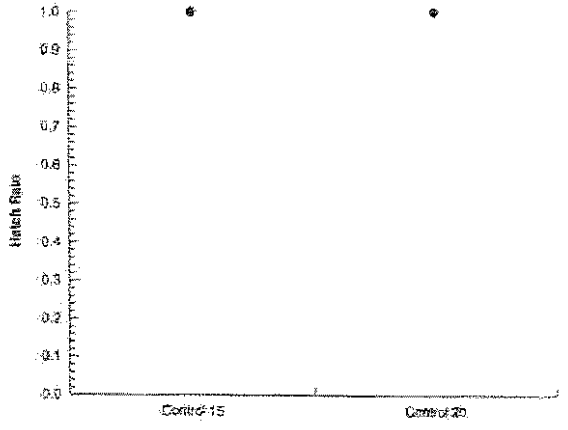
Hatch Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	1.0000	1.0000	1.0000	1.0000
Control 20	MC	1.0000	1.0000	1.0000	1.0000

Hatch Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	15/15	15/15	15/15	15/15
Control 20	MC	15/15	15/15	15/15	15/15

Graphics



Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	13-6762-4258	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.9.4
Analyzed:	21 Nov-19 14:10	Analysis:	Parametric-Two Sample	Status Level:	1
Batch ID:	00-6756-6431	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	Control 20 passed mean dry biomass-mg	12.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		Method Control	-1.243	1.943	0.285	6	CDF	0.8599	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.626	2.127	0.6145	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	1.626		0.7391	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0664909	0.0664909	1	1.545	0.2602	Non-Significant Effect
Error	0.258146	0.0430244	6			
Total	0.324637		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.175	47.47	0.5398	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9592	0.6451	0.8024	Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 15	N	4	2.249	1.863	2.635	2.265	1.937	2.528	0.1214	10.80%	0.00%
Control 20	MC	4	2.431	2.169	2.693	2.38	2.304	2.66	0.08231	6.77%	-8.11%

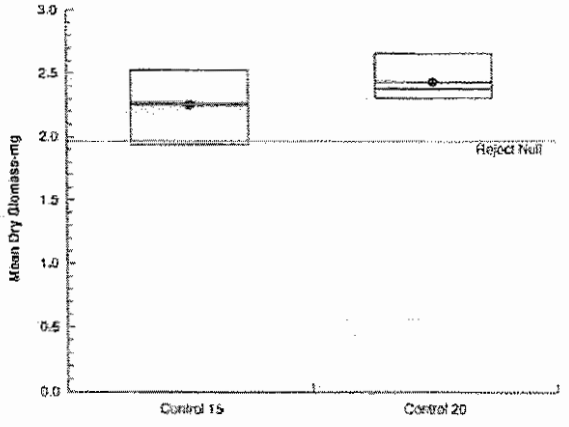
Mean Dry Biomass-mg Detail

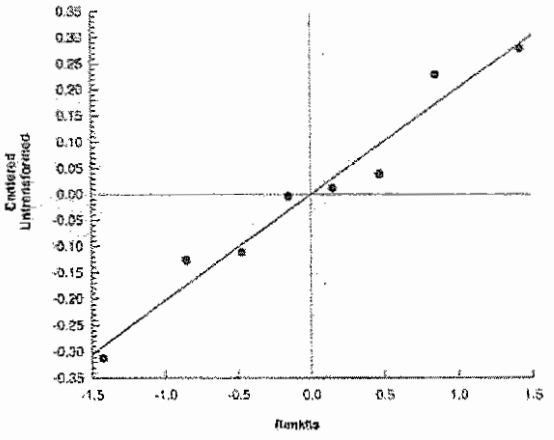
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	2.244	1.937	2.528	2.287
Control 20	MC	2.442	2.304	2.319	2.66

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	13-6762-4258	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.9.4
Analyzed:	21 Nov-19 14:10	Analysis:	Parametric-Two Sample	Status Level:	1

Graphics





Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	00-5763-6730	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.9.4
Analyzed:	21 Nov-19 14:13	Analysis:	Parametric-Two Sample	Status Level:	1
Batch ID:	00-6756-6431	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	Control 20 passed mean dry biomass-mg	12.67%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		Method Control	1.243	1.943	0.285	6	CDF	0.1301	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.626	2.127	0.6145	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	1.626		0.7391	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.0664909	0.0664909	1	1.545	0.2602	Non-Significant Effect
Error	0.258146	0.0430244	6			
Total	0.324637		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	2.175	47.47	0.5398	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9592	0.6451	0.8024	Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 15	N	4	2.249	1.863	2.635	2.265	1.937	2.528	0.1214	10.80%	0.00%
Control 20	MC	4	2.431	2.169	2.693	2.38	2.304	2.66	0.08231	6.77%	-8.11%

Mean Dry Biomass-mg Detail

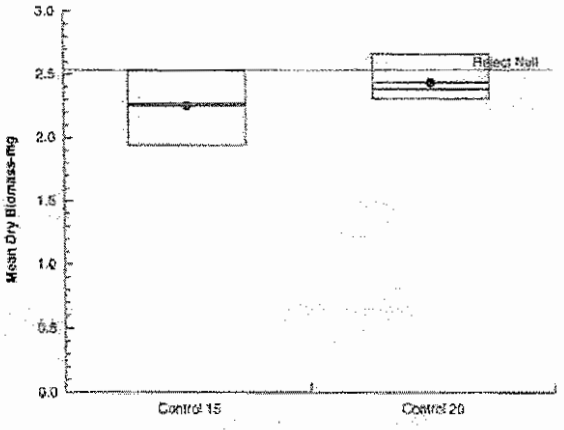
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	2.244	1.937	2.528	2.287
Control 20	MC	2.442	2.304	2.319	2.66

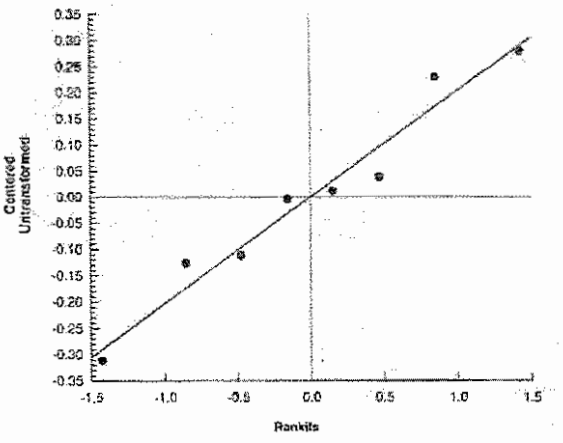
Fathead minnow (Pimephales promelas) 32-d survival and growth test

Nautilus Environmental Calgary

Analysis ID:	00-5763-6730	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-19 14:13	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	21-2811-7699	Endpoint:	Length	CETIS Version:	CETISv1.9.4
Analyzed:	22 Nov-19 11:58	Analysis:	Parametric-Two Sample	Status Level:	1
Batch ID:	00-6756-6431	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 20	16-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	Control 20 passed length	2.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		Method Control	0.03268	1.943	0.297	6	CDF	0.4875	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.373	2.127	1.0000	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	1.373		1.0000	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.000E-05	5.000E-05	1	0.001068	0.9750	Non-Significant Effect
Error	0.2809	0.0468166	6			
Total	0.28095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.106	47.47	0.9361	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8613	0.6451	0.1936	Normal Distribution

Length Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 15	N	4	10.21	9.852	10.56	10.23	9.93	10.43	0.1109	2.17%	0.00%
Control 20	MC	4	10.2	9.864	10.54	10.24	9.93	10.4	0.1054	2.07%	0.05%

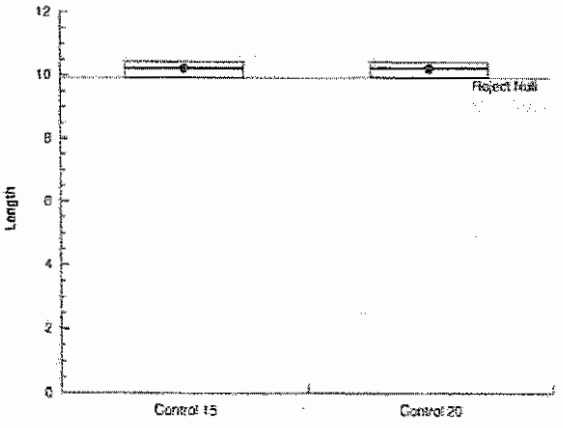
Length Detail

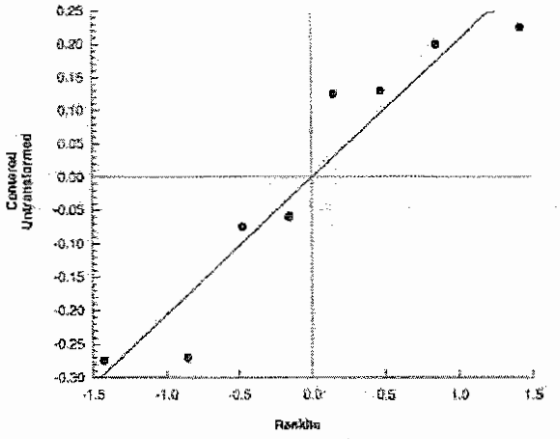
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	10.33	9.93	10.43	10.13
Control 20	MC	10.4	9.93	10.14	10.33

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	21-2811-7699	Endpoint:	Length	CETIS Version:	CETISv1.9.4
Analyzed:	22 Nov-19 11:58	Analysis:	Parametric-Two Sample	Status Level:	1

Graphics





Analyst: SS QA: Dec-23/19

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	19-7361-1307	Endpoint:	Length	CETIS Version:	CETISv1.9.4
Analyzed:	22 Nov-19 11:58	Analysis:	Parametric-Two Sample	Status Level:	1
Batch ID:	00-6756-6431	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	Control 20 passed length	2.91%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		Method Control	-0.03268	1.943	0.297	6	CDF	0.5125	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.373	2.127	1.0000	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	1.373		1.0000	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.000E-05	5.000E-05	1	0.001068	0.9750	Non-Significant Effect
Error	0.2809	0.0468166	6			
Total	0.28095		7			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Variance Ratio F Test	1.106	47.47	0.9361	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.8813	0.6451	0.1936	Normal Distribution

Length Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 15	N	4	10.21	9.852	10.56	10.23	9.93	10.43	0.1109	2.17%	0.00%
Control 20	MC	4	10.2	9.864	10.54	10.24	9.93	10.4	0.1054	2.07%	0.05%

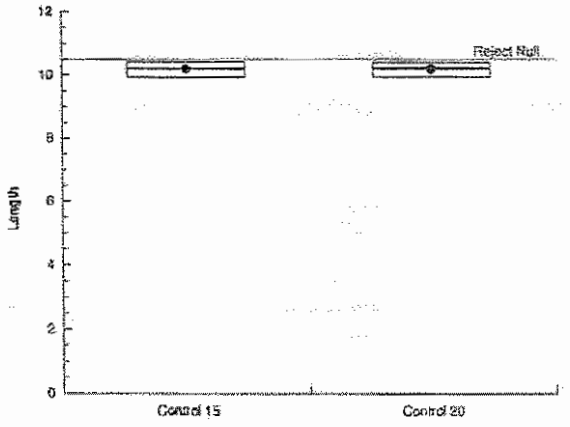
Length Detail

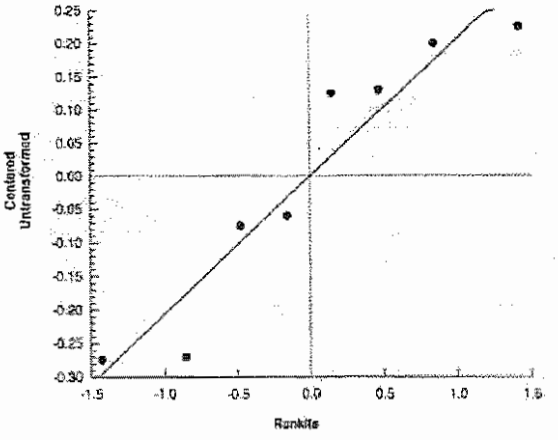
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	10.33	9.93	10.43	10.13
Control 20	MC	10.4	9.93	10.14	10.33

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	19-7361-1307	Endpoint:	Length	CETIS Version:	CETISv1.9.4
Analyzed:	22 Nov-19 11:58	Analysis:	Parametric-Two Sample	Status Level:	1

Graphics





CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	05-3792-8792	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 14:06	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	00-6756-6431	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Fisher Exact/Bonferroni-Holm Test CTT

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		Method Control	0.5000	Exact	0.5000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.127	0.8897	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	1.5		0.4783	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 15	N	59	1	60	0.9833	0.01667	0.0%
Control 20	MC	58	2	60	0.9667	0.03333	1.7%

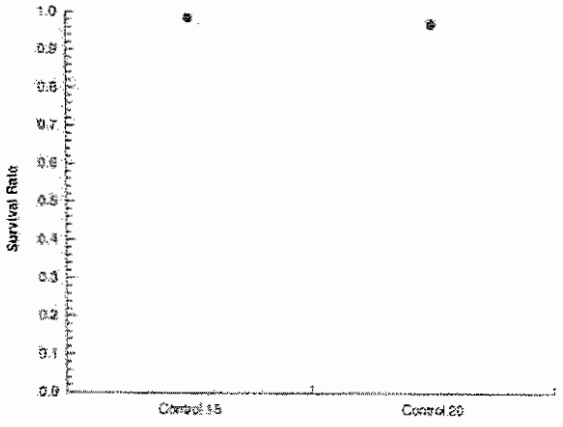
Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	1.0000	1.0000	0.9333	1.0000
Control 20	MC	1.0000	0.9333	0.9333	1.0000

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	15/15	15/15	14/15	15/15
Control 20	MC	15/15	14/15	14/15	15/15

Graphics



CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	03-6145-5004	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 14:07	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	00-6756-6431	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	

Fisher Exact/Bonferroni-Holm Test C.T

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		Method Control	0.8782	Exact	0.8782	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.5	2.127	0.8897	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	1.5		0.4783	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 15	N	59	1	60	0.9833	0.01667	0.0%
Control 20	MC	58	2	60	0.9667	0.03333	1.7%

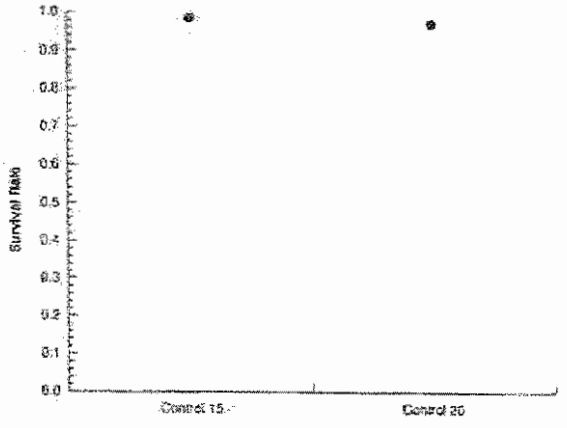
Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	1.0000	1.0000	0.9333	1.0000
Control 20	MC	1.0000	0.9333	0.9333	1.0000

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	15/15	15/15	14/15	15/15
Control 20	MC	15/15	14/15	14/15	15/15

Graphics



 Analyst: SS QA: Dec 23/19

CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	13-7689-0229	**Endpoint:**	Hatch Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-19 12:29	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	00-6756-6431	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19	48h (14.5 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	35h (10 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control (Control 15 ug/L)		FR_UFR1	1.0000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.5000	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.5000	Exact	1.0000	Non-Significant Effect
		LC_SLC	1.0000	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.398	2.802	0.2582	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.390		1.0000	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 15	N	60	0	60	1	0	0.0%
FR_UFR1		60	0	60	1	0	0.0%
GH_ERC		59	1	60	0.9833	0.01667	1.67%
GH_ER2		59	1	60	0.9833	0.01667	1.67%
CM_MC1		59	1	60	0.9833	0.01667	1.67%
LC_SLC		60	0	60	1	0	0.0%

Hatch Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	0.9333	1.0000	1.0000
GH_ER2		1.0000	1.0000	0.9333	1.0000
CM_MC1		1.0000	1.0000	1.0000	0.9333
LC_SLC		1.0000	1.0000	1.0000	1.0000

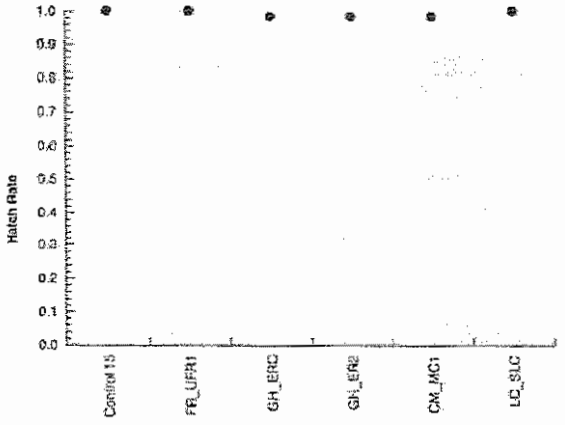
Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	13-7689-0229	**Endpoint:**	Hatch Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-19 12:29	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Hatch Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	15/15	15/15	15/15	15/15
FR_UFR1		15/15	15/15	15/15	15/15
GH_ERC		15/15	14/15	15/15	15/15
GH_ER2		15/15	15/15	14/15	15/15
CM_MC1		15/15	15/15	15/15	14/15
LC_SLC		15/15	15/15	15/15	15/15

Graphics



Analyst: SS QA: DEC 23/19

CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	15-9734-8747	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.9.4
Analyzed:	09 Dec-19 14:19	Analysis:	Parametric-Two Sample	Status Level:	1
Batch ID:	00-6756-6431	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA

Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 [illegible]	48h (14.5 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-2	
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry biomass-mg	28.55%
		GH_ERC passed mean dry biomass-mg	28.55%
		GH_ER2 passed mean dry biomass-mg	28.55%
		CM_MC1 passed mean dry biomass-mg	28.55%
		LC_SLC failed mean dry biomass-mg	28.55%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control (Right Control)		FR_UFR1	0.374	1.943	0.249	6	CDF	0.3606	Non-Significant Effect
		GH_ERC	-0.8481	1.943	0.274	6	CDF	0.7856	Non-Significant Effect
		GH_ER2	0.6687	1.943	0.56	6	CDF	0.2092	Non-Significant Effect
		CM_MC1	0.5606	1.943	0.315	6	CDF	0.2977	Non-Significant Effect
		LC_SLC*	2.215	1.943	0.642	6	CDF	0.0344	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.599	2.802	0.1203	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.599		0.7391	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.82356	0.364712	5	2.792	0.0489	Significant Effect
Error	2.35157	0.130643	18			
Total	4.17513		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	12.8	15.09	0.0254	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9153	0.884	0.0460	Normal Distribution

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 15-9734-8747 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.4
Analyzed: 09 Dec-19 14:19 Analysis: Parametric-Two Sample Status Level: 1

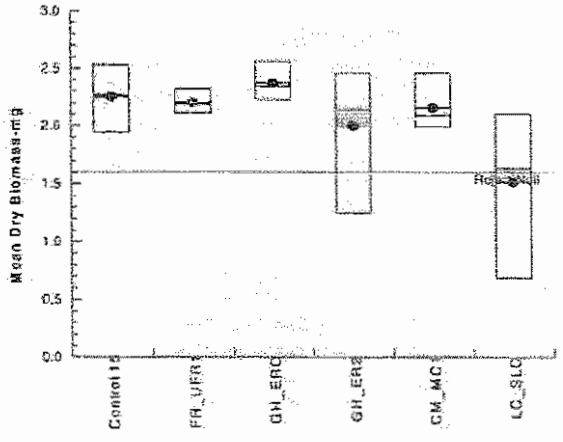
Mean Dry Biomass-mg Summary

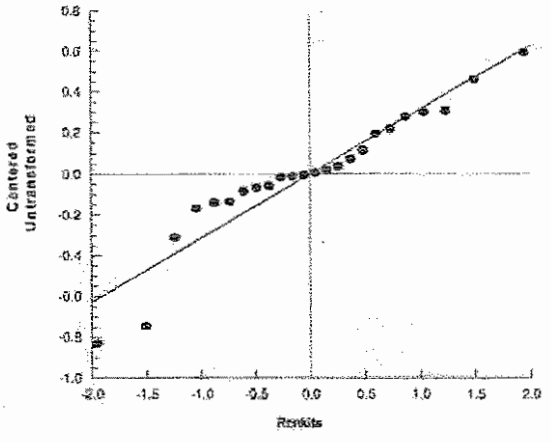
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 15	N	4	2.249	1.863	2.635	2.265	1.937	2.528	0.1214	10.80%	0.00%
FR_UFR1		4	2.201	2.068	2.333	2.186	2.115	2.315	0.04169	3.79%	2.13%
GH_ERC		4	2.368	2.141	2.596	2.343	2.227	2.56	0.07152	6.04%	-5.31%
GH_ER2		4	1.998	1.167	2.83	2.142	1.252	2.458	0.2513	26.15%	11.13%
CM_MC1		4	2.158	1.815	2.501	2.091	1.989	2.461	0.1078	9.99%	4.05%
LC_SLC		4	1.517	0.5389	2.495	1.637	0.686	2.109	0.3074	40.52%	32.54%

Mean Dry Biomass-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	2.244	1.937	2.528	2.287
FR_UFR1		2.189	2.184	2.315	2.115
GH_ERC		2.227	2.301	2.56	2.365
GH_ER2		1.252	2.071	2.213	2.458
CM_MC1		2.162	1.989	2.02	2.461
LC_SLC		1.457	0.686	1.816	2.109

Graphics





CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	20-3276-0871	**Endpoint:**	Length	**CETIS Version:**	CETISv1.9.4
Analyzed:	22 Nov-19 10:31	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	00-6756-6431	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 11:00	48h (14.5 °C)		
GH_ER2	08-2042-0627	20 Aug-19	21 Aug-19 11:00	48h (14.5 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed length	5.42%
		GH_ERC passed length	5.42%
		GH_ER2 passed length	5.42%
		CM_MC1 passed length	5.42%
		LC_SLC passed length	5.42%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control (control 15 ug/L)		FR_UFR1	-0.3205	1.943	0.455	6	CDF	0.6203	Non-Significant Effect
		GH_ERC	-1.975	1.943	0.477	6	CDF	0.9522	Non-Significant Effect
		GH_ER2	-1.7	1.943	0.487	6	CDF	0.9300	Non-Significant Effect
		CM_MC1	-1.136	1.943	0.654	6	CDF	0.8504	Non-Significant Effect
		LC_SLC	1.879	1.943	0.553	6	CDF	0.0547	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.017	2.802	0.8668	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.017		1.0000	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.86268	0.572536	5	2.762	0.0505	Non-Significant Effect
Error	3.73085	0.207269	18			
Total	6.59353		23			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	2.826	15.09	0.7265	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9851	0.884	0.9689	Normal Distribution

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 20-3276-0871 Endpoint: Length CETIS Version: CETISv1.9.4
Analyzed: 22 Nov-19 10:31 Analysis: Parametric-Two Sample Status Level: 1

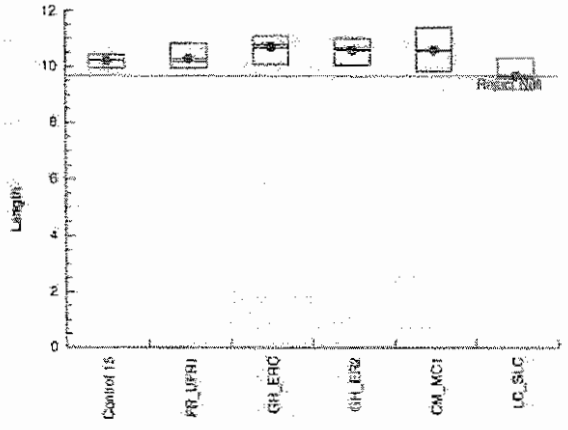
Length Summary

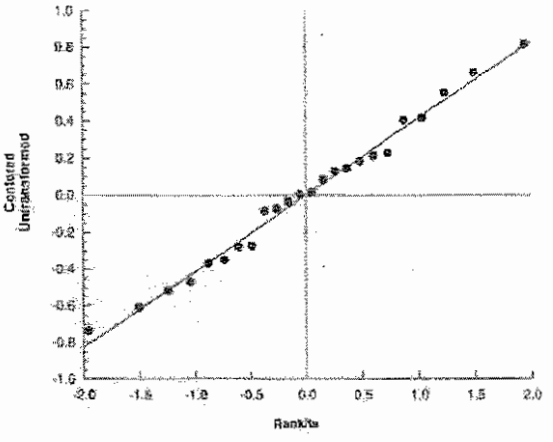
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 15	N	4	10.21	9.852	10.56	10.23	9.93	10.43	0.1109	2.17%	0.00%
FR_UFR1		4	10.28	9.624	10.94	10.18	9.93	10.83	0.2061	4.01%	-0.73%
GH_ERC		4	10.69	9.993	11.39	10.8	10.08	11.09	0.2191	4.10%	-4.75%
GH_ER2		4	10.59	9.965	11.21	10.64	10.07	11	0.1957	3.70%	-3.75%
CM_MC1		4	10.59	9.576	11.6	10.55	9.85	11.4	0.3178	6.00%	-3.75%
LC_SLC		4	9.67	8.835	10.5	9.575	9.2	10.33	0.2623	5.43%	5.24%

Length Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	10.33	9.93	10.43	10.13
FR_UFR1		10	10.36	9.93	10.83
GH_ERC		10.9	10.08	10.69	11.09
GH_ER2		11	10.55	10.73	10.07
CM_MC1		10.6	9.85	11.4	10.5
LC_SLC		9.3	9.2	10.33	9.85

Graphics





CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	19-5635-6281	Endpoint:	Survival Rate	CETIS Version:	CETISv1.9.4
Analyzed:	21 Nov-19 12:28	Analysis:	STP 2xK Contingency Tables	Status Level:	1
Batch ID:	00-8756-6431	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 15	10-6263-5019	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
FR_UFR1	19-7229-5960	20 Aug-19 11:23	21 Aug-19 11:00	37h (11.1 °C)		
GH_ERC	12-0073-7620	20 Aug-19	21 Aug-19 11:00	48h (14.5 °C)		
GH_ER2	03-2042-0627	20 Aug-19	21 Aug-19 11:00	48h (14.5 °C)		
CM_MC1	11-8128-5645	20 Aug-19 11:52	21 Aug-19 11:00	36h (10 °C)		
LC_SLC	02-2654-5518	20 Aug-19 08:51	21 Aug-19 11:00	39h (11.2 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 15	Water Sample	Teck Coal Ltd	Cu Control 15 ug/L	
FR_UFR1	Water Sample	Teck Coal Ltd	FR_UFR1_MON_2019-08-	
GH_ERC	Water Sample	Teck Coal Ltd	GH_ERC_WS_2019-08-20	
GH_ER2	Water Sample	Teck Coal Ltd	GH_ER2_WS_2019-08-20_	
CM_MC1	Water Sample	Teck Coal Ltd	CM_MC1_WS_2019-08-20	
LC_SLC	Water Sample	Teck Coal Ltd	LC_SLC_WS_2019-08-19_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1*	0.0161	Exact	0.0161	Significant Effect
(Control 15 ug/L)		GH_ERC*	0.0005	Exact	9.8E-04	Significant Effect
		GH_ER2*	0.0000	Exact	1.7E-05	Significant Effect
		CM_MC1*	0.0001	Exact	3.2E-04	Significant Effect
		LC_SLC*	0.0000	Exact	6.6E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.375	2.802	0.2602	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.375		0.4783	Non-Significant Trend in Controls

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 15	N	59	1	60	0.9833	0.01667	0.0%
FR_UFR1		52	8	60	0.8667	0.1333	11.86%
GH_ERC		47	13	60	0.7833	0.2167	20.34%
GH_ER2		41	19	60	0.6833	0.3167	30.51%
CM_MC1		45	15	60	0.75	0.25	23.73%
LC_SLC		37	23	60	0.6167	0.3833	37.29%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	1.0000	1.0000	0.9333	1.0000
FR_UFR1		0.9333	0.7333	1.0000	0.8000
GH_ERC		0.6667	0.6667	0.8667	0.7333
GH_ER2		0.2667	0.7333	0.7333	1.0000
CM_MC1		0.6667	0.6667	0.5333	0.9333
LC_SLC		0.6667	0.3333	0.6000	0.8667

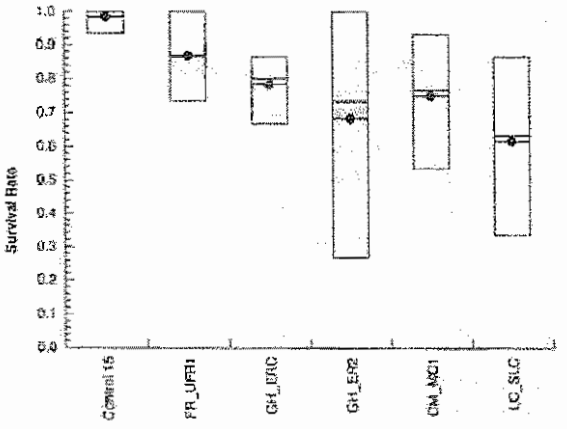
Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	19-5635-6281	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-19 12:28	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 15	N	15/15	15/15	14/15	15/15
FR_UFR1		14/15	11/15	15/15	12/15
GH_ERC		10/15	13/15	13/15	11/15
GH_ER2		4/15	11/15	11/15	15/15
CM_MC1		10/15	13/15	8/15	14/15
LC_SLC		10/15	5/15	9/15	13/15

Graphics



Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	02-2964-6978	**Endpoint:**	Hatch Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-19 11:45	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	00-6756-6431	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)		
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 11:00	48h (15 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 11:00	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Method Control		FR_FRCP1	1.0000	Exact	1.0000	Non-Significant Effect
(Zucchini control)		FR_FRABCH	0.5000	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.5000	Exact	1.0000	Non-Significant Effect
		EV_HC1	1.0000	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.0000	Exact	1.0000	Non-Significant Effect
		LC_LC3	1.0000	Exact	1.0000	Non-Significant Effect
		LC_DCDS	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LC5	1.0000	Exact	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.54	3.076	0.3757	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.54		1.0000	Non-Significant Trend in Controls

Dec 23/19

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 02-2964-6978 Endpoint: Hatch Rate CETIS Version: CETISv1.9.4
Analyzed: 21 Nov-19 11:45 Analysis: STP 2xK Contingency Tables Status Level: 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 20	MC	60	0	60	1	0	0.0%
FR_FRCP1		60	0	60	1	0	0.0%
FR_FRABCH		59	1	60	0.9833	0.01667	1.67%
GH_FR1		59	1	60	0.9833	0.01667	1.67%
EV_HC1		60	0	60	1	0	0.0%
EV_MC2		59	1	60	0.9833	0.01667	1.67%
CM_MC2		59	1	60	0.9833	0.01667	1.67%
LC_LCDSSLCC		60	0	60	1	0	0.0%
LC_LC3		60	0	60	1	0	0.0%
LC_DCDS		59	1	60	0.9833	0.01667	1.67%
LC_LC5		60	0	60	1	0	0.0%

Hatch Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	MC	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000
FR_FRABCH		1.0000	1.0000	1.0000	0.9333
GH_FR1		1.0000	1.0000	0.9333	1.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000
EV_MC2		1.0000	0.9333	1.0000	1.0000
CM_MC2		0.9333	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000
LC_DCDS		0.9333	1.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000

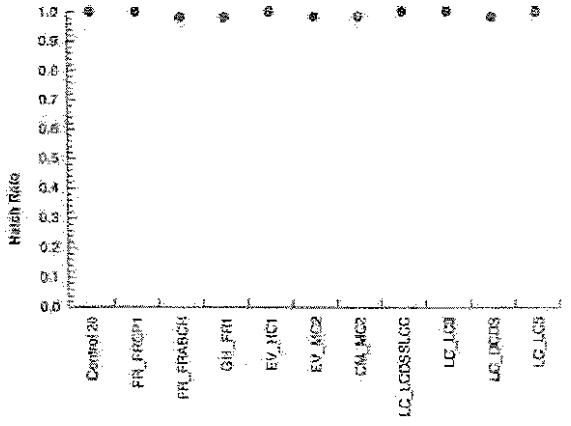
Hatch Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	MC	15/15	15/15	15/15	15/15
FR_FRCP1		15/15	15/15	15/15	15/15
FR_FRABCH		15/15	15/15	15/15	14/15
GH_FR1		15/15	15/15	14/15	15/15
EV_HC1		15/15	15/15	15/15	15/15
EV_MC2		15/15	14/15	15/15	15/15
CM_MC2		14/15	15/15	15/15	15/15
LC_LCDSSLCC		15/15	15/15	15/15	15/15
LC_LC3		15/15	15/15	15/15	15/15
LC_DCDS		14/15	15/15	15/15	15/15
LC_LC5		15/15	15/15	15/15	15/15

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	02-2964-6978	**Endpoint:**	Hatch Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-19 11:45	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: SS QA: Dec 23/19

CETIS Analytical Report

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	04-7445-9950	**Endpoint:**	Mean Dry Biomass-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	09 Dec-19 14:22	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	00-6756-6431	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 20	18-3854-4317	22 Aug-19	22 Aug-19 [illegible]	n/a	Teck Coal Ltd	
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)		
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 [illegible]	48h (15 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 [illegible]	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-0	
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-19	
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRCP1 failed mean dry biomass-mg	8.26%
		FR_FRABCH passed mean dry biomass-mg	8.26%
		GH_FR1 passed mean dry biomass-mg	8.26%
		EV_HC1 failed mean dry biomass-mg	8.26%
		EV_MC2 passed mean dry biomass-mg	8.26%
		CM_MC2 failed mean dry biomass-mg	8.26%
		LC_LCDSSLCC failed mean dry biomass-mg	8.26%
		LC_LC3 passed mean dry biomass-mg	8.26%
		LC_DCDS failed mean dry biomass-mg	8.26%
		LC_LC5 failed mean dry biomass-mg	8.26%

Equal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Method Control		FR_FRCP1*	2.855	1.943	0.244	6	CDF	0.0145	Significant Effect
(Zougik Control)		FR_FRABCH	1.453	1.943	0.234	6	CDF	0.0982	Non-Significant Effect
		GH_FR1	1.014	1.943	0.236	6	CDF	0.1749	Non-Significant Effect
		EV_HC1*	2.02	1.943	0.355	6	CDF	0.0450	Significant Effect
		EV_MC2	1.514	1.943	0.348	6	CDF	0.0904	Non-Significant Effect
		CM_MC2*	10.71	1.943	0.195	6	CDF	2.0E-05	Significant Effect
		LC_LCDSSLCC*	4.778	1.943	0.260	6	CDF	0.0015	Significant Effect
		LC_LC3	1.104	1.943	0.195	6	CDF	0.1558	Non-Significant Effect
		LC_DCDS*	3.072	1.943	0.355	6	CDF	0.0109	Significant Effect
		LC_LC5*	3.606	1.943	0.201	6	CDF	0.0045	Significant Effect

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 04-7445-9950 Endpoint: Mean Dry Biomass-mg CETIS Version: CETISv1.9.4
Analyzed: 09 Dec-19 14:22 Analysis: Parametric-Two Sample Status Level: 1

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.193	3.076	1.0000	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.193		0.7391	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.66229	0.36623	10	7.639	3.7E-06	Significant Effect
Error	1.58208	0.0479418	33			
Total	5.24437		43			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	8.407	23.21	0.5891	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9842	0.9295	0.7995	Normal Distribution

Mean Dry Biomass-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 20	MC	4	2.431	2.169	2.693	2.38	2.304	2.66	0.08231	6.77%	0.00%
FR_FRCP1		4	2.073	1.77	2.375	2.04	1.877	2.333	0.0949	9.16%	14.75%
FR_FRABCH		4	2.257	1.978	2.535	2.18	2.148	2.518	0.0876	7.76%	7.16%
GH_FR1		4	2.308	2.023	2.593	2.388	2.04	2.416	0.08956	7.76%	5.07%
EV_HC1		4	2.061	1.541	2.582	2.07	1.676	2.43	0.1636	15.87%	15.21%
EV_MC2		4	2.16	1.653	2.667	2.189	1.743	2.518	0.1592	14.74%	11.16%
CM_MC2		4	1.359	1.178	1.541	1.347	1.252	1.491	0.05698	8.38%	44.09%
LC_LCDSSLCC		4	1.792	1.456	2.127	1.749	1.59	2.078	0.1056	11.79%	26.31%
LC_LC3		4	2.32	2.138	2.503	2.315	2.203	2.449	0.05739	4.95%	4.56%
LC_DCDS		4	1.869	1.35	2.389	1.817	1.554	2.29	0.1633	17.47%	23.11%
LC_LC5		4	2.036	1.839	2.237	2.071	1.859	2.149	0.06255	6.14%	16.19%

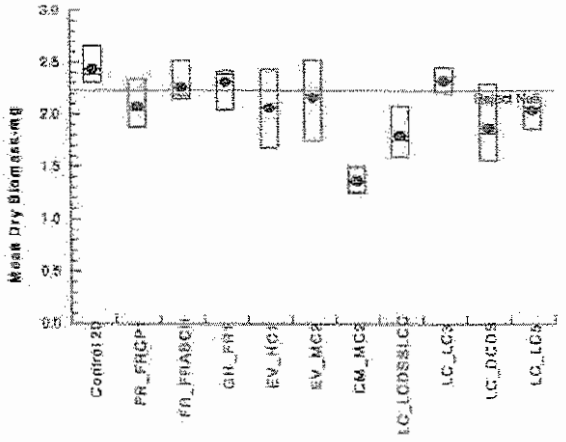
Mean Dry Biomass-mg Detail

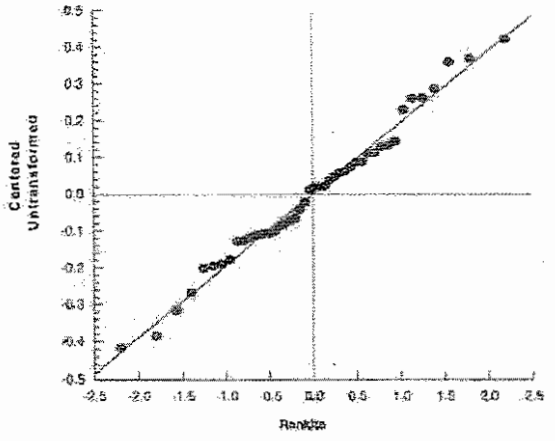
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	MC	2.442	2.304	2.319	2.66
FR_FRCP1		2.049	1.877	2.031	2.333
FR_FRABCH		2.169	2.148	2.191	2.518
GH_FR1		2.361	2.394	2.416	2.04
EV_HC1		1.935	2.205	1.676	2.43
EV_MC2		2.181	1.743	2.197	2.518
CM_MC2		1.417	1.252	1.277	1.491
LC_LCDSSLCC		1.81	1.59	1.656	2.078
LC_LC3		2.247	2.383	2.449	2.203
LC_DCDS		1.554	1.955	1.679	2.29
LC_LC5		2.086	2.056	2.149	1.859

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	04-7445-9950	Endpoint:	Mean Dry Biomass-mg	CETIS Version:	CETISv1.9.4
Analyzed:	09 Dec-19 14:22	Analysis:	Parametric-Two Sample	Status Level:	1

Graphics





Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	08-0659-0773	**Endpoint:**	Length	**CETIS Version:**	CETISv1.9.4
Analyzed:	22 Nov-19 11:46	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	00-6756-6431	**Test Type:**	Survival-Development-Growth	**Analyst:**	Stephanie Schiffer
Start Date:	22 Aug-19	**Protocol:**	ASTM E1241-05 (2013)	**Diluent:**	Site water
Ending Date:	23 Sep-19	**Species:**	Pimephales promelas	**Brine:**	
Test Length:	32d 0h	**Taxon:**	Actinopterygii	**Source:**	Aquatic Biosystems, CA — **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
FR_FRCP1	04-8084-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)		
FR_FRABCH	14-5092-7567	20 Aug-19 09:46	21 Aug-19 11:00	38h (11.9 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 11:00	48h (15 °C)		
EV_HC1	12-0828-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.8 °C)		
LC_LCDSSLCC	12-6177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 11:00	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_FRCP1 passed length	5.69%
		FR_FRABCH passed length	5.69%
		GH_FR1 passed length	5.69%
		EV_HC1 passed length	5.69%
		EV_MC2 passed length	5.69%
		CM_MC2 passed length	5.69%
		LC_LCDSSLCC passed length	5.69%
		LC_LC3 passed length	5.69%
		LC_DCDS passed length	5.69%
		LC_LC5 passed length	5.69%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Method Control		FR_FRCP1	-1.904	2.353	1.103	3	CDF	0.9234	Non-Significant Effect
(Control 20 ug/L)		FR_FRABCH	-1.233	2.353	1.412	3	CDF	0.8474	Non-Significant Effect
		GH_FR1	-0.7639	2.353	0.678	3	CDF	0.7498	Non-Significant Effect
		EV_HC1	-0.6572	2.015	0.314	5	CDF	0.7300	Non-Significant Effect
		EV_MC2	-0.8688	2.353	0.941	3	CDF	0.7756	Non-Significant Effect
		CM_MC2	-2.575	2.353	2.537	3	CDF	0.9589	Non-Significant Effect
		LC_LCDSSLCC	-1.441	2.353	0.702	3	CDF	0.8774	Non-Significant Effect
		LC_LC3	-2.941	2.015	0.331	5	CDF	0.9839	Non-Significant Effect
		LC_DCDS	1.56	2.015	0.300	5	CDF	0.0898	Non-Significant Effect
		LC_LC5	1.23	2.132	0.581	4	CDF	0.1430	Non-Significant Effect

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 08-0659-0773 Endpoint: Length CETIS Version: CETISv1.9.4
Analyzed: 22 Nov-19 11:48 Analysis: Parametric-Two Sample Status Level: 1

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	3.282	3.076	0.0200	Outlier Detected
Control Trend	Mann-Kendall Trend Test	3.282		1.0000	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	28.5415	2.85415	10	3.7	0.0021	Significant Effect
Error	25.4532	0.771308	33			
Total	53.9947		43			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	31.31	23.21	5.2E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9472	0.9295	0.0433	Normal Distribution

Length Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control 20	MC	4	10.2	9.884	10.54	10.24	9.93	10.4	0.1054	2.07%	0.00%
FR_FRCP1		4	11.09	9.639	12.55	11.18	10	12	0.4569	8.24%	-8.75%
FR_FRABCH		4	10.94	9.06	12.82	10.51	10.08	12.67	0.5907	10.80%	-7.25%
GH_FR1		4	10.42	9.567	11.27	10.38	9.93	11	0.268	5.14%	-2.16%
EV_HC1		4	10.3	9.937	10.67	10.34	10	10.54	0.1149	2.23%	-1.00%
EV_MC2		4	10.55	9.32	11.78	10.39	9.92	11.5	0.3858	7.32%	-3.41%
CM_MC2		4	12.97	9.561	16.39	12.7	11	15.5	1.073	16.53%	-27.21%
LC_LCDSSLCC		4	10.63	9.742	11.52	10.85	9.82	11	0.2791	5.25%	-4.22%
LC_LC3		4	10.68	10.28	11.08	10.66	10.4	11	0.1257	2.35%	-4.73%
LC_DCDS		4	9.967	9.632	10.3	9.995	9.73	10.15	0.1054	2.11%	2.28%
LC_LC5		4	9.865	9.066	10.66	9.92	9.2	10.42	0.251	5.09%	3.28%

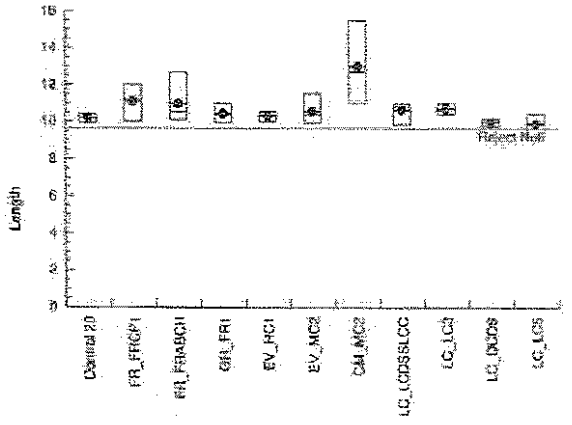
Length Detail

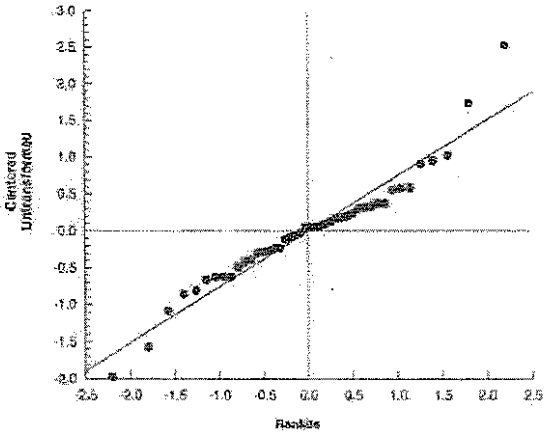
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	MC	10.4	9.93	10.14	10.33
FR_FRCP1		12	10	10.7	11.67
FR_FRABCH		10.7	12.67	10.08	10.31
GH_FR1		11	10	10.75	9.93
EV_HC1		10.27	10.4	10	10.54
EV_MC2		9.92	11.5	9.92	10.85
CM_MC2		14	11	11.4	15.5
LC_LCDSSLCC		11	9.82	10.7	11
LC_LC3		10.73	11	10.6	10.4
LC_DCDS		10.14	9.85	9.73	10.15
LC_LC5		10.42	9.92	9.2	9.92

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	08-0659-0773	Endpoint:	Length	CETIS Version:	CETISv1.9.4
Analyzed:	22 Nov-19 11:46	Analysis:	Parametric-Two Sample	Status Level:	1

Graphics





CETIS Analytical Report

Test Code/ID: Control_A / 05-8534-7552

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID:	20-4428-6783	Endpoint:	Survival Rate	CETIS Version:	CETISv1.9.4
Analyzed:	21 Nov-19 11:47	Analysis:	STP 2xK Contingency Tables	Status Level:	1
Batch ID:	00-6756-6431	Test Type:	Survival-Development-Growth	Analyst:	Stephanie Schiffer
Start Date:	22 Aug-19	Protocol:	ASTM E1241-05 (2013)	Diluent:	Site water
Ending Date:	23 Sep-19	Species:	Pimephales promelas	Brine:	
Test Length:	32d 0h	Taxon:	Actinopterygii	Source:	Aquatic Biosystems, CA Age:

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control 20	18-3854-4317	22 Aug-19	22 Aug-19	n/a	Teck Coal Ltd	
FR_FRCP1	04-8034-7392	20 Aug-19 08:15	21 Aug-19 11:00	40h (11.3 °C)		
FR_FRABCH	14-5092-7567	20 Aug-19 09:48	21 Aug-19 11:00	38h (11.9 °C)		
GH_FR1	19-4330-0154	20 Aug-19	21 Aug-19 11:00	48h (15 °C)		
EV_HC1	12-0628-2129	20 Aug-19 09:45	21 Aug-19 11:00	38h (14.6 °C)		
EV_MC2	17-3243-2958	20 Aug-19 10:55	21 Aug-19 11:00	37h (14.7 °C)		
CM_MC2	16-3121-5896	20 Aug-19 11:17	21 Aug-19 11:00	37h (10.6 °C)		
LC_LCDSSLCC	12-8177-2482	20 Aug-19 09:53	21 Aug-19 11:00	38h (13.3 °C)		
LC_LC3	10-3790-9462	20 Aug-19 09:30	21 Aug-19 11:00	38h (11.9 °C)		
LC_DCDS	10-3223-9303	20 Aug-19	21 Aug-19 11:00	48h (13.4 °C)		
LC_LC5	12-2319-1594	20 Aug-19 10:32	21 Aug-19 11:00	37h (12.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control 20	Water Sample	Teck Coal Ltd	Cu Control 20 ug/L	
FR_FRCP1	Water Sample	Teck Coal Ltd	FR_FRCP1_MON_2019-08	
FR_FRABCH	Water Sample	Teck Coal Ltd	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal Ltd	GH_FR1_WS_2019-08-20_	
EV_HC1	Water Sample	Teck Coal Ltd	EV_HC1_WS_2019_Q3_W	
EV_MC2	Water Sample	Teck Coal Ltd	EV_MC2_WS_2019_Q3_W	
CM_MC2	Water Sample	Teck Coal Ltd	CM_MC2_WS_2019-08-20	
LC_LCDSSLCC	Water Sample	Teck Coal Ltd	LC_LCDSSLCC_WS_2019	
LC_LC3	Water Sample	Teck Coal Ltd	LC_LC3_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal Ltd	LC_DCDS_WS_2019-08-1	
LC_LC5	Water Sample	Teck Coal Ltd	LC_LC5_WS_2019-08-19_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Method Control (Dosage control)		FR_FRCP1*	0.0000	Exact	9.4E-06	Significant Effect
		FR_FRABCH*	0.0001	Exact	7.6E-04	Significant Effect
		GH_FR1*	0.0147	Exact	0.0442	Significant Effect
		EV_HC1*	0.0042	Exact	0.0168	Significant Effect
		EV_MC2*	0.0005	Exact	0.0027	Significant Effect
		CM_MC2*	0.0000	Exact	7.3E-16	Significant Effect
		LC_LCDSSLCC*	0.0000	Exact	9.4E-06	Significant Effect
		LC_LC3	0.2195	Exact	0.2195	Non-Significant Effect
		LC_DCDS*	0.0003	Exact	0.0016	Significant Effect
		LC_LC5	0.0473	Exact	0.0946	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.208	3.076	1.0000	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.208		0.6261	Non-Significant Trend in Controls

Fathead minnow (Pimephales promelas) 32-d survival and growth test — Nautilus Environmental Calgary

Analysis ID: 20-4428-6783 Endpoint: Survival Rate CETIS Version: CETISv1.9.4
Analyzed: 21 Nov-19 11:47 Analysis: STP 2xK Contingency Tables Status Level: 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control 20	MC	58	2	60	0.9667	0.03333	0.0%
FR_FRCP1		37	23	60	0.6167	0.3833	36.21%
FR_FRABCH		42	17	59	0.7119	0.2881	26.36%
GH_FR1		50	10	60	0.8333	0.1667	13.79%
EV_HC1		48	12	60	0.8	0.2	17.24%
EV_MC2		45	15	60	0.75	0.25	22.41%
CM_MC2		16	44	60	0.2667	0.7333	72.41%
LC_LCDSSLCC		37	23	60	0.6167	0.3833	36.21%
LC_LC3		55	5	60	0.9167	0.08333	5.17%
LC_DCDS		44	16	60	0.7333	0.2667	24.14%
LC_LC5		52	8	60	0.8667	0.1333	10.34%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	MC	1.0000	0.9333	0.9333	1.0000
FR_FRCP1		0.4000	0.8000	0.6667	0.6000
FR_FRABCH		0.6667	0.4000	0.9286	0.6667
GH_FR1		0.6000	0.9333	0.8000	1.0000
EV_HC1		0.7333	1.0000	0.6000	0.8667
EV_MC2		0.8667	0.4000	0.8667	0.8667
CM_MC2		0.2000	0.4000	0.3333	0.1333
LC_LCDSSLCC		0.4667	0.7333	0.6667	0.6000
LC_LC3		0.7333	0.9333	1.0000	1.0000
LC_DCDS		0.4667	0.8667	0.7333	0.8667
LC_LC5		0.8000	0.8667	1.0000	0.8000

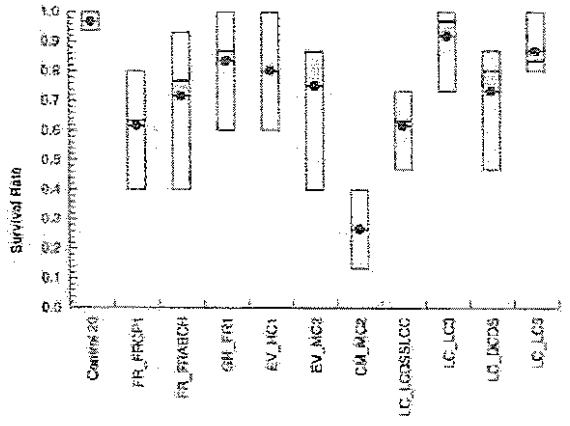
Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control 20	MC	15/15	14/15	14/15	15/15
FR_FRCP1		6/15	12/15	10/15	9/15
FR_FRABCH		10/15	6/15	13/14	13/15
GH_FR1		9/15	14/15	12/15	15/15
EV_HC1		11/15	15/15	9/15	13/15
EV_MC2		13/15	6/15	13/15	13/15
CM_MC2		3/15	6/15	5/15	2/15
LC_LCDSSLCC		7/15	11/15	10/15	9/15
LC_LC3		11/15	14/15	15/15	15/15
LC_DCDS		7/15	13/15	11/15	13/15
LC_LC5		12/15	13/15	15/15	12/15

Fathead minnow (Pimephales promelas) 32-d survival and growth test — **Nautilus Environmental Calgary**

Analysis ID:	20-4428-6783	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	21 Nov-19 11:47	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: SS QA: Dec-23/19

APPENDIX E - Chain-of-custody forms

Teck

COC ID:	20190820-1313	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	DL-EQuIS-GHO-Field@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:				
								Email 4:				
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5204			Phone Number	604-420-8773							

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt. / PRESERV. / ANALYSIS	7d C. dubia P/F	72 h P. subcapitata P/F	28d Hyallella P/F	7d C. dubia P/F (EDTA)	28d Hyallella P/F (EDTA)	30d FHM P/F - 15µg/L Cu Conducted in Calgary	30d FHM P/F - 20µg/L Cu Conducted in Calgary					Temp °C
FR_FRABCH_MON_2019-08-20_NP (1)	FR_FRABCH	WS		2019/08/20	09:46	G	2 x 20L		X	X	X				X					8.7, 9.4
FR_FRCP1_MON_2019-08-20_N (1)	FR_FRCP1	WS		2019/08/20	08:15	G	3 x 20L		X	X	X	X	X		X					9.2 - 10.1
FR_UFR1_MON_2019-08-20_N (1)	FR_UFR1	WS		2019/08/20	11:23	G	2 x 20L		X	X	X			X						12.4, 13.0
								WO#	191606	191608	191607	191609	191610	191611	191612					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
(1) clear, colourless, odourless, no particulates	Britt Anderson	August 20, 2019	Nautilus Environmental BC Jaymee Bucaney VB	Aug 21/19 @ 1030 Q3 - W1

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Britt Anderson	Mobile #	403-990-7060
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	[signature]	Date/Time	August 20, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

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COC ID:	Q3 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Jenni Kropp			Lab Contact	Emma Marus			Site:	jennifer.kropp@teck.com	EQuIS:	GHO
Email	jennifer.kropp@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commerce Court				Yes PDF	Yes Excel	
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 1:	leigh.stickney@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 2:	jennifer.kropp@teck.com		
Phone Number	250 865 3274			Phone Number				Email 3:	DL-Equis-GHO-Field@teck.com		
								PO number	610307		

SAMPLE DETAILS / ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A 72h P. subcapitata P/F	#N/A 7d C.dubia P/F	#N/A 28-d Hyallella P/F	#N/A 30d FHM P/F-15µg/L Conducted in Calgary	#N/A 30d FHM P/F-20µg/L Conducted in Calgary	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A Temp °C
GH_ER2_WS_2019-08-20_N ①	GH_ER2	WS		20-Aug	11:47	G	2x20L		x	x	x	X								8.2, 8.6
GH_ERC_WS_2019-08-20_N ①	GH_ERC	WS		20-Aug	13:12	G	2x20L		x	x	x	X								8.6, 9.2
GH_FR1_WS_2019-08-20_N ①	GH_FR1	WS		20-Aug	14:34	G	2x20L		x	x	x		X							7.9, 8.4
								WO #	191608	191606	191607	191611	191612							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
① clear, colourless, odourless, no particulates				Nautilus Environmental BC	Aug 21/19	10:30
				Jayme Bucaney JB		
					Q3-W1	

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

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COC ID: 20190820CRN1B | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q3 Chronic Sampling			Lab Contact	Richard Chea			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email	Richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	8664 Commerce Court			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3				Imperial Square Lake City			Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	[redacted]	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00610856			
Postal Code	V1C 4C3	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	604-420-8773							

SAMPLE DETAILS | ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	FILTERED	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	28-d H. azteca P/F	7-d C.dubia P/F	72-hr P. subcapitata P/F	30d FHM P/F 2.9 µg/L Cu Conductivity in Calgary				TEMP °C
									PRESERVED	No	No	No							
EV_HC1_WS_2019_Q3_WK1_N	① EV_HC1	WS	N	8/20/2019	9:45	G	2	30L				X	X	X	X				8.4, 9.1
EV_MC2_WS_2019_Q3_WK1_N	① EV_MC2	WS	N	8/20/2019	10:55	G	2	30L				X	X	X	X				9.5, 9.6
								WO #				191607	191606	191608	191612				
					Total		4												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees) ① clear, colourless, odourless, no particulates	Jason Gravelle	20-Aug-19	Nautilus Environmental - BC Jayme Tucaney JT	Aug 21/19 @ 10:30 Q3-W1

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Bryan Ogden	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature	[signature]	Date/Time	August 20, 2019
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

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COC ID: WEEKLY_CHRONIC_08202019_1 | TURNAROUND TIME: Regular | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Richard Chea			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 3:	Kate.Middleton@teck.com	X	X	X
								Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 5:	Jay.jones@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 7-d C.dubia P/F	7-d C.dubia P/F (EDTA)	72-hr P. subcapitata P/F	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)	30d FHM P/F - 15 mg/L Cu Conducted in Calgary	30d FHM P/F - 20 µg/L Cu Conducted in Calgary					TEMP °C
CM_MC1_WS_2019-08-20_N (1)	CM_MC1	WS	No	8/20/2019	11:52	G	2 x 20L			X		X	X		X						7.6, 8.0
CM_MC2_WS_2019-08-20_N (1)	CM_MC2	WS	No	8/20/2019	11:17	G	3 x 20L			X	X	X	X	X		X					8.4-9.8
RG_MIDAG_WS_2019-08-20_N	RG_MIDAG	WS	No	8/20/2019	10:30	G	3 x 20L			X	X		X	X							8.4-9.8
							WOR			191606	191609	191608	191607	191610	191611	191612					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
(1) clear, colourless, odourless, no particulates			Nautilus Environmental BC Jaymie Bucaog JB	Aug 21/19 @ 10:30 93-W1

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	250 425 7518
Sampler's Signature		Date/Time	8/20/2019 14:00:00

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Page 1 of 1

COC ID: 20190820 Chronic tox | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	carla.froymanparker@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			x
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00608154			
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL.	PRESERV.	ANALYSIS: 7-d C.dubia P/F	7-d C.dubia P/F (EDTA)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)	72 h P. subcapitata P/F	30d FHM P/F - 15ug/L Cu Conducted in Calgary	30d FHM P/F - 20ug/L Cu Conducted in Calgary					Temp °C
LC_LCDSSLCC_WS_2019-08-19_N (1)	LC_LCDSSLCC	WS	N	20-Aug	9:53	G	2+2			X	X	X	X	X		X					7.6, 8.7
LC_SLC_WS_2019-08-19_N (1)	LC_SLC	WS	N	20-Aug	8:51	G	2+2			X	X	X	X	X	X						6.1, 6.6
LC_LC3_WS_2019-08-19_N (1)	LC_LC3	WS	N	20-Aug	9:30	G	2+2			X	X	X	X	X		X					8.9, 9.6
LC_LC5_WS_2019-08-19_N (1)	LC_LC5	WS	N	20-Aug	10:32	G	2+2			X	X	X	X	X		X					9.0, 9.4
LC_DCDS_WS_2019-08-19_N (1)	LC_DCDS	WS	N	20-Aug	10:09	G	2+2			X	X	X	X	X		X					9.4, 9.9
									WO #	1916106		1916107		1916108	1916111	1916112					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Please provide prelimnary update as results are available

(1) clear, colourless, odourless, no particulates

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
K. Cambell/D.Tymstra	20-Aug	Nautilus Environmental BC	Aug 21/19 @ 1030
		Jaymee Bucaneg JB	
			93-W1

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	August 20, 2019

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COC ID:	20190820-1325	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	HydroQual Laboratories Ltd.			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	DL-EQuIS-GHO-field@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	ABinfo@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Address	PO Box 100			Address	#4, 6125 12 Street SE			Email 3:				
								Email 4:				
City	Elkford	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 1H0	Country	Canada	Postal Code	?T2H 2K1	Country	Canada					
Phone Number	1-250-865-5204			Phone Number	403-253-7121							

SAMPLE DETAILS

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow P/F (20 ug/l Cu Treated)	30-d fathead minnow P/F (15 ug/l Cu Treated)	
FR_FRABCH_MON_2019-08-20_NP	FR_FRABCH	WS		2019/08/20	09:46	G	3	X		1819-1850
FR_FRCP1_MON_2019-08-20_N	FR_FRCP1	WS		2019/08/20	08:15	G	3	X		1819-1849
FR_UFR1_MON_2019-08-20_N	FR_UFR1	WS		2019/08/20	11:23	G	3		X	1819-1851
	9x20L carboys									
2019/08/21	no S/no 1									
11 00	Week 1									
Drop off										
AE										
good condition										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Britt Anderson	August 20, 2019		

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Britt Anderson	Mobile #	403-990-7060
Sampler's Signature	[signature]	Date/Time	August 20, 2019

Teck

COC ID:	Q3 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Jenni Kropp			Lab Contact	Jacklyn Pool			Site:	jennifer.kropp@teck.com	EQuIS:	GHO
Email	jennifer.kropp@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.			Yes	PDF	Yes	Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610307		

SAMPLE DETAILS / ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A 30 d early life stage fathead minnow P/F (15 ug/l CU Treated)	#N/A 30 d early life stage fathead minnow P/F (20 ug/l CU Treated)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_ER2_WS_2019-08-20_N	GH_ER2	WS		20-Aug	11:47	G	3		X		1819 - 1854									
GH_ERC_WS_2019-08-20_N	GH_ERC	WS		20-Aug	13:12	G	3		X		1819 - 1853									
GH_FR1_WS_2019-08-20_N	GH_FR1	WS		20-Aug	14:34	G	3			X	1819 - 1852									

2019/08/21 no S/no1
11:00 Week1
Drop off ~~COC 2/4~~ JW
AE

good condition

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190820CRNIC	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations		
Job Description	Q3 Chronic Sampling		
Project Manager	Cam Griffin		
Email	Cameron.griffin@teck.com		
Address	RR#1 HWY# 3		
City	Sparwood	Province	BC
Postal Code	V1C 4C3	Country	Canada
Phone Number	1-250-425-8137		

LABORATORY

Lab Name	Nautilus Environmental		
Lab Contact	Tamara McClure		
Email			
Address	#4, 6125-12th Street S.E		
City	Calgary	Province	AB
Postal Code	T2H 2K1	Country	Canada
Phone Number	403 253 7121		

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Bryan.Ogden@teck.com	X	X	X
Email 2:	teckcal@equiteonline.com			X
Email 3:	Kimberley.Hackett@teck.com	X	X	X
Email 4:	Cameron.Griffin@teck.com	X	X	X
Email 5	Teck.lab.Results@teck.com	X	X	X
PO number	VPO00610856			

SAMPLE DETAILS

ANALYSIS REQUESTED

Filtered - F; Field, L; Lab, FL; Field & Lab, N; None

								FILTERED	No	No	No						
								PRESERVED	No	No	No						
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G - Grab C - Comp	# Of Cont.	ANALYSIS	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	28-d H. azteca	7-d C dubia P/F	72-hr P. subcapitata P/F	30-d fathead minnow P/F (20 ug/l Cu Treated)			
EV_HC1_WS_2019_Q3_WK1_N	EV_HC1	WS	N	8/20/2019	9:45	G	3	1819-1855						3			
EV_MC2_WS_2019_Q3_WK1_N	EV_MC2	WS	N	8/20/2019	10:55	G	3	1819-1856			2019/08/21			3			
											11:00						
											Drop off						
											AE						
											6x 20L coolers						
											good condition						
											no sinks						
					Total		6										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Toxicity 96-Hr 48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail
(Daphnia testing to occur at 20 degrees)

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Jason Gravelle	20-Aug-19		

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Bryan Ogden	Mobile #	
Sampler's Signature		Date/Time	August 20, 2019

Teck

COC ID:	WEEKLY_CHRONIC_08202019_2	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Hydroqual Laboratories			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Claudio Quinteros			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com				Jessica Wang			Email 2:	teckcoal@equisonline.com			X
				Email	claudio@nautilusenvironmental.ca			Email 3:	Jay.Jones@teck.com	X	X	X
					jessica@nautilusenvironmental.ca			Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	#4, 6125-12th Street S E.			Email 5:	Kate.Middleton@teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	403-253-7121							

SAMPLE DETAILS — **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

2019/08/21
11:00
Drop off
AE
6x20L carboys
good condition
No s/no!

Week 1

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 30-d fathead minnow P/F (15 ug/l Cu Treated)	ANALYSIS: 30-d fathead minnow P/F (20 ug/l Cu Treated)
CM_MC1_WS_2019-08-20_N 1819-1858	CM_MC1	WS	No	8/20/2019	11:52	G	3			X	
CM_MC2_WS_2019-08-20_N 1619-1857	CM_MC2	WS	No	8/20/2019	11:17	G	3				X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name		Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	8/20/2019 14:00:00
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190820 Chronic tox

TURNAROUND TIME:

PROJECT/CLIENT INFO

Facility Name / Job#	Line Creek Operation		
Project Manager	Carla Froyman Parker		
Email	carla.froymanparker@teck.com		
Address	Box 2003		
	15km North Hwy 43		
City	Sparwood	Province	BC
Postal Code	V0B 2G0	Country	Canada
Phone Number	250-425-3196		

LABORATORY

Lab Name	Nautilus Environmental - Calgary		
Lab Contact	Jeslin Wijaya		
Email	jeslin@nautilusenvironmental.ca		
Address	6125 12 St NE		
City	Calgary	Province	AB
Postal Code	T2H 2K1	Country	Canada
Phone Number	403-253-7121		

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	drake.tymstra@teck.com	X	X	
Email 2:	carla.froymanparker@teck.com	X	X	
Email 3:	kirsten.campbell@teck.com			X
Email 4:	teckcoal@equisonline.com			
PO number	VPO0008334			

SAMPLE DETAILS

ANALYSIS REQUESTED

Filtered - F; Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIELD FILT.	ANALYSIS: 30-d fathead minnow P/F (15 ug/l Cu Treated)	ANALYSIS: 30-d fathead minnow P/F (20 ug/l Cu Treated)	
LC_LCDSSLCC_WS_2019-08-19_N	LC_LCDSSLCC	WS	N	20-Aug	9:53	G	3			X	1819-1859
LC_SLC_WS_2019-08-19_N	LC_SLC	WS	N	20-Aug	8:51	G	3		X		1819-1860
LC_LC3_WS_2019-08-19_N	LC_LC3	WS	N	20-Aug	9:30	G	3			X	1819-1861
LC_LC5_WS_2019-08-19_N	LC_LC5	WS	N	20-Aug	10:32	G	3			X	1819-1863
LC_DCDS_WS_2019-08-19_N	LC_DCDS	WS	N	20-Aug		G	3			X	1819-1862
	Week 1										
2019/08/21	6 of 12 JW										
11:00	good condition										
Drop off	YC 5/10 1										
AE	15x20L carboys										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Please provide preliminary update as results are available

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
K. Cambell/D.Tymstra	20-Aug		

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	August 20, 2019

Teck

COC ID:	20190827-1100	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	britt.anderson@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	david.burroughs@teck.com	X	X	X
								Email 4:	scott.roughead@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 4:	teckcoal@equisonline.com			X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5204			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)										
FR_FRABCH_MON_2019-08-27_NP	FR_FRABCH	WS		2019/08/27		G	1 x 20L	X											9.1
FR_FRCP1_MON_2019-08-27_N	FR_FRCP1	WS		2019/08/27		G	2	X	X										9.3
FR_UFR1_MON_2019-08-27_N	FR_UFR1	WS		2019/08/27		G	1	X											10.1

191607 ~~191610~~ 191610

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Britt Anderson	2019/08/27	Tyrone Hamilton	Aug. 28/19 @ 10:43
			Nautilus - Burnaby	@ 3-42

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Britt Anderson	Mobile #	403-990-7060
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	[signature]	Date/Time	2019/08/27
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q3 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Jenni Kropp			Lab Contact	Emma Marus			Site:	jennifer.kropp@teck.com	EQuIS:	GHO
Email	jennifer.kropp@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commerce Court				*Yes* PDF	*Yes*	Excel
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 1:	leigh.stickney@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 2:	jennifer.kropp@teck.com		
Phone Number	250 865 3274			Phone Number				Email 3:	DL-Equis-GHO-Field@teck.com		
								PO number	610307		

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
									72h P. subcapitata P/F	7d C.dubia P/F	28-d Hyallella P/F									
GH_ER2_WS_2019-08-27_N	GH_ER2	WS		27-Aug	11:47	G	1x20L				x									12.0
GH_ERC_WS_2019-08-27_N	GH_ERC	WS		27-Aug	13:12	G	1				x									13.0
GH_FR1_WS_2019-08-27_N	GH_FR1	WS		27-Aug	10:11	G	1				x									13.0
											19 16 07									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				Tyrone Hamilton	Aug 23/19	@10:43
				Nautilus - Burnaby	Q3-W3	

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190827CRN2B | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q3 Chronic Sampling			Lab Contact	Richard Chea			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email	Richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	8664 Commerce Court			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3				Imperial Square Lake City			Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00610856			
Postal Code	V1C 4C3	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED										Filtered - F, Field, L: Lab, FL: Field & Lab, N: None
								FILTERED	No	No	No							
								PRESERVED		Nitric			Sulphuric			HCl		
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	28-d H. azteca	7-d C.dubia P/F	72-hr P. subcapitata P/F							
EV_HC1_WS_2019_Q3_WK2_N	EV_HC1	WS	N	8/27/2019	8:20	G	1x20L		1									10.3
EV_MC2_WS_2019_Q3_WK2_N	EV_MC2	WS	N	8/27/2019	9:35	G	1		1									9.4
									191607									
					Total		2											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphinia testing to occur at 20 degrees)	Jason Gravelle	27-Aug-19	Tyrone Hamilton Nautilus - Burnaby	Aug. 27/19 @ 10:43 Q3-W2

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jason Gravelle	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	August 27, 2019
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	WEEKLY_CHRONIC_08272019_1	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Richard Chea			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 3:	Kate.Middleton@teck.com	X	X	X
								Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 5:	Jay.Jones@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED											Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
							FIL.												
							PRESERV.												
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS 28-d Hyalella P/F	28-d Hyalella P/F (EDTA)										
CM_MC1_WS_2019-08-27_N	CM_MC1	WS	No	8/27/2019	10:20	G	1 x 204	X											8.1
CM_MC2_WS_2019-08-27_N	CM_MC2	WS	No	8/27/2019	9:28	G	2	X	X										7.8
RG_MIDAG_WS_2019-08-27_N	RG_MIDAG	WS	No	8/27/2019	8:53	G	1	X	X										7.0
								191627	191610										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Tyrone Hamilton	Aug. 28/19@10:43
			Nautilus - Burnaby	Q3-W2

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	KP / SH / MC	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	8/27/2019 14:00:00
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190827 Chronic tox | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	carla.froymanparker@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			x
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00608154			
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS | ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRSRV.	ANALYSIS: 28-d Hyalella P/F								
LC_LCDSSLCC_WS_2019-08-27_N	LC_LCDSSLCC	WS	N	Aug 27	10:21	G	1x20L			X								7.7
LC_SLC_WS_2019-08-27_N	LC_SLC	WS	N		9:17	G	1			X								7.2
LC_LC3_WS_2019-08-27_N	LC_LC3	WS	N		9:51	G	1			X								7.3
LC_LC5_WS_2019-08-27_N	LC_LC5	WS	N		11:11	G	1			X								7.7
LC_DCDS_WS_2019-08-27_N	LC_DCDS	WS	N		11:10	G	1			X								10.8

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	27-Aug	Tyrone Hamilton	Q3-W2
			Nautilus - Burnaby	Aug. 28/19 @ 10:43

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	August 27, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190827-1100	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	HydroQual Laboratories Ltd.			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	ABinfo@nautilusenvironmental.ca			Email 2:	britt.anderson@teck.com	X	X	X
Address	PO Box 100			Address	#4, 6125 12 Street SE			Email 3:	david.burroughs@teck.com	X	X	X
								Email 4:	scott.roughead@teck.com	X	X	X
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 4:	teckcoal@equisonline.com			X
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-865-5204			Phone Number	403-253-7121							

SAMPLE DETAILS

2019/08/28
14:20
Bear Paw
SC/ST/SC
6x20L carboys
No5/No6
Good Condition
Week 2

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID 1819-	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILT.	PRESERV.	ANALYSIS: 30-d fathead minnow P/F (15 ug/l Cu Treated)	ANALYSIS: 30-d fathead minnow P/F (20 ug/l Cu Treated)
FR_FRABCH_MON_2019-08-27_NP 1819-1850	FR_FRABCH	WS		2019/08/27		G	2				X
FR_FRCP1_MON_2019-08-27_N 1819-1849	FR_FRCP1	WS		2019/08/27		G	2				X
FR_UFR1_MON_2019-08-27_N 1819-1851	FR_UFR1	WS		2019/08/27		G	2			X	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Britt Anderson	2019/08/27		

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Britt Anderson	Mobile #	403-990-7060
Sampler's Signature		Date/Time	2019/08/27

Teck

COC ID:	Q3 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Jenni Kropp			Lab Contact	Jacklyn Pool			Site:	jennifer.kropp@teck.com	EQuIS:	GHO
Email	jennifer.kropp@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				*Yes* PDF	*Yes*	Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	DL-Equis-GHO Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610307		

SAMPLE DETAILS | **ANALYSIS REQUESTED**

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
									30 d early life stage fathead minnow P/F (15 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)										
1819 - GH_ER2_WS_2019-08-27_N ~1854	GH_ER2	WS		27-Aug		G	2		X		13.3°C									
GH_ERC_WS_2019-08-27_N 1819-1853	GH_ERC	WS		27-Aug		G	2		X											
GH_FR1_WS_2019-08-27_N ~1852	GH_FR1	WS		27-Aug		G	2			X	11.2°C									
2019/08/28	COC 1/3																			
SJ/MF	Week2																			
~~14:30~~ 14:20																				
NS/1182																				
GC																				
~~Drop off~~ Bear pond																				

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default) X	Sampler's Name		Mobile #		
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time		
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190827CRN2C | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations		
Job Description	Q3 Chronic Sampling		
Project Manager	Cam Griffin		
Email	Cameron.griffin@teck.com		
Address	RR#1 HWY# 3		
City	Sparwood	Province	BC
Postal Code	V1C 4C3	Country	Canada
Phone Number	1-250-425-8137		

LABORATORY

Lab Name	Nautilus Environmental		
Lab Contact	Tamara McClure		
Email			
Address	#4, 6125-12th Street S.E		
City	Calgary	Province	AB
Postal Code	T2H 2K1	Country	Canada
Phone Number	403 253 7121		

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Bryan.Ogden@teck.com	X	X	X
Email 2:	teckcoal@equisonline.com			X
Email 3:	Kimberley.Hackett@teck.com	X	X	X
Email 4:	Cameron.Griffin@teck.com	X	X	X
Email 5	Teck.Lab.Results@teck.com	X	X	X
PO number	VPO00610856			

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	28-d H. azteca	7-d C dubia P/F	72-hr P. subcapitata P/F	30-d fathead minnow P/F (20 ug/l Cu Treated)				
								FILTERED	No	No	No								
								PRESERVED	No	No	No							
1819-1855																		
EV_HC1_WS_2019_Q3_WK2_N	EV_HC1	WS	N	8/27/2019	8:20	G	2							2	11.4°C			
EV_MC2_WS_2019_Q3_WK2_N	EV_MC2	WS	N	8/27/2019	9:35	G	2							2	10.4°C 20.4			
2019/08/28 14:20	1819-1855																	
Bear Paw SC/ST/SC																		
4x20L carboys																		
N65/N61																		
Good Condition																		
Week 2																		
					Total		4											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)	Jason Gravelle	27-Aug-19		

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jason ~~Bryan Ogden~~ Gravelle	Mobile #	
Sampler's Signature		Date/Time	August 27, 2019

2019/08/28
ST/SC
Drop off
NS
GC
1420

Teck

COC ID:	WEEKLY_CHRONIC_08272019_2	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Hydroqual Laboratories			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Claudio Quinteros			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com				Jessica Wang			Email 2:	teckcoal@equisonline.com			X
				Email	claudio@nautilusenvironmental.ca			Email 3:	Jay.Jones@teck.com	X	X	X
					jessica@nautilusenvironmental.ca			Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	#4, 6125-12th Street S.E.			Email 5:	Kate.Middleton@teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	403-253-7121							

SAMPLE DETAILS

2019/08/26
14:20
Bear paw
JC/SH/SC
6x 20L carboys
N65/N67
Good Condition
Week 2

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL.	PRESERV.	ANALYSIS: 30-d fathead minnow P/F (15 ug/l CU Treated)	30-d fathead minnow P/F (20 ug/l CU Treated)	CMO Ni/Co Project
CM_MC1_WS_2019-08-27_N 1819-1858	CM_MC1	WS	No	8/27/2019	10:20	G	2			X		
CM_MC2_WS_2019-08-27_N 1819-1857	CM_MC2	WS	No	8/27/2019	9:28	G	2				X	
'CM_MC1	CM_MC1	WS	No	8/27/2019	10:20	G	4					X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	KP / SH / MC	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	8/27/2019 14:00:00
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190827 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact	Jeslin Wijaya			Email 1:	drake.tymstra@teck.com	X	X	
Email	carla.froymanparker@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	X	X	
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com	X	X	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number	[illegible]			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS

2019/08/28
14:20
Bear Paw
JC/ST/SC
10x7.0L carboys
NoS/NoZ
Good Condition
COC 1/2
Week 2

ANALYSIS REQUESTED

Filtered: F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow P/F (15 ug/l Cu Treated)	30-d fathead minnow P/F (20 ug/l Cu Treated)
LC_LCDSSLCC_WS_2019-08-27_N 1819-1859	LC_LCDSSLCC	WS	N	Aug 27	10:21	G	2		X
LC_SLC_WS_2019-08-27_N 1819-1860	LC_SLC	WS	N		9:17	G	2	X	
LC_LC3_WS_2019-08-27_N 1819-1861	LC_LC3	WS	N		9:51	G	2		X
LC_LC5_WS_2019-08-27_N 1819-1863	LC_LC5	WS	N		11:17	G	2		X
LC_DCDS_WS_2019-08-27_N 1819-1862	LC_DCDS	WS	N			G	2		X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	27-Aug		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	August 27, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190903-1330 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	britt.anderson@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	david.burroughs@teck.com	X	X	X
								Email 4:	scott.roughead@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 4:	teckcoal@equisonline.com			X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5204			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL.	PRESERV.	ANALYSIS: 28-d Hyalella P/F	28-d Hyalella P/F (EDTA)										
FR_FRABCH_MON_2019-09-03_NP	FR_FRABCH	WS		2019/09/03		G	1			X											10.0
FR_FRCP1_MON_2019-09-03_N	FR_FRCP1	WS		2019/09/03		G	2			X	X										10.3
FR_UFR1_MON_2019-09-03_N	FR_UFR1	WS		2019/09/03		G	1			X											10.8
										191607	191610										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Britt Anderson	2019/09/03	Tyrone Hamilton	Sept. 4/19 @ 11:12
			~~Sept 4/19 @ 11:18~~ Nautilus - Burnaby	Q3-W3

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Britt Anderson	Mobile #	403-990-7060
Sampler's Signature		Date/Time	2019/09/03

Teck

COC ID:	Q3 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Jenni Kropp			Lab Contact	Emma Marus			Site:	jennifer.kropp@teck.com	EQuIS:	GHO
Email	jennifer.kropp@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commerce Court				*Yes* PDF	*Yes* Excel	
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	610307		

SAMPLE DETAILS / ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A 72h P. subcapitata P/F	#N/A 7d C.dubia P/F	#N/A 28-d Hyallella P/F	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_ER2_WS_2019-09-02_N	GH_ER2	WS		3-Sep		G	1x20L				x									11.3
GH_ERC_WS_2019-09-02_N	GH_ERC	WS		3-Sep		G	1				x									11.5
GH_FR1_WS_2019-09-02_N	GH_FR1	WS		3-Sep		G	1				x									12.2

191607

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				Tyrone Hamilton	Nautilus	- Burnaby
				Sept. 4/19 @ 11:18	Q3-W3	

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190903CRN3B | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q3 Chronic Sampling			Lab Contact	Richard Chea			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email	Richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	8664 Commerce Court			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3				Imperial Square Lake City			Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00610856			
Postal Code	V1C 4C3	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED										Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								FILTERED	No	No	No							
								PRESERVED		Nitric			Sulphuric				HCl		
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	28-d H. azteca	7-d C.dubia P/F	72-hr P. subcapitata P/F							
EV_HC1_WS_2019-09_MON_N	EV_HC1	WS	N	9/3/2019	8:20	G	1 x 2L		1									10.5
EV_MC2_WS_2019-09_MON_N	EV_MC2	WS	N	9/3/2019	9:45	G	1 ↓		1									10.1
									191607									
					Total		2											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphinia testing to occur at 20 degrees)	Jason Gravelle	3-Sep-19	Tyrone Hamilton Nautilus - Burnaby	Sept. 4/19 @ 11:13 Q3-W3

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jason Gravelle	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	September 3, 2019
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: WEEKLY_CHRONIC_09032019_1 | TURNAROUND TIME: Regular | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Richard Chea			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 3:	Kate.Middleton@teck.com	X	X	X
								Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 5:	Jay.Jones@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS | ANALYSIS REQUESTED | Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 28-d Hyalella P/F	28-d Hyalella P/F (EDTA)										
									191607												
									191610												
CM_MC1_WS_2019-09-03_N	CM_MC1	WS	No	9/3/2019		G	1 x 2L			X											9.2
CM_MC2_WS_2019-09-03_N	CM_MC2	WS	No	9/3/2019		G	2			X	X										9.7
RG_MIDAG_WS_2019-09-03_N	RG_MIDAG	WS	No	9/3/2019		G	2			X	X										9.1

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Tyrone Hamilton	Nautilus - Burnaby
			Sept. 4/19 @ 11:18	Q3-W3

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	250 425 7518
Sampler's Signature		Date/Time	9/3/2019 14:00:00

Teck

COC ID: 20190903 Chronic tox | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	carla.froymanparker@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			x
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00608154			
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS | ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Fil.	PRESERV.	ANALYSIS: 28-d Hyalella P/F								
LC_LCDSSLCC_WS_2019-09-03_N	LC_LCDSSLCC	WS	N	09/03/19	12:29	G	1 x 20L			X								12.4
LC_SLC_WS_2019-09-03_N	LC_SLC	WS	N		10:49	G	1			X								12.4
LC_LC3_WS_2019-09-03_N	LC_LC3	WS	N		13:07	G	1			X								11.8
LC_LC5_WS_2019-09-03_N	LC_LC5	WS	N		13:30	G	1			X								12.7
LC_DCDS_WS_2019-09-03_N	LC_DCDS	WS	N	09/03/2019	9:50	G	1			X								12.8
										191607								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	3-Sep	Tyrone Hamilton	Q3- W3
			Sept. 4/19 @ 11:18	Nautilus - Burnaby

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	September 3, 2019

Teck

COC ID:	20190903-1330	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	HydroQual Laboratories Ltd.			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	ABinfo@nautilusenvironmental.ca			Email 2:	britt.anderson@teck.com	X	X	X
Address	PO Box 100			Address	#4, 6125 12 Street SE			Email 3:	david.burroughs@teck.com	X	X	X
								Email 4:	scott.roughead@teck.com	X	X	X
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 4:	teckcoal@equisonline.com			X
Postal Code	V0B 1H0	Country	Canada	Postal Code	?T2H 2K1	Country	Canada					
Phone Number	1-250-865-5204			Phone Number	403-253-7121							

SAMPLE DETAILS

2019/09/04
H 12:15
Bear Pan
JC
6x 20L carboys
NoS/NoI
Good Condition
~~COC~~
Week 3

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow P/F (15 ug/l Cu Treated)	30-d fathead minnow P/F (20 ug/l Cu Treated)
FR_FRABCH_MON_2019-08-27_NP 1819-1850	FR_FRABCH	WS		2019/09/03		G	2		X
FR_FRCP1_MON_2019-08-27_N 1819-1849	FR_FRCP1	WS		2019/09/03		G	2		X
FR_UFR1_MON_2019-08-27_N 1819-1851	FR_UFR1	WS		2019/09/03		G	2	X	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Britt Anderson	2019/09/03		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Britt Anderson	Mobile #	403-990-7060
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	2019/09/03
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q3 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Jenni Kropp			Lab Contact	Jacklyn Pool			Site:	jennifer.kropp@teck.com	EQuIS:	GHO
Email	jennifer.kropp@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				Yes PDF	Yes	Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	DL-Elk's GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610307		

2019/09/04
12:15
Bear Paw
JC
6x20L carboys
NoS/NaCl
Good Condition
COC 1/3
Week 3

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Preserved or both (F, P, FP)											
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d early life stage fathead minnow P/F (15 ug/l CU Treated)	30 d early life stage fathead minnow P/F (70 ug/l CU Treated)										
GH_ER2_WS_2019-09-02_N 1819-1854	GH_ER2	WS		3-Sep		G	2	X											
GH_ERC_WS_2019-09-02_N 1819-1853	GH_ERC	WS		3-Sep		G	2	X											
GH_FR1_WS_2019-09-02_N 1819-1852	GH_FR1	WS		3-Sep		G	2		X										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)					
Regular (default) X	Sampler's Name		Mobile #		
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time		
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190903CRN3C	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q3 Chronic Sampling			Lab Contact	Tamara McClure			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email				Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	#4, 6125-12th Street S E			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3							Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.LabResults@teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number	VPO00610356			
Postal Code	V1C 4C3	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	403 253 7121							

SAMPLE DETAILS								ANALYSIS REQUESTED											
								FILTERED	Na	Na	Na								
								PRESERVED	Na	Na	Na								
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G-Grab C=Comp	# Of Cont.	ANALYSIS	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	28-d H. azteca	7-d C.dubia P/F	72-hr P. subcapitata P/F	30-d fathead minnow P/F (20 ug/l Cu Treated)				
EV_HC1_WS_2019-09_MON_N	EV_HC1	WS	N	9/3/2019	8:20	G	2				1819-1855			2				
EV_MC2_WS_2019-09_MON_N	EV_MC2	WS	N	9/3/2019	9:45	G	2				1619-1856			2				
2019/09/04 12:15 Bear Paw SC 4x20L carboys N65/N65 Good Condition Week 3																			
					Total		4												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)	Jason Gravelle	3-Sep-19		

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jason Gravelle	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	September 3, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	WEEKLY_CHRONIC_09032019_2	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Hydroqual Laboratories			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Claudio Quinteros			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com				Jessica Wang			Email 2:	teckcoal@equisonline.com			X
				Email	claudio@nautilusenvironmental.ca			Email 3:	Jay.jones@teck.com	X	X	X
					jessica@nautilusenvironmental.ca			Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	#4, 6125-12th Street S.E.			Email 5:	Kate.Middleton@teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	403-253-7121							

2019/09/04
12:15
Bear Paw
X
4x20L carboys
N6S/N0L
Good Condition
Week 3

SAMPLE DETAILS								ANALYSIS REQUESTED												Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
							FIL.													
							PRESERV.													
							ANALYSIS	30-d fathead minnow P/F (15 ug/l CU Treated)	30-d fathead minnow P/F (20 ug/l CU Treated)											
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.													
CM_MC1_WS_2019-09-03_N 1819-1858	CM_MC1	WS	No	9/3/2019		G	2	X												
CM_MC2_WS_2019-09-03_N 1819-1857	CM_MC2	WS	No	9/3/2019		G	2		X											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name		Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	9/3/2019 14:00:00
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190903 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact	Jeslin Wijaya			Email 1:	drake.tymstra@teck.com	X	X	
Email	carla.froymanparker@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	X	X	
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com	X	X	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number	4700048151			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS

2019/09/04
12:15
Bear Paw
JC
10x20L carboys
NoS/NoI
Good Condition
COC 1/2
Week 3

ANALYSIS REQUESTED

Filtered - F; Field, L; Lab, FL; Field & Lab, N; None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: Filt.	PRESERV.	30-d fathead minnow P/F (15 ug/l Cu Treated)	30-d fathead minnow P/F (20 ug/l Cu Treated)
LC_LCDSSLCC_WS_2019-09-03_N 1819-1859	LC_LCDSSLCC	WS	N			G	2				X
LC_SLC_WS_2019-09-03_N 1819-1860	LC_SLC	WS	N			G	2			X	
LC_LC3_WS_2019-09-03_N 1819-1861	LC_LC3	WS	N			G	2				X
LC_LC5_WS_2019-09-03_N 1819-1863	LC_LC5	WS	N			G	2				X
LC_DCDS_WS_2019-09-03_N 1819-1862	LC_DCDS	WS	N	09/03/2019	9:50	G	2				X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	3-Sep		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	September 3, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190910-1415 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	britt.anderson@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	david.burroughs@teck.com	X	X	X
								Email 4:	scott.roughead@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 4:	teckcoal@equisonline.com			X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5204			Phone Number	604-420-8773							

SAMPLE DETAILS | ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys loc code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILT.	PRESERV.	ANALYSIS: 28-d Hyalella P/F	ANALYSIS: 28-d Hyalella P/F (EDTA)									
FR_FRABCH_MON_2019-09-10_NP	FR_FRABCH	WS		2019/09/10		G	1			X										5.8
FR_FRCP1_MON_2019-09-10_N	FR_FRCP1	WS		2019/09/10		G	2			X	X									6.7
FR_UFR1_MON_2019-09-10_N	FR_UFR1	WS		2019/09/10		G	1			X										5.8

204
191607
191610

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Britt Anderson	2019/09/10	Tyrone Hamilton	Sept 11/19 @ 10:30
			Nautilus - Burnaby	Q3-W4

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Britt Anderson	Mobile #	403-990-7060
Sampler's Signature		Date/Time	2019/09/10

Teck

COC ID:	Q3 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Jenni Kropp			Lab Contact	Emma Marus			Site:	jennifer.kropp@teck.com	EQuIS:	GHO
Email	jennifer.kropp@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commerce Court				*Yes* PDF	*Yes*	Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	610307		

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Perserved or both (F, P, F/P)											
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	72h P. subcapitata P/F	7d C.dubia P/F	28-d Hyallella P/F								
GH_ER2_WS_2019-09-10_N	GH_ER2	WS		10-Sep		G	1x20L				x								6.1
GH_ERC_WS_2019-09-10_N	GH_ERC	WS		10-Sep		G	1				x								6.1
GH_FR1_WS_2019-09-10_N	GH_FR1	WS		10-Sep		G	1				x								5.6
											191607								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				Tyrone Hamilton	sept. 11/19	@10:30
				Nautilus - Burnaby	Q3-W4	

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190910CRN4B	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q3 Chronic Sampling			Lab Contact	Richard Chea			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email	Richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	8664 Commerce Court			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3				Imperial Square Lake City			Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00610856			
Postal Code	V1C 4C3	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered : F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FILTERED PRESERVED ANALYSIS	No	No Nitric	No		Sulphuric			HCl		
									28-d H. azteca	7-d C.dubia P/F	72-hr P. subcapitata P/F							
EV_HC1_WS_2019_Q3_WK4_N	EV_HC1	WS	N	9/10/2019	9:00	G	1 x 202		1									5.8
EV_MC2_WS_2019_Q3_WK4_N	EV_MC2	WS	N	9/10/2019	9:55	G	1 ↓		1									6.0
									191607									
					Total		2											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphinia testing to occur at 20 degrees)	Jason Gravelle	10-Sep-19	Tyrone Hamilton Nautilus - Burnaby	Sept 11/19 @ 10:30 Q3-W4

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jason Gravelle	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	September 10, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: WEEKLY_CHRONIC_09102019_1 | TURNAROUND TIME: Regular | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Richard Chea			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 3:	Kate.Middleton@teck.com	X	X	X
								Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 5:	Jay.jones@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 28-d Hyalella P/F	28-d Hyalella P/F (EDTA)											
CM_MC1_WS_2019-09-10_N	CM_MC1	WS	No	9/10/2019	13:35	G	1 x 2L			X												5.6
CM_MC2_WS_2019-09-10_N	CM_MC2	WS	No	9/10/2019	12:40	G	2			X	X											7.6
RG_MIDAG_WS_2019-09-10_N	RG_MIDAG	WS	No	9/10/2019	12:06	G	1			X	X											6.3
										19607	19610											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Tyrone Hamilton	Sept. 11/19 @ 10:30
			Nautilus - Burnaby	Q3-W4

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	VS/SH/SH	Mobile #	250 425 7518
Sampler's Signature		Date/Time	9/10/2019 14:00:00

Teck

COC ID: 20190910 Chronic tox | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	carla.froymanparker@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00608154			
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS | ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL.	PRESERV.	ANALYSIS: 28-d Hyalella P/F									
LC_LCDSSLCC_WS_2019-09-03_N	LC_LCDSSLCC	WS	N	10-Sep	9:39	G	1 x2			X									7.9
LC_SLC_WS_2019-09-03_N	LC_SLC	WS	N	10-Sep	10:39	G	1			X									9.4
LC_LC3_WS_2019-09-03_N	LC_LC3	WS	N	10-Sep	10:06	G	1			X									8.6
LC_LC5_WS_2019-09-03_N	LC_LC5	WS	N	10-Sep	11:24	G	1			X									7.4
LC_DCDS_WS_2019-09-03_N	LC_DCDS	WS	N	10-Sep	10:07	G	1			X									9.6

7/9/19

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	10-Sep	Tyrone Hamilton	Sept. 11/19 @ 10:30
			Nautilus - Burnaby	Q3-W4

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	September 10, 2019

Teck

COC ID:	20190910-1415	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Fording River Operation		
Project Manager	Neil MacDonald		
Email	Neil.MacDonald@teck.com		
Address	PO Box 100		
City	Elkford	Province	BC
Postal Code	V0B 1H0	Country	Canada
Phone Number	1-250-865-5204		

LABORATORY

Lab Name	HydroQual Laboratories Ltd.		
Lab Contact			
Email	ABinfo@nautilusenvironmental.ca		
Address	#4, 6125 12 Street SE		
City	Calgary	Province	AB
Postal Code	?T2H 2K1	Country	Canada
Phone Number	403-253-7121		

OTHER INFO

Report Format / Distribution		Excel	PDF	ED
Email 1:	neil.macdonald@teck.com	X	X	X
Email 2:	britt.anderson@teck.com	X	X	X
Email 3:	david.burroughs@teck.com	X	X	X
Email 4:	scott.roughead@teck.com	X	X	X
Email 4:	teckcoal@equisonline.com			X

SAMPLE DETAILS

2019/09/11
09:15
Bear Paw
JC
9x20L carbon/s
NO3/NO2
Good Condition

ANALYSIS REQUESTED — Filtered - F: Field, L: Lab, FL: Field & Lab,

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30-d fathead minnow P/F (15 ug/l Cu Treated)	30-d fathead minnow P/F (20 ug/l Cu Treated)
FR_FRABCH_MON_2019-09-10_NP 1819-1850	FR_FRABCH	WS		2019/09/10		G	2		X
FR_FRCP1_MON_2019-09-10_N 1819-1849	FR_FRCP1	WS		2019/09/10		G	2		X
FR_UFR1_MON_2019-09-10_N 1819-1851	FR_UFR1	WS		2019/09/10		G	2	X	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Britt Anderson	2019/09/10		

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Britt Anderson	Mobile #	403-990-7060
Sampler's Signature		Date/Time	2019/09/10

Teck

COC ID:	Q3 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Jenni Kropp			Lab Contact	Jacklyn Pool			Site:	jennifer.kropp@teck.com	EQuIS:	GHO
Email	jennifer.kropp@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.				Yes PDF	Yes	Excel
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 1:	leigh.stickney@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 2:	jennifer.kropp@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			Email 3:	GH-EquisGHO-Field@teck.com		
								PO number			610307

2019/09/11
12: 09:15
Bear Paw
JC
9x20L carboys
N06/N07
Good Condition

Week 4
COC 1/3

SAMPLE DETAILS								ANALYSIS REQUESTED										
								Please indicate below Filtered, Perserved or both (F, P, F/P)										
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	30 d early life stage fathead minnow P/F (15 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)									
GH_ER2_WS_2019-09-10_N 1819-1854	GH_ER2	WS		10-Sep		G	2	X										
GH_ERC_WS_2019-09-10_N 1819-1853	GH_ERC	WS		10-Sep		G	2	X										
GH_FR1_WS_2019-09-10_N 1819-1852	GH_FR1	WS		10-Sep		G	2		X									

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date

SERVICE REQUEST (rush - subject to availability)

Priority (2 – 3 business days) - 50% surcharge	Regular (default) X	Sampler's Name		Mobile #	
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS		Sampler's Signature		Date/Time	

Teck

COC ID:	20190910CRN4C	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q3 Chronic Sampling			Lab Contact	Tamara McClare			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email				Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	#4, 6125-12th Street S.E			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3							Email 4	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.LabResults@teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number	VFO0061056			
Postal Code	V1C 4C3	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	403 253 7121							

SAMPLE DETAILS								ANALYSIS REQUESTED										Filtered - F; Field, L: Lab, FL: Field & Lab, N: None
								FILTERED	No	No	No							
								PRESERVED	No	No	No							
Sample ID 1819-1855	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	28-d H. azteca	7-d C dubia P/F	72-hr P. subcapitata P/F	30-d fathead minnow P/F (20 ug/l Cu Treated)				
EV_HC1_WS_2019_Q3_WK4_N	EV_HC1	WS	N	9/10/2019	9:00	G	2							2				
EV_MC2_WS_2019_Q3_WK4_N	EV_MC2	WS	N	9/10/2019	9:55	G	2							2				
2019/09/11 1819-1855																		
09:15																		
Bear Paw																		
JC																		
4x 20L carboys																		
No5/No6																		
Good Condition																		
Week 4																		
					Total		4											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)	Jason Gravelle	10-Sep-19		

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jason Gravelle	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	September 10, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	WEEKLY_CHRONIC_09102019_2	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Hydroqual Laboratories			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Claudio Quinteros			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com				Jessica Wang			Email 2:	teckcoal@equisonline.com			X
				Email	claudio@nautilusenvironmental.ca			Email 3:	Jay.jones@teck.com	X	X	X
					jessica@nautilusenvironmental.ca			Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	#4, 6125-12th Street S.E.			Email 5:	Kate.Middleton@teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	403-253-7121							

SAMPLE DETAILS

2019/09/11
09:15
Bear Paw
JC
4x20L cgr bags
N65/N65
Good Condition
Week 4

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 30-d fathead minnow P/F (15 ug/l CU Treated)	ANALYSIS: 30-d fathead minnow P/F (20 ug/l CU Treated)
CM_MC1_WS_2019-09-10_N 1819-1858	CM_MC1	WS	No	9/10/2019	13:35	G	2			X	
CM_MC2_WS_2019-09-10_N 1819-1857	CM_MC2	WS	No	9/10/2019	17:46	G	2				X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	VS/SH/SM	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	9/10/2019 14:00:00
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190910 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact	Jeslin Wijaya			Email 1:	drake.tymstra@teck.com	X	X	
Email	carla.froymanparker@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	X	X	
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com	X	X	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number	PO0160[illegible]			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS

2019/09/11
09:15
Bear Paw
DC
10x20L garboys
NOS/NOB
Good Condition
COC 1/2
Week 24

ANALYSIS REQUESTED

Filtered - F; Field; L: Lab; FL: Field & Lab; N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Tot.	PRESERV.	ANALYSIS: 30-d fathead minnow P/F (15 ug/l Cu Treated)	30-d fathead minnow P/F (20 ug/l Cu Treated)
LC_LCDSSLCC_WS_2019-09-03_N 1819-1859	LC_LCDSSLCC	WS	N	10-Sep		G	2				X
LC_SLC_WS_2019-09-03_N 1819-1860	LC_SLC	WS	N	10-Sep		G	2			X	
LC_LC3_WS_2019-09-03_N 1819-1861	LC_LC3	WS	N	10-Sep		G	2				X
LC_LC5_WS_2019-09-03_N 1819-1863	LC_LC5	WS	N	10-Sep		G	2				X
LC_DCDS_WS_2019-09-03_N 1819-1862	LC_DCDS	WS	N	10-Sep	10:07	G	2				X

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide preliminary update as results are available	K. Cambell/D.Tymstra	10-Sep		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	September 10, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20190917-1330

TURNAROUND TIME:

RUSH:

PROJECT/CLIENT INFO

Facility Name / Job#	Fording River Operation		
Project Manager	Neil MacDonald		
Email	Neil.MacDonald@teck.com		
Address	PO Box 100		
City	Elkford	Province	BC
Postal Code	V0B 1H0	Country	Canada
Phone Number	1-250-865-5204		

LABORATORY

Lab Name	HydroQual Laboratories Ltd.		
Lab Contact			
Email	ABinfo@nautilusenvironmental.ca		
Address	#4, 6125 12 Street SE		
City	Calgary	Province	AB
Postal Code	?T2H 2K1	Country	Canada
Phone Number	403-253-7121		

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	neil.macdonald@teck.com	X	X	X
Email 2:	britt.anderson@teck.com	X	X	X
Email 3:	david.burroughs@teck.com	X	X	X
Email 4:	scott.roughead@teck.com	X	X	X
Email 4:	teckcoal@equisonline.com			X

SAMPLE DETAILS

2019/09/18
11:00
Bear Paw
JC
6x20L carboys
NoS/NoS
Good Condition
Week 5

ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 30-d fathead minnow P/F (15 ug/l Cu Treated)	ANALYSIS: 30-d fathead minnow P/F (20 ug/l Cu Treated)
FR_FRABCH_WS_2019-09-17_NP	1819-1850 FR_FRABCH	WS		2019/09/17	11.1°C	G	2		X
FR_FRCPI_WS_2019-09-17_N	~~1819-1855~~ FR_FRCPI 1819-1847	WS		2019/09/17	12.4°C	G	2		X
FR_UFRI_WS_2019-09-17_N	1819-1851 FR_UFRI	WS		2019/09/17	11.6°C	G	2	X	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Britt Anderson	2019/09/17		

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Britt Anderson	Mobile #	403-990-7060
Sampler's Signature		Date/Time	2019/09/17

Teck

COC ID:	Q3 Chronic TOX_Hyd	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Hydroqual Laboratories Ltd			EDD delivery:			
Project Manager	Jenni Kropp			Lab Contact	Jacklyn Pool			Site:	jennifer.kropp@teck.com	EQuIS:	GHO
Email	jennifer.kropp@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	#4, 6125 - 12th Street S.E.			Yes	PDF	Yes	Excel
								Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Calgary	Province	AB	Email 2:	jennifer.kropp@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	T2H 2K1	Country	Can	Email 3:	DL-Equis-GHO-Field@teck.com		
Phone Number	250 865 3274			Phone Number	403.253.7121			PO number	610307		

SAMPLE DETAILS

2019/09/18
11:00
Bear Paw
SC
6x20L carboys
NoS/NoI
Good Condition
Week 5

COC 1/3

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	#N/A 30 d early life stage fathead minnow P/F (15 ug/l CU Treated)	#N/A 30 d early life stage fathead minnow P/F (20 ug/l CU Treated)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_ER2_WS_2019-09-17_N 1819-1854	GH_ER2 13.4°C	WS		17-Sep	11:36	G	2	X											
GH_ERC_WS_2019-09-17_N 1819-1855	GH_ERC 14.1°C	WS		17-Sep	12:56	G	2	X											
GH_FR1_WS_2019-09-17_N 1819-1852	GH_FR1 14.5°C	WS		17-Sep	13:46	G	2		X										

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20190917CRN5C	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q3 Chronic Sampling			Lab Contact	Tamara McClure			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email				Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	#4, 6125-12th Street S.E			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3							Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number	VPO00610856			
Postal Code	V1C 4C3	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	403 253 7121							

SAMPLE DETAILS								ANALYSIS REQUESTED										
								FILTERED	No	No	No							
								PRESERVED	No	No	No							
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	Toxicity 96-h rainbow trout (Pass/Fail)	Toxicity 48-h Daphnia magna	28-d H. azteca	7-d C dubia P/F	72-hr P. subcapitata P/F	30-d fathead minnow P/F (20 ug/l Cu Treated)				
1219-1855	14.8°C																	
EV_HC1_WS_2019_Q3_WK5_N	EV_HC1	WS	N	9/17/2019	9:00	G	2							2				
EV_MC2_WS_2019_Q3_WK5_N	EV_MC2	WS	N	9/17/2019	10:30	G	2							2				
20/09/19 1819-1855 15.5°C																		
11:00																		
Bear Paw																		
DC																		
4x 20L carboys																		
NaOS/NaS																		
Good Condition																		
Week 5																		
					Total		4											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphinia testing to occur at 20 degrees)	Jason Gravelle	17-Sep-19		

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jason Gravelle	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	September 17, 2019
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	WEEKLY_CHRONIC_09172019_2	TURNAROUND TIME:	Regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Hydroqual Laboratories			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Claudio Quinteros			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com				Jessica Wang			Email 2:	teckcoal@equisonline.com			X
				Email	claudio@nautilusenvironmental.ca			Email 3:	Jay.jones@teck.com	X	X	X
					jessica@nautilusenvironmental.ca			Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	#4, 6125-12th Street S.E			Email 5:	Kate.Middleton@teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	403-253-7121							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

2019/09/18
11:00
Bear Pow
JC
4x20L carboys
No61No1
Good Condition
Week 5

9.6°C

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL.	PRESERV.	ANALYSIS: 30-d fathead minnow P/F (15 ug/l CU Treated)	ANALYSIS: 30-d fathead minnow P/F (20 ug/l CU Treated)
CM_MC1_WS_2019-09-17_N 1819-1858	CM_MC1	WS	No	9/17/2019	11:30	G	2			X	
CM_MC2_WS_2019-09-17_N 1819-1857	CM_MC2	WS	No	9/17/2019	10:46	G	2				X

10.4°C

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default) X	Sampler's Name	VS/SH/MC	Mobile #	250 425 7518
Priority (2-3 business days) - 50% surcharge				
Emergency (1 Business Day) - 100% surcharge	Sampler's Signature		Date/Time	9/17/2019 14:00:00
For Emergency <1 Day, ASAP or Weekend - Contact ALS				

Page 1 of 1

Teck

COC ID: 20190917 Chronic tox | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - Calgary			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact	Jeslin Wijaya			Email 1:	drake.tymstra@teck.com	x	x	
Email	carla froymanparker@teck.com			Email	jeslin@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	x	x	
Address	Box 2003			Address	6125 12 St NE			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Calgary	Province	AB	PO number	VPO00608154			
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada					
Phone Number	250-425-3196			Phone Number	403-253-7121							

SAMPLE DETAILS | **ANALYSIS REQUESTED** (Filtered - F; Field, L; Lab, FL; Field & Lab, N; None)

20AY/09/18
11:00
Bear Paw
SC
10x 20L carboys
NoS/NoZ
Good Condition
Week 5
COC 1/2

Sample ID	Sample Location (sys loc code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont	30-d fathead minnow P/F (15 ug/l Cu Treated)	30-d fathead minnow P/F (20 ug/l Cu Treated)		
LC_LCDSSLCC_WS_2019-09-17_N 1819-1859	C_LCDSSLCC	WS	N	17-Sep	10:16	G	2		X	13.3°C	
LC_SLC_WS_2019-09-17_N 1819-1860	LC_SLC	WS	N	17-Sep	11:00	G	2	X		10.4°C	
LC_LC3_WS_2019-09-17_N 1819-1861	LC_LC3	WS	N	17-Sep	10:35	G	2		X	10.3°C	
LC_LC5_WS_2019-09-17_N 1819-1863	LC_LC5	WS	N	17-Sep	9:45	G	2		X	10.0°C	
LC_DCDS_WS_2019-09-17_N 1819-1862	LC_DCDS	WS	N	17-Sep	8:56	G	2		X	11.0°C	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	17-Sep		

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name	Drake Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	September 17, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

END OF REPORT

Fourth Quarter 2019
Nautilus Toxicity Testing on Elk Valley Samples with *Ceriodaphnia dubia*, *Pseudokirchneriella subcapitata*, *Hyalella azteca*, and *Oncorhyncus mykiss*

Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia*, *Pseudokirchneriella subcapitata*, *Hyalella azteca*, and *Oncorhyncus mykiss*

Fourth Quarter 2019

Final Report

March 30, 2020

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

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SIGNATURE PAGE

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This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

SUMMARY

Summaries of sample information and toxicity test results of samples collected from the Elk Valley to meet requirements of BC Ministry of Environment and Climate Change Strategy permit number 107517 quarterly toxicity testing program in the fourth quarter of 2019 are provided in the tables below.

Sample and Test Type Information

Sample IDs	FR_UFR1 (site control), GH_ER2 (site control), CM_MC1 (site control), LC_SLC (site control), FR_FRABCH, FR_FRCP1, GH_FR1, GH_ERC, CM_MC2, RG_MIDAG*, EV_MC2 , EV_HC1, LC_DCDS, LC_LC3, LC_LC5, LC_LCDSSLCC
Sample collection dates	November 12, 19, 26 and December 3, 10, 2019
Sample receipt dates	One day after sample collection
Sample receipt temperatures	Ranged from 0.0 to 2.6°C
Test types	*Ceriodaphnia dubia* 7-d survival and reproduction#
	Pseudokirchneriella subcapitata 72-h growth inhibition
	Hyalella azteca 28-d survival and growth
	Oncorhynchus mykiss (rainbow trout) embryo-alevin development

* Not tested with *P. subcapitata* or *O. mykiss*.

Test extended to 8 days to provide additional information on reproduction patterns.

Summary of Results

Endpoint	Mean ± SD				
	Laboratory Control	FR_UFR1 (Site Control)	GH_ER2 (Site Control)	CM_MC1 (Site Control)	LC_SLC (Site Control)
C. dubia					
Survival (%)	100	50 *, †, ‡, §	100	100	100
Reproduction	20.8 ± 3.4	14.4 ± 8.5 *, †	20.4 ± 5.0	18.1 ± 4.6	17.2 ± 6.0
P. subcapitata					
Cell yield (x 10^4 cells/mL)	40.6 ± 3.4	121.6 ± 7.9	113.4 ± 7.7	117.9 ± 8.3	113.6 ± 11.6
H. azteca					
Survival (%)	96.0 ± 8.9	94.0 ± 8.9	96.0 ± 8.9	92.0 ± 11.0	84.0 ± 20.7
Dry weight (mg)	0.39 ± 0.18	0.56 ± 0.21	0.23 ± 0.09 #	0.37 ± 0.20	0.32 ± 0.26
O. mykiss					
Survival (%)	90.0 ± 8.8	91.1 ± 6.9	91.1 ± 8.4	86.7 ± 8.8	87.5 ± 10.1
Viability (%)	88.9 ± 9.6	86.7 ± 12.0	86.7± 3.3	78.9 ± 13.5	81.9 ± 10.6
Length (mm)	21.2 ± 0.5	20.8 ± 0.9	19.6 ± 0.3	21.0 ± 1.2	20.9 ± 1.0
Wet weight (mg)	102.7 ± 9.9	102.6 ± 8.8	96.6 ± 8.0	102.5 ± 2.7	107.3 ± 7.8

SD = Standard Deviation
* Result was significantly lower than the laboratory control
# Result was significantly lower than the FR_UFR1 site control
† Result was significantly lower than the GH_ER2 site control
‡ Result was significantly lower than the CM_MC1 site control
§ Result was significantly lower than the LC_SLC site control

Summary of Results (continued)

Endpoint	Mean ± SD					
	FR_FRABCH	FR_FRCP1	GH_FR1	GH_ERC	CM_MC2	RG_MIDAG
C. dubia						
Survival (%)	90	90	100	90	90	100
Reproduction	16.9 ± 3.6 *, †	17.4 ± 4.2 *	20.0 ± 4.6	18.1 ± 3.7	17.9 ± 3.8 *	20.7 ± 3.1
P. subcapitata						
Cell Yield (x 10^4 cells/mL)	103.5 ± 7.2 #, ‡	103.8 ± 10.0 #, ‡	119.5 ± 8.2	124.8 ± 4.1	111.5 ± 6.0	NT
H. azteca						
Survival (%)	84.0 ± 25.1	92.0 ± 4.5	92.0 ± 11.0	84.0 ± 20.7	76.0 ± 26.1 †	94.0 ± 8.9
Dry weight (mg)	0.44 ± 0.18	0.14 ± 0.0.3 *, #, ‡	0.41 ± 0.11	0.29 ± 0.19 #	0.21 ± 0.02 *, #	0.32 ± 0.27
O. mykiss						
Survival (%)	75.4 ± 9.9 #, †	80.9 ± 3.7	62.1 ± 14.3 *, #, †, ‡, §	89.8 ± 8.9	73.3 ± 8.8 *, #, †	NT
Viability (%)	72.0 ± 6.6 *	76.4 ± 3.8	57.4 ± 12.2 *, #, †, ‡, §	85.3 ± 10.5	66.7 ± 3.3 *, #, †	NT
Length (mm)	20.9 ± 0.7	19.5 ± 1.7	21.0 ± 0.9	20.9 ± 0.8	21.0 ± 0.7	NT
Wet weight (mg)	102.8 ± 11.8	98.1 ± 11.9	112.0 ± 18.7	106.5 ± 4.1	107.5 ± 8.3	NT

SD = Standard Deviation, NT=Not Tested
* Result was significantly lower than the laboratory control
# Result was significantly lower than the FR_UFR1 site control
† Result was significantly lower than the GH_ER2 site control
‡ Result was significantly lower than the CM_MC1 site control
§ Result was significantly lower than the LC_SLC site control

Summary of Results (continued)

Endpoint	Mean ± SD					
	EV_MC2	EV_HC1	LC_DCDS	LC_LC3	LC_LC5	LC_LCDSSLCC
C. dubia						
Survival (%)	80	90	90	90	100	100
Reproduction	21.2 ± 1.8	21.9 ± 2.2	20.9 ± 3.7	15.8 ± 4.5 *, †	21.6 ± 2.6	18.2 ± 3.5
P. subcapitata						
Cell Yield (x 10^4 cells/mL)	106.8 ± 3.5 #	115.8 ± 3.9	120.0 ± 7.0	122.8 ± 8.5	129.8 ± 8.5	104.0 ± 10.0 #, ‡
H. azteca						
Survival (%)	94.0 ± 8.9	82.0 ± 34.9	34.0 ± 31.3 *, #, †, ‡, §	64.0 ± 43.4 *, #, †, ‡	72.0 ± 22.8 *, #, †	70.0 ± 33.9 *, #, †
Dry weight (mg)	0.33 ± 0.16 #	0.28 ± 0.23 #	0.20 ± 0.12 #	0.60 ± 0.1	0.26 ± 0.22	0.33 ± 0.20
O. mykiss						
Survival (%)	72.2 ± 10.2*, #, †	80.0 ± 6.7	65.4 ± 8.0 *, #, †, ‡, §	81.4 ± 4.8	74.2 ± 4.7 #, †	80.8 ± 5.4
Viability (%)	66.7 ± 6.7 *, #, †	76.7 ± 8.8	58.5 ± 11.5 *, #, †, ‡, §	73.7 ± 15.3	63.9 ± 11.1 *, #, †	76.4 ± 3.4
Length (mm)	21.1 ± 0.5	21.2 ± 0.6	21.3 ± 0.8	21.3 ± 0.7	21.2 ± 0.8	21.8 ± 0.3
Wet weight (mg)	103.6 ± 6.3	107.6 ± 2.6	107.6 ± 3.6	106.9 ± 10.2	103.9 ± 2.0	110.4 ± 3.0

SD = Standard Deviation
* Result was significantly lower than the laboratory control
# Result was significantly lower than the FR_UFR1 site control
† Result was significantly lower than the GH_ER2 site control
‡ Result was significantly lower than the CM_MC1 site control
§ Result was significantly lower than the LC_SLC site control

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. (Teck) on samples collected from various locations in the Elk Valley as part of a quarterly toxicity testing program required under the BC Ministry of Environment and Climate Change Strategy permit number 107517.

Stations sampled in the fourth quarter of 2019 are shown in Figure 1 and align with the integrated chronic toxicity testing program, which was designed to eliminate redundancy between Permit 107517 Section 9.8 (ii) and Permit 106970 toxicity testing programs. The integrated program was approved by the BC Ministry of Environment and Climate Change Strategy on March 4, 2019 (BC ENV 2019). Test species required to be tested quarterly include a cladoceran (*Ceriodaphnia dubia*) and a unicellular green alga (*Pseudokirchneriella subcapitata*). Tests are also required on a semi-annual basis using rainbow trout (*Oncorhynchus mykiss*; Q2 and Q4), an amphipod (*Hyalella azteca*; Q2 and Q4), and fathead minnows (*Pimephales promelas*; Q1 and Q3).

Water samples used for testing were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 0.0 to 2.6°C and were stored in the dark at 4 ± 2°C prior to testing. Table 1 summarizes the toxicity tests that were conducted on each sample as well as sample collection dates. Samples were collected weekly on the dates shown in Table 1 for the duration of the *H. azteca* and *O. mykiss* tests. All toxicity tests were conducted at the Nautilus Environmental laboratory in Burnaby, BC.

This report presents the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. The chain-of-custody forms are provided in Appendix E. Results of analytical chemistry that was performed on the samples tested in this program are uploaded by Teck to the Environmental Management System database. These samples were collected by Teck personnel at the same time the samples were collected for toxicity testing.

Figure 1. Chronic toxicity monitoring locations.

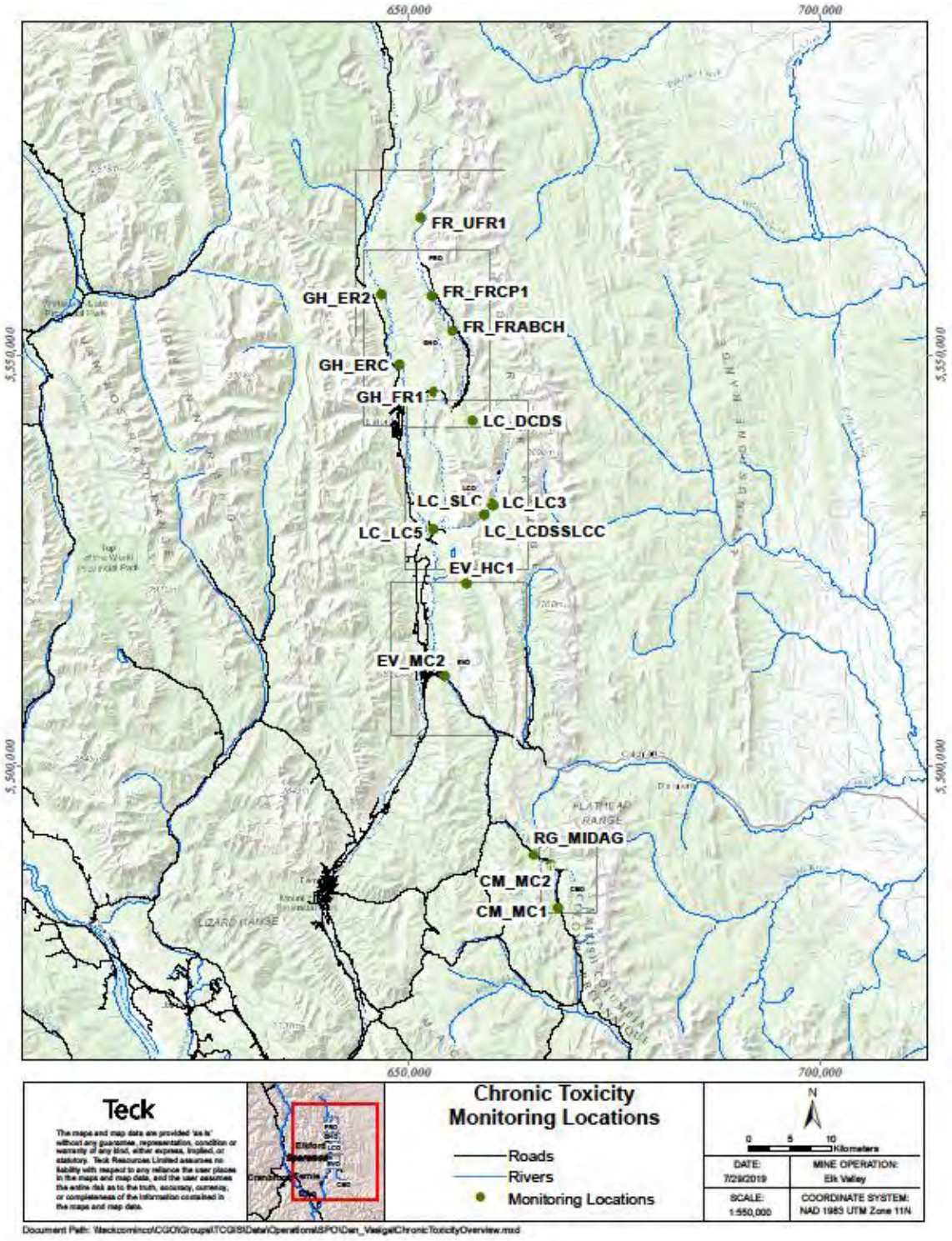

Table 1. Summary of toxicity testing program.

Sample ID	EMS Location ID	Species Tested	Sample Collection Dates
FR_UFR1 *	E300071	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
GH_ER2 *	E300090	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
CM_MC1 *	E258937	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
LC_SLC *	E282149	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
FR_FRABCH	-	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
FR_FRCP1	E299272	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
GH_FR1	E200028	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
GH_ERC	E258175	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
CM_MC2	E300091	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
RG_MIDAG	-	*C. dubia* and *H. azteca*	November 12, 19, 26 and December 3, 2019
EV_MC2	E102682	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
EV_HC1	E299270	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
LC_DCDS	E291569	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
LC_LC3	E297110	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
LC_LC5	0200389	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019
LC_LCDSSLCC	E282149	*C. dubia*, *P. subcapitata*, *H. azteca* and *O. mykiss*	November 12, 19, 26 and December 3, 10, 2019

***** Site water controls

2.0 METHODS

Methods for the toxicity tests using *C. dubia*, *P. subcapitata*, *H. azteca,* and *O. mykiss* are summarized in Tables 2 through 5. Laboratory control water was 20% Perrier water prepared with deionized water for *C. dubia*; deionized water with supplemented nutrients for *P. subcapitata*; reconstituted water prepared by addition of reagent grade salts to dechlorinated Metro Vancouver municipal tap water for *H. azteca* according to a recipe provided in Environment Canada (2013); and dechlorinated Metro Vancouver municipal tap water for *O. mykiss*.

For *C. dubia*, the test protocol specifies that test duration must be 7 ± 1 day, with the test being terminated on the day that at least 60% of control organisms have produced three broods. To provide additional information on reproduction patterns in the samples, and as requested by Teck, the tests were extended to 8 days, regardless of when 60% of controls had produced three broods. However, the results reported below were calculated based on the specifications of the test method, which in this case was based on the reproduction that had been observed up to Day 7 of exposure. The additional information on reproduction up to Day 8 of exposure is available in Appendix A.

For the *H. azteca* tests, all site waters were supplemented with 25 mg/L chloride and 0.02 mg/L bromide using NaCl and NaBr, respectively, according to recommendations by the *Hyalella* Advisory Group (chaired by Chris Ingersoll, USGS) (Norberg-King et al., 2014), since insufficient concentrations of these halides are known to impair growth of this species. The laboratory control water contained approximately 75 mg/L chloride and 0.8 mg/L bromide.

As requested by Teck, site waters used in tests with *O. mykiss* were amended with 20 µg/L copper to reduce potential for confounding effects from microbial growth. Rainbow trout embryo-alevin tests were performed using a blocked design (*i.e.*, eggs from one fish were used for replicate A of each test concentration, eggs from the second fish for replicate B, and so on). The blocked design approach was a planned deviation from the Environment Canada test method, which indicates that the eggs should be pooled prior to testing. However, this modification is considered appropriate because it reduces the risk of non-viable eggs from a single fish affecting the results of the entire test.

Statistical analyses were performed using CETIS (Tidepool Scientific Software, 2013), and involved comparison of results to both the laboratory and site water controls.

Table 2. Test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test species	*Ceriodaphnia dubia*
Organism source	In-house culture
Organism age	<24 hour old neonates, produced within a 12 hour window
Test type	Static-renewal
Test duration	8 days[1]
Test vessel	20-mL glass test tube
Test volume	15 mL
Test solution depth	10 cm
Test concentrations	100% (undiluted) sample, plus laboratory control
Test replicates	10 per treatment
Number of organisms	1 per replicate
Control water	20% Perrier water and 80% deionized water + 5 µg/L Se and 2 µg/L vitamin B12
Test solution renewal	Daily (100% renewal)
Test temperature	25 ± 1°C
Feeding	Daily with *Pseudokirchneriella subcapitata* and TCC[1] (3:1 ratio)
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival and reproduction checked daily
Test protocol	Environment Canada (2007a), EPS 1/RM/21
Statistical software	CETIS Version 1.9.4
Test endpoints	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods; no ephippia present
Reference toxicant	Sodium chloride (NaCl)

[1] Test duration was extended to 8 days to provide additional information on patterns of reproduction. Summarized data and calculated endpoints are based on results from Day 7, according to the standard test procedure; however, all of the data through 8 days are provided in Appendix A.

[2] TCC = Trout chow + cerophyl

Table 3. Test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test species	*Pseudokirchneriella subcapitata*, strain CPCC# 37
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Center, and originally isolated from Nivelta River, Norway.
Organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test concentrations	Full strength sample diluted to 95.2% (v/v) by addition of nutrients, plus laboratory control
Test replicates	4 per treatment; 8 for laboratory control and site control
Number of organisms	10,000 cells/mL
Control water	Deionized water supplemented with nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature and pH measured at test initiation; pH of two control wells measured at test termination
Test protocol	Environment Canada (2007b), EPS 1/RM/25
Statistical software	CETIS Version 1.9.4
Test endpoints	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤ 20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc (added as $ZnSO_4$)

Table 4. Test conditions: *Hyalella azteca* survival and growth test.

Test species	*Hyalella azteca*
Organism source	Aquatic Research Organisms, NH
Organism age	7- to 8-days old
Test type	Static-renewal
Test duration	28 days
Test vessel	375-mL glass container
Test volume	300 mL
Test concentrations	100% (undiluted) samples amended with 25 mg/L Cl and 0.02 mg/L Br, plus laboratory control
Test replicates	5 per treatment
Number of organisms	10 per replicate
Control water	Reconstituted water containing ~75 mg/L Cl and 0.8 mg/L Br (Environment Canada 2013). Samples were supplemented with 25 mg/L Cl and 0.02 mg/L Br.
Test solution renewal	Twice daily (~80% renewal)
Test temperature	23 ± 1°C
Feeding	1 mL of YCT daily to each container. Tetramin daily, with amounts increasing weekly; Week 1: 0.25 mg, Week 2: 0.5 mg, Week 3: 1 mg, Week 4: 1.5 mg in each test container.
Light intensity	500 to 1000 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity measured upon arrival; hardness and alkalinity measured at test termination; total ammonia measured at test initiation and termination
Test protocol	Modified from US EPA (2000), as described in Norberg-King et al. (2014)
Statistical software	CETIS Version 1.9.4
Test endpoints	Survival and dry weight
Test acceptability criteria for controls	Mean control survival of ≥80%, dry weight ≥0.10 mg
Reference toxicant	Sodium chloride (NaCl)

Table 5. Test conditions: *Oncorhynchus mykiss* embryo-alevin development test.

Test species	*Oncorhynchus mykiss*
Organism source	Lyndon Fish Hatcheries, ON
Gamete quality	Small amount of water added to milt on a dry glass slide; verification of vigorous sperm motility using a compound microscope (100 X magnification)
Organism age	<30 minutes post fertilization, <24 hour old gametes
Test type	Static-renewal
Test duration	Test terminated 7 days after ≥50% of controls hatch
Test vessel	4-L plastic containers
Test volume	2 L
Test solution depth	17 cm
Test concentrations	100% (undiluted sample) amended with 20 µg/L Cu, plus laboratory control
Test replicates	4 per treatment
Number of organisms	30 per replicate
Control water	Dechlorinated Metro Vancouver municipal tap water
Test solution renewal	Daily (80% renewal)
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark; low intensity light used during solution renewals
Aeration	Continuous gentle aeration
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured upon arrival; survival checked daily
Test protocol	Environment Canada (1998), EPS 1/RM/28
Statistical software	CETIS Version 1.9.4
Test endpoint	Survival, viability (which assesses incidence of deformities), length, wet weight
Test acceptability criteria for controls	≥65% normally developed hatched fish
Reference toxicant	Sodium dodecyl sulphate (SDS)

3.0 RESULTS

3.1 *Ceriodaphnia dubia*

Results of the toxicity tests using *C. dubia* are provided in Table 6 and 7. With the exception of FR_UFR1, survival and reproduction in the site water controls (GH_ER2, CM_MC1 and LC_SLC) performed similarly to the laboratory control. The Fording River site water control (FR_UFR1) produced an unusual result, in which there was 50% mortality, although the surviving organisms had no impairment of reproduction. To confirm whether this effect on survival was an anomalous response or a real toxicological effect, the sample was re-tested, and a sample that was collected from FR_UFR1 the following week was also tested for toxicity with *C. dubia*. Both the re-test of the initial sample and the test on the sample collected the following week showed no adverse effect (Table 7). Thus, it appears likely that this was an anomalous response, and it may be appropriate to exclude these data from the control range from the FR_UFR1 site and/or replace the data with data for the sample that was collected the following week. The cause of the adverse response could not be determined since it was not reproducible.

There were no adverse effects on survival in any of the samples tested; survival ranged between 80 and 100%. Significantly lower reproduction relative to the laboratory control was observed in samples from FR_FRABCH, FR_FRCP1, CM_MC2 and LC_LC3. There were also significantly lower levels of reproduction relative to GH_ER2 in samples FR_FRABCH and LC_LC3.

3.2 *Pseudokirchneriella subcapitata*

Results of the toxicity tests using *P. subcapitata* are provided in Table 8. The site water controls FR_UFR1, GH_ER2, CM_MC1 and LC_SLC produced 2.8 to 3.0-fold greater growth than the laboratory control. This finding is not unusual, since the higher ionic strength associated with the site water controls would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water.

There were no adverse effects on cell yield in any of the samples tested relative to the laboratory control. Stimulation of growth was observed in all samples tested compared to the laboratory control; percent stimulation ranged between 154.8% and 219.4%. Relative to the FR_UFR1 and CM_MC1 site water controls, there were significantly lower cell yields in samples FR_FRABCH, FR_FRCP1, and LC_LCDSSLCC. Furthermore, EV_MC2 was significantly reduced compared to FR_UFR1.

3.3 *Hyalella azteca*

Results of the toxicity tests using *H. azteca* are provided in Table 9. Survival and dry weight in all four site water controls performed similarly to the laboratory control, indicating that there were no adverse effects associated with these upstream locations.

Significantly lower survival relative to the laboratory control, FR_UFR1 and GH_ER2 was observed in samples from LC_DCDS, LC_LC3, LC_LC5 and LC_LCDSSLCC. Samples from LC_DCDS and LC_LC3 also exhibited lower survival compared to the CM_MC1 site water and LC_DCDS had reduced survival relative to LC_SLC.

Adverse effects on dry weight relative to the laboratory control occurred in samples from FR_CP1 and CM_MC2. Decreases in dry weight relative to FR_UFR1 were observed in GH_ER2, FR_CP1, GH_ERC, CM_MC2, EV_MC2, EV_HC1, and LC_DCDS. FR_FRCP1 also had significantly lower dry weight compared to CM_MC1.

3.4 *Oncorhynchus mykiss*

Results of the toxicity tests using *O. mykiss* are provided in Table 10. Eggs in one of the four replicates, which originated from a single female, were considered non-viable, producing particularly poor results (near complete mortality within the first two weeks of exposure). Data from this replicate were excluded from the statistical analyses.

The site water controls FR_UFR1, CM_MC1, GH_ER2 and LC_SLC performed similarly to the laboratory control for all endpoints (survival, viability, length, and wet weight), indicating that there were no adverse effects associated with the upstream site waters.

Adverse effects on survival or viability relative to one or more of controls (laboratory or site water controls) were observed in samples from FR_FRABCH, GH_FR1, CM_MC2, EV_MC2, LC_DCDS and LC_LC5. Survival ranged between 62.1 and 91.1% and embryo viability ranged between 57.4 and 88.9%.

There were no adverse effects on length or wet weight in any sample relative to the controls. There were no observations of unusual behavior or microbial/fungal growth observed on fish exposed to any of the samples. A hatch rate was not calculated in these tests; however, the survival endpoint provides an appropriate measure of successful hatch, since the test is terminated shortly following hatch.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Sample ID	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	20.8 ± 3.4
FR_UFR1 (Site Control)	50 *,†,‡,§	14.4 ± 8.5 *,†
GH_ER2 (Site Control)	100	20.4 ± 5.0
CM_MC1 (Site Control)	100	18.1 ± 4.6
LC_SLC (Site Control)	100	17.2 ± 6.0
FR_FRABCH	90	16.9 ± 3.6 *,†
FR_FRCP1	90	17.4 ± 4.2 *
GH_FR1	100	20.0 ± 4.6
GH_ERC	90	18.1 ± 3.7
CM_MC2	90	17.9 ± 3.8 *
RG_MIDAG	100	20.7 ± 3.1
EV_MC2	80	21.2 ± 1.8
EV_HC1	90	21.9 ± 2.2
LC_DCDS	90	20.9 ± 3.7
LC_LC3	90	15.8 ± 4.5 *,†
LC_LC5	100	21.6 ± 2.6
LC_LCDSSLCC	100	18.2 ± 3.5

SD = Standard Deviation
* Result was significantly lower than the laboratory control
† Result was significantly lower than the GH_ER2 site control
‡ Result was significantly lower than the CM_MC1 site control
§ Result was significantly lower than the LC_SLC site control

Table 7. Results: *Ceriodaphnia dubia* survival and reproduction tests on FR_UFR1 samples.

Sample ID	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	19.2 ± 3.6
FR_UFR1 (Re-test of Week 1 sample) [1]	100	18.8 ± 2.0
FR_UFR1 (Week 2 sample)	100	18.5 ± 3.1

SD = Standard Deviation

1 Test was conducted outside of sample holding time to confirm the result for this sample presented in Table 6

Table 8. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Sample ID	Cell Yield (x 10^4 cells/mL) (Mean ± SD)	Stimulation relative to laboratory control (%)
Laboratory Control	40.6 ± 3.4	-
FR_UFR1 (Site Control)	121.6 ± 7.9	199.4
GH_ER2 (Site Control)	113.4 ± 7.7	179.1
CM_MC1 (Site Control)	117.9 ± 8.3	190.2
LC_SLC (Site Control)	113.6 ± 11.6	179.7
FR_FRABCH	103.5 ± 7.2 #,‡	154.8
FR_FRCP1	103.8 ± 10.0 #,‡	155.4
GH_FR1	119.5 ± 8.2	194.2
GH_ERC	124.8 ± 4.1	207.1
CM_MC2	111.5 ± 6.0	174.5
EV_MC2	106.8 ± 3.5 #	162.8
EV_HC1	115.8 ± 3.9	184.9
LC_DCDS	120.0 ± 7.0	195.4
LC_LC3	122.8 ± 8.5	202.2
LC_LC5	129.8 ± 8.5	219.4
LC_LCDSSLCC	104.0 ± 10.0 #,‡	156.0

SD = Standard Deviation
# Result was significantly lower than the FR_UFR1 site control
‡ Result was significantly lower than the CM_MC1 site control

Table 9. Results: *Hyalella azteca* survival and growth test.

Sample ID	(Mean ± SD)	
	Survival (%)	Dry weight (mg)
Laboratory Control	96.0 ± 8.9	0.39 ± 0.18
FR_UFR1 (Site Control)	94.0 ± 8.9	0.56 ± 0.21
GH_ER2 (Site Control)	96.0 ± 8.9	0.23 ± 0.09 #
CM_MC1 (Site Control)	92.0 ± 11.0	0.37 ± 0.20
LC_SLC (Site Control)	84.0 ± 20.7	0.32 ± 0.26
FR_FRABCH	84.0 ± 25.1	0.44 ± 0.18
FR_FRCP1	92.0 ± 4.5	0.14 ± 0.03 *, #, ‡
GH_FR1	92.0 ± 11.0	0.41 ± 0.11
GH_ERC	84.0 ± 20.7	0.29 ± 0.19 #
CM_MC2	76.0 ± 26.1 †	0.21 ± 0.02 *, #
RG_MIDAG	94.0 ± 8.9	0.32 ± 0.27
EV_MC2	94.0 ± 8.9	0.33 ± 0.16 #
EV_HC1	82.0 ± 34.9	0.28 ± 0.23 #
LC_DCDS	34.0 ± 31.3 *, #, †, ‡, §	0.20 ± 0.12 #
LC_LC3	64.0 ± 43.4 *, #, †, ‡	0.60 ± 0.10
LC_LC5	72.0 ± 22.8 *, #, †	0.26 ± 0.22
LC_LCDSSLCC	70.0 ± 33.9 *, #, †	0.33 ± 0.20

SD = Standard Deviation
* Result was significantly lower than the laboratory control
# Result was significantly lower than the FR_UFR1 site control
† Result was significantly lower than the GH_ER2 site control
‡ Result was significantly lower than the CM_MC1 site control
§ Result was significantly lower than the LC_SLC site control

Table 10. Results: *Oncorhynchus mykiss* embryo-alevin development test.

Sample ID	(Mean ± SD)			
	Survival (%)	Viability (%)	Length (mm)	Wet Weight (mg)
Laboratory Control	90.0 ± 8.8	88.9 ± 9.6	21.2 ± 0.5	102.7 ± 9.9
FR_UFR1 (Site Control)	91.1 ± 6.9	86.7 ± 12.0	20.8 ± 0.9	102.6 ± 8.8
GH_ER2 (Site Control)	91.1 ± 8.4	86.7 ± 3.3	19.6 ± 0.3	96.6 ± 8.0
CM_MC1 (Site Control)	86.7 ± 8.8	78.9 ± 13.5	21.0 ± 1.2	102.5 ± 2.7
LC_SLC (Site Control)	87.5 ± 10.1	81.9 ± 10.6	20.9 ± 1.0	107.3 ± 7.8
FR_FRABCH	75.4 ± 9.9 #, †	72.0 ± 6.6 *	20.9 ± 0.7	102.8 ± 11.8
FR_FRCP1	80.9 ± 3.7	76.4 ± 3.8	19.5 ± 1.7	98.1 ± 11.9
GH_FR1	62.1 ± 14.3 *, #, †, ‡, §	57.4 ± 12.2 *, #, †, ‡, §	21.0 ± 0.9	112.0 ± 18.7
GH_ERC	89.8 ± 8.9	85.3 ± 10.5	20.9 ± 0.8	106.5 ± 4.1
CM_MC2	73.3 ± 8.8 *, #, †	66.7 ± 3.3 *, #, †	21.0 ± 0.7	107.5 ± 8.3
EV_MC2	72.2 ± 10.2 *, #, †	66.7 ± 6.7 *, #, †	21.1 ± 0.5	103.6 ± 6.3
EV_HC1	80.0 ± 6.7	76.7 ± 8.8	21.2 ± 0.6	107.6 ± 2.6
LC_DCDS	65.4 ± 8.0 *, #, †, ‡, §	58.5 ± 11.5 *, #, †, ‡, §	21.3 ± 0.8	107.6 ± 3.6
LC_LC3	81.4 ± 4.8	73.7 ± 15.3	21.3 ± 0.7	106.9 ± 10.2
LC_LC5	74.2 ± 4.7 #, †	63.9 ± 11.1*, #, †	21.2 ± 0.8	103.9 ± 2.0
LC_LCDSSLCC	80.8 ± 5.4	76.4 ± 3.4	21.8 ± 0.3	110.4 ± 3.0

Note: Site waters were amended with 20 µg/L Cu
SD = Standard Deviation
* Result was significantly lower than the laboratory control
# Result was significantly lower than the FR_UFR1 site control
† Result was significantly lower than the GH_ER2 site control
‡ Result was significantly lower than the CM_MC1 site control
§ Result was significantly lower than the LC_SLC site control

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the test protocols. All tests met control acceptability criteria. Water quality parameters remained within the ranges specified in the protocols throughout the tests and uncertainty associated with these tests is best described by the standard deviations around the means.

There were no deviations from test methodologies with the exception of planned modifications to the *H. azteca* and *O. mykiss* methods described in Section 2.0. In the *O. mykiss* test, eggs in one of the four replicates were considered non-viable, producing poor results (near complete mortality within the first two weeks of exposure in all treatments). Since the blocked design of the test isolated the eggs from individual females into individual replicates across the test, the effect of this non-viable batch of eggs was excluded from statistical analyses by excluding the data for this replicate, leaving three replicates with viable eggs for analysis.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 11. Results for these tests fell within the acceptable range for organism performance of two standard deviations around the mean, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate. The reference toxicant tests were performed under the same conditions as those used for the samples.

Table 11. Reference toxicant test results.

Test species	Endpoint	Historical mean (2 SD Range)	CV (%)	Test date
C. dubia	Survival (LC50): 2.1 g/L NaCl	2.0 (1.9 – 2.2)	4	November 4, 2019
	Reproduction (IC50): 1.9 g/L NaCl	1.7 (1.2 – 2.4)	17	
P. subcapitata	Growth (IC50): 26.6 µg/L Zn	31.6 (25.8 – 38.7)	10	November 22, 2019
H. azteca	Survival (LC50): 4.4 g/L NaCl	5.8 (4.2 – 8.1)	17	November 14, 2019
O. mykiss	Viability (EC50): 7.0 mg/L SDS	4.2 (2.1 – 8.3)	35	November 13, 2019

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration

5.0 REFERENCES

BC Ministry of Environment and Sustainability (BC ENV). Re: Approval of the request to integrate the chronic toxicity test requirements of Permit 107517 Section 9.8 (ii) and Permit 106970. Letter from Douglas Hills (BC ENV) to Carla Fraser (Teck) dated March 4, 2019.

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APPENDIX A – *Ceriodaphnia dubia* toxicity test data

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 192276

Start Date/Time: NOV 13, 2019 @ 1530h
Set up by: SAK / MLF / SSK

Sample Information:

Sample ID: various - see below
Sample Date: Nov 12, 2019
Date Received: NOV 13, 2019
Sample Volume: 2 - 12 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 110419 A and 110619 A + B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 24
Mortality (%) in previous 7 d: 1.7
Individual female # used ≥8 young on test day: From 110419 A : 61, 62, 63, 69, 73, 75, 76
110619 A+B : 17, 20, 22 - 27, 29, 30

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd 238
Stock Solution ID: 19 Na 03
Date Initiated: NOV 4, 2019

7-d LC50 (95% CL): 2.1 (1.5 - 3.0) g/L NaCL
7-d IC50 (95% CL): 1.9 (1.3 - 2.3) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.9 - 2.2) g/L NaCL CV (%): 4
7-d IC50 Reference Toxicant Mean and Historical Range: 1.7 (1.2 - 2.4) g/L NaCL CV (%): 17

Test Results:

signs below indicates samples that are significantly lower than site controls :
α - FR_UFRL
β - GH_ER2
- CM_MCL
δ - LC_SLC

	Survival (%)	Reproduction (Mean ± SD)
Negative Control	100	20.8 ± 3.4
FR_UFRL_MON-2019-11-12_N	50 *, β, #, δ	14.4 ± 8.5 *, β
GH_ER2_WS_2019-11-04_N	100	20.4 ± 5.0
CM_MCL_WS_2019-11-12_N	100	18.1 ± 4.6
LC_SLC_WS_2019-08-19_N	100	17.2 ± 6.0
FR_FRABCH_MON_2019-11-12_NP	90	16.9 ± 3.6 *, β
FR_FRCPL_WS_2019-11-12_N	90	17.4 ± 4.2 *
GH_FRL_WS_2019-11-04_N	100	20.0 ± 4.6
GH_ERC_WS_2019-11-04_N	90	18.1 ± 3.7

* indicates sample that is significantly lower than lab (negative) control.

Reviewed by: [signature]
Date reviewed: Jan 30, 2020

Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 192276

Start Date/Time: NOV 13. 2019 @ 1530h
Set up by: SAK / MLF / SSK

Sample Information:

Sample ID: various - see below
Sample Date: NOV 12, 2019
Date Received: NOV 13, 2019
Sample Volume: 2-12 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 110419 A and 110619 A+B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 24
Mortality (%) in previous 7 d: 1.7
Individual female # used ≥8 young on test day: from 110419 A = 61, 62, 63, 69, 73, 75, 76
110619 A+B = 17, 20, 22 - 27, 29, 30

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd 238
Stock Solution ID: 19 NA03
Date Initiated: NOV 4, 2019

7-d LC50 (95% CL): 2.1 (1.5 - 3.0) g/L NaCl
7-d IC50 (95% CL): 1.9 ~~(2.3~~ (1.3 - 2.3) g/L NaCl
JW

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.9 - 2.2) g/L NaCl CV (%): 4
7-d IC50 Reference Toxicant Mean and Historical Range: 1.7 (1.2 - 2.4) g/L NaCl CV (%): 17

Test Results:

	Survival (%)	Reproduction (Mean ± SD)
~~Negative Control~~ JW		±
CM_MC2_WS_2019-11-12_N	90	17.9 ± 3.8 *
EV_MC2_WS_2019_Q4_WK1_N	80	21.2 ± 1.8
EV_HC1_WS_2019_Q4_WK1_N	100	21.9 ± 2.2
LC_DCDS_WS_2019-08-19_N	90	20.9 ± 3.7
LC_LC3_WS_2019-08-19_N	90	15.8 ± 4.5 *,B
LC_LC5_WS_2019-08-19_N	100	21.6 ± 2.6
LC_LCDSSLCC_WS_2019-08-19_N	100	18.2 ± 3.5
RG_MIDAG_WS_2019-11-12_N	100	20.7 ± 3.1

Reviewed by: [signature]
Date reviewed: Jan. 30, 2020

Ceriodaphnia dubia Summary Sheet

Client: TECK Coal
Work Order No.: 1922766

Start Date/Time: NOV 21/19 @1130h
Set up by: SAK/SSK/MLF

Sample Information:

Sample ID: FR-VFR1 (W1+W2)
Sample Date: NOV12/19 and NOV20/19
Date Received: NOV13/19 and NOV21/19
Sample Volume: various.

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: BB111419B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: ~~SK 22.5~~ 22
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: #76-79

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd 239
Stock Solution ID: 19NA03
Date Initiated: NOV 13/19

7-d LC50 (95% CL): 2.1 (1.5-3.0) g/L NaCL
7-d IC50 (95% CL): 2.0 (1.9-2.1) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.9-2.2) g/L NaCL CV (%): 4
7-d IC50 Reference Toxicant Mean and Historical Range: 1.7 (1.3-2.4) g/L NaCL CV (%): 16

Test Results:

	Survival (%)	Reproduction (Mean ± SD)
Negative Control	100	19.2 ± 3.6
FR-VFR1 (week1)	100	18.8 ± 2.0
FR-VFR1 (week2)	100	18.5 ± 3.1
		±
		±
		±
		±
		±
		±

Reviewed by: JCh
Date reviewed: Feb-11/20

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Vallieu
Work Order #: 192276

Start Date & Time: NOV 13/19 @ 1530 h
Stop Date & Time: NOV 21/19 @ 1430 h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration CONTROL	Days 0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	25.0	25.0	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	25.0	~~25.0~~ 25.0	25.0	~~25.0~~	25.0
DO (mg/L)	8.0	7.0	8.0	7.4	8.0	7.3	6.2	7.2	6.1	7.0	8.0	~~6.5~~ 6.4	8.0	6.5	6.0
pH	8.1	7.8	~~8.0~~ 8.0	8.0	8.2	7.8	6.2	7.8	6.2	7.8	8.2	~~7.7~~ 7.7	8.1	7.7	8.1
Cond. (µS/cm)	217	215		215		216		217		207		217		—	216
Initials	SSK	SSK		SSK		A		—		MLF		SSK		SAK	SSK

SSK 8.0 ①

① 25.0 ② 6.6 ③ 7.7

Concentration FR_UFR1	Days 0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
① Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	~~25.0~~	24.0
DO (mg/L)	8.2	7.1	7.9	7.4	6.2	7.4	6.0	7.1	6.0	7.2	7.5	6.4	~~6.0~~ 6.0	5.6	7.4
pH	8.0	8.2	8.2	8.1	6.2	6.0	6.2	7.8	6.1	8.1	8.2	7.8	8.0	7.7	~~7.7~~ 8.0
Cond. (µS/cm)	351	356		351		344		347		354		357		327	
Initials	SAK	SAK		SAK		A		—		SAK		SAK		SAK	SAK

8.0

Concentration GH_ER2	Days 0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
② Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	~~25.0~~	24.0
DO (mg/L)	8.2	7.2	8.1	7.4	6.1	7.3	7.9	7.2	6.2	7.4	7.6	6.6	~~6.6~~ 6.6	5.6	7.5
pH	8.1	8.2	8.3	8.2	6.2	6.2	6.2	8.1	8.2	8.1	8.2	7.9	8.1	7.8	~~7.8~~ 8.1
Cond. (µS/cm)	315	318		312		307		310		317		318		—	304
Initials	SAK	SAK		SAK		A		—		SAK		SAK		SAK	SAK

8.0

Concentration CM_MCI	Days 0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
③ Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	~~25.0~~	24.0
DO (mg/L)	8.3	7.1	8.0	7.4	6.2	7.2	6.2	7.1	6.1	7.5	8.0	6.9	~~6.7~~ 6.7	5.6	7.5
pH	8.0	8.1	8.3	8.2	6.2	8.1	6.2	8.1	6.2	8.2	8.3	8.0	8.1	7.7	8.0
Cond. (µS/cm)	285	289		284		279		281		287		288		—	280
Initials	SAK	SAK		SAK		A		—		SAK		SAK		SAK	SAK

8.0

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	Control	FR_UFR1	GH_ER2	CM_MCI
Hardness*	100	178	290	138
Alkalinity*	92	132	136	126

* mg/L as CaCO3

Analysts: SAK | MLF | AWD | SSK
Reviewed by:
Date reviewed: Jan. 14, 2020

Sample Description: Please refer to COC

Comments: Broodboard Used: 110419 A and 110619 A+B

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: KAMLOOPS
Work Order #: 192276

Start Date & Time: Nov 13/19 @ 1530h
Stop Date & Time: Nov 27/19 @ 1430h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration: CONTROL	Days													
	0	1		2		3		4		5		6		7
	~~FINAL~~ init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	7.2													
pH	7.9													
Cond. (µS/cm)	270													
Initials	SSK													

① Concentration: FR_UFR1	Days													
	0	1		2		3		4		5		6		7
	~~FINAL~~ init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	7.1													
pH	8.0													
Cond. (µS/cm)	340													
Initials	SSK													

② Concentration: GH_ER2	Days													
	0	1		2		3		4		5		6		7
	~~FINAL~~ init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	7.2													
pH	8.0													
Cond. (µS/cm)	304													
Initials	SSK													

③ Concentration: CM_MC1	Days													
	0	1		2		3		4		5		6		7
	~~FINAL~~ init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	7.1													
pH	8.0													
Cond. (µS/cm)	290													
Initials	SSK													

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	Control	FR-UFR1	GH-ER2	CM-MC1
Hardness*	100	178	290	138
Alkalinity*	92	132	136	126

* mg/L as CaCO3

Analysts: SAK/MLF/AWD/SSK
Reviewed by:
Date reviewed: Jan. 14, 2020

Sample Description: see Pg1

Comments: Broodboard Used: see Pg1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various
Work Order #: 192276

Start Date & Time: Nov. 13/19 @ 1530h
Stop Date & Time: Nov 21/19 @ 1430h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(4)

Concentration: LC-SLC	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	8.3	7.2	8.2	7.5	8.1	7.3	8.0	7.1	8.0	7.5	7.7	6.7	8.0	5.6	7.1
pH	7.9	8.2	8.3	8.2	8.2	8.0	8.1	8.1	8.1	8.2	8.3	8.0	8.0	7.8	8.0
Cond. (µS/cm)	390	388		382		377		375		387		388		377 →	
Initials	JSK	SAK								SAK		SAK		SAK	SAK

(5)

Concentration: FR_FRABCH	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	8.4	7.3	8.0	7.5	8.1	7.3	7.9	7.1	8.0	7.2	7.8	6.8	8.0	6.0	7.2
pH	8.0	8.1	8.2	8.2	8.2	8.0	8.2	8.1	8.2	8.2	8.2	8.1	8.1	8.0	8.1
Cond. (µS/cm)	1044	1037		1046		1036		1040		1026		1035		1036 →	
Initials	SAK	SAK								SAK		SAK		SAK	SAK

(6)

Concentration: FR_FRCP1	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	8.2	7.1	8.0	7.4	8.1	7.2	8.0	7.1	7.9	7.4	8.0	6.8	8.0	6.3	7.3
pH	8.1	8.2	8.2	8.2	8.1	8.2	8.1	8.1	8.1	8.2	8.2	8.1	8.1	8.0	8.1
Cond. (µS/cm)	1278	1272		1300		1289		1283		1279		1289		1281 →	
Initials	SAK	SAK								SAK		SAK		SAK	SAK

(7)

Concentration: GH_FR1	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	~~25.0~~	24.0
DO (mg/L)	8.3	7.2	8.1	7.5	8.2	7.2	8.0	7.1	7.9	7.5	7.7	6.9	8.0	5.8	7.4
pH	8.2	8.2	8.4	8.4	8.2	8.3	8.2	8.2	8.2	8.4	8.4	8.3	8.2	8.1	8.2
Cond. (µS/cm)	870	872		867		863		862		869		873		861 →	
Initials	SAK	SAK								SAK		SAK		SAK	SAK

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ LC-SLC	FR_FRABCH	FR_FRCP1	GH_FR1
Hardness*	200	670	720	490
Alkalinity*	130	216	200	210

* mg/L as CaCO3

Analysts: MLF/SAK/SSK/AWD
Reviewed by:
Date reviewed: Jan. 14, 2020

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various.
Work Order #: 192276

Start Date & Time: Nov 13/19 @ 1530h
Stop Date & Time: Nov 21/19 @ 1430h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(4)

Concentration LC-SLC	Days 0	1		2		3		4		5		6		7
	~~init.~~ FINAL SSK	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	7.3													
pH	7.9													
Cond. (µS/cm)	380													
Initials	SSK													

(5)

Concentration FR-FRABCH	Days 0	1		2		3		4		5		6		7
	~~init.~~ FINAL SSK	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	7.2													
pH	8.0													
Cond. (µS/cm)	1030													
Initials	SSK													

(6)

Concentration FR-FRCPI	Days 0	1		2		3		4		5		6		7
	~~init.~~ FINAL SSK	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	7.3													
pH	7.9													
Cond. (µS/cm)	1289													
Initials	SSK													

(7)

Concentration GH-FRI	Days 0	1		2		3		4		5		6		7
	~~init.~~ FINAL SSK	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	7.2													
pH	8.0													
Cond. (µS/cm)	870													
Initials	SSK													

SAK

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ LC-SLC SSK	FRABCH	FR-FRCPI	GH-FRI
Hardness*	200	670	720	490
Alkalinity*	130	216	200	210

* mg/L as CaCO3

Analysts: SAK/MLF/AWD/SSK

Reviewed by: [signature]

Date reviewed: Jan. 14, 2020

Sample Description: see Pg1

Comments: Broodboard Used: see Pg1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 192276

Start Date & Time: Nov. 13/19 @ 1530h
Stop Date & Time: Nov 21/19 @ 1430h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(8) GH_ERC

	Days															
Concentration	0	1		2		3		4		5		6		7		
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	8.4	7.3	8.1	7.5	FJ	7.2	L0	7.1	L0	7.5	7.4	6.9	8.0	5.7	7.5
pH	8.1	8.2	8.3	8.2	L2	L2	L2	8.2	L2	8.3	8.3	8.2	8.1	7.9	8.2
Cond. (µS/cm)	369	373		364		359		361		369		370		360 →	
Initials	SAK	SAK								SAK		SAK		SAK	SAK

(9) CM_MC2

	Days															
Concentration	0	1		2		3		4		5		6		7		
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	8.3	7.2	8.1	7.3	L1	7.3	L0	7.2	L0	7.3	7.7	7.1	8.0	6.9	7.3
pH	8.2	8.2	8.4	8.2	L3	L1	L2	8.1	L1	8.1	8.4	8.1	8.3	8.3	8.2
Cond. (µS/cm)	1039	1045		1032		999		1014		1038		1041		1004 →	
Initials	SAK	SAK								SAK		SAK		SAK	SAK

(10) EV_MC2

	Days															
Concentration	0	1		2		3		4		5		6		7		
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	8.4	7.1	8.1	7.1	L1	7.2	7.9	7.3	L1	7.3	7.4	7.2	8.0	6.7	7.8
pH	8.0	8.2	8.4	8.3	L3	L2	L2	8.1	L2	8.2	8.4	8.1	8.1	8.2	8.2
Cond. (µS/cm)	694	662		664		654		657		682		641		629 →	
Initials	SAK	SAK								SAK		SAK		SAK	SAK

(11) EV_HCl

	Days															
Concentration	0	1		2		3		4		5		6		7		
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	8.3	7.2	8.0	7.2	L2	7.3	L0	7.2	L0	7.3	7.4	7.1	8.0	6.5	7.8
pH	8.1	8.2	8.4	8.3	L3	L2	L2	8.2	L1	8.3	8.4	8.2	8.2	8.2	8.3
Cond. (µS/cm)	739	758		751		742		750		757		756		751 →	
Initials	SAK	SAK								SAK		SAK		SAK	SAK

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ GH_ERC	CM_MC2	EV_MC2	EV_HCl
Hardness*	180	550	340	400
Alkalinity*	164	226	204	212

* mg/L as CaCO3

Analysts: SAK / MLF / AWD / SSK
Reviewed by:
Date reviewed: Jan. 14, 2020

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 192276

Start Date & Time: Nov 13/19 @ 1530h
Stop Date & Time: Nov 21/19 @ 1430h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(8) GH-ERC

Concentration	0	1		2		3		4		5		6		7
~~FINAL~~ SSK	~~Init.~~	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	7.1													
pH	8.0													
Cond. (µS/cm)	705													
Initials	SSK													

(9) CM-MC2

Concentration	0	1		2		3		4		5		6		7
~~FINAL~~ SSK	~~Init.~~	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	7.1													
pH	8.1													
Cond. (µS/cm)	1009													
Initials	SSK													

(10) EV-MC2

Concentration	0	1		2		3		4		5		6		7
~~FINAL~~ SSK	~~Init.~~	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	7.0													
pH	8.1													
Cond. (µS/cm)	638													
Initials	SSK													

(11) EV-HC1

Concentration	0	1		2		3		4		5		6		7
~~FINAL~~ SSK	~~Init.~~	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	6.9													
pH	8.1													
Cond. (µS/cm)	749													
Initials	SSK													

SAK

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~SSK Control~~ GH-ERC	CM-MC2	EV-MC2	EV-HC1
Hardness*	180	550	340	400
Alkalinity*	164	226	204	212

* mg/L as CaCO3

Analysts: SAK/MLP/AWD/SSK
Reviewed by:
Date reviewed: Jan. 14, 2020

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 192276

Start Date & Time: Nov 13/19 @ 1530h
Stop Date & Time: Nov 21/19 @ 1430h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(12) LC-DCDS

Concentration	Days 0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	8.3	7.2	8.0	7.3	8.1	7.3	8.0	7.3	8.0	7.3	8.1	7.1	8.0	6.5	7.8
pH	8.1	8.1	8.3	8.2	8.3	8.1	8.1	8.1	8.1	8.2	8.4	8.2	8.1	8.1	8.2
Cond. (µS/cm)	765	768		761		756		751		764		765		754 →	
Initials	SAK	SAK								SAK		SAK			SAK

(13) LC-LC3

Concentration	Days 0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	8.4	7.3	8.1	7.2	8.2	7.9	8.1	7.3	8.1	7.4	7.9	7.1	8.0	6.8	7.7
pH	7.8	8.1	8.3	8.2	8.3	8.2	8.2	8.2	8.1	8.4	8.4	8.3	8.2	8.2	8.2
Cond. (µS/cm)	1209	1206		1201		1191		1185		1183		1183		1171 →	
Initials	SSK	SAK								SAK		SAK		SAK	SAK

(14) LC-LC5

Concentration	Days 0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	8.4	7.1	8.1	7.3	8.1	7.2	8.0	7.3	8.0	7.2	7.8	7.0	8.0	6.5	7.5
pH	8.2	8.3	8.4	8.3	8.3	8.3	8.1	8.2	8.2	8.4	8.5	8.3	8.3	8.2	8.3
Cond. (µS/cm)	764	784		780		768		773		780		781		766 →	
Initials	SAK	SAK								SAK		SAK		SAK	SAK

(15) LC-LCDSSLCC

Concentration	Days 0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~	NEW
Temperature (°C)	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0
DO (mg/L)	8.4	7.2	8.2	7.2	8.1	7.2	8.0	7.3	8.1	7.3	7.8	7.1	8.0	6.4	7.3
pH	8.1	8.2	8.4	8.3	8.3	8.2	8.2	8.2	8.2	8.4	8.5	8.3	8.3	8.2	8.2
Cond. (µS/cm)	922	922		926		902		910		917		918		901 →	
Initials	SSK	SAK								SAK		SAK		SAK	SAK

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ LC-DCDS	LC-LC3	LC-LC5	LC-LCDSSLCC
Hardness*	370	640	390	430
Alkalinity*	158	230	208	210

* mg/L as CaCO3

Analysts: SAK/MLF/AWD/SSK

Reviewed by:

Date reviewed: Jan. 14, 2020

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Various
Work Order #: 192276

Start Date & Time: NOV 13/19 @1530h
Stop Date & Time: NOV 21/19 @1430h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(12)

Concentration LC-DCDS	Days 0 FINAL ~~Init.~~ SSK	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	25.0													
DO (mg/L)	7.2													
pH	8.1													
Cond. (µS/cm)	756													
Initials	SSK													

(13)

Concentration LC-LC3	Days 0 FINAL ~~Init.~~ SSK	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	25.0													
DO (mg/L)	7.0													
pH	8.2													
Cond. (µS/cm)	1169													
Initials	SSK													

(14)

Concentration LC-LC5	Days 0 FINAL ~~Init.~~ SSK	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	25.0													
DO (mg/L)	7.1													
pH	8.1													
Cond. (µS/cm)	~~1169~~ 1775													
Initials	SSK													

SSK (15) (15)

Concentration LC-LCDSSLCC	Days 0 FINAL ~~Init.~~ SSK	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	25.0													
DO (mg/L)	6.9													
pH	8.1													
Cond. (µS/cm)	904													
Initials	SSK													

Thermometer: 4 DO meter/probe: 1/1 pH meter/probe: 1/1 Conductivity meter/probe: 1/1

	~~Control~~ SSK	LC-LC3	LC-LC5	LC-LCDSSLCC
Hardness*	370	640	390	430
Alkalinity*	158	230	208	210

* mg/L as CaCO3

Analysts: MLF/SAK/AWD/SSK
Reviewed by:
Date reviewed: Jan. 14, 2020

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: Vanilla.
Work Order #: 192276

Start Date & Time: Nov. 13/19 @ 1530h
Stop Date & Time: Nov 21/19 @ 1430h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration RG-MIDAG	Days 0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final	NEW
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	~~24.0~~ 25.0	25.0	25.0
DO (mg/L)	8.3	7.2	8.1	7.2	8.2	7.4	8.0	7.3	8.1	7.4	7.6	7.0	7.9	7.0	7.6
pH	8.1	8.3	8.4	8.3	8.3	8.2	8.2	8.3	8.2	8.4	8.4	8.7	~~8.5~~ 8.14	8.2	8.2
Cond. (µS/cm)	686	695		682		679		678		691		695		666	
Initials	SAK	SAK		2		0		0		SAK		SAK		SAK	SAK

(16)

Concentration	Days 0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days 0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

SSK

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	Control	RG-MIDAG		
Hardness*		320		
Alkalinity*		SK 200		SSK

* mg/L as CaCO3

Analysts: SAK/MLF/AWD/SSK
Reviewed by:
Date reviewed: Jan. 14, 2020

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various
Work Order #: 192276

Start Date & Time: Nov 13/19 @ 1530h
Stop Date & Time: Nov 21/19 @ 1430h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(16)

Concentration: RG-MIDAG	Days													
	0	1		2		3		4		5		6		7
	~~Initial~~ FINAL	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0													
DO (mg/L)	7.0													
pH	8.02													
Cond. (µS/cm)	685													
Initials	SSK													

SSK

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

SSK

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	~~Control~~ JW	RG-MIDAG		
Hardness*		320		
Alkalinity*		200		

* mg/L as CaCO3

Analysts: SSK/MLF/AWD/SAF

Reviewed by: [signature]

Date reviewed: Jan. 14, 2020

Sample Description: see Pg 1

Comments: Broodboard Used: see Pg 1

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TECK Coal
Sample ID: Various
Work Order #: 192276 b

Start Date & Time: Nov. 21/19 @ 1130h
Stop Date & Time: Nov. 29/19 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

(% V/V)

Concentration CONTROL	Days 0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old SAK	New
Temperature (°C)	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.4	8.0	7.4	8.0	7.2	8.0	7.1	8.0	7.0	8.1	7.0	8.0	7.0	8.0
pH	8.1	7.8	8.2	7.7	8.2	7.8	8.1	7.8	8.0	~~8~~ SAK 7.8	8.2	7.7	8.0	7.7	8.1
Cond. (µS/cm)	216	216		214		215		216		216		215		—	217
Initials	MF	SSK		ø		ø		SSK		SSK		SAK		SAK	SAK

FR_UFRI Concentration Week 1	Days 0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old SAK	New
Temperature (°C)	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	25.0	25.0	24.0	24.0	25.0	24.0	25.0
DO (mg/L)	7.9	7.5	7.6	7.4	8.2	7.2	8.1	7.0	8.1	6.8	7.9	6.8	7.6	6.9	7.7
pH	8.0	8.0	7.9	8.0	8.1	8.0	8.1	7.9	8.0	7.9	8.0	7.9	8.1	7.9	8.0
Cond. (µS/cm)	357	355		357		358		363		358		359		—	363
Initials	SAK	SAK		ø		ø		SAK		SAK		SAK		SAK	SAK

FR_UFRI Concentration Week 2	Days 0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	~~final~~ old SAK	New
Temperature (°C)	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	25.0	25.0	24.0	24.0	25.0	24.0	24.0
DO (mg/L)	7.9	7.5	7.8	7.3	8.2	7.2	8.2	7.0	8.0	6.8	7.9	6.7	7.6	7.0	8.0
pH	8.1	8.0	8.0	8.1	8.1	8.0	8.2	7.9	8.1	7.9	8.0	7.9	8.2	8.0	8.1
Cond. (µS/cm)	352	349		359		360		356		350		351 ~~354~~ SSK		—	351
Initials	SAK	ø		~~SAK~~ SAK ø		ø		SAK		SAK		SAK		SAK	SAK

Concentration	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

SAK

Thermometer: 4 **DO meter/probe:** 1 / 1 **pH meter/probe:** 1 / 1 **Conductivity meter/probe:** 1 / 1

	Control	FR_UFRI(W1)	~~FFR~~ SAK FR_UFRI(W2)	
Hardness*	100	178	170	
Alkalinity*	95	132	144	

SAK

* mg/L as CaCO3

Analysts: SAK / MLF / AWD / SSK

Reviewed by: [signature]

Date reviewed: Feb. 11/20

Sample Description: Clear, colourless, odourless, no particulates

Comments: **Broodboard Used:** BB011119 B (#76 - 79)

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TECK coal
Sample ID: Various
Work Order #: 192276 b

Start Date & Time: Nov. 21/19 @ 1130h
Stop Date & Time: Nov. 29/19 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration CONTROL SAM	Days 0 FINAL init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	25.0													
DO (mg/L)	7.00													
pH	7.7													
Cond. (µS/cm)	220													
Initials	SSK													

FR_UFR1 Concentration Week 1 SAM	Days 0 FINAL init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	25.0													
DO (mg/L)	6.9													
pH	7.8													
Cond. (µS/cm)	370													
Initials	SSK													

FR_UFR1 Concentration Week 2 SAM	Days 0 FINAL init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	25.0													
DO (mg/L)	6.9													
pH	7.8													
Cond. (µS/cm)	365													
Initials	SSK													

Concentration	Days 0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: 4 **DO meter/probe:** 1 / 1 **pH meter/probe:** 1 / 1 **Conductivity meter/probe:** 1 / 1

	Control	FR_UFR1 (W1)	FR_UFR1 (W2)	
Hardness*	100	178	170	
Alkalinity*	95	132	144	

SAM

* mg/L as CaCO3

Analysts: SAK / MLF / AWD / SSK
Reviewed by: [signature]
Date reviewed: Feb-11/20

Sample Description: See Pg 1

Comments: **Broodboard Used:** See Pg 1

Client: Teck

W.O.#: 192277

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Control	Nov. 14/19	Nov. 15/19	50	3.0	3.1	58	50 ①	6.8	136	SY
FR_UFR1			50	6.7	6.8	132	50 ①	8.9	178	
GH_ER2			50	6.9	7.0	136	10 ②	2.7	~~270~~ 540	
CM_MC1			50	6.4	6.5	126	50 ①	6.9	~~138~~ 276	
LC_SLC			50	6.6	6.7	130	10 ②	2.0	200	
FR_FRCP1			50	10.1	10.2	200	10 ②	7.2	720	
FR_FRABCH			50	10.9	11.0	216	10 ②	6.7	670	
GH_FR1			50	10.6	10.7	210	10 ②	4.9	490	
GH_ERC			50	8.3	8.4	164	10 ②	1.8	180	
CM_MC2			50	11.4	11.5	226	10 ②	5.5	550	
RG_MIDAG		Nov. 19/19	50	10.1	10.2	200	10 ②	~~4.2~~ ② SY	320	SY
EV_MC2			50	10.3	10.4	204	10 ②	~~4.4~~ ① SY	340	
EV_HC1			50	10.7	10.8	212	10 ②	4.0	400	
LC_LCD55L			50	10.6	10.7	210	10 ②	4.3	430	
LC_LC3			50	11.6	11.7	230	10 ②	6.4	640	
LC_LC5			50	10.5	10.6	208	10 ②	3.9	390	
LC_DCD5			50	8.0	8.1	158	10 ②	3.7	370	
EDTA Control			50	3.2	3.3	62	10 ②	1.4	140	
FR-FRCP1 +EDTA			50	11.2	11.3	222	10 ②	6.8	680	
CM_MC2 + EDTA			50	10.7	10.8	212	10 ②	5.4	~~540~~	
RG_MIDAG +EDTA			50	9.5	9.6	188	10 ②	3.3	320	

Day 0 / WK 1

② 3.2
① 3.4

Notes: ~~Notes:~~

Notes: ① diluted to 100mL w/ 50mL DI water, ② diluted to 100mL w/ 90mL DI water

Reviewed by: KM

Date Reviewed: Jan. 14, 2020

Client: TECK COAL

W.O.#: 192776 a+b.

Hardness and Alkalinity Datasheet

		Alkalinity							Hardness			
	Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
(W1)	FR_UFR1	NOV 14/19	NOV 15/19	50	6.7	6.8	132		50①	8.9	178	SY
(W2)	FR-UFR1	NOV 20/19	NOV 21/19	50	7.3	7.4	144		10②	1.7	170	SY
	20% Pewter.	NOV 20/19	NOV 20/19	100	9.7	9.9	95		50	5.0	100	SSK

Notes: ① diluted ~~100~~ to 100 mL w/ 50 mL DI water ② Diluted ~~1000~~ mL w/ 90 mL DI water.

Reviewed by: JCL Date Reviewed: Feb. 5/20

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: various
Work Order: 19-2276

(% v/v)

Start Date & Time: NOV 13/19 @ 1530h
Stop Date & Time: NOV 21/19 @ 1430h
Set up by: SAK/MLF/SSK

Concentration: CONTROL

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											MLF
3											A
4	3	3	2	3	3	3	3	2	2		SSK
5	8	6	✓	5	6	10	6	9	5	4	MLF
6	✓	✓	6	11	7	8	12	✓	8	7	SSK
7	12	10	15	2	5	12	✓	13	✓	14	SAK
8	5	7	9	9	11	12	✓	9	8	✓	SSK
Total	23	19	23	19	16	23	21	24	15	25	SSK

① ✓

Concentration: FR-VFR1

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											MLF
3										3	A
4	4	2	3	2	3	✓	4	3	2	✓	SSK
5	8	4	6	5	6	✓	✓	✓	X	2	MLF
6	10	10	14	14	14	13	✓	✓	✓	✓	SAK
7	✓	✓	✓	X	✓	X	X	X	✓	13	SAK
8	9	11	9	✓	11	✓	✓	✓	✓	✓	SSK
Total	22	16	23	21X	23	18X	14X	3X	2X	17	SSK

Concentration: GH-EP2

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											MLF
3											A
4	3	2	2	✓	4	4	4	3	3	3	SSK
5	8	7	7	6	6	8	8	5	7	8	MLF
6	11	10	11	11	10	14	12	✓	11	14	SAK
7	✓	✓	8	✓	✓	✓	✓	✓	✓	✓	SAK
8	10	9	✓	9	✓	11	7	8	7	10	SSK
Total	22	19	20	19	20	26	24	18	21	25	SSK

① SAK

Concentration: CM-MC1

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											MLF
3											A
4	3	3	3	2	3	3	4	3	3	3	SSK
5	5	8	5	5	6	8	9	6	4	✓	MLF
6	✓	10	✓	✓	4	11	10	12	12	8	SAK
7	12	✓	3	12	✓	✓	✓	✓	✓	✓	SAK
8	11	10	11	14	11	12	10	14	11	11	SSK
Total	20	21	11	20	13	22	23	21	19	22	SSK

11 JW

Concentration: LC-SLC

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											MLF
3											A
4	3	3	3	2	4	3	2	3	2	3	SSK
5	5	✓	4	7	5	✓	✓	✓	✓	4	MLF
6	12	13	13	13	14	12	2	9	13	9	SAK
7			13	✓	✓	9	✓	✓	✓	✓	SAK
8	9	9	9	10	11	✓	8	11	11	10	SSK
Total	20	16	20	22	23	24	4	12	15	16	SSK

Concentration: FR-FRABCH

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											MLF
3	2					3					A
4		2	3	2	2		3	4	3	3	SSK
5	✓	✓	✓	3	6	6	6	6	7	5	MLF
6	15	2	9	8	11	11	10	11	10	9	SAK
7	X	7									SAK
8		10	11	10	9	9	10	10	9	10	SSK
Total	18X	11	12	13	19	20	19	21	20	17	SSK

Concentration: FR-FRLP1

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											MLF
3	3										A
4		3	3	2	3	3	3	4	3	4	SSK
5	8	7	6	✓	6	5	7	6	6	8	MLF
6	11	11	9	7	2	10	11	8	8	7	SAK
7					10	10					SAK
8	7	9	7	9	8	10	10	8	8	9	SSK
Total	22	21	18	9	4	18X	21	18	18	19	SSK

① dead on SSK mortality on day 7 for FR-FRLP1 (replicate F).

Concentration: GH-FR1

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											MLF
3									2		A
4	3	4	3	4	3	4	2	3	2	3	SSK
5	8	4	7	5	6	9	3	6	6	5	MLF
6	13	2	12	11	15	12	10	10	14	11	SAK
7	10	✓	✓	✓	✓	✓	✓	✓	✓	✓	SAK
8	✓	11	9	11	10	9	7	9	9	9	SSK
Total	24	10	22	20	24	25	15	19	22	19	SSK

Concentration: GH-ERC

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											MLF
3											A
4	3	4	3	3	3	2	2	3	5	3	SSK
5	6	7	6	✓	8	5	6	✓	✓	6	MLF
6	10	11	9	10	12	9	8	10	13	14	SAK
7									X	✓	SAK
8	9	5	7	9	10	9	9	8	✓	10	SSK
Total	19	22	18	13	23	16	16	13	18X	23	SSK

Notes: X = mortality.

Comments: 1. Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

2. Ephippia present in Controls (Y), (N) ?

Reviewed by: _____

Date reviewed: Jan. 14, 2020

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: various
Work Order: 19

(%v/v)

Start Date & Time: NOV 13/19 @ 1530h
Stop Date & Time: NOV 21/19 @ 1430h
Set up by: SAK / MLF / SSF

Concentration: CM-MC2

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	✓	✓	✓	✓	✓	3	3	✓	✓	✓	A
4	3	3	3	4	3	✓	✓	4	3	4	SSK
5	9	6	6	4	7	5	✓	8X	8	8	MLF
6	9	8	10	9	11	10	8	1	10	10	SAK
7	✓	✓	✓	✓	9	✓	✓	1	✓	✓	SAK
8	7	8	✓	10	✓	9	5	1	4	7	SSK
Total	21	17	19	17	21	18	11	12X	21	22	SSK

Concentration: EV-MC2

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	✓	✓	✓	3	✓	✓	✓	✓	✓	3	A
4	3	4	3	✓	5	4	6	7	7	✓	SSK
5	6	8	6	7	7	6	6	7	7	7	MLF
6	11	9	10	14	12	12	10	11	12	11	SAK
7	11	X	✓	✓	✓	✓	✓	✓	✓	X	SAK
8	9	↓	9	9	10	9	8	10	5	↓	SSK
Total	20	21X	19	24	24	22	19	20	22	21X	SSK

Concentration: EV-HC1

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	✓	✓	✓	3	✓	4	✓	✓	✓	✓	A
4	4	3	3	✓	4	✓	3	4	3	4	SSK
5	6	8	6	7	7	6	4	6	9	7	MLF
6	9	11	13	15	13	12	11	12	12	10	SAK
7	✓	✓	✓	✓	✓	9	✓	✓	✓	✓	SAK
8	10	11	11	↓	7	✓	10	11	12	8	SSK
Total	19	22	22	25	24	22	18	22	24	21	SSK

Concentration: LC-DCDS

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	✓	2	3	✓	✓	2	4	✓	3	2	A
4	4	✓	✓	3	4	✓	✓	2	✓	✓	SSK
5	8	✓	7	7	✓	4	5	7	5	7	MLF
6	11	13	16	10	8	14	14	11	12	13	SAK
7	✓	8	11	✓	✓	✓	✓	✓	X	✓	SAK
8	✓	9	✓	5	6	✓	✓	✓	↓X	5	SSK
Total	23	23	26	20	12	20	23	20	20	22	SSK

Concentration: LC-LC3

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	✓	✓	✓	✓	2	✓	✓	✓	✓	✓	A
4	2	2	2	4	✓	3	3	4	4	3	SSK
5	3	9	6	7	6	6	5	X	5	4	MLF
6	8	6	10	5	11	8	10	1	10	10	SAK
7	✓	✓	✓	✓	✓	✓	✓	1	✓	9	SAK
8	9	8	7	9	11	6	7	1	11	✓	SSK
Total	13	17	18	16	19	17	18	4X	19	17	SSK

Concentration: LC-LC5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	✓	3	3	4	3	3	3	3	3	3	SSK
5	6	7	6	✓	9	4	7	4	8	7	MLF
6	11	10	12	14	14	14	14	13	14	12	SAK
7	8	11	✓	✓	11	✓	✓	✓	✓	✓	SAK
8	✓	✓	10	11	1	11	12	14	7	9	SSK
Total	19	20	21	18	26	21	24	20	25	22	SSK

Concentration: LC-LCDSSLCC

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	2	✓	✓	✓	✓	4	3	✓	2	✓	A
4	✓	4	3	3	4	✓	✓	3	✓	3	SSK
5	8	✓	8	7	4	7	4	3	7	5	MLF
6	4	13	7	12	11	11	14	6	12	8	SAK
7	✓	✓	✓	✓	✓	✓	11	✓	✓	✓	SAK
8	✓	11	10	9	10	11	✓	10	✓	9	SSK
Total	14	17	18	22	19	22	21	12	21	16	SSK

Concentration: RG-MIDAG

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	✓	✓	✓	✓	✓	3	✓	✓	✓	✓	A
4	3	3	4	4	2	✓	3	2	4	3	SSK
5	7	5	7	8	7	8	6	6	7	7	MLF
6	11	6	13	12	12	13	12	11	9	9	SAK
7	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	SAK
8	10	10	✓	10	11	✓	✓	✓	✓	12	SSK
Total	21	14	24	24	21	24	21	19	20	29	SSK

19 JW

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Comments: 1. Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

2. Ephippia present in Controls (Y), (N)?

Reviewed by: KW

Date reviewed: Jan. 14, 2020

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: TECK
Sample ID: various
Work Order: 192766

Start Date & Time: Nov 21/19 @ 1130h
Stop Date & Time: Nov 29/19 @ 1200h
Set up by: SAF/SSK/MLF

(%v/v)

Concentration: CONTROL

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	N
2	/	/	/	/	/	/	/	/	/	/	N
3	/	/	/	/	/	/	/	/	/	/	SSK
4	2	3	3	3	3	2	3	3	3	2	SSK
5	7	5	/	6	7	4	3	/	6	6	SAK
6	9	/	8	/	/	9	/	10	/	/	SAK
7	12	7	12	7	15	10	12	10	9	13	SAK
8	✓	10	9	9	10	✓	10	9	11	12	SSK
Total	18	15	23	16	25	15	18	23	19	21	SSK

Concentration: 1.56 FR-UFRI (W1)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	N
2	/	/	✓	✓	/	/	/	/	/	/	N
3	/	3	/	/	/	/	/	/	/	/	SSK
4	3	✓	4	3	3	4	3	2	3	3	SSK
5	7	8	7	6	4	8	7	8	8	8	SAK
6	11	8	10	7	9	/	7	/	/	9	SAK
7	/	/	/	/	9	9	/	9	7	/	SAK
8	12	13	12	11	✓	10	11	11	12	13	SSK
Total	21	19	21	16	16	21	17	19	19	20	SSK

Concentration: 3.12 FR-UFRI (W2)

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	N
2	/	/	/	/	/	/	/	/	/	/	N
3	/	/	/	/	/	/	/	/	/	/	SSK
4	3	4	2	3	3	2	3	3	2	2	SSK
5	5	/	6	7	8	8	8	8	6	5	SAK
6	8	8	/	9	/	/	12	/	/	/	SAK
7	/	9	9	/	2	6	/	9	10	15	SAK
8	12	10	9	9	7	9	9	10	9	10	SSK
Total	16	21	17	19	13	16	23	20	18	22	SSK

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	
2	/	/	/	/	/	/	/	/	/	/	
3											
4											
5											
6											
7											
8											
Total											

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	
2	/	/	/	/	/	/	/	/	/	/	
3											
4											
5											
6											
7											
8											
Total											

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	
2	/	/	/	/	/	/	/	/	/	/	
3											
4											
5											
6											
7											
8											
Total											

SSK

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	
2	/	/	/	/	/	/	/	/	/	/	
3											
4											
5											
6											
7											
8											
Total											

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	
2	/	/	/	/	/	/	/	/	/	/	
3											
4											
5											
6											
7											
8											
Total											

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

SSK

Notes: X = mortality.

Comments: 1. Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

2. Ephippia present in Controls (Y), (N) ?

Reviewed by: JGM

Date reviewed: Feb-5/20

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Batch ID:	13-2984-1080	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	13 Nov-19 15:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	21 Nov-19 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	05-7960-3496	13 Nov-19	13 Nov-19	16h	Teck Coal	Teck Coal Q4
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	30h (0 °C)		
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	29h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	29h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	28h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	25h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	26h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	29h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	26h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	30h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	29h (1.8 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	28h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	20% Perrier Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	FR_FRABCH failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	Lab Control failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	LC_LCDSSLCC failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	LC_DCDS failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	FR_UFR1 failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	EV_HC1 failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	GH_ER2 failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	FR_FRCP1 failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	GH_FR1 failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	CM_MC1 failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	CM_MC2 failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	GH_ERC failed 7d survival rate	1

Analyst: JW QA: Jm 30/20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	LC_LC5 failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	LC_LC3 failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	RG_MIDAG failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	LC_SLC failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.0163	EV_MC2 failed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_UFR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_UFR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_UFR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_ER2 passed 7d survival rate	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_UFR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_UFR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_UFR1 passed 7d survival rate	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_UFR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.2368	FR_UFR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_UFR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LC3 passed 7d survival rate	1

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_UFR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_UFR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	0.5000	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_UFR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRCP1 passed 7d survival rate	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_UFR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	Lab Control passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_FR1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ERC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LCDSSLCC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	RG_MIDAG passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRCP1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC5 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_DCDS passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_MC2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_FRABCH passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	GH_ER2 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_LC3 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	EV_HC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	LC_SLC passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	CM_MC1 passed 7d survival rate	1
12-0400-7807	7d Survival Rate	Wilcoxon Rank Sum Two-Sample Test	1.0000	FR_UFR1 passed 7d survival rate	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	LC_LCDSSLCC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	LC_SLC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	CM_MC2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	LC_DCDS failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	FR_FRABCH failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	CM_MC1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	LC_LC5 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	EV_HC1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	FR_FRCP1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	LC_LC3 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	GH_ER2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	EV_MC2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	Lab Control failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	FR_UFR1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	GH_FR1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	GH_ERC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0248	RG_MIDAG failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	FR_FRCP1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	LC_LC5 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	GH_ERC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	CM_MC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	FR_FRABCH passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	EV_HC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	RG_MIDAG passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	LC_DCDS passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	LC_LCDSSLCC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	EV_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	LC_SLC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	CM_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	Lab Control passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	GH_ER2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	LC_LC3 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	FR_UFR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4189	GH_FR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	LC_LC5 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	GH_ERC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	LC_DCDS passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	CM_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	LC_LC3 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	CM_MC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	FR_UFR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	EV_HC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	GH_ER2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	RG_MIDAG passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	Lab Control passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	LC_SLC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	LC_LCDSSLCC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	FR_FRCP1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	FR_FRABCH passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	GH_FR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0782	EV_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	GH_ERC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	Lab Control failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	LC_SLC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	LC_DCDS failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	EV_HC1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	FR_FRCP1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	RG_MIDAG failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	FR_FRABCH failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	EV_MC2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	FR_UFR1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	CM_MC2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	LC_LC5 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	CM_MC1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	GH_ER2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	LC_LC3 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	GH_FR1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0122	LC_LCDSSLCC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	GH_ER2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	LC_LCDSSLCC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	LC_SLC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	EV_HC1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	FR_UFR1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	Lab Control failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	RG_MIDAG failed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	GH_FR1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	CM_MC2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	GH_ERC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	EV_MC2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	LC_LC3 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	FR_FRCP1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	FR_FRABCH failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	LC_DCDS failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	LC_LC5 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0327	CM_MC1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	GH_FR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	LC_DCDS passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	FR_UFR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	LC_LCDSSLCC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	EV_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	RG_MIDAG passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	LC_SLC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	Lab Control passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	FR_FRCP1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	CM_MC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	GH_ER2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	CM_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	LC_LC3 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	LC_LC5 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	EV_HC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	GH_ERC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.3329	FR_FRABCH passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	LC_LCDSSLCC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	LC_LC3 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	CM_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	RG_MIDAG passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	GH_ERC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	Lab Control passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	GH_FR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	CM_MC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	FR_FRABCH passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	LC_DCDS passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	FR_UFR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	EV_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	EV_HC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	FR_FRCP1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	LC_SLC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	LC_LC5 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0549	GH_ER2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	EV_HC1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	LC_LC5 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	LC_LCDSSLCC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	LC_LC3 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	EV_MC2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	RG_MIDAG failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	LC_DCDS failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	GH_FR1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	GH_ER2 failed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	FR_UFR1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	CM_MC1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	LC_SLC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	Lab Control failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	CM_MC2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	FR_FRABCH failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	FR_FRCP1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0457	GH_ERC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	FR_UFR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	FR_FRCP1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	LC_SLC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	LC_LC5 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	LC_LCDSSLCC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	FR_FRABCH passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	EV_HC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	LC_DCDS passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	LC_LC3 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	CM_MC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	GH_ER2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	GH_ERC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	GH_FR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	CM_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	RG_MIDAG passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	Lab Control passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.6253	EV_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	LC_SLC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	GH_ERC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	LC_LC3 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	GH_FR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	EV_HC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	CM_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	FR_FRABCH passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	GH_ER2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	LC_LC5 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	FR_UFR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	LC_LCDSSLCC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	Lab Control passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	CM_MC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	EV_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	FR_FRCP1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	LC_DCDS passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7974	RG_MIDAG passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	LC_SLC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	CM_MC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	GH_ERC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	RG_MIDAG passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	LC_LC3 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	GH_FR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	GH_ER2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	CM_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	FR_UFR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	FR_FRCP1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	EV_MC2 passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	FR_FRABCH passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	LC_DCDS passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	LC_LCDSSLCC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	Lab Control passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	LC_LC5 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.5247	EV_HC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	LC_LC3 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	GH_ER2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	CM_MC1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	FR_UFR1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	LC_LCDSSLCC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	CM_MC2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	GH_FR1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	LC_LC5 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	FR_FRCP1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	Lab Control failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	EV_HC1 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	FR_FRABCH failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	RG_MIDAG failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	GH_ERC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	LC_SLC failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	LC_DCDS failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0064	EV_MC2 failed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	GH_ER2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	FR_FRABCH passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	EV_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	LC_LC5 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	FR_UFR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	EV_HC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	FR_FRCP1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	LC_DCDS passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	GH_ERC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	LC_LC3 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	RG_MIDAG passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	GH_FR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	LC_SLC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	LC_LCDSSLCC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	CM_MC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	CM_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.7168	Lab Control passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	FR_FRABCH passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	RG_MIDAG passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	FR_FRCP1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	LC_LCDSSLCC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	GH_ER2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	CM_MC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	GH_FR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	LC_DCDS passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	LC_SLC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	LC_LC3 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	Lab Control passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	FR_UFR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	GH_ERC passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	CM_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	EV_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	LC_LC5 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.0547	EV_HC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	GH_ERC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	GH_FR1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	Lab Control passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	CM_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	LC_LCDSSLCC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	RG_MIDAG passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	FR_FRCP1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	LC_LC5 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	CM_MC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	EV_MC2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	FR_FRABCH passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	GH_ER2 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	LC_LC3 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	EV_HC1 passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	LC_SLC passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	LC_DCDS passed reproduction	1
19-3428-5874	Reproduction	Unequal Variance t Two-Sample Test	0.4729	FR_UFR1 passed reproduction	1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

7d Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_UFR1		10	0.5000	0.1230	0.8770	0.0000	1.0000	0.1667	0.5270	105.41%	50.00%
GH_ER2		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
CM_MC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_SLC	XC	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_FRABCH		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
FR_FRCP1		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
GH_FR1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
GH_ERC		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
CM_MC2		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
EV_MC2		10	0.8000	0.4984	1.0000	0.0000	1.0000	0.1333	0.4216	52.70%	20.00%
EV_HC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_DCDS		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
LC_LC3		10	0.9000	0.6738	1.0000	0.0000	1.0000	0.1000	0.3162	35.14%	10.00%
LC_LC5		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
LC_LCDSSLCC		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
RG_MIDAG		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	N	10	20.8	18.35	23.25	15	25	1.083	3.425	16.47%	0.00%
FR_UFR1		10	14.4	8.309	20.49	2	23	2.692	8.514	59.13%	30.77%
GH_ER2		10	20.4	16.81	23.99	8	26	1.586	5.016	24.59%	1.92%
CM_MC1		10	18.1	14.81	21.39	11	23	1.456	4.606	25.45%	12.98%
LC_SLC	XC	10	17.2	12.88	21.52	4	24	1.908	6.033	35.08%	17.31%
FR_FRABCH		10	16.9	14.3	19.5	11	21	1.149	3.635	21.51%	18.75%
FR_FRCP1		10	17.4	14.36	20.44	9	22	1.343	4.248	24.41%	16.35%
GH_FR1		10	20	16.7	23.3	10	25	1.461	4.619	23.09%	3.85%
GH_ERC		10	18.1	15.44	20.76	13	23	1.178	3.725	20.58%	12.98%
CM_MC2		10	17.9	15.17	20.63	11	22	1.206	3.814	21.31%	13.94%
EV_MC2		10	21.2	19.9	22.5	19	24	0.5735	1.814	8.55%	-1.92%
EV_HC1		10	21.9	20.34	23.46	18	25	0.6904	2.183	9.97%	-5.29%
LC_DCDS		10	20.9	18.26	23.54	12	26	1.169	3.695	17.68%	-0.48%
LC_LC3		10	15.8	12.59	19.01	4	19	1.42	4.492	28.43%	24.04%
LC_LC5		10	21.6	19.72	23.48	18	26	0.8327	2.633	12.19%	-3.85%
LC_LCDSSLCC		10	18.2	15.73	20.67	12	22	1.093	3.458	19.00%	12.50%
RG_MIDAG		10	20.7	18.51	22.89	14	24	0.9667	3.057	14.77%	0.48%

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	23	19	23	19	16	23	21	24	15	25
FR_UFR1		22	16	23	21	23	13	4	3	2	17
GH_ER2		22	19	20	19	20	26	24	8	21	25
CM_MC1		20	21	11	20	13	22	23	21	19	11
LC_SLC	XC	20	16	20	22	23	24	4	12	15	16
FR_FRABCH		17	11	12	13	19	20	19	21	20	17
FR_FRCP1		22	21	18	9	11	18	21	18	17	19
GH_FR1		24	10	22	20	24	25	15	19	22	19
GH_ERC		19	22	18	13	23	16	16	13	18	23
CM_MC2		21	17	19	17	21	18	11	12	21	22
EV_MC2		20	21	19	24	24	22	19	20	22	21
EV_HC1		19	22	22	25	24	22	18	22	24	21
LC_DCDS		23	23	26	20	12	20	23	20	20	22
LC_LC3		13	17	18	16	19	17	18	4	19	17
LC_LC5		19	20	21	18	26	21	24	20	25	22
LC_LCDSSLCC		14	17	18	22	19	22	21	12	21	16
RG_MIDAG		21	14	24	24	21	24	21	19	20	19

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1		1/1	1/1	1/1	0/1	1/1	0/1	0/1	0/1	0/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_SLC	XC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	12-0400-7807	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	24 Jan-20 10:26	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Batch ID:	13-2984-1080	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	13 Nov-19 15:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	21 Nov-19 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	05-7960-3496	13 Nov-19	13 Nov-19	16h	Teck Coal	Teck Coal Q4
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	30h (0 °C)		
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	29h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	28h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	25h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	26h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	29h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	26h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	30h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	29h (1.8 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	28h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	20% Perrier Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	

Analyst: JW QA: Jan 29/20

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 12-0400-7807 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 24 Jan-20 10:26 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	FR_UFR1 failed 7d survival rate	34.51%
		GH_ER2 passed 7d survival rate	34.51%
		LC_SLC passed 7d survival rate	34.51%
		FR_FRABCH passed 7d survival rate	34.51%
		FR_FRCP1 passed 7d survival rate	34.51%
		GH_FR1 passed 7d survival rate	34.51%
		GH_ERC passed 7d survival rate	34.51%
		CM_MC2 passed 7d survival rate	34.51%
		EV_MC2 passed 7d survival rate	34.51%
		EV_HC1 passed 7d survival rate	34.51%
		LC_DCDS passed 7d survival rate	34.51%
		LC_LC3 passed 7d survival rate	34.51%
		LC_LC5 passed 7d survival rate	34.51%
		LC_LCDSSLCC passed 7d survival rate	34.51%
		RG_MIDAG passed 7d survival rate	34.51%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1*	80	n/a	1	18	Exact	0.0163	Significant Effect
		GH_ER2	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_SLC	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		FR_FRCP1	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		GH_FR1	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		GH_ERC	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		CM_MC2	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		EV_MC2	95	n/a	1	18	Exact	0.2368	Non-Significant Effect
		EV_HC1	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_DCDS	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		LC_LC3	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		LC_LC5	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	105	n/a	1	18	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.669968	0.0446645	15	2.469	0.0030	Significant Effect
Error	2.60448	0.0180867	144			
Total	3.27445		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	7.647	2.165	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	3.351	2.165	7.7E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6057	0.9774	5.3E-19	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 12-0400-7807 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 24 Jan-20 10:26 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
FR_UFR1		10	0.5000	0.1230	0.8770	0.5000	0.0000	1.0000	0.1667	105.41%	50.00%
GH_ER2		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
LC_SLC		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
FR_FRABCH		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	10.00%
FR_FRCP1		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	10.00%
GH_FR1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
GH_ERC		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	10.00%
CM_MC2		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	10.00%
EV_MC2		10	0.8000	0.4984	1.0000	1.0000	0.0000	1.0000	0.1333	52.70%	20.00%
EV_HC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
LC_DCDS		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	10.00%
LC_LC3		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	10.00%
LC_LC5		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
LC_LCDSSLCC		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%
RG_MIDAG		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	0.00%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	N	10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	0.00%
FR_UFR1		10	0.7854	0.588	0.9828	0.7854	0.5236	1.047	0.08727	35.14%	25.00%
GH_ER2		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	0.00%
LC_SLC		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	0.00%
FR_FRABCH		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	5.00%
FR_FRCP1		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	5.00%
GH_FR1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	0.00%
GH_ERC		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	5.00%
CM_MC2		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	5.00%
EV_MC2		10	0.9425	0.7845	1.1	1.047	0.5236	1.047	0.06981	23.42%	10.00%
EV_HC1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	0.00%
LC_DCDS		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	5.00%
LC_LC3		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	5.00%
LC_LC5		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	0.00%
LC_LCDSSLCC		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	0.00%
RG_MIDAG		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	0.00%

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 12-0400-7807 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 24 Jan-20 10:26 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_UFR1		1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
FR_UFR1		1.047	1.047	1.047	0.5236	1.047	0.5236	0.5236	0.5236	0.5236	1.047
GH_ER2		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_SLC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
FR_FRABCH		0.5236	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
FR_FRCP1		1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047	1.047	1.047
GH_FR1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
GH_ERC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047
CM_MC2		1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047
EV_MC2		1.047	0.5236	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236
EV_HC1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_DCDS		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047
LC_LC3		1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047
LC_LC5		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_LCDSSLCC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
RG_MIDAG		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047

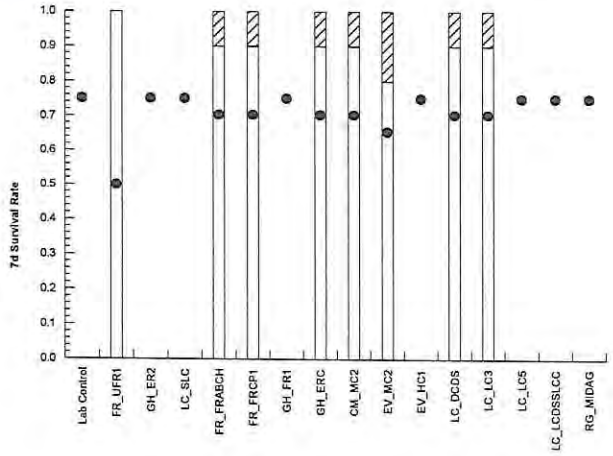
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

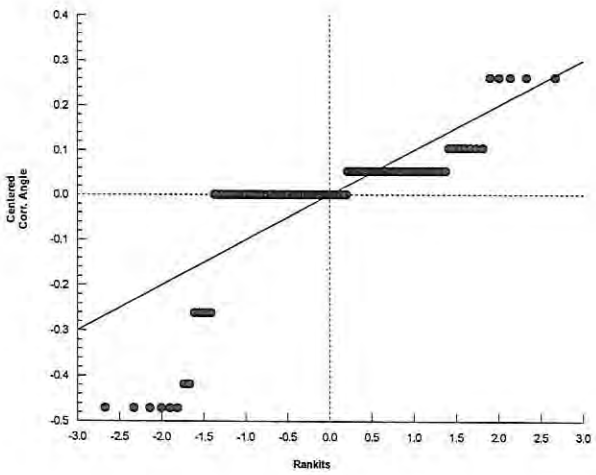
Analysis ID:	12-0400-7807	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	24 Jan-20 10:26	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1		1/1	1/1	1/1	0/1	1/1	0/1	0/1	0/1	0/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	19-3428-5874	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	22 Jan-20 14:58	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	13-2984-1080	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	13 Nov-19 15:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	21 Nov-19 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	05-7960-3496	13 Nov-19	13 Nov-19	16h	Teck Coal	Teck Coal Q4
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	30h (0 °C)		
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	29h (0 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	29h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	28h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	25h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	26h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	29h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	26h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	30h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	29h (1.8 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	28h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	20% Perrier Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 19-3428-5874 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 22 Jan-20 14:58 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 failed reproduction	12.14%
		GH_ER2 passed reproduction	12.14%
		CM_MC1 passed reproduction	12.14%
		FR_FRABCH failed reproduction	12.14%
		FR_FRCP1 failed reproduction	12.14%
		GH_FR1 passed reproduction	12.14%
		GH_ERC passed reproduction	12.14%
		CM_MC2 failed reproduction	12.14%
		EV_MC2 passed reproduction	12.14%
		EV_HC1 passed reproduction	12.14%
		LC_DCDS passed reproduction	12.14%
		LC_LC3 failed reproduction	12.14%
		LC_LC5 passed reproduction	12.14%
		LC_LCDSSLCC passed reproduction	12.14%
		RG_MIDAG passed reproduction	12.14%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1*	2.205	1.796	5.212	11	CDF	0.0248	Significant Effect
		GH_ER2	0.2083	1.753	3.367	15	CDF	0.4189	Non-Significant Effect
		CM_MC1	1.488	1.746	3.169	16	CDF	0.0782	Non-Significant Effect
		FR_FRABCH*	2.469	1.74	2.748	17	CDF	0.0122	Significant Effect
		FR_FRCP1*	1.97	1.74	3.002	17	CDF	0.0327	Significant Effect
		GH_FR1	0.4399	1.746	3.175	16	CDF	0.3329	Non-Significant Effect
		GH_ERC	1.687	1.74	2.784	17	CDF	0.0549	Non-Significant Effect
		CM_MC2*	1.789	1.74	2.82	17	CDF	0.0457	Significant Effect
		EV_MC2	-0.3264	1.771	2.171	13	CDF	0.6253	Non-Significant Effect
		EV_HC1	-0.8563	1.753	2.252	15	CDF	0.7974	Non-Significant Effect
		LC_DCDS	-0.06276	1.74	2.772	17	CDF	0.5247	Non-Significant Effect
		LC_LC3*	2.799	1.746	3.119	16	CDF	0.0064	Significant Effect
		LC_LC5	-0.5855	1.746	2.385	16	CDF	0.7168	Non-Significant Effect
		LC_LCDSSLCC	1.689	1.74	2.677	17	CDF	0.0547	Non-Significant Effect
		RG_MIDAG	0.06888	1.74	2.526	17	CDF	0.4729	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	745.444	49.6963	15	2.822	7.0E-04	Significant Effect
Error	2535.5	17.6076	144			
Total	3280.94		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	34.66	30.58	0.0027	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9382	0.9774	2.0E-06	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 19-3428-5874 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 22 Jan-20 14:58 **Analysis:** Parametric-Two Sample **Status Level:** 1

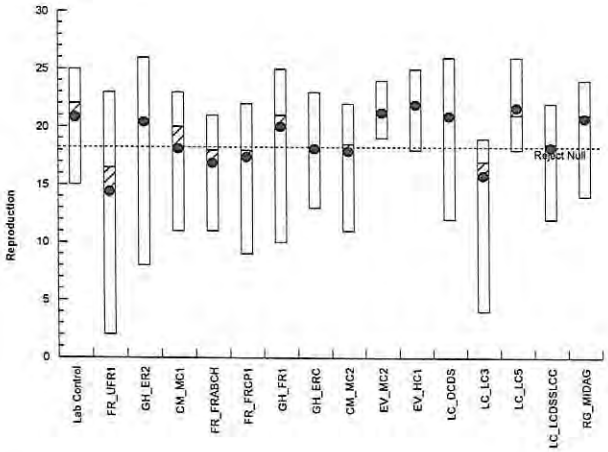
Reproduction Summary

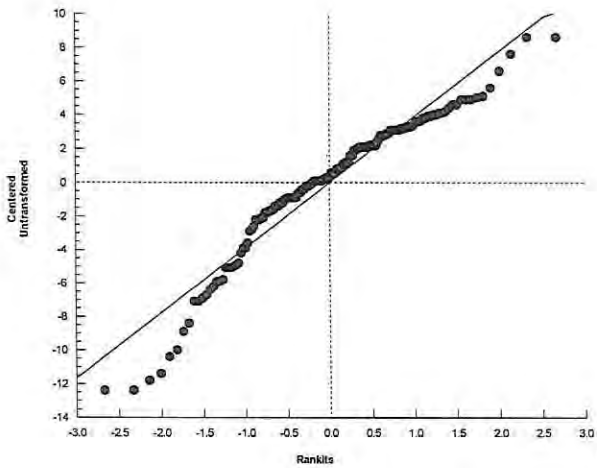
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	N	10	20.8	18.35	23.25	22	15	25	1.083	16.47%	0.00%
FR_UFR1		10	14.4	8.309	20.49	16.5	2	23	2.692	59.13%	30.77%
GH_ER2		10	20.4	16.81	23.99	20.5	8	26	1.586	24.59%	1.92%
CM_MC1		10	18.1	14.81	21.39	20	11	23	1.456	25.45%	12.98%
FR_FRABCH		10	16.9	14.3	19.5	18	11	21	1.149	21.51%	18.75%
FR_FRCP1		10	17.4	14.36	20.44	18	9	22	1.343	24.41%	16.35%
GH_FR1		10	20	16.7	23.3	21	10	25	1.461	23.09%	3.85%
GH_ERC		10	18.1	15.44	20.76	18	13	23	1.178	20.58%	12.98%
CM_MC2		10	17.9	15.17	20.63	18.5	11	22	1.206	21.31%	13.94%
EV_MC2		10	21.2	19.9	22.5	21	19	24	0.5735	8.55%	-1.92%
EV_HC1		10	21.9	20.34	23.46	22	18	25	0.6904	9.97%	-5.29%
LC_DCDS		10	20.9	18.26	23.54	21	12	26	1.169	17.68%	-0.48%
LC_LC3		10	15.8	12.59	19.01	17	4	19	1.42	28.43%	24.04%
LC_LC5		10	21.6	19.72	23.48	21	18	26	0.8327	12.19%	-3.85%
LC_LCDSSLCC		10	18.2	15.73	20.67	18.5	12	22	1.093	19.00%	12.50%
RG_MIDAG		10	20.7	18.51	22.89	21	14	24	0.9667	14.77%	0.48%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	23	19	23	19	16	23	21	24	15	25
FR_UFR1		22	16	23	21	23	13	4	3	2	17
GH_ER2		22	19	20	19	20	26	24	8	21	25
CM_MC1		20	21	11	20	13	22	23	21	19	11
FR_FRABCH		17	11	12	13	19	20	19	21	20	17
FR_FRCP1		22	21	18	9	11	18	21	18	17	19
GH_FR1		24	10	22	20	24	25	15	19	22	19
GH_ERC		19	22	18	13	23	16	16	13	18	23
CM_MC2		21	17	19	17	21	18	11	12	21	22
EV_MC2		20	21	19	24	24	22	19	20	22	21
EV_HC1		19	22	22	25	24	22	18	22	24	21
LC_DCDS		23	23	26	20	12	20	23	20	20	22
LC_LC3		13	17	18	16	19	17	18	4	19	17
LC_LC5		19	20	21	18	26	21	24	20	25	22
LC_LCDSSLCC		14	17	18	22	19	22	21	12	21	16
RG_MIDAG		21	14	24	24	21	24	21	19	20	19

Graphics





CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-5820-2307	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	29 Jan-20 16:26	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Batch ID:	13-2984-1080	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	13 Nov-19 15:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	21 Nov-19 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	30h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	29h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	29h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	28h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	25h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	26h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	29h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	26h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	30h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	29h (1.8 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	28h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	

Analyst: JW QA: Jan 30/20

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 03-5820-2307 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:26 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	GH_ER2 passed 7d survival rate	20.71%
		CM_MC1 passed 7d survival rate	20.71%
		LC_SLC passed 7d survival rate	20.71%
		FR_FRABCH passed 7d survival rate	20.71%
		FR_FRCP1 passed 7d survival rate	20.71%
		GH_FR1 passed 7d survival rate	20.71%
		GH_ERC passed 7d survival rate	20.71%
		CM_MC2 passed 7d survival rate	20.71%
		EV_MC2 passed 7d survival rate	20.71%
		EV_HC1 passed 7d survival rate	20.71%
		LC_DCDS passed 7d survival rate	20.71%
		LC_LC3 passed 7d survival rate	20.71%
		LC_LC5 passed 7d survival rate	20.71%
		LC_LCDSSLCC passed 7d survival rate	20.71%
		RG_MIDAG passed 7d survival rate	20.71%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control (FR_UFRI)		GH_ER2	130	n/a	1	18	Exact	1.0000	Non-Significant Effect
		CM_MC1	130	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_SLC	130	n/a	1	18	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	125	n/a	2	18	Exact	0.9946	Non-Significant Effect
		FR_FRCP1	125	n/a	2	18	Exact	0.9946	Non-Significant Effect
		GH_FR1	130	n/a	1	18	Exact	1.0000	Non-Significant Effect
		GH_ERC	125	n/a	2	18	Exact	0.9946	Non-Significant Effect
		CM_MC2	125	n/a	2	18	Exact	0.9946	Non-Significant Effect
		EV_MC2	120	n/a	2	18	Exact	0.9714	Non-Significant Effect
		EV_HC1	130	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_DCDS	125	n/a	2	18	Exact	0.9946	Non-Significant Effect
		LC_LC3	125	n/a	2	18	Exact	0.9946	Non-Significant Effect
		LC_LC5	130	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	130	n/a	1	18	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	130	n/a	1	18	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.669968	0.0446645	15	2.469	0.0030	Significant Effect
Error	2.60448	0.0180867	144			
Total	3.27445		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	7.647	2.165	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	3.351	2.165	7.7E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6057	0.9774	5.3E-19	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 03-5820-2307 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:26 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	10	0.5000	0.1230	0.8770	0.5000	0.0000	1.0000	0.1667	105.41%	0.00%
GH_ER2		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
CM_MC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
LC_SLC		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
FR_FRABCH		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
FR_FRCP1		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
GH_FR1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
GH_ERC		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
CM_MC2		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
EV_MC2		10	0.8000	0.4984	1.0000	1.0000	0.0000	1.0000	0.1333	52.70%	-60.00%
EV_HC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
LC_DCDS		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
LC_LC3		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
LC_LC5		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
LC_LCDSSLCC		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
RG_MIDAG		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	10	0.7854	0.588	0.9828	0.7854	0.5236	1.047	0.08727	35.14%	0.00%
GH_ER2		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
CM_MC1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
LC_SLC		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
FR_FRABCH		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
FR_FRCP1		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
GH_FR1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
GH_ERC		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
CM_MC2		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
EV_MC2		10	0.9425	0.7845	1.1	1.047	0.5236	1.047	0.06981	23.42%	-20.00%
EV_HC1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
LC_DCDS		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
LC_LC3		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
LC_LC5		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
LC_LCDSSLCC		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
RG_MIDAG		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 03-5820-2307 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:26 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	XC	1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	XC	1.047	1.047	1.047	0.5236	1.047	0.5236	0.5236	0.5236	0.5236	1.047
GH_ER2		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
CM_MC1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_SLC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
FR_FRABCH		0.5236	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
FR_FRCP1		1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047	1.047	1.047
GH_FR1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
GH_ERC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047
CM_MC2		1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047
EV_MC2		1.047	0.5236	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236
EV_HC1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_DCDS		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047
LC_LC3		1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047
LC_LC5		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_LCDSSLCC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
RG_MIDAG		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047

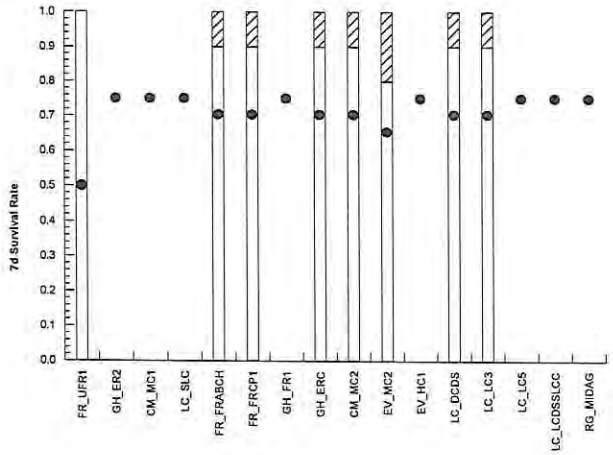
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

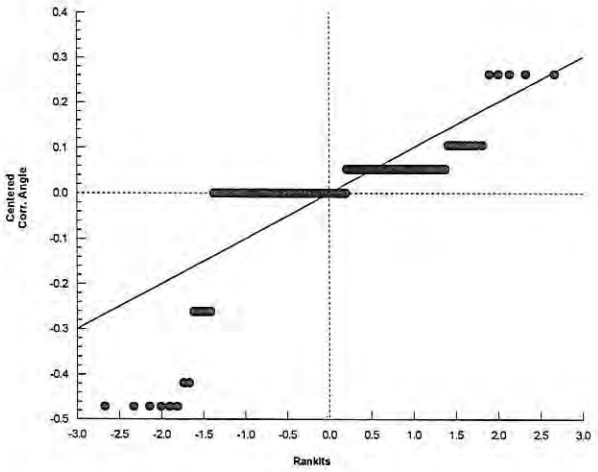
Analysis ID: 03-5820-2307 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:26 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	05-7677-3336	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	22 Jan-20 15:19	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	13-2984-1080	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	13 Nov-19 15:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	21 Nov-19 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	30h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	29h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	29h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	28h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	25h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	26h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	29h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	26h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	30h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	29h (1.8 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	28h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 05-7677-3336 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 22 Jan-20 15:19 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed reproduction	35.68%
		CM_MC1 passed reproduction	35.68%
		LC_SLC passed reproduction	35.68%
		FR_FRABCH passed reproduction	35.68%
		FR_FRCP1 passed reproduction	35.68%
		GH_FR1 passed reproduction	35.68%
		GH_ERC passed reproduction	35.68%
		CM_MC2 passed reproduction	35.68%
		EV_MC2 passed reproduction	35.68%
		EV_HC1 passed reproduction	35.68%
		LC_DCDS passed reproduction	35.68%
		LC_LC3 passed reproduction	35.68%
		LC_LC5 passed reproduction	35.68%
		LC_LCDSSLCC passed reproduction	35.68%
		RG_MIDAG passed reproduction	35.68%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2	-1.92	1.761	5.504	14	CDF	0.9623	Non-Significant Effect
(FR_UFR1)		CM_MC1	-1.209	1.771	5.421	13	CDF	0.8759	Non-Significant Effect
		LC_SLC	-0.8485	1.746	5.761	16	CDF	0.7957	Non-Significant Effect
		FR_FRABCH	-0.854	1.782	5.218	12	CDF	0.7951	Non-Significant Effect
		FR_FRCP1	-0.9971	1.771	5.329	13	CDF	0.8315	Non-Significant Effect
		GH_FR1	-1.828	1.771	5.424	13	CDF	0.9547	Non-Significant Effect
		GH_ERC	-1.259	1.782	5.238	12	CDF	0.8840	Non-Significant Effect
		CM_MC2	-1.186	1.782	5.258	12	CDF	0.8708	Non-Significant Effect
		EV_MC2	-2.47	1.833	5.046	9	CDF	0.9822	Non-Significant Effect
		EV_HC1	-2.698	1.812	5.038	10	CDF	0.9888	Non-Significant Effect
		LC_DCDS	-2.215	1.782	5.231	12	CDF	0.9766	Non-Significant Effect
		LC_LC3	-0.4599	1.771	5.391	13	CDF	0.6734	Non-Significant Effect
		LC_LC5	-2.555	1.812	5.108	10	CDF	0.9857	Non-Significant Effect
		LC_LCDSSLCC	-1.308	1.796	5.219	11	CDF	0.8912	Non-Significant Effect
		RG_MIDAG	-2.202	1.796	5.137	11	CDF	0.9751	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	738.694	49.2463	15	2.572	0.0020	Significant Effect
Error	2757.5	19.1493	144			
Total	3496.19		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	36.49	30.58	0.0015	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9365	0.9774	1.5E-06	Non-Normal Distribution

Jm 1/24/20

Analysis ID: 05-7677-3336 Endpoint: Reproduction CETIS Version: CETISv1.9.4
Analyzed: 22 Jan-20 15:19 Analysis: Parametric-Two Sample Status Level: 1

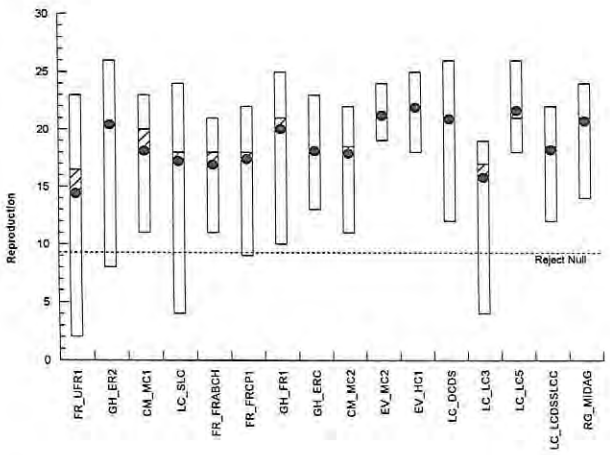
Reproduction Summary

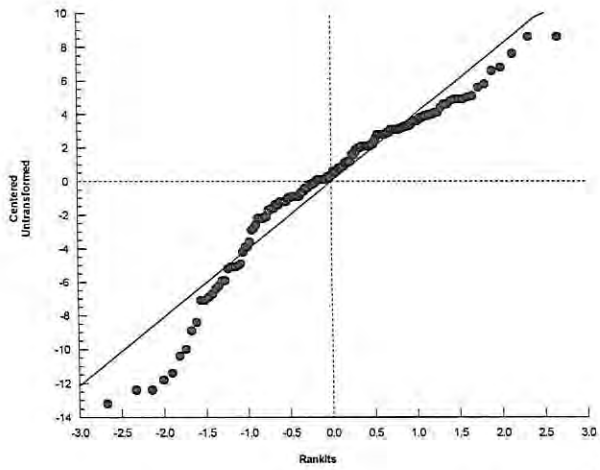
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	10	14.4	8.309	20.49	16.5	2	23	2.692	59.13%	0.00%
GH_ER2		10	20.4	16.81	23.99	20.5	8	26	1.586	24.59%	-41.67%
CM_MC1		10	18.1	14.81	21.39	20	11	23	1.456	25.45%	-25.69%
LC_SLC		10	17.2	12.88	21.52	18	4	24	1.908	35.08%	-19.44%
FR_FRABCH		10	16.9	14.3	19.5	18	11	21	1.149	21.51%	-17.36%
FR_FRCP1		10	17.4	14.36	20.44	18	9	22	1.343	24.41%	-20.83%
GH_FR1		10	20	16.7	23.3	21	10	25	1.461	23.09%	-38.89%
GH_ERC		10	18.1	15.44	20.76	18	13	23	1.178	20.58%	-25.69%
CM_MC2		10	17.9	15.17	20.63	18.5	11	22	1.206	21.31%	-24.31%
EV_MC2		10	21.2	19.9	22.5	21	19	24	0.5735	8.55%	-47.22%
EV_HC1		10	21.9	20.34	23.46	22	18	25	0.6904	9.97%	-52.08%
LC_DCDS		10	20.9	18.26	23.54	21	12	26	1.169	17.68%	-45.14%
LC_LC3		10	15.8	12.59	19.01	17	4	19	1.42	28.43%	-9.72%
LC_LC5		10	21.6	19.72	23.48	21	18	26	0.8327	12.19%	-50.00%
LC_LCDSSLCC		10	18.2	15.73	20.67	18.5	12	22	1.093	19.00%	-26.39%
RG_MIDAG		10	20.7	18.51	22.89	21	14	24	0.9667	14.77%	-43.75%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1	XC	22	16	23	21	23	13	4	3	2	17
GH_ER2		22	19	20	19	20	26	24	8	21	25
CM_MC1		20	21	11	20	13	22	23	21	19	11
LC_SLC		20	16	20	22	23	24	4	12	15	16
FR_FRABCH		17	11	12	13	19	20	19	21	20	17
FR_FRCP1		22	21	18	9	11	18	21	18	17	19
GH_FR1		24	10	22	20	24	25	15	19	22	19
GH_ERC		19	22	18	13	23	16	16	13	18	23
CM_MC2		21	17	19	17	21	18	11	12	21	22
EV_MC2		20	21	19	24	24	22	19	20	22	21
EV_HC1		19	22	22	25	24	22	18	22	24	21
LC_DCDS		23	23	26	20	12	20	23	20	20	22
LC_LC3		13	17	18	16	19	17	18	4	19	17
LC_LC5		19	20	21	18	26	21	24	20	25	22
LC_LCDSSLCC		14	17	18	22	19	22	21	12	21	16
RG_MIDAG		21	14	24	24	21	24	21	19	20	19

Graphics





Jan 24/20

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-7013-7942	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	29 Jan-20 16:27	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Batch ID:	13-2984-1080	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	13 Nov-19 15:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	21 Nov-19 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	30h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	29h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	29h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	28h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	25h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	26h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	29h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	26h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	30h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	29h (1.8 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	28h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 10-7013-7942 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:27 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	FR_UFR1 failed 7d survival rate	34.51%
		CM_MC1 passed 7d survival rate	34.51%
		LC_SLC passed 7d survival rate	34.51%
		FR_FRABCH passed 7d survival rate	34.51%
		FR_FRCP1 passed 7d survival rate	34.51%
		GH_FR1 passed 7d survival rate	34.51%
		GH_ERC passed 7d survival rate	34.51%
		CM_MC2 passed 7d survival rate	34.51%
		EV_MC2 passed 7d survival rate	34.51%
		EV_HC1 passed 7d survival rate	34.51%
		LC_DCDS passed 7d survival rate	34.51%
		LC_LC3 passed 7d survival rate	34.51%
		LC_LC5 passed 7d survival rate	34.51%
		LC_LCDSSLCC passed 7d survival rate	34.51%
		RG_MIDAG passed 7d survival rate	34.51%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control (GH_ERC)		FR_UFR1*	80	n/a	1	18	Exact	0.0163	Significant Effect
		CM_MC1	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_SLC	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		FR_FRCP1	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		GH_FR1	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		GH_ERC	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		CM_MC2	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		EV_MC2	95	n/a	1	18	Exact	0.2368	Non-Significant Effect
		EV_HC1	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_DCDS	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		LC_LC3	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		LC_LC5	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	105	n/a	1	18	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.669968	0.0446645	15	2.469	0.0030	Significant Effect
Error	2.60448	0.0180867	144			
Total	3.27445		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	7.647	2.165	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	3.351	2.165	7.7E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6057	0.9774	5.3E-19	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 10-7013-7942 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:27 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	0.5000	0.1230	0.8770	0.5000	0.0000	1.0000	0.1667	105.41%	0.00%
GH_ER2	XC	10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
CM_MC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
LC_SLC		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
FR_FRABCH		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
FR_FRCP1		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
GH_FR1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
GH_ERC		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
CM_MC2		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
EV_MC2		10	0.8000	0.4984	1.0000	1.0000	0.0000	1.0000	0.1333	52.70%	-60.00%
EV_HC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
LC_DCDS		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
LC_LC3		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
LC_LC5		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
LC_LCDSSLCC		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
RG_MIDAG		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	0.7854	0.588	0.9828	0.7854	0.5236	1.047	0.08727	35.14%	0.00%
GH_ER2	XC	10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
CM_MC1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
LC_SLC		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
FR_FRABCH		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
FR_FRCP1		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
GH_FR1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
GH_ERC		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
CM_MC2		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
EV_MC2		10	0.9425	0.7845	1.1	1.047	0.5236	1.047	0.06981	23.42%	-20.00%
EV_HC1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
LC_DCDS		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
LC_LC3		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
LC_LC5		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
LC_LCDSSLCC		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
RG_MIDAG		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%

Analyst: JW QA: Jan-30/20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 10-7013-7942 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:27 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000
GH_ER2	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.047	1.047	1.047	0.5236	1.047	0.5236	0.5236	0.5236	0.5236	1.047
GH_ER2	XC	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
CM_MC1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_SLC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
FR_FRABCH		0.5236	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
FR_FRCP1		1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047	1.047	1.047
GH_FR1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
GH_ERC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047
CM_MC2		1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047
EV_MC2		1.047	0.5236	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236
EV_HC1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_DCDS		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047
LC_LC3		1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047
LC_LC5		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_LCDSSLCC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
RG_MIDAG		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047

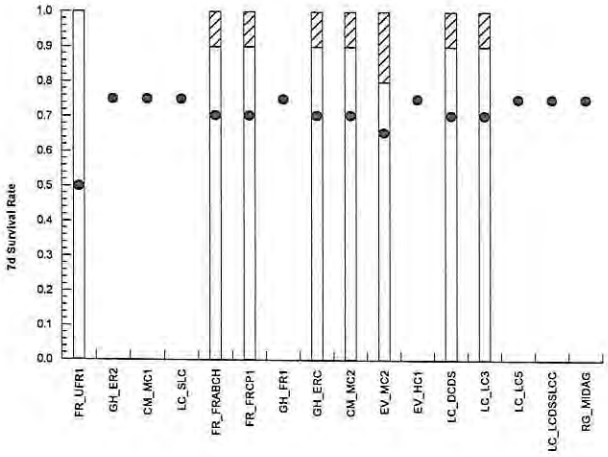
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

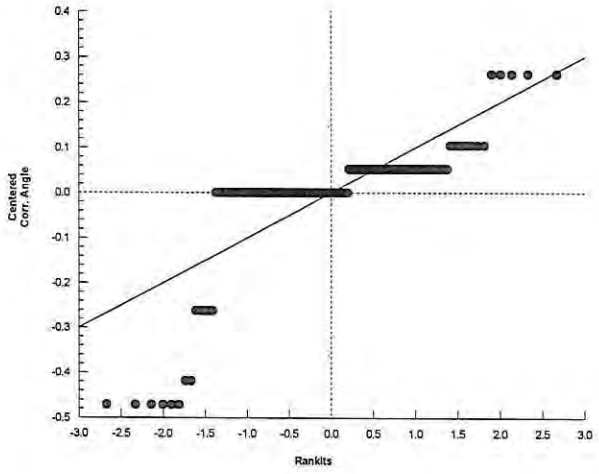
Analysis ID: 10-7013-7942 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:27 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	0/1	1/1	0/1	0/1	0/1	0/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	16-4233-5488	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 Jan-20 17:11	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	13-2984-1080	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	13 Nov-19 15:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	21 Nov-19 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	30h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	29h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	29h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	28h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	25h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	26h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	29h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	26h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	30h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	29h (1.8 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	28h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 16-4233-5488 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 23 Jan-20 17:11 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 failed reproduction	16.04%
		CM_MC1 passed reproduction	16.04%
		LC_SLC passed reproduction	16.04%
		FR_FRABCH failed reproduction	16.04%
		FR_FRCP1 passed reproduction	16.04%
		GH_FR1 passed reproduction	16.04%
		GH_ERC passed reproduction	16.04%
		CM_MC2 passed reproduction	16.04%
		EV_MC2 passed reproduction	16.04%
		EV_HC1 passed reproduction	16.04%
		LC_DCDS passed reproduction	16.04%
		LC_LC3 failed reproduction	16.04%
		LC_LC5 passed reproduction	16.04%
		LC_LCDSSLCC passed reproduction	16.04%
		RG_MIDAG passed reproduction	16.04%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1*	1.92	1.761	5.504	14	CDF	0.0377	Significant Effect
(GH - ER 2)		CM_MC1	1.068	1.74	3.746	17	CDF	0.1502	Non-Significant Effect
		LC_SLC	1.29	1.74	4.316	17	CDF	0.1072	Non-Significant Effect
		FR_FRABCH*	1.787	1.746	3.42	16	CDF	0.0465	Significant Effect
		FR_FRCP1	1.443	1.74	3.616	17	CDF	0.0835	Non-Significant Effect
		GH_FR1	0.1855	1.74	3.751	17	CDF	0.4275	Non-Significant Effect
		GH_ERC	1.164	1.746	3.449	16	CDF	0.1307	Non-Significant Effect
		CM_MC2	1.255	1.746	3.479	16	CDF	0.1138	Non-Significant Effect
		EV_MC2	-0.4743	1.796	3.029	11	CDF	0.6777	Non-Significant Effect
		EV_HC1	-0.8672	1.782	3.083	12	CDF	0.7986	Non-Significant Effect
		LC_DCDS	-0.2538	1.746	3.439	16	CDF	0.5986	Non-Significant Effect
		LC_LC3*	2.16	1.74	3.704	17	CDF	0.0227	Significant Effect
		LC_LC5	-0.6699	1.771	3.172	13	CDF	0.7427	Non-Significant Effect
		LC_LCDSSLCC	1.142	1.753	3.377	15	CDF	0.1357	Non-Significant Effect
		RG_MIDAG	-0.1615	1.761	3.271	14	CDF	0.5630	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	738.694	49.2463	15	2.572	0.0020	Significant Effect
Error	2757.5	19.1493	144			
Total	3496.19		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	36.49	30.58	0.0015	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9365	0.9774	1.5E-06	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	16-4233-5488	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 Jan-20 17:11	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

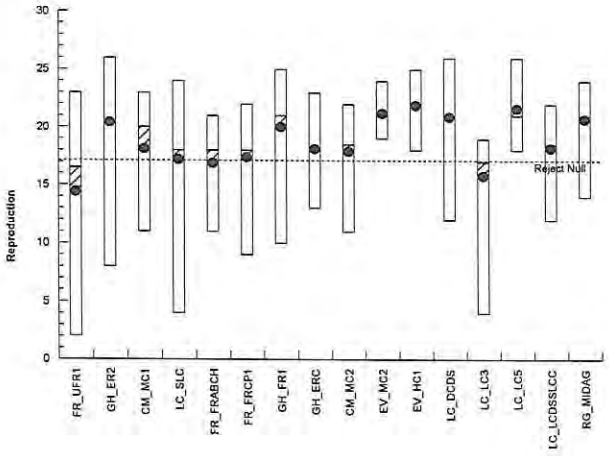
Reproduction Summary

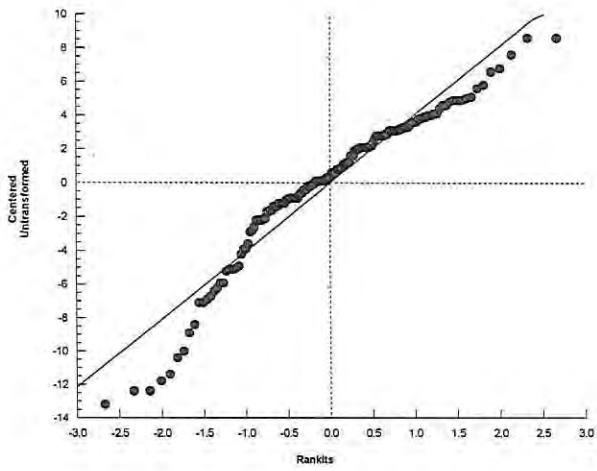
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	14.4	8.309	20.49	16.5	2	23	2.692	59.13%	0.00%
GH_ER2	XC	10	20.4	16.81	23.99	20.5	8	26	1.586	24.59%	-41.67%
CM_MC1		10	18.1	14.81	21.39	20	11	23	1.456	25.45%	-25.69%
LC_SLC		10	17.2	12.88	21.52	18	4	24	1.908	35.08%	-19.44%
FR_FRABCH		10	16.9	14.3	19.5	18	11	21	1.149	21.51%	-17.36%
FR_FRCP1		10	17.4	14.36	20.44	18	9	22	1.343	24.41%	-20.83%
GH_FR1		10	20	16.7	23.3	21	10	25	1.461	23.09%	-38.89%
GH_ERC		10	18.1	15.44	20.76	18	13	23	1.178	20.58%	-25.69%
CM_MC2		10	17.9	15.17	20.63	18.5	11	22	1.206	21.31%	-24.31%
EV_MC2		10	21.2	19.9	22.5	21	19	24	0.5735	8.55%	-47.22%
EV_HC1		10	21.9	20.34	23.46	22	18	25	0.6904	9.97%	-52.08%
LC_DCDS		10	20.9	18.26	23.54	21	12	26	1.169	17.68%	-45.14%
LC_LC3		10	15.8	12.59	19.01	17	4	19	1.42	28.43%	-9.72%
LC_LC5		10	21.6	19.72	23.48	21	18	26	0.8327	12.19%	-50.00%
LC_LCDSSLCC		10	18.2	15.73	20.67	18.5	12	22	1.093	19.00%	-26.39%
RG_MIDAG		10	20.7	18.51	22.89	21	14	24	0.9667	14.77%	-43.75%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		22	16	23	21	23	13	4	3	2	17
GH_ER2	XC	22	19	20	19	20	26	24	8	21	25
CM_MC1		20	21	11	20	13	22	23	21	19	11
LC_SLC		20	16	20	22	23	24	4	12	15	16
FR_FRABCH		17	11	12	13	19	20	19	21	20	17
FR_FRCP1		22	21	18	9	11	18	21	18	17	19
GH_FR1		24	10	22	20	24	25	15	19	22	19
GH_ERC		19	22	18	13	23	16	16	13	18	23
CM_MC2		21	17	19	17	21	18	11	12	21	22
EV_MC2		20	21	19	24	24	22	19	20	22	21
EV_HC1		19	22	22	25	24	22	18	22	24	21
LC_DCDS		23	23	26	20	12	20	23	20	20	22
LC_LC3		13	17	18	16	19	17	18	4	19	17
LC_LC5		19	20	21	18	26	21	24	20	25	22
LC_LCDSSLCC		14	17	18	22	19	22	21	12	21	16
RG_MIDAG		21	14	24	24	21	24	21	19	20	19

Graphics





CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	21-1392-1814	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	29 Jan-20 16:28	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Batch ID:	13-2984-1080	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	13 Nov-19 15:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	21 Nov-19 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	30h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	29h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	29h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	28h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	25h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	26h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	29h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	26h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	30h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	29h (1.8 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	28h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	

Analyst: JW QA: Jan-30/20

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 21-1392-1814 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:28 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	FR_FRCP1 passed 7d survival rate	34.51%
		GH_FR1 passed 7d survival rate	34.51%
		GH_ERC passed 7d survival rate	34.51%
		CM_MC2 passed 7d survival rate	34.51%
		EV_MC2 passed 7d survival rate	34.51%
		EV_HC1 passed 7d survival rate	34.51%
		LC_DCDS passed 7d survival rate	34.51%
		LC_LC3 passed 7d survival rate	34.51%
		LC_LC5 passed 7d survival rate	34.51%
		LC_LCDSSLCC passed 7d survival rate	34.51%
		RG_MIDAG passed 7d survival rate	34.51%
		FR_UFR1 failed 7d survival rate	34.51%
		GH_ER2 passed 7d survival rate	34.51%
		LC_SLC passed 7d survival rate	34.51%
		FR_FRABCH passed 7d survival rate	34.51%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control (CM_MC1)		FR_UFR1*	80	n/a	1	18	Exact	0.0163	Significant Effect
		GH_ER2	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_SLC	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		FR_FRCP1	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		GH_FR1	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		GH_ERC	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		CM_MC2	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		EV_MC2	95	n/a	1	18	Exact	0.2368	Non-Significant Effect
		EV_HC1	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_DCDS	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		LC_LC3	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		LC_LC5	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	105	n/a	1	18	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.669968	0.0446645	15	2.469	0.0030	Significant Effect
Error	2.60448	0.0180867	144			
Total	3.27445		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	7.647	2.165	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	3.351	2.165	7.7E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6057	0.9774	5.3E-19	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 21-1392-1814 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:28 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	0.5000	0.1230	0.8770	0.5000	0.0000	1.0000	0.1667	105.41%	0.00%
GH_ER2		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
CM_MC1	XC	10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
LC_SLC		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
FR_FRABCH		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
FR_FRCP1		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
GH_FR1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
GH_ERC		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
CM_MC2		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
EV_MC2		10	0.8000	0.4984	1.0000	1.0000	0.0000	1.0000	0.1333	52.70%	-60.00%
EV_HC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
LC_DCDS		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
LC_LC3		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
LC_LC5		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
LC_LCDSSLCC		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
RG_MIDAG		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	0.7854	0.588	0.9828	0.7854	0.5236	1.047	0.08727	35.14%	0.00%
GH_ER2		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
CM_MC1	XC	10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
LC_SLC		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
FR_FRABCH		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
FR_FRCP1		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
GH_FR1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
GH_ERC		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
CM_MC2		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
EV_MC2		10	0.9425	0.7845	1.1	1.047	0.5236	1.047	0.06981	23.42%	-20.00%
EV_HC1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
LC_DCDS		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
LC_LC3		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
LC_LC5		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
LC_LCDSSLCC		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
RG_MIDAG		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%

Analyst: JW QA: JM-30/20

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID: 21-1392-1814 Endpoint: 7d Survival Rate CETIS Version: CETISv1.9.4
Analyzed: 29 Jan-20 16:28 Analysis: Nonparametric-Two Sample Status Level: 1

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.047	1.047	1.047	0.5236	1.047	0.5236	0.5236	0.5236	0.5236	1.047
GH_ER2		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
CM_MC1	XC	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_SLC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
FR_FRABCH		0.5236	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
FR_FRCP1		1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047	1.047	1.047
GH_FR1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
GH_ERC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047
CM_MC2		1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047
EV_MC2		1.047	0.5236	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236
EV_HC1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_DCDS		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047
LC_LC3		1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047
LC_LC5		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_LCDSSLCC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
RG_MIDAG		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047

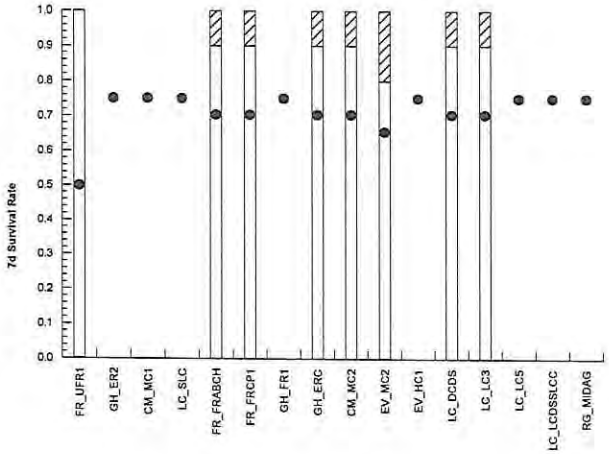
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

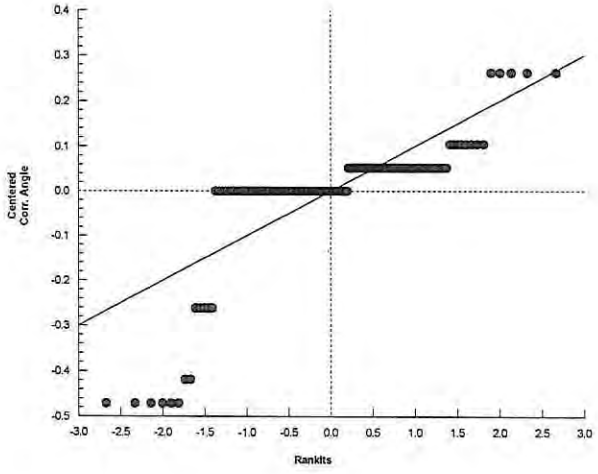
Analysis ID: 21-1392-1814 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:28 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	0/1	1/1	0/1	0/1	0/1	0/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	01-3724-1821	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 Jan-20 17:15	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	13-2984-1080	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	13 Nov-19 15:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	21 Nov-19 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	30h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	29h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	29h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	28h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	25h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	26h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	29h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	26h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	30h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	29h (1.8 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	28h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 01-3724-1821 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 23 Jan-20 17:15 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	16.93%
		GH_ER2 passed reproduction	16.93%
		LC_SLC passed reproduction	16.93%
		FR_FRABCH passed reproduction	16.93%
		FR_FRCP1 passed reproduction	16.93%
		GH_FR1 passed reproduction	16.93%
		GH_ERC passed reproduction	16.93%
		CM_MC2 passed reproduction	16.93%
		EV_MC2 passed reproduction	16.93%
		EV_HC1 passed reproduction	16.93%
		LC_DCDS passed reproduction	16.93%
		LC_LC3 passed reproduction	16.93%
		LC_LC5 passed reproduction	16.93%
		LC_LCDSSLCC passed reproduction	16.93%
		RG_MIDAG passed reproduction	16.93%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	1.209	1.771	5.421	13	CDF	0.1241	Non-Significant Effect
(CM_MCL)		GH_ER2	-1.068	1.74	3.746	17	CDF	0.8498	Non-Significant Effect
		LC_SLC	0.375	1.746	4.191	16	CDF	0.3563	Non-Significant Effect
		FR_FRABCH	0.6468	1.74	3.228	17	CDF	0.2632	Non-Significant Effect
		FR_FRCP1	0.3533	1.74	3.447	17	CDF	0.3641	Non-Significant Effect
		GH_FR1	-0.9212	1.74	3.588	17	CDF	0.8151	Non-Significant Effect
		GH_ERC	0	1.74	3.259	17	CDF	0.5000	Non-Significant Effect
		CM_MC2	0.1058	1.74	3.289	17	CDF	0.4585	Non-Significant Effect
		EV_MC2	-1.981	1.796	2.811	11	CDF	0.9634	Non-Significant Effect
		EV_HC1	-2.358	1.782	2.873	12	CDF	0.9819	Non-Significant Effect
		LC_DCDS	-1.5	1.74	3.248	17	CDF	0.9240	Non-Significant Effect
		LC_LC3	1.131	1.74	3.539	17	CDF	0.1370	Non-Significant Effect
		LC_LC5	-2.086	1.761	2.955	14	CDF	0.9721	Non-Significant Effect
		LC_LCDSSLCC	-0.05491	1.746	3.18	16	CDF	0.5216	Non-Significant Effect
		RG_MIDAG	-1.487	1.753	3.064	15	CDF	0.9212	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	738.694	49.2463	15	2.572	0.0020	Significant Effect
Error	2757.5	19.1493	144			
Total	3496.19		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	36.49	30.58	0.0015	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9365	0.9774	1.5E-06	Non-Normal Distribution

JN 1/24/20

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 01-3724-1821 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 23 Jan-20 17:15 **Analysis:** Parametric-Two Sample **Status Level:** 1

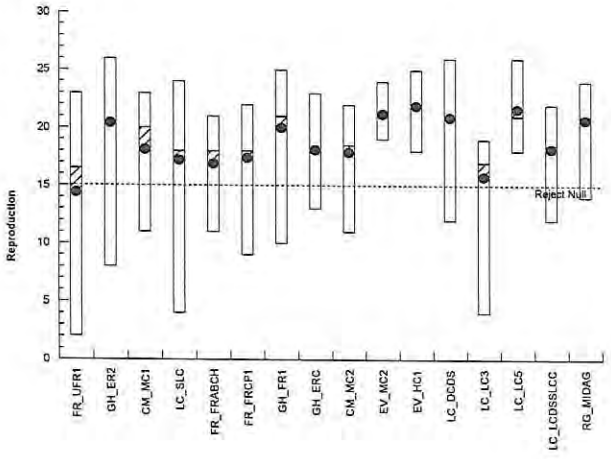
Reproduction Summary

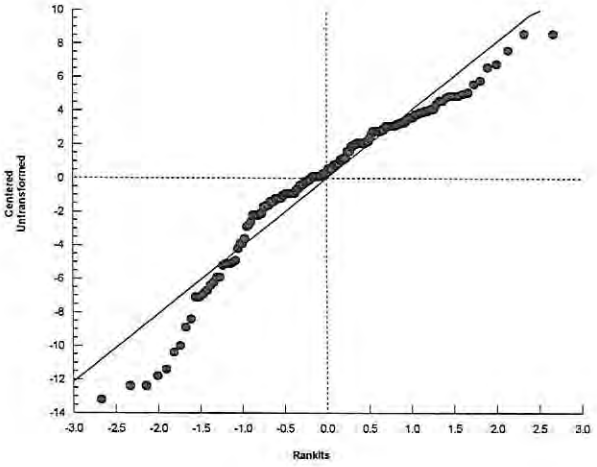
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	14.4	8.309	20.49	16.5	2	23	2.692	59.13%	0.00%
GH_ER2		10	20.4	16.81	23.99	20.5	8	26	1.586	24.59%	-41.67%
CM_MC1	XC	10	18.1	14.81	21.39	20	11	23	1.456	25.45%	-25.69%
LC_SLC		10	17.2	12.88	21.52	18	4	24	1.908	35.08%	-19.44%
FR_FRABCH		10	16.9	14.3	19.5	18	11	21	1.149	21.51%	-17.36%
FR_FRCP1		10	17.4	14.36	20.44	18	9	22	1.343	24.41%	-20.83%
GH_FR1		10	20	16.7	23.3	21	10	25	1.461	23.09%	-38.89%
GH_ERC		10	18.1	15.44	20.76	18	13	23	1.178	20.58%	-25.69%
CM_MC2		10	17.9	15.17	20.63	18.5	11	22	1.206	21.31%	-24.31%
EV_MC2		10	21.2	19.9	22.5	21	19	24	0.5735	8.55%	-47.22%
EV_HC1		10	21.9	20.34	23.46	22	18	25	0.6904	9.97%	-52.08%
LC_DCDS		10	20.9	18.26	23.54	21	12	26	1.169	17.68%	-45.14%
LC_LC3		10	15.8	12.59	19.01	17	4	19	1.42	28.43%	-9.72%
LC_LC5		10	21.6	19.72	23.48	21	18	26	0.8327	12.19%	-50.00%
LC_LCDSSLCC		10	18.2	15.73	20.67	18.5	12	22	1.093	19.00%	-26.39%
RG_MIDAG		10	20.7	18.51	22.89	21	14	24	0.9667	14.77%	-43.75%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		22	16	23	21	23	13	4	3	2	17
GH_ER2		22	19	20	19	20	26	24	8	21	25
CM_MC1	XC	20	21	11	20	13	22	23	21	19	11
LC_SLC		20	16	20	22	23	24	4	12	15	16
FR_FRABCH		17	11	12	13	19	20	19	21	20	17
FR_FRCP1		22	21	18	9	11	18	21	18	17	19
GH_FR1		24	10	22	20	24	25	15	19	22	19
GH_ERC		19	22	18	13	23	16	16	13	18	23
CM_MC2		21	17	19	17	21	18	11	12	21	22
EV_MC2		20	21	19	24	24	22	19	20	22	21
EV_HC1		19	22	22	25	24	22	18	22	24	21
LC_DCDS		23	23	26	20	12	20	23	20	20	22
LC_LC3		13	17	18	16	19	17	18	4	19	17
LC_LC5		19	20	21	18	26	21	24	20	25	22
LC_LCDSSLCC		14	17	18	22	19	22	21	12	21	16
RG_MIDAG		21	14	24	24	21	24	21	19	20	19

Graphics





CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	08-4715-2794	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	29 Jan-20 16:29	**Analysis:**	Nonparametric-Two Sample	**Status Level:**	1
Batch ID:	13-2984-1080	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	13 Nov-19 15:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	21 Nov-19 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	30h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	29h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	29h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	28h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	25h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	26h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	29h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	26h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	30h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	29h (1.8 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	28h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	

Analyst: JW QA: Jan.30/20

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 08-4715-2794 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:29 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Angular (Corrected)	C > T	FR_UFR1 failed 7d survival rate	34.51%
		GH_ER2 passed 7d survival rate	34.51%
		CM_MC1 passed 7d survival rate	34.51%
		FR_FRABCH passed 7d survival rate	34.51%
		FR_FRCP1 passed 7d survival rate	34.51%
		GH_FR1 passed 7d survival rate	34.51%
		GH_ERC passed 7d survival rate	34.51%
		CM_MC2 passed 7d survival rate	34.51%
		EV_MC2 passed 7d survival rate	34.51%
		EV_HC1 passed 7d survival rate	34.51%
		LC_DCDS passed 7d survival rate	34.51%
		LC_LC3 passed 7d survival rate	34.51%
		LC_LC5 passed 7d survival rate	34.51%
		LC_LCDSSLCC passed 7d survival rate	34.51%
		RG_MIDAG passed 7d survival rate	34.51%

Wilcoxon Rank Sum Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Site Control (LC_SLC)		FR_UFR1*	80	n/a	1	18	Exact	0.0163	Significant Effect
		GH_ER2	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		CM_MC1	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		FR_FRCP1	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		GH_FR1	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		GH_ERC	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		CM_MC2	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		EV_MC2	95	n/a	1	18	Exact	0.2368	Non-Significant Effect
		EV_HC1	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_DCDS	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		LC_LC3	100	n/a	1	18	Exact	0.5000	Non-Significant Effect
		LC_LC5	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	105	n/a	1	18	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	105	n/a	1	18	Exact	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	0.669968	0.0446645	15	2.469	0.0030	Significant Effect
Error	2.60448	0.0180867	144			
Total	3.27445		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Levene Equality of Variance Test	7.647	2.165	<1.0E-37	Unequal Variances
Variances	Mod Levene Equality of Variance Test	3.351	2.165	7.7E-05	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.6057	0.9774	5.3E-19	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 08-4715-2794 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:29 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	0.5000	0.1230	0.8770	0.5000	0.0000	1.0000	0.1667	105.41%	0.00%
GH_ER2		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
CM_MC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
LC_SLC	XC	10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
FR_FRABCH		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
FR_FRCP1		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
GH_FR1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
GH_ERC		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
CM_MC2		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
EV_MC2		10	0.8000	0.4984	1.0000	1.0000	0.0000	1.0000	0.1333	52.70%	-60.00%
EV_HC1		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
LC_DCDS		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
LC_LC3		10	0.9000	0.6738	1.0000	1.0000	0.0000	1.0000	0.1000	35.14%	-80.00%
LC_LC5		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
LC_LCDSSLCC		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%
RG_MIDAG		10	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.00%	-100.00%

Angular (Corrected) Transformed Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	0.7854	0.588	0.9828	0.7854	0.5236	1.047	0.08727	35.14%	0.00%
GH_ER2		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
CM_MC1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
LC_SLC	XC	10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
FR_FRABCH		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
FR_FRCP1		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
GH_FR1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
GH_ERC		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
CM_MC2		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
EV_MC2		10	0.9425	0.7845	1.1	1.047	0.5236	1.047	0.06981	23.42%	-20.00%
EV_HC1		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
LC_DCDS		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
LC_LC3		10	0.9948	0.8764	1.113	1.047	0.5236	1.047	0.05236	16.64%	-26.67%
LC_LC5		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
LC_LCDSSLCC		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%
RG_MIDAG		10	1.047	1.047	1.047	1.047	1.047	1.047	0	0.00%	-33.33%

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 08-4715-2794 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:29 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.0000	1.0000	1.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
CM_MC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_SLC	XC	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRABCH		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_FRCP1		1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000
GH_FR1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
GH_ERC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
CM_MC2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
EV_MC2		1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000
EV_HC1		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_DCDS		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000
LC_LC3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000
LC_LC5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
LC_LCDSSLCC		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
RG_MIDAG		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Angular (Corrected) Transformed Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1.047	1.047	1.047	0.5236	1.047	0.5236	0.5236	0.5236	0.5236	1.047
GH_ER2		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
CM_MC1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_SLC	XC	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
FR_FRABCH		0.5236	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
FR_FRCP1		1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047	1.047	1.047
GH_FR1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
GH_ERC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047
CM_MC2		1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047
EV_MC2		1.047	0.5236	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236
EV_HC1		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_DCDS		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047
LC_LC3		1.047	1.047	1.047	1.047	1.047	1.047	1.047	0.5236	1.047	1.047
LC_LC5		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
LC_LCDSSLCC		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047
RG_MIDAG		1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047	1.047

Ceriodaphnia 7-d Survival and Reproduction Test

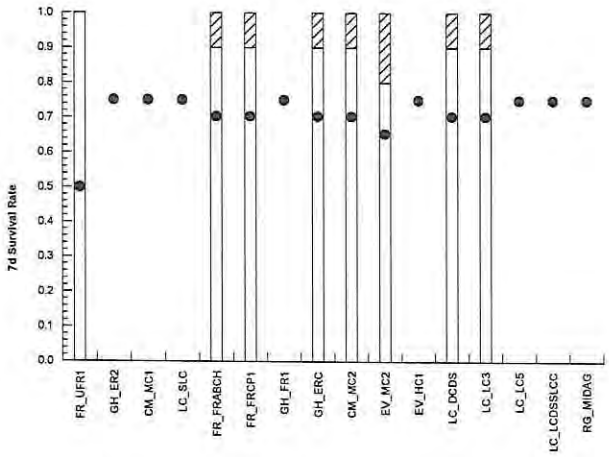
Nautilus Environmental

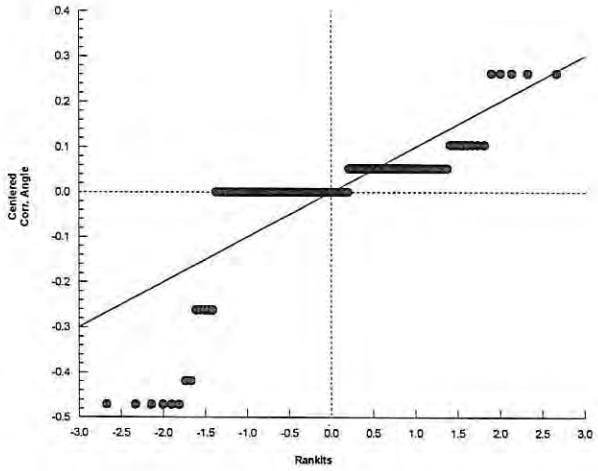
Analysis ID: 08-4715-2794 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 29 Jan-20 16:29 **Analysis:** Nonparametric-Two Sample **Status Level:** 1

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		1/1	1/1	1/1	0/1	1/1	0/1	0/1	0/1	0/1	1/1
GH_ER2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
CM_MC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_SLC	XC	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRABCH		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_FRCP1		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
GH_FR1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
GH_ERC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
CM_MC2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
EV_MC2		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
EV_HC1		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_DCDS		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
LC_LC3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
LC_LC5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
LC_LCDSSLCC		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
RG_MIDAG		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics





Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	11-8593-3405	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	22 Jan-20 15:07	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	13-2984-1080	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	13 Nov-19 15:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	21 Nov-19 14:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 23h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	30h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	29h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	29h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	28h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	25h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	26h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	29h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	26h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	30h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	29h (1.8 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	28h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID: 11-8593-3405 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 22 Jan-20 15:07 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	22.02%
		GH_ER2 passed reproduction	22.02%
		CM_MC1 passed reproduction	22.02%
		FR_FRABCH passed reproduction	22.02%
		FR_FRCP1 passed reproduction	22.02%
		GH_FR1 passed reproduction	22.02%
		GH_ERC passed reproduction	22.02%
		CM_MC2 passed reproduction	22.02%
		EV_MC2 passed reproduction	22.02%
		EV_HC1 passed reproduction	22.02%
		LC_DCDS passed reproduction	22.02%
		LC_LC3 passed reproduction	22.02%
		LC_LC5 passed reproduction	22.02%
		LC_LCDSSLCC passed reproduction	22.02%
		RG_MIDAG passed reproduction	22.02%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	0.8485	1.746	5.761	16	CDF	0.2043	Non-Significant Effect
(LC - SLC)		GH_ER2	-1.29	1.74	4.316	17	CDF	0.8928	Non-Significant Effect
		CM_MC1	-0.375	1.746	4.191	16	CDF	0.6437	Non-Significant Effect
		FR_FRABCH	0.1347	1.761	3.923	14	CDF	0.4474	Non-Significant Effect
		FR_FRCP1	-0.08571	1.746	4.074	16	CDF	0.5336	Non-Significant Effect
		GH_FR1	-1.165	1.746	4.195	16	CDF	0.8695	Non-Significant Effect
		GH_ERC	-0.4014	1.761	3.949	14	CDF	0.6529	Non-Significant Effect
		CM_MC2	-0.3101	1.753	3.957	15	CDF	0.6196	Non-Significant Effect
		EV_MC2	-2.008	1.812	3.611	10	CDF	0.9638	Non-Significant Effect
		EV_HC1	-2.316	1.796	3.644	11	CDF	0.9796	Non-Significant Effect
		LC_DCDS	-1.654	1.761	3.941	14	CDF	0.9398	Non-Significant Effect
		LC_LC3	0.5886	1.746	4.153	16	CDF	0.2822	Non-Significant Effect
		LC_LC5	-2.114	1.782	3.71	12	CDF	0.9719	Non-Significant Effect
		LC_LCDSSLCC	-0.4548	1.761	3.873	14	CDF	0.6719	Non-Significant Effect
		RG_MIDAG	-1.636	1.771	3.788	13	CDF	0.9371	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	738.694	49.2463	15	2.572	0.0020	Significant Effect
Error	2757.5	19.1493	144			
Total	3496.19		159			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	36.49	30.58	0.0015	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9365	0.9774	1.5E-06	Non-Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID: 11-8593-3405 **Endpoint:** Reproduction **CETIS Version:** CETISv1.9.4
Analyzed: 22 Jan-20 15:07 **Analysis:** Parametric-Two Sample **Status Level:** 1

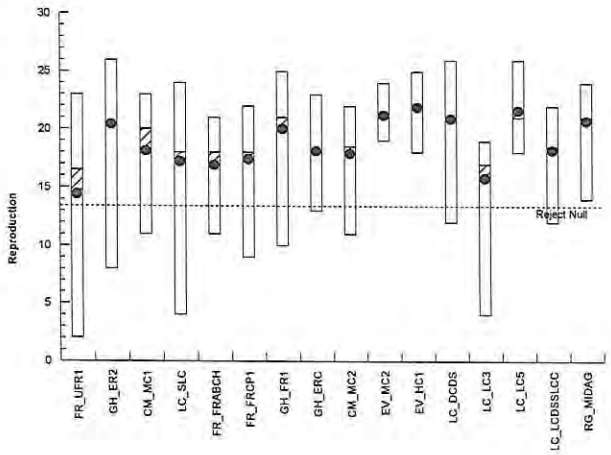
Reproduction Summary

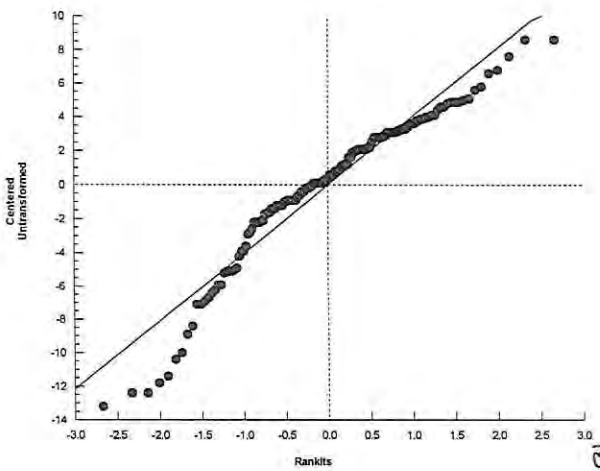
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		10	14.4	8.309	20.49	16.5	2	23	2.692	59.13%	0.00%
GH_ER2		10	20.4	16.81	23.99	20.5	8	26	1.586	24.59%	-41.67%
CM_MC1		10	18.1	14.81	21.39	20	11	23	1.456	25.45%	-25.69%
LC_SLC	XC	10	17.2	12.88	21.52	18	4	24	1.908	35.08%	-19.44%
FR_FRABCH		10	16.9	14.3	19.5	18	11	21	1.149	21.51%	-17.36%
FR_FRCP1		10	17.4	14.36	20.44	18	9	22	1.343	24.41%	-20.83%
GH_FR1		10	20	16.7	23.3	21	10	25	1.461	23.09%	-38.89%
GH_ERC		10	18.1	15.44	20.76	18	13	23	1.178	20.58%	-25.69%
CM_MC2		10	17.9	15.17	20.63	18.5	11	22	1.206	21.31%	-24.31%
EV_MC2		10	21.2	19.9	22.5	21	19	24	0.5735	8.55%	-47.22%
EV_HC1		10	21.9	20.34	23.46	22	18	25	0.6904	9.97%	-52.08%
LC_DCDS		10	20.9	18.26	23.54	21	12	26	1.169	17.68%	-45.14%
LC_LC3		10	15.8	12.59	19.01	17	4	19	1.42	28.43%	-9.72%
LC_LC5		10	21.6	19.72	23.48	21	18	26	0.8327	12.19%	-50.00%
LC_LCDSSLCC		10	18.2	15.73	20.67	18.5	12	22	1.093	19.00%	-26.39%
RG_MIDAG		10	20.7	18.51	22.89	21	14	24	0.9667	14.77%	-43.75%

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
FR_UFR1		22	16	23	21	23	13	4	3	2	17
GH_ER2		22	19	20	19	20	26	24	8	21	25
CM_MC1		20	21	11	20	13	22	23	21	19	11
LC_SLC	XC	20	16	20	22	23	24	4	12	15	16
FR_FRABCH		17	11	12	13	19	20	19	21	20	17
FR_FRCP1		22	21	18	9	11	18	21	18	17	19
GH_FR1		24	10	22	20	24	25	15	19	22	19
GH_ERC		19	22	18	13	23	16	16	13	18	23
CM_MC2		21	17	19	17	21	18	11	12	21	22
EV_MC2		20	21	19	24	24	22	19	20	22	21
EV_HC1		19	22	22	25	24	22	18	22	24	21
LC_DCDS		23	23	26	20	12	20	23	20	20	22
LC_LC3		13	17	18	16	19	17	18	4	19	17
LC_LC5		19	20	21	18	26	21	24	20	25	22
LC_LCDSSLCC		14	17	18	22	19	22	21	12	21	16
RG_MIDAG		21	14	24	24	21	24	21	19	20	19

Graphics





CETIS Summary Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Batch ID:	05-1396-7883	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	21 Nov-19 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	29 Nov-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	12-3692-1381	21 Nov-19	21 Nov-19	11h	Teck Coal	Teck Coal Q4
FR_UFR1 (W1)	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	9d 2h (0 °C)		
FR_UFR1 (W2)	05-1656-4161	19 Nov-19 09:25	20 Nov-19 11:50	50h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	20% Perrier Control	
FR_UFR1 (W1)	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
FR_UFR1 (W2)	Water Sample	Teck Coal	FR_UFR1_WS_2019-11-19	

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
05-7328-2488	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 7d survival rate	1
05-7328-2488	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
05-7328-2488	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
05-7328-2488	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 7d survival rate	1
05-7328-2488	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
05-7328-2488	7d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 7d survival rate	1
13-6736-3791	Reproduction	Dunnett Multiple Comparison Test	0.5412	Lab Control passed reproduction	1
13-6736-3791	Reproduction	Dunnett Multiple Comparison Test	0.5412	FR_UFR1 passed reproduction	1
13-6736-3791	Reproduction	Dunnett Multiple Comparison Test	0.5412	FR_UFR1 passed reproduction	1
13-6736-3791	Reproduction	Dunnett Multiple Comparison Test	0.4442	Lab Control passed reproduction	1
13-6736-3791	Reproduction	Dunnett Multiple Comparison Test	0.4442	FR_UFR1 passed reproduction	1
13-6736-3791	Reproduction	Dunnett Multiple Comparison Test	0.4442	FR_UFR1 passed reproduction	1

7d Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	N	10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_UFR1 (W1)		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%
FR_UFR1 (W2)		10	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.00%	0.00%

Reproduction Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	N	10	19.2	16.64	21.76	15	25	1.133	3.584	18.67%	0.00%
FR_UFR1 (W1)		10	18.8	17.38	20.22	16	21	0.6289	1.989	10.58%	2.08%
FR_UFR1 (W2)		10	18.5	16.28	20.72	13	23	0.9804	3.1	16.76%	3.65%

7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_UFR1 (W1)		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_UFR1 (W2)		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

Reproduction Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	18	15	23	16	25	15	18	23	18	21
FR_UFR1 (W1)		21	19	21	16	16	21	17	19	18	20
FR_UFR1 (W2)		16	21	17	19	13	16	23	20	18	22

JW

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1 (in1)		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1 (in2)		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Analyst: JN QA: Feb. 5/20

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-7328-2488	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Dec-19 17:40	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	05-1396-7883	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	21 Nov-19 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	29 Nov-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	12-3692-1381	21 Nov-19	21 Nov-19	11h	Teck Coal	Teck Coal Q4
FR_UFR1 (W1)	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	9d 2h (0 °C)		
FR_UFR1 (W2)	05-1656-4161	19 Nov-19 09:25	20 Nov-19 11:50	50h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	20% Perrier Control	
FR_UFR1 (W1)	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
FR_UFR1 (W2)	Water Sample	Teck Coal	FR_UFR1_WS_2019-11-19	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1 (W1)	1.0000	Exact	1.0000	Non-Significant Effect
		FR_UFR1 (W2)	1.0000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	N	10	0	10	1	0	0.0%
FR_UFR1 (W1)		10	0	10	1	0	0.0%
FR_UFR1 (W2)		10	0	10	1	0	0.0%

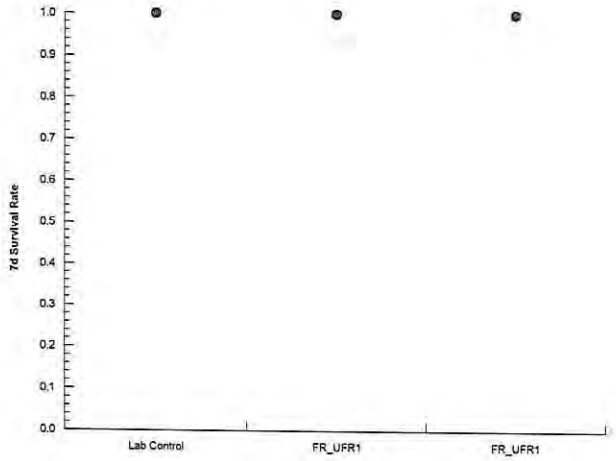
7d Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_UFR1 (W1)		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
FR_UFR1 (W2)		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

7d Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1 (W1)		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
FR_UFR1 (W2)		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst: JN QA: Feb-5/20

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-6736-3791	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Dec-19 17:40	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	05-1396-7883	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	21 Nov-19 11:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water with Se and B12
Ending Date:	29 Nov-19 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	8d 1h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	12-3692-1381	21 Nov-19	21 Nov-19	11h	Teck Coal	Teck Coal Q4
FR_UFR1 (W1)	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	9d 2h (0 °C)		
FR_UFR1 (W2)	05-1656-4161	19 Nov-19 09:25	20 Nov-19 11:50	50h (0 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	20% Perrier Control	
FR_UFR1 (W1)	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
FR_UFR1 (W2)	Water Sample	Teck Coal	FR_UFR1_WS_2019-11-19	

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed reproduction	13.80%
		FR_UFR1 passed reproduction	13.80%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1 (W1)	0.3014	1.997	2.65	18	CDF	0.5412	Non-Significant Effect
		FR_UFR1 (W2)	0.5275	1.997	2.65	18	CDF	0.4442	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.46667	1.23333	2	0.1401	0.8699	Non-Significant Effect
Error	237.7	8.8037	27			
Total	240.167		29			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	2.869	9.21	0.2382	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9808	0.9031	0.8452	Normal Distribution

Reproduction Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	N	10	19.2	16.64	21.76	18	15	25	1.133	18.67%	0.00%
FR_UFR1 (W1)		10	18.8	17.38	20.22	19	16	21	0.6289	10.58%	2.08%
FR_UFR1 (W2)		10	18.5	16.28	20.72	18.5	13	23	0.9804	16.76%	3.65%

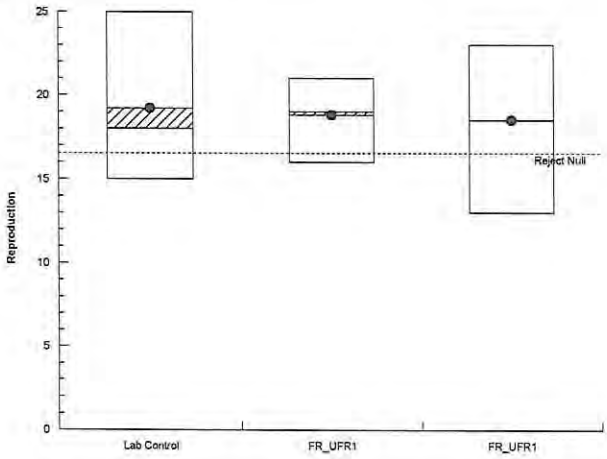
Reproduction Detail

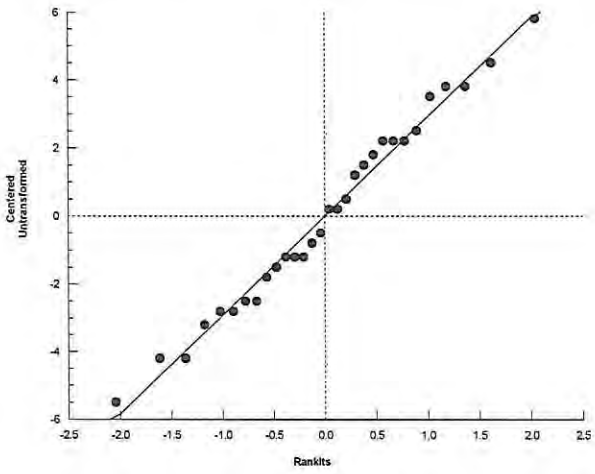
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
Lab Control	N	18	15	23	16	25	15	18	23	18	21
FR_UFR1 (W1)		21	19	21	16	16	21	17	19	18	20
FR_UFR1 (W2)		16	21	17	19	13	16	23	20	18	22

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-6736-3791	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Dec-19 17:40	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Graphics





APPENDIX B – *Pseudokirchneriella subcapitata* toxicity test data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck coal
Work Order No.: 192274

Start Date: Nov 14, 2019 @ 1300h
Set up by: MLT

Sample Information:

Sample ID: various - see below
Sample Date: Nov 12, 2019
Date Received: Nov 13, 2019
Sample Volume: 4 - 12 x 20 L

Test Organism Information:

Culture Date: Nov 8, 2019
Age of culture (Day 0): 6 days

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC 191
Stock Solution ID: 19 Zn 02
Date Initiated: Nov 22, 2019

72-h IC50 (95% CL): 26.6 (23.5 - 30.0) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 31.6 (25.8 - 38.7) ug/L Zn CV (%): 10

Test Results:

signs below
* & indicates cell yield that is significantly lower than site control :
α - FR - UFR 1
β - GH - ER 2
- CM - MC 1
δ - LC - SLC

	Cell Yield (Mean± SD)
Negative Control	40.6 ± 3.4
FR_UFR1_MON_2019-11-12_N	121.6 ± 7.9
GH_ER2_WS_2019-11-04_N	113.4 ± 7.7
CM_MC1_WS_2019-11-12_N	117.9 ± 8.3
LC_SLC_WS_2019-08-19_N	113.6 ± 11.6
FR_FRABCH_MON_2019-11-12_NP	103.5 ± 7.2 α #
FR_FRCP1_WS_2019-11-12_N	103.8 ± 10.0 α #
GH_FR1_WS_2019-11-04_N	119.5 ± 8.2
GH_ERC_WS_2019-11-04_N	124.8 ± 4.1

All samples are significantly greater than the negative control.

Reviewed by: [signature]

Date reviewed: Jan 14, 2020

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck COAL
Work Order No.: 192274

Start Date: NOV 14, 2019 @ 1300h
Set up by: MLT

Sample Information:

Sample ID: various - see below
Sample Date: NOV 12, 2019
Date Received: NOV 13, 2019
Sample Volume: 4 - 12 x 20 L

Test Organism Information:

Culture Date: NOV 8, 2019
Age of culture (Day 0): 6 days

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC 191
Stock Solution ID: 19 Zn 02
Date Initiated: NOV 22, 2019

72-h IC50 (95% CL): 26.6 (23.5 - 30.0) mg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 31.6 (25.8 - 38.7) mg/L Zn CV (%): 10

Test Results:

	Cell Yield (Mean± SD)
~~Negative Control~~ JW	±
CM_MC2_WS_2019-11-12_N	111.5 ± 6.0
EV_MC2_WS_2019_Q4_WK1_N	106.8 ± 3.5 α
EV_HC1_WS_2019_Q4_WK1_N	115.8 ± 3.9
LC_DCDS_WS_2019-08-19_N	120.0 ± 7.0
LC_LC3_WS_2019-08-19_N	122.8 ± 8.5
LC_LC5_WS_2019-08-19_N	129.8 ± 8.5
LC_LCDSSLCC_~~2019~~ WS_2019-08-19_N	104.0 ± 10.0 α #
JW	±

All samples are significantly greater than the negative control.

Reviewed by: [signature]
Date reviewed: Jan. 14, 2020

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MG

Sample ID: various | Test Date/Time: Nov 14/19 @ 1300h

Work Order No.: 192274 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Nov 8/19 | Age of Culture: 6d | Culture Health: Good.

Culture Count: 1 355 2 395 | Average: 375 | Culture Cell Density (c1): 375 x10⁴ cells/mL

$v1 = \frac{220{,}000 \text{ cells/ml} \times 100 \text{ ml}}{(c1) \quad 375 \times 10^4 \quad \text{cells/ml}} = 5.87 \text{ mL}$

Time Zero Counts: 1 22 2 21 | Average: 21.5

No. of Cells/mL: 21.5 x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9773 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.3	23.0	23.0	25.0	25.0	26.0	✓	✓	✓	✓
(site) FR_UFR1	8.3	23.0					✓	✓	✓	✓
(site) GH_ER2	8.3	23.0					✓	✓	✓	✓
(site) CM_MC1	8.3	23.0					✓	✓	✓	✓
(site) LC_SLC	8.3	23.0					✓	✓	✓	✓
FR_FRABCH	8.4	23.0					✓	✓	✓	✓
FR_FRCP1	8.4	23.0					✓	✓	✓	✓
GH_FR1	8.4	23.0					✓	✓	✓	✓
GH_ERC	8.3	23.0					✓	✓	✓	✓
CM_MC2	8.4	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MG	MG	MG	MG	✓	✓	MG	MG	✓	✓

Initial control pH: Well 1: 7.3 | Well 2: 7.3

Final control pH: Well 1: 7.2 | Well 2: 7.2

Light intensity (lux): 4300 | Date measured: Nov. 14/19

Thermometer: 4 | Light meter: 1 | pH meter/probe: 1, 1

Sample Description: Please refer to COC.

Comments:

Reviewed: [signature] | Date reviewed: Jan. 14, 2020

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: TCCK | Setup by: MG

Sample ID: various | Test Date/Time: Nov 14/19 @ 1300h

Work Order No.: 192274 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Nov 8/19 | Age of Culture: 6d | Culture Health: Good

Culture Count: 1335 2395 | Average: 375 | Culture Cell Density (c1): 375 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 375X10⁴ cells/ml = 5.87mL

Time Zero Counts: 1 22 2 21 | Average: 21.5

No. of Cells/mL: 21.5 x 10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9773 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.3	23.0	25.0	25.0	25.0	26.0	✓	✓	✓	✓
EV_MC2	8.4	23.0	↓	↓	↓	↓	✓	✓	✓	✓
EV_HCl	8.4	23.0					✓	✓	✓	✓
LC_DCDS	8.3	23.0					✓	✓	✓	✓
LC_LC3	8.3	23.0					✓	✓	✓	✓
LC_LC5	8.4	23.0					✓	✓	✓	✓
LC_LCDSSLCC	8.4	23.0					✓	✓	✓	✓
Initials	MG	MG	MG	MG	↓	↓	MG	MG	↓	↓

Initial control pH: Well 1: 7.3 Well 2: 7.3

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 4300 Date measured: Nov 14/19

Thermometer: 4 Light meter: 1 pH meter/probe: 1/1

Sample Description:

Comments:

Reviewed: [signature] Date reviewed: Jan 14, 2020

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: Nov 14/19 @ 1300h
Work Order #: 192274
Termination Date: Nov 17/19 @ 1300h
Sample ID: various
Test set up by: MC
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	44					MC
	B	42					
	C	47					
	D	38					
	E	41					
	F	36					
	G	42					
	H	43					
FR4FR1 (site)	A	115					
	B	133					
	C	118					
	D	130					
	E (A dup)	129					
	F (B dup)	116					
	G (C dup)	127					
	H (D dup)	113					
GH_ER2 (site)	A	106					
	B	102					
	C	119					
	D	121					
	E (A dup)	125					
	F (B dup)	115					
	G (C dup)	116					
	H (D dup)	111					
CM_MC1 (site)	A	108					
	B	125					
	C	119					
	D	106					
	E (A dup)	130					
	F (B dup)	125					
	G (C dup)	118					
	H (D dup)	120					
	A						
	B						
	C						
	D						

Comments:

Reviewed by: [signature] Date Reviewed: Jan. 14, 2020

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: Nov 14/19 @ 1300h
Work Order #: 192774
Termination Date: Nov 17/19 @ 1300h
Sample ID: various
Test set up by: MC
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A						
	B						
	C						
	D						
	E						
	F						
	G						
	H						
LC_SLC (Site)	A	110					MC
	B	103					
	C	122					
	D	135					
EAMG	A	121					
FB	B	118					
GC	C	100					
HD	D	108					
FR_REABCH	A	100					
	B	114					
	C	98					
	D	106					
FR_FRCP1	A	114					
	B	93					
	C	112					
	D	100					
GH_FR1	A	122					
	B	130					
	C	110					
	D	120					
GH_ERC	A	121					
	B	126					
	C	125					
	D	131					
CM_MC2	A	111					
	B	115					
	C	119					
	D	105					

Comments:

Reviewed by: [signature] Date Reviewed: Jan 14, 2020

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: Nov 14/19 @ 1300h
Work Order #: 192274
Termination Date: Nov 17/19 @ 1300h
Sample ID: Various
Test set up by: MG
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A						MG
	B						
	C						
	D						
	E						
	F						
	G						
	H						
EV_MC2	A	104					
	B	106					
	C	112					
	D	109					
EV_HCl	A	122					
	B	113					
	C	117					
	D	115					
LC_DLDS	A	114					
	B	128					
	C	126					
	D	116					
LC_LC3	A	115					
	B	132					
	C	130					
	D	118					
LC_LC5	A	125					
	B	137					
	C	139					
	D	121					
LC_LCDSBLCC	A	102					
	B	106					
	C	94					
	D	118					
	A						
	B						
	C						
	D						

Comments:

Reviewed by: [signature] Date Reviewed: Jan 14, 2020

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 192274
Sample ID: Teck Coal various samples pass/fail

Start Date/Time: 14-Nov-19 @ 1300h
Termination Date/Time: 17-Nov-19 @ 1300h
Initial Cell Density: 9773 cell/mL

									215000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9772.727
Control	A	44				44	43.0	mean	40.6
Lab Control	B	42				42	41.0	SD	3.420004
	C	47				47	46.0	CV	8.413765
	D	38				38	37.0		
	E	41				41	40.0		
	F	36				36	35.0		
	G	42				42	41.0		
	H	43				43	42.0		
Control	A	115				115	114.0	mean	121.6
Site Water	B	133				133	132.0	SD	7.909082
(FR_UFR1)	C	118				118	117.0	CV	6.501627
95.2% (v/v)	D	130				130	129.0		
	E	129				129	128.0		
	F	116				116	115.0		
	G	127				127	126.0		
	H	113				113	112.0		
Control	A	106				106	105.0	mean	113.4
Site Water	B	102				102	101.0	SD	7.707835
(GH_ER2)	C	119				119	118.0	CV	6.797169
95.2% (v/v)	D	121				121	120.0		
	E	125				125	124.0		
	F	115				115	114.0		
	G	116				116	115.0		
	H	111				111	110.0		
Control	A	108				108	107.0	mean	117.9
Site Water	B	125				125	124.0	SD	8.322731
(CM_MC1)	C	119				119	118.0	CV	7.059281
95.2% (v/v)	D	106				106	105.0		
	E	130				130	129.0		
	F	125				125	124.0		
	G	118				118	117.0		
	H	120				120	119.0		
						#DIV/0!	#DIV/0!		
						#DIV/0!	#DIV/0!		
						#DIV/0!	#DIV/0!		
						#DIV/0!	#DIV/0!		

Reviewed by: _____

Date reviewed: Jan. 14, 2020

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 192274
Sample ID: Teck Coal various samples pass/fail

Start Date/Time: 14-Nov-19 @ 1300h
Termination Date/Time: 17-Nov-19 @ 1300h
Initial Cell Density: 9773 cell/mL

									215000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9772.727
Control	A	44				44	43.0	mean	40.6
	B	42				42	41.0	SD	3.420004
	C	47				47	46.0	CV	8.413765
	D	38				38	37.0		
	A	41				41	40.0		
	B	36				36	35.0		
	C	42				42	41.0		
	D	43				43	42.0		
Site Control	A	110				110	109.0	mean	113.6
(LC_SLC)	B	103				103	102.0	SD	11.56272
95.2% (v/v)	C	122				122	121.0	CV	10.17417
	D	135				135	134.0		
	E	121				121	120.0		
	F	118				118	117.0		
	G	100				100	99.0		
	H	108				108	107.0		
FR_FRABCH	A	100				100	99.0		
95.2% (v/v)	B	114				114	113.0		
	C	98				98	97.0		
	D	106				106	105.0		
FR_FRCP1	A	114				114	113.0		
95.2% (v/v)	B	93				93	92.0		
	C	112				112	111.0		
	D	100				100	99.0		
GH_FR1	A	122				122	121.0		
95.2% (v/v)	B	130				130	129.0		
	C	110				110	109.0		
	D	120				120	119.0		
GH_ERC	A	121				121	120.0		
95.2% (v/v)	B	126				126	125.0		
	C	125				125	124.0		
	D	131				131	130.0		
CM_MC2	A	111				111	110.0		
95.2% (v/v)	B	115				115	114.0		
	C	119				119	118.0		
	D	105				105	104.0		

Reviewed by: _____

Date reviewed: Jan. 14, 2020

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 192274
Sample ID: Teck Coal various samples pass/fail

Start Date/Time: 14-Nov-19 @ 1300h
Termination Date/Time: 17-Nov-19 @ 1300h
Initial Cell Density: 9773 cell/mL

									215000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9772.727
Control	A	44				44	43.0	mean	40.6
	B	42				42	41.0	SD	3.420004
	C	47				47	46.0	CV	8.413765
	D	38				38	37.0		
	A	41				41	40.0		
	B	36				36	35.0		
	C	42				42	41.0		
	D	43				43	42.0		
EV_MC2	A	104				104	103.0		
95.2% (v/v)	B	106				106	105.0		
	C	112				112	111.0		
	D	109				109	108.0		
EV_HC1	A	122				122	121.0		
95.2% (v/v)	B	113				113	112.0		
	C	117				117	116.0		
	D	115				115	114.0		
LC_DCDS	A	114				114	113.0		
95.2% (v/v)	B	128				128	127.0		
	C	126				126	125.0		
	D	116				116	115.0		
LC_LC3	A	115				115	114.0		
95.2% (v/v)	B	132				132	131.0		
	C	130				130	129.0		
	D	118				118	117.0		
LC_LC5	A	125				125	124.0		
95.2% (v/v)	B	137				137	136.0		
	C	139				139	138.0		
	D	122				122	121.0		
LC_LCDSSLC	A	102				102	101.0		
95.2% (v/v)	B	106				106	105.0		
	C	94				94	93.0		
	D	118				118	117.0		
	A					#DIV/0!	#DIV/0!		
	B					#DIV/0!	#DIV/0!		
	C					#DIV/0!	#DIV/0!		
	D					#DIV/0!	#DIV/0!		

Reviewed by: _____

Date reviewed: Jan. 14, 2020

EC Alga Growth Inhibition Test

Nautilus Environmental

Batch ID:	20-5059-7041	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	14 Nov-19 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	17 Nov-19 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	13-5462-4084	14 Nov-19	14 Nov-19	13h	Teck Coal	
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	51h (0 °C)		
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	49h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	50h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	48h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	50h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	50h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	46h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	47h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	49h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	50h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	52h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	50h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	48h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	51h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	50h (1.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1

EC Alga Growth Inhibition Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC5 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_DCDS failed cell yield	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_HC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	EV_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LC3 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_FR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_LCDSSLCC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_UFR1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRCP1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	Lab Control failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	FR_FRABCH failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	LC_SLC failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	CM_MC1 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ER2 failed cell yield	1
09-7665-9953	Cell Yield	Dunnett Multiple Comparison Test	6.2E-07	GH_ERC failed cell yield	1

Cell Yield Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	N	8	40.62	37.77	43.48	35	46	1.209	3.42	8.42%	0.00%
FR_UFR1		8	121.6	115	128.2	112	132	2.796	7.909	6.50%	-199.38%
GH_ER2		8	113.4	106.9	119.8	101	124	2.725	7.708	6.80%	-179.08%
CM_MC1		8	117.9	110.9	124.8	105	129	2.943	8.323	7.06%	-190.15%
LC_SLC	XC	8	113.6	104	123.3	99	134	4.088	11.56	10.18%	-179.69%
FR_FRABCH		4	103.5	92.06	114.9	97	113	3.594	7.188	6.94%	-154.77%
FR_FRCP1		4	103.8	87.87	119.6	92	113	4.99	9.979	9.62%	-155.38%
GH_FR1		4	119.5	106.4	132.6	109	129	4.113	8.226	6.88%	-194.15%
GH_ERC		4	124.8	118.2	131.3	120	130	2.056	4.113	3.30%	-207.08%
CM_MC2		4	111.5	102	121	104	118	2.986	5.972	5.36%	-174.46%
EV_MC2		4	106.8	101.2	112.3	103	111	1.75	3.5	3.28%	-162.77%
EV_HC1		4	115.8	109.6	121.9	112	121	1.931	3.862	3.34%	-184.92%
LC_DCDS		4	120	108.8	131.2	113	127	3.512	7.024	5.85%	-195.38%
LC_LC3		4	122.8	109.2	136.3	114	131	4.25	8.5	6.92%	-202.15%
LC_LC5		4	129.8	116.2	143.3	121	138	4.25	8.5	6.55%	-219.38%
LC_LCDSSLCC		4	104	88.09	119.9	93	117	5	10	9.62%	-156.00%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	N	43	41	46	37	40	35	41	42
FR_UFR1		114	132	117	129	128	115	126	112
GH_ER2		105	101	118	120	124	114	115	110
CM_MC1		107	124	118	105	129	124	117	119
LC_SLC	XC	109	102	121	134	120	117	99	107
FR_FRABCH		99	113	97	105				
FR_FRCP1		113	92	111	99				
GH_FR1		121	129	109	119				
GH_ERC		120	125	124	130				
CM_MC2		110	114	118	104				
EV_MC2		103	105	111	108				
EV_HC1		121	112	116	114				
LC_DCDS		113	127	125	115				
LC_LC3		114	131	129	117				
LC_LC5		124	136	138	121				
LC_LCDSSLCC		101	105	93	117				

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	09-7665-9953	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 17:18	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-5059-7041	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	14 Nov-19 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	17 Nov-19 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	13-5462-4084	14 Nov-19	14 Nov-19	13h	Teck Coal	
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	51h (0 °C)		
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	49h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	50h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	48h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	50h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	50h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	46h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	47h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	49h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	50h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	52h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	50h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	48h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	51h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	50h (1.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	09-7665-9953	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 17:18	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 failed cell yield	31.60%
		GH_ER2 failed cell yield	31.60%
		CM_MC1 failed cell yield	31.60%
		LC_SLC failed cell yield	31.60%
		FR_FRABCH failed cell yield	31.60%
		FR_FRCP1 failed cell yield	31.60%
		GH_FR1 failed cell yield	31.60%
		GH_ERC failed cell yield	31.60%
		CM_MC2 failed cell yield	31.60%
		EV_MC2 failed cell yield	31.60%
		EV_HC1 failed cell yield	31.60%
		LC_DCDS failed cell yield	31.60%
		LC_LC3 failed cell yield	31.60%
		LC_LC5 failed cell yield	31.60%
		LC_LCDSSLCC failed cell yield	31.60%

Dunnett Multiple Comparison Test

Sample I vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	FR_UFR1*	20.78	2.688	10.48	14	CDF	6.2E-07	Significant Effect
	GH_ER2*	18.66	2.688	10.48	14	CDF	6.2E-07	Significant Effect
	CM_MC1*	19.82	2.688	10.48	14	CDF	6.2E-07	Significant Effect
	LC_SLC*	18.73	2.688	10.48	14	CDF	6.2E-07	Significant Effect
	FR_FRABCH*	13.17	2.688	12.84	10	CDF	6.2E-07	Significant Effect
	FR_FRCP1*	13.22	2.688	12.84	10	CDF	6.2E-07	Significant Effect
	GH_FR1*	16.52	2.688	12.84	10	CDF	6.2E-07	Significant Effect
	GH_ERC*	17.62	2.688	12.84	10	CDF	6.2E-07	Significant Effect
	CM_MC2*	14.84	2.688	12.84	10	CDF	6.2E-07	Significant Effect
	EV_MC2*	13.85	2.688	12.84	10	CDF	6.2E-07	Significant Effect
	EV_HC1*	15.73	2.688	12.84	10	CDF	6.2E-07	Significant Effect
	LC_DCDS*	16.62	2.688	12.84	10	CDF	6.2E-07	Significant Effect
	LC_LC3*	17.2	2.688	12.84	10	CDF	6.2E-07	Significant Effect
	LC_LC5*	18.67	2.688	12.84	10	CDF	6.2E-07	Significant Effect
	LC_LCDSSLCC*	13.27	2.688	12.84	10	CDF	6.2E-07	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.887	3.323	0.2621	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.887		0.5484	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	44554.2	2970.28	15	48.86	<1.0E-37	Significant Effect
Error	4133.88	60.7923	68			
Total	48688		83			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	14.87	30.58	0.4611	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9831	0.9596	0.3404	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 09-7665-9953 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:18 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

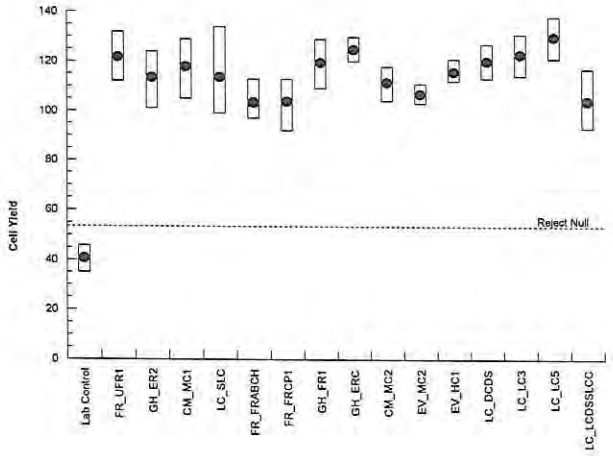
Cell Yield Summary

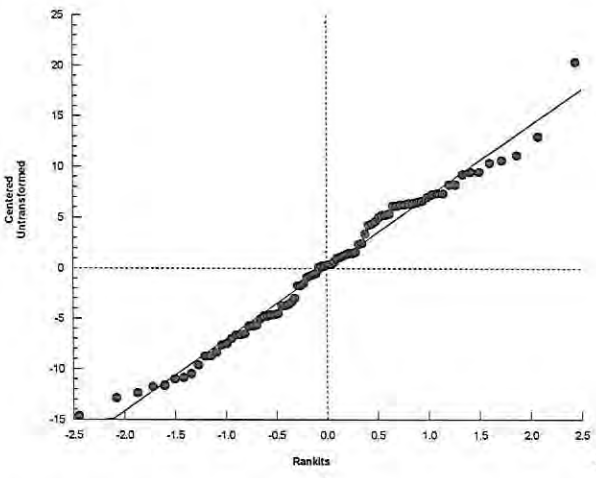
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	N	8	40.62	37.77	43.48	41	35	46	1.209	8.42%	0.00%
FR_UFR1		8	121.6	115	128.2	121.5	112	132	2.796	6.50%	-199.38%
GH_ER2		8	113.4	106.9	119.8	114.5	101	124	2.725	6.80%	-179.08%
CM_MC1		8	117.9	110.9	124.8	118.5	105	129	2.943	7.06%	-190.15%
LC_SLC		8	113.6	104	123.3	113	99	134	4.088	10.18%	-179.69%
FR_FRABCH		4	103.5	92.06	114.9	102	97	113	3.594	6.94%	-154.77%
FR_FRCP1		4	103.8	87.87	119.6	105	92	113	4.99	9.62%	-155.38%
GH_FR1		4	119.5	106.4	132.6	120	109	129	4.113	6.88%	-194.15%
GH_ERC		4	124.8	118.2	131.3	124.5	120	130	2.056	3.30%	-207.08%
CM_MC2		4	111.5	102	121	112	104	118	2.986	5.36%	-174.46%
EV_MC2		4	106.8	101.2	112.3	106.5	103	111	1.75	3.28%	-162.77%
EV_HC1		4	115.8	109.6	121.9	115	112	121	1.931	3.34%	-184.92%
LC_DCDS		4	120	108.8	131.2	120	113	127	3.512	5.85%	-195.38%
LC_LC3		4	122.8	109.2	136.3	123	114	131	4.25	6.92%	-202.15%
LC_LC5		4	129.8	116.2	143.3	130	121	138	4.25	6.55%	-219.38%
LC_LCDSSLCC		4	104	88.09	119.9	103	93	117	5	9.62%	-156.00%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
Lab Control	N	43	41	46	37	40	35	41	42
FR_UFR1		114	132	117	129	128	115	126	112
GH_ER2		105	101	118	120	124	114	115	110
CM_MC1		107	124	118	105	129	124	117	119
LC_SLC		109	102	121	134	120	117	99	107
FR_FRABCH		99	113	97	105				
FR_FRCP1		113	92	111	99				
GH_FR1		121	129	109	119				
GH_ERC		120	125	124	130				
CM_MC2		110	114	118	104				
EV_MC2		103	105	111	108				
EV_HC1		121	112	116	114				
LC_DCDS		113	127	125	115				
LC_LC3		114	131	129	117				
LC_LC5		124	136	138	121				
LC_LCDSSLCC		101	105	93	117				

Graphics





EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-3682-6991	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 17:18	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-5059-7041	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	14 Nov-19 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	17 Nov-19 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	51h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	49h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	50h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	48h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	50h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	50h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	46h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	47h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	49h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	50h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	52h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	50h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	48h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	51h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	50h (1.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 11-3682-6991 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:18 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed cell yield	10.99%
		CM_MC1 passed cell yield	10.99%
		LC_SLC passed cell yield	10.99%
		FR_FRABCH failed cell yield	10.99%
		FR_FRCP1 failed cell yield	10.99%
		GH_FR1 passed cell yield	10.99%
		GH_ERC passed cell yield	10.99%
		CM_MC2 passed cell yield	10.99%
		EV_MC2 failed cell yield	10.99%
		EV_HC1 passed cell yield	10.99%
		LC_DCDS passed cell yield	10.99%
		LC_LC3 passed cell yield	10.99%
		LC_LC5 passed cell yield	10.99%
		LC_LCDSSLCC failed cell yield	10.99%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2	2.024	2.677	10.91	14	CDF	0.1941	Non-Significant Effect
FR_HER1		CM_MC1	0.9202	2.677	10.91	14	CDF	0.7190	Non-Significant Effect
		LC_SLC	1.963	2.677	10.91	14	CDF	0.2158	Non-Significant Effect
		FR_FRABCH*	3.632	2.677	13.36	10	CDF	0.0036	Significant Effect
		FR_FRCP1*	3.581	2.677	13.36	10	CDF	0.0042	Significant Effect
		GH_FR1	0.4258	2.677	13.36	10	CDF	0.8965	Non-Significant Effect
		GH_ERC	-0.6261	2.677	13.36	10	CDF	0.9969	Non-Significant Effect
		CM_MC2	2.029	2.677	13.36	10	CDF	0.1927	Non-Significant Effect
		EV_MC2*	2.98	2.677	13.36	10	CDF	0.0234	Significant Effect
		EV_HC1	1.177	2.677	13.36	10	CDF	0.5920	Non-Significant Effect
		LC_DCDS	0.3256	2.677	13.36	10	CDF	0.9195	Non-Significant Effect
		LC_LC3	-0.2254	2.677	13.36	10	CDF	0.9852	Non-Significant Effect
		LC_LC5	-1.628	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLCC*	3.531	2.677	13.36	10	CDF	0.0049	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.772	3.288	0.3444	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.772		0.3987	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3946.95	281.925	14	4.244	3.7E-05	Significant Effect
Error	4052	66.4262	61			
Total	7998.95		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.249	29.14	0.8148	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9776	0.9559	0.1993	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 11-3682-6991 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:18 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

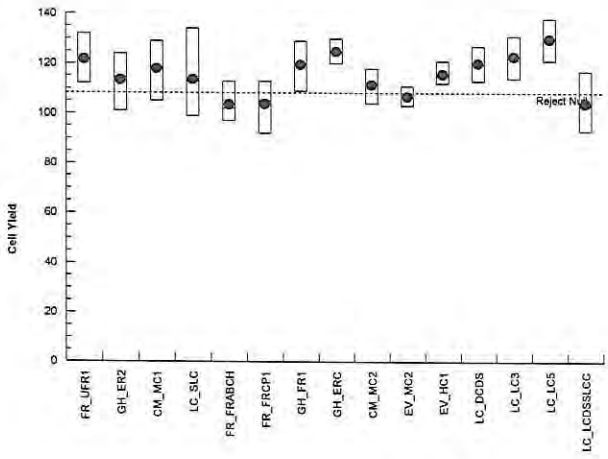
Cell Yield Summary

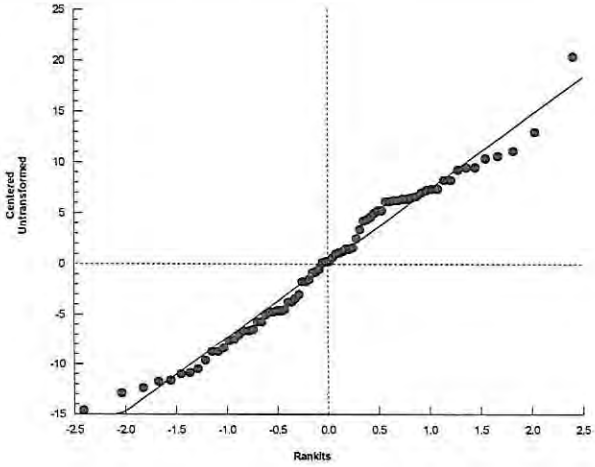
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	8	121.6	115	128.2	121.5	112	132	2.796	6.50%	0.00%
GH_ER2		8	113.4	106.9	119.8	114.5	101	124	2.725	6.80%	6.78%
CM_MC1		8	117.9	110.9	124.8	118.5	105	129	2.943	7.06%	3.08%
LC_SLC		8	113.6	104	123.3	113	99	134	4.088	10.18%	6.58%
FR_FRABCH		4	103.5	92.06	114.9	102	97	113	3.594	6.94%	14.90%
FR_FRCP1		4	103.8	87.87	119.6	105	92	113	4.99	9.62%	14.70%
GH_FR1		4	119.5	106.4	132.6	120	109	129	4.113	6.88%	1.75%
GH_ERC		4	124.8	118.2	131.3	124.5	120	130	2.056	3.30%	-2.57%
CM_MC2		4	111.5	102	121	112	104	118	2.986	5.36%	8.32%
EV_MC2		4	106.8	101.2	112.3	106.5	103	111	1.75	3.28%	12.23%
EV_HC1		4	115.8	109.6	121.9	115	112	121	1.931	3.34%	4.83%
LC_DCDS		4	120	108.8	131.2	120	113	127	3.512	5.85%	1.34%
LC_LC3		4	122.8	109.2	136.3	123	114	131	4.25	6.92%	-0.92%
LC_LC5		4	129.8	116.2	143.3	130	121	138	4.25	6.55%	-6.68%
LC_LCDSSLCC		4	104	88.09	119.9	103	93	117	5	9.62%	14.49%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	XC	114	132	117	129	128	115	126	112
GH_ER2		105	101	118	120	124	114	115	110
CM_MC1		107	124	118	105	129	124	117	119
LC_SLC		109	102	121	134	120	117	99	107
FR_FRABCH		99	113	97	105				
FR_FRCP1		113	92	111	99				
GH_FR1		121	129	109	119				
GH_ERC		120	125	124	130				
CM_MC2		110	114	118	104				
EV_MC2		103	105	111	108				
EV_HC1		121	112	116	114				
LC_DCDS		113	127	125	115				
LC_LC3		114	131	129	117				
LC_LC5		124	136	138	121				
LC_LCDSSLCC		101	105	93	117				

Graphics





EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	13-6787-1455	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 17:18	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-5059-7041	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	14 Nov-19 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	17 Nov-19 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	51h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	49h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	50h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	48h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	50h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	50h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	46h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	47h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	49h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	50h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	52h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	50h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	48h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	51h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	50h (1.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-6787-1455	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 17:18	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	GH_ER2 passed cell yield	10.99%
		CM_MC1 passed cell yield	10.99%
		LC_SLC passed cell yield	10.99%
		FR_FRABCH passed cell yield	10.99%
		FR_FRCP1 passed cell yield	10.99%
		GH_FR1 passed cell yield	10.99%
		GH_ERC passed cell yield	10.99%
		CM_MC2 passed cell yield	10.99%
		EV_MC2 passed cell yield	10.99%
		EV_HC1 passed cell yield	10.99%
		LC_DCDS passed cell yield	10.99%
		LC_LC3 passed cell yield	10.99%
		LC_LC5 passed cell yield	10.99%
		LC_LCDSSLCC passed cell yield	10.99%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2	-2.024	2.677	10.91	14	CDF	1.0000	Non-Significant Effect
FR_nFR1		CM_MC1	-0.9202	2.677	10.91	14	CDF	0.9992	Non-Significant Effect
		LC_SLC	-1.963	2.677	10.91	14	CDF	1.0000	Non-Significant Effect
		FR_FRABCH	-3.632	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		FR_FRCP1	-3.581	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		GH_FR1	-0.4258	2.677	13.36	10	CDF	0.9930	Non-Significant Effect
		GH_ERC	0.6261	2.677	13.36	10	CDF	0.8374	Non-Significant Effect
		CM_MC2	-2.029	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		EV_MC2	-2.98	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		EV_HC1	-1.177	2.677	13.36	10	CDF	0.9998	Non-Significant Effect
		LC_DCDS	-0.3256	2.677	13.36	10	CDF	0.9897	Non-Significant Effect
		LC_LC3	0.2254	2.677	13.36	10	CDF	0.9385	Non-Significant Effect
		LC_LC5	1.628	2.677	13.36	10	CDF	0.3592	Non-Significant Effect
		LC_LCDSSLCC	-3.531	2.677	13.36	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.772	3.288	0.3444	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.772		0.3987	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3946.95	281.925	14	4.244	3.7E-05	Significant Effect
Error	4052	66.4262	61			
Total	7998.95		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.249	29.14	0.8148	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9776	0.9559	0.1993	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 13-6787-1455 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:18 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

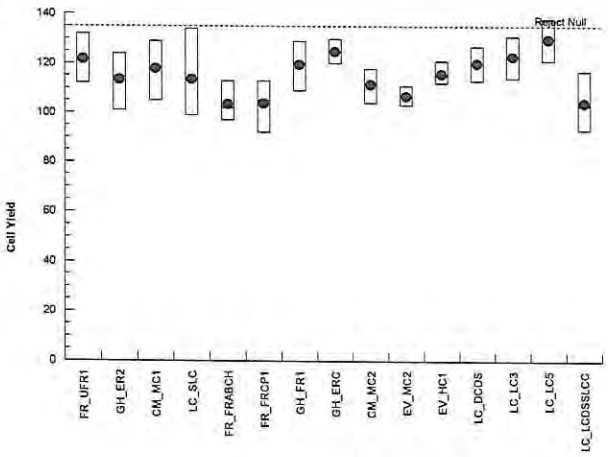
Cell Yield Summary

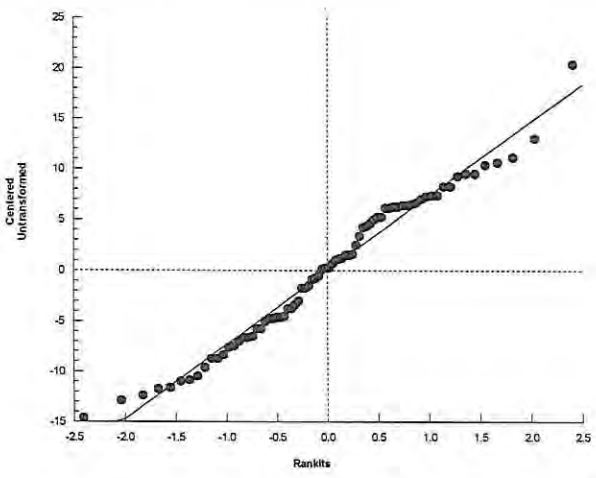
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	8	121.6	115	128.2	121.5	112	132	2.796	6.50%	0.00%
GH_ER2		8	113.4	106.9	119.8	114.5	101	124	2.725	6.80%	6.78%
CM_MC1		8	117.9	110.9	124.8	118.5	105	129	2.943	7.06%	3.08%
LC_SLC		8	113.6	104	123.3	113	99	134	4.088	10.18%	6.58%
FR_FRABCH		4	103.5	92.06	114.9	102	97	113	3.594	6.94%	14.90%
FR_FRCP1		4	103.8	87.87	119.6	105	92	113	4.99	9.62%	14.70%
GH_FR1		4	119.5	106.4	132.6	120	109	129	4.113	6.88%	1.75%
GH_ERC		4	124.8	118.2	131.3	124.5	120	130	2.056	3.30%	-2.57%
CM_MC2		4	111.5	102	121	112	104	118	2.986	5.36%	8.32%
EV_MC2		4	106.8	101.2	112.3	106.5	103	111	1.75	3.28%	12.23%
EV_HC1		4	115.8	109.6	121.9	115	112	121	1.931	3.34%	4.83%
LC_DCDS		4	120	108.8	131.2	120	113	127	3.512	5.85%	1.34%
LC_LC3		4	122.8	109.2	136.3	123	114	131	4.25	6.92%	-0.92%
LC_LC5		4	129.8	116.2	143.3	130	121	138	4.25	6.55%	-6.68%
LC_LCDSSLCC		4	104	88.09	119.9	103	93	117	5	9.62%	14.49%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1	XC	114	132	117	129	128	115	126	112
GH_ER2		105	101	118	120	124	114	115	110
CM_MC1		107	124	118	105	129	124	117	119
LC_SLC		109	102	121	134	120	117	99	107
FR_FRABCH		99	113	97	105				
FR_FRCP1		113	92	111	99				
GH_FR1		121	129	109	119				
GH_ERC		120	125	124	130				
CM_MC2		110	114	118	104				
EV_MC2		103	105	111	108				
EV_HC1		121	112	116	114				
LC_DCDS		113	127	125	115				
LC_LC3		114	131	129	117				
LC_LC5		124	136	138	121				
LC_LCDSSLCC		101	105	93	117				

Graphics





EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-8835-7371	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 17:19	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-5059-7041	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	14 Nov-19 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	17 Nov-19 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	51h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	49h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	50h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	48h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	50h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	50h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	46h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	47h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	49h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	50h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	52h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	50h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	48h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	51h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	50h (1.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 00-8835-7371 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:19 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed cell yield	11.79%
		CM_MC1 passed cell yield	11.79%
		LC_SLC passed cell yield	11.79%
		FR_FRABCH passed cell yield	11.79%
		FR_FRCP1 passed cell yield	11.79%
		GH_FR1 passed cell yield	11.79%
		GH_ERC passed cell yield	11.79%
		CM_MC2 passed cell yield	11.79%
		EV_MC2 passed cell yield	11.79%
		EV_HC1 passed cell yield	11.79%
		LC_DCDS passed cell yield	11.79%
		LC_LC3 passed cell yield	11.79%
		LC_LC5 passed cell yield	11.79%
		LC_LCDSSLCC passed cell yield	11.79%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-2.024	2.677	10.91	14	CDF	1.0000	Non-Significant Effect
GH_ER2		CM_MC1	-1.104	2.677	10.91	14	CDF	0.9997	Non-Significant Effect
		LC_SLC	-0.06135	2.677	10.91	14	CDF	0.9741	Non-Significant Effect
		FR_FRABCH	1.979	2.677	13.36	10	CDF	0.2102	Non-Significant Effect
		FR_FRCP1	1.928	2.677	13.36	10	CDF	0.2287	Non-Significant Effect
		GH_FR1	-1.227	2.677	13.36	10	CDF	0.9998	Non-Significant Effect
		GH_ERC	-2.279	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		CM_MC2	0.3757	2.677	13.36	10	CDF	0.9086	Non-Significant Effect
		EV_MC2	1.327	2.677	13.36	10	CDF	0.5129	Non-Significant Effect
		EV_HC1	-0.4759	2.677	13.36	10	CDF	0.9942	Non-Significant Effect
		LC_DCDS	-1.327	2.677	13.36	10	CDF	0.9999	Non-Significant Effect
		LC_LC3	-1.878	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		LC_LC5	-3.281	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.878	2.677	13.36	10	CDF	0.2482	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.772	3.288	0.3444	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.772		0.7195	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3946.95	281.925	14	4.244	3.7E-05	Significant Effect
Error	4052	66.4262	61			
Total	7998.95		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.249	29.14	0.8148	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9776	0.9559	0.1993	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 00-8835-7371 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:19 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

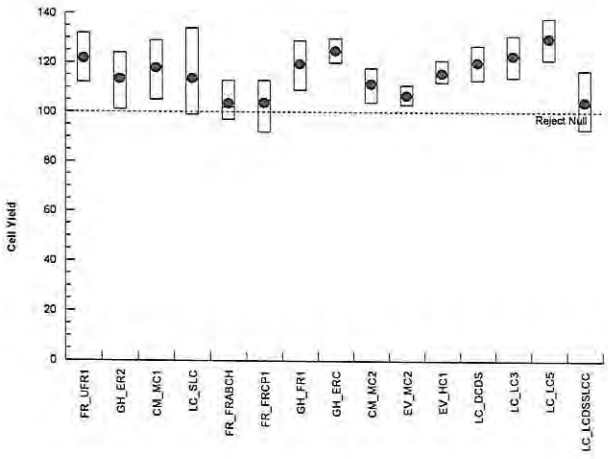
Cell Yield Summary

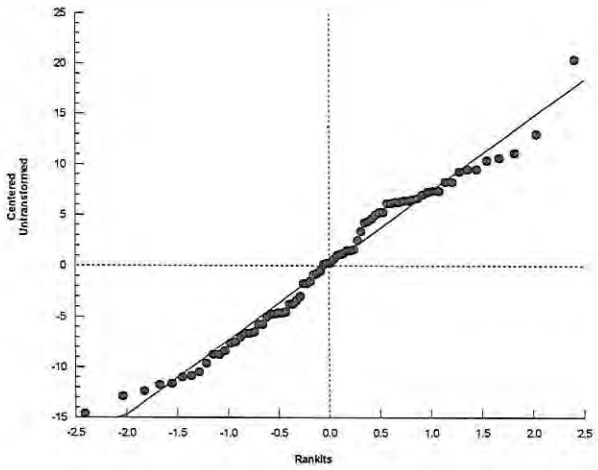
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	121.6	115	128.2	121.5	112	132	2.796	6.50%	0.00%
GH_ER2	XC	8	113.4	106.9	119.8	114.5	101	124	2.725	6.80%	6.78%
CM_MC1		8	117.9	110.9	124.8	118.5	105	129	2.943	7.06%	3.08%
LC_SLC		8	113.6	104	123.3	113	99	134	4.088	10.18%	6.58%
FR_FRABCH		4	103.5	92.06	114.9	102	97	113	3.594	6.94%	14.90%
FR_FRCP1		4	103.8	87.87	119.6	105	92	113	4.99	9.62%	14.70%
GH_FR1		4	119.5	106.4	132.6	120	109	129	4.113	6.88%	1.75%
GH_ERC		4	124.8	118.2	131.3	124.5	120	130	2.056	3.30%	-2.57%
CM_MC2		4	111.5	102	121	112	104	118	2.986	5.36%	8.32%
EV_MC2		4	106.8	101.2	112.3	106.5	103	111	1.75	3.28%	12.23%
EV_HC1		4	115.8	109.6	121.9	115	112	121	1.931	3.34%	4.83%
LC_DCDS		4	120	108.8	131.2	120	113	127	3.512	5.85%	1.34%
LC_LC3		4	122.8	109.2	136.3	123	114	131	4.25	6.92%	-0.92%
LC_LC5		4	129.8	116.2	143.3	130	121	138	4.25	6.55%	-6.68%
LC_LCDSSLCC		4	104	88.09	119.9	103	93	117	5	9.62%	14.49%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		114	132	117	129	128	115	126	112
GH_ER2	XC	105	101	118	120	124	114	115	110
CM_MC1		107	124	118	105	129	124	117	119
LC_SLC		109	102	121	134	120	117	99	107
FR_FRABCH		99	113	97	105				
FR_FRCP1		113	92	111	99				
GH_FR1		121	129	109	119				
GH_ERC		120	125	124	130				
CM_MC2		110	114	118	104				
EV_MC2		103	105	111	108				
EV_HC1		121	112	116	114				
LC_DCDS		113	127	125	115				
LC_LC3		114	131	129	117				
LC_LC5		124	136	138	121				
LC_LCDSSLCC		101	105	93	117				

Graphics





EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	13-1922-0127	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 17:19	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-5059-7041	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	14 Nov-19 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	17 Nov-19 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	51h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	49h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	50h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	48h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	50h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	50h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	46h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	47h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	49h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	50h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	52h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	50h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	48h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	51h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	50h (1.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 13-1922-0127 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:19 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 passed cell yield	11.79%
		CM_MC1 passed cell yield	11.79%
		LC_SLC passed cell yield	11.79%
		FR_FRABCH passed cell yield	11.79%
		FR_FRCP1 passed cell yield	11.79%
		GH_FR1 passed cell yield	11.79%
		GH_ERC passed cell yield	11.79%
		CM_MC2 passed cell yield	11.79%
		EV_MC2 passed cell yield	11.79%
		EV_HC1 passed cell yield	11.79%
		LC_DCDS passed cell yield	11.79%
		LC_LC3 passed cell yield	11.79%
		LC_LC5 failed cell yield	11.79%
		LC_LCDSSLCC passed cell yield	11.79%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	2.024	2.677	10.91	14	CDF	0.1941	Non-Significant Effect
GH_ERZ		CM_MC1	1.104	2.677	10.91	14	CDF	0.6295	Non-Significant Effect
		LC_SLC	0.06135	2.677	10.91	14	CDF	0.9618	Non-Significant Effect
		FR_FRABCH	-1.979	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		FR_FRCP1	-1.928	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		GH_FR1	1.227	2.677	13.36	10	CDF	0.5658	Non-Significant Effect
		GH_ERC	2.279	2.677	13.36	10	CDF	0.1200	Non-Significant Effect
		CM_MC2	-0.3757	2.677	13.36	10	CDF	0.9915	Non-Significant Effect
		EV_MC2	-1.327	2.677	13.36	10	CDF	0.9999	Non-Significant Effect
		EV_HC1	0.4759	2.677	13.36	10	CDF	0.8834	Non-Significant Effect
		LC_DCDS	1.327	2.677	13.36	10	CDF	0.5129	Non-Significant Effect
		LC_LC3	1.878	2.677	13.36	10	CDF	0.2482	Non-Significant Effect
		LC_LC5*	3.281	2.677	13.36	10	CDF	0.0103	Significant Effect
		LC_LCDSSLCC	-1.878	2.677	13.36	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.772	3.288	0.3444	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.772		0.7195	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3946.95	281.925	14	4.244	3.7E-05	Significant Effect
Error	4052	66.4262	61			
Total	7998.95		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.249	29.14	0.8148	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9776	0.9559	0.1993	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 13-1922-0127 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:19 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

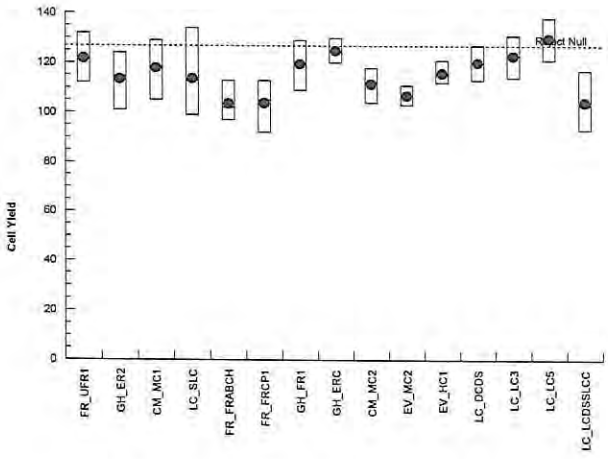
Cell Yield Summary

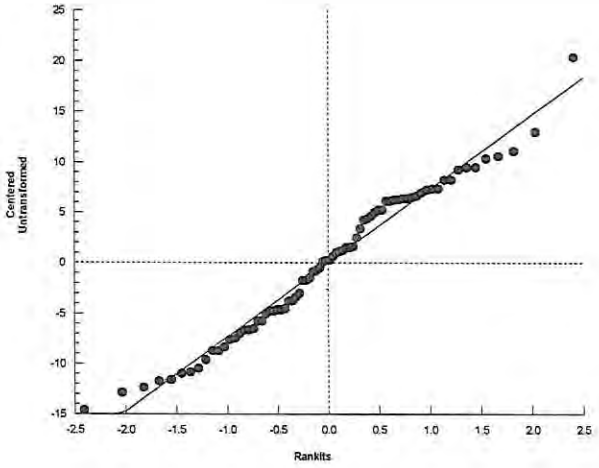
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	121.6	115	128.2	121.5	112	132	2.796	6.50%	0.00%
GH_ER2	XC	8	113.4	106.9	119.8	114.5	101	124	2.725	6.80%	6.78%
CM_MC1		8	117.9	110.9	124.8	118.5	105	129	2.943	7.06%	3.08%
LC_SLC		8	113.6	104	123.3	113	99	134	4.088	10.18%	6.58%
FR_FRABCH		4	103.5	92.06	114.9	102	97	113	3.594	6.94%	14.90%
FR_FRCP1		4	103.8	87.87	119.6	105	92	113	4.99	9.62%	14.70%
GH_FR1		4	119.5	106.4	132.6	120	109	129	4.113	6.88%	1.75%
GH_ERC		4	124.8	118.2	131.3	124.5	120	130	2.056	3.30%	-2.57%
CM_MC2		4	111.5	102	121	112	104	118	2.986	5.36%	8.32%
EV_MC2		4	106.8	101.2	112.3	106.5	103	111	1.75	3.28%	12.23%
EV_HC1		4	115.8	109.6	121.9	115	112	121	1.931	3.34%	4.83%
LC_DCDS		4	120	108.8	131.2	120	113	127	3.512	5.85%	1.34%
LC_LC3		4	122.8	109.2	136.3	123	114	131	4.25	6.92%	-0.92%
LC_LC5		4	129.8	116.2	143.3	130	121	138	4.25	6.55%	-6.68%
LC_LCDSSLCC		4	104	88.09	119.9	103	93	117	5	9.62%	14.49%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		114	132	117	129	128	115	126	112
GH_ER2	XC	105	101	118	120	124	114	115	110
CM_MC1		107	124	118	105	129	124	117	119
LC_SLC		109	102	121	134	120	117	99	107
FR_FRABCH		99	113	97	105				
FR_FRCP1		113	92	111	99				
GH_FR1		121	129	109	119				
GH_ERC		120	125	124	130				
CM_MC2		110	114	118	104				
EV_MC2		103	105	111	108				
EV_HC1		121	112	116	114				
LC_DCDS		113	127	125	115				
LC_LC3		114	131	129	117				
LC_LC5		124	136	138	121				
LC_LCDSSLCC		101	105	93	117				

Graphics





EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	20-2720-3285	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 17:20	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-5059-7041	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	14 Nov-19 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	17 Nov-19 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	51h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	49h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	50h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	48h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	50h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	50h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	46h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	47h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	49h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	50h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	52h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	50h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	48h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	51h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	50h (1.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 20-2720-3285 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:20 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed cell yield	11.34%
		GH_ER2 passed cell yield	11.34%
		LC_SLC passed cell yield	11.34%
		FR_FRABCH failed cell yield	11.34%
		FR_FRCP1 failed cell yield	11.34%
		GH_FR1 passed cell yield	11.34%
		GH_ERC passed cell yield	11.34%
		CM_MC2 passed cell yield	11.34%
		EV_MC2 passed cell yield	11.34%
		EV_HC1 passed cell yield	11.34%
		LC_DCDS passed cell yield	11.34%
		LC_LC3 passed cell yield	11.34%
		LC_LC5 passed cell yield	11.34%
		LC_LCDSSLCC failed cell yield	11.34%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-0.9202	2.677	10.91	14	CDF	0.9992	Non-Significant Effect
CM_MC1		GH_ER2	1.104	2.677	10.91	14	CDF	0.6295	Non-Significant Effect
		LC_SLC	1.043	2.677	10.91	14	CDF	0.6603	Non-Significant Effect
		FR_FRABCH*	2.88	2.677	13.36	10	CDF	0.0303	Significant Effect
		FR_FRCP1*	2.83	2.677	13.36	10	CDF	0.0344	Significant Effect
		GH_FR1	-0.3256	2.677	13.36	10	CDF	0.9897	Non-Significant Effect
		GH_ERC	-1.377	2.677	13.36	10	CDF	0.9999	Non-Significant Effect
		CM_MC2	1.277	2.677	13.36	10	CDF	0.5394	Non-Significant Effect
		EV_MC2	2.229	2.677	13.36	10	CDF	0.1326	Non-Significant Effect
		EV_HC1	0.4258	2.677	13.36	10	CDF	0.8965	Non-Significant Effect
		LC_DCDS	-0.4258	2.677	13.36	10	CDF	0.9930	Non-Significant Effect
		LC_LC3	-0.9768	2.677	13.36	10	CDF	0.9994	Non-Significant Effect
		LC_LC5	-2.379	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLCC*	2.78	2.677	13.36	10	CDF	0.0390	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.772	3.288	0.3444	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.772		0.9049	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3946.95	281.925	14	4.244	3.7E-05	Significant Effect
Error	4052	66.4262	61			
Total	7998.95		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.249	29.14	0.8148	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9776	0.9559	0.1993	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 20-2720-3285 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:20 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

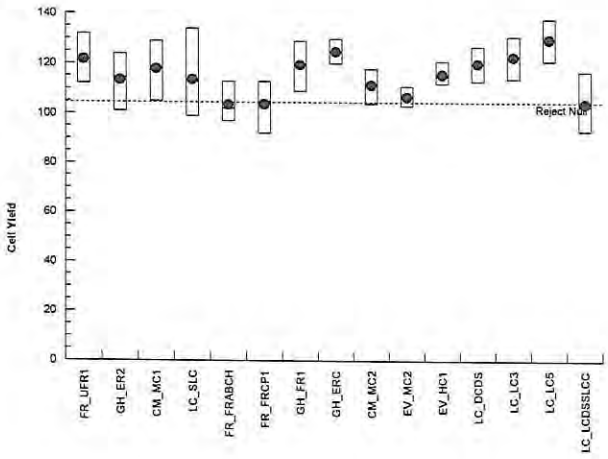
Cell Yield Summary

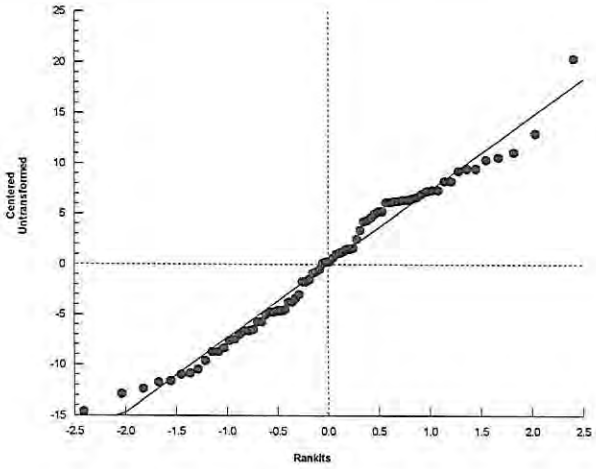
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	121.6	115	128.2	121.5	112	132	2.796	6.50%	0.00%
GH_ER2		8	113.4	106.9	119.8	114.5	101	124	2.725	6.80%	6.78%
CM_MC1	XC	8	117.9	110.9	124.8	118.5	105	129	2.943	7.06%	3.08%
LC_SLC		8	113.6	104	123.3	113	99	134	4.088	10.18%	6.58%
FR_FRABCH		4	103.5	92.06	114.9	102	97	113	3.594	6.94%	14.90%
FR_FRCP1		4	103.8	87.87	119.6	105	92	113	4.99	9.62%	14.70%
GH_FR1		4	119.5	106.4	132.6	120	109	129	4.113	6.88%	1.75%
GH_ERC		4	124.8	118.2	131.3	124.5	120	130	2.056	3.30%	-2.57%
CM_MC2		4	111.5	102	121	112	104	118	2.986	5.36%	8.32%
EV_MC2		4	106.8	101.2	112.3	106.5	103	111	1.75	3.28%	12.23%
EV_HC1		4	115.8	109.6	121.9	115	112	121	1.931	3.34%	4.83%
LC_DCDS		4	120	108.8	131.2	120	113	127	3.512	5.85%	1.34%
LC_LC3		4	122.8	109.2	136.3	123	114	131	4.25	6.92%	-0.92%
LC_LC5		4	129.8	116.2	143.3	130	121	138	4.25	6.55%	-6.68%
LC_LCDSSLCC		4	104	88.09	119.9	103	93	117	5	9.62%	14.49%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		114	132	117	129	128	115	126	112
GH_ER2		105	101	118	120	124	114	115	110
CM_MC1	XC	107	124	118	105	129	124	117	119
LC_SLC		109	102	121	134	120	117	99	107
FR_FRABCH		99	113	97	105				
FR_FRCP1		113	92	111	99				
GH_FR1		121	129	109	119				
GH_ERC		120	125	124	130				
CM_MC2		110	114	118	104				
EV_MC2		103	105	111	108				
EV_HC1		121	112	116	114				
LC_DCDS		113	127	125	115				
LC_LC3		114	131	129	117				
LC_LC5		124	136	138	121				
LC_LCDSSLCC		101	105	93	117				

Graphics





EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-6916-6718	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 17:20	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-5059-7041	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	14 Nov-19 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	17 Nov-19 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	51h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	49h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	50h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	48h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	50h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	50h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	46h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	47h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	49h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	50h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	52h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	50h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	48h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	51h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	50h (1.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 11-6916-6718 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:20 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	GH_ER2 passed cell yield	11.34%
		LC_SLC passed cell yield	11.34%
		FR_FRABCH passed cell yield	11.34%
		FR_FRCP1 passed cell yield	11.34%
		GH_FR1 passed cell yield	11.34%
		GH_ERC passed cell yield	11.34%
		CM_MC2 passed cell yield	11.34%
		EV_MC2 passed cell yield	11.34%
		EV_HC1 passed cell yield	11.34%
		LC_DCDS passed cell yield	11.34%
		LC_LC3 passed cell yield	11.34%
		LC_LC5 passed cell yield	11.34%
		LC_LCDSSLCC passed cell yield	11.34%
		FR_UFR1 passed cell yield	11.34%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	0.9202	2.677	10.91	14	CDF	0.7190	Non-Significant Effect
CM_MC1		GH_ER2	-1.104	2.677	10.91	14	CDF	0.9997	Non-Significant Effect
		LC_SLC	-1.043	2.677	10.91	14	CDF	0.9995	Non-Significant Effect
		FR_FRABCH	-2.88	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		FR_FRCP1	-2.83	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		GH_FR1	0.3256	2.677	13.36	10	CDF	0.9195	Non-Significant Effect
		GH_ERC	1.377	2.677	13.36	10	CDF	0.4865	Non-Significant Effect
		CM_MC2	-1.277	2.677	13.36	10	CDF	0.9999	Non-Significant Effect
		EV_MC2	-2.229	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		EV_HC1	-0.4258	2.677	13.36	10	CDF	0.9930	Non-Significant Effect
		LC_DCDS	0.4258	2.677	13.36	10	CDF	0.8965	Non-Significant Effect
		LC_LC3	0.9768	2.677	13.36	10	CDF	0.6925	Non-Significant Effect
		LC_LC5	2.379	2.677	13.36	10	CDF	0.0976	Non-Significant Effect
		LC_LCDSSLCC	-2.78	2.677	13.36	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.772	3.288	0.3444	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.772		0.9049	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3946.95	281.925	14	4.244	3.7E-05	Significant Effect
Error	4052	66.4262	61			
Total	7998.95		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.249	29.14	0.8148	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9776	0.9559	0.1993	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 11-6916-6718 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:20 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

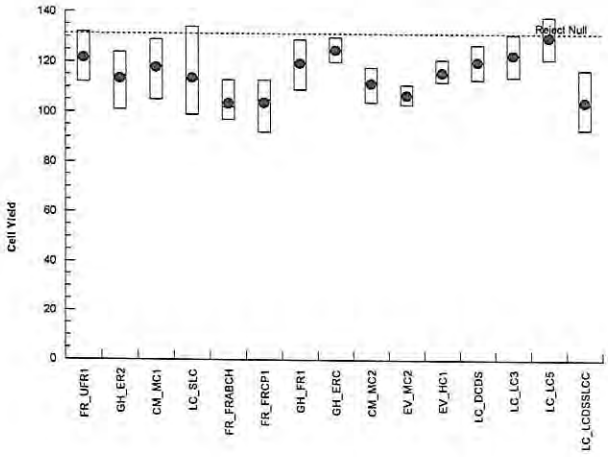
Cell Yield Summary

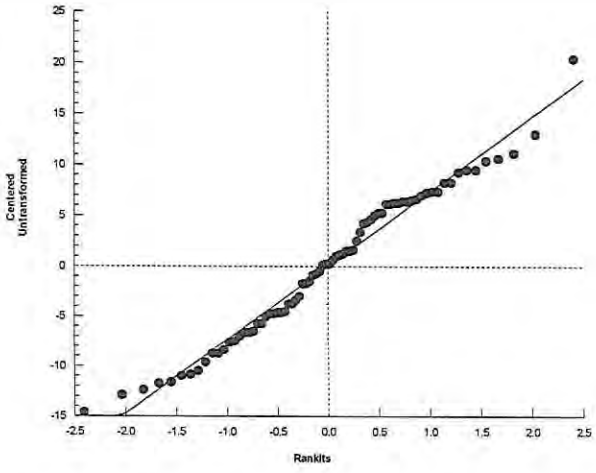
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	121.6	115	128.2	121.5	112	132	2.796	6.50%	0.00%
GH_ER2		8	113.4	106.9	119.8	114.5	101	124	2.725	6.80%	6.78%
CM_MC1	XC	8	117.9	110.9	124.8	118.5	105	129	2.943	7.06%	3.08%
LC_SLC		8	113.6	104	123.3	113	99	134	4.088	10.18%	6.58%
FR_FRABCH		4	103.5	92.06	114.9	102	97	113	3.594	6.94%	14.90%
FR_FRCP1		4	103.8	87.87	119.6	105	92	113	4.99	9.62%	14.70%
GH_FR1		4	119.5	106.4	132.6	120	109	129	4.113	6.88%	1.75%
GH_ERC		4	124.8	118.2	131.3	124.5	120	130	2.056	3.30%	-2.57%
CM_MC2		4	111.5	102	121	112	104	118	2.986	5.36%	8.32%
EV_MC2		4	106.8	101.2	112.3	106.5	103	111	1.75	3.28%	12.23%
EV_HC1		4	115.8	109.6	121.9	115	112	121	1.931	3.34%	4.83%
LC_DCDS		4	120	108.8	131.2	120	113	127	3.512	5.85%	1.34%
LC_LC3		4	122.8	109.2	136.3	123	114	131	4.25	6.92%	-0.92%
LC_LC5		4	129.8	116.2	143.3	130	121	138	4.25	6.55%	-6.68%
LC_LCDSSLCC		4	104	88.09	119.9	103	93	117	5	9.62%	14.49%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		114	132	117	129	128	115	126	112
GH_ER2		105	101	118	120	124	114	115	110
CM_MC1	XC	107	124	118	105	129	124	117	119
LC_SLC		109	102	121	134	120	117	99	107
FR_FRABCH		99	113	97	105				
FR_FRCP1		113	92	111	99				
GH_FR1		121	129	109	119				
GH_ERC		120	125	124	130				
CM_MC2		110	114	118	104				
EV_MC2		103	105	111	108				
EV_HC1		121	112	116	114				
LC_DCDS		113	127	125	115				
LC_LC3		114	131	129	117				
LC_LC5		124	136	138	121				
LC_LCDSSLCC		101	105	93	117				

Graphics





EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-8540-4390	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 17:21	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-5059-7041	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	14 Nov-19 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	17 Nov-19 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	51h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	49h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	50h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	48h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	50h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	50h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	46h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	47h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	49h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	50h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	52h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	50h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	48h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	51h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	50h (1.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 14-8540-4390 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:21 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed cell yield	11.76%
		GH_ER2 passed cell yield	11.76%
		CM_MC1 passed cell yield	11.76%
		FR_FRABCH passed cell yield	11.76%
		FR_FRCP1 passed cell yield	11.76%
		GH_FR1 passed cell yield	11.76%
		GH_ERC passed cell yield	11.76%
		CM_MC2 passed cell yield	11.76%
		EV_MC2 passed cell yield	11.76%
		EV_HC1 passed cell yield	11.76%
		LC_DCDS passed cell yield	11.76%
		LC_LC3 passed cell yield	11.76%
		LC_LC5 passed cell yield	11.76%
		LC_LCDSSLCC passed cell yield	11.76%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-1.963	2.677	10.91	14	CDF	1.0000	Non-Significant Effect
LC-SLC		GH_ER2	0.06135	2.677	10.91	14	CDF	0.9618	Non-Significant Effect
		CM_MC1	-1.043	2.677	10.91	14	CDF	0.9995	Non-Significant Effect
		FR_FRABCH	2.029	2.677	13.36	10	CDF	0.1927	Non-Significant Effect
		FR_FRCP1	1.979	2.677	13.36	10	CDF	0.2102	Non-Significant Effect
		GH_FR1	-1.177	2.677	13.36	10	CDF	0.9998	Non-Significant Effect
		GH_ERC	-2.229	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		CM_MC2	0.4258	2.677	13.36	10	CDF	0.8965	Non-Significant Effect
		EV_MC2	1.377	2.677	13.36	10	CDF	0.4865	Non-Significant Effect
		EV_HC1	-0.4258	2.677	13.36	10	CDF	0.9930	Non-Significant Effect
		LC_DCDS	-1.277	2.677	13.36	10	CDF	0.9999	Non-Significant Effect
		LC_LC3	-1.828	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		LC_LC5	-3.231	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLCC	1.928	2.677	13.36	10	CDF	0.2287	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.772	3.288	0.3444	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.772		0.5484	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3946.95	281.925	14	4.244	3.7E-05	Significant Effect
Error	4052	66.4262	61			
Total	7998.95		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.249	29.14	0.8148	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9776	0.9559	0.1993	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 14-8540-4390 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:21 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

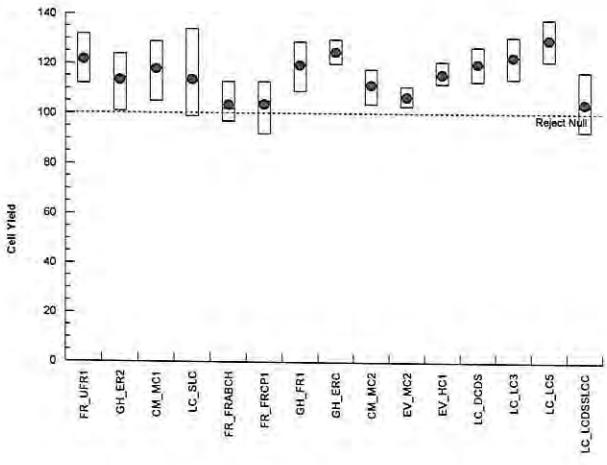
Cell Yield Summary

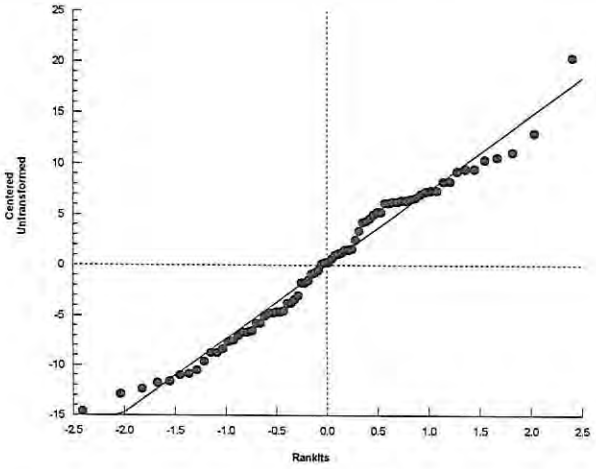
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	121.6	115	128.2	121.5	112	132	2.796	6.50%	0.00%
GH_ER2		8	113.4	106.9	119.8	114.5	101	124	2.725	6.80%	6.78%
CM_MC1		8	117.9	110.9	124.8	118.5	105	129	2.943	7.06%	3.08%
LC_SLC	XC	8	113.6	104	123.3	113	99	134	4.088	10.18%	6.58%
FR_FRABCH		4	103.5	92.06	114.9	102	97	113	3.594	6.94%	14.90%
FR_FRCP1		4	103.8	87.87	119.6	105	92	113	4.99	9.62%	14.70%
GH_FR1		4	119.5	106.4	132.6	120	109	129	4.113	6.88%	1.75%
GH_ERC		4	124.8	118.2	131.3	124.5	120	130	2.056	3.30%	-2.57%
CM_MC2		4	111.5	102	121	112	104	118	2.986	5.36%	8.32%
EV_MC2		4	106.8	101.2	112.3	106.5	103	111	1.75	3.28%	12.23%
EV_HC1		4	115.8	109.6	121.9	115	112	121	1.931	3.34%	4.83%
LC_DCDS		4	120	108.8	131.2	120	113	127	3.512	5.85%	1.34%
LC_LC3		4	122.8	109.2	136.3	123	114	131	4.25	6.92%	-0.92%
LC_LC5		4	129.8	116.2	143.3	130	121	138	4.25	6.55%	-6.68%
LC_LCDSSLCC		4	104	88.09	119.9	103	93	117	5	9.62%	14.49%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		114	132	117	129	128	115	126	112
GH_ER2		105	101	118	120	124	114	115	110
CM_MC1		107	124	118	105	129	124	117	119
LC_SLC	XC	109	102	121	134	120	117	99	107
FR_FRABCH		99	113	97	105				
FR_FRCP1		113	92	111	99				
GH_FR1		121	129	109	119				
GH_ERC		120	125	124	130				
CM_MC2		110	114	118	104				
EV_MC2		103	105	111	108				
EV_HC1		121	112	116	114				
LC_DCDS		113	127	125	115				
LC_LC3		114	131	129	117				
LC_LC5		124	136	138	121				
LC_LCDSSLCC		101	105	93	117				

Graphics





EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-9181-6695	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	25 Nov-19 17:21	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	20-5059-7041	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	14 Nov-19 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	
Ending Date:	17 Nov-19 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 6d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	51h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	49h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	50h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	48h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	50h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	50h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	46h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	47h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	49h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	50h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	52h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	50h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	48h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	51h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	50h (1.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 07-9181-6695 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:21 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C < T	FR_UFR1 passed cell yield	11.76%
		GH_ER2 passed cell yield	11.76%
		CM_MC1 passed cell yield	11.76%
		FR_FRABCH passed cell yield	11.76%
		FR_FRCP1 passed cell yield	11.76%
		GH_FR1 passed cell yield	11.76%
		GH_ERC passed cell yield	11.76%
		CM_MC2 passed cell yield	11.76%
		EV_MC2 passed cell yield	11.76%
		EV_HC1 passed cell yield	11.76%
		LC_DCDS passed cell yield	11.76%
		LC_LC3 passed cell yield	11.76%
		LC_LC5 failed cell yield	11.76%
		LC_LCDSSLCC passed cell yield	11.76%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	1.963	2.677	10.91	14	CDF	0.2158	Non-Significant Effect
LC_SLC		GH_ER2	-0.06135	2.677	10.91	14	CDF	0.9741	Non-Significant Effect
		CM_MC1	1.043	2.677	10.91	14	CDF	0.6603	Non-Significant Effect
		FR_FRABCH	-2.029	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		FR_FRCP1	-1.979	2.677	13.36	10	CDF	1.0000	Non-Significant Effect
		GH_FR1	1.177	2.677	13.36	10	CDF	0.5920	Non-Significant Effect
		GH_ERC	2.229	2.677	13.36	10	CDF	0.1326	Non-Significant Effect
		CM_MC2	-0.4258	2.677	13.36	10	CDF	0.9930	Non-Significant Effect
		EV_MC2	-1.377	2.677	13.36	10	CDF	0.9999	Non-Significant Effect
		EV_HC1	0.4258	2.677	13.36	10	CDF	0.8965	Non-Significant Effect
		LC_DCDS	1.277	2.677	13.36	10	CDF	0.5394	Non-Significant Effect
		LC_LC3	1.828	2.677	13.36	10	CDF	0.2686	Non-Significant Effect
		LC_LC5*	3.231	2.677	13.36	10	CDF	0.0118	Significant Effect
		LC_LCDSSLCC	-1.928	2.677	13.36	10	CDF	1.0000	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.772	3.288	0.3444	No Outliers Detected
Control Trend	Mann-Kendall Trend Test	2.772		0.5484	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3946.95	281.925	14	4.244	3.7E-05	Significant Effect
Error	4052	66.4262	61			
Total	7998.95		75			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.249	29.14	0.8148	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9776	0.9559	0.1993	Normal Distribution

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 07-9181-6695 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 25 Nov-19 17:21 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

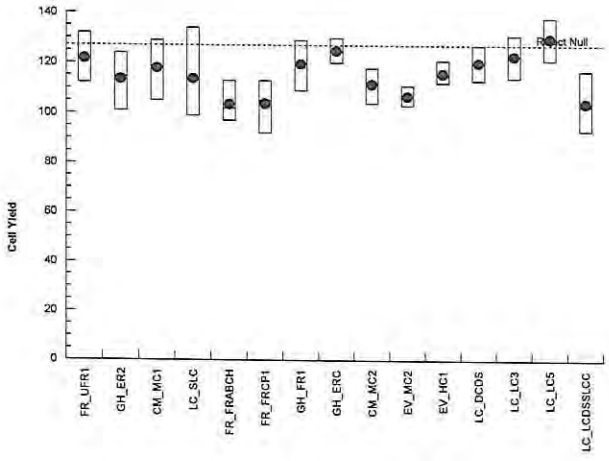
Cell Yield Summary

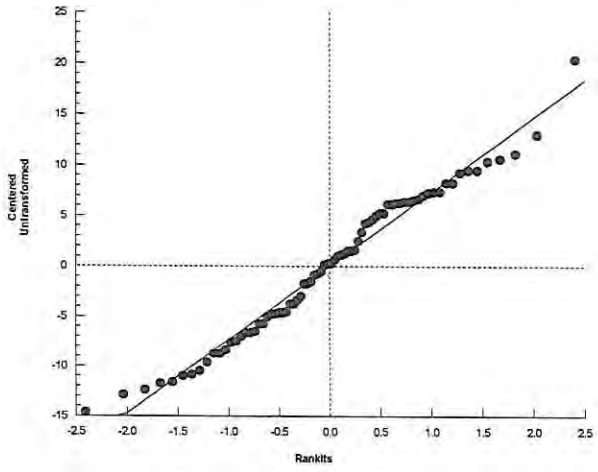
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		8	121.6	115	128.2	121.5	112	132	2.796	6.50%	0.00%
GH_ER2		8	113.4	106.9	119.8	114.5	101	124	2.725	6.80%	6.78%
CM_MC1		8	117.9	110.9	124.8	118.5	105	129	2.943	7.06%	3.08%
LC_SLC	XC	8	113.6	104	123.3	113	99	134	4.088	10.18%	6.58%
FR_FRABCH		4	103.5	92.06	114.9	102	97	113	3.594	6.94%	14.90%
FR_FRCP1		4	103.8	87.87	119.6	105	92	113	4.99	9.62%	14.70%
GH_FR1		4	119.5	106.4	132.6	120	109	129	4.113	6.88%	1.75%
GH_ERC		4	124.8	118.2	131.3	124.5	120	130	2.056	3.30%	-2.57%
CM_MC2		4	111.5	102	121	112	104	118	2.986	5.36%	8.32%
EV_MC2		4	106.8	101.2	112.3	106.5	103	111	1.75	3.28%	12.23%
EV_HC1		4	115.8	109.6	121.9	115	112	121	1.931	3.34%	4.83%
LC_DCDS		4	120	108.8	131.2	120	113	127	3.512	5.85%	1.34%
LC_LC3		4	122.8	109.2	136.3	123	114	131	4.25	6.92%	-0.92%
LC_LC5		4	129.8	116.2	143.3	130	121	138	4.25	6.55%	-6.68%
LC_LCDSSLCC		4	104	88.09	119.9	103	93	117	5	9.62%	14.49%

Cell Yield Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
FR_UFR1		114	132	117	129	128	115	126	112
GH_ER2		105	101	118	120	124	114	115	110
CM_MC1		107	124	118	105	129	124	117	119
LC_SLC	XC	109	102	121	134	120	117	99	107
FR_FRABCH		99	113	97	105				
FR_FRCP1		113	92	111	99				
GH_FR1		121	129	109	119				
GH_ERC		120	125	124	130				
CM_MC2		110	114	118	104				
EV_MC2		103	105	111	108				
EV_HC1		121	112	116	114				
LC_DCDS		113	127	125	115				
LC_LC3		114	131	129	117				
LC_LC5		124	136	138	121				
LC_LCDSSLCC		101	105	93	117				

Graphics





APPENDIX C – *Hyalella azteca* toxicity test data

Hyalella azteca ~~Sediment~~ Water-only Test Summary Sheet

Client: Teck
Work Order No.: 192277

Start Date: Nov 14/19
Set up by: SY/KZL

Sample Information:

Sample ID: Various - see below
Sample Date: Nov 12, 19, 26; Dec 3/19
Date Received: Nov 13, 20, 27; Dec 4/19
Sample Volume: 2x2L, 5x2L, 4x2L, 12x2L per refresh

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Biosystems, CO
Date received: Nov 13/19
Age or size (Day 0): 7-8d

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA 180
Stock Solution ID: n/a
Date Initiated: Nov 14/19

96-h LC50 (95% CL): 4.4 (2.9-5.6) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.8 (4.2-8.1) g/L NaCl CV (%): 17

* samples significantly different compared to Lab Control
α samples significantly different compared to site control FR-UFR1
β samples significantly different compared to site control GH-ER2
γ samples significantly different compared to site control CM-MC1
ε samples significantly different compared to site control LC-SLC

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
Lab Control	96.0 ± 8.9	0.39 ± 0.18
FR-UFR1	94.0 ± 8.9	0.56 ± 0.21
GH-ER2	96.0 ± 8.9	0.23 ± 0.09 α
CM-MC1	92.0 ± 11.0	0.37 ± 0.20
LC-SLC	84.0 ± 20.7	0.32 ± 0.26
FR-FRCP1	92.0 ± 4.5	0.14 ± 0.03 *α, β γ
FR-FRABCH	84.0 ± 25.1	0.44 ± 0.18
GH-FR1	92.0 ± 11.0	0.41 ± 0.11

Reviewed by: [signature]
Date reviewed: Feb. 3/20

Hyalella azteca ~~Sediment~~ Water only Test Summary Sheet

Client: Teck
Work Order No.: 192277

Start Date: Nov 14/19
Set up by: SY/KJL

Sample Information:

Sample ID: Various - see below
Sample Date: Nov 12, 19, 26; Dec 3/19
Date Received: Nov 13, 20, 27; Dec 4/19
Sample Volume: 2x20L, 5x20L, 4x20L, 12x20L per refresh

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Biosystems, CO
Date received: Nov 13/19
Age or size (Day 0): 7-8d

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA180
Stock Solution ID: n/a
Date Initiated: Nov 14/19

96-h LC50 (95% CL): 4.4 (2.9-5.6) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.8 (4.2-8.1) g/L NaCl CV (%): 17

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
GH_ERC	84.0 ± 20.7	0.29 ± 0.19α
CM_MCZ	76.0 ± 26.1β	0.21 ± 0.02*,α
RG_MIDAG	94.0 ± 8.9	0.32 ± 0.27
EV_MCZ	94.0 ± 8.9	0.33 ± 0.16α
EV_HCl	82.0 ± 34.9	0.28 ± 0.23α
LC_LCDSSLCC	70.0 ± 33.9*,α,β	0.33 ± 0.20
LC_LC3	64.0 ± 43.4*,α,β,γ	0.60 ± 0.10
LC_LC5	72.0 ± 22.8*,α,β	0.26 ± 0.22α

Reviewed by: JCH Date reviewed: Feb. 3/20

Hyalella azteca ~~Sediment~~ water-only KJL Test Summary Sheet

Client: Teck
Work Order No.: 192277

Start Date: Nov 14/19
Set up by: SY/KJL

Sample Information:

Sample ID: Various - see below
Sample Date: Nov 12, 19, 26; Dec 3/19
Date Received: Nov 13, 20, 27; Dec 4/19
Sample Volume: 2x20L, 5x20L, 4x20L, 12x20L per refresh

Test Organism Information:

Species: *Hyalella azteca*
Supplier: Aquatic Biosystems, CO
Date received: Nov 13/19
Age or size (Day 0): 7-8d

NaCl Reference Toxicant Results:

Reference Toxicant ID: HA180
Stock Solution ID: n/a
Date Initiated: Nov 14/19

96-h LC50 (95% CL): 4.4 (2.9 - 5.6) g/L NaCl

96-h LC50 Reference Toxicant Mean and Range: 5.8 (4.2-8.1) g/L NaCl CV (%): 17

Test Results:

Sample ID	Survival ± SD (%)	Average Dry Wt. ± SD (mg)
LC_DCDS	34.0 ± 31.3 *α,β,γ,ε	0.20 ± 0.12α
MET EDTA Control	96.0 ± 8.9	0.50 ± 0.22
FR-FRCP1+ EDTA	72.0 ± 13.0 *,α,β	0.19 ± 0.05 *α
CM-MC2 + EDTA	40.0 ± 15.8 *α,β,γ,ε	0.28 ± 0.03α
RG-MIDAG+ EDTA	94.0 ± 8.9	0.46 ± 0.24
	±	±
	±	±
	±	±

Reviewed by: JGH Date reviewed: Feb. 3/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	23.0	23.0	23.0	22.0	23.0	22.5	23.0	23.0	23.0	23.0	23.0	22.5	23.0	22.5
FR_UFR1	22.0	23.0	23.0	22.0	22.0	22.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	22.5
GH_ER2	22.0	23.0	23.0	23.0	22.0	22.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
CM_MC1	22.0	23.0	23.0	23.0	22.5	22.5	23.0	23.0	23.0	23.0	23.0	23.5	23.5	23.0
LC-SLC	22.0	23.0	23.5	23.0	22.5	22.5	23.0	23.0	23.0	23.0	23.0	23.5	24.0	23.0
FR_FRCP1	22.0	23.0	24.0	23.0	22.0	22.5	23.0	23.0	23.0	23.0	23.0	23.5	24.0	23.0
FR_FRABCH	23.0	23.0	24.0	23.0	22.0	22.5	23.0	23.0	23.0	23.0	23.0	24.0	24.0	23.0
GH_FR1	23.0	23.0	24.0	23.0	22.5	22.5	23.0	23.0	23.0	23.0	23.0	24.0	24.0	23.0
GH_ERC	22.0	23.0	24.0	23.0	22.0	22.5	23.0	23.0	23.0	23.0	23.0	24.0	24.0	23.0
CM_MC2	23.0	23.5	24.0	23.0	22.5	22.5	23.0	23.0	23.0	23.0	23.0	24.0	24.0	23.0
Technician Initials	SY	SY	SY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SY	SY	SY	SY	SY

Thermometer: Cer 6

Conductivity (µS)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	435	447	438	447	434	458	440	447	432	445	434	453	435	446
FR_UFR1	422	444	426	~~383~~ ②	421	442	432	435	423	432	426	439	429	441
GH-ER2	383	415	388	400	384	406	391	401	386	394	389	396	392	401
CM-MC1	356	381	361	367	357	323	364	370	360	363	358	366	362	371
LC-SLC	~~1343~~ ①	478	452	460	447	471	461	461	450	460	454	461	457	464
FR_FRCP1	1343	1361	1344	1350	1336	1760	1359	1360	1345	1324	1342	1312	1307	1315
FR_FRABCH	1091	1100	1091	1092	1090	1107	1102	1097	1090	1061	1056	1051	1046	1052
GH-FR1	924	951	928	934	921	949	936	935	925	926	922	928	923	937
GH_ERC	427	481	433	444	432	455	442	482	433	438	437	444	436	451
CM_MC2	1091	1098	1094	1098	1089	1098	1103	1099	1095	1074	1068	1062	1061	1072
Technician Initials	SY	SY	SY	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SY	SY	SY	SY	SY

① 451

Conductivity meter: 3/3

Comments: ② 434

Reviewed by: [illegible]

Date Reviewed: Jan 21/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG	23.0	23.0	24.0	23.5	23.0	23.0	23.0	23.0	23.0	23.0	23.0	24.0	24.0	23.0
EV_MC2	22.0	23.0	23.0	23.0	22.0	23.0	23.0	23.0	23.0	23.0	23.0	24.0	24.0	23.0
EV_HCl	22.0	23.0	23.0	23.5	22.0	23.0	23.0	23.0	23.0	23.0	23.0	24.0	24.0	23.0
LC_LCDSSLCC	22.0	23.0	23.0	23.5	22.0	23.0	23.0	23.0	23.0	23.0	23.0	24.0	24.0	23.0
LC_LC3	22.0	23.0	23.0	23.5	22.0	23.0	22.5	23.0	23.0	23.0	23.0	24.0	23.5	22.5
LC_LC5	22.0	23.5	23.0	23.5	22.0	23.0	22.5	23.0	23.0	23.0	23.0	24.0	23.5	22.5
LC_DCDS	22.0	23.5	23.0	23.5	22.0	23.0	22.5	23.5	23.0	23.0	23.0	24.0	23.0	22.5
Technician Initials	SH	SH	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SH	SH	SH	SH	SH

Thermometer: Cer 6

Conductivity (µS)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG - MIDAG	751	784	754	760	753	767	765	756	755	759	751	759	757	770
EV_MC2	759	795	761	765	746	764	749	760	763	752	745	746	752	761
EV_HCl	818	840	820	826	811	822	823	823	819	820	811	818	822	826
LC_LCDSSLCC	966	993	967	981	967	954	974	979	965	974	960	975	973	990
LC_LC3	1249	1271	1250	1265	1232	1254	1269	1270	1255	1239	1242	1240	1249	1257
LC_LC5	842	864	845	856	833	1462	844	846	847	839	841	834	828	838
LC_DCDS	824	840	826	835	818	841	829	833	828	828	820	825	829	848
Technician Initials	SH	SH	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SH	SH	SH	SH	SH

Conductivity meter: 3/3

Comments:

Reviewed by: [illegible]

Date Reviewed: Jan. 21/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	24.0	24.0	24.0	23.5	22.5	23.5	22.5	24.0	23.0	24.0	23.0	24.0	23.0	22.5
FR-FRCP1+EDTA	24.0	24.0	24.0	23.5	22.0	23.5	22.5	24.0	23.0	24.0	23.0	24.0	23.0	22.5
CM-MC2+EDTA	24.0	24.0	24.0	23.5	22.0	23.5	22.5	24.0	23.0	24.0	23.0	24.0	23.0	22.5
RG-MIDAG+EDTA	24.0	24.0	24.0	23.5	22.0	23.5	22.5	24.0	23.0	24.0	23.0	24.0	23.0	22.5
Technician Initials	SH	SH	SH	M	M	S	A	KM	KM	SH	SH	SH	SH	SH

Thermometer: Ger 6

Conductivity (µS)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	445	459	446	451	438	453	447	449	450	447	445	445	446	452
FR-FRCP1 + EDTA	1342	1330	1335	1328	1350	1355	1357	1336	1349	1322	1320	1329	1313	1329
CM-MC2 + EDTA	1105	1103	1104	1105	1100	1124	1111	1110	1105	1092	1091	1085	1087	1090
RG-MIDAG + EDTA	756	769	759	760	749	772	762	759	760	759	756	764	758	771
Technician Initials	SH	SH	SH	M	M	S	A	KM	KM	SH	SH	SH	SH	SH

Conductivity meter: 3/3

Comments:

Reviewed by: JCM

Date Reviewed: Jan. 24/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277

Start Date: Nov. 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	23.0	23.0	23.0	22.0	22.0	22.5	22.0	22.5	22.0	23.0	22.5	22.0	22.0	22.5
FR-UFR1	~~21~~ 22.0	23.0	23.0	22.0	23.0	22.5	22.0	23.0	23.0	23.0	23.0	22.0	22.5	22.0
GH-ER2	22.0	23.0	23.0	22.0	23.0	22.5	22.0	23.0	23.0	23.0	23.0	22.5	23.0	22.0
CM-MC1	22.0	23.0	23.0	23.0	23.0	22.5	22.0	23.0	23.0	23.5	23.0	22.5	23.0	22.0
LC-SLC	22.0	23.0	23.0	23.0	23.5	22.5	22.0	23.0	23.5	23.5	23.5	23.0	23.5	22.0
FR-FRCP1	22.0	23.0	23.0	23.0	23.5	22.5	22.0	23.0	23.5	23.5	24.0	23.0	23.5	22.0
FR-FRABCH	22.0	23.0	23.0	23.5	23.5	22.5	22.0	23.0	23.5	24.0	24.0	23.0	24.0	22.0
GH-FR1	22.0	23.0	23.0	23.5	23.5	22.5	22.0	23.0	23.5	24.0	24.0	23.0	24.0	22.0
GH-ERC	22.0	23.0	23.0	23.5	23.5	22.5	22.0	22.5	23.0	24.0	23.5	23.0	24.0	22.0
CM-MC2	22.0	23.0	23.0	23.5	23.5	22.5	22.0	23.0	24.0	24.0	24.0	23.0	24.0	22.0
Technician Initials	SH	SH	SH	RL	RL	IR	IR	SH	SH	SH	SH	SH	SH	SH

Thermometer: Cor 6

Conductivity (µS)

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	438	456	437	449	444	~~452~~ 453	444	461	445	456	445	459	447	455
FR-UFR1	419	432	427	434	433	437	415	442	430	436	429	440	434	445
GH-ER2	387	400	395	401	399	405	385	405	398	398	396	406	399	411
CM-MC1	355	367	364	366	366	377	356	375	364	366	363	372	365	372
LC-SLC	458	471	466	471	469	475	458	475	466	471	465	476	471	482
FR-FRCP1	1176	1200	1189	1187	1184	1168	1183	1186	1187	1185	1184	1181	1185	1179
FR-FRABCH	1106	1114	1115	1103	1105	1095	1107	1096	1102	1097	1104	1089	1100	1091
GH-FR1	920	933	931	931	933	930	930	942	941	944	942	942	940	939
GH-ERC	426	437	434	435	434	454	427	452	437	442	441	444	441	448
CM-MC2	1063	1073	1075	1067	1075	1063	1071	1075	1070	1071	1075	~~1050~~ ① 1069	1073	1071
Technician Initials	SH	SH	SH	RL	RL	IR	IR	SH	SH	SH	SH	SH	SH	SH

Conductivity meter: 3/3

Comments:

Reviewed by: JCL

Date Reviewed: Jan - 21/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 193277

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG	22.0	23.0	23.0	23.5	23.5	22.5	22.0	23.0	23.0	23.5	23.0	23.0	23.0	22.0
EV_MC2	22.0	22.5	22.0	23.5	23.5	22.5	22.0	23.0	23.0	23.5	23.0	23.0	23.0	22.0
EV_HC1	22.0	22.0	22.5	23.5	24.0	22.5	22.0	23.5	23.0	23.5	23.0	23.0	23.0	22.0
LC_LCDSSLCC	22.0	22.5	22.0	23.5	23.0	22.5	22.0	23.0	23.0	24.0	23.0	23.5	23.0	22.0
LC_LC3	22.0	23.0	22.0	23.5	23.0	22.5	22.0	23.0	23.0	24.0	23.0	23.5	23.0	22.0
LC_LC5	22.0	23.0	22.0	23.0	23.0	22.5	22.0	23.0	22.5	24.0	23.0	23.0	23.0	22.0
LC_DCDS	22.0	23.0	22.0	23.5	23.0	22.5	22.0	23.0	22.5	24.0	22.5	23.0	23.0	22.0
Technician Initials	SH	SH	SH	RL	RL	~	A	SH	SH	SH	SH	SH	SH	SH

Thermometer: Cer 6

Conductivity (µS)

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG	754	769	768	768	770	767	751	779	775	777	778	775	779	778
EV_MC2	622	641	633	637	638	643	630	646	641	642	641	640	643	664
EV_HC1	816	829	828	829	834	847	850	841	844	842	846	843	846	861
LC_LCDSSLCC	966	990	982	991	986	991	978	987	985	993	987	991	988	992
LC_LC3	1221	1248	1239	1246	1242	1242	1235	1248	1236	1238	1240	1240	1241	1241
LC_LC5	819	839	832	835	828	857	819	848	829	831	831	831	832	831
LC_DCDS	823	842	834	844	838	843	832	856	845	851	847	853	847	854
Technician Initials	SH	SH	SH	RL	RL	~	A	SH	SH	SH	SH	SH	SH	SH

Conductivity meter: 3/3

Comments:

Reviewed by: JGL

Date Reviewed: Jan. 21/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	22.0	23.0	22.5	23.5	23.0	22.5	22.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
FR-FRCP1 + EDTA	22.0	23.0	22.0	24.0	23.0	22.5	22.0	23.5	23.0	23.5	24.0	23.0	23.0	23.0
CM-MC2 + EDTA	22.0	23.0	22.0	24.0	23.0	22.5	22.0	23.5	23.0	24.0	24.0	23.0	23.0	23.0
RG-MIDAG+EDTA	22.0	23.0	22.0	24.0	22.5	22.5	22.0	23.0	22.5	23.5	24.0	23.0	23.0	23.0
Technician Initials	SH	SH	SH	RL	RL	[illegible]	[illegible]	SH	SH	SH	SH	SH	SH	SH

Thermometer: Cer 6

Conductivity (µS)

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	438	450	445	447	447	459	442	465	450	461	447	459	447	468
FR_FRCP1 +EDTA	1188	1211	1196	1191	1195	1186	1228	1201	1194	1199	1197	1198	1200	1199
CM_MC2 + EDTA	1070	1084	1081	1085	1082	1077	1084	1094	1085	1091	1086	1089	1088	1087
RG_MIDAG +EDTA	752	761	763	769	759	771	754	778	767	776	765	774	767	782
Technician Initials	SH	SH	SH	RL	RL	[illegible]	[illegible]	SH	SH	SH	SH	SH	SH	SH

Conductivity meter: 3/3

Comments:

Reviewed by: JGH

Date Reviewed: Jan. 24/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	①22.0 ②22.0	Day												
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	~~22.0~~ ①	~~22.0~~ ②	22.0	23.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0	23.0
FR-UFR1	22.0	22.0	22.5	23.5	24.0	22.5	24.0	22.0	23.0	22.0	22.5	22.0	22.0	23.0
GH-ER2	22.0	22.0	23.0	24.0	24.0	22.5	24.0	22.5	23.0	22.0	23.0	22.0	22.0	23.0
CM-MC1	22.0	22.0	23.0	23.5	24.0	22.5	24.0	22.0	23.0	22.0	23.0	22.0	22.5	23.0
LC-SLC	22.0	22.0	22.5	23.5	24.0	23.0	24.0	22.0	23.0	22.0	23.0	22.0	23.0	23.0
FR-FRCP1	22.0	22.0	23.0	24.0	24.0	23.0	24.0	22.0	23.5	22.0	23.0	22.0	23.0	23.0
FR-FRABCH	22.0	22.0	23.0	23.5	24.0	23.0	24.0	22.0	23.5	22.0	22.5	22.0	23.0	23.0
GH-FR1	22.0	22.0	23.0	24.0	24.0	23.0	24.0	22.0	23.0	22.0	23.0	22.0	23.0	23.0
GH-ERC	22.0	22.0	23.0	24.0	24.0	23.0	24.0	22.0	23.0	22.0	23.0	22.0	23.0	23.0
CM-MC2	22.0	22.0	23.0	24.0	24.0	23.0	24.0	22.5	23.0	22.0	23.0	22.0	23.0	23.0
Technician Initials	SH	SH	SH	RC	RC	~	~	SH	SH	SH	SH	SH	SH	SH

Thermometer: Cer 6

Conductivity (µS)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	447	454	449	455	446	464	447	462	447	459	447	464	448	456
FR-UFR1	443	451	441	451	448	457	451	455	443	452	450	454	446	453
GH-ER2	402	412	404	404	408	418	410	421	412	419	413	425	411	420
CM-MC1	369	375	370	378	375	381	377	384	376	382	379	385	375	381
LC-SLC	475	480	477	484	481	486	482	490	480	488	481	489	479	482
FR-FRCP1	1381	1365	1367	1351	1359	1349	1359	1358	1359	1361	1353	1360	1346	1335
FR-FRABCH	1151	1142	1138	1123	1123	1121	1122	1119	1127	1130	1117	1132	1117	1122
GH-FR1	949	945	947	944	940	944	941	941	946	950	944	953	943	946
GH-ERC	451	454	450	453	449	459	450	461	456	462	~~456~~ 453	463	449	459
CM-MC2	1174	1139	1158	1159	1154	1160	1153	1148	1154	1150	1154	1148	1152	1146
Technician Initials	SH	SH	SH	RC	RC	~	~	SH	SH	SH	SH	SH	SH	SH

Conductivity meter: 3/3

Comments:

Reviewed by: JCR Date Reviewed: Jan-21/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG	22.0	22.0	23.0	24.0	24.0	23.0	23.5	22.0	23.0	22.0	23.0	22.0	23.0	24.0
EV_MC2	22.0	22.0	22.0	24.0	24.0	23.0	23.5	23.0	22.0	22.0	22.0	22.0	23.0	23.5
EV_HCl	22.0	22.5	22.0	24.5	24.0	23.0	23.5	22.0	22.0	22.0	22.0	22.0	23.0	23.5
LC_LCDSSLCC	22.0	23.0	22.0	24.0	24.0	23.0	23.5	22.5	22.0	22.0	22.0	22.0	22.0	24.0
LC_LC3	22.0	23.0	22.0	24.0	24.0	23.0	23.5	22.5	22.0	22.0	22.0	22.5	23.0	24.0
LC_LC5	22.0	22.5	22.0	23.0	24.0	23.0	23.5	22.5	22.0	22.0	22.0	22.5	23.0	24.0
LC_DCDS	22.0	23.0	22.0	23.0	24.0	23.0	23.5	23.0	22.0	22.0	22.0	23.0	23.0	24.0
Technician Initials	SH	SH	SH	AC	AC	AC	AC	SH	SH	SH	SH	SH	SH	SH

Thermometer: Cer 6

Conductivity (µS)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG	792	799	796	790	795	801	791	803	792	800	791	802	789	796
EV_MC2	697	697	697	702	705	709	700	708	698	709	699	707	700	702
EV_HCl	852	852	854	843	855	860	856	864	854	868	854	868	855	858
LC_LCDSSLCC	1026	1025	1025	1030	1025	1031	1026	1025	1022	1026	1020	1023	1019	1019
LC_LC3	1261	1260	1258	1262	1258	1262	1255	1256	1252	1258	1251	1257	1249	1251
LC_LC5	851	861	850	860	847	856	841	857	848	856	843	853	845	845
LC_DCDS	864	875	864	880	869	877	871	883	867	881	868	879	865	873
Technician Initials	SH	SH	SH	AC	AC	AC	AC	SH	SH	SH	SH	SH	SH	SH

Conductivity meter: 313

Comments:

Reviewed by: JCh Date Reviewed: Jan-21/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	①22.0	Day												
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	~~24.0~~	23.0	22.0	24.0	24.0	23.0	24.0	23.0	23.0	23.0	22.5	23.0	23.0	24.0
FR_FRCP1 + EDTA	22.0	23.0	22.0	24.0	24.0	23.0	24.0	23.0	22.5	23.0	22.0	23.0	22.0	24.0
CM_MC2 +EDTA	22.0	23.0	22.0	24.0	24.0	23.0	24.0	23.0	23.0	23.0	22.0	23.0	22.0	24.0
RG_MIDAG +EDTA	22.0	23.0	22.0	24.0	24.0	23.0	24.0	23.0	22.0	23.0	22.0	23.0	22.0	24.0
Technician Initials	SH	SH	SH	AC	AC	A	A	SH	SH	SH	SH	SH	SH	SH

Thermometer: Co-6

Conductivity (µS)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	447	455	450	458	453	460	454	462	454	463	453	464	455	460
FR-FRCP1+EDTA	1374	1376	1368	1381	1371	1374	1366	1364	1363	1366	1366	1364	1368	1366
CM_MC2 +EDTA	1164	1169	1160	1161	1152	1165	1153	1163	1150	1165	1151	1162	1153	1157
RG-MIDAG+EDTA	789	793	787	788	792	800	793	805	795	795	795	792	798	792
Technician Initials	SH	SH	SH	AC	AC	A	A	SH	SH	SH	SH	SH	SH	SH

Conductivity meter: 313

Comments:

Reviewed by: JGH

Date Reviewed: Jan. 21/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day 21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
FR-UFR1	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0	22.0	22.0	22.0	22.0	22.0	22.0
GH-ER2	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0	22.5	22.5	23.0	22.0	22.0	22.0
CM-MC1	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0	22.5	22.0	22.0	22.0	22.0	22.0
LC-SLC	22.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0	23.0	22.0	22.0	22.0	22.0	22.0
FR-FRCP1	22.5	22.0	22.0	22.0	22.0	22.0	22.5	22.0	22.5	22.0	22.0	22.0	22.0	22.0
FR-FRABCH	23.0	22.0	22.5	22.0	22.0	22.0	22.5	22.0	23.0	22.0	22.5	22.0	22.0	22.0
GH-FR1	22.5	22.0	22.0	22.0	22.0	22.0	22.5	22.0	23.0	22.0	23.0	22.0	22.0	22.0
GH-ERC	23.0	22.0	22.0	22.0	22.0	22.0	22.5	22.0	22.5	22.0	23.0	22.0	22.0	22.0
CM-MC2	23.0	22.0	22.0	22.0	22.0	22.5	22.5	22.0	22.0	22.5	23.0	22.0	22.0	22.0
Technician Initials	SY	SY	SY	JD	JD	MM	MM	SY	SY	SY	SY	SY	SY	SY

Thermometer: Cer 6

Conductivity (µS)

Sample ID	Day 21	22		23		24		25 ①392		26		27		28 ②370
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	447	452	436	444	444	443	437	444	439	442	440	444	437	450
FR-UFR1	434	440	431	437	434	439	438	440	435	439	437	442	434	447
GH-ER2	395	400	393	400	394	402	395	401	~~402~~①	400	394	403	394	408
CM-MC1	367	372	368	~~375~~ 375	368	374	369	377	368	375	370	377	~~378~~ 378②	381
LC-SLC	470	486	471	479	472	479	474	480	472	~~477~~ 477	470	479	472	486
FR-FRCP1	1801	1796	1794	1776	1778	1772	1781	1769	1779	1764	1779	1758	1770	1766
FR-FRABCH	1113	1123	1106	1096	1088	1092	1090	1077	1091	1075	1089	1078	1092	1081
GH-FR1	915	922	919	915	907	910	907	909	905	908	906	902	898	898
GH-ERC	452	464	454	461	456	465	455	462	454	461	455	461	455	468
CM-MC2	1116	1132	1117	1105	1105	1096	1110	1091	1095	1088	1095	1091	1087	1099
Technician Initials	SY	SY	SY	JD	JD	MM	MM	SY	SY	SY	SY	SY	SY	SY

Conductivity meter: 3/3

Comments: Day 23 readings done with pH-2, DO-2, and CP-5

Reviewed by: JGu

Date Reviewed: Jan. 21/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	23.0	22.0	22.0	22.0	22.0	22.5	22.5	23.0	23.0	22.5	23.0	22.0	22.0	22.0
EV_MC2	22.0	22.0	22.0	22.0	22.0	22.5	22.5	22.5	23.0	22.0	22.0	22.0	22.0	22.0
EV-HCl	22.0	22.0	22.0	22.0	22.0	22.5	22.5	23.0	23.0	22.5	22.0	22.0	22.0	22.0
LC-LCDSSLCC	22.0	22.0	22.0	22.0	22.0	22.5	22.5	22.5	23.0	23.0	22.0	22.0	22.0	22.0
LC_LC3	22.0	22.0	22.0	22.0	22.0	22.5	22.5	23.0	23.0	23.0	22.0	22.0	22.0	22.0
LC_LC5	22.0	22.0	22.0	22.0	22.0	22.5	22.5	22.5	23.0	23.0	22.0	22.0	22.0	22.0
LC-DCDS	22.0	22.0	22.0	22.0	22.0	22.5	22.5	23.0	23.0	23.0	22.0	22.0	22.0	22.0
Technician Initials	SY	SY	SY	SY	SY	MM	MM	SY	SY	SY	SY	SY	SY	SY

Thermometer: Cer 6

Conductivity (µS)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	802	819	805	806	802	804	800	803	800	800	798	803	802	811
EV_MC2	646	660	646	657	658	654	656	655	655	653	654	656	649	662
EV-HCl	840	852	843	850	844	850	843	849	844	847	842	850	837	854
LC-LCDSSLCC	996	1011	999	998	994	998	992	998	993	993	990	995	984	1003
LC_LC3	1245	1256	1245	1246	1238	1237	1241	1232	1243	1231	1240	1232	1233	1234
LC_LC5	842	869	849	856	845	854	848	853	846	850	845	846	841	842
LC_DCDS	857	884	859	863	913	864	857	862	858	861	858	865	860	873
Technician Initials	SY	SY	SY	SY	SY	MM	MM	SY	SY	SY	SY	SY	SY	SY

Conductivity meter: 3/3

Comments:

Reviewed by: JGR

Date Reviewed: Jan-24/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277

Start Date: Nov. 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*

Temperature (°C)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	23.0	22.0	22.0	22.0	22.0	22.5	22.0	23.0	22.0	23.0	22.0	22.0	22.0	22.0
FR_FRCP1 + EDTA	23.0	22.0	22.0	22.0	22.0	22.5	22.0	22.5	22.0	23.0	22.0	22.0	22.0	22.0
CM_MC2 + EDTA	22.0	22.0	22.0	22.0	22.0	22.5	22.0	22.5	22.0	23.0	22.0	22.0	22.0	22.0
RG_MIDAG + EDTA	22.0	22.0	22.0	22.0	22.0	22.5	22.0	23.0	22.0	23.0	22.0	22.0	22.0	22.0
Technician Initials	SM	SM	SM	SM	SM	MM	MM	CM	CM	SM	SM	SM	SM	SM

Thermometer: Cer 6

Conductivity (µS)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	452	464	455	460	456	459	457	459	457	460	455	456	450	458
FR_FRCP1 + EDTA	1798	1792	1799	1784	1790	1779	1785	1774	1782	1775	1782	1771	1776	1766
CM_MC2 + EDTA	1118	1130	1122	1119	1111	1113	1111	1110	1110	1108	1111	1112	1107	1118
RG_MIDAG + EDTA	804	828	806	810	806	817	809	815	806	812	805	813	804	818
Technician Initials	SM	SM	SM	SM	SM	MM	MM	SM	SM	SM	SM	SM	SM	SM

Conductivity meter: 3/3

Comments:

Reviewed by: JCM

Date Reviewed: Jan. 21/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 193277
Test Condition: 28d water only growth & survival

Start Date: Nov. 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	8.2	7.1	8.2	6.8	8.2	6.9	≥2	7.0	8.2	6.6	8.2	5.8	8.2	5.5
FR_UFR1	8.7	7.2	8.6	7.0	8.4	7.0	≥2	7.1	8.2	6.6	8.2	5.7	8.3	5.6
GH_ER2	8.6	7.0	8.5	7.0	8.3	6.8	≥3	6.9	8.3	6.5	8.3	5.7	8.3	5.5
CM_MC1	8.6	6.9	8.6	6.9	8.3	6.9	≥2	7.0	8.2	6.7	8.2	5.8	8.1	5.6
LC_SLC	8.7	6.7	8.6	6.9	8.3	6.8	≥2	7.1	8.1	6.8	8.2	5.8	8.2	5.6
FR_FRCP1	8.7	6.6	8.6	6.9	8.3	6.9	≥3	7.1	8.2	6.8	8.3	5.9	8.1	5.6
FR_FRABCH	8.6	6.7	8.5	6.8	8.4	6.8	≥3	7.0	8.2	6.6	8.1	5.6	8.0	5.3
GH_FR1	8.4	6.4	8.4	6.8	8.4	6.7	≥2	7.0	8.1	6.6	8.0	5.5	7.8	5.4
GH_ERC	8.3	6.5	8.2	6.9	8.3	6.8	≥3	7.0	8.1	6.6	8.0	5.6	7.9	5.3
CM_MC2	8.5	6.7	8.4	6.8	8.4	6.9	≥3	6.9	8.2	6.5	8.2	5.5	8.0	5.3
Technician Initials	SH	SH	SH	AL	AL	AL	JL	KL	KL	SH	SH	SH	SH	SH

DO meter: 3/3

pH

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	7.6	7.5	7.8	7.3	7.8	7.5	7.9	7.4	7.7	7.4	7.8	7.3	7.8	7.4
FR_UFR1	7.8	7.8	7.9	7.7	7.9	7.8	7.9	7.7	7.8	7.8	7.9	7.7	8.0	7.7
GH_ER2	7.9	7.8	8.0	7.7	8.0	7.8	8.0	7.7	7.9	7.7	8.0	7.7	8.0	7.7
CM_MC1	7.7	7.7	7.9	7.7	7.9	7.9	7.9	7.7	7.9	7.7	8.0	7.6	8.0	7.6
LC_SLC	7.9	7.6	8.0	7.7	7.9	8.0	8.0	7.7	7.9	7.7	7.9	7.7	8.0	7.7
FR_FRCP1	8.0	8.0	8.0	7.8	7.8	8.0	8.0	7.8	7.9	7.8	7.8	7.8	7.9	7.7
FR_FRABCH	7.9	8.0	7.9	7.8	7.8	8.1	8.0	7.8	7.8	7.6	7.8	7.7	7.9	7.7
GH_FR1	8.0	7.9	8.1	7.9	8.0	8.0	7.9	7.8	8.0	7.9	8.1	7.8	8.1	7.8
GH_ERC	7.8	7.8	8.0	7.8	7.9	7.9	7.9	7.8	8.1	7.8	8.1	7.8	8.1	7.8
CM_MC2	8.0	8.1	8.0	7.9	7.9	8.1	8.0	7.9	7.9	7.9	7.9	7.8	7.9	7.8
Technician Initials	SH	SH	SH	AL	AL	AL	JL	KL	KL	SH	SH	SH	SH	SH

pH meter: 3/3

Light meter: 17-1

Light intensity (Lux): 510 - 4800

Comments:

Reviewed by: JCL

Date Reviewed: Jan 24/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 193277
Test Condition: 28d growth + survival, water only

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	8.6	6.7	8.5	6.8	8.5	6.8	8.2	6.7	8.1	6.7	8.0	5.5	7.9	5.3
EV-MC2	8.7	6.6	8.5	7.0	8.5	6.9	8.3	7.0	8.1	6.6	7.9	5.5	7.7	5.2
EV-HC1	8.7	6.8	8.6	6.5	8.5	6.8	8.2	6.9	8.2	6.6	8.0	5.4	7.9	4.9
LC-LCDSSLCC	8.5	6.6	8.4	6.7	8.4	6.9	8.2	6.9	8.2	6.7	8.1	5.6	8.0	5.3
LC-LC3	8.4	6.6	8.4	6.8	8.4	6.8	8.2	6.8	8.3	6.5	8.1	5.4	7.9	4.9
LC-LC5	8.4	6.9	8.3	6.7	8.5	6.8	8.3	6.7	8.3	6.6	8.2	5.7	8.1	5.4
LC-DCDS	8.6	6.8	8.5	6.8	8.4	6.9	8.2	6.9	8.3	6.6	8.2	5.6	8.0	5.3
Technician Initials	SY	SY	SY	M	M	[illegible]	[illegible]	KJL	KJL	SY	SY	SY	SY	SY

DO meter: 3/3

pH

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	7.9	7.9	8.1	7.9	7.9	8.0	7.9	7.9	8.1	7.9	8.0	7.7	8.1	7.8
EV-MC2	7.7	7.9	7.9	7.9	7.9	8.0	8.0	7.9	8.0	7.8	7.9	7.7	8.0	7.7
EV-HC1	7.9	8.0	8.1	7.9	8.0	8.1	8.0	7.9	8.0	7.9	8.0	7.8	8.1	7.7
LC-LCDSSLCC	8.0	8.0	8.1	7.9	8.0	8.1	7.9	7.9	8.0	7.9	8.0	7.9	8.0	7.9
LC-LC3	7.9	8.0	7.9	7.9	7.9	8.0	8.0	7.9	7.9	7.9	7.9	7.9	8.0	7.8
LC-LC5	8.0	8.0	8.1	8.2	8.1	8.1	8.0	8.1	8.1	7.9	8.0	7.9	8.1	7.9
LC-DCDS	7.9	7.9	8.0	7.9	8.0	8.1	8.0	8.0	8.0	7.8	8.0	7.8	8.0	7.8
Technician Initials	SY	SY	SY	M	M	[illegible]	[illegible]	KJL	KJL	SY	SY	[illegible]	SY	SY

pH meter: 3/3

Light meter: LI-1

Light intensity (Lux): 510-4800

Comments:

Reviewed by: JCL

Date Reviewed: Jan 24/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277
Test Condition: 28d water only growth + survival
Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	8.1	6.9	7.8	6.5	8.0	6.9	8.0	6.9	8.2	6.7	8.1	5.6	8.0	5.3
FR_FRCPI + EDTA	8.6	6.6	8.2	6.5	8.4	6.8	8.1	6.9	8.2	6.6	8.0	5.6	7.8	5.3
CM_MC2 + EDTA	8.5	6.4	8.3	6.6	8.4	6.9	8.1	7.0	8.1	6.5	7.9	5.4	7.8	4.9
RG_MIDAG + EDTA	8.6	6.7	8.3	6.7	8.5	6.8	8.2	6.8	8.2	6.6	8.1	5.6	7.9	5.2
Technician Initials	JH	SH	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SH	SH	SH	SH	SH

DO meter: 313

pH

Sample ID	Day													
	0	1		2		3		4		5		6		7
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	7.6	7.4	7.8	7.4	7.6	7.6	7.7	7.5	7.7	7.4	7.7	7.4	7.8	7.3
FR_FRCPI +EDTA	7.9	8.1	7.9	7.9	7.9	7.9	8.0	7.9	7.9	7.9	7.9	7.9	7.9	7.9
CM_MC2 +EDTA	8.0	8.1	8.1	8.0	8.0	8.0	8.1	7.9	8.0	8.0	8.0	7.9	8.1	7.8
RG_MIDAG +EDTA	7.9	8.0	8.1	8.0	8.0	8.1	8.1	7.9	8.0	7.9	8.0	7.9	8.0	7.8
Technician Initials	JH	SH	SH	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	SH	SH	SH	SH	SH

pH meter: 313

Light meter: LI-1
Light intensity (Lux): 510-4800

Comments:

Reviewed by: JGH
Date Reviewed: Jan. 14/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277
Test Condition: 28d water only growth + survival

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	8.2	5.8	8.1	6.5	8.3	6.4	8.4	5.9	8.2	6.1	8.2	6.1	8.2	6.0
FR-UFR1	8.9	5.9	8.0	6.6	8.3	6.5	8.3	6.1	8.2	6.0	7.8	5.8	8.1	5.8
GH-ER2	8.8	5.9	7.8	6.7	8.0	6.4	8.4	6.0	8.1	5.9	8.0	5.8	8.1	5.9
CM-MC1	8.8	5.9	8.0	6.8	8.4	6.4	8.2	6.1	8.2	6.2	8.0	6.0	8.0	6.0
LC-SLC	8.9	6.1	7.9	6.5	8.2	6.3	8.3	5.8	8.0	5.7	8.0	5.7	8.0	5.6
FR-FRCP1	8.9	6.0	8.0	6.5	8.2	6.4	8.2	6.0	8.0	5.8	7.9	5.8	8.0	5.9
FR-FRABCH	8.8	6.0	8.0	6.5	8.4	6.5	8.3	6.1	8.1	6.0	8.0	5.9	8.0	5.9
GH-FR1	8.7	6.2	7.9	6.9	8.0	6.6	8.4	5.9	7.8	5.9	7.9	5.9	7.9	5.9
GH-ERC	8.7	5.7	7.7	5.8	7.9	6.4	8.3	6.0	7.7	5.7	7.8	5.8	7.9	5.8
CM-MC2	8.8	5.9	7.9	6.3	8.2	6.4	8.3	5.9	8.0	5.8	8.0	5.8	8.0	5.8
Technician Initials	SH	SH	SH	RL	RL	A	M	SH	SH	SH	SH	SH	SH	SH

DO meter: 3/3

pH

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	7.8	7.4	7.8	7.1	7.7	7.3	7.8	7.2	7.8	7.1	7.8	7.1	7.8	7.1
FR-UFR1	8.0	7.6	8.0	7.5	7.9	7.8	7.9	7.4	7.9	7.5	8.0	7.5	7.9	7.5
GH-ER2	7.9	7.7	7.9	7.6	7.9	7.7	7.9	7.6	8.0	7.6	8.1	7.6	8.0	7.6
CM-MC1	7.9	7.6	7.9	7.6	7.9	7.8	7.9	7.6	7.9	7.7	8.0	7.7	8.0	7.6
LC-SLC	7.9	7.6	7.9	7.6	7.9	7.7	8.0	7.5	7.9	7.6	8.0	7.7	8.0	7.7
FR-FRCP1	7.8	7.8	7.8	7.7	7.8	7.7	7.9	7.6	7.8	7.7	7.8	7.7	7.8	7.7
FR-FRABCH	7.8	7.8	7.8	7.8	7.8	7.8	7.9	7.8	7.8	7.9	7.9	7.9	7.8	7.8
GH-FR1	8.0	7.9	7.9	8.0	8.0	7.7	7.9	7.8	7.9	7.9	8.0	7.9	8.0	7.9
GH-ERC	8.0	7.7	8.0	7.7	8.0	7.8	8.0	7.7	8.0	7.8	8.1	7.8	8.0	7.7
CM-MC2	8.1	7.9	8.1	7.7	7.9	7.8	8.0	7.9	8.0	7.9	7.9	7.8	8.0	7.9
Technician Initials	SH	SH	SH	RL	RL	A	M	SH	SH	SH	SH	SH	SH	SH

pH meter: 3/3

Light meter: Lit-1

Light intensity (Lux): 500 - 4900

Comments:

Reviewed by: JCA

Date Reviewed: Jan. 24/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277
Test Condition: 28d water only growth + survival

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	8.7	6.1	8.0	6.7	7.9	6.4	8.2	6.0	7.8	5.9	7.9	6.0	8.0	6.0
EV-MC2	8.8	6.0	8.1	6.8	8.0	6.4	8.3	5.9	7.8	5.7	7.8	5.9	8.0	5.8
EV-HCl	8.9	6.0	8.2	6.8	8.0	6.5	8.2	6.1	7.7	6.1	7.6	6.0	7.8	6.0
LC-LCDSSLCC	8.8	5.9	8.2	6.6	8.3	6.5	8.2	6.0	7.7	6.0	7.7	6.0	7.7	5.9
LC-LC3	8.7	5.8	8.1	6.8	8.3	6.5	8.3	6.0	8.0	6.0	7.8	5.9	7.8	6.0
LC-LC5	8.8	6.1	8.2	6.4	8.3	6.4	8.4	5.8	7.9	5.7	7.8	5.7	7.8	5.8
LC-DCDS	8.6	6.1	8.0	6.3	8.3	6.6	8.3	6.1	7.9	6.0	7.9	6.0	8.0	6.0
Technician Initials	SY	SY	SY	RC	RC	A	A	SY	SY	SY	SY	SY	SY	SY

DO meter: 3/3

pH

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	7.9	7.9	7.9	7.9	8.1	7.9	8.0	7.9	8.0	7.9	8.1	7.9	8.1	7.9
EV-MC2	7.8	7.7	7.8	7.9	8.0	8.0	8.0	7.9	7.9	7.9	8.0	8.0	8.0	7.9
EV-HCl	7.9	7.7	8.0	7.9	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.0	8.0
LC-LCDSSLCC	8.0	7.9	8.0	7.9	8.0	7.9	8.0	7.9	8.0	7.9	8.1	7.9	8.0	7.9
LC-LC3	7.8	7.8	7.9	7.9	8.0	8.0	8.0	7.9	8.0	7.9	8.0	7.9	8.0	7.9
LC-LC5	7.9	7.8	7.9	7.8	8.0	8.0	8.0	7.9	8.0	7.8	8.0	7.9	8.0	7.9
LC-DCDS	7.9	7.9	7.9	7.7	8.0	8.0	8.1	7.8	8.0	7.8	8.0	7.8	8.1	7.9
Technician Initials	SY	SY	SY	RC	RC	A	A	SY	SY	SY	SY	SY	SY	SY

pH meter: 3/3

Light meter: LI-1

Light intensity (Lux): 500-4900

Comments:

Reviewed by: JCL

Date Reviewed: Jan. 24/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277
Test Condition: 28d water only growth + survival

Start Date: Nov. 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	8.3	5.8	~~8.0~~ 7.8	6.2	8.1	6.4	5.3	5.9	8.0	5.8	8.0	5.9	7.9	5.9
FR_FRCP1 +EDTA	8.9	6.0	8.1	6.6	8.1	6.5	5.2	6.1	7.8	6.0	7.8	6.0	7.8	6.0
CM-MC2 + EDTA	8.8	5.9	8.1	6.6	8.2	6.3	5.2	5.9	7.9	5.7	7.8	5.8	7.9	5.8
RG-MIDAG +EDTA	8.7	6.1	8.0	6.8	8.3	6.4	5.1	6.0	7.9	5.9	7.9	6.0	8.0	5.9
Technician Initials	SY	SY	SY	RC	RC	A	A	SY	SY	SY	SY	SY	SY	SY

DO meter: 3/3

pH

Sample ID	Day													
	7	8		9		10		11		12		13		14
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	7.8	7.3	7.7	7.4	7.8	7.9	7.9	7.4	7.8	7.4	7.8	7.2	7.8	7.1
FR-FRCP1 +EDTA	7.8	7.8	7.8	7.8	7.9	5.0	5.0	7.8	7.9	7.8	8.0	7.9	7.9	7.8
CM_MC2 +EDTA	8.1	7.9	8.1	7.9	8.0	5.0	5.0	7.9	8.0	7.8	8.1	7.8	8.0	7.9
RG-MIDAG +EDTA	7.9	7.8	7.8	7.9	8.0	5.0	5.0	7.9	8.0	7.9	8.0	7.9	8.0	7.9
Technician Initials	SY	SY	SY	RC	RC	A	A	SY	SY	SY	SY	SY	SY	SY

pH meter: 3/3

Light meter: lit-1

Light intensity (Lux): 500-4900

Comments:

Reviewed by: [signature]

Date Reviewed: Jan. 24/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet

Water Quality

Client: Teck
Work Order No.: 192277
Test Condition: 28d water only growth + survival

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	8.2	6.3	8.3	6.2	8.3	5.4	8.1	6.0	8.2	5.8	8.4	5.9	8.3	6.2
FR-UFR1	8.9	6.0	8.9	6.0	8.0	5.7	8.2	5.9	8.2	5.7	8.0	5.8	8.0	6.0
GH-ER2	8.9	5.9	8.8	5.0	8.1	5.6	8.0	5.5	8.0	5.4	7.9	5.5	7.9	5.8
CM-MC1	8.8	6.0	8.7	6.0	8.1	5.5	8.1	5.7	8.0	5.7	7.9	5.6	7.9	5.8
LC-SLC	8.9	6.3	8.7	6.2	7.8	5.8	8.1	5.9	8.0	5.8	8.0	5.6	8.0	5.9
FR-FRCP1	8.7	6.5	8.6	6.4	7.8	5.4	8.1	5.7	8.1	5.8	8.0	5.7	7.9	6.0
FR-FRABCH	8.8	6.4	8.8	6.5	7.8	5.8	8.0	6.0	7.8	6.0	7.8	5.9	7.7	6.1
GH-FR1	8.7	6.6	8.6	6.7	8.1	6.2	8.1	6.1	8.0	6.0	7.9	5.8	7.9	6.0
GH-ERC	8.7	5.5	8.7	5.6	8.1	5.7	8.0	5.6	8.1	5.4	8.0	5.5	7.9	5.8
CM-MC2	8.9	5.9	8.7	5.8	8.1	5.2	8.0	5.6	8.0	5.5	8.0	5.5	8.0	5.7
Technician Initials	SH	SH	SH	RC	RC	[illegible]	[illegible]	SH	SH	SH	SH	SH	SH	SH

DO meter: 3/3

pH

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	7.8	7.1	7.8	7.0	7.5	7.3	7.6	7.1	7.6	7.1	7.6	7.0	7.6	7.2
FR-UFR1	7.8	7.5	8.0	7.4	7.8	7.7	7.9	7.5	7.8	7.5	7.8	7.5	7.9	7.7
GH-ER2	7.9	7.6	8.0	7.4	7.9	7.6	7.9	7.6	7.9	7.6	7.9	7.6	7.9	7.7
CM-MC1	7.8	7.5	7.9	7.5	7.8	7.7	7.9	7.7	7.9	7.6	7.9	7.7	7.9	7.7
LC-SLC	7.8	7.6	8.0	7.6	7.9	7.7	7.9	7.6	7.9	7.6	7.9	7.6	7.9	7.7
FR-FRCP1	7.9	7.9	7.8	7.7	7.7	7.7	7.8	7.7	7.7	7.7	7.8	7.7	7.7	7.7
FR-FRABCH	7.9	7.8	7.8	7.8	7.7	7.8	7.9	7.8	7.8	7.8	7.8	7.8	7.8	7.8
GH-FR1	8.1	7.9	8.0	7.8	7.9	8.0	8.0	7.9	8.0	7.9	8.0	7.9	8.0	7.9
GH-ERC	7.9	7.6	8.0	7.8	8.0	7.6	8.0	7.6	8.0	7.6	8.0	7.7	8.0	7.7
CM-MC2	8.0	7.8	7.9	7.7	7.8	7.8	8.0	7.8	7.9	7.8	7.9	7.8	7.9	7.8
Technician Initials	SH	SH	SH	RC	RC	[illegible]	[illegible]	SH	SH	SH	SH	SH	SH	SH

pH meter: 3/3

Light meter: Lit-1

Light intensity (Lux): 400-5000

Comments:

Reviewed by: [signature]

Date Reviewed: Jan. 24/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277
Test Condition: 28d water only growth + survival

Start Date: Nov. 14/19
Termination Date: Dec. 12/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	8.9	6.6	8.7	6.2	8.1	5.5	8.1	5.8	8.1	5.9	8.0	5.8	7.8	6.0
EV-MC2	8.9	6.4	8.8	5.5	7.9	5.7	8.1	5.6	8.0	5.8	7.9	5.5	7.8	5.8
EV-HC1	8.8	6.6	8.8	6.3	8.1	6.0	8.0	5.8	8.0	5.8	7.8	5.7	7.6	6.0
LC-LCDSSLEC	8.9	6.5	8.8	6.0	7.8	6.3	8.1	6.0	7.9	5.9	7.7	5.8	7.7	6.1
LC-LC3	8.7	6.3	8.6	6.8	7.9	5.8	8.1	5.8	8.0	5.7	7.9	5.6	7.8	5.8
LC-LC5	8.7	6.7	8.6	6.2	7.9	5.9	8.0	5.7	7.9	5.7	7.8	5.5	7.8	5.7
LC-DCDS	8.9	6.5	8.7	6.3	7.9	5.6	8.0	5.7	7.9	5.6	7.8	5.6	7.7	5.9
Technician Initials	SH	SH	SH	RL	RL	A	A	SH	SH	SH	SH	SH	SH	SH

DO meter: 3/3

pH

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG-MIDAG	7.9	7.9	8.0	7.8	8.0	7.9	8.0	7.9	8.0	7.9	7.9	7.8	8.0	7.9
EV-MC2	7.9	7.9	8.0	7.8	8.0	7.9	8.0	7.9	8.0	7.9	8.0	7.9	8.0	7.9
EV-HC1	8.0	8.0	8.1	7.9	8.1	8.0	8.1	7.9	8.1	7.9	8.0	7.9	8.1	8.0
LC-LCDSSLEC	8.1	7.9	8.1	7.8	8.0	8.0	8.0	8.0	8.0	8.0	7.9	7.9	8.0	7.9
LC-LC3	8.0	8.0	8.0	7.9	7.9	8.1	8.0	8.0	8.0	8.0	7.9	8.0	8.0	8.0
LC-LC5	8.1	7.9	8.0	7.7	8.0	8.0	8.0	7.9	8.0	8.0	7.8	7.9	8.0	7.9
LC-DCDS	8.0	7.8	8.0	7.7	8.0	7.9	8.1	7.8	8.0	7.8	7.9	7.8	8.0	7.9
Technician Initials	SH	SH	SH	RL	RL	A	A	SH	SH	SH	SH	SH	SH	SH

pH meter: 3/3

Light meter: 1+1

Light intensity (Lux): 400-5000

Comments:

Reviewed by: JGH

Date Reviewed: Jan. 24/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277
Test Condition: 28d water only growth + survival

Start Date: Nov. 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	8.2	6.3	8.0	5.6	7.8	6.1	7.9	5.8	7.9	5.9	7.8	5.7	7.6	6.0
FR_FRCP1 +EDTA	8.9	6.1	8.6	5.8	7.9	5.7	8.0	5.7	8.0	5.8	7.9	5.5	7.8	5.8
CM_MC2 + EDTA	8.9	5.9	8.6	5.2	8.1	5.9	8.1	5.8	8.1	5.8	8.0	5.6	7.8	5.8
RG_MIDAG + EDTA	8.9	6.3	8.7	6.2	8.2	5.8	8.2	5.9	8.2	5.9	8.1	5.7	7.9	5.9
Technician Initials	SH	SH	SH	AC	AC	A	A	SH	SH	SH	SH	SH	SH	SH

DO meter: 3/3

pH

Sample ID	Day													
	14	15		16		17		18		19		20		21
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA Control	7.8	7.2	7.8	7.2	7.8	7.4	8.0	7.2	7.8	7.2	7.8	7.1	7.9	7.3
FR_FRCP1 +EDTA	7.9	7.8	7.8	7.7	7.8	7.9	8.1	7.8	8.1	7.9	8.1	7.9	8.1	7.9
CM_MC2 +EDTA	8.0	7.8	7.9	7.7	7.9	7.8	8.1	7.9	8.1	7.9	8.1	7.9	8.0	7.9
RG_MIDAG +EDTA	7.9	7.9	8.0	7.8	8.0	8.0	8.1	7.9	8.0	8.0	8.0	7.9	8.0	7.9
Technician Initials	SH	SH	SH	AC	AC	A	A	SH	SH	SH	SH	SH	SH	SH

pH meter: 3/3

Light meter: Lit-1

Light intensity (Lux): 400-5000

Comments:

Reviewed by: JCh

Date Reviewed: Jan-24/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277
Test Condition: 28d water only growth + survival

Start Date: Nov. 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	8.2	6.3	8.5	6.0	8.3	5.9	8.1	6.0	8.2	5.8	8.3	5.9	8.5	6.0
FR-UFR1	8.9	6.7	8.9	6.0	8.0	5.4	8.1	5.3	8.2	5.4	8.1	5.2	8.2	4.9
GH-ER2	8.9	6.5	8.9	5.6	8.1	5.8	8.2	5.7	8.2	5.6	8.1	5.4	8.1	5.2
CM-MC1	8.9	7.2	8.8	6.6	8.2	6.3	8.1	6.1	8.1	5.9	8.0	5.6	8.0	5.5
LC-SLC	8.8	6.2	8.9	6.6	8.2	5.7	8.2	5.8	8.1	5.8	7.9	5.7	8.0	5.6
FR-FRCP1	8.9	6.4	8.9	6.3	8.2	5.5	8.1	5.7	8.0	5.8	7.9	5.5	7.9	5.3
FR-FRABCH	8.9	6.5	8.8	5.4	8.2	5.9	8.2	5.8	8.0	5.8	7.8	5.4	7.9	5.3
GH-FR1	8.7	6.8	8.9	~~6.6~~	~~8.2~~	6.0	8.2	5.9	8.1	5.8	8.0	5.5	8.0	5.3
GH-ERC	8.9	6.2	8.9	~~5.6~~	8.1	6.1	8.1	6.1	8.1	6.0	7.9	5.7	7.9	5.4
CM-MC2	8.8	6.0	8.7	4.6	8.1	5.5	8.2	5.6	8.2	5.5	8.0	5.1	8.0	4.7
Technician Initials	SH	SH	SH	JD	JD	MM	MM	SH	SH	CH	SH	SH	SH	CH

DO meter: 3/3

pH

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Control	7.8	7.0	7.5	7.6	7.8	7.2	7.8	7.2	7.7	7.2	7.8	7.1	7.7	7.0
FR-UFR1	8.0	7.5	7.9	7.8	8.3	7.5	8.1	7.5	8.1	7.5	8.1	7.5	8.0	7.6
GH-ER2	8.0	7.5	7.9	7.9	8.2	7.5	8.2	7.6	8.2	7.5	8.2	7.4	8.1	7.5
CM-MC1	7.9	7.7	7.9	8.1	8.2	7.8	8.1	7.8	8.2	7.8	8.2	7.7	8.1	7.7
LC-SLC	7.9	7.5	7.9	8.0	8.2	7.6	8.2	7.6	8.2	7.6	8.2	7.6	8.1	7.7
FR-FRCP1	7.9	7.8	7.8	8.2	8.0	7.7	8.1	7.8	8.0	7.8	8.1	7.8	8.0	7.8
FR-FRABCH	7.9	7.7	7.8	8.0	8.0	7.6	8.1	7.7	8.0	7.6	8.0	7.6	8.0	7.7
GH-FR1	8.1	7.8	8.0	8.1	8.2	7.8	8.2	7.8	8.1	7.8	8.1	7.7	8.0	7.7
GH-ERC	7.9	7.7	7.9	8.0	8.2	7.7	8.2	7.7	8.1	7.7	8.2	7.7	8.2	7.7
CM-MC2	8.0	7.6	7.9	7.9	8.1	7.7	8.1	7.7	8.1	7.7	8.1	7.6	8.1	7.6
Technician Initials	SH	SH	SH	JD	JD	MM	MM	SH	SH	CH	SH	SH	SH	CH

pH meter: 3/3 JD

Light meter: LI-1

Light intensity (Lux): 470 - 4900

Comments:

Reviewed by: JDH

Date Reviewed: Jan-24/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277
Test Condition: 28d water only growth + survival

Start Date: Nov. 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG	8.9	6.6	8.8	5.9	8.2	5.3	8.1	5.5	7.9	5.7	7.7	5.4	7.8	5.1
EV_MC2	8.9	6.7	8.9	6.0	8.2	5.9	8.2	5.8	8.1	5.8	8.0	5.5	7.9	5.3
EV_HCl	8.7	6.8	8.6	5.9	8.2	5.6	8.0	5.7	8.0	5.7	7.9	5.3	7.9	5.0
LC_LCDSSLCC	8.8	6.5	8.9	5.5	8.2	5.7	8.1	5.7	8.1	5.6	8.0	5.3	7.8	4.8
LC_LC3	8.9	6.6	8.9	5.6	8.3	5.2	8.1	5.3	8.0	5.5	7.9	5.2	7.7	4.7
LC_LC5	8.9	6.2	8.8	5.8	8.4	5.9	8.2	6.0	8.1	5.8	7.9	5.6	7.8	5.3
LC_DCDS	8.8	6.4	8.7	6.0	8.4	6.0	8.2	6.0	8.1	5.9	8.0	5.7	7.9	5.5
Technician Initials	SH	SH	SH	JD	JD	MM	MM	CH	SH	SH	SH	SH	SH	SH

DO meter: 3/3

pH

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
RG_MIDAG	8.0	7.9	8.0	8.1	8.3	7.7	8.2	7.8	8.2	7.8	8.2	7.7	8.1	7.8
EV_MC2	8.0	7.8	8.0	8.0	8.3	7.8	8.3	7.8	8.2	7.8	8.3	7.8	8.2	7.8
EV_HCl	8.1	7.9	8.1	8.1	8.3	7.8	8.2	7.8	8.1	7.8	8.2	7.8	8.1	7.9
LC_LCDSSLCC	8.1	7.8	8.0	8.0	8.2	7.8	8.1	7.8	8.1	7.8	8.1	7.7	8.0	7.8
LC_LC3	8.0	7.9	7.9	8.1	8.1	7.8	8.2	7.9	8.1	7.9	8.1	7.8	8.1	7.7
LC_LC5	8.1	7.8	8.0	8.0	8.2	7.8	8.2	7.8	8.1	7.8	8.2	7.7	8.1	7.7
LC_DCDS	8.0	7.7	8.0	8.0	8.2	7.8	8.2	7.8	8.2	7.7	8.2	7.7	8.0	7.8
Technician Initials	SH	SH	SH	JD	JD	MM	MM	SH	SH	SH	SH	SH	SH	SH

pH meter: 3/3

Light meter: Li-1

Light intensity (Lux): 470-4900

Comments:

Reviewed by: JCH

Date Reviewed: Jan. 29/20

Chronic *H. azteca* Water-Only Toxicity Test Data Sheet
Water Quality

Client: Teck
Work Order No.: 192277
Test Condition: 28d water only growth + survival

Start Date: Nov. 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*

Dissolved Oxygen (mg/L)

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA control	8.3	6.2	7.9	5.6	8.1	5.5	8.1	5.6	8.0	5.6	7.9	5.4	7.8	5.1
FR-FRCP1 +EDTA	8.9	6.1	8.8	5.8	8.3	5.2	8.1	5.4	8.0	5.6	7.8	5.3	7.6	4.9
CM-MC2 +EDTA	8.8	5.9	8.6	5.8	8.3	5.7	8.2	5.7	8.1	5.7	8.0	5.3	7.8	4.7
RG-MIDAG +EDTA	8.9	6.2	8.9	5.7	8.3	5.5	8.2	5.6	8.2	5.7	8.0	5.4	7.9	4.9
Technician Initials	SH	SH	SH	SD	SD	MM	MM	SH	SH	SH	SH	LR	SH	SH

DO meter: 3/3

pH

Sample ID	Day													
	21	22		23		24		25		26		27		28
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
EDTA control	7.7	~~7.4~~ 7.2	7.7	7.6	7.9	7.3	7.8	7.2	7.8	7.3	7.8	7.2	7.8	7.2
FR-FRCP1 +EDTA	7.9	7.8	7.8	8.2	8.0	7.9	8.1	7.9	7.9	7.9	8.0	7.8	7.9	7.9
CM-MC2 +EDTA	8.0	7.9	7.9	8.0	8.2	7.7	8.1	7.8	7.8	7.8	8.0	7.7	7.9	7.7
RG-MIDAG +EDTA	8.0	7.9	7.9	8.0	8.2	7.8	8.2	7.8	7.8	7.8	8.0	7.8	8.0	7.8
Technician Initials	SH	SH	SH	SD	SD	MM	MM	SH	SH	SH	SH	SH	SH	SH

pH meter: 3/3

Light meter: LI-1

Light intensity (Lux): 470-4900

Comments:

Reviewed by: JCM

Date Reviewed: Jan-24/20

H. azteca Water-only Toxicity Test Data Sheet

~~14~~ 28-d Survival and Weight

Client: Teck
Work Order No: 192277
Sample ID: See below

Start Date: Nov 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (04 blue)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
Control	1	A	10	0	0	KJL	1071.77	1076.76	10	NM/ST
	2	B	10	0	0		1048.58	1055.01	10	
	3	C	10	0	0		1053.77	1057.05	10	
	4	D	8	0	2		1058.08	1060.03	8	
	5	E	10	0	0		1057.53	1059.92	10	
FR_UFR1	6	A	8	0	2	ST	1062.07	1063.74	8	
	7	B	10	0	0	ST	1060.61	1067.99	10	
	8	C	9	0	1	ST	1053.41	1058.41	9	
	9	D	10	0	0	ST	1047.80	1054.58	10	
	10	E	10	0	0	ST	1062.58	1068.79	10	
GH_ER2	11	A	10	0	0	KJL	1073.37	1074.56	10	
	12	B	10	0	0	KJL	1056.89	1060.45	10	
	13	C	10	0	0	KJL	1071.28	1073.11	10	
	14	D	8	0	2	KJL	1067.99	1069.63	8	
	15	E	10	0	0	KJL	1069.14	1072.06	10	
CM_MC1	16	A	10	0	0	SY	1051.78	1057.15	10	
	17	B	8	0	2		1083.37	1086.77	8	
	18	C	10	0	0		1061.85	1067.69	10	
	19	D	~~9~~ 10	0	~~SY~~ 0		1031.65	1033.49	10	
	20	E	8	0	2		1069.96	1066.11	8	

Comments: 109. reweigh - #1 - 1076.73, #27 - 1049.88, #31 - 1062.98, #44 - 1048.18, #59 - 1045.77
#69 - 1046.16, #81 - 1048.08, #91 - 1064.15, #92 - 1092.49, #99 - 1052.46
#104 - 1076.16

Reviewed by: JCh

Date Reviewed: Jan-4/20

H. azteca Water-only Toxicity Test Data Sheet

~~14~~ 28-d Survival and Weight

Client: Teck
Work Order No: 192277
Sample ID: See below

Start Date: Nov 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (04 blue)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~	21	A	10	0	0		1060.60	1062.61	10	MH / ST
LC-SLC	22	B	10	0	0		1042.64	1048.72	10	
	23	C	9	0	1		1056.45	1061.76	9	
	24	D	5①	0	5		1055.54	1056.11	5	
	25	E	8	0	2		1035.89	1036.65	8	
FR-FRCP1	26	A	9	0	1		1051.47	1052.47	9	
	27	B	9	0	1		1048.85	1049.78	9	
	28	C	9	0	1		1054.14	1055.30	9	
	29	D	9	0	1		1046.96	1048.55	9	
	30	E	10	0	0		1051.80	1053.47	10	
FR-FRABCH	31	A	~~8~~ 4	0	~~7~~ 6		1062.35	1062.86	4	
	32	B	10	0	0		1054.13	1058.50	10	
	33	C	10	0	0		1038.59	1043.88	10	
	34	D	9	0	1		1050.64	1055.37	9	
	35	E	9	0	1		1073.92	1078.93	9	
GH-FR1	36	A	10	0	0		1064.34	1068.91	10	
	37	B	8	0	2		1086.39	1088.82	8	
	38	C	10	0	0		1068.31	1073.06	10	
	39	D	8	0	2		1055.87	1060.04	8	
	40	E	10	0	0		1061.44	1064.27	10	

Comments: ① checked by KSJ

Reviewed by: JCh

Date Reviewed: Jan. 17/20

H. azteca Water-only Toxicity Test Data Sheet

~~14~~ 28-d Survival and Weight

Client: Tech
Work Order No: 192277
Sample ID: See below

Start Date: Nov 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (Q4 blue)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~	41	A	5	0	5	SM	1060.97	1061.16	5	MM/ST
GH-ERC	42	B	10	0	0	SM	1038.59	1041.80	10	
	43	C	10	0	0	SM	1060.45	1064.45	10	
	44	D	9	0	1	X	1043.50	1048.08	9	
	45	E	8	0	2	X	1061.89	1063.19	8	
CM-MC2	46	A	8	0	2	X	1039.52	1041.33	8	
	47	B	9	0	1	SM	1098.13	1099.86	9	
	48	C	9	0	1	X	1054.41	1056.16	9	
	49	D	3 (10)	1	6	SM	1046.41	1047.53	3	
	50	E	9	0	1	X	1070.63	1072.87	9	
RG-MIDAG	51	A	9	0	1	X	1061.34	1063.64	9	
	52	B	10	0	0	X	1046.09	1054.03	10	
	53	C	10	0	0	SM	1053.78	1055.95	10	
	54	D	8	0	2	SM	1052.07	1053.24	8	
	55	E	10	0	0	X	1056.65	1058.76	10	
EV-MC2	56	A	10	0	0	SM	1061.50	1065.56	10	
	57	B	9	0	1		1048.80	1052.12	9	
	58	C	0 ~~8~~ 10	0	~~8~~ 0		1058.90	1061.93	10	
	59	D	8	1	1		1045.06	1045.67	8	
	60	E	10	0	0		1044.38	1049.23	10	

Comments: ① checked by KJL

Reviewed by: JCh

Date Reviewed: Jan. 17/20

H. azteca Water-only Toxicity Test Data Sheet

~~14~~ 28-d Survival and Weight

Client: Teck
Work Order No: 192277
Sample ID: See below

Start Date: Nov 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Q4 Pan No. blue	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~ KJL	61	A	2 ②	1	7	[illegible]	1063.22	1063.41	2	MM/ST
EV_HC1	62	B	10	0	0	[illegible]	1048.40	1050.88	10	
	63	C	10	0	0	[illegible]	1056.47	1058.46	10	
	64	D	10	0	0	[illegible]	1058.15	1065.04	10	
	65	E	9	0	1	[illegible]	1049.66	1051.26	9	
LC_LCDSSLCC	66	A	2 ①	0	8	9	1064.97	1065.26	2	
	67	B	9	0	1	9	1063.23	1068.79	9	
	68	C	~~10~~ 5	~~0~~ 0	~~0~~ 5	8	1056.84	1057.60	5	
	69	D	9	0	1	8	1043.75	1046.45	9	
	70	E	10	0	0	9	1054.36	1058.58	10	
LC_LC3	71	A	0 ②	0	10	[illegible]	1083.26	—	0	
	72	B	4 ③	0	6	[illegible]	1047.19	1099.08	4	
	73	C	8	0	2	[illegible]	1045.34	1050.23	8	
	74	D	10	0	0	[illegible]	1051.65	1057.60	10	
	75	E	10	0	0	[illegible]	1041.56	1048.63	10	
LC_LC5	76	A	10	0	0	CMP	1070.68	1077.07	10	
	77	B	8	0	2		1042.79	1043.46	8	
	78	C	4	0	6		1047.54	1048.20	4	
	79	D	~~9~~ 6	1	~~0~~ 3		1054.56	1055.75	6	
	80	E	8 ④	2	0	KJL	1057.44	1058.64	6 ~~[illegible]~~ 54	

Comments: ① checked by MTT ③ checked by JW
② checked by KJL ④ 2. lost in transfer

Reviewed by: [illegible]

Date Reviewed: Jan. 24/20

H. azteca Water-only Toxicity Test Data Sheet

14-d 28 Survival and Weight

Client: Teck
Work Order No: 192277
Sample ID: See below

Start Date: Nov 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (Q4 blue)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~ KJL	81	A	2①	4	4	~~KJL~~	1047.69	1047.86	2	MM / ST
LC-DCDS	82	B	2①	0	8	SY	1073.35	1074.08	2	
	83	C	5①	0	5	SY	1059.11	1059.97	5	
	84	D	8	0	2	~~KJL~~	1078.15	1079.63	8	
	85	E	0①	5 ~~0~~ 1	4 ~~5~~ 9	SY	1067.77	—	0	
EDTA CONTROL	86	A	10	0	0	SY	968.19	972.10	10	
	87	B	10	0	0		975.99	978.57	10	
	88	C	10	0	0		1057.19	1064.56	10	
	89	D	10	0	0		1059.87	1067.02	10	
	90	E	8	0	2		1046.68	1049.70	8	
FR-FRCP1 + EDTA	91	A	8	0	2	SY	1062.67	1063.76	8	
	92	B	5 ~~7~~ 6	0	5 ~~3~~ ~~6~~ 4		1091.53	5 ~~4~~ 1092.5 ~~4~~ 92	5 ~~7~~ 6	
	93	C	9	0	1		1050.35	1052.68	9	
	94	D	7	0	3		1047.73	1048.96	7	
	95	E	6	0	4		1061.91	1062.91	6	
CM-MC2 + EDTA	96	A	4	2	4	KJL	1040.83	1042.04	4	
	97	B	3	3	4		1066.66	1067.37	3	
	98	C	6	1	3		1073.95	1075.57	6	
	99	D	2	5	3		1051.80	1052.39	2	
	100	E	5	1	4		1044.43	1045.84	5	

Comments: ① checked by KJL

Reviewed by: JM

Date Reviewed: Jan. 21/20

H. azteca Water-only Toxicity Test Data Sheet

~~14~~ 28-d Survival and Weight

Client: Teck
Work Order No: 192277
Sample ID: See below

Start Date: Nov 14/19
Termination Date: Dec 12/19
Test Organism: *Hyalella azteca*
Balance: 1

Sample ID	Pan No. (Q4 blue)	Rep	No. alive	No. dead	No. missing	Initials	Pan weight (mg)	Pan + organism (mg)	No. weighed	Initials
~~Control~~ RW	101	A	10	0	0	SY	1045.33	1052.35	10	MM / ST
RG-MIDAG+EDTA	102	B	10	0	0	↓	1045.10	1052.22	10	↓ ↓
	103	C	8	1	1		1053.34	1055.95	8	
	104	D	10	0	0		1072.33	1075.99	10	
	105	E	9	0	1	↓	1067.54	1069.16	9	↓ ↓
		A								
		B								
		C								
		D								
		E								
		A								
		B								
		C								
		D								
		E								
		A								
		B								
		C								
		D								
		E								

Comments:

Reviewed by: JCh

Date Reviewed: Jan-17/20

Client: Teck

W.O.#: 192277

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Control	Nov. 14/19	Nov. 15/19	50	3.0	3.1	58	50 ①	6.8	136	SY
FR_UFR1			50	6.7	6.8	132	50 ①	8.9	178	
GH_ER2			50	6.9	7.0	136	10 ②	2.7	270	
CM_MC1			50	6.4	6.5	126	50 ①	6.9	138	
LC_SLC			50	6.6	6.7	130	10 ②	2.0	200	
FR_FRCP1			50	10.1	10.2	200	10 ②	7.2	720	
FR_FRABCH			50	10.9	11.0	216	10 ②	6.7	670	
GH_FR1			50	10.6	10.7	210	10 ②	4.9	490	
GH_ERC			50	8.3	8.4	164	10 ②	1.8	180	
CM_MC2			50	11.4	11.5	226	10 ②	5.5	550	
RG_MIDAG		Nov. 19/19	50	10.1	10.2	200	10 ②	~~4.2~~ ② SY	320	SY
EV_MC2			50	10.3	10.4	204	10 ②	~~4.4~~ ① SY	340	
EV_HC1			50	10.7	10.8	212	10 ②	4.0	400	
LC_LCDSSLCC			50	10.6	10.7	210	10 ②	4.3	430	
LC_LC3			50	11.6	11.7	230	10 ②	6.4	640	
LC_LC5			50	10.5	10.6	208	10 ②	3.9	390	
LC_DCDS			50	8.0	8.1	158	10 ②	3.7	370	
EDTA Control			50	3.2	3.3	62	10 ②	1.4	140	
FR-FRCP1 +EDTA			50	11.2	11.3	222	10 ②	6.8	680	
CM_MC2 + EDTA			50	10.7	10.8	212	10 ②	5.4	540	
RG-MIDAG +EDTA ~~Notes:~~			50	9.5	9.6	188	10 ②	3.3	320	

Day 0 / WK 1

② 3.2
① 3.4

Notes: ① diluted to 100mL w/ 50mL DI water, ② diluted to 100mL w/ 90mL DI water

Reviewed by: JCh Date Reviewed: Jan. 16/20

Client: Teck

W.O.#: 192277

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR_UFR1	Nov. 20/19	Nov. 21/19	50	7.3	7.4	144	10 ①	1.7	170	SY
GH_ER2			50	7.6	7.7	150	10 ①	2.4	240	
CM_MC1			50	7.7	7.8	152	~~10~~ 50	6.9	~~240~~ 138	
LC_SLC			50	~~SY~~ 7.3	7.5	142	10 ①	2.0	200	
FR_FRCP1			50	10.6	10.7	210	10 ①	7.4	740	
FR_FRABCH			50	12.0	12.1	238	10 ①	6.6	660	
GH_FR1			50	11.0	11.1	218	10 ①	4.8	480	
GH_ERC			50	8.4	8.5	166	10 ①	1.8	180	
CM_MC2		↓	50	11.5	11.6	228	10 ①	5.7	570	
RG_MIDAG		Nov. 22/19	50	9.6	9.7	190	10 ①	2.8	280	
EV_MC2			50	9.6	9.7	190	10 ①	3.1	310	
EV_HC1			50	11.0	11.1	218	10 ①	4.0	400	
LC_LCDSSLEC			50	10.5	10.6	208	10 ①	4.6	460	
LC_LC3			50	12.1	12.2	240	10 ①	6.6	660	
LC_LC5		↓	50	10.5	10.6	208	10 ①	3.4	390	
LC_DCDS		Nov. 25/19	50	7.9	8.0	156	10 ①	3.5	350	
EDTA control			50	3.3	3.4	64	10 ①	1.2	120	
FR_FRCP1 +EDTA			50	11.1	11.2	220	10 ①	6.4	640	
CM_MC2 + EDTA			50	11.0	11.1	218	10 ①	5.5	550	
RG_MIDAG +EDTA	↓	↓	50	9.6	9.7	190	10 ①	3.8	380	↓

Day 7 / Week 2

Notes: ① diluted w/ DI water to 100mL

Reviewed by: JGM

Date Reviewed: Jan. 16/20

Client: Teck

W.O.#: 192277

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR_UFR1	Nov 27/19	Nov 28/19	50	7.1	7.2	140	10①	1.9	190	SY
GH_ER2			50	7.8	7.9	154	10①	2.3	230	
CM_MC1			50	6.9	7.0	136	10①	1.3	130	
LC_SLC			50	7.6	7.7	150	10①	2.0	200	
FR_FRCP1			50	13.6	13.7	270	10①	7.2	720	
FR_FRABCH		Nov 29/19	50	12.3	12.4	244	10①	6.5	650	
GH_FR1			50	10.9	11.0	216	10①	4.9	490	
GH_ERC			50	8.4	8.5	166	10①	1.7	170	
CM_MC2			50	11.6	11.7	230	10①	5.7	570	
RG_MIDAG			50	9.6	9.7	190	10①	3.8	380	
EV_MC2			50	9.7	9.9	190	10①	3.2	320	
EV_HC1			50	10.5	10.6	208	10①	4.2	420	
LC_LCDSSL	SY LC-DSSLC		50	10.3	10.4	204	10①	5.0	500	
LC_LC3			50	12.0	12.1	238	10①	~~6.0~~ 6.2③	620	
LC_LC5			50	10.1	10.2	200	10①	4.4	440	
LC_DCDS			50	7.8	7.9	154	10①	4.0	400	
EDTA Control			50	3.3	8.4	64	10①	1.2	120	
FR_FRCP1 +EDTA			50	11.6	11.7	230	10①	7.7	770	
CM_MC2 + EDTA			50	10.9	11.1	214	10①	5.5	550	
RG_MIDAG + EDTA			50	9.5	9.6	188	10①	3.6	360	

Day 14 / WK 3

Notes: ① diluted to 100mL w/ 90mL DI Water

Reviewed by: JCh Date Reviewed: Jan. 16/20

Client: Teck

W.O.#: 192277

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	② Dec. 6/19 Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR_UFR1	Dec. 4/19	~~50~~ ①	50	7.7	7.8	152	10①	2.3	230	SJ
GH_ER2				8.1	8.2	160		2.8	280	SJ
CM_MC1				7.6	7.7	150		2.5	250	SJ
LC_SLC				7.6	7.7	150		3.2	320	SJ
FR_FRCP1				14.4	14.5	286		9.9	990	SJ
FR_FRABCH				12.2	12.3	242		7.5	750	SJ
GH_FR1				10.8	10.9	214		5.5	550	SJ
GH_ERC				8.1	8.2	160		3.7	370	SJ
CM_MC2				11.2	11.3	222		7.0	700	SJ
RG_MIDAG				9.6	9.7	190		4.5	450	SJ
EV_MC2				9.4	9.5	186		4.2	420	SJ
EV_HC1				10.5	10.6	208		5.2	520	SJ
LC_LCDSSLCC				10.3	16.4	264		5.5	550	SJ
LC_LC3				11.5	11.6	228		8.5	850	SJ
LC_LC5				9.8	9.9	194		5.6	560	SJ
LC_DCDS				8.1	8.2	160		6.5	650	SJ
EDTA CONTROL				3.5	3.6	68		2.9	290	SJ
FR_FRCP1+EDTA				14.3	14.4	284		10.1	1010	SJ
CM_MC2+EDTA				11.2	11.3	222		6.0	600	SJ
RG_MIDAG+EDTA	↓	↓	↓	9.3	~~9.2~~ 9.4	184	↓	4.8	480	SJ

Day 21 / Week ~~3~~ 4

Notes: ① DILUTED TO 100ML W/ 90ML DI WATER

Reviewed by: JGh Date Reviewed: Jan. 16/20

Client: Teck

W.O.#: 192277

Hardness and Alkalinity Datasheet

	Alkalinity							Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR_UFR1	Dec. 12/19	Dec. 19/19	50	6.8	6.9	134		10①	2.1	210	SY
GH_ER2			50	7.5	7.6	148		10①	1.9	190	
CM_MC1			50	7.4	7.5	146		10①	1.4	140	
LC_SLC			50	7.4	7.5	146		10①	2.0	200	
FR_FRCP1			50	11.0	11.2	216		10①	9.8	980	
FR_FRABCH			50	11.6	11.7	230		10①	7.3	730	
GH_FR1			50	8.7	8.8	172		10①	4.9	490	
GH_ERC			50	8.3	8.4	164		10①	2.2	220	
CM_MC2			50	9.6	9.7	190		10①	6.1	610	
RG_MIDAG			50	8.7	8.8	172		10①	4.3	430	
EV_MC2			50	9.4	9.5	186		10①	3.6	360	
EV_HC1			50	9.7	9.8	192		10①	5.4	540	
LC_LCDSSLCC			50	8.6	8.7	170		10①	4.6	460	
LC_LC3			50	9.2	9.3	182		10①	6.0	600	
LC_LC5			50	8.4	8.5	166		10①	4.1	410	
LC_DCDS			50	7.6	7.7	150		10①	3.9	390	
EDTA control			50	3.2	3.3	62		10①	1.4	140	
FR_FRCP1 + EDTA			50	10.8	10.9	214		10①	9.3	930	
CM_MC2 + EDTA			50	9.3	9.4	184		10①	5.6	560	
RG_MIDAG + EDTA	↓	↓	50	8.5	8.6	168		10①	4.0	400	↓

Day 28

Notes: ① diluted to 100mL w/ 90mL DI water

Reviewed by: JCh Date Reviewed: Jan. 16/20

CETIS Summary Report

28d Water Only

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test (SZH) (SZH)

Nautilus Environmental

Batch ID:	18-7620-4968	**Test Type:**	Growth-Survival (~~10d~~) (SZH) 14d	**Analyst:**	Sean Yue
Start Date:	14 Nov-19	**Protocol:**	EPA/600/R-99/064 (2000) (Modified)	**Diluent:**	Reconstituted Water
Ending Date:	12 Dec-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	07-5025-5799	14 Nov-19	14 Nov-19	n/a	Teck Coal	Teck Coal Q4
FR_UFR1	08-6945-2424	12 Nov-19 09:49 ✓	13 Nov-19 11:30	38h (0 °C) ✓		
GH_ER2	14-9952-9322	12 Nov-19 12:03 ✓	13 Nov-19 11:30	36h (0 °C) ✓		
CM_MC1	04-3284-1213	12 Nov-19 10:45 ✓	13 Nov-19 11:30	37h (0 °C) ✓		
LC_SLC	05-4724-5694	12 Nov-19 13:07 ✓	13 Nov-19 11:30	35h (1.5 °C) ✓		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30 ✓	13 Nov-19 11:30	37h (0 °C) ✓		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39 ✓	13 Nov-19 11:30	37h (0 °C) ✓		
GH_FR1	12-2825-5207	12 Nov-19 14:33 ✓	13 Nov-19 11:30	33h (0 °C) ✓		
GH_ERC	21-3387-4816	12 Nov-19 13:41 ✓	13 Nov-19 11:30	34h (1.2 °C) ✓		
CM_MC2	02-5668-3961	12 Nov-19 12:11 ✓	13 Nov-19 11:30	36h (0 °C) ✓		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43 ✓	13 Nov-19 11:30	36h (0 °C) ✓		
EV_MC2	06-7376-7316	12 Nov-19 10:35 ✓	13 Nov-19 11:30	37h (0 °C) ✓		
EV_HC1	03-0087-5543	12 Nov-19 09:15 ✓	13 Nov-19 11:30	39h (0 °C) ✓		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32 ✓	13 Nov-19 11:30	37h (1.8 °C) ✓		
LC_LC3	19-1971-9965	12 Nov-19 13:28 ✓	13 Nov-19 11:30	35h (1.2 °C) ✓		
LC_LC5	03-8413-9244	12 Nov-19 10:00 ✓	13 Nov-19 11:30	38h (0.9 °C) ✓		
LC_DCDS	05-9778-0225	12 Nov-19 11:00 ✓	13 Nov-19 11:30	37h (0 °C) ✓		
EDTA Control	17-1720-4826	14 Nov-19	14 Nov-19	n/a		
FR_FRCP1 + EDTA	20-6224-2086	12 Nov-19	12 Nov-19	48h		
CM_MC2 + EDTA	11-1066-0904	12 Nov-19	13 Nov-19	48h		
RG_MIDAG + EDT	08-0806-2893	12 Nov-19	13 Nov-19	48h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Single Comparison Summary

Analysis ID	Endpoint (SZH)	Comparison Method	P-Value	Comparison Result 28d	S
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate (SZH)	1

28d

Analyst: SZH QA: Jan. 29/20

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1

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Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test 52y 52y
Nautilus Environmental

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_LC5 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_LC5 passed 10d survival rate	1

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Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test 524 524 — Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_LC5 passed 10d survival rate	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5499	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	LC_LC5 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0530	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	LC_LC5 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.3323	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	FR_FRABCH failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	LC_LC3 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	LC_DCDS failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	CM_MC1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	GH_ER2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	EDTA Control failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	LC_SLC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	GH_FR1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	LC_LC5 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	FR_FRCP1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	EV_HC1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	CM_MC2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	RG_MIDAG failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	RG_MIDAG + EDTA failed 10d survival rat	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	EV_MC2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	Lab Control failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	FR_FRCP1 + EDTA failed 10d survival rat	1

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	CM_MC2 + EDTA failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	FR_UFR1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	GH_ERC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0077	LC_LCDSSLCC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	FR_FRABCH failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	CM_MC1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	FR_FRCP1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	EV_MC2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	GH_FR1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	Lab Control failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	FR_FRCP1 + EDTA failed 10d survival rat	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	RG_MIDAG + EDTA failed 10d survival rat	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	EV_HC1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	EDTA Control failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	LC_LCDSSLCC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	LC_LC5 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	CM_MC2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	LC_SLC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	GH_ER2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	GH_ERC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	CM_MC2 + EDTA failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	LC_DCDS failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	FR_UFR1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	RG_MIDAG failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	8.0E-04	LC_LC3 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	LC_SLC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	GH_FR1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	FR_FRCP1 + EDTA failed 10d survival rat	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	LC_DCDS failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	RG_MIDAG + EDTA failed 10d survival rat	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	CM_MC2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	EV_MC2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	RG_MIDAG failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	FR_FRCP1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	EV_HC1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	GH_ERC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	LC_LC3 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	FR_UFR1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	EDTA Control failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	FR_FRABCH failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	LC_LCDSSLCC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	Lab Control failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	GH_ER2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	LC_LC5 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	CM_MC2 + EDTA failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	CM_MC1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	FR_FRCP1 + EDTA failed 10d survival rat	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	EV_MC2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	CM_MC2 + EDTA failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	EDTA Control failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	GH_ER2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	CM_MC1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	CM_MC2 failed 10d survival rate	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	FR_UFR1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	LC_DCDS failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	LC_LC5 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	FR_FRABCH failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	GH_ERC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	LC_LC3 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	RG_MIDAG + EDTA failed 10d survival rat	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	RG_MIDAG failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	Lab Control failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	GH_FR1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	LC_LCDSSLCC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	EV_HC1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	LC_SLC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	2.2E-10	FR_FRCP1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	CM_MC2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	EV_HC1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	GH_ERC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	EDTA Control failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	LC_LC5 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	LC_SLC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	GH_FR1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	LC_DCDS failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	FR_UFR1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	FR_FRCP1 + EDTA failed 10d survival rat	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	FR_FRABCH failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	Lab Control failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	RG_MIDAG + EDTA failed 10d survival rat	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	RG_MIDAG failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	EV_MC2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	LC_LCDSSLCC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	CM_MC2 + EDTA failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	GH_ER2 failed 10d survival rate	1

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Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test **Nautilus Environmental**
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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	CM_MC1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	LC_LC3 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0151	FR_FRCP1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	RG_MIDAG failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	EV_MC2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	CM_MC2 + EDTA failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	CM_MC2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	GH_ERC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	RG_MIDAG + EDTA failed 10d survival rat	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	Lab Control failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	FR_FRABCH failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	LC_SLC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	LC_LC5 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	LC_DCDS failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	CM_MC1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	FR_FRCP1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	LC_LC3 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	EDTA Control failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	EV_HC1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	GH_ER2 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	LC_LCDSSLCC failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	FR_UFR1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	GH_FR1 failed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	7.9E-09	FR_FRCP1 + EDTA failed 10d survival rat	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Lab Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EDTA Control passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	RG_MIDAG + EDTA passed 10d survival r	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 + EDTA passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed 10d survival rate	1
19-8690-3874	10d Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 + EDTA passed 10d survival r	1

28d S24 28d S24

28d ~~10d~~ Survival Rate Summary
SZY

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	N	5	0.9600	0.8489	1.0000	0.8000	1.0000	0.0400	0.0894	9.32%	0.00%
FR_UFR1		5	0.9400	0.8289	1.0000	0.8000	1.0000	0.0400	0.0894	9.52%	2.08%
GH_ER2		5	0.9600	0.8489	1.0000	0.8000	1.0000	0.0400	0.0894	9.32%	0.00%
CM_MC1		5	0.9200	0.7840	1.0000	0.8000	1.0000	0.0490	0.1095	11.91%	4.17%
LC_SLC		5	0.8400	0.5825	1.0000	0.5000	1.0000	0.0927	0.2074	24.69%	12.50%
FR_FRCP1		5	0.9200	0.8645	0.9755	0.9000	1.0000	0.0200	0.0447	4.86%	4.17%
FR_FRABCH		5	0.8400	0.5283	1.0000	0.4000	1.0000	0.1122	0.2510	29.88%	12.50%
GH_FR1		5	0.9200	0.7840	1.0000	0.8000	1.0000	0.0490	0.1095	11.91%	4.17%
GH_ERC		5	0.8400	0.5825	1.0000	0.5000	1.0000	0.0927	0.2074	24.69%	12.50%
CM_MC2		5	0.7600	0.4362	1.0000	0.3000	0.9000	0.1166	0.2608	34.31%	20.83%
RG_MIDAG		5	0.9400	0.8289	1.0000	0.8000	1.0000	0.0400	0.0894	9.52%	2.08%
EV_MC2		5	0.9400	0.8289	1.0000	0.8000	1.0000	0.0400	0.0894	9.52%	2.08%
EV_HC1		5	0.8200	0.3863	1.0000	0.2000	1.0000	0.1562	0.3493	42.60%	14.58%
LC_LCDSSLCC		5	0.7000	0.2789	1.0000	0.2000	1.0000	0.1517	0.3391	48.45%	27.08%
LC_LC3		5	0.6400	0.1016	1.0000	0.0000	1.0000	0.1939	0.4336	67.75%	33.33%
LC_LC5		5	0.7200	0.4369	1.0000	0.4000	1.0000	0.1020	0.2280	31.67%	25.00%
LC_DCDS		5	0.3400	0.0000	0.7287	0.0000	0.8000	0.1400	0.3130	92.07%	64.58%
EDTA Control		5	0.9600	0.8489	1.0000	0.8000	1.0000	0.0400	0.0894	9.32%	0.00%
FR_FRCP1 + EDTA		5	0.7200	0.5581	0.8819	0.6000	0.9000	0.0583	0.1304	18.11%	25.00%
CM_MC2 + EDTA		5	0.4000	0.2037	0.5963	0.2000	0.6000	0.0707	0.1581	39.53%	58.33%
RG_MIDAG + EDT		5	0.9400	0.8289	1.0000	0.8000	1.0000	0.0400	0.0894	9.52%	2.08%

28d ~~10d~~ Survival Rate Detail
SZY

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Control	N	1.0000	1.0000	1.0000	0.8000	1.0000
FR_UFR1		0.8000	1.0000	0.9000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	0.8000	1.0000
CM_MC1		1.0000	0.8000	1.0000	1.0000	0.8000
LC_SLC		1.0000	1.0000	0.9000	0.5000	0.8000
FR_FRCP1		0.9000	0.9000	0.9000	0.9000	1.0000
FR_FRABCH		0.4000	1.0000	1.0000	0.9000	0.9000
GH_FR1		1.0000	0.8000	1.0000	0.8000	1.0000
GH_ERC		0.5000	1.0000	1.0000	0.9000	0.8000
CM_MC2		0.8000	0.9000	0.9000	0.3000	0.9000
RG_MIDAG		0.9000	1.0000	1.0000	0.8000	1.0000
EV_MC2		1.0000	0.9000	1.0000	0.8000	1.0000
EV_HC1		0.2000	1.0000	1.0000	1.0000	0.9000
LC_LCDSSLCC		0.2000	0.9000	0.5000	0.9000	1.0000
LC_LC3		0.0000	0.4000	0.8000	1.0000	1.0000
LC_LC5		1.0000	0.8000	0.4000	0.6000	0.8000
LC_DCDS		0.2000	0.2000	0.5000	0.8000	0.0000
EDTA Control		1.0000	1.0000	1.0000	1.0000	0.8000
FR_FRCP1 + EDTA		0.8000	0.6000	0.9000	0.7000	0.6000
CM_MC2 + EDTA		0.4000	0.3000	0.6000	0.2000	0.5000
RG_MIDAG + EDT		1.0000	1.0000	0.8000	1.0000	0.9000

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ SZH Test **Nautilus Environmental**

28d ~~10d~~ SZH **Survival Rate Binomials**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Control	N	10/10	10/10	10/10	8/10	10/10
FR_UFR1		8/10	10/10	9/10	10/10	10/10
GH_ER2		10/10	10/10	10/10	8/10	10/10
CM_MC1		10/10	8/10	10/10	10/10	8/10
LC_SLC		10/10	10/10	9/10	5/10	8/10
FR_FRCP1		9/10	9/10	9/10	9/10	10/10
FR_FRABCH		4/10	10/10	10/10	9/10	9/10
GH_FR1		10/10	8/10	10/10	8/10	10/10
GH_ERC		5/10	10/10	10/10	9/10	8/10
CM_MC2		8/10	9/10	9/10	3/10	9/10
RG_MIDAG		9/10	10/10	10/10	8/10	10/10
EV_MC2		10/10	9/10	10/10	8/10	10/10
EV_HC1		2/10	10/10	10/10	10/10	9/10
LC_LCDSSLCC		2/10	9/10	5/10	9/10	10/10
LC_LC3		0/10	4/10	8/10	10/10	10/10
LC_LC5		10/10	8/10	4/10	6/10	8/10
LC_DCDS		2/10	2/10	5/10	8/10	0/10
EDTA Control		10/10	10/10	10/10	10/10	8/10
FR_FRCP1 + EDTA		8/10	6/10	9/10	7/10	6/10
CM_MC2 + EDTA		4/10	3/10	6/10	2/10	5/10
RG_MIDAG + EDT		10/10	10/10	8/10	10/10	9/10

CETIS Analytical Report

28d Water Only

Test Code/ID: 192277a / 06-6217-2766

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test (S24 / S24)

Nautilus Environmental

Analysis ID:	19-8690-3874	**Endpoint:**	~~10d~~ Survival Rate (28d / S24)	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:22	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	18-7620-4968	**Test Type:**	Growth-Survival (~~10d~~) S24 28d	**Analyst:**	Sean Yue
Start Date:	14 Nov-19	**Protocol:**	EPA/600/R-99/064 (2000) (Modified)	**Diluent:**	Reconstituted Water
Ending Date:	12 Dec-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	07-5025-5799	14 Nov-19	14 Nov-19	n/a	Teck Coal	Teck Coal Q4
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	38h (0 °C)		
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	36h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	37h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	35h (1.5 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	37h (0 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	37h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	33h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	34h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	36h (0 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	36h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	37h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	39h (0 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	37h (1.8 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	35h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	38h (0.9 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	37h (0 °C)		
EDTA Control	17-1720-4826	14 Nov-19	14 Nov-19	n/a		
FR_FRCP1 + EDTA	20-6224-2086	12 Nov-19	12 Nov-19	48h		
CM_MC2 + EDTA	11-1066-0904	12 Nov-19	13 Nov-19	48h		
RG_MIDAG + EDT	08-0806-2893	12 Nov-19	13 Nov-19	48h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	0.5000	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.6913	Exact	1.0000	Non-Significant Effect

JCL

Hyalella ~~14-d~~ 28d Survival and Growth ~~Sediment~~ Test (~~324~~ 324) **Nautilus Environmental**

Analysis ID: 19-8690-3874 **Endpoint:** ~~10d~~ 28d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jan-20 14:22 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		CM_MC1	0.3389	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.0458	Exact	0.5499	Non-Significant Effect
		FR_FRCP1	0.3389	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.0458	Exact	0.5499	Non-Significant Effect
		GH_FR1	0.3389	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.0458	Exact	0.5499	Non-Significant Effect
		CM_MC2	0.0038	Exact	0.0530	Non-Significant Effect
		RG_MIDAG	0.5000	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.0256	Exact	0.3323	Non-Significant Effect
		LC_LCDSSLCC*	0.0005	Exact	0.0077	Significant Effect
		LC_LC3*	0.0000	Exact	8.0E-04	Significant Effect
		LC_LC5*	0.0009	Exact	0.0151	Significant Effect
		LC_DCDS*	0.0000	Exact	2.2E-10	Significant Effect
		EDTA Control	0.6913	Exact	1.0000	Non-Significant Effect
		FR_FRCP1 + EDTA*	0.0009	Exact	0.0151	Significant Effect
		CM_MC2 + EDTA*	0.0000	Exact	7.9E-09	Significant Effect
		RG_MIDAG + EDTA	0.5000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Lab Control	N	48	2	50	0.96	0.04	-26.32%
FR_UFR1		47	3	50	0.94	0.06	-23.68%
GH_ER2		48	2	50	0.96	0.04	-26.32%
CM_MC1		46	4	50	0.92	0.08	-21.05%
LC_SLC		42	8	50	0.84	0.16	-10.53%
FR_FRCP1		46	4	50	0.92	0.08	-21.05%
FR_FRABCH		42	8	50	0.84	0.16	-10.53%
GH_FR1		46	4	50	0.92	0.08	-21.05%
GH_ERC		42	8	50	0.84	0.16	-10.53%
CM_MC2		38	12	50	0.76	0.24	0.0%
RG_MIDAG		47	3	50	0.94	0.06	-23.68%
EV_MC2		47	3	50	0.94	0.06	-23.68%
EV_HC1		41	9	50	0.82	0.18	-7.9%
LC_LCDSSLCC		35	15	50	0.7	0.3	7.9%
LC_LC3		32	18	50	0.64	0.36	15.79%
LC_LC5		36	14	50	0.72	0.28	5.26%
LC_DCDS		17	33	50	0.34	0.66	55.26%
EDTA Control		48	2	50	0.96	0.04	-26.32%
FR_FRCP1 + EDTA		36	14	50	0.72	0.28	5.26%
CM_MC2 + EDTA		20	30	50	0.4	0.6	47.37%
RG_MIDAG + EDTA		47	3	50	0.94	0.06	-23.68%

Hyalella ~~14-d~~ 28d Survival and Growth ~~Sediment~~ Test (524) (524)

Nautilus Environmental

Analysis ID: 19-8690-3874 **Endpoint:** (524) ~~10d~~ 28d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jan-20 14:22 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

28d ~~10d~~ (524) **Survival Rate Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Control	N	1.0000	1.0000	1.0000	0.8000	1.0000
FR_UFR1		0.8000	1.0000	0.9000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	0.8000	1.0000
CM_MC1		1.0000	0.8000	1.0000	1.0000	0.8000
LC_SLC		1.0000	1.0000	0.9000	0.5000	0.8000
FR_FRCP1		0.9000	0.9000	0.9000	0.9000	1.0000
FR_FRABCH		0.4000	1.0000	1.0000	0.9000	0.9000
GH_FR1		1.0000	0.8000	1.0000	0.8000	1.0000
GH_ERC		0.5000	1.0000	1.0000	0.9000	0.8000
CM_MC2		0.8000	0.9000	0.9000	0.3000	0.9000
RG_MIDAG		0.9000	1.0000	1.0000	0.8000	1.0000
EV_MC2		1.0000	0.9000	1.0000	0.8000	1.0000
EV_HC1		0.2000	1.0000	1.0000	1.0000	0.9000
LC_LCDSSLCC		0.2000	0.9000	0.5000	0.9000	1.0000
LC_LC3		0.0000	0.4000	0.8000	1.0000	1.0000
LC_LC5		1.0000	0.8000	0.4000	0.6000	0.8000
LC_DCDS		0.2000	0.2000	0.5000	0.8000	0.0000
EDTA Control		1.0000	1.0000	1.0000	1.0000	0.8000
FR_FRCP1 + EDTA		0.8000	0.6000	0.9000	0.7000	0.6000
CM_MC2 + EDTA		0.4000	0.3000	0.6000	0.2000	0.5000
RG_MIDAG + EDT		1.0000	1.0000	0.8000	1.0000	0.9000

28d ~~10d~~ (524) **Survival Rate Binomials**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Control	N	10/10	10/10	10/10	8/10	10/10
FR_UFR1		8/10	10/10	9/10	10/10	10/10
GH_ER2		10/10	10/10	10/10	8/10	10/10
CM_MC1		10/10	8/10	10/10	10/10	8/10
LC_SLC		10/10	10/10	9/10	5/10	8/10
FR_FRCP1		9/10	9/10	9/10	9/10	10/10
FR_FRABCH		4/10	10/10	10/10	9/10	9/10
GH_FR1		10/10	8/10	10/10	8/10	10/10
GH_ERC		5/10	10/10	10/10	9/10	8/10
CM_MC2		8/10	9/10	9/10	3/10	9/10
RG_MIDAG		9/10	10/10	10/10	8/10	10/10
EV_MC2		10/10	9/10	10/10	8/10	10/10
EV_HC1		2/10	10/10	10/10	10/10	9/10
LC_LCDSSLCC		2/10	9/10	5/10	9/10	10/10
LC_LC3		0/10	4/10	8/10	10/10	10/10
LC_LC5		10/10	8/10	4/10	6/10	8/10
LC_DCDS		2/10	2/10	5/10	8/10	0/10
EDTA Control		10/10	10/10	10/10	10/10	8/10
FR_FRCP1 + EDTA		8/10	6/10	9/10	7/10	6/10
CM_MC2 + EDTA		4/10	3/10	6/10	2/10	5/10
RG_MIDAG + EDT		10/10	10/10	8/10	10/10	9/10

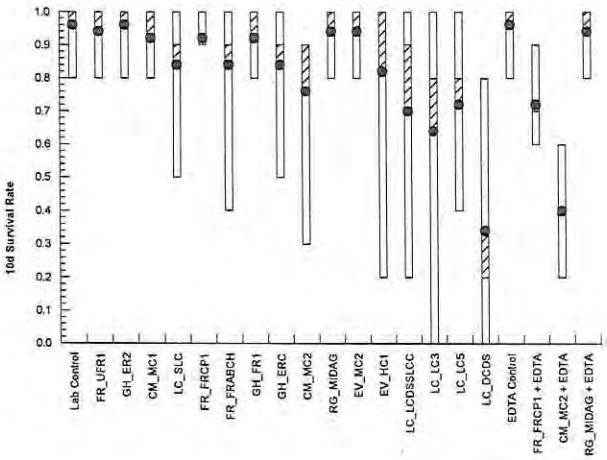
Analyst: (524) QA: Jan-29/20

28d Water Only

Hyalella ~~14-d~~ 52d Survival and Growth ~~Sediment~~ 52d Test — **Nautilus Environmental**

Analysis ID:	19-8690-3874	**Endpoint:**	~~10d~~ 28d 32d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:22	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



CETIS Analytical Report

28d Water Only

Test Code/ID: 192277a / 06-6217-2766

Hyalella ~~14d~~ 28d Survival and Growth ~~Sediment~~ 524 Test

Nautilus Environmental

Analysis ID:	07-4401-7118	**Endpoint:**	~~10d~~ 28d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:47	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	18-7620-4968	**Test Type:**	Growth-Survival (~~10d~~ 28d)	**Analyst:**	Sean Yue
Start Date:	14 Nov-19	**Protocol:**	EPA/600/R-99/064 (2000) (Modified)	**Diluent:**	Reconstituted Water
Ending Date:	12 Dec-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	38h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	36h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	37h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	35h (1.5 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	37h (0 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	37h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	33h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	34h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	36h (0 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	36h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	37h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	39h (0 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	37h (1.8 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	35h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	38h (0.9 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	37h (0 °C)		
EDTA Control	17-1720-4826	14 Nov-19	14 Nov-19	n/a		
FR_FRCP1 + EDTA	20-6224-2086	12 Nov-19	12 Nov-19	48h		
CM_MC2 + EDTA	11-1066-0904	12 Nov-19	13 Nov-19	48h		
RG_MIDAG + EDT	08-0806-2893	12 Nov-19	13 Nov-19	48h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (FR_UFR1)		GH_ER2	0.8189	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.5000	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.0999	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.5000	Exact	1.0000	Non-Significant Effect

Analyst: SZY QA: Jan. 29/20

28d Water Only

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test (28d, 524) Nautilus Environmental

Analysis ID: 07-4401-7118 **Endpoint:** ~~10d~~ 28d Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jan-20 14:47 **Analysis:** 524 STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		FR_FRABCH	0.0999	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.5000	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.0999	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.0113	Exact	0.1469	Non-Significant Effect
		RG_MIDAG	0.6611	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.6611	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.0606	Exact	0.7275	Non-Significant Effect
		LC_LCDSSLCC*	0.0017	Exact	0.0264	Significant Effect
		LC_LC3*	0.0002	Exact	0.0033	Significant Effect
		LC_LC5*	0.0032	Exact	0.0483	Significant Effect
		LC_DCDS*	0.0000	Exact	1.9E-09	Significant Effect
		EDTA Control	0.8189	Exact	1.0000	Non-Significant Effect
		FR_FRCP1 + EDTA*	0.0032	Exact	0.0483	Significant Effect
		CM_MC2 + EDTA*	0.0000	Exact	5.9E-08	Significant Effect
		RG_MIDAG + EDTA	0.6611	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	XC	47	3	50	0.94	0.06	-23.68%
GH_ER2		48	2	50	0.96	0.04	-26.32%
CM_MC1		46	4	50	0.92	0.08	-21.05%
LC_SLC		42	8	50	0.84	0.16	-10.53%
FR_FRCP1		46	4	50	0.92	0.08	-21.05%
FR_FRABCH		42	8	50	0.84	0.16	-10.53%
GH_FR1		46	4	50	0.92	0.08	-21.05%
GH_ERC		42	8	50	0.84	0.16	-10.53%
CM_MC2		38	12	50	0.76	0.24	0.0%
RG_MIDAG		47	3	50	0.94	0.06	-23.68%
EV_MC2		47	3	50	0.94	0.06	-23.68%
EV_HC1		41	9	50	0.82	0.18	-7.9%
LC_LCDSSLCC		35	15	50	0.7	0.3	7.9%
LC_LC3		32	18	50	0.64	0.36	15.79%
LC_LC5		36	14	50	0.72	0.28	5.26%
LC_DCDS		17	33	50	0.34	0.66	55.26%
EDTA Control		48	2	50	0.96	0.04	-26.32%
FR_FRCP1 + EDTA		36	14	50	0.72	0.28	5.26%
CM_MC2 + EDTA		20	30	50	0.4	0.6	47.37%
RG_MIDAG + EDTA		47	3	50	0.94	0.06	-23.68%

Analyst: 524 QA: JGL Jan. 29/20

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test — Nautilus Environmental

Analysis ID:	07-4401-7118	**Endpoint:**	~~10d~~ Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:47	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

~~10d~~ Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	XC	0.8000	1.0000	0.9000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	0.8000	1.0000
CM_MC1		1.0000	0.8000	1.0000	1.0000	0.8000
LC_SLC		1.0000	1.0000	0.9000	0.5000	0.8000
FR_FRCP1		0.9000	0.9000	0.9000	0.9000	1.0000
FR_FRABCH		0.4000	1.0000	1.0000	0.9000	0.9000
GH_FR1		1.0000	0.8000	1.0000	0.8000	1.0000
GH_ERC		0.5000	1.0000	1.0000	0.9000	0.8000
CM_MC2		0.8000	0.9000	0.9000	0.3000	0.9000
RG_MIDAG		0.9000	1.0000	1.0000	0.8000	1.0000
EV_MC2		1.0000	0.9000	1.0000	0.8000	1.0000
EV_HC1		0.2000	1.0000	1.0000	1.0000	0.9000
LC_LCDSSLCC		0.2000	0.9000	0.5000	0.9000	1.0000
LC_LC3		0.0000	0.4000	0.8000	1.0000	1.0000
LC_LC5		1.0000	0.8000	0.4000	0.6000	0.8000
LC_DCDS		0.2000	0.2000	0.5000	0.8000	0.0000
EDTA Control		1.0000	1.0000	1.0000	1.0000	0.8000
FR_FRCP1 + EDTA		0.8000	0.6000	0.9000	0.7000	0.6000
CM_MC2 + EDTA		0.4000	0.3000	0.6000	0.2000	0.5000
RG_MIDAG + EDT		1.0000	1.0000	0.8000	1.0000	0.9000

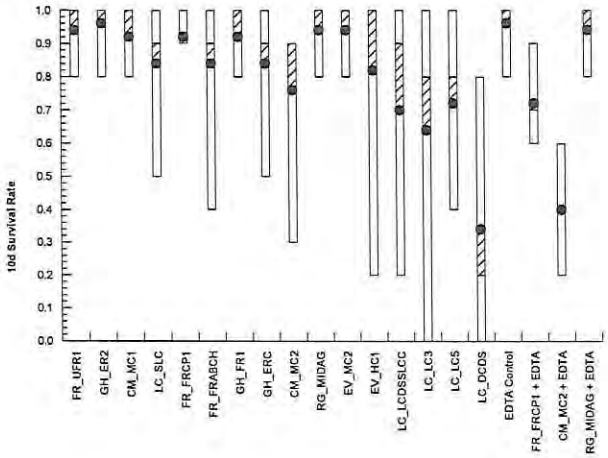
~~10d~~ Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	XC	8/10	10/10	9/10	10/10	10/10
GH_ER2		10/10	10/10	10/10	8/10	10/10
CM_MC1		10/10	8/10	10/10	10/10	8/10
LC_SLC		10/10	10/10	9/10	5/10	8/10
FR_FRCP1		9/10	9/10	9/10	9/10	10/10
FR_FRABCH		4/10	10/10	10/10	9/10	9/10
GH_FR1		10/10	8/10	10/10	8/10	10/10
GH_ERC		5/10	10/10	10/10	9/10	8/10
CM_MC2		8/10	9/10	9/10	3/10	9/10
RG_MIDAG		9/10	10/10	10/10	8/10	10/10
EV_MC2		10/10	9/10	10/10	8/10	10/10
EV_HC1		2/10	10/10	10/10	10/10	9/10
LC_LCDSSLCC		2/10	9/10	5/10	9/10	10/10
LC_LC3		0/10	4/10	8/10	10/10	10/10
LC_LC5		10/10	8/10	4/10	6/10	8/10
LC_DCDS		2/10	2/10	5/10	8/10	0/10
EDTA Control		10/10	10/10	10/10	10/10	8/10
FR_FRCP1 + EDTA		8/10	6/10	9/10	7/10	6/10
CM_MC2 + EDTA		4/10	3/10	6/10	2/10	5/10
RG_MIDAG + EDT		10/10	10/10	8/10	10/10	9/10

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test (SZ4) (SZ4) **Nautilus Environmental**

Analysis ID:	07-4401-7118	**Endpoint:**	~~10d~~ 28d Survival Rate (SZ4)	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:47	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



CETIS Analytical Report

28d Water Only

Report Date: 28 Jan-20 14:48 (p 1 of 4)
Test Code/ID: 192277a / 06-6217-2766

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test

Nautilus Environmental

Analysis ID:	03-6492-6351	**Endpoint:**	~~10d~~ Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:48	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	18-7620-4968	**Test Type:**	Growth-Survival (~~10d~~) 28d	**Analyst:**	Sean Yue
Start Date:	14 Nov-19	**Protocol:**	EPA/600/R-99/064 (2000) (Modified)	**Diluent:**	Reconstituted Water
Ending Date:	12 Dec-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	38h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	36h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	37h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	35h (1.5 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	37h (0 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	37h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	33h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	34h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	36h (0 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	36h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	37h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	39h (0 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	37h (1.8 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	35h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	38h (0.9 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	37h (0 °C)		
EDTA Control	17-1720-4826	14 Nov-19	14 Nov-19	n/a		
FR_FRCP1 + EDTA	20-6224-2086	12 Nov-19	12 Nov-19	48h		
CM_MC2 + EDTA	11-1066-0904	12 Nov-19	13 Nov-19	48h		
RG_MIDAG + EDT	08-0806-2893	12 Nov-19	13 Nov-19	48h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (GH_ER2)		FR_UFR1	0.5000	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.3389	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.0458	Exact	0.5041	Non-Significant Effect
		FR_FRCP1	0.3389	Exact	1.0000	Non-Significant Effect

Analyst: SZY QA: JCL Jan-29/20

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test (524, 524, 28d) Nautilus Environmental

Analysis ID: 03-6492-6351 **Endpoint:** (524) ~~10d~~ Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jan-20 14:48 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		FR_FRABCH	0.0458	Exact	0.5041	Non-Significant Effect
		GH_FR1	0.3389	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.0458	Exact	0.5041	Non-Significant Effect
		CM_MC2*	0.0038	Exact	0.0492	Significant Effect
		RG_MIDAG	0.5000	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.5000	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.0256	Exact	0.3067	Non-Significant Effect
		LC_LCDSSLCC*	0.0005	Exact	0.0072	Significant Effect
		LC_LC3*	0.0000	Exact	7.5E-04	Significant Effect
		LC_LC5*	0.0009	Exact	0.0141	Significant Effect
		LC_DCDS*	0.0000	Exact	2.1E-10	Significant Effect
		EDTA Control	0.6913	Exact	0.6913	Non-Significant Effect
		FR_FRCP1 + EDTA*	0.0009	Exact	0.0141	Significant Effect
		CM_MC2 + EDTA*	0.0000	Exact	7.5E-09	Significant Effect
		RG_MIDAG + EDTA	0.5000	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		47	3	50	0.94	0.06	-23.68%
GH_ER2	XC	48	2	50	0.96	0.04	-26.32%
CM_MC1		46	4	50	0.92	0.08	-21.05%
LC_SLC		42	8	50	0.84	0.16	-10.53%
FR_FRCP1		46	4	50	0.92	0.08	-21.05%
FR_FRABCH		42	8	50	0.84	0.16	-10.53%
GH_FR1		46	4	50	0.92	0.08	-21.05%
GH_ERC		42	8	50	0.84	0.16	-10.53%
CM_MC2		38	12	50	0.76	0.24	0.0%
RG_MIDAG		47	3	50	0.94	0.06	-23.68%
EV_MC2		47	3	50	0.94	0.06	-23.68%
EV_HC1		41	9	50	0.82	0.18	-7.9%
LC_LCDSSLCC		35	15	50	0.7	0.3	7.9%
LC_LC3		32	18	50	0.64	0.36	15.79%
LC_LC5		36	14	50	0.72	0.28	5.26%
LC_DCDS		17	33	50	0.34	0.66	55.26%
EDTA Control		48	2	50	0.96	0.04	-26.32%
FR_FRCP1 + EDTA		36	14	50	0.72	0.28	5.26%
CM_MC2 + EDTA		20	30	50	0.4	0.6	47.37%
RG_MIDAG + EDTA		47	3	50	0.94	0.06	-23.68%

28d Water Only

Hyalella ~~14-d~~ 52d Survival and Growth ~~Sediment~~ 52d Test — **Nautilus Environmental**

Analysis ID:	03-6492-6351	**Endpoint:**	28d 52d ~~10d~~ Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:48	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

28d ~~10d~~ 52d **Survival Rate Detail**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.8000	1.0000	0.9000	1.0000	1.0000
GH_ER2	XC	1.0000	1.0000	1.0000	0.8000	1.0000
CM_MC1		1.0000	0.8000	1.0000	1.0000	0.8000
LC_SLC		1.0000	1.0000	0.9000	0.5000	0.8000
FR_FRCP1		0.9000	0.9000	0.9000	0.9000	1.0000
FR_FRABCH		0.4000	1.0000	1.0000	0.9000	0.9000
GH_FR1		1.0000	0.8000	1.0000	0.8000	1.0000
GH_ERC		0.5000	1.0000	1.0000	0.9000	0.8000
CM_MC2		0.8000	0.9000	0.9000	0.3000	0.9000
RG_MIDAG		0.9000	1.0000	1.0000	0.8000	1.0000
EV_MC2		1.0000	0.9000	1.0000	0.8000	1.0000
EV_HC1		0.2000	1.0000	1.0000	1.0000	0.9000
LC_LCDSSLCC		0.2000	0.9000	0.5000	0.9000	1.0000
LC_LC3		0.0000	0.4000	0.8000	1.0000	1.0000
LC_LC5		1.0000	0.8000	0.4000	0.6000	0.8000
LC_DCDS		0.2000	0.2000	0.5000	0.8000	0.0000
EDTA Control		1.0000	1.0000	1.0000	1.0000	0.8000
FR_FRCP1 + EDTA		0.8000	0.6000	0.9000	0.7000	0.6000
CM_MC2 + EDTA		0.4000	0.3000	0.6000	0.2000	0.5000
RG_MIDAG + EDT		1.0000	1.0000	0.8000	1.0000	0.9000

28d ~~10d~~ 52d **Survival Rate Binomials**

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		8/10	10/10	9/10	10/10	10/10
GH_ER2	XC	10/10	10/10	10/10	8/10	10/10
CM_MC1		10/10	8/10	10/10	10/10	8/10
LC_SLC		10/10	10/10	9/10	5/10	8/10
FR_FRCP1		9/10	9/10	9/10	9/10	10/10
FR_FRABCH		4/10	10/10	10/10	9/10	9/10
GH_FR1		10/10	8/10	10/10	8/10	10/10
GH_ERC		5/10	10/10	10/10	9/10	8/10
CM_MC2		8/10	9/10	9/10	3/10	9/10
RG_MIDAG		9/10	10/10	10/10	8/10	10/10
EV_MC2		10/10	9/10	10/10	8/10	10/10
EV_HC1		2/10	10/10	10/10	10/10	9/10
LC_LCDSSLCC		2/10	9/10	5/10	9/10	10/10
LC_LC3		0/10	4/10	8/10	10/10	10/10
LC_LC5		10/10	8/10	4/10	6/10	8/10
LC_DCDS		2/10	2/10	5/10	8/10	0/10
EDTA Control		10/10	10/10	10/10	10/10	8/10
FR_FRCP1 + EDTA		8/10	6/10	9/10	7/10	6/10
CM_MC2 + EDTA		4/10	3/10	6/10	2/10	5/10
RG_MIDAG + EDT		10/10	10/10	8/10	10/10	9/10

CETIS Analytical Report

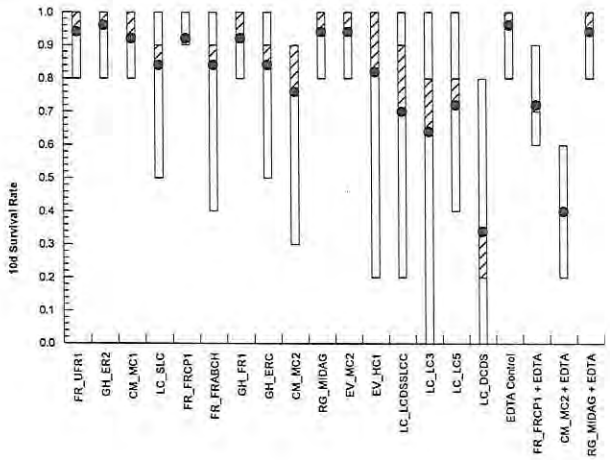
Report Date: 28 Jan-20 14:48 (p 4 of 4)
Test Code/ID: 192277a / 06-6217-2766

28d Water Only

Hyalella ~~14-d~~ 524 Survival and Growth ~~Sediment~~ 524 Test — **Nautilus Environmental**

Analysis ID:	03-6492-6351	**Endpoint:**	28d 524 ~~10d~~ Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:48	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



CETIS Analytical Report

28d Water Only

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test

Nautilus Environmental

Analysis ID:	11-5126-6297	**Endpoint:**	~~10d~~ Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:49	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	18-7620-4968	**Test Type:**	Growth-Survival ~~(10d)~~ 28d	**Analyst:**	Sean Yue
Start Date:	14 Nov-19	**Protocol:**	EPA/600/R-99/064 (2000) (Modified)	**Diluent:**	Reconstituted Water
Ending Date:	12 Dec-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	38h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	36h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	37h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	35h (1.5 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	37h (0 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	37h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	33h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	34h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	36h (0 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	36h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	37h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	39h (0 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	37h (1.8 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	35h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	38h (0.9 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	37h (0 °C)		
EDTA Control	17-1720-4826	14 Nov-19	14 Nov-19	n/a		
FR_FRCP1 + EDTA	20-6224-2086	12 Nov-19	12 Nov-19	48h		
CM_MC2 + EDTA	11-1066-0904	12 Nov-19	13 Nov-19	48h		
RG_MIDAG + EDT	08-0806-2893	12 Nov-19	13 Nov-19	48h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (CM_MC1)		FR_UFR1	0.7820	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.8978	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.1783	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.6425	Exact	1.0000	Non-Significant Effect

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test — Nautilus Environmental

Analysis ID: 11-5126-6297 **Endpoint:** ~~10d~~ Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jan-20 14:49 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		FR_FRABCH	0.1783	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.6425	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.1783	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.0269	Exact	0.3495	Non-Significant Effect
		RG_MIDAG	0.7820	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.7820	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.1168	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.0047	Exact	0.0759	Non-Significant Effect
		LC_LC3*	0.0007	Exact	0.0112	Significant Effect
		LC_LC5	0.0087	Exact	0.1304	Non-Significant Effect
		LC_DCDS*	0.0000	Exact	1.3E-08	Significant Effect
		EDTA Control	0.8978	Exact	1.0000	Non-Significant Effect
		FR_FRCP1 + EDTA	0.0087	Exact	0.1304	Non-Significant Effect
		CM_MC2 + EDTA*	0.0000	Exact	3.6E-07	Significant Effect
		RG_MIDAG + EDTA	0.7820	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		47	3	50	0.94	0.06	-23.68%
GH_ER2		48	2	50	0.96	0.04	-26.32%
CM_MC1	XC	46	4	50	0.92	0.08	-21.05%
LC_SLC		42	8	50	0.84	0.16	-10.53%
FR_FRCP1		46	4	50	0.92	0.08	-21.05%
FR_FRABCH		42	8	50	0.84	0.16	-10.53%
GH_FR1		46	4	50	0.92	0.08	-21.05%
GH_ERC		42	8	50	0.84	0.16	-10.53%
CM_MC2		38	12	50	0.76	0.24	0.0%
RG_MIDAG		47	3	50	0.94	0.06	-23.68%
EV_MC2		47	3	50	0.94	0.06	-23.68%
EV_HC1		41	9	50	0.82	0.18	-7.9%
LC_LCDSSLCC		35	15	50	0.7	0.3	7.9%
LC_LC3		32	18	50	0.64	0.36	15.79%
LC_LC5		36	14	50	0.72	0.28	5.26%
LC_DCDS		17	33	50	0.34	0.66	55.26%
EDTA Control		48	2	50	0.96	0.04	-26.32%
FR_FRCP1 + EDTA		36	14	50	0.72	0.28	5.26%
CM_MC2 + EDTA		20	30	50	0.4	0.6	47.37%
RG_MIDAG + EDTA		47	3	50	0.94	0.06	-23.68%

Hyalella ~~14-d~~ 28d Survival and Growth ~~Sediment~~ Test — Nautilus Environmental
SZ4 SZ4

Analysis ID:	11-5126-6297	**Endpoint:** ~~10d~~ 28d Survival Rate	**CETIS Version:** CETISv1.9.4
Analyzed:	28 Jan-20 14:49	**Analysis:** SZ4 STP 2xK Contingency Tables	**Status Level:** 1

28d ~~10d~~ Survival Rate Detail
SZ4

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.8000	1.0000	0.9000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	0.8000	1.0000
CM_MC1	XC	1.0000	0.8000	1.0000	1.0000	0.8000
LC_SLC		1.0000	1.0000	0.9000	0.5000	0.8000
FR_FRCP1		0.9000	0.9000	0.9000	0.9000	1.0000
FR_FRABCH		0.4000	1.0000	1.0000	0.9000	0.9000
GH_FR1		1.0000	0.8000	1.0000	0.8000	1.0000
GH_ERC		0.5000	1.0000	1.0000	0.9000	0.8000
CM_MC2		0.8000	0.9000	0.9000	0.3000	0.9000
RG_MIDAG		0.9000	1.0000	1.0000	0.8000	1.0000
EV_MC2		1.0000	0.9000	1.0000	0.8000	1.0000
EV_HC1		0.2000	1.0000	1.0000	1.0000	0.9000
LC_LCDSSLCC		0.2000	0.9000	0.5000	0.9000	1.0000
LC_LC3		0.0000	0.4000	0.8000	1.0000	1.0000
LC_LC5		1.0000	0.8000	0.4000	0.6000	0.8000
LC_DCDS		0.2000	0.2000	0.5000	0.8000	0.0000
EDTA Control		1.0000	1.0000	1.0000	1.0000	0.8000
FR_FRCP1 + EDTA		0.8000	0.6000	0.9000	0.7000	0.6000
CM_MC2 + EDTA		0.4000	0.3000	0.6000	0.2000	0.5000
RG_MIDAG + EDT		1.0000	1.0000	0.8000	1.0000	0.9000

28d ~~10d~~ Survival Rate Binomials
SZ4

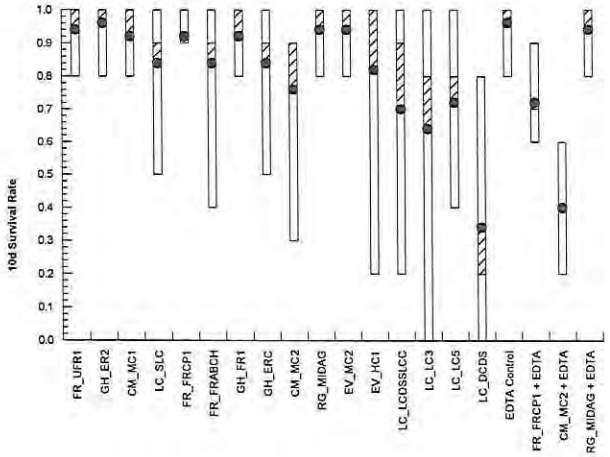
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		8/10	10/10	9/10	10/10	10/10
GH_ER2		10/10	10/10	10/10	8/10	10/10
CM_MC1	XC	10/10	8/10	10/10	10/10	8/10
LC_SLC		10/10	10/10	9/10	5/10	8/10
FR_FRCP1		9/10	9/10	9/10	9/10	10/10
FR_FRABCH		4/10	10/10	10/10	9/10	9/10
GH_FR1		10/10	8/10	10/10	8/10	10/10
GH_ERC		5/10	10/10	10/10	9/10	8/10
CM_MC2		8/10	9/10	9/10	3/10	9/10
RG_MIDAG		9/10	10/10	10/10	8/10	10/10
EV_MC2		10/10	9/10	10/10	8/10	10/10
EV_HC1		2/10	10/10	10/10	10/10	9/10
LC_LCDSSLCC		2/10	9/10	5/10	9/10	10/10
LC_LC3		0/10	4/10	8/10	10/10	10/10
LC_LC5		10/10	8/10	4/10	6/10	8/10
LC_DCDS		2/10	2/10	5/10	8/10	0/10
EDTA Control		10/10	10/10	10/10	10/10	8/10
FR_FRCP1 + EDTA		8/10	6/10	9/10	7/10	6/10
CM_MC2 + EDTA		4/10	3/10	6/10	2/10	5/10
RG_MIDAG + EDT		10/10	10/10	8/10	10/10	9/10

Analyst: SZ4 QA: Jan. 29/20

Hyalella ~~14-d~~ 23d Survival and Growth ~~Sediment~~ Test 524 824 524 **Nautilus Environmental**

Analysis ID:	11-5126-6297	**Endpoint:**	~~10d~~ 23d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:49	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



Analyst: 524 JCK QA: Jan-29/20

CETIS Analytical Report

28d Water Only

Test Code/ID: 192277a / 06-6217-2766

Hyalella ~~14-d~~ 28d Survival and Growth ~~Sediment~~ Water Test

Nautilus Environmental

Analysis ID:	11-5581-9163	**Endpoint:**	~~10d~~ 28d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:49	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	18-7620-4968	**Test Type:**	Growth-Survival ~~(10d)~~ 28d	**Analyst:**	Sean Yue
Start Date:	14 Nov-19	**Protocol:**	EPA/600/R-99/064 (2000)(Modified)	**Diluent:**	Reconstituted Water
Ending Date:	12 Dec-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	38h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	36h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	37h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	35h (1.5 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	37h (0 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	37h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	33h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	34h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	36h (0 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	36h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	37h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	39h (0 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	37h (1.8 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	35h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	38h (0.9 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	37h (0 °C)		
EDTA Control	17-1720-4826	14 Nov-19	14 Nov-19	n/a		
FR_FRCP1 + EDTA	20-6224-2086	12 Nov-19	12 Nov-19	48h		
CM_MC2 + EDTA	11-1066-0904	12 Nov-19	13 Nov-19	48h		
RG_MIDAG + EDT	08-0806-2893	12 Nov-19	13 Nov-19	48h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control (LC_SLC)		FR_UFR1	0.9744	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.9922	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.9394	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.9394	Exact	1.0000	Non-Significant Effect

Analyst: SZH QA: Jan-29/20

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test (524 524) — Nautilus Environmental

Analysis ID: 11-5581-9163 **Endpoint:** ~~10d~~ 28d Survival Rate (524) **CETIS Version:** CETISv1.9.4
Analyzed: 28 Jan-20 14:49 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		FR_FRABCH	0.6071	Exact	1.0000	Non-Significant Effect
		GH_FR1	0.9394	Exact	1.0000	Non-Significant Effect
		GH_ERC	0.6071	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.2270	Exact	1.0000	Non-Significant Effect
		RG_MIDAG	0.9744	Exact	1.0000	Non-Significant Effect
		EV_MC2	0.9744	Exact	1.0000	Non-Significant Effect
		EV_HC1	0.5000	Exact	1.0000	Non-Significant Effect
		LC_LCDSSLCC	0.0765	Exact	1.0000	Non-Significant Effect
		LC_LC3	0.0195	Exact	0.3316	Non-Significant Effect
		LC_LC5	0.1135	Exact	1.0000	Non-Significant Effect
		LC_DCDS*	0.0000	Exact	5.5E-06	Significant Effect
		EDTA Control	0.9922	Exact	1.0000	Non-Significant Effect
		FR_FRCP1 + EDTA	0.1135	Exact	1.0000	Non-Significant Effect
		CM_MC2 + EDTA*	0.0000	Exact	9.1E-05	Significant Effect
		RG_MIDAG + EDTA	0.9744	Exact	1.0000	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		47	3	50	0.94	0.06	-23.68%
GH_ER2		48	2	50	0.96	0.04	-26.32%
CM_MC1		46	4	50	0.92	0.08	-21.05%
LC_SLC	XC	42	8	50	0.84	0.16	-10.53%
FR_FRCP1		46	4	50	0.92	0.08	-21.05%
FR_FRABCH		42	8	50	0.84	0.16	-10.53%
GH_FR1		46	4	50	0.92	0.08	-21.05%
GH_ERC		42	8	50	0.84	0.16	-10.53%
CM_MC2		38	12	50	0.76	0.24	0.0%
RG_MIDAG		47	3	50	0.94	0.06	-23.68%
EV_MC2		47	3	50	0.94	0.06	-23.68%
EV_HC1		41	9	50	0.82	0.18	-7.9%
LC_LCDSSLCC		35	15	50	0.7	0.3	7.9%
LC_LC3		32	18	50	0.64	0.36	15.79%
LC_LC5		36	14	50	0.72	0.28	5.26%
LC_DCDS		17	33	50	0.34	0.66	55.26%
EDTA Control		48	2	50	0.96	0.04	-26.32%
FR_FRCP1 + EDTA		36	14	50	0.72	0.28	5.26%
CM_MC2 + EDTA		20	30	50	0.4	0.6	47.37%
RG_MIDAG + EDTA		47	3	50	0.94	0.06	-23.68%

Analyst: SZH QA: Jan-29/20

28d Water Only

Hyalella ~~14-d~~ SZY Survival and Growth ~~Sediment~~ SZY Test — Nautilus Environmental

Analysis ID:	11-5581-9163	**Endpoint:**	28d ~~10d~~ SZY Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:49	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

28d ~~10d~~ SZY Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.8000	1.0000	0.9000	1.0000	1.0000
GH_ER2		1.0000	1.0000	1.0000	0.8000	1.0000
CM_MC1		1.0000	0.8000	1.0000	1.0000	0.8000
LC_SLC	XC	1.0000	1.0000	0.9000	0.5000	0.8000
FR_FRCP1		0.9000	0.9000	0.9000	0.9000	1.0000
FR_FRABCH		0.4000	1.0000	1.0000	0.9000	0.9000
GH_FR1		1.0000	0.8000	1.0000	0.8000	1.0000
GH_ERC		0.5000	1.0000	1.0000	0.9000	0.8000
CM_MC2		0.8000	0.9000	0.9000	0.3000	0.9000
RG_MIDAG		0.9000	1.0000	1.0000	0.8000	1.0000
EV_MC2		1.0000	0.9000	1.0000	0.8000	1.0000
EV_HC1		0.2000	1.0000	1.0000	1.0000	0.9000
LC_LCDSSLCC		0.2000	0.9000	0.5000	0.9000	1.0000
LC_LC3		0.0000	0.4000	0.8000	1.0000	1.0000
LC_LC5		1.0000	0.8000	0.4000	0.6000	0.8000
LC_DCDS		0.2000	0.2000	0.5000	0.8000	0.0000
EDTA Control		1.0000	1.0000	1.0000	1.0000	0.8000
FR_FRCP1 + EDTA		0.8000	0.6000	0.9000	0.7000	0.6000
CM_MC2 + EDTA		0.4000	0.3000	0.6000	0.2000	0.5000
RG_MIDAG + EDT		1.0000	1.0000	0.8000	1.0000	0.9000

28d ~~10d~~ SZY Survival Rate Binomials

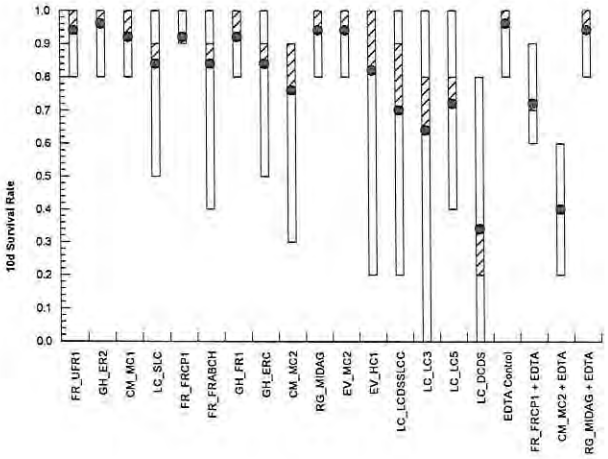
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		8/10	10/10	9/10	10/10	10/10
GH_ER2		10/10	10/10	10/10	8/10	10/10
CM_MC1		10/10	8/10	10/10	10/10	8/10
LC_SLC	XC	10/10	10/10	9/10	5/10	8/10
FR_FRCP1		9/10	9/10	9/10	9/10	10/10
FR_FRABCH		4/10	10/10	10/10	9/10	9/10
GH_FR1		10/10	8/10	10/10	8/10	10/10
GH_ERC		5/10	10/10	10/10	9/10	8/10
CM_MC2		8/10	9/10	9/10	3/10	9/10
RG_MIDAG		9/10	10/10	10/10	8/10	10/10
EV_MC2		10/10	9/10	10/10	8/10	10/10
EV_HC1		2/10	10/10	10/10	10/10	9/10
LC_LCDSSLCC		2/10	9/10	5/10	9/10	10/10
LC_LC3		0/10	4/10	8/10	10/10	10/10
LC_LC5		10/10	8/10	4/10	6/10	8/10
LC_DCDS		2/10	2/10	5/10	8/10	0/10
EDTA Control		10/10	10/10	10/10	10/10	8/10
FR_FRCP1 + EDTA		8/10	6/10	9/10	7/10	6/10
CM_MC2 + EDTA		4/10	3/10	6/10	2/10	5/10
RG_MIDAG + EDT		10/10	10/10	8/10	10/10	9/10

28d Water Only

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test SZU SZU **Nautilus Environmental**

Analysis ID:	11-5581-9163	**Endpoint:**	~~10d~~ 28d Survival Rate SZU	**CETIS Version:**	CETISv1.9.4
Analyzed:	28 Jan-20 14:49	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



CETIS Summary Report

28 Water-only

Hyalella ~~14-d~~ 28d Survival and Growth ~~Sediment~~ Water Test

Nautilus Environmental

Batch ID:	18-7620-4968	**Test Type:**	Growth-Survival (10d)	**Analyst:**	KJC
Start Date:	14 Nov-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	12 Dec-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	07-5025-5799	14 Nov-19	14 Nov-19	n/a	Teck Coal	Teck Coal Q4
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	38h (0 °C)		
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	36h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	37h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	35h (1.5 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	37h (0 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	37h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	33h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	34h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	36h (0 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	36h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	37h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	39h (0 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	37h (1.8 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	35h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	38h (0.9 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	37h (0 °C)		
EDTA Control	17-1720-4826	14 Nov-19	14 Nov-19	n/a		
FR_FRCP1 + EDTA	20-6224-2086	12 Nov-19	12 Nov-19	48h		
CM_MC2 + EDTA	11-1066-0904	12 Nov-19	13 Nov-19	48h		
RG_MIDAG + EDT	08-0806-2893	12 Nov-19	13 Nov-19	48h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	LC_DCDS passed mean dry weight-mg	1

Hyalella ~~14-d~~ Survival and Growth ~~Sediment~~ Test — Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.8969	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0618	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	CM_MC1 passed mean dry weight-mg	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.4493	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3176	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	Lab Control failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	LC_DCDS failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	FR_FRABCH failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	FR_FRCP1 + EDTA failed mean dry weigh	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	RG_MIDAG + EDTA failed mean dry weigh	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	RG_MIDAG failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	CM_MC1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	CM_MC2 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	LC_LC5 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	FR_UFR1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	EV_MC2 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	GH_ERC failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	EV_HC1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	EDTA Control failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	LC_SLC failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	CM_MC2 + EDTA failed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	LC_LC3 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	GH_ER2 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	LC_LCDSSLCC failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	FR_FRCP1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0171	GH_FR1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	LC_LC5 passed mean dry weight-mg	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6490	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.5719	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	LC_LC5 passed mean dry weight-mg	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1969	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	LC_LC3 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	CM_MC2 + EDTA failed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	FR_UFR1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	RG_MIDAG + EDTA failed mean dry weigh	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	LC_LC5 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	RG_MIDAG failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	CM_MC2 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	EDTA Control failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	EV_MC2 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	CM_MC1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	FR_FRABCH failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	LC_LCDSSLCC failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	LC_DCDS failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	LC_SLC failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	EV_HC1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	GH_ERC failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	GH_FR1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	GH_ER2 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	FR_FRCP1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	Lab Control failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0450	FR_FRCP1 + EDTA failed mean dry weigh	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3301	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	EV_HC1 passed mean dry weight-mg	1

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2845	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.2169	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	FR_FRCP1 + EDTA passed mean dry wei	1

Hyalella 14-d Survival and Growth Sediment Test — Nautilus Environmental

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.3055	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.9664	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1616	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	CM_MC2 passed mean dry weight-mg	1

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Hyalella ~~14~~-d Survival and Growth ~~Sediment~~ Test 10 EJV Nautilus Environmental

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0515	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.7863	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	CM_MC2 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	EV_HC1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	GH_ERC failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	EDTA Control failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	LC_LC5 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	LC_SLC failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	GH_FR1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	LC_DCDS failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	FR_UFR1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	FR_FRCP1 + EDTA failed mean dry weigh	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	FR_FRABCH failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	Lab Control failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	RG_MIDAG + EDTA failed mean dry weigh	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	RG_MIDAG failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	EV_MC2 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	LC_LCDSSLCC failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	CM_MC2 + EDTA failed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	GH_ER2 failed mean dry weight-mg	1

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Hyalella ~~14~~-d Survival and Growth ~~Sediment~~ Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	CM_MC1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	LC_LC3 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.0370	FR_FRCP1 failed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.1148	FR_FRCP1 + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	Lab Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	LC_SLC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	LC_LC5 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	FR_UFR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	EV_HC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	LC_DCDS passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	RG_MIDAG passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	CM_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	CM_MC1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	GH_ERC passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	EDTA Control passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	FR_FRCP1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	LC_LCDSSLCC passed mean dry weight-	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	LC_LC3 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	GH_FR1 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	RG_MIDAG + EDTA passed mean dry wei	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	EV_MC2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	FR_FRABCH passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	CM_MC2 + EDTA passed mean dry weight	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	GH_ER2 passed mean dry weight-mg	1
13-4867-9000	Mean Dry Weight-mg	Unequal Variance t Two-Sample Test	0.6849	FR_FRCP1 + EDTA passed mean dry wei	1

Water-only

Hyalella ~~14~~ 28-d Survival and Growth ~~Sediment~~ Test **Nautilus Environmental**

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Lab Control	N	5	0.3906	0.172	0.6091	0.239	0.643	0.07872	0.176	45.07%	0.00%
FR_UFR1		5	0.5603	0.3022	0.8183	0.2088	0.738	0.09293	0.2078	37.09%	-43.45%
GH_ER2		5	0.231	0.1151	0.3469	0.119	0.356	0.04175	0.09336	40.42%	40.85%
CM_MC1		5	0.3747	0.1246	0.6249	0.1438	0.584	0.09011	0.2015	53.76%	4.05%
LC_SLC		5	0.3216	0.003179	0.64	0.095	0.608	0.1147	0.2564	79.74%	17.66%
FR_FRCP1		5	0.1374	0.09649	0.1783	0.1033	0.1767	0.01473	0.03295	23.98%	64.82%
FR_FRABCH		5	0.4351	0.2144	0.6559	0.1275	0.5567	0.0795	0.1778	40.85%	-11.42%
GH_FR1		5	0.408	0.2745	0.5415	0.283	0.5213	0.04807	0.1075	26.34%	-4.47%
GH_ERC		5	0.2861	0.05325	0.5189	0.03801	0.5089	0.08386	0.1875	65.55%	26.75%
CM_MC2		5	0.2137	0.1841	0.2433	0.1922	0.2489	0.01067	0.02386	11.17%	45.28%
RG_MIDAG		5	0.3248	-0.004571	0.6541	0.1463	0.794	0.1186	0.2652	81.67%	16.85%
EV_MC2		5	0.3278	0.1351	0.5206	0.07625	0.485	0.06943	0.1552	47.36%	16.06%
EV_HC1		5	0.2818	-0.009114	0.5726	0.09503	0.689	0.1048	0.2343	83.14%	27.86%
LC_LCDSSLCC		5	0.3274	0.08054	0.5742	0.145	0.6178	0.0889	0.1988	60.72%	16.18%
LC_LC3		4	0.5964	0.4432	0.7496	0.4725	0.707	0.04814	0.09627	16.14%	-52.72%
LC_LC5		5	0.2572	-0.01418	0.5286	0.08374	0.639	0.09775	0.2186	84.98%	34.14%
LC_DCDS		4	0.2018	0.01474	0.3888	0.08502	0.365	0.05876	0.1175	58.25%	48.34%
EDTA Control		5	0.4957	0.2267	0.7647	0.258	0.737	0.09689	0.2167	43.71%	-26.92%
FR_FRCP1 + EDTA		5	0.1938	0.1316	0.2561	0.1362	0.2589	0.02241	0.05012	25.86%	50.37%
CM_MC2 + EDTA		5	0.2779	0.246	0.3098	0.2367	0.3025	0.01148	0.02567	9.24%	28.85%
RG_MIDAG + EDT		5	0.4573	0.1614	0.7531	0.18	0.712	0.1066	0.2383	52.12%	-17.08%

Mean Dry Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Control	N	0.499	0.643	0.328	0.2438	0.239
FR_UFR1		0.2088	0.738	0.5556	0.678	0.621
GH_ER2		0.119	0.356	0.183	0.205	0.292
CM_MC1		0.537	0.425	0.584	0.184	0.1438
LC_SLC		0.201	0.608	0.59	0.114	0.095
FR_FRCP1		0.1111	0.1033	0.1289	0.1767	0.167
FR_FRABCH		0.1275	0.437	0.529	0.5256	0.5567
GH_FR1		0.457	0.3037	0.475	0.5213	0.283
GH_ERC		0.03801	0.321	0.4	0.5089	0.1625
CM_MC2		0.2262	0.1922	0.1944	0.2067	0.2489
RG_MIDAG		0.2556	0.794	0.217	0.1463	0.211
EV_MC2		0.406	0.3689	0.303	0.07625	0.485
EV_HC1		0.09503	0.248	0.199	0.689	0.1778
LC_LCDSSLCC		0.145	0.6178	0.152	0.3	0.422
LC_LC3			0.4725	0.6113	0.595	0.707
LC_LC5		0.639	0.08374	0.165	0.1983	0.2
LC_DCDS		0.08502	0.365	0.172	0.185	
EDTA Control		0.391	0.258	0.737	0.715	0.3775
FR_FRCP1 + EDTA		0.1362	0.2317	0.2589	0.1757	0.1667
CM_MC2 + EDTA		0.3025	0.2367	0.2733	0.295	0.282
RG_MIDAG + EDT		0.702	0.712	0.3262	0.366	0.18

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	21-4497-1859	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Feb-20 14:00	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	02-1913-8066	**Test Type:**	Survival-Growth	**Analyst:**	KJV
Start Date:	14 Nov-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	12 Dec-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Lab Control	07-5025-5799	14 Nov-19	14 Nov-19	n/a	Teck Coal	Teck Coal Q4
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	38h (0 °C)		
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	36h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	37h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	35h (1.5 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	37h (0 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	37h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	33h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	34h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	36h (0 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	36h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	37h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	39h (0 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	37h (1.8 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	35h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	38h (0.9 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	37h (0 °C)		
EDTA Control	17-1720-4826	14 Nov-19	14 Nov-19	n/a		
FR_FRCP1 + EDTA	20-6224-2086	12 Nov-19	12 Nov-19	48h		
CM_MC2 + EDTA	11-1066-0904	12 Nov-19	13 Nov-19	48h		
RG_MIDAG + EDT	08-0806-2893	12 Nov-19	13 Nov-19	48h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Lab Control	Water Sample	Teck Coal	Lab Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Analyst: KJV QA: Feb-5/20

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 21-4497-1859 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 03 Feb-20 14:00 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	64.27%
		GH_ER2 passed mean dry weight-mg	64.27%
		CM_MC1 passed mean dry weight-mg	64.27%
		LC_SLC passed mean dry weight-mg	64.27%
		FR_FRCP1 failed mean dry weight-mg	64.27%
		FR_FRABCH passed mean dry weight-mg	64.27%
		GH_FR1 passed mean dry weight-mg	64.27%
		GH_ERC passed mean dry weight-mg	64.27%
		CM_MC2 failed mean dry weight-mg	64.27%
		RG_MIDAG passed mean dry weight-mg	64.27%
		EV_MC2 passed mean dry weight-mg	64.27%
		EV_HC1 passed mean dry weight-mg	64.27%
		LC_LCDSSLCC passed mean dry weight-mg	64.27%
		LC_LC3 passed mean dry weight-mg	64.27%
		LC_LC5 passed mean dry weight-mg	64.27%
		LC_DCDS passed mean dry weight-mg	64.27%
		EDTA Control passed mean dry weight-mg	64.27%
		FR_FRCP1 + EDTA failed mean dry weight-m	64.27%
		CM_MC2 + EDTA passed mean dry weight-m	64.27%
		RG_MIDAG + EDTA passed mean dry weight-	64.27%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	-1.393	1.895	0.231	7	CDF	0.8969	Non-Significant Effect
		GH_ER2	1.791	1.943	0.173	6	CDF	0.0618	Non-Significant Effect
		CM_MC1	0.1321	1.895	0.227	7	CDF	0.4493	Non-Significant Effect
		LC_SLC	0.4957	1.895	0.264	7	CDF	0.3176	Non-Significant Effect
		FR_FRCP1*	3.161	2.132	0.171	4	CDF	0.0171	Significant Effect
		FR_FRABCH	-0.3986	1.895	0.212	7	CDF	0.6490	Non-Significant Effect
		GH_FR1	-0.1892	1.943	0.179	6	CDF	0.5719	Non-Significant Effect
		GH_ERC	0.9083	1.895	0.218	7	CDF	0.1969	Non-Significant Effect
		CM_MC2*	2.226	2.132	0.169	4	CDF	0.0450	Significant Effect
		RG_MIDAG	0.4621	1.943	0.277	6	CDF	0.3301	Non-Significant Effect
		EV_MC2	0.5976	1.895	0.199	7	CDF	0.2845	Non-Significant Effect
		EV_HC1	0.8302	1.895	0.248	7	CDF	0.2169	Non-Significant Effect
		LC_LCDSSLCC	0.5322	1.895	0.225	7	CDF	0.3055	Non-Significant Effect
		LC_LC3	-2.231	1.943	0.179	6	CDF	0.9664	Non-Significant Effect
		LC_LC5	1.062	1.895	0.238	7	CDF	0.1616	Non-Significant Effect
		LC_DCDS	1.922	1.943	0.191	6	CDF	0.0515	Non-Significant Effect
		EDTA Control	-0.8423	1.895	0.237	7	CDF	0.7863	Non-Significant Effect
		FR_FRCP1 + EDTA*	2.404	2.132	0.175	4	CDF	0.0370	Significant Effect
		CM_MC2 + EDTA	1.416	2.132	0.17	4	CDF	0.1148	Non-Significant Effect
		RG_MIDAG + EDTA	-0.5034	1.895	0.251	7	CDF	0.6849	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.39891	0.0699454	20	2.276	0.0051	Significant Effect
Error	2.52014	0.0307334	82			
Total	3.91905		102			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	47.6	37.57	4.8E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9829	0.9663	0.2065	Normal Distribution

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 21-4497-1859 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 03 Feb-20 14:00 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Lab Control	N	5	0.3906	0.172	0.6091	0.328	0.239	0.643	0.07872	45.07%	0.00%
FR_UFR1		5	0.5603	0.3022	0.8183	0.621	0.2088	0.738	0.09293	37.09%	-43.45%
GH_ER2		5	0.231	0.1151	0.3469	0.205	0.119	0.356	0.04175	40.42%	40.85%
CM_MC1		5	0.3747	0.1246	0.6249	0.425	0.1438	0.584	0.09011	53.76%	4.05%
LC_SLC		5	0.3216	0.003179	0.64	0.201	0.095	0.608	0.1147	79.74%	17.66%
FR_FRCP1		5	0.1374	0.09649	0.1783	0.1289	0.1033	0.1767	0.01473	23.98%	64.82%
FR_FRABCH		5	0.4351	0.2144	0.6559	0.5256	0.1275	0.5567	0.0795	40.85%	-11.42%
GH_FR1		5	0.408	0.2745	0.5415	0.457	0.283	0.5213	0.04807	26.34%	-4.47%
GH_ERC		5	0.2861	0.05325	0.5189	0.321	0.03801	0.5089	0.08386	65.55%	26.75%
CM_MC2		5	0.2137	0.1841	0.2433	0.2067	0.1922	0.2489	0.01067	11.17%	45.28%
RG_MIDAG		5	0.3248	-0.004571	0.6541	0.217	0.1463	0.794	0.1186	81.67%	16.85%
EV_MC2		5	0.3278	0.1351	0.5206	0.3689	0.07625	0.485	0.06943	47.36%	16.06%
EV_HC1		5	0.2818	-0.009114	0.5726	0.199	0.09503	0.689	0.1048	83.14%	27.86%
LC_LCDSSLCC		5	0.3274	0.08054	0.5742	0.3	0.145	0.6178	0.0889	60.72%	16.18%
LC_LC3		4	0.5964	0.4432	0.7496	0.6031	0.4725	0.707	0.04814	16.14%	-52.72%
LC_LC5		5	0.2572	-0.01418	0.5286	0.1983	0.08374	0.639	0.09775	84.98%	34.14%
LC_DCDS		4	0.2018	0.01474	0.3888	0.1785	0.08502	0.365	0.05876	58.25%	48.34%
EDTA Control		5	0.4957	0.2267	0.7647	0.391	0.258	0.737	0.09689	43.71%	-26.92%
FR_FRCP1 + EDTA		5	0.1938	0.1316	0.2561	0.1757	0.1362	0.2589	0.02241	25.86%	50.37%
CM_MC2 + EDTA		5	0.2779	0.246	0.3098	0.282	0.2367	0.3025	0.01148	9.24%	28.85%
RG_MIDAG + EDT		5	0.4573	0.1614	0.7531	0.366	0.18	0.712	0.1066	52.12%	-17.08%

Mean Dry Weight-mg Detail

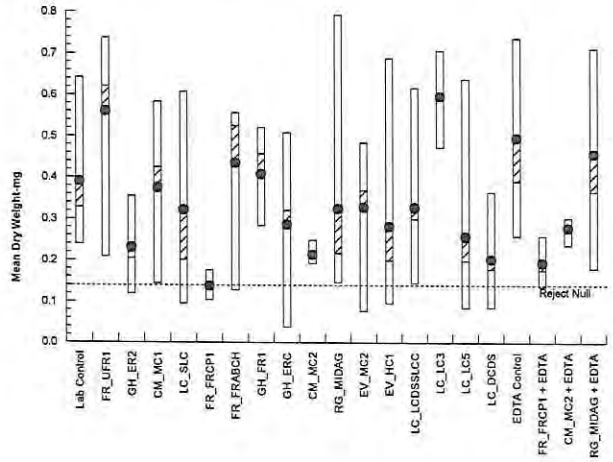
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
Lab Control	N	0.499	0.643	0.328	0.2438	0.239
FR_UFR1		0.2088	0.738	0.5556	0.678	0.621
GH_ER2		0.119	0.356	0.183	0.205	0.292
CM_MC1		0.537	0.425	0.584	0.184	0.1438
LC_SLC		0.201	0.608	0.59	0.114	0.095
FR_FRCP1		0.1111	0.1033	0.1289	0.1767	0.167
FR_FRABCH		0.1275	0.437	0.529	0.5256	0.5567
GH_FR1		0.457	0.3037	0.475	0.5213	0.283
GH_ERC		0.03801	0.321	0.4	0.5089	0.1625
CM_MC2		0.2262	0.1922	0.1944	0.2067	0.2489
RG_MIDAG		0.2556	0.794	0.217	0.1463	0.211
EV_MC2		0.406	0.3689	0.303	0.07625	0.485
EV_HC1		0.09503	0.248	0.199	0.689	0.1778
LC_LCDSSLCC		0.145	0.6178	0.152	0.3	0.422
LC_LC3		0.4725	0.6113	0.595	0.707	
LC_LC5		0.639	0.08374	0.165	0.1983	0.2
LC_DCDS		0.08502	0.365	0.172	0.185	
EDTA Control		0.391	0.258	0.737	0.715	0.3775
FR_FRCP1 + EDTA		0.1362	0.2317	0.2589	0.1757	0.1667
CM_MC2 + EDTA		0.3025	0.2367	0.2733	0.295	0.282
RG_MIDAG + EDT		0.702	0.712	0.3262	0.366	0.18

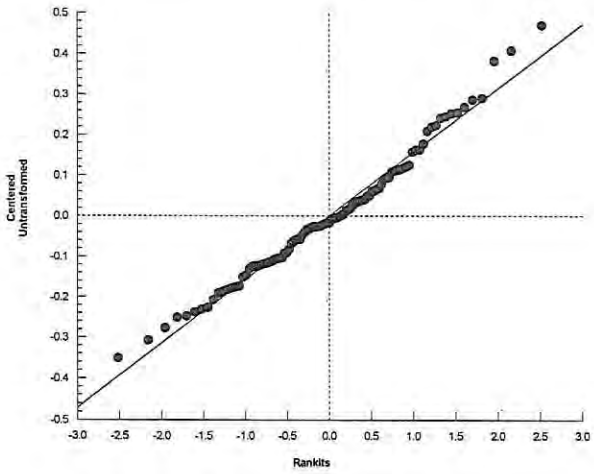
Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	21-4497-1859	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Feb-20 14:00	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Analyst:_____ QA: Feb-3/20

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	08-8607-9545	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Feb-20 14:02	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	02-1913-8066	**Test Type:**	Survival-Growth	**Analyst:**	KJV
Start Date:	14 Nov-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	12 Dec-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	38h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	36h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	37h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	35h (1.5 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	37h (0 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	37h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	33h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	34h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	36h (0 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	36h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	37h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	39h (0 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	37h (1.8 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	35h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	38h (0.9 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	37h (0 °C)		
EDTA Control	17-1720-4826	14 Nov-19	14 Nov-19	n/a		
FR_FRCP1 + EDTA	20-6224-2086	12 Nov-19	12 Nov-19	48h		
CM_MC2 + EDTA	11-1066-0904	12 Nov-19	13 Nov-19	48h		
RG_MIDAG + EDT	08-0806-2893	12 Nov-19	13 Nov-19	48h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Analyst: KJV QA: Feb-3/20

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 08-8607-9545 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 03 Feb-20 14:02 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 failed mean dry weight-mg	47.82%
		CM_MC1 passed mean dry weight-mg	47.82%
		LC_SLC passed mean dry weight-mg	47.82%
		FR_FRCP1 failed mean dry weight-mg	47.82%
		FR_FRABCH passed mean dry weight-mg	47.82%
		GH_FR1 passed mean dry weight-mg	47.82%
		GH_ERC failed mean dry weight-mg	47.82%
		CM_MC2 failed mean dry weight-mg	47.82%
		RG_MIDAG passed mean dry weight-mg	47.82%
		EV_MC2 failed mean dry weight-mg	47.82%
		EV_HC1 failed mean dry weight-mg	47.82%
		LC_LCDSSLCC passed mean dry weight-mg	47.82%
		LC_LC3 passed mean dry weight-mg	47.82%
		LC_LC5 failed mean dry weight-mg	47.82%
		LC_DCDS failed mean dry weight-mg	47.82%
		EDTA Control passed mean dry weight-mg	47.82%
		FR_FRCP1 + EDTA failed mean dry weight-m	47.82%
		CM_MC2 + EDTA failed mean dry weight-mg	47.82%
		RG_MIDAG + EDTA passed mean dry weight-	47.82%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		GH_ER2*	3.232	2.015	0.205	5	CDF	0.0116	Significant Effect
(FR-UFR1)		CM_MC1	1.433	1.895	0.245	7	CDF	0.0975	Non-Significant Effect
		LC_SLC	1.617	1.895	0.28	7	CDF	0.0750	Non-Significant Effect
		FR_FRCP1*	4.494	2.132	0.201	4	CDF	0.0054	Significant Effect
		FR_FRABCH	1.023	1.895	0.232	7	CDF	0.1702	Non-Significant Effect
		GH_FR1	1.455	2.015	0.211	5	CDF	0.1027	Non-Significant Effect
		GH_ERC*	2.19	1.895	0.237	7	CDF	0.0323	Significant Effect
		CM_MC2*	3.705	2.132	0.199	4	CDF	0.0104	Significant Effect
		RG_MIDAG	1.563	1.895	0.286	7	CDF	0.0810	Non-Significant Effect
		EV_MC2*	2.004	1.895	0.22	7	CDF	0.0426	Significant Effect
		EV_HC1*	1.989	1.895	0.265	7	CDF	0.0435	Significant Effect
		LC_LCDSSLCC	1.811	1.895	0.244	7	CDF	0.0565	Non-Significant Effect
		LC_LC3	-0.3456	2.015	0.211	5	CDF	0.6282	Non-Significant Effect
		LC_LC5*	2.247	1.895	0.256	7	CDF	0.0297	Significant Effect
		LC_DCDS*	3.261	1.943	0.214	6	CDF	0.0086	Significant Effect
		EDTA Control	0.4809	1.895	0.254	7	CDF	0.3226	Non-Significant Effect
		FR_FRCP1 + EDTA*	3.833	2.132	0.204	4	CDF	0.0093	Significant Effect
		CM_MC2 + EDTA*	3.016	2.132	0.2	4	CDF	0.0197	Significant Effect
		RG_MIDAG + EDTA	0.7285	1.895	0.268	7	CDF	0.2450	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.38379	0.0728313	19	2.371	0.0042	Significant Effect
Error	2.39622	0.0307207	78			
Total	3.78001		97			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	47.58	36.19	2.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.982	0.9648	0.1987	Normal Distribution

Analyst: KJV QA: Feb. 3/20

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 08-8607-9545 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 03 Feb-20 14:02 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1	XC	5	0.5603	0.3022	0.8183	0.621	0.2088	0.738	0.09293	37.09%	0.00%
GH_ER2		5	0.231	0.1151	0.3469	0.205	0.119	0.356	0.04175	40.42%	58.77%
CM_MC1		5	0.3747	0.1246	0.6249	0.425	0.1438	0.584	0.09011	53.76%	33.11%
LC_SLC		5	0.3216	0.003179	0.64	0.201	0.095	0.608	0.1147	79.74%	42.60%
FR_FRCP1		5	0.1374	0.09649	0.1783	0.1289	0.1033	0.1767	0.01473	23.98%	75.48%
FR_FRABCH		5	0.4351	0.2144	0.6559	0.5256	0.1275	0.5567	0.0795	40.85%	22.33%
GH_FR1		5	0.408	0.2745	0.5415	0.457	0.283	0.5213	0.04807	26.34%	27.18%
GH_ERC		5	0.2861	0.05325	0.5189	0.321	0.03801	0.5089	0.08386	65.55%	48.94%
CM_MC2		5	0.2137	0.1841	0.2433	0.2067	0.1922	0.2489	0.01067	11.17%	61.86%
RG_MIDAG		5	0.3248	-0.004571	0.6541	0.217	0.1463	0.794	0.1186	81.67%	42.03%
EV_MC2		5	0.3278	0.1351	0.5206	0.3689	0.07625	0.485	0.06943	47.36%	41.49%
EV_HC1		5	0.2818	-0.009114	0.5726	0.199	0.09503	0.689	0.1048	83.14%	49.71%
LC_LCDSSLCC		5	0.3274	0.08054	0.5742	0.3	0.145	0.6178	0.0889	60.72%	41.57%
LC_LC3		4	0.5964	0.4432	0.7496	0.6031	0.4725	0.707	0.04814	16.14%	-6.46%
LC_LC5		5	0.2572	-0.01418	0.5286	0.1983	0.08374	0.639	0.09775	84.98%	54.09%
LC_DCDS		4	0.2018	0.01474	0.3888	0.1785	0.08502	0.365	0.05876	58.25%	63.99%
EDTA Control		5	0.4957	0.2267	0.7647	0.391	0.258	0.737	0.09689	43.71%	11.52%
FR_FRCP1 + EDTA		5	0.1938	0.1316	0.2561	0.1757	0.1362	0.2589	0.02241	25.86%	65.40%
CM_MC2 + EDTA		5	0.2779	0.246	0.3098	0.282	0.2367	0.3025	0.01148	9.24%	50.40%
RG_MIDAG + EDT		5	0.4573	0.1614	0.7531	0.366	0.18	0.712	0.1066	52.12%	18.39%

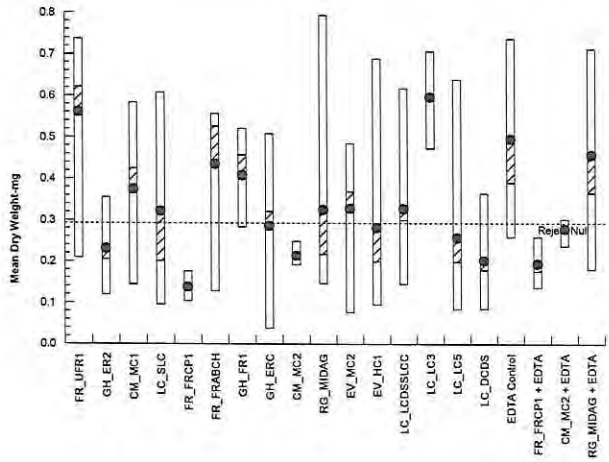
Mean Dry Weight-mg Detail

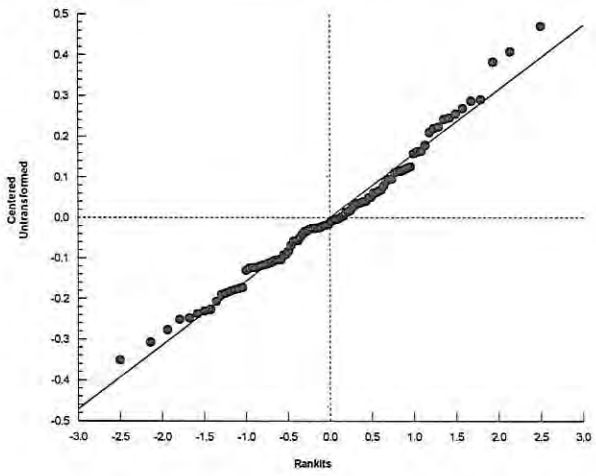
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1	XC	0.2088	0.738	0.5556	0.678	0.621
GH_ER2		0.119	0.356	0.183	0.205	0.292
CM_MC1		0.537	0.425	0.584	0.184	0.1438
LC_SLC		0.201	0.608	0.59	0.114	0.095
FR_FRCP1		0.1111	0.1033	0.1289	0.1767	0.167
FR_FRABCH		0.1275	0.437	0.529	0.5256	0.5567
GH_FR1		0.457	0.3037	0.475	0.5213	0.283
GH_ERC		0.03801	0.321	0.4	0.5089	0.1625
CM_MC2		0.2262	0.1922	0.1944	0.2067	0.2489
RG_MIDAG		0.2556	0.794	0.217	0.1463	0.211
EV_MC2		0.406	0.3689	0.303	0.07625	0.485
EV_HC1		0.09503	0.248	0.199	0.689	0.1778
LC_LCDSSLCC		0.145	0.6178	0.152	0.3	0.422
LC_LC3		0.4725	0.6113	0.595	0.707	
LC_LC5		0.639	0.08374	0.165	0.1983	0.2
LC_DCDS		0.08502	0.365	0.172	0.185	
EDTA Control		0.391	0.258	0.737	0.715	0.3775
FR_FRCP1 + EDTA		0.1362	0.2317	0.2589	0.1757	0.1667
CM_MC2 + EDTA		0.3025	0.2367	0.2733	0.295	0.282
RG_MIDAG + EDT		0.702	0.712	0.3262	0.366	0.18

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	08-8607-9545	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Feb-20 14:02	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Analyst: KJ QA: Feb-3/20

CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	08-8798-7906	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Feb-20 14:05	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	02-1913-8066	**Test Type:**	Survival-Growth	**Analyst:**	KJV
Start Date:	14 Nov-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	12 Dec-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	38h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	36h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	37h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	35h (1.5 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	37h (0 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	37h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	33h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	34h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	36h (0 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	36h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	37h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	39h (0 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	37h (1.8 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	35h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	38h (0.9 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	37h (0 °C)		
EDTA Control	17-1720-4826	14 Nov-19	14 Nov-19	n/a		
FR_FRCP1 + EDTA	20-6224-2086	12 Nov-19	12 Nov-19	48h		
CM_MC2 + EDTA	11-1066-0904	12 Nov-19	13 Nov-19	48h		
RG_MIDAG + EDT	08-0806-2893	12 Nov-19	13 Nov-19	48h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Analyst: KJV QA: JCH Feb-3/20

Hyalella 28-d Survival and Growth Sediment Test Nautilus Environmental

Analysis ID: 08-8798-7906 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 03 Feb-20 14:05 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	99.85%
		CM_MC1 passed mean dry weight-mg	99.85%
		LC_SLC passed mean dry weight-mg	99.85%
		FR_FRCP1 passed mean dry weight-mg	99.85%
		FR_FRABCH passed mean dry weight-mg	99.85%
		GH_FR1 passed mean dry weight-mg	99.85%
		GH_ERC passed mean dry weight-mg	99.85%
		CM_MC2 passed mean dry weight-mg	99.85%
		RG_MIDAG passed mean dry weight-mg	99.85%
		EV_MC2 passed mean dry weight-mg	99.85%
		EV_HC1 passed mean dry weight-mg	99.85%
		LC_LCDSSLCC passed mean dry weight-mg	99.85%
		LC_LC3 passed mean dry weight-mg	99.85%
		LC_LC5 passed mean dry weight-mg	99.85%
		LC_DCDS passed mean dry weight-mg	99.85%
		EDTA Control passed mean dry weight-mg	99.85%
		FR_FRCP1 + EDTA passed mean dry weight-	99.85%
		CM_MC2 + EDTA passed mean dry weight-m	99.85%
		RG_MIDAG + EDTA passed mean dry weight-	99.85%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-3.232	2.015	0.205	5	CDF	0.9884	Non-Significant Effect
(GH-ER2)		CM_MC1	-1.447	2.015	0.200	5	CDF	0.8963	Non-Significant Effect
		LC_SLC	-0.7423	2.015	0.246	5	CDF	0.7544	Non-Significant Effect
		FR_FRCP1	2.114	2.132	0.094	4	CDF	0.0510	Non-Significant Effect
		FR_FRABCH	-2.273	1.943	0.175	6	CDF	0.9683	Non-Significant Effect
		GH_FR1	-2.78	1.895	0.121	7	CDF	0.9864	Non-Significant Effect
		GH_ERC	-0.5879	2.015	0.189	5	CDF	0.7089	Non-Significant Effect
		CM_MC2	0.4016	2.132	0.092	4	CDF	0.3542	Non-Significant Effect
		RG_MIDAG	-0.7456	2.132	0.268	4	CDF	0.7513	Non-Significant Effect
		EV_MC2	-1.195	1.943	0.157	6	CDF	0.8614	Non-Significant Effect
		EV_HC1	-0.4501	2.015	0.227	5	CDF	0.6643	Non-Significant Effect
		LC_LCDSSLCC	-0.9811	2.015	0.198	5	CDF	0.8142	Non-Significant Effect
		LC_LC3	-5.735	1.943	0.124	6	CDF	0.9994	Non-Significant Effect
		LC_LC5	-0.2466	2.015	0.214	5	CDF	0.5925	Non-Significant Effect
		LC_DCDS	0.4057	2.015	0.145	5	CDF	0.3509	Non-Significant Effect
		EDTA Control	-2.509	2.015	0.213	5	CDF	0.9730	Non-Significant Effect
		FR_FRCP1 + EDTA	0.7842	1.943	0.092	6	CDF	0.2314	Non-Significant Effect
		CM_MC2 + EDTA	-1.083	2.132	0.092	4	CDF	0.8301	Non-Significant Effect
		RG_MIDAG + EDTA	-1.977	2.015	0.231	5	CDF	0.9475	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.38379	0.0728313	19	2.371	0.0042	Significant Effect
Error	2.39622	0.0307207	78			
Total	3.78001		97			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	47.58	36.19	2.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.982	0.9648	0.1987	Normal Distribution

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 08-8798-7906 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 03 Feb-20 14:05 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		5	0.5603	0.3022	0.8183	0.621	0.2088	0.738	0.09293	37.09%	0.00%
GH_ER2	XC	5	0.231	0.1151	0.3469	0.205	0.119	0.356	0.04175	40.42%	58.77%
CM_MC1		5	0.3747	0.1246	0.6249	0.425	0.1438	0.584	0.09011	53.76%	33.11%
LC_SLC		5	0.3216	0.003179	0.64	0.201	0.095	0.608	0.1147	79.74%	42.60%
FR_FRCP1		5	0.1374	0.09649	0.1783	0.1289	0.1033	0.1767	0.01473	23.98%	75.48%
FR_FRABCH		5	0.4351	0.2144	0.6559	0.5256	0.1275	0.5567	0.0795	40.85%	22.33%
GH_FR1		5	0.408	0.2745	0.5415	0.457	0.283	0.5213	0.04807	26.34%	27.18%
GH_ERC		5	0.2861	0.05325	0.5189	0.321	0.03801	0.5089	0.08386	65.55%	48.94%
CM_MC2		5	0.2137	0.1841	0.2433	0.2067	0.1922	0.2489	0.01067	11.17%	61.86%
RG_MIDAG		5	0.3248	-0.004571	0.6541	0.217	0.1463	0.794	0.1186	81.67%	42.03%
EV_MC2		5	0.3278	0.1351	0.5206	0.3689	0.07625	0.485	0.06943	47.36%	41.49%
EV_HC1		5	0.2818	-0.009114	0.5726	0.199	0.09503	0.689	0.1048	83.14%	49.71%
LC_LCDSSLCC		5	0.3274	0.08054	0.5742	0.3	0.145	0.6178	0.0889	60.72%	41.57%
LC_LC3		4	0.5964	0.4432	0.7496	0.6031	0.4725	0.707	0.04814	16.14%	-6.46%
LC_LC5		5	0.2572	-0.01418	0.5286	0.1983	0.08374	0.639	0.09775	84.98%	54.09%
LC_DCDS		4	0.2018	0.01474	0.3888	0.1785	0.08502	0.365	0.05876	58.25%	63.99%
EDTA Control		5	0.4957	0.2267	0.7647	0.391	0.258	0.737	0.09689	43.71%	11.52%
FR_FRCP1 + EDTA		5	0.1938	0.1316	0.2561	0.1757	0.1362	0.2589	0.02241	25.86%	65.40%
CM_MC2 + EDTA		5	0.2779	0.246	0.3098	0.282	0.2367	0.3025	0.01148	9.24%	50.40%
RG_MIDAG + EDT		5	0.4573	0.1614	0.7531	0.366	0.18	0.712	0.1066	52.12%	18.39%

Mean Dry Weight-mg Detail

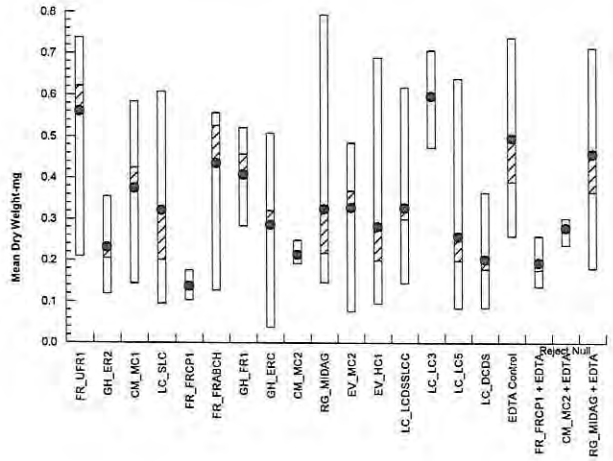
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.2088	0.738	0.5556	0.678	0.621
GH_ER2	XC	0.119	0.356	0.183	0.205	0.292
CM_MC1		0.537	0.425	0.584	0.184	0.1438
LC_SLC		0.201	0.608	0.59	0.114	0.095
FR_FRCP1		0.1111	0.1033	0.1289	0.1767	0.167
FR_FRABCH		0.1275	0.437	0.529	0.5256	0.5567
GH_FR1		0.457	0.3037	0.475	0.5213	0.283
GH_ERC		0.03801	0.321	0.4	0.5089	0.1625
CM_MC2		0.2262	0.1922	0.1944	0.2067	0.2489
RG_MIDAG		0.2556	0.794	0.217	0.1463	0.211
EV_MC2		0.406	0.3689	0.303	0.07625	0.485
EV_HC1		0.09503	0.248	0.199	0.689	0.1778
LC_LCDSSLCC		0.145	0.6178	0.152	0.3	0.422
LC_LC3		0.4725	0.6113	0.595	0.707	
LC_LC5		0.639	0.08374	0.165	0.1983	0.2
LC_DCDS		0.08502	0.365	0.172	0.185	
EDTA Control		0.391	0.258	0.737	0.715	0.3775
FR_FRCP1 + EDTA		0.1362	0.2317	0.2589	0.1757	0.1667
CM_MC2 + EDTA		0.3025	0.2367	0.2733	0.295	0.282
RG_MIDAG + EDT		0.702	0.712	0.3262	0.366	0.18

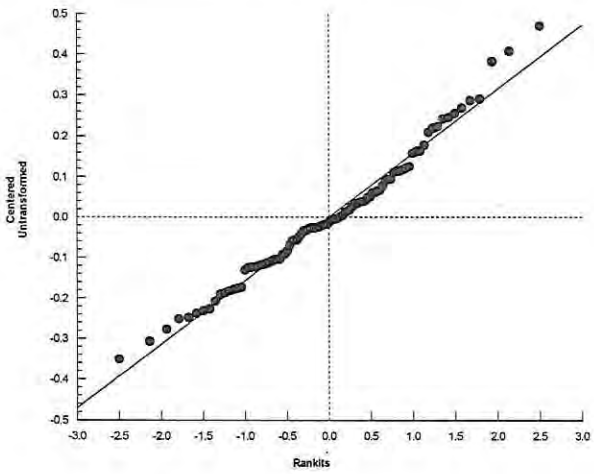
Analyst: KJL QA: Feb. 3/20

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	08-8798-7906	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Feb-20 14:05	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





Analyst: KW QA: Feb-3/20

Hyalella 28-d Survival and Growth Sediment Test

Nautilus Environmental

Analysis ID:	04-2315-5867	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Feb-20 14:07	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	02-1913-8066	**Test Type:**	Survival-Growth	**Analyst:**	KJV
Start Date:	14 Nov-19	**Protocol:**	EPA/600/R-99/064 (2000) (modified)	**Diluent:**	Reconstituted Water
Ending Date:	12 Dec-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	38h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	36h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	37h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	35h (1.5 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	37h (0 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	37h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	33h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	34h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	36h (0 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	36h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	37h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	39h (0 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	37h (1.8 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	35h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	38h (0.9 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	37h (0 °C)		
EDTA Control	17-1720-4826	14 Nov-19	14 Nov-19	n/a		
FR_FRCP1 + EDTA	20-6224-2086	12 Nov-19	12 Nov-19	48h		
CM_MC2 + EDTA	11-1066-0904	12 Nov-19	13 Nov-19	48h		
RG_MIDAG + EDT	08-0806-2893	12 Nov-19	13 Nov-19	48h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID: 04-2315-5867 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 03 Feb-20 14:07 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	70.56%
		GH_ER2 passed mean dry weight-mg	70.56%
		LC_SLC passed mean dry weight-mg	70.56%
		FR_FRCP1 failed mean dry weight-mg	70.56%
		FR_FRABCH passed mean dry weight-mg	70.56%
		GH_FR1 passed mean dry weight-mg	70.56%
		GH_ERC passed mean dry weight-mg	70.56%
		CM_MC2 passed mean dry weight-mg	70.56%
		RG_MIDAG passed mean dry weight-mg	70.56%
		EV_MC2 passed mean dry weight-mg	70.56%
		EV_HC1 passed mean dry weight-mg	70.56%
		LC_LCDSSLCC passed mean dry weight-mg	70.56%
		LC_LC3 passed mean dry weight-mg	70.56%
		LC_LC5 passed mean dry weight-mg	70.56%
		LC_DCDS passed mean dry weight-mg	70.56%
		EDTA Control passed mean dry weight-mg	70.56%
		FR_FRCP1 + EDTA passed mean dry weight-	70.56%
		CM_MC2 + EDTA passed mean dry weight-m	70.56%
		RG_MIDAG + EDTA passed mean dry weight-	70.56%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-1.433	1.895	0.245	7	CDF	0.9025	Non-Significant Effect
(CM-MC)		GH_ER2	1.447	2.015	0.200	5	CDF	0.1037	Non-Significant Effect
		LC_SLC	0.3644	1.895	0.276	7	CDF	0.3632	Non-Significant Effect
		FR_FRCP1*	2.6	2.132	0.195	4	CDF	0.0300	Significant Effect
		FR_FRABCH	-0.5026	1.895	0.228	7	CDF	0.6847	Non-Significant Effect
		GH_FR1	-0.3256	1.943	0.198	6	CDF	0.6221	Non-Significant Effect
		GH_ERC	0.7204	1.895	0.233	7	CDF	0.2473	Non-Significant Effect
		CM_MC2	1.775	2.132	0.193	4	CDF	0.0753	Non-Significant Effect
		RG_MIDAG	0.3356	1.895	0.282	7	CDF	0.3735	Non-Significant Effect
		EV_MC2	0.4125	1.895	0.216	7	CDF	0.3462	Non-Significant Effect
		EV_HC1	0.6729	1.895	0.262	7	CDF	0.2613	Non-Significant Effect
		LC_LCDSSLCC	0.3744	1.895	0.24	7	CDF	0.3596	Non-Significant Effect
		LC_LC3	-2.17	2.015	0.206	5	CDF	0.9589	Non-Significant Effect
		LC_LC5	0.8842	1.895	0.252	7	CDF	0.2030	Non-Significant Effect
		LC_DCDS	1.608	1.943	0.209	6	CDF	0.0795	Non-Significant Effect
		EDTA Control	-0.9141	1.895	0.251	7	CDF	0.8045	Non-Significant Effect
		FR_FRCP1 + EDTA	1.948	2.132	0.198	4	CDF	0.0616	Non-Significant Effect
		CM_MC2 + EDTA	1.066	2.132	0.194	4	CDF	0.1732	Non-Significant Effect
		RG_MIDAG + EDTA	-0.5912	1.895	0.264	7	CDF	0.7135	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.38379	0.0728313	19	2.371	0.0042	Significant Effect
Error	2.39622	0.0307207	78			
Total	3.78001		97			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	47.58	36.19	2.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.982	0.9648	0.1987	Normal Distribution

JCL

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 04-2315-5867 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 03 Feb-20 14:07 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		5	0.5603	0.3022	0.8183	0.621	0.2088	0.738	0.09293	37.09%	0.00%
GH_ER2		5	0.231	0.1151	0.3469	0.205	0.119	0.356	0.04175	40.42%	58.77%
CM_MC1	XC	5	0.3747	0.1246	0.6249	0.425	0.1438	0.584	0.09011	53.76%	33.11%
LC_SLC		5	0.3216	0.003179	0.64	0.201	0.095	0.608	0.1147	79.74%	42.60%
FR_FRCP1		5	0.1374	0.09649	0.1783	0.1289	0.1033	0.1767	0.01473	23.98%	75.48%
FR_FRABCH		5	0.4351	0.2144	0.6559	0.5256	0.1275	0.5567	0.0795	40.85%	22.33%
GH_FR1		5	0.408	0.2745	0.5415	0.457	0.283	0.5213	0.04807	26.34%	27.18%
GH_ERC		5	0.2861	0.05325	0.5189	0.321	0.03801	0.5089	0.08386	65.55%	48.94%
CM_MC2		5	0.2137	0.1841	0.2433	0.2067	0.1922	0.2489	0.01067	11.17%	61.86%
RG_MIDAG		5	0.3248	-0.004571	0.6541	0.217	0.1463	0.794	0.1186	81.67%	42.03%
EV_MC2		5	0.3278	0.1351	0.5206	0.3689	0.07625	0.485	0.06943	47.36%	41.49%
EV_HC1		5	0.2818	-0.009114	0.5726	0.199	0.09503	0.689	0.1048	83.14%	49.71%
LC_LCDSSLCC		5	0.3274	0.08054	0.5742	0.3	0.145	0.6178	0.0889	60.72%	41.57%
LC_LC3		4	0.5964	0.4432	0.7496	0.6031	0.4725	0.707	0.04814	16.14%	-6.46%
LC_LC5		5	0.2572	-0.01418	0.5286	0.1983	0.08374	0.639	0.09775	84.98%	54.09%
LC_DCDS		4	0.2018	0.01474	0.3888	0.1785	0.08502	0.365	0.05876	58.25%	63.99%
EDTA Control		5	0.4957	0.2267	0.7647	0.391	0.258	0.737	0.09689	43.71%	11.52%
FR_FRCP1 + EDTA		5	0.1938	0.1316	0.2561	0.1757	0.1362	0.2589	0.02241	25.86%	65.40%
CM_MC2 + EDTA		5	0.2779	0.246	0.3098	0.282	0.2367	0.3025	0.01148	9.24%	50.40%
RG_MIDAG + EDT		5	0.4573	0.1614	0.7531	0.366	0.18	0.712	0.1066	52.12%	18.39%

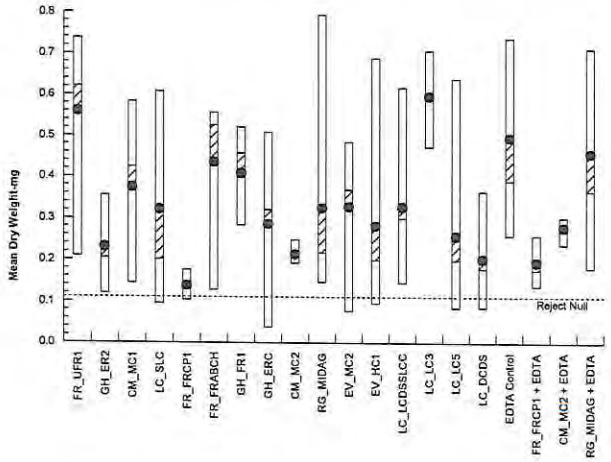
Mean Dry Weight-mg Detail

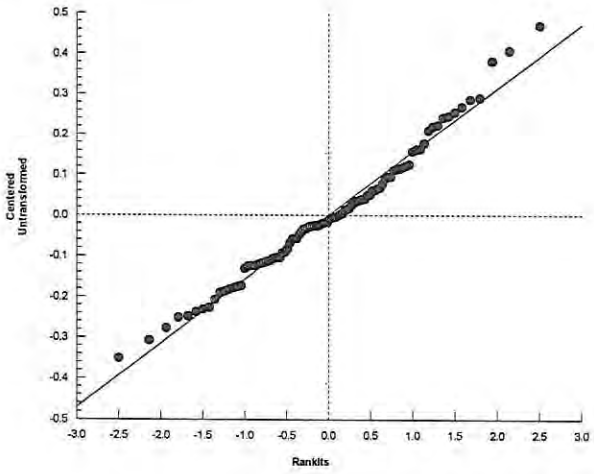
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.2088	0.738	0.5556	0.678	0.621
GH_ER2		0.119	0.356	0.183	0.205	0.292
CM_MC1	XC	0.537	0.425	0.584	0.184	0.1438
LC_SLC		0.201	0.608	0.59	0.114	0.095
FR_FRCP1		0.1111	0.1033	0.1289	0.1767	0.167
FR_FRABCH		0.1275	0.437	0.529	0.5256	0.5567
GH_FR1		0.457	0.3037	0.475	0.5213	0.283
GH_ERC		0.03801	0.321	0.4	0.5089	0.1625
CM_MC2		0.2262	0.1922	0.1944	0.2067	0.2489
RG_MIDAG		0.2556	0.794	0.217	0.1463	0.211
EV_MC2		0.406	0.3689	0.303	0.07625	0.485
EV_HC1		0.09503	0.248	0.199	0.689	0.1778
LC_LCDSSLCC		0.145	0.6178	0.152	0.3	0.422
LC_LC3		0.4725	0.6113	0.595	0.707	
LC_LC5		0.639	0.08374	0.165	0.1983	0.2
LC_DCDS		0.08502	0.365	0.172	0.185	
EDTA Control		0.391	0.258	0.737	0.715	0.3775
FR_FRCP1 + EDTA		0.1362	0.2317	0.2589	0.1757	0.1667
CM_MC2 + EDTA		0.3025	0.2367	0.2733	0.295	0.282
RG_MIDAG + EDT		0.702	0.712	0.3262	0.366	0.18

Analyst: JCL QA: JCL Feb. 3/20

Analysis ID:	04-2315-5867	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Feb-20 14:07	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





CETIS Analytical Report

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID:	12-6935-6071	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Feb-20 14:21	**Analysis:**	Parametric-Two Sample	**Status Level:**	1
Batch ID:	02-1913-8066	**Test Type:**	Survival-Growth	**Analyst:**	KJV
Start Date:	14 Nov-19	**Protocol:**	EPA/600/R-99/064 (2000)(modified)	**Diluent:**	Reconstituted Water
Ending Date:	12 Dec-19	**Species:**	Hyalella azteca	**Brine:**	
Test Length:	28d 0h	**Taxon:**	Malacostraca	**Source:**	Aquatic Biosystems, CO **Age:** 7-8d

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	38h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	36h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	37h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	35h (1.5 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	37h (0 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	37h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	33h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	34h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	36h (0 °C)		
RG_MIDAG	19-9868-9325	12 Nov-19 11:43	13 Nov-19 11:30	36h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	37h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	39h (0 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	37h (1.8 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	35h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	38h (0.9 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	37h (0 °C)		
EDTA Control	17-1720-4826	14 Nov-19	14 Nov-19	n/a		
FR_FRCP1 + EDTA	20-6224-2086	12 Nov-19	12 Nov-19	48h		
CM_MC2 + EDTA	11-1066-0904	12 Nov-19	13 Nov-19	48h		
RG_MIDAG + EDT	08-0806-2893	12 Nov-19	13 Nov-19	48h		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
RG_MIDAG	Water Sample	Teck Coal	RG_MIDAG_WS_2019-11-	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
EDTA Control	Water Sample	Teck Coal	EDTA control	
FR_FRCP1 + EDTA	Water Sample	Teck Coal	FR_FRCP1 + EDTA	
CM_MC2 + EDTA	Water Sample	Teck Coal	CM_MC2 + EDTA	
RG_MIDAG + EDT	Water Sample	Teck Coal	RG_MIDAG + EDTA	

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 12-6935-6071 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 03 Feb-20 14:21 **Analysis:** Parametric-Two Sample **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	92.23%
		GH_ER2 passed mean dry weight-mg	92.23%
		CM_MC1 passed mean dry weight-mg	92.23%
		FR_FRCP1 passed mean dry weight-mg	92.23%
		FR_FRABCH passed mean dry weight-mg	92.23%
		GH_FR1 passed mean dry weight-mg	92.23%
		GH_ERC passed mean dry weight-mg	92.23%
		CM_MC2 passed mean dry weight-mg	92.23%
		RG_MIDAG passed mean dry weight-mg	92.23%
		EV_MC2 passed mean dry weight-mg	92.23%
		EV_HC1 passed mean dry weight-mg	92.23%
		LC_LCDSSLCC passed mean dry weight-mg	92.23%
		LC_LC3 passed mean dry weight-mg	92.23%
		LC_LC5 passed mean dry weight-mg	92.23%
		LC_DCDS passed mean dry weight-mg	92.23%
		EDTA Control passed mean dry weight-mg	92.23%
		FR_FRCP1 + EDTA passed mean dry weight-	92.23%
		CM_MC2 + EDTA passed mean dry weight-m	92.23%
		RG_MIDAG + EDTA passed mean dry weight-	92.23%

Unequal Variance t Two-Sample Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control (LC-SLC)		FR_UFR1	-1.617	1.895	0.28	7	CDF	0.9250	Non-Significant Effect
		GH_ER2	0.7423	2.015	0.246	5	CDF	0.2456	Non-Significant Effect
		CM_MC1	-0.3644	1.895	0.276	7	CDF	0.6368	Non-Significant Effect
		FR_FRCP1	1.593	2.132	0.247	4	CDF	0.0932	Non-Significant Effect
		FR_FRABCH	-0.8137	1.895	0.264	7	CDF	0.7787	Non-Significant Effect
		GH_FR1	-0.6948	2.015	0.251	5	CDF	0.7409	Non-Significant Effect
		GH_ERC	0.25	1.895	0.269	7	CDF	0.4049	Non-Significant Effect
		CM_MC2	0.9368	2.132	0.246	4	CDF	0.2009	Non-Significant Effect
		RG_MIDAG	-0.01918	1.895	0.313	7	CDF	0.5074	Non-Significant Effect
		EV_MC2	-0.04646	1.943	0.261	6	CDF	0.5178	Non-Significant Effect
		EV_HC1	0.2565	1.895	0.294	7	CDF	0.4025	Non-Significant Effect
		LC_LCDSSLCC	-0.0397	1.895	0.275	7	CDF	0.5153	Non-Significant Effect
		LC_LC3	-2.21	2.015	0.251	5	CDF	0.9609	Non-Significant Effect
		LC_LC5	0.4273	1.895	0.286	7	CDF	0.3410	Non-Significant Effect
		LC_DCDS	0.93	2.015	0.26	5	CDF	0.1975	Non-Significant Effect
		EDTA Control	-1.16	1.895	0.284	7	CDF	0.8579	Non-Significant Effect
		FR_FRCP1 + EDTA	1.093	2.132	0.249	4	CDF	0.1678	Non-Significant Effect
		CM_MC2 + EDTA	0.3792	2.132	0.246	4	CDF	0.3619	Non-Significant Effect
		RG_MIDAG + EDTA	-0.8665	1.895	0.297	7	CDF	0.7925	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1.38379	0.0728313	19	2.371	0.0042	Significant Effect
Error	2.39622	0.0307207	78			
Total	3.78001		97			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	47.58	36.19	2.9E-04	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.982	0.9648	0.1987	Normal Distribution

Hyalella 28-d Survival and Growth Sediment Test — **Nautilus Environmental**

Analysis ID: 12-6935-6071 **Endpoint:** Mean Dry Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 03 Feb-20 14:21 **Analysis:** Parametric-Two Sample **Status Level:** 1

Mean Dry Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
FR_UFR1		5	0.5603	0.3022	0.8183	0.621	0.2088	0.738	0.09293	37.09%	0.00%
GH_ER2		5	0.231	0.1151	0.3469	0.205	0.119	0.356	0.04175	40.42%	58.77%
CM_MC1		5	0.3747	0.1246	0.6249	0.425	0.1438	0.584	0.09011	53.76%	33.11%
LC_SLC	XC	5	0.3216	0.003179	0.64	0.201	0.095	0.608	0.1147	79.74%	42.60%
FR_FRCP1		5	0.1374	0.09649	0.1783	0.1289	0.1033	0.1767	0.01473	23.98%	75.48%
FR_FRABCH		5	0.4351	0.2144	0.6559	0.5256	0.1275	0.5567	0.0795	40.85%	22.33%
GH_FR1		5	0.408	0.2745	0.5415	0.457	0.283	0.5213	0.04807	26.34%	27.18%
GH_ERC		5	0.2861	0.05325	0.5189	0.321	0.03801	0.5089	0.08386	65.55%	48.94%
CM_MC2		5	0.2137	0.1841	0.2433	0.2067	0.1922	0.2489	0.01067	11.17%	61.86%
RG_MIDAG		5	0.3248	-0.004571	0.6541	0.217	0.1463	0.794	0.1186	81.67%	42.03%
EV_MC2		5	0.3278	0.1351	0.5206	0.3689	0.07625	0.485	0.06943	47.36%	41.49%
EV_HC1		5	0.2818	-0.009114	0.5726	0.199	0.09503	0.689	0.1048	83.14%	49.71%
LC_LCDSSLCC		5	0.3274	0.08054	0.5742	0.3	0.145	0.6178	0.0889	60.72%	41.57%
LC_LC3		4	0.5964	0.4432	0.7496	0.6031	0.4725	0.707	0.04814	16.14%	-6.46%
LC_LC5		5	0.2572	-0.01418	0.5286	0.1983	0.08374	0.639	0.09775	84.98%	54.09%
LC_DCDS		4	0.2018	0.01474	0.3888	0.1785	0.08502	0.365	0.05876	58.25%	63.99%
EDTA Control		5	0.4957	0.2267	0.7647	0.391	0.258	0.737	0.09689	43.71%	11.52%
FR_FRCP1 + EDTA		5	0.1938	0.1316	0.2561	0.1757	0.1362	0.2589	0.02241	25.86%	65.40%
CM_MC2 + EDTA		5	0.2779	0.246	0.3098	0.282	0.2367	0.3025	0.01148	9.24%	50.40%
RG_MIDAG + EDT		5	0.4573	0.1614	0.7531	0.366	0.18	0.712	0.1066	52.12%	18.39%

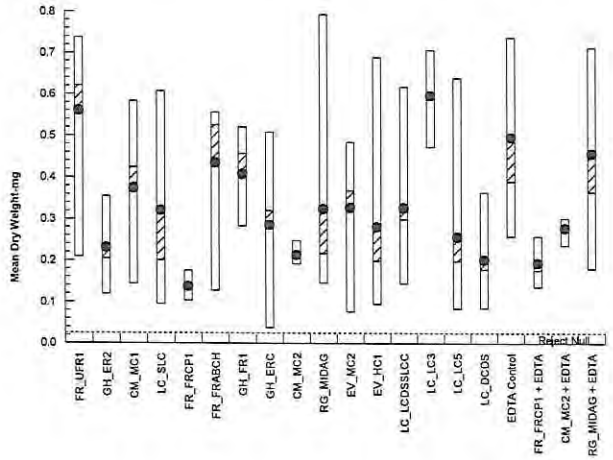
Mean Dry Weight-mg Detail

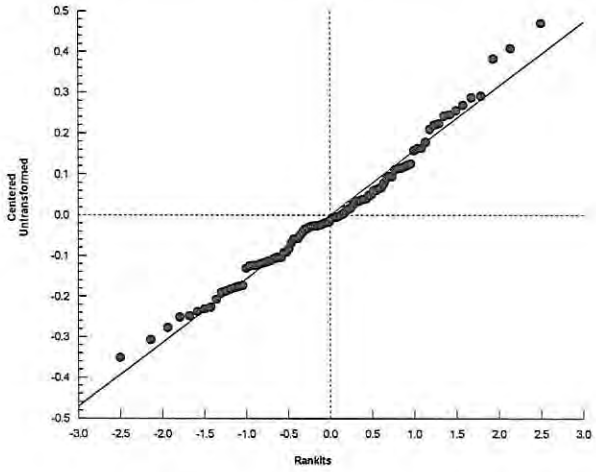
Sample	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5
FR_UFR1		0.2088	0.738	0.5556	0.678	0.621
GH_ER2		0.119	0.356	0.183	0.205	0.292
CM_MC1		0.537	0.425	0.584	0.184	0.1438
LC_SLC	XC	0.201	0.608	0.59	0.114	0.095
FR_FRCP1		0.1111	0.1033	0.1289	0.1767	0.167
FR_FRABCH		0.1275	0.437	0.529	0.5256	0.5567
GH_FR1		0.457	0.3037	0.475	0.5213	0.283
GH_ERC		0.03801	0.321	0.4	0.5089	0.1625
CM_MC2		0.2262	0.1922	0.1944	0.2067	0.2489
RG_MIDAG		0.2556	0.794	0.217	0.1463	0.211
EV_MC2		0.406	0.3689	0.303	0.07625	0.485
EV_HC1		0.09503	0.248	0.199	0.689	0.1778
LC_LCDSSLCC		0.145	0.6178	0.152	0.3	0.422
LC_LC3		0.4725	0.6113	0.595	0.707	
LC_LC5		0.639	0.08374	0.165	0.1983	0.2
LC_DCDS		0.08502	0.365	0.172	0.185	
EDTA Control		0.391	0.258	0.737	0.715	0.3775
FR_FRCP1 + EDTA		0.1362	0.2317	0.2589	0.1757	0.1667
CM_MC2 + EDTA		0.3025	0.2367	0.2733	0.295	0.282
RG_MIDAG + EDT		0.702	0.712	0.3262	0.366	0.18

Hyalella 28-d Survival and Growth Sediment Test **Nautilus Environmental**

Analysis ID:	12-6935-6071	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Feb-20 14:21	**Analysis:**	Parametric-Two Sample	**Status Level:**	1

Graphics





NAUTILUS ENVIRONMENTAL
ATTN: Sean
8664 Commerce Court
Imperial Square Lake City
Burnabv BC V5A 4N7

Date Received: 20-NOV-19
Report Date: 28-NOV-19 10:29 (MT)
Version: FINAL

Client Phone: 604-420-8773

Certificate of Analysis

Lab Work Order #: L2385535

Project P.O. #: NOT SUBMITTED
Job Reference:
C of C Numbers:
Legal Site Desc:

Hilary Woods
Account Manager

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ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2385535-1	L2385535-2	L2385535-3	L2385535-4	L2385535-5
	Description					
	Sampled Date	15-NOV-19	15-NOV-19	15-NOV-19	15-NOV-19	15-NOV-19
	Sampled Time					
	Client ID	CONTROL	FR_UFR1	GH_ER2	CM_MC1	LC_SLC
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Ammonia, Total (as N) (mg/L)	<0.0050	0.0113	0.0241	0.0059	0.0084

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2385535-6	L2385535-7	L2385535-8	L2385535-9	L2385535-10
	Description					
	Sampled Date	15-NOV-19	15-NOV-19	15-NOV-19	15-NOV-19	15-NOV-19
	Sampled Time					
	Client ID	FR_FRCP1	FR_FRABCH	GH_FR1	GH_ERC	CM_MC2
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Ammonia, Total (as N) (mg/L)	0.0156	0.0105	0.0157	0.0162	0.0105

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2385535-11	L2385535-12	L2385535-13	L2385535-14	L2385535-15
	Description					
	Sampled Date	15-NOV-19	15-NOV-19	15-NOV-19	15-NOV-19	15-NOV-19
	Sampled Time					
	Client ID	RG_MIDAG	EV_MC2	EV_HCI	LC_LCDSSL	LC_LC3
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Ammonia, Total (as N) (mg/L)	0.0119	0.0220	0.0184	0.0110	0.0095

ALS ENVIRONMENTAL ANALYTICAL REPORT

Sample ID	L2385535-16	L2385535-17	L2385535-18	L2385535-19	L2385535-20
Description					
Sampled Date	15-NOV-19	15-NOV-19	15-NOV-19	15-NOV-19	15-NOV-19
Sampled Time					
Client ID	LC_LC5	LC_DCDS	EDTA CONTROL	FR_FRCPI+EDTA	CM_MC2+EDTA
Grouping **Analyte**					
WATER					
Anions and Nutrients Ammonia, Total (as N) (mg/L)	0.0085	0.0247	0.0270	0.0279	0.0117

ALS ENVIRONMENTAL ANALYTICAL REPORT

	Sample ID	L2385535-21				
	Description					
	Sampled Date	15-NOV-19				
	Sampled Time					
	Client ID	RG_MIDAG+EDTA				
Grouping	**Analyte**					
WATER						
Anions and Nutrients	Ammonia, Total (as N) (mg/L)	0.0137				

Reference Information

Test Method References:

ALS Test Code	Matrix	Test Description	Method Reference**
NH3-F-VA	Water	Ammonia in Water by Fluorescence	J. ENVIRON. MONIT., 2005, 7, 37-42, RSC

This analysis is carried out, on sulfuric acid preserved samples, using procedures modified from J. Environ. Monit., 2005, 7, 37 - 42, The Royal Society of Chemistry, "Flow-injection analysis with fluorescence detection for the determination of trace levels of ammonium in seawater", Roslyn J. Waston et al.

** ALS test methods may incorporate modifications from specified reference methods to improve performance.

The last two letters of the above test code(s) indicate the laboratory that performed analytical analysis for that test. Refer to the list below:

Laboratory Definition Code	Laboratory Location
VA	ALS ENVIRONMENTAL - VANCOUVER, BRITISH COLUMBIA, CANADA

Chain of Custody Numbers:

GLOSSARY OF REPORT TERMS

Surrogate - A compound that is similar in behaviour to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.
mg/kg - milligrams per kilogram based on dry weight of sample.
mg/kg wwt - milligrams per kilogram based on wet weight of sample.
mg/kg lwt - milligrams per kilogram based on lipid-adjusted weight of sample.
mg/L - milligrams per litre.
< - Less than.
D.L. - The reported Detection Limit, also known as the Limit of Reporting (LOR).
N/A - Result not available. Refer to qualifier code and definition for explanation.

Test results reported relate only to the samples as received by the laboratory.
UNLESS OTHERWISE STATED, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.
Analytical results in unsigned test reports with the DRAFT watermark are subject to change, pending final QC review.

NAUTILUS ENVIRONMENTAL

TESTING LOCATION (Please Circle)

Burnaby (●)
8664 Commerce Court
Burnaby, British Columbia, Canada
V5A 4N7
Phone 604.420.8773

Calgary ( )
#4, 6125 12 Street SE
Calgary, Alberta, Canad
T2H 2K1
Phone 403.253.7121

L2385535-COFC

Date _____ Page 1 of 3

Report to:		**Invoice To:**	
Company	Nautilus Environmental	**Company**	Same
Address		**Address**	
City/Prov/PC		**City/Prov/PC**	
Contact	Sean	**Contact**	
Phone		**Phone**	
Email	sean@nautilusenvironmental.ca	**Email**	
		PO No.	

Sample Collection By: **Sample Type:** Grab ( ) OR Composite ( )

	SAMPLE ID	DATE (DD/MM/YY)	TIME	MATRIX	# OF CONTAINERS AND VOLUME (e.g. 1 x 20 L)	COMMENTS	ANALYSES REQUIRED: Overlying Ammonia	Receipt Temperature (°C)
1	RG_MIDAG + EDTA	Nov. 17/19			1 x 125mL	Day 0	✓	
2							✓	
3							✓	
4							✓	
5							✓	
6							✓	
7							✓	
8							✓	
9							✓	
10							✓	

SPECIAL INSTRUCTIONS/COMMENTS (CLIENT)

SAMPLE RECEIPT DETAILS (LABORATORY)

1. Total No. of Containers		4. Ice Present in Cooler?	Y / N
2. Courier		5. Seal Present?	Y / N
3. Good Condition?	Y / N	6. Initials Present on Seal?	Y / N

SAMPLE DESCRIPTION AND COMMENTS (LABORATORY)

Th 20Nov19 4:30PM
RC

RELINQUISHED BY (CLIENT)

(Printed Name) (Signature)

(Company) (Date DD/MM/YY and Time)

RECEIVED BY (LABORATORY)

(Printed Name) (Signature)

(Company) (Date DD/MM/YY and Time)

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling, or transport of the sample, application or interpretation of the test data or results in part or in whole.

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

NAUTILUS ENVIRONMENTAL

TESTING LOCATION (Please Circle)

Burnaby (●)
8664 Commerce Court
Burnaby, British Columbia, Canada
V5A 4N7
Phone 604.420.8773

Calgary ( )
#4, 6125 12 Street SE
Calgary, Alberta, Canada
T2H 2K1
Phone 403.253.7121

L2385535-COFC

Date _____ Page 1 of 3

Report to:

Company	Nautilus Environmental
Address	
City/Prov/PC	
Contact	Sean
Phone	
Email	sean@nautilusenvironmental.ca

Invoice To:

Company	Same
Address	
City/Prov/PC	
Contact	
Phone	
Email	
PO No.	

Sample Collection By:

Sample Type: Grab ( ) OR Composite ( )

	SAMPLE ID	DATE (DD/MM/YY)	TIME	MATRIX	# OF CONTAINERS AND VOLUME (e.g. 1 x 20 L)	COMMENTS	ANALYSES REQUIRED: Overlying Ammonia	Receipt Temperature (°C)
1	Control	Nov 15/19			1 x 125mL	Day 0	✓	
2	FR_UFR1				1 x 125mL		✓	
3	GH_ER2				1 x 125mL		✓	
4	CM_MC1				1 x 125mL		✓	
5	LC_SLC				1 x 125mL		✓	
6	FR_FRCP1				1 x 125mL		✓	
7	FR_FRABCH				1 x 125mL		✓	
8	GH_FR1				1 x 125mL		✓	
9	GH_ERC				1 x 125mL		✓	
10	CM_MC2	↓			1 x 125mL		✓	

SPECIAL INSTRUCTIONS/COMMENTS (CLIENT)

SAMPLE RECEIPT DETAILS (LABORATORY)

1. Total No. of Containers		4. Ice Present in Cooler?	Y / N
2. Courier		5. Seal Present?	Y / N
3. Good Condition?	Y / N	6. Initials Present on Seal?	Y / N

SAMPLE DESCRIPTION AND COMMENTS (LABORATORY)

Th 20NOV19 4:50PM
8°C

RELINQUISHED BY (CLIENT)

(Printed Name) (Signature)

(Company) (Date DD/MM/YY and Time)

RECEIVED BY (LABORATORY)

(Printed Name) (Signature)

(Company) (Date DD/MM/YY and Time)

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NAUTILUS ENVIRONMENTAL

TESTING LOCATION (Please Circle)

Burnaby (●)
8664 Commerce Court
Burnaby, British Columbia, Canada
V5A 4N7
Phone 604.420.8773

Calgary ( )
#4, 6125 12 Street SE
Calgary, Alberta, Canada
T2H 2K1
Phone 403.253.7121

L2385535-COFC

Date _____ Page 2 of 3

Report to:		**Invoice To:**	
Company	Nautilus Environmental	**Company**	Same
Address		**Address**	
City/Prov/PC		**City/Prov/PC**	
Contact	Sean	**Contact**	
Phone		**Phone**	
Email	sean@nautilusenvironmental.ca	**Email**	
		PO No.	

Sample Collection By: **Sample Type:** Grab ( ) OR Composite ( )

	SAMPLE ID	DATE (DD/MM/YY)	TIME	MATRIX	# OF CONTAINERS AND VOLUME (e.g. 1 x 20 L)	COMMENTS	ANALYSES REQUIRED: Overlying Ammonia	Receipt Temperature (°C)
1	RG_MIDAG	Nov. 15/19			1 x 125mL	Day 0	✓	
2	EV_MC2				1 x 125mL		✓	
3	EV_HCl				1 x 125mL		✓	
4	LC_LCDSSL				1 x 125mL		✓	
5	LC_LC3				1 x 125mL		✓	
6	LC_LC5				1 x 125mL		✓	
7	LC_DCDS				1 x 125mL		✓	
8	EDTA Control				1 x 125mL		✓	
9	FR_FRCPI + EDTA				1 x 125mL		✓	
10	CM_MC2 + EDTA	↓			1 x 125mL		✓	

SPECIAL INSTRUCTIONS/COMMENTS (CLIENT)

SAMPLE RECEIPT DETAILS (LABORATORY)

1. Total No. of Containers		4. Ice Present in Cooler?	Y / N
2. Courier		5. Seal Present?	Y / N
3. Good Condition?	Y / N	6. Initials Present on Seal?	Y / N

SAMPLE DESCRIPTION AND COMMENTS (LABORATORY)

TG 20NOV19 4:50PM
8°C

RELINQUISHED BY (CLIENT)

(Printed Name) (Signature)

(Company) (Date DD/MM/YY and Time)

RECEIVED BY (LABORATORY)

(Printed Name) (Signature)

(Company) (Date DD/MM/YY and Time)

Our liability is limited to the cost of the test requested. The test results only relate to the sample as received. No liability in whole or in part is assumed for the collection, handling, or transport of the sample, application or interpretation of the test data or results in part or in whole.

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

ALS Environmental

CERTIFICATE OF ANALYSIS

Work Order	: **VA19A0606**	Page	: 1 of 4
Client	: **Nautilus Environmental Company Inc.**	Laboratory	: Vancouver - Environmental
Contact	: Sean	Account Manager	: Hilary Woods
Address	: 8664 Commerce Court Imperial Square Lake City Burnaby BC Canada V5A 4N7	Address	: 8081 Lougheed Highway Burnaby BC Canada V5A 1W9
Telephone	: ----	Telephone	: +1 604 253 4188
Project	: ----	Date Samples Received	: 13-Dec-2019 14:10
PO	: ----	Date Analysis Commenced	: 13-Dec-2019
C-O-C number	: ----	Issue Date	: 16-Dec-2019 15:36
Sampler	: ----		
Site	: Tissue, Water and Sediment Testing		
Quote number	: Q69439		
No. of samples received	: 21		
No. of samples analysed	: 21		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Tracy Harley	Supervisor - Water Quality Instrumentation	Inorganics - Water Quality, Burnaby, British Columbia

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
mg/L	milligrams per litre

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical results in reports identified as "Preliminary Report" are considered authorized for use.

Analytical Results

Sub-Matrix: **Water** (Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	CONTROL	FR_UFR1	GH_ER2	CM_MC1	LC_SLC
					Client sampling date / time	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019
						VA19A0606-001	VA19A0606-002	VA19A0606-003	VA19A0606-004	VA19A0606-005
						Result	Result	Result	Result	Result
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298-L	0.0050	mg/L		0.375	0.416	0.368	0.454	0.421

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Water** (Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	FR_FRCP1	FR_FRABCH	GH_FR1	GH_ERC	CM_MC2
					Client sampling date / time	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019
						VA19A0606-006	VA19A0606-007	VA19A0606-008	VA19A0606-009	VA19A0606-010
						Result	Result	Result	Result	Result
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298-L	0.0050	mg/L		0.364	0.138	0.462	0.484	0.184

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: **Water** (Matrix: **Water**)

Analyte	CAS Number	Method	LOR	Unit	Client sample ID	RG_MIDAG	EV_MC2	EV_HCI	LC_LCDSSL	LC_LC3
					Client sampling date / time	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019
						VA19A0606-011	VA19A0606-012	VA19A0606-013	VA19A0606-014	VA19A0606-015
						Result	Result	Result	Result	Result
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298-L	0.0050	mg/L		0.446	0.343	0.367	0.233	0.160

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	LC_LC5	LC_DCDS	EDTA CONTROL	FR_FRCPI + EDTA	CM_MC2 + EDTA
					Client sampling date / time	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019	12-Dec-2019
Analyte	CAS Number	Method	LOR	Unit		VA19A0606-016	VA19A0606-017	VA19A0606-018	VA19A0606-019	VA19A0606-020
						Result	Result	Result	Result	Result
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298-L	0.0050	mg/L		0.390	0.258	0.473	0.202	0.0828

Please refer to the General Comments section for an explanation of any qualifiers detected.

Analytical Results

Sub-Matrix: Water (Matrix: Water)					Client sample ID	RG_MIDAG + EDTA	----	----	----	----
					Client sampling date / time	12-Dec-2019	----	----	----	----
Analyte	CAS Number	Method	LOR	Unit		VA19A0606-021	--------	--------	--------	--------
						Result	----	----	----	----
Anions and Nutrients										
ammonia, total (as N)	7664-41-7	E298-L	0.0050	mg/L		0.310	----	----	----	----

Please refer to the General Comments section for an explanation of any qualifiers detected.

APPENDIX D – *Oncorhynchus mykiss* toxicity test data

Embryo-Alevin Test Summary Sheet

Client: Teck
Work Order No.: 192275
Test Date: November 13 - December 13, 2019
Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: Various - see table below
Sample Date: November 12, 19, 26, December 3 and 10, 2019
Date Received: November 13, 20, 27, December 4 and 11, 2019
Sample Volume: (1-12) x 20 L per refresh

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L CaCO3): 6 - 9
Alkalinity (mg/L CaCO3): 8 - 10

Test Organism Information:

Batch No: 111319
Source: Lyndon Fish Hatcheries, New Dundee, ON
Number male broodstock used: 6
Loading Density: 1.10 g/L
Number female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE128
Stock Solution ID: 19S02
Date Initiated: November 13, 2019
7-d EC50 (95% CL): 7.0 (6.8 - 7.3) mg/L SDS

Reference Toxicant Mean and Range: 4.2 (2.1 - 8.3) mg/L SDS
Reference Toxicant CV (%): 35

Test Results:

Sample ID	Survival (%) (Mean ± SD)	Normal (%) (Mean ± SD)	Length (mm) (Mean ± SD)	Wet weight (mg) (Mean ± SD)
Control	90.0 ± 8.8	88.9 ± 9.6	21.2 ± 0.5	102.7 ± 9.9
FR_UFR1 †	91.1 ± 6.9	86.7 ± 12.0	20.8 ± 0.9	102.6 ± 8.8
GH_ER2 †	91.1 ± 8.4	86.7 ± 3.3	19.6 ± 0.3	96.6 ± 8.0
CM_MC1 †	86.7 ± 8.8	78.9 ± 13.5	21.0 ± 1.2	102.5 ± 2.7
LC_SLC †	87.5 ± 10.1	81.9 ± 10.6	20.9 ± 1.0	107.3 ± 7.8
FR_FRABCH †	75.4 ± 9.9 $^{\alpha\beta}$	72.0 ± 6.6 *	20.9 ± 0.7	102.8 ± 11.8
FR_FRCP1 †	80.9 ± 3.7	76.4 ± 3.8	19.5 ± 1.7	98.1 ± 11.9
GH_FR1 †	62.1 ± 14.3 $^{*\alpha\beta\#\delta}$	57.4 ± 12.2 $^{*\alpha\beta\#\delta}$	21.0 ± 0.9	112.0 ± 18.7
GH_ERC †	89.8 ± 8.9	85.3 ± 10.5	20.9 ± 0.8	106.5 ± 4.1
CM_MC2 †	73.3 ± 8.8 $^{*\alpha\beta}$	66.7 ± 3.3 $^{*\alpha\beta}$	21.0 ± 0.7	107.5 ± 8.3
EV_MC2 †	72.2 ± 10.2 $^{*\alpha\beta}$	66.7 ± 6.7 $^{*\alpha\beta}$	21.1 ± 0.5	103.6 ± 6.3
EV_HC1 †	80.0 ± 6.7	76.7 ± 8.8	21.2 ± 0.6	107.6 ± 2.6
LC_DCDS †	65.4 ± 8.0 $^{*\alpha\beta\#\delta}$	58.5 ± 11.5 $^{*\alpha\beta\#\delta}$	21.3 ± 0.8	107.6 ± 3.6
LC_LC3 †	81.4 ± 4.8	73.7 ± 15.3	21.3 ± 0.7	106.9 ± 10.2
LC_LC5 †	74.2 ± 4.7 $^{\alpha\beta}$	63.9 ± 11.1 $^{*\alpha\beta}$	21.2 ± 0.8	103.9 ± 2.0
LC_LCDSSLCC †	80.8 ± 5.4	76.4 ± 3.4	21.8 ± 0.3	110.4 ± 3.0

† + 20 µg/L Cu

* Indicates results that were significantly lower relative to the laboratory control
$^{\alpha}$ Indicates results that were significantly lower relative to reference site FR_UFR1
$^{\beta}$ Indicates results that were significantly lower relative to reference site GH_ER2
$^{\#}$ Indicates results that were significantly lower relative to reference site CM_MC1
$^{\delta}$ Indicates results that were significantly lower relative to reference site LC_SLC

Reviewed by: [signature]
Date reviewed: Feb. 9, 2020

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

Control Concentration	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	15.0	15.0	14.80	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	10.1	10.0	10.1	10.0	10.1	10.0	10.0	9.83	10.1	10.1	10.1	10.2
pH	6.8	6.9	6.8	6.9	6.8	6.9	6.9	6.9	7.1	6.9	7.0	6.9	7.0
Cond. (µS/cm)	29	29		29		30		30		29		29	
Initials	A	MM		MM		MM		A		MM		MM	

FR_UFR1 Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	9.9	10.0	10.1	9.8	9.9	10.0	9.9	9.9	10.0	10.2	10.0	10.1
pH	7.9	7.9	8.0	8.0	8.1	8.1	8.1	8.1	8.1	7.9	8.0	8.0	8.1
Cond. (µS/cm)	1333	349		337		342		345		347		345	
Initials	A	MM		MM		MM		A		MM		MM	

GH_ER2 Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	9.8	10.0	10.1	9.9	9.8	9.9	9.9	9.9	9.9	10.1	10.0	10.1
pH	7.9	7.9	8.0	8.0	8.1	8.1	8.0	8.1	8.2	7.9	8.0	8.0	8.1
Cond. (µS/cm)	309	313		306		306		309		307		309	
Initials	A	MM		MM		MM		A		MM		MM	

CM_MCl Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	9.8	9.9	10.1	9.8	9.8	9.9	9.9	9.8	10.0	10.1	9.9	10.1
pH	7.8	7.9	8.0	8.0	8.1	8.1	8.0	8.2	8.2	7.9	8.0	8.0	8.1
Cond. (µS/cm)	271	287		277		277		280		277		291	
Initials	A	MM		MM		MM		A		MM		MM	

Thermometer: CER#3 **DO meter:** 213 / 213 (probe) **pH meter:** 213 / 213 (probe) **Conductivity meter:** 213 / 213 (probe)

	Control	FR_UFR1	GH_ER2	CM_MCl
Hardness*	9	178	270	130
Alkalinity*	9	132	136	126

* mg/L as CaCO3

Analysts: AWD, MM

Reviewed by: [signature]

Date reviewed: Jan-24-2020

Sample Description: FR_UFR1, GH_ER2, CM_MCl - clear, no colour, no odour, no particulates

Comments: used stock soln 19CU02 (100 mg/L Cu)

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Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

LC-SLC Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	9.9	9.9	9.8	9.9	9.8	10.1	9.8	9.9	9.8	10.2	9.7	10.0
pH	7.5	7.9	8.0	8.0	8.1	8.1	8.0	8.1	8.3	7.9	8.1	8.0	8.12
Cond. (µS/cm)	382	382		369		371		377		374		373	
Initials	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	

FR_FRABCH Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.6	14.5	14.5
DO (mg/L)	10.3	9.8	10.1	9.8	9.9	9.8	10.0	9.8	9.9	10.0	10.0	9.9	10.0
pH	7.8	7.9	8.1	8.0	8.1	8.0	8.1	8.1	8.2	7.9	8.2	8.0	8.2
Cond. (µS/cm)	1027	1044		1036		1026		1033		1029		1029	
Initials	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	

FR_FRCP1 Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	9.6	10.0	9.9	9.8	9.8	10.0	9.9	9.8	9.8	10.1	9.9	10.1
pH	7.9	8.0	8.2	8.1	8.2	8.1	8.2	8.1	8.2	7.9	8.2	8.0	8.2
Cond. (µS/cm)	1307	1302		1295		1277		1281		1274		1284	
Initials	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	

GH-FR1 Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	9.8	10.0	9.9	9.8	9.9	10.0	9.8	9.8	9.9	10.1	9.8	10.0
pH	7.9	8.0	8.2	8.1	8.2	8.0	8.2	8.1	8.2	8.0	8.1	8.0	8.1
Cond. (µS/cm)	877	872		869		846		851		849		854	
Initials	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]	

Thermometer: CER#3 **DO meter:** 213 (LC-SLC probe) / 213 **pH meter:** 213 (probe) / 213 **Conductivity meter:** 213 (probe) / 213

	~~Control~~	FR_FRABCH	FR_FRCP1	GH-FR1
Hardness*	200	~~720~~ 670	~~670~~ 720	490
Alkalinity*	130	~~200~~ 216	~~216~~ 200	210

* mg/L as CaCO3

Analysts: AWD, [illegible]
Reviewed by: [illegible]
Date reviewed: Jan 24, 2020

Sample Description: LCSLC, FR_FRABCH, FR_FRCP1, GH-FR1 - clear, no colour, no odour, no particulates

Comments: Used stock soln 19Cu02 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

GH_ERC Concentration + 20 µg/L Cu

	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	10.0	10.1	9.8	9.9	9.8	9.9	9.9	9.9	10.0	10.1	9.9	10.0
pH	7.9	7.8	8.0	8.0	8.1	8.1	8.1	8.1	8.2	7.9	8.1	8.0	8.1
Cond. (µS/cm)	345	363		354		356		361		358		354	
Initials	AP	MM		MM		MM		AP		MM		MM	

CM_MC2 Concentration + 20 µg/L Cu

	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	9.8	10.1	9.8	9.8	10.0	9.9	10.0	9.8	10.0	10.0	9.9	10.0
pH	7.8	8.0	8.1	8.0	8.1	8.1	8.1	8.0	8.2	8.0	8.2	8.0	8.2
Cond. (µS/cm)	1094	1033		1029		1018		1016		1020		1015	
Initials	AP	MM		MM		MM		AP		MM		MM	

EV_MC2 Concentration + 20 µg/L Cu

	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	10.0	10.2	9.9	9.9	9.8	9.8	9.9	9.9	9.9	10.1	9.9	10.0
pH	7.9	7.9	8.1	8.0	8.1	8.1	8.1	8.0	8.3	7.9	8.2	8.0	8.2
Cond. (µS/cm)	1034 ① 654	667		652		659		663		648		655	
Initials	AP	MM		MM		MM		AP		MM		MM	

EV_HCl Concentration + 20 µg/L Cu

	Days 0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	9.9	10.2	9.8	9.9	9.8	9.9	9.8	9.8	10.0	10.1	9.8	10.1
pH	7.9	8.0	8.1	8.0	8.1	8.1	8.2	8.1	8.2	8.0	8.2	8.0	8.2
Cond. (µS/cm)	754	750		736		731		738		757		749	
Initials	AP	MM		MM		MM		AP		MM		MM	

Thermometer: CER#3 (GH_ERC) DO meter: 213 | 213 probe pH meter: 213 | 213 probe Conductivity meter: 213 | 213 probe

	~~Control~~ GH_ERC	CM_MC2	EV_MC2	EV_HCl
Hardness*	180	550	340	400
Alkalinity*	164	226	204	212

* mg/L as CaCO3

Analysts: AWD, MM
Reviewed by: [signature]
Date reviewed: Jan 28, 2020

Sample Description: GH_ERC, CM_MC2, EV_MC2, EV_HCl - clear, no colour, no odour, no particulates

Comments: used stock soln 19Cu02 (100 mg/L Cu)

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Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

LC_DCDS Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	9.8	10.0	9.9	9.9	9.9	9.9	9.8	9.9	9.8	10.0	9.8	10.0
pH	~~8.10~~ 8.2	8.0	8.0	8.0	8.1	8.1	8.1	8.0	8.1	8.0	8.1	8.1	8.1
Cond. (µS/cm)	769	763		754		743		745		742		740	
Initials	AS	MM		MM		MM		AS		MM		MM	

LC_LC3 Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	9.9	10.1	9.8	9.9	9.8	10.0	9.8	9.7	9.9	10.0	9.9	10.1
pH	8.2	8.0	8.2	8.1	8.1	8.0	8.2	8.1	8.2	7.9	8.2	8.0	8.2
Cond. (µS/cm)	1205	1205		1196		1162		1167		1149		1154	
Initials	AS	MM		MM		MM		AS		MM		MM	

LC_LC5 Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	10.3	9.9	10.0	10.0	9.9	9.8	10.0	9.8	9.8	9.9	10.0	9.8	10.1
pH	8.2	8.0	8.3	8.0	8.1	8.1	8.3	8.1	8.2	8.0	8.3	8.2	8.3
Cond. (µS/cm)	754	776		752		750		761		753		760	
Initials	AS	MM		MM		MM		AS		MM		MM	

LC_LCDSSLCC Concentration + 20 mg/L Cu	Days												
	0	1		2		3		4		5		6	
	init.	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.5	14.5	14.5	14.5
DO (mg/L)	14.0	9.8	10.0	9.9	9.9	9.8	10.0	9.8	9.9	9.8	10.1	10.0	10.0
pH	8.2	8.0	8.2	8.1	8.2	8.1	8.2	8.2	8.2	8.1	8.3	8.1	8.2
Cond. (µS/cm)	~~917~~ 913	913		897		899		901		897		901	
Initials	AS	MM		MM		MM		AS		MM		MM	

Thermometer: CER#2 **DO meter:** 213 | 213 probe **pH meter:** 213 | 213 probe **Conductivity meter:** 213 | 213 probe

	~~Control~~ LC_DCDS	LC_LC3	LC_LC5	LC_LCDSSLCC
Hardness*	370	640	390	430
Alkalinity*	158	230	208	210

* mg/L as $CaCO_3$

Analysts: AWD, MM

Reviewed by: [signature]

Date reviewed: Jan 24, 2020

Sample Description: LC-LC3 - clear, yellow, no odour, no particulates
LC_DCDS, LC_LC5, LC_LCDSSLCC - clear, no colour, no odour, no particulates.

Comments: used stock soln 19Cu02 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

CONT Concentration	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.1	10.2	10.0	10.2	10.1	10.2	10.1	10.0	10.1	9.9	10.1	10.1	10.2	10.2
pH	6.7	6.8	6.8	6.9	6.8	6.8	6.8	6.7	6.8	6.9	6.8	6.8	6.7	6.6
Cond. (µS/cm)	29		28		28		28		28		28		28	
Initials	MM		MM		MM		A		A		MM		MM	

FR_UFR1 Concentration ~20 mg/L CV	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.0	10.2	10.1	10.2	10.1	10.1	10.3	10.2	10.0	9.9	10.0	10.2	10.0	10.3
pH	8.0	7.9	8.0	8.0	7.9	7.9	7.8	7.9	7.9	7.9	7.8	8.1	7.8	8.0
Cond. (µS/cm)	342		326		344		343		343		344		342	
Initials	MM		MM		MM		A		A		MM		MM	

GH_ER2 Concentration ~20 mg/L CV	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.0	10.2	10.0	10.3	10.1	10.2	10.1	10.1	10.1	9.8	10.0	10.2	9.9	10.3
pH	8.0	7.8	8.0	8.0	8.0	8.0	8.0	8.1	8.0	8.0	7.9	8.1	7.9	8.0
Cond. (µS/cm)	310		300		313		311		310		312		313	
Initials	MM		MM		MM		A		A		MM		MM	

CM_MC1 Concentration ~20 mg/L CV	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.0	10.1	10.0	10.3	10.0	10.3	10.1	10.1	10.2	9.9	10.1	10.2	9.9	10.2
pH	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.1	8.0	7.9	7.9	8.0	7.9	8.0
Cond. (µS/cm)	278		267		281		279		280		282		279	
Initials	MM		MM		MM		A		A		MM		MM	

Thermometer: CER#3 DO meter: 213 (probe) 213 pH meter: 213 (probe) 213 Conductivity meter: 213 (probe) 213

	Control	FR_UFR1	GH_ER2	CM_MC1
Hardness*	8	170	240	138
Alkalinity*	7	144	150	152

* mg/L as CaCO3

Analysts: AWD, YML

Reviewed by: [signature]

Date reviewed: Jan 24, 2020

Sample Description: FR-UFR1, GH-ER2, CM-MC1 - clear, no colour, no odour, no particulates

Comments: Used stock soln 19CV02 (100mg/L CV)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

12/6/20

Client: Teck
Sample ID: (various)
Work Order #: 192275

Start Date & Time: November 13 2019 @1450h
Stop Date & Time: December 13 2019 @0940h
Test Species: *Oncorhynchus mykiss*

LC-SLC Concentration ± 20 mg/L CV

	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	9.8	10.2	9.9	10.1	10.1	10.2	10.1	10.1	10.1	10.0	9.9	10.1	9.8	10.2
pH	8.0	7.9	8.0	8.1	8.0	8.0	8.0	8.0	8.0	8.0	7.8	8.1	7.9	8.1
Cond. (µS/cm)	373		369		383 ~~384~~		388		380		383		381	
Initials	MW		MW		MW		A		A		MW		MW	

FR_FRABCH Concentration ± 20 mg/L CV

	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.6	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	9.8	10.3	9.9	10.2	10.1	10.1	10.1	10.2	10.1	10.0	10.0	10.2	9.9	10.2
pH	7.9	8.2	7.9	8.2	8.0	8.0	8.0	8.1	8.0	8.0	7.8	8.0	7.9	8.2
Cond. (µS/cm)	1012		1013		1040		1028		1033		1049		1039	
Initials	MW		MW		MW		A		A		MW		MW	

FR_FRCP1 Concentration ± 20 mg/L CV

	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.0	10.2	10.0	10.2	10.1	10.3	10.1	10.1	10.1	9.9	10.0	10.2	10.0	10.1
pH	7.9	8.2	8.1	8.2	8.0	8.2	8.0	8.1	8.0	8.1	7.9	8.1	7.9	8.2
Cond. (µS/cm)	1064		1091		1124 ~~1144~~		1128		1130		1122		1125	
Initials	MW		MW		MW		A		A		MW		MW	

GH-FR1 Concentration ± 20 mg/L CV

	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	9.9	10.2	10.0	10.2	10.1	10.3	10.1	10.1	10.1	10.0	10.0	10.1	9.9	10.2
pH	8.1	8.2	8.1	8.2	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.3
Cond. (µS/cm)	~~819~~ 817		820		852		850		848		856		856	
Initials	MW		MW		MW		A		A		MW		MW	

Thermometer: CER#3 **DO meter:** 213 / 213 probe **pH meter:** 213 / 213 probe **Conductivity meter:** 213 / 213 probe

	~~Control~~	FR_FRABCH	FR_FRCP1	GH_FR1
Hardness*	200	660	740	490
Alkalinity*	142	~~210~~ 238	210	218

* mg/L as CaCO3

Analysts: AWD, MW
Reviewed by: [signature]
Date reviewed: JAN 24, 2020

Sample Description: LC-SLC, FR-FRABCH, FR-FRCP1, GH-FR1 - clear, no colour, no odour, no particulates

Comments: used stock soln 19Cu02 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

RJ 7/20

Client: Teck
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

GH-ERC Concentration + 20 µg/L Cu	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.1	10.1	9.8	10.2	10.1	10.1	10.2	10.1	10.2	10.0	10.0	10.3	10.0	10.3
pH	8.1	8.1	8.0	8.1	8.0	8.2	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.2
Cond. (µS/cm)	341		339		350		354		356		355		352	
Initials	MW		MW		MW		A		A		MW		MW	

CM-MC2 Concentration + 20 µg/L Cu	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.2	10.1	10.0	10.1	10.2	10.3	10.1	10.0	10.1	10.0	10.1	10.2	10.1	10.2
pH	8.0	8.2	8.1	8.2	8.0	8.2	8.0	8.2	8.0	8.0	8.0	8.1	8.0	8.3
Cond. (µS/cm)	1017		977		1010		1010		1012		1013		1010	
Initials	MW		MW		MW		A		A		MW		MW	

EV-MC2 Concentration + 20 µg/L Cu	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.6	14.0	13.5	13.5	13.5
DO (mg/L)	10.1	10.2	10.0	10.1	10.1	10.3	10.1	10.0	10.1	9.9	9.9	10.2	10.1	10.2
pH	8.0	8.2	8.0	8.2	8.1	8.2	8.0	8.2	8.0	8.1	8.0	8.1	8.0	8.3
Cond. (µS/cm)	653		534		554		550		552		556		554	
Initials	MW		MW		MW		A		A		MW		MW	

EV-HCl Concentration + 20 µg/L Cu	Days													
	7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.1	10.2	9.8	10.2	10.1	10.2	10.1	10.0	10.1	10.0	10.0	10.2	10.0	10.2
pH	8.1	8.2	8.1	8.2	8.0	8.2	8.0	8.2	8.0	8.1	8.0	8.1	8.0	8.3
Cond. (µS/cm)	752		715		754		740		742		746		750	
Initials	MW		MW		MW		A		A		MW		MW	

Thermometer: CER#3 DO meter: 213 | 213 pH meter: 213 | 213 Conductivity meter: 213 | 213
(GH-ERC probe; pH probe; conductivity probe)

	~~Control~~	CM-MC2	EV-MC2	EV-HCl
Hardness*	180	570	310	400
Alkalinity*	166	228	190	218

* mg/L as CaCO3

Analysts: AWD, MW
Reviewed by:
Date reviewed: Jan-24, 2020

Sample Description: GH-ERC, CM-MC2, EV-MC2, EV-HCl - clear, no colour, no odour, no particulates

Comments: used stock soln 19Cv02 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

RB 8/20

Client: Teck
Sample ID: (various)
Work Order #: 1972275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

LC-DCDS Concentration + 20 µg/L Cu

	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.1	10.1	10.0	10.2	10.1	10.2	10.1	10.2	10.1	10.0	10.0	10.2	10.0	10.3
pH	8.0	8.2	8.1	8.2	8.0	8.1	8.0	8.2	8.0	8.0	8.0	8.1	8.0	8.2
Cond. (µS/cm)	~~719~~		728		753		753		753		754		753	
Initials	MW		MW		MW		A		A		MW		MW	

LC-LC3 Concentration + 20 µg/L Cu

	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.1	10.1	9.9	10.2	10.1	10.1	10.1	10.1	10.1	9.9	10.0	10.1	10.0	10.2
pH	8.0	8.2	8.0	8.2	8.0	8.2	8.0	8.2	8.0	8.0	8.0	8.1	8.1	8.3
Cond. (µS/cm)	1149		1132		1166		1170		1169		1172		1168	
Initials	MW		MW		MW		A		A		MW		MW	

LC-LC5 Concentration + 20 µg/L Cu

	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.2	10.2	9.9	10.3	10.1	10.2	10.1	10.1	10.1	10.1	10.0	10.1	9.9	10.2
pH	8.1	8.2	8.1	8.2	8.0	8.2	8.0	8.2	8.0	7.9	8.1	8.1	8.1	8.3
Cond. (µS/cm)	~~753~~		721		749		748		749		751		747	
Initials	MW		MW		MW		A		A		MW		MW	

LC-LCDSSLCC Concentration + 20 µg/L Cu

	Days 7		8		9		10		11		12		13	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	14.0	13.5	13.5	13.5
DO (mg/L)	10.1	10.2	10.0	10.2	10.1	10.2	10.2	10.2	10.2	10.1	10.0	10.2	9.9	10.2
pH	8.1	8.2	8.1	8.3	8.1	8.2	8.0	8.2	8.0	8.0	8.0	8.1	8.1	8.3
Cond. (µS/cm)	920		869		906		900		900		899		900	
Initials	MW		MW		MW		A		A		MW		MW	

Thermometer: CE243 (LC-DCDS probe) **DO meter:** 213/213 probe **pH meter:** 213/213 probe **Conductivity meter:** 213/213 probe

	~~Control~~ MW	LC-LC3	LC-LC5	LC-LCDSSLCC
Hardness*	350	660	390	460
Alkalinity*	156	240	208	208

* mg/L as CaCO3

Analysts: AWD, MW

Reviewed by: [signature]
Date reviewed: Jan 24, 2020

Sample Description: LC-LC3 - clear, yellow, no odour no particulates
LC-DCDS - clear, no colour no odour, no particulates
LC-LC5
LC-LCDSSLCC

Comments: used stock soln 19Cu02 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

CONT Concentration	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.5	13.5	14.0	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	10.2	10.2	10.1	10.0	10.0	10.2	10.2	10.2	10.1	10.0	10.1	10.0	10.0
pH	6.8	6.9	7.0	7.1	7.0	6.9	6.9	6.9	6.9	7.0	7.0	6.9	6.9	7.0
Cond. (µS/cm)	28		28		29		28		28		29		29	
Initials	MM		MM		MM		A		MM		MM		MM	

FR_UTR1 Concentration +20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	10.1	10.3	10.2	9.8	9.8	10.2	9.9	10.2	10.0	9.9	10.1	9.9	10.0
pH	7.9	8.0	7.9	8.0	7.9	7.8	7.9	8.0	7.9	7.9	7.8	8.0	7.8	8.0
Cond. (µS/cm)	342		351		356		352		353		355		353	
Initials	MM		MM		MM		A		MM		MM		MM	

GH_ER2 Concentration +20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	10.1	10.3	10.2	10.0	10.0	10.2	9.8	10.2	10.0	9.7	10.1	9.9	10.0
pH	8.0	8.0	7.9	8.0	7.9	7.9	7.9	8.0	7.9	8.0	7.9	8.0	7.9	8.1
Cond. (µS/cm)	312		316		317		315		317		320		318	
Initials	MM		MM		MM		A		MM		MM		MM	

CM_MC1 Concentration +20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	10.1	10.2	10.1	9.8	10.0	10.2	9.8	10.2	10.0	9.9	10.0	10.0	10.1
pH	7.9	8.0	7.9	8.0	7.8	7.9	7.9	8.0	7.9	8.1	7.9	8.1	7.8	8.1
Cond. (µS/cm)	281		288		296		292		288		288		286	
Initials	MM		MM		MM		A		MM		MM		MM	

Thermometer: CER# 3 **DO meter:** 213 / 213 (probe) **pH meter:** 213 / 213 (probe) **Conductivity meter:** 213 / 213 (probe)

	Control	FR_UTR1	GH_ER2	CM_MC1
Hardness*	9	190	230	130
Alkalinity*	8	140	154	136

* mg/L as CaCO3

Analysts: AWD, MM

Reviewed by: [illegible]

Date reviewed: Jan 24, 2020

Sample Description: FR_UTR1, GH_ER2, CM_MC1 - clear, no colour, no odour, no particulates.

Comments: used stock soln 19Cu02 (100 mg/L Cu)

RB 10/20

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

LC-SLC Concentration +20 mg/L (u)

	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	10.1	10.2	10.1	10.0	10.1	10.1	9.9	10.2	10.0	9.9	10.0	10.0	9.9
pH	7.9	8.0	7.9	8.0	7.9	7.9	7.9	8.0	7.9	8.2	7.9	8.1	7.9	8.1
Cond. (µS/cm)	383		390		387		390		391		392		390	
Initials	MM		MM		MM		A		A		MM		MM	

FR-FRABCH Concentration +20 mg/L (u)

	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	10.2	10.2	10.1	10.1	10.1	10.2	9.8	10.2	10.1	9.9	10.1	9.8	10.0
pH	8.0	8.2	7.9	8.2	7.9	8.1	7.9	8.1	7.9	8.1	7.8	8.2	7.9	8.3
Cond. (µS/cm)	1042		1070		1065		1057		1059		1067		1060	
Initials	MM		MM		MM		A		A		MM		MM	

FR-FRCP1 Concentration +20 mg/L (u)

	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	10.1	10.3	10.2	10.0	10.0	10.1	9.9	10.2	10.1	10.0	10.1	10.0	10.1
pH	8.0	8.2	8.0	8.3	8.0	8.2	7.9	8.1	7.9	8.1	7.8	8.2	7.9	8.3
Cond. (µS/cm)	1126		1282D		1276		1286		1251		1296		1285	
Initials	MM		MM		MM		A		A		MM		MM	

GH-FR1 Concentration +20 mg/L (u)

	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	10.1	10.2	10.2	10.0	10.1	10.2	9.9	10.2	10.2	9.9	10.0	10.0	10.0
pH	8.0	8.3	8.1	8.3	8.0	8.2	8.0	8.2	8.0	8.1	8.1	8.2	8.1	8.3
Cond. (µS/cm)	872		860		861		870		873		867		871	
Initials	MM		MM		MM		A		A		MM		MM	

Thermometer: CER#3 **DO meter:** 213 / 213 probe **pH meter:** 213 / 213 probe **Conductivity meter:** 213 / 213 probe

	LC-SLC ~~Control~~	FR-FRABCH	FR-FRCP1	GH-FR1
Hardness*	200	650	720	490
Alkalinity*	150	244	270	216

* mg/L as CaCO3

Analysts: AWD, MC

Reviewed by: [redacted]
Date reviewed: Jan 24, 2020

Sample Description: LC-SLC, FR-FRABCH, FR-FRCP1, GH-FR1 - clear, no colour, no odour, no particulates

Comments: *confirmed w/ 2nd chamber; used stock soln 19CU02 (100 mg/L (u))

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

GH-ERC Concentration +20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	10.2	10.3	10.0	9.9	10.2	10.1	9.9	10.1	10.1	9.7	10.0	10.0	10.1
pH	8.0	8.2	7.9	8.2	7.9	8.2	7.9	8.1	7.9	8.2	7.9	8.2	8.0	8.3
Cond. (µS/cm)	355		362		3254		362		360		361		359	
Initials	MM		MM		MM		A		A		MM		MM	

CM_MC2 Concentration +20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	15.0	14.5	14.5	14.5
DO (mg/L)	10.0	10.1	10.2	10.2	9.8	10.1	10.1	9.8	10.1	10.1	9.9	10.2	9.9	10.2
pH	8.0	8.2	8.1	8.2	8.0	8.2	7.9	8.1	8.0	8.1	8.1	8.2	8.1	8.3
Cond. (µS/cm)	1009		1084		1076		1074		1076		1085		1079	
Initials	MM		MM		MM		A		A		MM		MM	

EV_MC2 Concentration +20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	15.0	14.5	14.5	14.5
DO (mg/L)	10.0	10.2	10.3	10.2	10.0	10.1	10.2	9.9	10.2	10.0	9.8	10.1	9.9	10.1
pH	8.0	8.2	8.0	8.2	7.9	8.2	7.9	8.1	7.9	8.1	8.0	8.2	8.0	8.3
Cond. (µS/cm)	559		610		611		619		618		613		617	
Initials	MM		MM		MM		A		A		MM		MM	

EV_HCl Concentration +20 mg/L Cu	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	15.0	14.5	14.5	14.5
DO (mg/L)	10.0	10.1	10.3	10.1	10.0	10.1	10.1	9.9	10.1	10.1	9.9	10.1	9.9	10.1
pH	8.0	8.2	8.1	8.3	8.0	8.2	8.0	8.2	8.0	8.1	8.1	8.2	8.1	8.3
Cond. (µS/cm)	749		765		767		770		772		760		766	
Initials	MM		MM		MM		A		A		MM		MM	

Thermometer: CER#3 **DO meter:** 213 / 213 probe **pH meter:** 213 / 213 probe **Conductivity meter:** 213 / 213 probe

	~~Control~~ GH-ERC	CM_MC2	EV_MC2	EV_HCl
Hardness*	170	570	320	420
Alkalinity*	166	230	190	208

* mg/L as CaCO3

Analysts: AWD, MM

Reviewed by: [signature]
Date reviewed: Jan-24, 2020

Sample Description: GH-ERC, CM_MC2, EV_MC2, EV_HCl - clear, no colour, no odour, no particulates

Comments: used stock soln 19CuO2 (100 mg/L Cu)

13.12.20

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

LC-DCDS Concentration ± 20 mg/L (u	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	15.0	14.5	14.5	14.5
DO (mg/L)	9.8	10.2	10.3	10.2	10.1	10.0	10.1	9.8	10.1	10.0	9.9	10.0	10.1	10.2
pH	8.1	8.3	8.0	8.3	8.0	8.1	7.9	8.1	7.9	8.1	8.0	8.1	8.0	8.3
Cond. (µS/cm)	756		780		777		773		776		778		774	
Initials	MM		MM		MM		A		A		MM		MM	

LC-LC3 Concentration ± 20 mg/L (u	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	15.0	14.5	14.5	14.5
DO (mg/L)	9.9	10.1	10.3	10.2	10.2	10.1	10.2	9.9	10.1	10.1	10.0	10.1	10.2	10.1
pH	8.0	8.2	8.1	8.2	8.0	8.2	8.0	8.2	8.0	8.1	8.0	8.2	8.0	8.3
Cond. (µS/cm)	1169		1185		1183		1175		1179		1188		1185	
Initials	MM		MM		MM		A		A		MM		MM	

LC-LC5 Concentration ± 20 mg/L (u	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	15.0	14.5	14.5	14.5
DO (mg/L)	9.8	10.1	10.3	10.2	10.0	10.1	10.2	9.9	10.2	10.1	10.0	10.1	10.0	10.1
pH	8.0	8.3	8.1	8.3	8.0	8.2	8.0	8.2	8.0	8.1	8.1	8.3	8.0	8.3
Cond. (µS/cm)	759		770		769		771		773		772		770	
Initials	MM		MM		MM		A		MM		MM		MM	

LC-LCDSSLCC Concentration ± 20 mg/L (u	Days													
	14		15		16		17		18		19		20	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.0	13.5	13.0	13.5	14.5	14.5	14.0	14.5	14.0	14.5	15.0	14.5	14.5	14.5
DO (mg/L)	9.9	10.1	10.3	10.2	10.0	10.1	10.1	9.8	10.1	10.0	9.9	10.1	10.0	10.1
pH	8.0	8.3	8.1	8.3	8.0	8.2	8.0	8.2	8.0	8.1	8.1	8.3	8.1	8.3
Cond. (µS/cm)	912		951		950		946		940		949		940	
Initials	MM		MM		MM		A		A		MM		MM	

Thermometer: CER#3 **DO meter:** 213 / 213 (LC-DCDS probe) **pH meter:** 213 / 213 (probe) **Conductivity meter:** 213 / 213 (probe)

	~~Control~~	LC-LC3	LC-LC5	LC-LCDSSLCC
Hardness*	400	620	440	500
Alkalinity*	154	238	200	204

* mg/L as $CaCO_3$

Analysts: AWD, YM

Reviewed by: [illegible]

Date reviewed: Jan. 24, 2020

Sample Description: LC-LC3 - clear, yellow, no odour, no particulates
LC-DCDS, LC-LC5, LC-LCDSSLCC - clear, no colour, no odour, no particulates

Comments: Used stock soln 19CU02 (100 mg/L (u)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

CONT Concentration	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	10.0	9.9	10.3	9.8	10.3	10.2	10.3	10.1	10.2	10.1	9.8	10.0
pH	7.0	7.1	7.0	6.9	6.8	7.1	6.5	6.9	6.9	6.8	6.8	6.7	6.9	6.8
Cond. (µS/cm)	29		28		28		28		28		29		28	
Initials	MM		MM		[illegible]		MM		MM		MM		MM	

FR-VFR1 Concentration +20 µg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.1	10.0	10.1	9.8	10.1	10.1	10.1	10.1	10.0	10.0	9.8	10.1
pH	7.9	8.1	7.8	8.1	7.9	8.1	7.7	7.9	7.7	7.9	7.8	7.9	7.8	8.0
Cond. (µS/cm)	350		353		351		346		347		350		352	
Initials	MM		MM		MD		MM		MM		MM		MM	

GH-ER2 Concentration +20 µg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.2	10.0	10.2	9.9	10.2	10.1	10.1	10.0	9.9	10.0	9.8	10.1
pH	8.0	8.2	7.9	8.1	7.9	8.1	7.8	7.9	7.8	8.0	7.9	8.1	7.9	8.2
Cond. (µS/cm)	314		310		308		308		308		311		313	
Initials	MM		MM		MD		MM		MM		MM		MM	

CM-MC1 Concentration +20 µg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.2	10.2	10.0	10.2	9.9	10.2	10.2	10.2	10.0	9.8	10.1	9.9	10.0
pH	7.9	8.2	7.7	8.1	7.7	8.2	7.7	8.0	7.7	8.0	7.8	8.0	7.9	8.2
Cond. (µS/cm)	286		288		288		284		285		282		287	
Initials	MM		MM		MD		MM		MM		MM		MM	

Thermometer: CER#3 DO meter: 213 (probe) | 213 pH meter: 213 (probe) | 213 Conductivity meter: 213 (probe) | 213

	Control	FR-VFR1	GH-ER2	CM-MC1
Hardness*	8	230	280	250
Alkalinity*	6	152	160	150

* mg/L as CaCO3

Analysts: AWD, MD, MM
Reviewed by: [signature]
Date reviewed: Jan. 24, 2020

Sample Description: FR-VFR1, GH-ER2, CM-MC1 - clear, no colour, no odour, no particulates

Comments: used stock soln 19CU02 (100 mg/L Cu)

PG 14/20

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

LC-SLC Concentration + 20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	10.0	10.2	10.0	10.2	10.0	10.2	10.1	10.2	10.0	10.0	10.1	9.7	10.1
pH	7.9	8.2	7.9	8.1	7.9	8.1	7.8	8.0	7.8	8.0	7.9	8.1	7.9	8.2
Cond. (µS/cm)	387		390		384		385		386		389		384	
Initials	MM		MM		MD/A		MM		MM		MM		MM	

FR-FRABCH Concentration + 20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	10.1	10.0	10.2	9.8	10.2	10.1	10.1	10.1	9.8	10.2	9.8	10.0
pH	7.8	8.2	7.8	8.2	8.0	8.1	7.8	8.0	7.8	8.0	7.9	8.1	7.9	8.2
Cond. (µS/cm)	1057		1051		1032		1033		1034		1040		1050	
Initials	MM		MM		MD/A		MM		MM		MM		MM	

FR-FRCP1 Concentration + 20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	10.1	10.1	10.3	10.1	10.2	10.2	10.2	10.2	9.8	10.1	9.8	10.0
pH	7.9	8.3	8.0	8.3	8.0	8.2	7.8	8.1	7.8	8.2	7.9	8.3	7.9	8.2
Cond. (µS/cm)	1282		1743①		1718		1723		1723		1721		1725	
Initials	MM		MM		MD/A		MM		MM		MM		MM	

GH-FR1 Concentration + 20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	10.1	10.1	10.0	10.2	9.9	10.1	10.2	10.1	10.1	9.9	10.1	9.8	10.0
pH	8.1	8.3	8.1	8.3	8.1	8.2	8.0	8.2	8.0	8.2	8.0	8.4	8.0	8.3
Cond. (µS/cm)	867		831		824		817		817		820		821	
Initials	MM		MM		A		MM		MM		MM		MM	

Thermometer: CER#3 **DO meter:** 213 / 213 (probe: LC-SLC) **pH meter:** 213/213 (probe) **Conductivity meter:** 213/213 (probe)

	~~Control~~	FR-FRABCH	FR-FRCP1	GH-FR1
Hardness*	320	750	990	550
Alkalinity*	150	242	286	214

* mg/L as CaCO3

Analysts: AWD, MD, MM

Reviewed by: [signature]

Date reviewed: Jan. 24, 2020

Sample Description: LC-SLC, FR-FRABCH, FR-FRCP1, GH-FR1 - clear, no colour, no odour, no particulates

Comments: ① confirmed w/ 2nd t-meter; used stock soln 19/002 (100 mg/L Cu)

13-15/20

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

GH-ERC Concentration +20 µg/L Cu

	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	10.1	10.3	10.0	10.1	9.8	10.1	10.1	10.1	10.0	9.9	10.2	9.9	10.1
pH	8.0	8.3	7.9	8.3	7.7	8.2	7.8	8.0	7.8	8.1	7.9	8.2	7.8	8.2
Cond. (µS/cm)	357		370		369		369		370		368		372	
Initials	MM		MM		MD/A		MM		MM		MM		MM	

CM_MC2 Concentration +20 µg/L Cu

	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.8	10.1	10.2	9.9	10.1	9.8	10.2	10.1	10.2	10.0	9.9	10.2	10.0	10.0
pH	8.1	8.0	8.1	8.3	8.1	8.2	8.0	8.1	8.0	8.2	8.0	8.3	8.0	8.2
Cond. (µS/cm)	1076		1053		1037		1033		1033		1035		1034	
Initials	MM		MM		MD/A		MM		MM		MM		MM	

EV_MC2 Concentration +20 µg/L Cu

	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	10.1	10.2	10.0	10.2	9.8	10.2	10.2	10.2	9.9	10.0	10.1	10.0	10.2
pH	8.0	8.3	8.0	8.3	7.9	8.2	7.9	8.2	7.9	8.2	8.0	8.3	7.9	8.2
Cond. (µS/cm)	613		569		562		556		556		568		561	
Initials	MM		MM		MD/A		MM		MM		MM		MM	

EV_HC1 Concentration +20 µg/L Cu

	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.2	9.9	10.1	10.0	10.2	10.1	10.2	10.0	9.9	10.1	9.9	10.1
pH	8.1	8.3	8.1	8.3	8.0	8.2	8.0	8.2	8.0	8.2	8.0	8.4	8.0	8.2
Cond. (µS/cm)	772		759		750		759		757		756		752	
Initials	MM		MM		MD/A		MM		MM		MM		MM	

Thermometer: CERB **DO meter:** 2/3 2/3 (probe) **pH meter:** 2/3 2/3 (probe) **Conductivity meter:** 2/3 2/3 (probe)

	~~Control~~ GH-ERC	CM_MC2	EV_MC2	EV_HC1
Hardness*	370	700	420	520
Alkalinity*	160	222	186	208

* mg/L as CaCO3

Analysts: AWD, MD, MM
Reviewed by: [signature]
Date reviewed: Jan 24, 2020

Sample Description: GH-ERC, CM_MC2, EV_MC2, EV_HC1 – clear, no colour, no odour, no particulates

Comments: used stock soln 19Cu02 (100 mg/L Cu)

PG 16/20

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

LC-DCDS Concentration ± 20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	10.2	10.0	10.2	9.9	10.1	10.2	10.1	10.0	9.9	10.1	9.9	10.0
pH	8.0	8.1	8.1	8.2	8.0	8.2	7.9	8.0	8.0	8.0	8.0	8.2	8.0	8.0
Cond. (µS/cm)	770		774		764		764		765		770		771	
Initials	MM		MM		MD/A		MM		MM		MM		MM	

LC_LC3 Concentration ± 20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.2	10.2	10.0	10.1	10.0	10.1	10.2	10.1	10.0	9.8	10.1	9.9	10.1
pH	8.0	8.3	8.0	8.3	8.0	8.2	8.0	8.2	8.0	8.1	8.2	8.3	8.1	8.1
Cond. (µS/cm)	1170		1182		1165		1160		1157		1181		1182	
Initials	MM		MM		MD/A		MM		MM		MM		MM	

LC-LCS Concentration ± 20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.2	10.1	9.8	10.2	9.8	10.2	10.1	10.2	10.1	9.9	10.1	10.0	10.1
pH	8.1	8.3	8.2	8.3	8.1	8.2	8.1	8.2	8.1	8.2	8.2	8.3	8.2	8.2
Cond. (µS/cm)	760		770		754		763		760		760		762	
Initials	MM		MM		MD/A		MM		MM		MM		MM	

LC-LCDSSLCC Concentration ± 20 mg/L Cu	Days													
	21		22		23		24		25		26		27	
	new	old	new	old	new	old	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.2	10.0	10.2	10.0	10.2	10.2	10.2	10.1	9.9	10.2	10.0	10.1
pH	8.1	8.3	8.2	8.4	8.1	8.3	8.1	8.2	8.1	8.2	8.1	8.3	8.1	8.1
Cond. (µS/cm)	932		930		915		911		911		912		911	
Initials	MM		MM		A		MM		MM		MM		MM	

Thermometer: CER#3 **DO meter:** 213 / 213 (probe) **pH meter:** 213 / 213 (probe) **Conductivity meter:** 213 / 213 (probe)

	~~Control~~ LC_DCDS	LC_LC3	LC_LCS	LC_LCDSSLCC
Hardness*	650	850	560	550
Alkalinity*	160	228	194	204

Analysts: AWD, MD, MM

Reviewed by:

Date reviewed: Jan-24, 2020

* mg/L as $CaCO_3$

Sample Description: LC_LC3 - clear, no colour, no odour, no particulates
LC_DCDS, LC_LCS, LC_LCDSSLCC - clear, no colour, no odour, no particulates

Comments: used stock soln 19Cu02 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

AS 17/20

Client: Teck
Sample ID: (various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

CONT Concentration	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	13.0	14.5	14.5	14.5		14.5								
DO (mg/L)	10.1	10.2	10.1	10.2		10.0								
pH	6.9	6.8	6.8	6.8		6.9								
Cond. (µS/cm)	28		27		30									
Initials	YM		YM		YM									

FR_UFR1 Concentration + 20 µg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5		14.5								
DO (mg/L)	10.0	10.1	10.2	10.1		10.1								
pH	7.8	7.9	8.0	8.0		8.0								
Cond. (µS/cm)	350		350		353									
Initials	YM		YM		YM									

GH-ER2 Concentration + 20 µg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5		14.5								
DO (mg/L)	9.9	10.1	10.1	10.1		10.1								
pH	7.9	8.1	8.0	8.1		8.0								
Cond. (µS/cm)	311		316		319									
Initials	YM		YM		YM									

CM_MCI Concentration + 20 µg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5		14.5								
DO (mg/L)	9.9	10.0	10.2	10.2		10.0								
pH	7.9	8.1	8.0	8.1		8.0								
Cond. (µS/cm)	287		288		290									
Initials	YM		YM		YM									

Thermometer: CER#3 **DO meter:** YM ~~313~~ 313 probe **pH meter:** YM ~~313~~ 313 probe **Conductivity meter:** YM ~~313~~ 313 probe

	Control	FR_UFR1	GH-ER2	CM_MCI
Hardness*	10	186	172	174
Alkalinity*	7	150	148	140

* mg/L as CaCO3

Analysts: YM
Reviewed by: [signature]
Date reviewed: Jan-24, 2020

Sample Description: FR_UFR1, GH-ER2, CM_MCI - clear, no colour, no odour, no particulates

Comments: used stock soln 19Cu02 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

RS 19/20

Client: Teck
Sample ID: (various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

LC-SLC Concentration ± 20 ug/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5	\	14.5								
DO (mg/L)	10.0	10.1	9.9	10.1	\	10.0								
pH	7.9	8.1	8.0	8.1	\	8.1								
Cond. (µS/cm)	386		393		396									
Initials	MM		MM		MM									

FR_FRABCH Concentration ± 20 ug/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5	\	14.5								
DO (mg/L)	10.0	10.1	10.0	10.1	\	10.0								
pH	7.9	8.2	8.0	8.2	\	8.2								
Cond. (µS/cm)	1034		1068		v 9 1026									
Initials	MM		MM		MM									

FR_FRCP1 Concentration ± 20 ug/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5	\	14.5								
DO (mg/L)	9.8	10.1	10.0	10.2	\	10.0								
pH	7.8	8.2	8.0	8.2	\	8.2								
Cond. (µS/cm)	1720		1334®		1449									
Initials	MM		MM		MM									

GM-FR1 Concentration ± 20 ug/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5	\	14.5								
DO (mg/L)	9.9	10.1	10.0	10.2	\	9.9								
pH	8.1	8.4	8.0	8.4	\	8.4								
Cond. (µS/cm)	819		879		846									
Initials	MM		MM		MM									

Thermometer: CER#3 DO meter: 3 (LC-SLC probe) 3 pH meter: 3 (probe) 3 Conductivity meter: 3 (probe)

	~~Control~~	FR_FRABCH	FR_FRCP1	GM-FR1
Hardness*	220	670	850	570
Alkalinity*	138	222	224	198

* mg/L as CaCO3

Analysts: MM

Reviewed by: [signature]
Date reviewed: Jan 24, 2020

Sample Description: LC-SLC, FR_FRABCH, FR_FRCP1, GM-FR1 - clear, no colour, no odour, no particulates

Comments: ® confirmed w/ 2nd (-meter.); used stock soln 19Cu02 (100 mg/L Cu)

P3/19/20

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

GH-ERC Concentration + 20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5	\	14.5								
DO (mg/L)	10.1	10.2	9.9	10.1	\	9.9								
pH	7.8	8.2	7.9	8.3	\	8.2								
Cond. (µS/cm)	370		371		384									
Initials	YM		YM		YM									

CM-MC2 Concentration + 20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5	\	14.5								
DO (mg/L)	10.2	10.1	10.1	10.1	\	10.1								
pH	8.0	8.3	8.0	8.3	\	8.3								
Cond. (µS/cm)	YM ~~370~~ 1036		1034		1038									
Initials	YM		YM		YM									

EV-MC2 Concentration + 20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5	\	14.5								
DO (mg/L)	9.9	10.1	9.9	10.2	\	10.0								
pH	7.9	8.3	8.0	8.3	\	8.2								
Cond. (µS/cm)	YM ~~1057~~ 582		604		582									
Initials	YM		YM		YM									

EV-HC1 Concentration + 20 mg/L Cu	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5	\	14.5								
DO (mg/L)	10.0	10.0	10.0	10.2	\	10.1								
pH	8.0	8.3	8.1	8.3	\	8.3								
Cond. (µS/cm)	749		762		764									
Initials	YM		YM		YM									

Thermometer: CER#3 **DO meter:** 3/3 probe **pH meter:** 3/3 probe **Conductivity meter:** 3/3 probe

	GH-ERC ~~Control~~	CM-MC2	EV-MC2	EV-HC1
Hardness*	188	590	360	500
Alkalinity*	154	208	168	188

* mg/L as $CaCO_3$

Analysts: YM

Reviewed by: [signature]

Date reviewed: Jan. 24, 2020

Sample Description: ~~GH-ERC~~, CM-MC2, EV-MC2, EV-HC1 - clear, no colour, no odour, no particulates.

Comments: Used stock soln 19CU02 (100 mg/L Cu)

Embryo-Alevin Freshwater Toxicity Test
Initial and Final Water Quality Measurements

RJ 20/20

Client: Teck
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

LC-DCDS Concentration ± 20 mg/L Cu

	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5		14.5								
DO (mg/L)	10.0	10.2	10.1	10.1		10.2								
pH	8.0	8.0	8.0	8.2		8.2								
Cond. (µS/cm)	764		781		7892									
Initials														

LC-LC3 Concentration ± 20 mg/L Cu

	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5		14.5								
DO (mg/L)	9.9	10.1	10.0	10.1		10.0								
pH	8.1	8.2	7.9	8.2		8.3								
Cond. (µS/cm)	1184		1306 ①		1257									
Initials														

LC-LC5 Concentration ± 20 mg/L Cu

	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5		14.5								
DO (mg/L)	10.0	10.2	10.0	10.1		10.0								
pH	8.1	8.3	8.1	8.3		8.34								
Cond. (µS/cm)	7961		772		774									
Initials														

LC-LCDSSLCC Concentration ± 20 mg/L Cu

	Days													
	28		29		30 final									
	new	old	new	old	new	~~old~~	new	old	new	old	new	old	new	old
Temperature (°C)	14.5	14.5	14.0	14.5		14.5								
DO (mg/L)	10.0	10.1	9.9	10.1		10.2								
pH	8.1	8.3	8.1	8.3		8.4								
Cond. (µS/cm)	917		983		959									
Initials														

Thermometer: CE#3 **DO meter:** 313 probe **pH meter:** 313 probe **Conductivity meter:** 313 probe

	LC-DCDS ~~Control~~	LC-LC3	LC-LC5	LC-LCDSSLCC
Hardness*	490	760	450	490
Alkalinity*	144	210	180	186

* mg/L as $CaCO_3$

Analysts:
Reviewed by:
Date reviewed: Jan 24, 2020

Sample Description: LC-LC3 - clear, yellow, no odour, no particulates
LC-DCDS, LC-LC5, LC-LCDSSLCC - clear, no colour, no odour, no particulates.

Comments: ① confirmed w/ 2nd C-meter; used stock soln 19CU02 (100 mg/L Cu)

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: (various)
Work Order #: 192275

Start Date & Time: November 13 2019 @ 1450h
Stop Date & Time: December 13 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

~~Concentration~~ Sample ID	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		1	2	3	4	5	6	7	8	9	10	11	12	
Control	1	0	0	0	0	13	9 5	5	0	0	1	0	1	25
	2	↓	↓	↓	↓	0	0	0	1	↓	0	↓	0	0
	3	↓	↓	↓	↓	↓	1 0	1	↓	↓	↓	↓	↓	1
	4	↓	↓	↓	↓	↓	0	0	1	↓	↓	↓	↓	1
FR_UFR1	1	↓	↓	↓	↓	7	4	2	0	↓	↓	↓	2	15
+ 20 µg/L Cu	2	↓	↓	↓	↓	0	0	0	↓	↓	↓	↓	0	0
	3	↓	↓	↓	↓	↓	0	↓	↓	↓	↓	↓	↓	0
	4	↓	↓	↓	↓	↓	0	↓	↓	↓	↓	↓	↓	0
GH-ER2	1	↓	↓	↓	↓	6	4	3	↓	↓	↓	↓	↓	13
+ 20 µg/L Cu	2	↓	↓	↓	↓	0	0	0	↓	↓	↓	↓	↓	0
	3	↓	↓	↓	↓	↓	↓	1 0	↓	↓	↓	1	↓	0
	4	↓	↓	↓	↓	↓	↓	1	↓	↓	↓	1	↓	2
GH_MCl	1	↓	↓	↓	↓	12	1	1	↓	↓	↓	1	↓	15
+ 20 µg/L Cu	2	↓	↓	↓	↓	0	0	0	↓	↓	↓	0	↓	0
	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	↓	1
	4	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	0	↓	1
LC-SLC	1	↓	↓	↓	↓	6	6	↓	0	↓	0	1	↓	13
+ 20 µg/L Cu	2	↓	↓	↓	↓	0	0	↓	↓	↓	1	0	↓	1
	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	0	↓	↓	0
	4	↓	↓	↓	↓	↓	↓	1	↓	↓	1	↓	↓	2
FR_FRABCH	1	↓	↓	↓	↓	12	7	0	1	1	0	↓	3	24
+ 20 µg/L Cu	2	↓	↓	↓	↓	0	0	↓	2	0	1	↓	0	3
	3	↓	↓	↓	↓	↓	↓	↓	0	↓	0	↓	↓	0
	4	↓	↓	↓	↓	↓	↓	↓	2	↓	2	↓	↓	4
FR_FRCP1	1	↓	↓	↓	↓	12	1	1	1	↓	0	1	↓	15
+ 20 µg/L Cu	2	↓	↓	↓	↓	0	0	0	0	↓	↓	2	1	3
	3	↓	↓	↓	↓	↓	0	↓	↓	↓	↓	0	0	0
	4	↓	↓	↓	↓	↓	0	↓	↓	↓	↓	0	2	2
GH-FR1	1	↓	↓	↓	↓	13	3	2	↓	1	↓	0	5	20
+ 20 µg/L Cu	2	↓	↓	↓	↓	0	0	1	1	0	3	2	1	8
	3	↓	↓	↓	↓	↓	0	0	0	0	0	0	0	0
	4	↓	↓	↓	↓	↓	1	1	0	1	4	1	4	12
Tech Initials		MM	MM	MM	AL	MM	MM	ML	MM	MM	MM	AL	MM	MM

Comments: _____

Reviewed by: _____ **Date reviewed:** Jan. 24, 2020

Embryo-Alevin Toxicity Test
Daily Mortality

13216

Client: Teck
Sample ID: (various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

~~Concentration~~ Sample ID	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		1	2	3	4	5	6	7	8	9	10	11	12	
GH-ERC	1	0	0	0	0	15	1	2	0	0	0	0	0	18
+ 20 mg/L Cu	2	"	"	"	"	0	0	0	"	"	"	0	1	0
	3	"	"	"	"	"	"	"	"	"	"	1	"	1
	4	"	"	"	"	"	"	"	"	"	"	0	"	0
CM_MC2	1	"	"	"	"	8	4	3	"	1	1	0	3	21
+ 20 mg/L Cu	2	"	"	"	"	0	0	0	"	0	2	0	4	6
	3	"	"	"	"	"	"	"	"	0	0	0	1	1
	4	"	"	"	"	"	"	"	1	2	0	0	1	4
EV_MC2	1	"	"	"	"	11	3	3	0	0	1	0	2	20
+ 20 mg/L Cu	2	"	"	"	"	0	0	0	1	"	3	0	1	5
	3	"	"	"	"	"	0	"	0	"	0	0	0	0
	4	"	"	"	"	"	1	"	1	"	2	2	0	6
EV_HCl	1	"	"	"	"	6	5	3	0	"	0	0	1	15
+ 20 mg/L Cu	2	"	"	"	"	0	0	0	1	"	1	0	1	3
	3	"	"	"	"	"	"	0	0	"	1	0	"	2
	4	"	"	"	"	"	"	1	0	"	1	0	0	2
LC_DCDS	1	"	"	"	"	14	4	0	0	1	2	1	1	23
+ 20 mg/L Cu	2	"	"	"	"	0	0	1	2	0	2	2	0 ~~1~~	7
	3	"	"	"	"	"	"	"	0	1	0	0	0	2
	4	"	"	"	"	"	"	0	"	1	4	1	2	8
LC_LC3	1	"	"	"	"	12	"	0	"	0	1	0	1	14
+ 20 mg/L Cu	2	"	"	"	"	0	"	2	"	1	1	0	0	4
	3	"	"	"	"	"	"	0	"	0	0	0	"	0
	4	"	"	"	"	"	"	"	"	"	"	0	"	1
LC_LC5	1	"	"	"	"	9	1	"	"	"	4	0	1	15
+ 20 mg/L Cu	2	"	"	"	"	0	0	"	"	"	0	0	1	1
	3	"	"	"	"	"	"	"	"	"	0	0	0	0
	4	"	"	"	"	"	"	"	"	"	1	0	0	3
LC_LCDSSLCC	1	"	"	"	"	15	3	~~0~~ 1	1	1	0	0	0	~~20~~ 21
+ 20 mg/L Cu	2	"	"	"	"	0	0	0	0	0	4	0	1	5
	3	"	"	"	"	"	0	0	"	0	0	0	0	0
	4	"	"	"	"	"	1	1	"	"	0	1	0	4
Tech Initials		MM	MM	MM	[illegible]	MM	CM	MM	MM	MM	MM	[illegible]	MM	CM

Comments:

Reviewed by: [signature] **Date reviewed:** Jan-24, 2020

Embryo-Alevin Toxicity Test
Daily Mortality

pg. 3/6

Client: Teck
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

~~Concentration~~ Sample ID	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		13 ①	14	15	16	17	18	19	20	21	22	23	24	
control	1	0	0	1	0	0	0	0	0	0	0 ②	0	0	1
	2	↓	↓	0	↓	0	↓	↓	↓ ②	↓	↓ ③	↓	↓	0
	3	↓	↓	↓	↓	0	↓	↓	↓	↓	↓	↓ ② ③	↓	0
	4	↓	↓	↓	↓	0	↓	↓	↓	1	↓ ②	↓ ①	↓	1
FR_UFR1	1	↓	↓	↓	↓	0	↓	1	↓	↓	2 ②	↓ ③	↓	5
+ 20 ug/L Cu	2	↓	↓	↓	↓	↓	↓	0	1	0	0 ②	↓ ③	0	1
	3	↓	↓	↓	↓	↓	↓	↓	0	↓ ②	↓ ③	1	2	3
	4	↓	↓	↓	1	↓	↓	↓	↓	↓	↓ ②	0 ③	0	1
GH-ER2	1	↓	↓	↓	1	↓	↓	↓	↓	↓	2 ②	0 ③	↓	3
+20 ug/L Cu	2	↓	↓	↓	0	↓	↓	↓	↓	↓	1 ② ③	1	↓	2
	3	↓	↓	↓	↓	↓	↓	↓	↓	↓ ②	0 ③	0	↓	0
	4	↓	↓	↓	↓	↓	↓	↓	↓	↓	1 ②	0	↓	1
CaLMCl	1	↓	↓	↓	↓	↓	↓	↓	2	↓	1 ②	1 ③	↓	4
+20 ug/L Cu	2	↓	↓	↓	↓	↓	↓	↓	0	↓ ②	0 ③	1	↓	1
	3	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓ ② ③	0	↓	0
	4	↓	↓	↓	↓	↓	↓	↓	↓	↓	↓ ②	0 ③	↓	2
LC-SLC	1	2	↓	↓	↓	↓	1	2	1	↓	2 ②	1 ③	0	9
+20 ug/L Cu	2	0	↓	↓	↓	↓	0	0	0	↓ ②	1 ③	0	0	1
	3	↓	↓	↓	↓	↓	↓	1	↓	↓ ②	0 ③	↓	0	1
	4	↓	↓	↓	1	↓	↓	0	↓	↓	0 ①	↓ ③	1	2
FR_FRABCH	1	1	↓	↓	0	1	↓	1	↓	↓ ②	1 ③	↓	0	4
+20 ug/L Cu	2	0	↓	↓	1	1	0	0	1	1 ②	0 ③	↓	↓	4
	3	0	↓	↓	0	0	↓	↓	0	1 ②	0 ③	1	↓	2
	4	1	↓	↓	0	↓	↓	↓	0	0 ②	1 ③	0	1	3
FR_FRCP1	1	0	↓	1	1	↓	2	1	0	1 ②	1	1 ③	2	9
+20 ug/L Cu	2	3	↓	0	0	1	0	0	1	↓ ②	0 ③	0	0	4
	3	0	↓	2	↓	1	↓	0	0	↓ ②	1 ③	1	1	5
	4	↓	↓	0	↓	0	↓	1	0	1 ②	0 ③	0	↓	2
GH-FR1	1	↓	↓	1	↓	↓	↓	0	1	1	1 ②	1 ③	1	7
+ 20 ug/L Cu	2	↓	↓	2	↓	↓	0	↓	0	0 ②	0 ③	0	0	2
	3	↓	↓	1	2	↓	↓	↓	2	↓ ②	↓ ③	1	1	7
	4	↓	1	1	0	↓	↓	1	0	↓	↓ ②	0 ③	0	3
Tech Initials		MM	MM	MM	MM	AR	MM	MM	MM	MM	M	MM	AR	MM

Comments: ① at eyed stage ② starting to hatch ③ >50% hatched

Reviewed by: _____ **Date reviewed:** Jan-24, 2020

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

~~Concentration~~ Sample ID	Rep	Day of Test - No. of Mortalities												Total Dead Eggs/Embryos/ Alevins
		13 (1)	14	15	16	17/18	18/7	19	20	21	22	23	24	
GH-ERC	1	0	0	0	0	1	0	0	2	0	(2)2	0	0 (3)	5
+20 ug/L Cu	2	|	|	|	|	0	|	|	0	|	(2)2	| (3)	1	3
	3	|	|	|	|	|	|	|	1	(2)	(3)1	|	1	2
	4	↓	|	|	↓	|	|	|	|	↓ (2)	(3)0	↓	0	0
CM-MC2	1	|	|	|	2	|	|	|	↓	|	(2)0	3	| (3)	7
+20 ug/L Cu	2	|	|	|	0	|	|	|	1	(2)	(3)0	1	|	3
	3	1	|	|	|	|	|	|	0	|	2(3)	2	↓	5
	4	0	|	↓	|	|	|	|	0 (2)	|	(2)(3)	1	|	4 dead x2.
EV-MC2	1	|	|	1	↓	|	|	|	2	| (2)	1 (3)	1	0	6
+20 ug/L Cu	2	0	|	|	1	|	|	|	0	| (2)	0 (3)	1	|	3
	3	1	↓	0	0	↓	|	|	|	| (2)	1 (3)	1	|	3
	4	0	1	|	1	2	|	|	↓	↓ (2)	2 (3)	0	|	5
EV-HCl	1	|	0	|	|	3	|	|	1	1 (2)	0 (3)	1	|	6
+20 ug/L Cu	2	↓	|	|	|	|	|	↓	1	1 (2)	0 (3)	0	↓	3
	3	1	|	|	|	0	↓	2	1 (2)	0	1 (3)	|	1	6
	4	1	|	|	|	|	1	0	0	| (2)	0 (3)	|	0	2
LC-DCDS	1	0	|	|	|	|	0	0	|	| (2)	|	↓	|	0
+20 ug/L Cu	2	|	↓	|	|	4	|	|	|	↓ (2)	| (3)	1	↓	2
	3	↓	1	|	|	1	|	0	↓ (2)	2	↓ (3)	0	1	5
	4	1	1	↓	|	1	|	|	1	0 (2)	1	x (3)	0	5
LC-LC3	1	0	1	1	|	0	↓	|	1	1 (2)	0	|	↓	1	5
+20 ug/L Cu	2	|	0	0	|	|	1	↓	1	0 (3)	|	|	↓	0	2
	3	↓	1	|	|	↓	0	2	0 (2)	|	| (3)	2 (3)	1	6
	4	1	1	|	↓	1	0	0	|	↓	|	| (3)	0 (3)	0	3
LC-LC5	1	0	1	↓	2	2	0	|	↓	1 (2)	|	|	↓	0	6
+20 ug/L Cu	2	|	1	1	0	1	1	|	2	0 (2)	|	|	↓	1	7
	3	|	0	1	|	0	0	|	0	2	↓ (3)	1 (3)	0	0	4
	4	|	0	1	↓	0	2	|	|	1	1 (2)	0 (3)	0	0	5
LC-LCDSSLCC	1	|	1	0	|	|	0	|	|	i *	0 (2)	|	|	0	4
+20 ug/L Cu	2	|	0	|	0	0	0	|	↓	0 (2)	0 (3)	|	|	1	1
	3	|	|	|	|	|	0	|	1	| (2)	2 (3)	|	|	0	3
	4	↓	↓	↓	↓	↓	0	↓	|	↓ (2)	0 (3)	↓	0	0	1
Tech Initials		MM	MM	MM	MM	MM	A	MM	MM	MM	M	MM	A	MM

Comments: (1) at eyed stage (2) starting to hatch (3) > 50% hatched

Reviewed by: MM **Date reviewed:** Jan. 24, 2020

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teek
Sample ID: (Various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

~~Concentration~~ Sample ID	Rep	Day of Test - No. of Mortalities							Total Dead Embryos/ Alevins	Total Undeveloped/ Unhatched (Abnormal Alevins)	Total No. Alevins- normal	Total Exposed Eggs
		25	26	27	28	29	30	day 25-30 Total Dead				
Control	1	0	0	0	2	1	1	4	30	0	0	30
	2	1	0	1	0	0	0	0	0	0	30	30
	3	↓	1	↓	↓	↓	2	3	4	1	25	30
	4	3	0	↓	↓	↓	0	3	5	0	25	30
FR-UFR1	1	1	↓	3	↓	↓	↓	4	24	0	5	29
+20 mg/L Cu	2	0	↓	0	↓	↓	↓	0	1	0	29	30
	3	1	↓	2	↓	↓	↓	2	5	3	22	30
	4	↓	↓	1	↓	↓	↓	1	2	1	27	30
GH-ER2	1	2	↓	1	↓	↓	↓	3	19	4	7	30
+20 mg/L Cu	2	0	↓	0	3	↓	↓	3	5	0	25	30
	3	↓	↓	↓	0	↓	↓	0	0	3	27	30
	4	↓	↓	↓	↓	↓	↓	0	3	1	26	30
CHL-MCI	1	2	1	↓	↓	↓	↓	3	22	2	6	30
+20 mg/L Cu	2	0	0	1	↓	↓	↓	1	2	0	28	30
	3	0	↓	0	1	↓	1	2	3	4	23	30
	4	1	↓	↓	0	↓	2	4	7	3	20	30
LC-SLC	1	1	↓	0	↓	↓	0	1	23	3	5	31
+20 mg/L Cu	2	0	↓	↓	↓	↓	0	0	2	0	28	30
	3	↓	↓	↓	↓	↓	1	1	2	4	24	30
	4	↓	↓	1	↓	↓	2	3	7	1	21	29
FR-FRABCH	1	↓	↓	0	↓	↓	0	0	28	1	1	30
+20 mg/L Cu	2	↓	↓	↓	↓	↓	3	3	10	0	20	30
	3	↓	↓	↓	1	↓	12*	2	4	2	23	29
	4	1	↓	↓	0	↓	0	1	8	1	21	30
FR-FRCP1	1	1	↓	↓	↓	↓	↓	1	25	2	3	30
+20 mg/L Cu	2	0	↓	↓	↓	↓	↓	0	7	0	23	30
	3	↓	↓	↓	↓	↓	↓	0	5	3	21	29
	4	↓	↓	↓	↓	↓	↓	1	5	1	24	30
GH-FR1	1	↓	↓	↓	↓	↓	↓	0	27	1	1	29
+20 mg/L Cu	2	↓	1	↓	↓	↓	↓	1	11	0	20	31
	3	↓	0	↓	↓	↓	↓	0	7	3	18	28
	4	↓	0	1	↓	↓	↓	1	16	1	13	30
Tech Initials												

Comments: See "Rainbow Trout Embryo-Alevin Toxicity Test – Overall Results" for detailed normality assessments

Reviewed by: _____ **Date reviewed:** Jan. 24, 2020

Embryo-Alevin Toxicity Test
Daily Mortality

Client: Teck
Sample ID: (various)
Work Order #: 192275

Start Date & Time: November 13, 2019 @ 1450h
Stop Date & Time: December 13, 2019 @ 0940h
Test Species: *Oncorhynchus mykiss*

~~Concentration~~ Sample ID	Rep	Day of Test - No. of Mortalities							Total Dead Embryos/ Alevins	Total Undeveloped/ Unhatched (Abnormal Alevins)	Total No. Alevins (normal)	Total Exposed Eggs
		25	26	27	28	29	30	Day 25-30 Total Dead				
GH-ERC	1	1	0	0	0	1	0	2	25	2	~~28~~ 3	30
+ 20 ug/L Cu	2	0	1	1	1	0	1	2	5	0	~~30~~ 25	30
	3	1	1	0	0	1	1	1	4	3	~~25~~ 22	29
	4	0	↓	0	0	↓	↓	0	0	1	29	30
CM-MC2	1	0	2	—	—	—	—	2	30	0	0	30
+ 20 ug/L Cu	2	1	0	1	0	0	0	2	11	0	19	30
	3	0	1	0	1	1	1	1	7	3	20	30
	4	0	1	1	1	1	0	0	~~26~~ 26	3	21	~~29~~ 30
EV_MC2	1	2	1	1	1	1	1	2	28	0	2	30
+ 20 ug/L Cu	2	0	↓	1	1	1	1	1	9	1	20	30
	3	1	1	0	1	1	1	2	5	3	22	30
	4	0	0	0	1	1	1	0	11	1	18	30
EV_HCl	1	1	1	2	1	1	1	2	23	1	6	30
+ 20 ug/L Cu	2	1	1	0	1	1	1	0	6	0	24	30
	3	1	1	1	1	1	1	0	8	2	20	30
	4	↓	1	1	1	1	1	0	4	1	25	30
LC-DCDS	1	1	1	1	1	1	1	1	24	4	1	29
+ 20 ug/L Cu	2	0	↓	1	1	↓	1	0	9	0	22	31
	3	1	1	1	↓	1	1	2	9	6	14	29
	4	1	0	1	1	0	1	1	14	0	18	32
LC-LC3	1	1	1	1	0	1	1	0	19	3	6	28
+ 20 ug/L Cu	2	1	1	1	1	↓	1	0	6	1	25	32
	3	1	1	1	1	1	1	1	7	6	17	30
	4	1	1	1	1	0	1	0	4	0	25	29
LC-LC5	1	1	1	↓	↓	1	1	0	21	1	8	30
+ 20 ug/L Cu	2	↓	1	1	1	1	1	1	9	1	20	30
	3	1	1	0	1	1	1	2	6	8	15	29
	4	0	↓	1	0	1	1	0	8	0	22	30
LC-LCDSSLCC	1	1	1	1	1	1	1	1	~~25~~ 26	2	2	~~29~~ 30
+ 20 ug/L Cu	2	1	0	1	↓	1	1	0	6	0	24	30
	3	↓	0	↓	1	↓	↓	1	4	4	22	30
	4	1	1	↓	0	↓	↓	2	7	0	22	29
Tech Initials		MM	MM	MM	MM	MM	MM	MM	MM	MM	MM	MM

Comments: See "Rainbow Trout Embryo-Alevin Toxicity Test – Overall Results" for detailed normality assessments

Reviewed by: [signature]
Date reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: Control

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
B	1	22.5	✓		
	2	22.0	✓		
	3	21.0	✓		
	4	22.0	✓		
	5	21.0	✓		
	6	22.0	✓		
	7	22.0	✓		
	8	21.5	✓		
	9	22.0	✓		
	10	21.0	✓		
	11	21.0	✓		
	12	21.0	✓		
	13	23.0	✓		
	14	22.0	✓		
	15	22.0	✓		
	16	22.0	✓		
	17	21.0	✓		
	18	22.0	✓		
	19	22.0	✓		
	20	22.0	✓		
	21	22.0	✓		
	22	22.0	✓		
	23	22.5	✓		
	24	21.5	✓		
	25	22.0	✓		
	26	22.0	✓		
	27	22.5	✓		
	28	21.0	✓		
	29	20.5	✓		
	30	22.0	✓		
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 3.08 g

Number of survivors: 30

Number of deformed/have difficulty swimming: 0

Initials: YWL

Reviewed by: [redacted]

Date Reviewed: Jan. 24, 2020

RS.2/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: Teck

Sample ID: Control

Work Order No.: 192275

Start Date: November 13, 2019

Termination Date: December 13, 2019

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
C	1	21.5	✓		
	2	22.0	✓		
	3	21.0	✓		
	4	21.0	✓		
	5	22.5	✓		
	6	21.0	✓		
	7	21.0	✓		
	8	20.5	✓		
	9	21.0	✓		
	10	20.5	✓		
	11	21.0	✓		
	12	21.0	✓		
	13	21.0	✓		
	14	21.5	✓		
	15	22.0	✓		
	16	22.0	✓		
	17	22.0	✓		
	18	21.0	✓		
	19	21.0	✓		
	20	22.0	✓		
	21	21.0	✓		
	22	20.0	✓		
	23	21.0	✓		
	24	21.5	✓		
	25	20.5	✓		
	26	15.5		✓	abnormal growth on body
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.93 g

Number of survivors: 26

Number of deformed/have difficulty swimming: 1 ~~4~~

Initials: [illegible]

Reviewed by: [signature]

Date Reviewed: Jan-24, 2020

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

RS 3/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Start Date: **November 13, 2019**

Sample ID: Control

Termination Date: **December 13, 2019**

Work Order No.: **192275**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
D	1	21.0	✓		
	2	21.0	✓		
	3	21.0	✓		
	4	21.0	✓		
	5	21.0	✓		
	6	20.5	✓		
	7	20.5	✓		
	8	21.0	✓		
	9	21.0	✓		
	10	20.5	✓		
	11	20.0	✓		
	12	21.0	✓		
	13	20.0	✓		
	14	20.5	✓		
	15	21.5	✓		
	16	21.0	✓		
	17	21.0	✓		
	18	21.0	✓		
	19	20.0	✓		
	20	20.5	✓		
	21	20.5	✓		
	22	21.0	✓		
	23	20.5	✓		
	24	20.5	✓		
	25	21.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 232 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 0

Initials: MM

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

RD.4/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Start Date: **November 13, 2019**

Sample ID: FR_UFIR1

Termination Date: **December 13, 2019**

Work Order No.: **192275**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	20.5	✓		
	2	19.5	✓		
	3	20.0	✓		
	4	20.5	✓		
	5	19.5	✓		
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.46 g

Number of survivors: 5

Number of deformed/have difficulty swimming: 0

Initials: MM

Reviewed by: [signature]

Date Reviewed: Jan-24, 2020

P3.5/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR_UFR1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	22.0	✓		
	2	21.0	✓		
	3	22.0	✓		
	4	22.0	✓		
	5	22.0	✓		
	6	22.0	✓		
	7	22.5	✓		
	8	22.5	✓		
	9	23.0	✓		
	10	21.5	✓		
	11	23.0	✓		
	12	22.0	✓		
	13	21.0	✓		
	14	21.0	✓		
	15	22.0	✓		
	16	21.5	✓		
	17	22.0	✓		
	18	22.0	✓		
	19	22.0	✓		
	20	22.0	✓		
	21	22.0	✓		
	22	22.5	✓		
	23	22.0	✓		
	24	20.0	✓		
	25	22.0	✓		
	26	21.5	✓		
	27	22.0	✓		
	28	21.5	✓		
	29	21.5	✓		
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 3.10g

Number of survivors: 29

Number of deformed/have difficulty swimming: 0

Initials: LW

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

RS 6/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR UTR1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	19.0	✓		
	2	21.0	✓		
	3	21.0	✓		
	4	21.5	✓		
	5	22.5	✓		
	6	21.0	✓		
	7	20.5	✓		
	8	21.5	✓		
	9	21.0	✓		
	10	22.0	✓		
	11	22.0	✓		
	12	22.0	✓		
	13	19.0	✓		
	14	22.0	✓		
	15	21.0	✓		
	16	20.5	✓		
	17	20.5	✓		
	18	20.0	✓		
	19	21.0	✓		
	20	21.0	✓		
	21	16.5	✓		
	22	21.5	✓		
	23	18.0		✓	extra growth on body
	24	19.5		✓	abnormal jaw
	25	16.0		✓	scoliosis
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.71 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 3

Initials: LLW

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR-VFR1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	20.0	✓		
	2	21.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	20.5	✓		
	6	20.5	✓		
	7	21.0	✓		
	8	20.0	✓		
	9	19.0	✓		
	10	20.5	✓		
	11	21.0	✓		
	12	20.0	✓		
	13	20.5	✓		
	14	20.0	✓		
	15	21.0	✓		
	16	20.0	✓		
	17	21.0	✓		
	18	20.0	✓		
	19	20.5	✓		
	20	21.0	✓		
	21	20.0	✓		
	22	22.0	✓		
	23	20.5	✓		
	24	18.5	✓		
	25	20.5	✓		
	26	21.0	✓		
	27	20.0	✓		
	28	16.0		✓	abnormal jaw, yolksac edema.
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): ~~2.40g~~ 2.59g

Number of survivors: 28

Number of deformed/have difficulty swimming: 1

Initials: VW

Reviewed by: [signature]

Date Reviewed: Jan 24, 2020

P3.8/62

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Start Date: **November 13, 2019**

Sample ID: GHLER2

Termination Date: **December 13, 2019**

Work Order No.: **192275**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	20.5	✓		
	2	20.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	20.5	✓		
	6	19.0	✓		
	7	19.0	✓		
	8	19.0		✓	facial abnormality - jaw
	9	19.0		✓	bent tail, facial abnormality - jaw
	10	18.5		✓	abnormal eye
	11	19.5		✓	abnormal eyes
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.023

Number of survivors: 11

Number of deformed/have difficulty swimming: 4

Initials: IWL

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

B 9/62

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH_ER2

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	21.0	✓		
	2	19.0	✓		
	3	19.5	✓		
	4	20.0	✓		
	5	19.0	✓		
	6	20.0	✓		
	7	20.0	✓		
	8	21.0	✓		
	9	21.0	✓		
	10	21.0	✓		
	11	19.0	✓		
	12	20.0	✓		
	13	19.0	✓		
	14	20.5	✓		
	15	21.0	✓		
	16	20.0	✓		
	17	19.0	✓		
	18	18.0	✓		
	19	20.0	✓		
	20	19.5	✓		
	21	20.0	✓		
	22	19.5	✓		
	23	20.0	✓		
	24	19.5	✓		
	25	20.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.50 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, YW

Reviewed by: [signature]

Date Reviewed: Jan 24, 2020

P3 10/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**
Sample ID: GH-ER2
Work Order No.: **192275**

Start Date: **November 13, 2019**
Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	21.0	✓		
	2	20.0	✓		
	3	19.0	✓		
	4	21.0	✓		
	5	21.0	✓		
	6	21.0	✓		
	7	21.0	✓		
	8	21.5	✓		
	9	20.5	✓		
	10	18.5	✓		
	11	18.0	✓		
	12	20.5	✓		
	13	21.0	✓		
	14	20.5	✓		
	15	21.5	✓		
	16	19.5	✓		
	17	21.0	✓		
	18	20.0	✓		
	19	19.0	✓		
	20	16.0	✓		
	21	20.0	✓		
	22	19.0	✓		
	23	18.5	✓		
	24	19.5	✓		
	25	20.0	✓		
	26	19.5	✓		
	27	19.0	✓		
	28	21.5		✓	kyphosis
	29	18.0		✓	scoliosis
	30	13.0		✓	scoliosis
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 3.07 g
Number of survivors: 30
Number of deformed/have difficulty swimming: 3
Initials: MD, CS, YW

Reviewed by: [signature]
Date Reviewed: Jan. 24, 2020

PS 11/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Start Date: **November 13, 2019**

Sample ID: GH-ER2

Termination Date: **December 13, 2019**

Work Order No.: **192275**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	20.0	✓		
	2	19.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	19.5	✓		
	6	20.0	✓		
	7	20.5	✓		
	8	19.0	✓		
	9	21.0	✓		
	10	18.5	✓		
	11	19.0	✓		
	12	18.0	✓		
	13	19.0	✓		
	14	20.0	✓		
	15	20.0	✓		
	16	20.0	✓		
	17	20.0	✓		
	18	18.5	✓		
	19	20.0	✓		
	20	18.0	✓		
	21	19.5	✓		
	22	19.0	✓		
	23	20.0	✓		
	24	19.0	✓		
	25	18.5	✓		
	26	20.0	✓		
	27	15.0		✓	scoliosis
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.36g

Number of survivors: 27

Number of deformed/have difficulty swimming: 1

Initials: MD, YYL, CS

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

AS 12/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Start Date: **November 13, 2019**

Sample ID: CM_MC1

Termination Date: **December 13, 2019**

Work Order No.: **192275**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D4 A	1	20.0	✓		
	2	19.5	✓		
	3	21.5	✓		
	4	20.0	✓		
	5	19.5 ~~20.0~~ MD	✓		
	6	19.0	✓		
	7	20.0	✓	✓	eye abnormality
	8	19.5		✓	eye & facial abnormality - jaw
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.74 g

Number of survivors: 8

Number of deformed/have difficulty swimming: 2

Initials: MD, CS, YMC

Reviewed by: [signature]

Date Reviewed: Jan 24, 2020

RB 13/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Start Date: **November 13, 2019**

Sample ID: CM_MC1

Termination Date: **December 13, 2019**

Work Order No.: **192275**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	22.5	✓		
	2	22.0	✓		
	3	22.5	✓		
	4	22.5	✓		
	5	22.0	✓		
	6	22.0	✓		
	7	22.5	✓		
	8	23.0	✓		
	9	22.5	✓		
	10	22.0	✓		
	11	22.0	✓		
	12	23.0	✓		
	13	22.0	✓		
	14	23.0	✓		
	15	23.0	✓		
	16	22.0	✓		
	17	22.0	✓		
	18	22.0	✓		
	19	21.5	✓		
	20	22.0	✓		
	21	22.0	✓		
	22	22.5	✓		
	23	23.0	✓		
	24	20.5	✓		
	25	22.0	✓		
	26	22.5	✓		
	27	22.0	✓		
	28	22.0	✓		
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.89 g

Number of survivors: 23

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, YMC

Reviewed by: [signature]

Date Reviewed: Jan-24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Start Date: **November 13, 2019**

Sample ID: CM_MC1

Termination Date: **December 13, 2019**

Work Order No.: **192275**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	22.0	✓		
	2	21.0	✓		
	3	20.0	✓		
	4	21.0	✓		
	5	21.0	✓		
	6	21.0	✓		
	7	22.0	✓		
	8	22.0	✓		
	9	21.0	✓		
	10	22.0	✓		
	11	19.5	✓		
	12	21.5	✓		
	13	22.0	✓		
	14	21.5	✓		
	15	21.0	✓		
	16	21.5	✓		
	17	21.0	✓		
	18	22.0	✓		
	19	22.0	✓		
	20	21.0	✓		
	21	21.0	✓		
	22	22.0	✓		
	23	20.0	✓		
	24	21.0		✓	facial abnormality - jaw
	25	17.0		✓	2 heads sharing 1 tail; abnormal eye
	26	17.0		✓	kyphosis
	27	18.5		✓	scoliosis
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.83 g

Number of survivors: 27

Number of deformed/have difficulty swimming: 4

Initials: MD, YYL, CS

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: CM_MC1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	21.0	✓		
	2	20.5	✓		
	3	21.5	✓		
	4	19.0	✓		
	5	19.5	✓		
	6	21.5	✓		
	7	20.5	✓		
	8	20.5	✓		
	9	20.5	✓		
	10	20.0	✓		
	11	21.5	✓		
	12	19.5	✓		
	13	19.0	✓		
	14	20.5	✓		
	15	21.5	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	20.0	✓		
	19	19.0	✓		
	20	19.5	✓		
	21	19.0		✓	abnormal eye
	22	18.5		✓	abnormal eye
	23	18.0		✓	abnormal jaw
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.29 g

Number of survivors: 23

Number of deformed/have difficulty swimming: 3

Initials: MD, CS, YYC

Reviewed by: [signature]

Date Reviewed: Jan 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-SLC

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	20.5	✓		
	2	20.0	✓		
	3	22.0	✓		
	4	20.0	✓		
	5	19.5	✓		
	6	17.0		✓	jaw face + eye abnormality
	7	18.0		✓	facial + eye abnormality
	8	19.0		✓	missing fin.
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.76 g

Number of survivors: 8

Number of deformed/have difficulty swimming: 3

Initials: MD, CS, MH

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

PS 17/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-SLC

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	22.5	✓		
	2	21.0	✓		
	3	23.0	✓		
	4	22 ~~22~~.5	✓		
	5	22.5	✓		
	6	22.0	✓		
	7	22.0	✓		
	8	23.0	✓		
	9	22.5	✓		
	10	22.5	✓		
	11	21.5	✓		
	12	22.0	✓		
	13	22.0	✓		
	14	22.0	✓		
	15	21.5	✓		
	16	22.5	✓		
	17	21.5	✓		
	18	22.5	✓		
	19	21.5	✓		
	20	22.0	✓		
	21	21.5	✓		
	22	22.0	✓		
	23	21.5	✓		
	24	mo ~~21.0~~ 21.5	✓		
	25	22.0	✓		
	26	22.5	✓		
	27	22.0	✓		
	28	21.5	✓		
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 3.19g

Number of survivors: 28

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, YLC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

PS18162

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Start Date: **November 13, 2019**

Sample ID: LC-SLC

Termination Date: **December 13, 2019**

Work Order No.: **192275**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	21.0	✓		
	2	22.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	21.5	✓		
	6	20.0	✓		
	7	20.0	✓		
	8	20.0	✓		
	9	20.5	✓		
	10	21.0	✓		
	11	21.0	✓		
	12	21.0	✓		
	13	21.5	✓		
	14	22.0	✓		
	15	21.0	✓		
	16	21.5	✓		
	17	21.0	✓		
	18	21.0	✓		
	19	21.5	✓		
	20	21.0	✓		
	21	20.0	✓		
	22	19.5	✓		
	23	21.0	✓		
	24	20.0	✓		
	25	19.5		✓	kyphosis
	26	19.5		✓	scoliosis
	27	15.0		✓	2 heads sharing 1 tail
	28	19.5		✓	kyphosis.
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 3.06g

Number of survivors: 28

Number of deformed/have difficulty swimming: 4

Initials: MD, CS, MC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

RS.19/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-SLC

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	21.5	✓		
	2	19.0	✓		
	3	20.0	✓		
	4	21.0	✓		
	5	21.5	✓		
	6	21.0	✓		
	7	21.0	✓		
	8	21.0	✓		
	9	20.0	✓		
	10	20.5	✓		
	11	20.0	✓		
	12	19.5	✓		
	13	19.5	✓		
	14	21.0	✓		
	15	19.0	✓		
	16	21.0	✓		
	17	19.0	✓		
	18	21.0	✓		
	19	20.5	✓		
	20	21.0	✓		
	21	20.5	✓		
	22	15.0		✓	Kyphosis
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.17g

Number of survivors: 22

Number of deformed/have difficulty swimming: 1

Initials: MD, CS, YHL

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

P3.20/262

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR_FRABCH

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	17.5	✓		
	2	18.0		✓	abnormal eye, abnormal caudal fin
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.15g

Number of survivors: 2

Number of deformed/have difficulty swimming: 1

Initials: MD, CS, YC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

13/21/62

Client: **Teck**

Sample ID: FR_FRABCH1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	22.0	✓		
	2	22.0	✓		
	3	21.5	✓		
	4	22.0	✓		
	5	22.0	✓		
	6	21.0	✓		
	7	21.0	✓		
	8	21.5	✓		
	9	20.5	✓		
	10	22.0	✓		
	11	21.0	✓		
	12	22.0	✓		
	13	22.0	✓		
	14	21.5	✓		
	15	22.5	✓		
	16	22.0	✓		
	17	21.0	✓		
	18	22.0	✓		
	19	20.5	✓		
	20	21.5	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.91g

Number of survivors: 20

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, NYC

Reviewed by: [signature]

Date Reviewed: Jan 24, 2020

13/22/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR-FRABCM

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	22.0	✓		
	2	22.0	✓		
	3	21.0	✓		
	4	22.0	✓		
	5	21.0	✓		
	6	20.0	✓		
	7	22.0	✓		
	8	22.0	✓		
	9	21.0	✓		
	10	21.0	✓		
	11	21.0	✓		
	12	22.0	✓		
	13	21.0	✓		
	14	22.5	✓		
	15	21.0	✓		
	16	22.0	✓		
	17	22.0	✓		
	18	21.0	✓		
	19	21.0	✓		
	20	21.0	✓		
	21	21.0	✓		
	22	22.0	✓		
	23	17.0	✓		
	24	20.0		✓	extra growth on body
	25	19.0		✓	yolksac edema
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.91 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 2

Initials: MD, CS, YYC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

pg. 23/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR_FRABCH

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	21.0	✓		
	2	20.5	✓		
	3	20.5	✓		
	4	19.0	✓		
	5	21.0	✓		
	6	20.0	✓		
	7	18.5	✓		
	8	20.0	✓		
	9	21.0	✓		
	10	20.0	✓		
	11	19.5	✓		
	12	20.0	✓		
	13	19.0	✓		
	14	20.5	✓		
	15	22.0	✓		
	16	18.5	✓		
	17	20.0	✓		
	18	19.5	✓		
	19	21.0	✓		
	20	21.5	✓		
	21	19.0	✓		
	22	19.5		✓	yolksac edema
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.12 g

Number of survivors: 22

Number of deformed/have difficulty swimming: 1

Initials: MM

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR_FRCP1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	19.5	✓		
	2	17.0	✓		
	3	19.0	✓		
	4	15.0		✓	kyphosis
	5	16.0		✓	abnormal eye, missing tail fin-
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.44g

Number of survivors: 5

Number of deformed/have difficulty swimming: 2

Initials: MD, CS, YHC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR-KRCP1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	21.0	✓		
	2	21.5	✓		
	3	22.0	✓		
	4	23.0	✓		
	5	22.0	✓		
	6	23.0	✓		
	7	22.5	✓		
	8	22.5	✓		
	9	23.0	✓		
	10	19.0	✓		
	11	21.0	✓		
	12	22.0	✓		
	13	21.0	✓		
	14	20.0	✓		
	15	21.0	✓		
	16	22.0	✓		
	17	21.0	✓		
	18	21.5	✓		
	19	20.0	✓		
	20	21.5	✓		
	21	19.0	✓		
	22	19.0	✓		
	23	19.5	✓		
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.48g

Number of survivors: 23

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, YWL

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

03.26/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR FRCP1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	19.5	✓		
	2	20.5	✓		
	3	21.0	✓		
	4	18.5	✓		
	5	21.0	✓		
	6	20.0	✓		
	7	20.5	✓		
	8	20.5	✓		
	9	20.0	✓		
	10	19.0	✓		
	11	21.0	✓		
	12	19.0	✓		
	13	20.5	✓		
	14	19.0	✓		
	15	21.5	✓		
	16	20.5	✓		
	17	20.0	✓		
	18	21.0	✓		
	19	19.5	✓		
	20	21.0	✓		
	21	17.0	✓		
	22	13.0		✓	scoliosis
	23	16.5		✓	yolksac edema
	24	15.0		✓	kyphosis
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.44g

Number of survivors: 24

Number of deformed/have difficulty swimming: 3

Initials: MD, CS, YMC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

13.27/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: FR-FRCP1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	15.0	✓		
	2	18.0	✓		
	3	17.0	✓		
	4	16.5	✓		
	5	18.5	✓		
	6	17.5	✓		
	7	17.5	✓		
	8	17.5	✓		
	9	19.5	✓		
	10	18.5	✓		
	11	18.0	✓		
	12	18.0	✓		
	13	19.0	✓		
	14	17.5	✓		
	15	18.0	✓		
	16	19.0	✓		
	17	19.0	✓		
	18	17.0	✓		
	19	18.0	✓		
	20	19.0	✓		
	21	17.0	✓		
	22	16.0	✓		
	23	18.5	✓		
	24	18.0	✓		
	25	19.5		✓	Kyphosis
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.12 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 1

Initials: MD, CS, YM

Reviewed by: [signature]

Date Reviewed: Jan 24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-FR1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	21.0	✓		
	2	19.5		✓	kyphosis
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.22 g

Number of survivors: 21

Number of deformed/have difficulty swimming: 1 BM

Initials: MD, CS, YH

Reviewed by: [signature]

Date Reviewed: Jan 24, 2020

B.29/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-FR1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	22.5	✓		
	2	22.5	✓		
	3	22.5	✓		
	4	22.5	✓		
	5	22.0	✓		
	6	21.0	✓		
	7	22.0	✓		
	8	22.0	✓		
	9	21.0	✓		
	10	21.0	✓		
	11	22.0	✓		
	12	22.0	✓		
	13	21.0	✓		
	14	21.0	✓		
	15	22.0	✓		
	16	22.5	✓		
	17	22.0	✓		
	18	21.5	✓		
	19	23.0	✓		
	20	20.5	✓		
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.08g

Number of survivors: 20

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, MM

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-FR1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	21.0	✓		
	2	20.0	✓		
	3	21.5	✓		
	4	21.5	✓		
	5	22.0	✓		
	6	22.0	✓		
	7	18.0	✓		
	8	22.0	✓		
	9	21.0	✓		
	10	22.5	✓		
	11	22.0	✓		
	12	22.0	✓		
	13	21.5	✓		
	14	22.0	✓		
	15	22.0	✓		
	16	22.0	✓		
	17	22.5	✓		
	18	22.0	✓		
	19	18.0	~~✓~~	✓	yolksac edema
	20	19.0		✓	kyphosis
	21	18.5		✓	2 ~~heads~~ heads attached to 1 tail
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.80 g

Number of survivors: 21

Number of deformed/have difficulty swimming: 3

Initials: MD, CS, MH

Reviewed by: [signature]

Date Reviewed: Jan-24, 2020

RS 31162

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-FR1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	20.0	✓		
	2	21.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	19.5	✓		
	6	21.0	✓		
	7	20.5	✓		
	8	20.5	✓		
	9	20.0	✓		
	10	20.0	✓		
	11	19.0	✓		
	12	19.5	✓		
	13	21.0	✓		
	14	19.0		✓	abnormal jaw
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.38 g

Number of survivors: 14

Number of deformed/have difficulty swimming: 1

Initials: MD, CS, YMC

Reviewed by: [signature]

Date Reviewed: Jan 24, 2020

RB-32162

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GM-ERC

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	21.0	✓		
	2	20.0	✓		
	3	19.0	✓		
	4	19.5		✓	facial abnormality - jaw
	5	16.0		✓	yolksac edema
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.49 g

Number of survivors: 5

Number of deformed/have difficulty swimming: 2

Initials: MD, CS, YW

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GM-ERC

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	21.0	✓		
	2	22.0	✓		
	3	22.0	✓		
	4	21.5	✓		
	5	22.0	✓		
	6	21.5	✓		
	7	21.5	✓		
	8	21.5	✓		
	9	22.0	✓		
	10	22.0	✓		
	11	21.5	✓		
	12	22.0	✓		
	13	21.5	✓		
	14	22.0	✓		
	15	22.0	✓		
	16	21.5	✓		
	17	22.5	✓		
	18	22.0	✓		
	19	22.0	✓		
	20	21.5	✓		
	21	22.0	✓		
	22	22.0	✓		
	23	22.5	✓		
	24	21.5	✓		
	25	21.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.65 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, YML

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-ERC

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	21.0	✓		
	2	21.0	✓		
	3	21.0	✓		
	4	19.5	✓		
	5	21.0	✓		
	6	21.0	✓		
	7	20.5	✓		
	8	22.0	✓		
	9	19.5	✓		
	10	19.5	✓		
	11	22.0	✓		
	12	22.0	✓		
	13	21.0	✓		
	14	22.0	✓		
	15	21.5	✓		
	16	20.5	✓		
	17	21.5	✓		
	18	21.0	✓		
	19	19.5	✓		
	20	20.0	✓		
	21	19.5	✓		
	22	20.5	✓		
	23	18.0		✓	extra growth on body
	24	17.5		✓	scoliosis
	25	19.0		✓	kyphosis
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.77g

Number of survivors: 25

Number of deformed/have difficulty swimming: 3

Initials: MD, CS, YW

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: GH-ERC

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	20.0	✓		
	2	22.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	22.0	✓		
	6	21.0	✓		
	7	21.0	✓		
	8	19.0	✓		
	9	18.5	✓		
	10	20.5	✓		
	11	21.0	✓		
	12	20.5	✓		
	13	20.5	✓		
	14	21.5	✓		
	15	21.5	✓		
	16	21.5	✓		
	17	21.0	✓		
	18	19.0	✓		
	19	20.0	✓		
	20	21.0	✓		
	21	21.0	✓		
	22	20.5	✓		
	23	20.0	✓		
	24	20.5	✓		
	25	21.5	✓		
	26	21.0	✓		
	27	21.0	✓		
	28	20.0	✓		
	29	20.5	✓		
	30	17.0		✓	2 heads attached to one tail
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 3.089

Number of survivors: 30

Number of deformed/have difficulty swimming: 1

Initials: MD, CS, YML

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

RB-36/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Start Date: **November 13, 2019**

Sample ID: CM_MC2

Termination Date: **December 13, 2019**

Work Order No.: **192275**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	20.0	✓		
	2	22.0	✓		
	3	22.0	✓		
	4	21.5	✓		
	5	22.0	✓		
	6	22.5	✓		
	7	22.0	✓		
	8	21.0	✓		
	9	21.5	✓		
	10	22.0	✓		
	11	21.5	✓		
	12	22.0	✓		
	13	22.0	✓		
	14	22.0	✓		
	15	22.0	✓		
	16	22.0	✓		
	17	23.0	✓		
	18	22.0	✓		
	19	22.0	✓		
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.13g

Number of survivors: 19

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, YM

Reviewed by: [signature]

Date Reviewed: Jan-24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: CM MC2

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	22.0	✓		
	2	21.0	✓		
	3	21.5	✓		
	4	20.0	✓		
	5	22.5	✓		
	6	22.0	✓		
	7	20.0	✓		
	8	22.0	✓		
	9	20.5	✓		
	10	19.5	✓		
	11	22.5	✓		
	12	22.0	✓		
	13	22.0	✓		
	14	23.0	✓		
	15	22.0	✓		
	16	18.5	✓		
	17	18.5	✓		
	18	21.0	✓		
	19	21.0	✓		
	20	21.0	✓		
	21	19.0		✓	extra growth on body
	22	19.0		✓	extra growth on body
	23	18.0		✓	scoliosis
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.59 g

Number of survivors: 23

Number of deformed/have difficulty swimming: 3

Initials: MD, CS, YML

Reviewed by: [signature]

Date Reviewed: Jan 24, 2020

A3-38162

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: CM_MC2

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	21.0	✓		
	2	21.0	✓		
	3	21.0	✓		
	4	21.0	✓		
	5	21.5	✓		
	6	21.0	✓		
	7	22.0	✓		
	8	19.0	✓		
	9	20.0	✓		
	10	19.0	✓		
	11	21.0	✓		
	12	21.5	✓		
	13	21.0	✓		
	14	21.0	✓		
	15	21.0	✓		
	16	21.0	✓		
	17	21.0	✓		
	18	21.5	✓		
	19	21.5	✓		
	20	20.5	✓		
	21	21.0	✓		
	22	18.5		✓	yolksac edema
	23	17.0		✓	scoliosis
	24	17.0		✓	kyphosis
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 235g

Number of survivors: 24

Number of deformed/have difficulty swimming: 3

Initials: MD, CS, YMC

Reviewed by: [signature]

Date Reviewed: Jan-24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: ~~EM~~ EM_MC2

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	2.0	✓		
	2	2.0	✓		
	3				
	4				
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
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	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.18 g

Number of survivors: 2

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, YWL

Reviewed by: _____

Date Reviewed: Jan 24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: EV_MC2

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	22.0	✓		
	2	22.0	✓		
	3	22.0	✓		
	4	22.0	✓		
	5	22.5	✓		
	6	24.0	✓		
	7	21.0	✓		
	8	21.5	✓		
	9	~~22.0~~ 22.5	✓		
	10	21.0	✓		
	11	19.5	✓		
	12	21.0	✓		
	13	21.5	✓		
	14	22.0	✓		
	15	20.5	✓		
	16	22.5	✓		
	17	21.0	✓		
	18	22.5	✓		
	19	22.0	✓		
	20	22.0	✓		
	21	~~20.~~ 19.5		✓	Kyphosis
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.17 g

Number of survivors: 21

Number of deformed/have difficulty swimming: 1

Initials: MD, CS, YM

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: EV_MC2

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	23.0	✓		
	2	22.0	✓		
	3	22.0	✓		
	4	22.0	✓		
	5	20.5	✓		
	6	20.5	✓		
	7	22.5	✓		
	8	19.0	✓		
	9	21.0	✓		
	10	20.0	✓		
	11	21.5	✓		
	12	22.0	✓		
	13	23.0	✓		
	14	22.0	✓		
	15	21.0	✓		
	16	23.0	✓		
	17	21.0	✓		
	18	20.5	✓		
	19	22.0	✓		
	20	21.0	✓		
	21	19.5	✓		
	22	22.0	✓		
	23	18.0		✓	extra growth on body
	24	17.0		✓	kyphosis
	25	18.0		✓	kyphosis
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.75g

Number of survivors: 25

Number of deformed/have difficulty swimming: 3

Initials: MD, CS, YML

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: EV_MC2

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	21.5	✓		
	2	21.0	✓		
	3	22.0	✓		
	4	19.5	✓		
	5	21.0	✓		
	6	21.5	✓		
	7	21.5	✓		
	8	21.5	✓		
	9	21.0	✓		
	10	18.0	✓		
	11	20.0	✓		
	12	20.0	✓		
	13	21.0	✓		
	14	22.0	✓		
	15	20.0	✓		
	16	22.5	✓		
	17	20.0	✓		
	18	20.0	✓		
	19	19.0		✓	kyphosis
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.85 g

Number of survivors: 19

Number of deformed/have difficulty swimming: 1

Initials: MD, CS, MM

Reviewed by: [signature]

Date Reviewed: Jan 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: EM_MC1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	21.0	✓		
	2	22.0	✓		
	3	21.0	✓		
	4	20.5	✓		
	5	21.0	✓		
	6	19.0	✓		
	7	18.5		✓	scoliosis
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.63 g

Number of survivors: 7

Number of deformed/have difficulty swimming: 1

Initials: MD, CS, YYC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: EV-MC1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	21.0	✓		
	2	24.0	✓		
	3	22.5	✓		
	4	21.5	✓		
	5	23.0	✓		
	6	22.0	✓		
	7	22.0	✓		
	8	23.0	✓		
	9	21.0	✓		
	10	23.5	✓		
	11	22.0	✓		
	12	23.0	✓		
	13	22.0	✓		
	14	23.0	✓		
	15	~~21.0~~ 20.5	✓		
	16	22.5	✓		
	17	19.0	✓		
	18	21.5	✓		
	19	22.0	✓		
	20	22.0	✓		
	21	22.0	✓		
	22	21.0	✓		
	23	22.5	✓		
	24	19.0	✓		
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.61g

Number of survivors: 24

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, YML

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: EV_MC1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	20.5	✓		
	2	22.0	✓		
	3	22.0	✓		
	4	19.0	✓		
	5	21.0	✓		
	6	21.0	✓		
	7	21.0	✓		
	8	22.0	✓		
	9	21.0	✓		
	10	21.5	✓		
	11	23.0	✓		
	12	21.0	✓		
	13	20.0	✓		
	14	20.0	✓		
	15	21.0	✓		
	16	23.0	✓		
	17	23.0	✓		
	18	~~19.5~~ 19.0	✓		
	19	20.5	✓		
	20	22.0	✓		
	21	21.0		✓	abnormal jaw
	22	17.0		✓	two heads attached to one tail
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.41g

Number of survivors: 22

Number of deformed/have difficulty swimming: 2

Initials: MD, CS, MC

Reviewed by:

Date Reviewed: Jan. 24, 2020

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: EV_MC1

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	18.5	✓		
	2	22.0	✓		
	3	21.5	✓		
	4	21.0	✓		
	5	21.0	✓		
	6	21.5	✓		
	7	21.0	✓		
	8	22.5	✓		
	9	21.0	✓		
	10	21.0	✓		
	11	22.5	✓		
	12	19.5	✓		
	13	21.0	✓		
	14	19.5	✓		
	15	21.0	✓		
	16	21.0	✓		
	17	21.0	✓		
	18	22.0	✓		
	19	20.5	✓		
	20	22.0	✓		
	21	21.0	✓		
	22	19.5	✓		
	23	20.0	✓		
	24	21.0	✓		
	25	22.0	✓		
	26	17.0		✓	scoliosis
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.72 g

Number of survivors: 26

Number of deformed/have difficulty swimming: 1

Initials: MD, CS, MC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

B47162

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-DCDS

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	22.0	✓		
	2	18.0		✓	yolksac edema, missing tail fin
	3	20.0		✓	facial abnormality/jaw, bent tail
	4	20.0		✓	facial abnormality - jaw
	5	17.5		✓	yolksac edema
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.63 g

Number of survivors: 5

Number of deformed/have difficulty swimming: 4

Initials: MDCS YMC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC_DCD3

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	23.0	✓		
	2	23.5	✓		
	3	23.5	✓		
	4	23.0 ~~23.5~~ MD	✓		
	5	21.5 ~~23.0~~ MD	✓		
	6	23 ~~21.5~~ MD	✓		
	7	20.5	✓		
	8	23.0	✓		
	9	20.5	✓		
	10	22.5	✓		
	11	21.0	✓		
	12	23.0	✓		
	13	23.0	✓		
	14	23.0	✓		
	15	22.0	✓		
	16	23.0	✓		
	17	22.0	✓		
	18	23.0	✓		
	19	21.5	✓		
	20	22.5	✓		
	21	22.0	✓		
	22	20.0	✓		
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.30 g

Number of survivors: 22

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, YML

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

RJ 49/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC DCDS

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	22.5	✓		
	2	21.0	✓		
	3	22.5	✓		
	4	21.5	✓		
	5	23.0	✓		
	6	22.0	✓		
	7	22.0	✓		
	8	22.0	✓		
	9	21.0	✓		
	10	21.0	✓		
	11	19.5	✓		
	12	20.5	✓		
	13	20.5	✓		
	14	19.5	✓		
	15	19.5		✓	extra growth on body
	16	20.0		✓	scoliosis
	17	21.0		✓	abnormal jaw
	18	19.0		✓	kyphosis
	19	20.0		✓	kyphosis
	20	18.5		✓	extra growth on body
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.23 g

Number of survivors: 20

Number of deformed/have difficulty swimming: 6

Initials: MD, CS, YMC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-DCDS

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	21.0	✓		
	2	20.0	✓		
	3	22.0	✓		
	4	21.0	✓		
	5	21.0	✓		
	6	21.0	✓		
	7	21.5	✓		
	8	21.0	✓		
	9	20.0	✓		
	10	22.0	✓		
	11	21.0	✓		
	12	19.0	✓		
	13	20.0	✓		
	14	21.0	✓		
	15	21.0	✓		
	16	21.0	✓		
	17	21.0	✓		
	18	21.0	✓		
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 1.92 g

Number of survivors: 18

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, YML

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LCLC3

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	20.0	✓		
	2	19.0	✓		
	3	20.0	✓		
	4	20.0	✓		
	5	21.5	✓		
	6	20.5	✓		
	7	18.0		✓	yolksac edema
	8	19.5		✓	mild abnormal eye
	9	19.5		✓	abnormal eye
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.94 g

Number of survivors: 9

Number of deformed/have difficulty swimming: 3

Initials: MD, CS, YML

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-LC3

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	22.0	✓		
	2	22.0	✓		
	3	22.5	✓		
	4	22.0	✓		
	5	22.0	✓		
	6	22.5	✓		
	7	21.5	✓		
	8	21.0	✓		
	9	22.5	✓		
	10	22.0	✓		
	11	22.5	✓		
	12	22.0	✓		
	13	22.5	✓		
	14	22.0	✓		
	15	22.0	✓		
	16	21.0	✓		
	17	22.5	✓		
	18	22.0	✓		
	19	23.0	✓		
	20	22.0	✓		
	21	23.0	✓		
	22	22.5	✓		
	23	23.0	✓		
	24	22.0	✓		
	25	23.0	✓		
	26	18.0		✓	2 ~~[illegible]~~ fish attached to 1 yolksac
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.97 g

Number of survivors: 26

Number of deformed/have difficulty swimming: 1

Initials: MD, CS, YML

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-LC3

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	22.0	✓		
	2	22.0	✓		
	3	22.0	✓		
	4	22.5	✓		
	5	22.5	✓		
	6	21.5	✓		
	7	22.0	✓		
	8	22.0	✓		
	9	20.0	✓		
	10	21.5	✓		
	11	21.0	✓		
	12	22.0	✓		
	13	20.5	✓		
	14	22.0	✓		
	15	22.5	✓		
	16	21.5	✓		
	17	22.0	✓		
	18	17.0		✓	scoliosis
	19	19.0		✓	kyphosis
	20	19.0		✓	extra growth ~~off~~ on body
	21	17.0		✓	abnormal jaw ; extra growth on body
	22	18.0		✓	2 heads attached to one tail
	23	16.0		✓	abnormal jaw, yolksac edema
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.56g

Number of survivors: 23

Number of deformed/have difficulty swimming: 6

Initials: MD, CS, MC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC_LC3

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	21.0	✓		
	2	21.0	✓		
	3	20.0	✓		
	4	21.0	✓		
	5	22.0	✓		
	6	21.5	✓		
	7	21.5	✓		
	8	22.0	✓		
	9	21.0	✓		
	10	22.0	✓		
	11	21.0	✓		
	12	22.0	✓		
	13	20.0	✓		
	14	21.0	✓		
	15	21.0	✓		
	16	21.0	✓		
	17	21.0	✓		
	18	21.0	✓		
	19	21.5	✓		
	20	19.5	✓		
	21	21.0	✓		
	22	21.0	✓		
	23	22.0	✓		
	24	21.5	✓		
	25	21.0	✓		
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.38 g

Number of survivors: 25

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, MM

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

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Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-LCS

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A	1	22.0	✓		
	2	22.0	✓		
	3	20.0	✓		
	4	20.5	✓		
	5	21.5	✓		
	6	21.5	✓		
	7	23.0	✓		
	8	22.5	✓		
	9	19.0		✓	facial abnormality - jaw
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.84 g

Number of survivors: 9

Number of deformed/have difficulty swimming: 1

Initials: MD, CS, YML

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-LCS

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B	1	22.5	✓		
	2	21.5	✓		
	3	21.0	✓		
	4	23.0	✓		
	5	23.0	✓		
	6	21.5	✓		
	7	22.0	✓		
	8	22.0	✓		
	9	22.0	✓		
	10	23.0	✓		
	11	22.0	✓		
	12	21.5	✓		
	13	23.0	✓		
	14	23.0	✓		
	15	22.0	✓		
	16	22.0	✓		
	17	22.0	✓		
	18	23.0	✓		
	19	20.0	✓		
	20	23.5	✓		
	21	21.5		✓	kyphosis
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.17g

Number of survivors: 21

Number of deformed/have difficulty swimming: 1

Initials: MD, CS, YMM

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet

Length, Wet Weight, Deformities

Client: Teck

Sample ID: LCLC5

Work Order No.: 192275

Start Date: November 13, 2019

Termination Date: December 13, 2019

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	23.0	✓		
	2	23.0	✓		
	3	21.0	✓		
	4	23.0	✓		
	5	20.0	✓		
	6	21.5	✓		
	7	23.0	✓		
	8	20.5	✓		
	9	19.0	✓		
	10	23.5	✓		
	11	23.5	✓		
	12	23.0	✓		
	13	21.0	✓		
	14	21.0	✓		
	15	23.5	✓		
	16	19.0		✓	kyphosis
	17	19.5		✓	2 heads attached to 1 tail, scoliosis
	18	18.5		✓	kyphosis
	19	20.0		✓	extra growth on body
	20	20.0		✓	kyphosis
	21	19.0		✓	kyphosis
	22	17.0		✓	kyphosis
	23	18.0		✓	2 bodies attached to one yolksac.
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.44g

Number of survivors: 23

Number of deformed/have difficulty swimming: 8

Initials: MDES, YWL

Reviewed by:

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**
Sample ID: LC-LC5
Work Order No.: **192275**

Start Date: **November 13, 2019**
Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	20.0	✓		
	2	22.0	✓		
	3	23.0	✓		
	4	20.5	✓		
	5	SMD ~~21.5~~ 21.0	✓		
	6	20.5	✓		
	7	22.0	✓		
	8	20.5	✓		
	9	19.5	✓		
	10	18.5	✓		
	11	19.5	✓		
	12	22.0	✓		
	13	20.0	✓		
	14	21.5	✓		
	15	20.5	✓		
	16	21.0	✓		
	17	22.0	✓		
	18	21.5	✓		
	19	20.5	✓		
	20	21.5	✓		
	21	18.5	✓		
	22	20.0	✓		
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 225 g
Number of survivors: 22
Number of deformed/have difficulty swimming: 0
Initials: MD, CS, YML

Reviewed by: [signature]
Date Reviewed: Jan 24, 2020

Rs.59/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-LCDSSLCC

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 A~~B~~m	1	20.5	✓		
	2	18.0	✓		
	3	20.5		✓	bent tail
	4	22.5		✓	facial abnormality jaw
	5				
	6				
	7				
	8				
	9				
	10				
	11				
	12				
	13				
	14				
	15				
	16				
	17				
	18				
	19				
	20				
	21				
	22				
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 0.37g

Number of survivors: 4

Number of deformed/have difficulty swimming: 2

Initials: MD, CS, YUL

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2021

Issued: July 17, 2006; Ver. 1.0

Nautilus Environmental

RJ 60/62

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-LCDSSLCC

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 B ~~A~~MD	1	22.0	✓		
	2	22.5	✓		
	3	23.0	✓		
	4	22.5	✓		
	5	22.5	✓		
	6	22.0	✓		
	7	22.5	✓		
	8	23.0	✓		
	9	19.0	✓		
	10	22.0	✓		
	11	22.5	✓		
	12	22.0	✓		
	13	22.0	✓		
	14	23.0	✓		
	15	23.0	✓		
	16	22.0	✓		
	17	19.5	✓		
	18	22.0	✓		
	19	22.0	✓		
	20	21.5	✓		
	21	21.0	✓		
	22	22.5	✓		
	23	22.5	✓		
	24	22.0	✓		
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.61g

Number of survivors: 24

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, YHC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC-LCDSLCC

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 C	1	22.0	✓		
	2	22.5	✓		
	3	22.5	✓		
	4	21.5	✓		
	5	23.0	✓		
	6	21.0	✓		
	7	23.0	✓		
	8	23.0	✓		
	9	22.0	✓		
	10	22.0	✓		
	11	23.5	✓		
	12	23.5	✓		
	13	21.5	✓		
	14	22.0	✓		
	15	22.0	✓		
	16	23.5	✓		
	17	23.0	✓		
	18	21.0	✓		
	19	23.0	✓		
	20	22.0	✓		
	21	21.0	✓		
	22	22.5	✓		
	23	22.5		✓	kyphosis
	24	16.5		✓	2 bodies attached to 1 yolksac
	25	21.0		✓	2 bodies attached to 1 tail
	26	19.5		✓	2 bodies attached to 1 tail; bent tail
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.96 g

Number of survivors: 26

Number of deformed/have difficulty swimming: 4

Initials: MD, CS, YNC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Embryo - Alevin Test Termination Data Sheet
Length, Wet Weight, Deformities

Client: **Teck**

Sample ID: LC_LCOSSLCR

Work Order No.: **192275**

Start Date: **November 13, 2019**

Termination Date: **December 13, 2019**

Treatment and Replicate	Fish	Length (mm)	Normal	Abnormal	Comments
100 D	1	21.5	✓		
	2	21.5	✓		
	3	22.0	✓		
	4	21.5	✓		
	5	19.0	✓		
	6	22.0	✓		
	7	22.5	✓		
	8	21.0	✓		
	9	21.5	✓		
	10	21.0	✓		
	11	21.5	✓		
	12	21.5	✓		
	13	22.0	✓		
	14	23.5	✓		
	15	21.0	✓		
	16	21.5	✓		
	17	21.5	✓		
	18	22.5	✓		
	19	20.5	✓		
	20	22.5	✓		
	21	21.5	✓		
	22	18.0	✓		
	23				
	24				
	25				
	26				
	27				
	28				
	29				
	30				
	31				
	32				
	33				
	34				
	35				

Total Weight (pooled): 2.39 g

Number of survivors: 22

Number of deformed/have difficulty swimming: 0

Initials: MD, CS, YMC

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Rainbow Trout Embryo-Alevin Toxicity Test - Overall Results

Client: Teck
WO#: 192275

Test Initiation Date: November 13, 2019
Test Termination Date: December 13, 2019

* Only 3 replicates used in statistical analysis - Rep 1/A excluded due to possible poor egg quality

	Test Conc.		Mortality Counts Day	Day	Day	Total	Abnormal	Normal	Total No.	Total No.				Normal Alevins		
	(% v/v)	Rep	1 - 12	13 - 24	25 - 30	Dead	Alevins	Alevins	Alevins	Exposed	Survival					
Control	Control	1	25	1	4	30	0	0	0	30	0.0			0.0		
		2	0	0	0	0	0	30	30	30	100.0			100.0		
		3	1	0	3	4	1 (1)	25	26	30	86.7	Mean	SD	83.3	Mean	SD
		4	1	1	3	5	0	25	25	30	83.3	67.5	45.6	83.3	66.7	45.1
1	100	1	15	5	4	24	0	5	5	29	17.2			17.2		
FR_UFR1		2	0	1	0	1	0	29	29	30	96.7			96.7		
+ 20 µg/L Cu		3	0	3	2	5	3 (2)	22	25	30	83.3	Mean	SD	73.3	Mean	SD
		4	0	1	1	2	1 (3)	27	28	30	93.3	72.6	37.4	90.0	69.3	36.1
2	100	1	13	3	3	19	4 (4)	7	11	30	36.7			23.3		
GH_ER2		2	0	2	3	5	0	25	25	30	83.3			83.3		
+ 20 µg/L Cu		3	0	0	0	0	3 (5)	27	30	30	100.0	Mean	SD	90.0	Mean	SD
		4	2	1	0	3	1 (6)	26	27	30	90.0	77.5	28.1	86.7	70.8	31.8
3	100	1	15	4	3	22	2 (7)	6	8	30	26.7			20.0		
CM_MC1		2	0	1	1	2	0	28	28	30	93.3			93.3		
+ 20 µg/L Cu		3	1	0	2	3	4 (8)	23	27	30	90.0	Mean	SD	76.7	Mean	SD
		4	1	2	4	7	3 (9)	20	23	30	76.7	71.7	30.9	66.7	64.2	31.4
4	100	1	13	9	1	23	3 (10)	5	8	31	25.8			16.1		
LC_SLC		2	1	1	0	2	0	28	28	30	93.3			93.3		
+ 20 µg/L Cu		3	0	1	1	2	4 (11)	24	28	30	93.3	Mean	SD	80.0	Mean	SD
		4	2	2	3	7	1 (12)	21	22	29	75.9	72.1	31.9	72.4	65.5	34.0
5	100	1	24	4	0	28	1 (13)	1	2	30	6.7			3.3		
FR_FRABCH		2	3	4	3	10	0	20	20	30	66.7			66.7		
+ 20 µg/L Cu		3	0	2	2	4	2 (14)	23	25	29	86.2	Mean	SD	79.3	Mean	SD
		4	4	3	1	8	1 (15)	21	22	30	73.3	58.2	35.3	70.0	54.8	34.7
6	100	1	15	9	1	25	2 (16)	3	5	30	16.7			10.0		
FR_FRCP1		2	3	4	0	7	0	23	23	30	76.7			76.7		
+ 20 µg/L Cu		3	0	5	0	5	3 (17)	21	24	29	82.8	Mean	SD	72.4	Mean	SD
		4	2	2	1	5	1 (12)	24	25	30	83.3	64.9	32.3	80.0	59.8	33.3
7	100	1	20	7	0	27	1 (12)	1	2	29	6.9			3.4		
GH_FR1		2	8	2	1	11	0	20	20	31	64.5			64.5		
+ 20 µg/L Cu		3	0	7	0	7	3 (18)	18	21	28	75.0	Mean	SD	64.3	Mean	SD
		4	12	3	1	16	1 (19)	13	14	30	46.7	48.3	30.0	43.3	43.9	28.7
8	100	1	18	5	2	25	2 (20)	3	5	30	16.7			10.0		
GH_ERC		2	0	3	2	5	0	25	25	30	83.3			83.3		
+ 20 µg/L Cu		3	1	2	1	4	3 (21)	22	25	29	86.2	Mean	SD	75.9	Mean	SD
		4	0	0	0	0	1 (22)	29	30	30	100.0	71.6	37.3	96.7	66.5	38.6
9	100	1	21	7	2	30	0	0	0	30	0.0			0.0		
CM_MC2		2	6	3	2	11	0	19	19	30	63.3			63.3		
+ 20 µg/L Cu		3	1	5	1	7	3 (23)	20	23	30	76.7	Mean	SD	66.7	Mean	SD
		4	4	~~12~~	0	~~16~~	3 (17)	21	24	~~28~~ 30	~~82.8~~ 80.0	55.80	~~38.0~~ 37.4	~~72.4~~ 70.0	50.80	33.84
10	100	1	20	6	2	28	0	2	2	30	6.7			6.7		
EV_MC2		2	5	3	1	9	1 (12)	20	21	30	70.0			66.7		
+ 20 µg/L Cu		3	0	3	2	5	3 (24)	22	25	30	83.3	Mean	SD	73.3	Mean	SD
		4	6	5	0	11	1 (12)	18	19	30	63.3	55.8	33.8	60.0	51.7	30.5
11	100	1	15	6	2	23	1 (6)	6	7	30	23.3			20.0		
EV_HC1		2	3	3	0	6	0	24	24	30	80.0			80.0		
+ 20 µg/L Cu		3	2	6	0	8	2 (25)	20	22	30	73.3	Mean	SD	66.7	Mean	SD
		4	2	2	0	4	1 (6)	25	26	30	86.7	65.8	28.9	83.3	62.5	29.2
12	100	1	23	0	1	24	4 (26)	1	5	29	17.2			3.4		
LC_DCDS		2	7	2	0	9	0	22	22	31	71.0			71.0		
+ 20 µg/L Cu		3	2	5	2	9	6 (27)	14	20	29	69.0	Mean	SD	48.3	Mean	SD
		4	8	5	1	14	0	18	18	32	56.3	53.4	24.9	56.3	44.7	29.1
13	100	1	14	5	0	19	3 (28)	6	9	28	32.1			21.4		
LC_LC3		2	4	2	0	6	1 (29)	25	26	32	81.3			78.1		
+ 20 µg/L Cu		3	0	6	1	7	6 (30)	17	23	30	76.7	Mean	SD	56.7	Mean	SD
		4	1	3	0	4	0	25	25	29	86.2	69.1	24.9	86.2	60.6	28.9
14	100	1	15	6	0	21	1 (11)	8	9	30	30.0			26.7		
LC_LC5		2	1	7	1	9	1 (12)	20	21	30	70.0			66.7		
+ 20 µg/L Cu		3	0	4	2	6	8 (31)	15	23	29	79.3	Mean	SD	51.7	Mean	SD
		4	3	5	0	8	0	22	22	30	73.3	63.2	22.4	73.3	54.6	20.7
15	100	1	~~20~~ 21	4	1	~~25~~ 26	2 (32)	2	4	~~28~~ 30	13.3			6.7		
LC_LCDSSLCC		2	5	1	0	6	0	24	24	30	80.0			80.0		
+ 20 µg/L Cu		3	0	3	1	4	4 (33)	22	26	30	86.7	Mean	SD	73.3	Mean	SD
		4	4	1	2	7	0	22	22	29	75.9	64.70	~~38.8~~ 34.0	75.9	59.0	~~34.0~~ 35.0

① Abnormal growth on body
② 1 abnormal growth on body, 1 abnormal jaw, 1 scoliosis
③ abnormal jaw + yolksac edema
④ 1 abnormal jaw, 2 abnormal eye, 1 bent tail + abnormal jaw
⑤ 1 kyphosis, 2 scoliosis
⑥ scoliosis
⑦ 1 abnormal eye, 1 abnormal eye + abnormal jaw
⑧ 1 abnormal jaw, 1 two-headed w/ single tail + abnormal eye, 1 kyphosis, 1 scoliosis
⑨ 2 abnormal eye, 1 abnormal jaw
⑩ 2 abnormal jaw + eye, 1 missing tail fin.
⑪ 2 kyphosis, 1 scoliosis, 1 two-headed w/ single tail
⑫ kyphosis
⑬ abnormal eye + tail fin.
⑭ 1 abnormal growth on body, 1 yolksac edema
⑮ yolksac edema
⑯ 1 kyphosis, 1 abnormal eye + missing tail fin.
⑰ 1 scoliosis, 1 yolksac edema, 1 kyphosis
⑱ 1 yolksac edema, 1 kyphosis, 1 two-headed w/ single tail.
⑲ abnormal jaw
⑳ 1 abnormal jaw, 1 yolksac edema

Feb. 3/20

Rainbow Trout Embryo-Alevin Toxicity Test - Overall Results

Client: Teck
WO#: 192275

Test Initiation Date: November 13, 2019
Test Termination Date: December 13, 2019

(21) 1 abnormal growth on body, 1 scoliosis, 1 kyphosis

(22) two-headed w/ single tail

(23) 2 abnormal growth on body, 1 scoliosis

(24) 1 abnormal growth on body, 2 kyphosis

(25) 1 abnormal jaw, 1 two-headed w/ single tail.

(26) 1 yolksac edema + missing tail fin, 1 abnormal jaw + bent tail, 1 abnormal jaw, 1 yolksac edema

(27) 2 abnormal growth on body, 2 kyphosis, 1 scoliosis, 1 abnormal jaw

(28) 2 abnormal eye, 1 yolksac edema

(29) two fish attached to one yolksac

(30) 1 scoliosis, 1 kyphosis, ~~1 bent tail~~, 1 abnormal growth on body, 1 abnormal jaw + abnormal growth on body, 1 two-headed w/ single tail, 1 abnormal jaw + yolksac edema.

(31) 5 kyphosis, 1 two-headed w/ single tail + scoliosis, 1 abnormal growth on body, 1 two-headed w/ single tail.

(32) 1 bent tail, 1 abnormal jaw

(33) 1 kyphosis, 1 two-headed w/ single tail, 1 two fish attached to one yolksac, 1 two-headed w/ single tail + bent tail.

ps. 2/2

Feb 3/20

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 192275

	CONTROL				FR_UFR1			
Fish #	**Control A**	**Control B**	**Control C**	**Control D**	**100 A**	**100 B**	**100 C**	**100 D**
1		22.5	21.5	21.0	20.5	22.0	19.0	20.0
2		22.0	22.0	21.0	19.5	21.0	21.0	21.0
3		21.0	21.0	21.0	20.0	22.0	21.0	20.0
4		22.0	21.0	21.0	20.5	22.0	21.5	20.0
5		21.0	22.5	21.0	19.5	22.0	22.5	20.5
6		22.0	21.0	20.5		22.0	21.0	20.5
7		22.0	21.0	20.5		22.5	20.5	21.0
8		21.5	20.5	21.0		22.5	21.5	20.0
9		22.0	21.0	21.0		23.0	21.0	19.0
10		21.0	20.5	20.5		21.5	22.0	20.5
11		21.0	21.0	20.0		23.0	22.0	21.0
12		21.0	21.0	21.0		22.0	22.0	20.0
13		23.0	21.0	20.0		21.0	19.0	20.5
14		22.0	21.5	20.5		21.0	22.0	20.0
15		22.0	22.0	21.5		22.0	21.0	21.0
16		22.0	22.0	21.0		21.5	20.5	20.0
17		21.0	22.0	21.0		22.0	20.5	21.0
18		22.0	21.0	21.0		22.0	20.0	20.0
19		22.0	21.0	20.0		22.0	21.0	20.5
20		22.0	22.0	20.5		22.0	21.0	21.0
21		22.0	21.0	20.5		22.0	16.5	20.0
22		22.0	20.0	21.0		22.5	21.5	22.0
23		22.5	21.0	20.5		22.0	18.0	20.5
24		21.5	21.5	20.5		20.0	19.5	18.5
25		22.0	20.5	21.0		22.0	16.0	20.5
26		22.0	15.5			21.5		21.0
27		22.5				22.0		20.0
28		21.0				21.5		16.0
29		20.5				21.5		
30		22.0						
31								
# Survivors	0	30	26	25	5	29	25	28
Average Length (mm)	**#DIV/0!**	**21.767**	**21.000**	**20.740**	**20.000**	**21.862**	**20.460**	**20.214**
Pooled Weight (g)		3.08	2.93	2.32	0.46	3.10	2.71	2.59
Pooled Weight (mg)	**0**	**3080**	**2930**	**2320**	**460**	**3100**	**2710**	**2590**
Average Weight (g)	#DIV/0!	0.103	0.113	0.093	0.092	0.107	0.108	0.093
= abnormal								

Feb. 3, 2020

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 192275

	GH_ER2				CM_MC1			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	20.5	21.0	21.0	20.0	20.0	22.5	22.0	21.0
2	20.0	19.0	20.0	19.0	19.5	22.0	21.0	20.5
3	20.0	19.5	19.0	20.0	21.5	22.5	20.0	21.5
4	20.0	20.0	21.0	20.0	20.0	22.5	21.0	19.0
5	20.5	19.0	21.0	19.5	19.5	22.0	21.0	19.5
6	19.0	20.0	21.0	20.0	19.0	22.0	21.0	21.5
7	19.0	20.0	21.0	20.5	20.0	22.5	22.0	20.5
8	19.0	21.0	21.5	19.0	19.5	23.0	22.0	20.5
9	14.0	21.0	20.5	21.0		22.5	21.0	20.5
10	18.5	21.0	18.5	18.5		22.0	22.0	20.0
11	19.5	19.0	18.0	19.0		22.0	19.5	21.5
12		20.0	20.5	18.0		23.0	21.5	19.5
13		19.0	21.0	19.0		22.0	22.0	19.0
14		20.5	20.5	20.0		23.0	21.5	20.5
15		21.0	21.5	20.0		23.0	21.0	21.5
16		20.0	19.5	20.0		22.0	21.5	19.0
17		19.0	21.0	20.0		22.0	21.0	19.0
18		18.0	20.0	18.5		22.0	22.0	20.0
19		20.0	19.0	20.0		21.5	22.0	19.0
20		19.5	16.0	18.0		22.0	21.0	19.5
21		20.0	20.0	19.5		22.0	21.0	19.0
22		19.5	19.0	19.0		22.5	22.0	18.5
23		20.0	18.5	20.0		23.0	20.0	18.0
24		19.5	19.5	19.0		20.5	21.0	
25		20.0	20.0	18.5		22.0	17.0	
26			19.5	20.0		22.5	17.0	
27			19.0	15.0		22.0	18.5	
28			21.5			22.0		
29			18.0					
30			13.0					
31								
# Survivors	11	25	30	27	8	28	27	23
Average Length (mm)	**19.091**	**19.860**	**19.650**	**19.296**	**19.875**	**22.232**	**20.833**	**19.935**
Pooled Weight (g)	1.02	2.50	3.07	2.36	0.74	2.89	2.83	2.29
Pooled Weight (mg)	**1020**	**2500**	**3070**	**2360**	**740**	**2890**	**2830**	**2290**
Average Weight (g)	0.093	0.100	0.102	0.087	0.093	0.103	0.105	0.100

= abnormal

Feb 3/20

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 192275

	LC_SLC				FR_FRABCH			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	20.5	22.5	21.0	21.5	17.5	22.0	22.0	21.0
2	20.0	21.0	22.0	19.0	18.0	22.0	22.0	20.5
3	22.0	23.0	20.0	20.0		21.5	21.0	20.5
4	20.0	22.5	20.0	21.0		22.0	22.0	19.0
5	19.5	22.5	21.5	21.5		22.0	21.0	21.0
6	17.0	22.0	20.0	21.0		21.0	20.0	20.0
7	18.0	22.0	20.0	21.0		21.0	22.0	19.5
8	19.0	23.0	20.0	21.0		21.5	22.0	20.0
9		22.5	20.5	20.0		20.5	21.0	21.0
10		22.5	21.0	20.5		22.0	21.0	20.0
11		21.5	21.0	20.0		21.0	21.0	19.5
12		22.0	21.0	19.5		22.0	22.0	20.0
13		22.0	21.5	19.5		22.0	21.0	19.0
14		22.0	22.0	21.0		21.5	22.5	20.5
15		21.5	21.0	19.0		22.5	21.0	22.0
16		22.5	21.5	21.0		22.0	22.0	19.5
17		21.5	21.0	19.0		21.0	22.0	20.0
18		22.5	21.0	21.0		22.0	21.0	19.5
19		21.5	21.5	20.5		20.5	21.0	21.0
20		22.0	21.0	21.0		21.5	21.0	21.5
21		21.5	20.0	20.5			21.0	19.0
22		22.0	19.5	15.0			22.0	19.5
23		21.5	21.0				17.0	
24		21.5	20.0				20.0	
25		22.0	19.5				19.0	
26		22.5	19.5					
27		22.0	15.0					
28		21.5	19.5					
29								
30								
31								
# Survivors	8	28	28	22	2	20	25	22
Average Length (mm)	**19.500**	**22.037**	**20.446**	**20.159**	**17.750**	**21.575**	**21.100**	**20.159**
Pooled Weight (g)	0.76	3.19	3.06	2.17	0.15	1.91	2.91	2.12
Pooled Weight (mg)	**760**	**3190**	**3060**	**2170**	**150**	**1910**	**2910**	**2120**
Average Weight (g)	0.095	0.114	0.109	0.099	0.075	0.096	0.116	0.096
= abnormal								

Feb 3/20

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 192275

	FR_FRCP1				GH_FR1			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	19.5	21.0	19.5	15.0	21.0	22.5	21.0	20.0
2	17.0	21.5	20.5	18.0	19.5	22.5	20.0	21.0
3	19.0	22.0	21.0	17.0		22.5	21.5	20.0
4	15.0	23.0	18.5	16.5		22.5	21.5	20.0
5	16.0	22.0	21.0	18.5		22.0	22.0	19.5
6		23.0	20.0	17.5		21.0	22.0	21.0
7		22.5	20.5	17.5		22.0	18.0	20.5
8		22.5	20.5	17.5		22.0	22.0	20.5
9		23.0	20.0	19.5		21.0	21.0	20.0
10		19.0	19.0	18.5		21.0	22.5	20.0
11		21.0	21.0	18.0		22.0	22.0	19.0
12		22.0	19.0	18.0		22.0	22.0	19.5
13		21.0	20.5	19.0		21.0	21.5	21.0
14		20.0	19.0	17.5		21.0	22.0	19.0
15		21.0	21.5	18.0		22.0	22.0	
16		22.0	20.5	19.0		22.5	22.0	
17		21.0	20.0	19.0		22.0	22.5	
18		21.5	21.0	17.0		21.5	22.0	
19		20.0	19.5	18.0		23.0	18.0	
20		21.5	21.0	19.0		20.5	19.0	
21		19.0	17.0	17.0			18.5	
22		19.0	13.0	16.0				
23		19.5	16.5	18.5				
24			15.0	18.0				
25				19.5				
26								
27								
28								
29								
30								
31								
# Survivors	5	23	24	25	2	20	21	14
Average Length (mm)	**17.300**	**21.217**	**19.375**	**17.880**	**20.250**	**21.825**	**21.095**	**20.071**
Pooled Weight (g)	0.44	2.48	2.44	2.12	0.22	2.08	2.80	1.38
Pooled Weight (mg)	**440**	**2480**	**2440**	**2120**	**220**	**2080**	**2800**	**1380**
Average Weight (g)	0.088	0.108	0.102	0.085	0.110	0.104	0.133	0.099
= abnormal								

Feb. 23/21

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 192275

	GH_ERC				CM_MC2			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	21.0	21.0	21.0	20.0		20.0	22.0	21.0
2	20.0	22.0	21.0	22.0		22.0	21.0	21.0
3	19.0	22.0	21.0	20.0		22.0	21.5	21.0
4	19.5	21.5	19.5	20.0		21.5	20.0	21.0
5	16.0	22.0	21.0	22.0		22.0	22.5	21.5
6		21.5	21.0	21.0		22.5	22.0	21.0
7		21.5	20.5	21.0		22.0	20.0	22.0
8		21.5	22.0	19.0		21.0	22.0	19.0
9		22.0	19.5	18.5		21.5	20.5	20.0
10		22.0	19.5	20.5		22.0	19.5	19.0
11		21.5	22.0	21.0		21.5	22.5	21.0
12		22.0	22.0	20.5		22.0	22.0	21.5
13		21.5	21.0	20.5		22.0	22.0	21.0
14		22.0	22.0	21.5		22.0	23.0	21.0
15		22.0	21.5	21.5		22.0	22.0	21.0
16		21.5	20.5	21.5		22.0	18.5	21.0
17		22.5	21.5	21.0		23.0	18.5	21.0
18		22.0	21.0	19.0		22.0	21.0	21.5
19		22.0	19.5	20.0		22.0	21.0	21.5
20		21.5	20.0	21.0			21.0	20.5
21		22.0	19.5	21.0			19.0	21.0
22		22.0	20.5	20.5			19.0	18.5
23		22.5	18.0	20.0			18.0	17.0
24		21.5	17.5	20.5				17.0
25		21.0	19.0	21.5				
26				21.0				
27				21.0				
28				20.0				
29				20.5				
30				17.0				
31								
# Survivors	5	25	25	30	0	19	23	24
Average Length (mm)	**19.100**	**21.780**	**20.460**	**20.483**	**#DIV/0!**	**21.842**	**20.804**	**20.458**
Pooled Weight (g)	0.49	2.65	2.77	3.08		2.13	2.59	2.35
Pooled Weight (mg)	**1810**	**2650**	**2770**	**3080**	**0**	**2130**	**2590**	**2350**
Average Weight (g)	0.098	0.106	0.111	0.103	#DIV/0!	0.112	0.113	0.098
= abnormal								

Feb 3/20

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 192275

p3 6/8

	EV_MC2				EV_HC1			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	21.0	22.0	23.0	21.5	21.0	21.0	20.5	18.5
2	21.0	22.0	22.0	21.0	22.0	24.0	22.0	22.0
3		22.0	22.0	22.0	21.0	22.5	22.0	21.5
4		22.0	22.0	19.5	20.5	21.5	19.0	21.0
5		22.5	20.5	21.0	21.0	23.0	21.0	21.0
6		24.0	20.5	21.5	19.0	22.0	21.0	21.5
7		21.0	22.5	21.5	18.5	22.0	21.0	21.0
8		21.5	19.0	21.5		23.0	22.0	22.5
9		22.5	21.0	21.0		21.0	21.0	21.0
10		21.0	20.0	18.0		23.5	21.5	21.0
11		19.5	21.5	20.0		22.0	23.0	22.5
12		21.0	22.0	20.0		23.0	21.0	19.5
13		21.5	23.0	21.0		22.0	20.0	21.0
14		22.0	22.0	22.0		23.0	20.0	19.5
15		20.5	21.0	20.0		20.5	21.0	21.0
16		22.5	23.0	22.5		22.5	23.0	21.0
17		21.0	21.0	20.0		19.0	23.0	21.0
18		22.5	20.5	20.0		21.5	19.0	22.0
19		22.0	22.0	19.0		22.0	20.5	20.5
20		22.0	21.0			22.0	22.0	22.0
21		19.5	19.5			22.0	21.0	21.0
22			22.0			21.0	17.0	19.5
23			18.0			22.5		20.0
24			17.0			19.0		21.0
25			18.0					22.0
26								17.0
27								
28								
29								
30								
31								
# Survivors	2	21	25	19	7	24	22	26
Average Length (mm)	**21.000**	**21.643**	**20.960**	**20.684**	**20.429**	**21.896**	**20.977**	**20.827**
Pooled Weight (g)	0.18	2.17	2.75	1.85	0.63	2.61	2.41	2.72
Pooled Weight (mg)	**180**	**2170**	**2750**	**1850**	**630**	**2610**	**2410**	**2720**
Average Weight (g)	0.090	0.103	0.110	0.097	0.090	0.109	0.110	0.105
= abnormal								

FEB 3/20

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 192275

AJ 7/8

	LC_DCDS				LC_LC3			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	22.0	23.0	22.5	21.0	20.0	22.0	22.0	21.0
2	18.0	23.5	21.0	20.0	19.0	22.0	22.0	21.0
3	20.0	23.5	22.5	22.0	20.0	22.5	22.0	20.0
4	20.0	23.0	21.5	21.0	20.0	22.0	22.5	21.0
5	17.5	21.5	23.0	21.0	21.5	22.0	22.5	22.0
6		23.0	22.0	21.0	20.5	22.5	21.5	21.5
7		20.5	22.0	21.5	18.0	21.5	22.0	21.5
8		23.0	22.0	21.0	19.5	21.0	22.0	22.0
9		20.5	21.0	20.0	19.5	22.5	20.0	21.0
10		22.5	21.0	22.0		22.0	21.5	22.0
11		21.0	19.5	21.0		22.5	21.0	21.0
12		23.0	20.5	19.0		22.0	22.0	22.0
13		23.0	20.5	20.0		22.5	20.5	20.0
14		23.0	19.5	21.0		22.0	22.0	21.0
15		22.0	19.5	21.0		22.0	22.5	21.0
16		23.0	20.0	21.0		21.0	21.5	21.0
17		22.0	21.0	21.0		22.5	22.0	21.0
18		23.0	19.0	21.0		22.0	17.0	21.0
19		21.5	20.0			23.0	19.0	21.5
20		22.5	18.5			22.0	19.0	19.5
21		22.0				23.0	17.0	21.0
22		20.0				22.5	18.0	21.0
23						23.0	16.0	22.0
24						22.0		21.5
25						23.0		21.0
26						18.0		
27								
28								
29								
30								
31								
# Survivors	5	22	20	18	9	26	23	25
Average Length (mm)	**19.500**	**22.273**	**20.825**	**20.861**	**19.778**	**22.038**	**20.674**	**21.140**
Pooled Weight (g)	0.63	2.30	2.23	1.92	0.94	2.97	2.56	2.38
Pooled Weight (mg)	**630**	**2300**	**2230**	**1920**	**940**	**2970**	**2560**	**2380**
Average Weight (g)	0.126	0.105	0.112	0.107	0.104	0.114	0.111	0.095
= abnormal								

Feb 3/20

Embryo - Alevin Test - Lengths, Wet Weights, Normality Assessment

Client : Teck WO#: 192275

p3 8/8

	LC_LC5				LC_LCDSSLCC			
Fish #	**100 A**	**100 B**	**100 C**	**100 D**	**100 A**	**100 B**	**100 C**	**100 D**
1	22.0	22.5	23.0	20.0	20.5	22.0	22.0	21.5
2	22.0	21.5	23.0	22.0	18.0	22.5	22.5	21.5
3	20.0	21.0	21.0	23.0	20.5	23.0	22.5	22.0
4	20.5	23.0	23.0	20.5	22.5	22.5	21.5	21.5
5	21.5	23.0	20.0	21.0		22.5	23.0	19.0
6	21.5	21.5	21.5	20.5		22.0	21.0	22.0
7	23.0	22.0	23.0	22.0		22.5	23.0	22.5
8	22.5	22.0	20.5	20.5		23.0	23.0	21.0
9	19.0	22.0	19.0	19.5		19.0	22.0	21.5
10		23.0	23.5	18.5		22.0	22.0	21.0
11		22.0	23.5	19.5		22.5	23.5	21.5
12		21.5	23.0	22.0		22.0	23.5	21.5
13		23.0	21.0	20.0		22.0	21.5	22.0
14		23.0	21.0	21.5		23.0	22.0	23.5
15		22.0	23.5	20.5		23.0	22.0	21.0
16		22.0	19.0	21.0		22.0	23.5	21.5
17		22.0	19.5	22.0		19.5	23.0	21.5
18		23.0	18.5	21.5		22.0	21.0	22.5
19		20.0	20.0	20.5		22.0	23.0	20.5
20		23.5	20.0	21.5		21.5	22.0	22.5
21		21.5	19.0	18.5		21.0	21.0	21.5
22			17.0	20.0		22.5	22.5	18.0
23			18.0			22.5	22.5	
24						22.0	16.5	
25							21.0	
26							19.5	
27								
28								
29								
30								
31								
# Survivors	9	21	23	22	4	24	26	22
Average Length (mm)	**21.333**	**22.143**	**20.891**	**20.727**	**20.375**	**22.021**	**21.942**	**21.409**
Pooled Weight (g)	0.84	2.17	2.44	2.25	0.37	2.61	2.96	2.39
Pooled Weight (mg)	**840**	**2170**	**2440**	**2250**	**370**	**2610**	**2960**	**2390**
Average Weight (g)	0.093	0.103	0.106	0.102	0.093	0.109	0.114	0.109
= abnormal								

Feb. 3/20

Client: Teck

W.O.#: 192275

Hardness and Alkalinity Datasheet

		Alkalinity						Hardness			
	Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
week1	Dechlor	Nov. 13/19	Nov. 13/19	100	1.0	1.1	9	100	0.9	9	[illegible]
week2	Dechlor	Nov. 20/19	Nov. 20/19	100	0.8	0.9	7	100	0.8	8	[illegible]
week3	Dechlor	Nov. 27/19	Nov. 27/19	100	0.9	1.0	8	100	0.9	9	[illegible]
week4	Dechlor	Dec. 4/19	Dec. 4/19	100	0.7	0.8	6	100	0.8	8	[illegible]
week5	Dechlor	Dec. 11/19	Dec. 11/19	100	0.8	0.9	7	100	1.0	10	[illegible]

Notes:

Reviewed by: [illegible] Date Reviewed: Jan. 24, 2020

Client: Teck

W.O.#: 192275

R3 2/6

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
~~Control~~	~~Nov. 14/19~~	~~Nov. 15/19~~	50	~~3.0~~	~~3.1~~	~~58~~	~~50 ①~~	~~6.8~~	~~136~~	~~SM~~
FR_UFR1	Nov 14/19	Nov 15/19	50	6.7	6.8	132	50 ①	8.9	178	SM
GH_ER2			50	6.9	7.0	136	10 ②	2.7	~~SM~~ 270	
CM_MC1			50	6.4	6.5	126	50 ①	6.9	~~SM~~ 138	
LC_SLC			50	6.6	6.7	130	10 ②	2.0	200	
FR_FRCP1			50	10.1	10.2	200	10 ②	7.2	720	
FR_FRABCH			50	10.9	11.0	216	10 ②	6.7	670	
GH_FR1			50	10.6	10.7	210	10 ②	4.9	490	
GH_ERC			50	8.3	8.4	164	10 ②	1.8	180	
CM_MC2			50	11.4	11.5	226	10 ②	5.5	550	
~~RG_MIDAG~~		~~Nov. 19/19~~	50	~~10.1~~	~~10.2~~	~~200~~	~~10 ②~~	~~4.2 ③~~ SM	320	SM ② 3.2 ④ 3.4
EV_MC2	Nov 14/19	Nov 19/19	50	10.3	10.4	204	10 ②	~~4.4 ⑤~~ SM	340	
EV_HC1			50	10.7	10.8	212	10 ②	4.0	400	
LC_LCD55LCC			50	10.6	10.7	210	10 ②	4.3	430	
LC_LC3			50	11.6	11.7	230	10 ③	6.4	640	
LC_LC5			50	10.5	10.6	208	10 ②	3.9	390	
LC_DCD5	↓	↓	50	8.0	8.1	158	10 ②	3.7	370	
~~EDTA Control~~			~~50~~	~~3.2~~	~~3.3~~	~~62~~	~~10 ④~~	~~1.4~~	~~140~~	~~WS~~
~~FR_FRCP1 + EDTA~~			~~50~~	~~11.2~~	~~11.3~~	~~222~~	~~10 ②~~	~~6.8~~	~~680~~	~~✓~~
~~CM_MC2 + EDTA~~			~~50~~	~~10.7~~	~~10.8~~	~~212~~	~~10 ②~~	~~5.4~~	~~540~~	~~✓~~
~~MIDAG + EDTA~~			50	9.5	9.6	188	10 ②	3.3	320	✓
~~Notes:~~										

Day 0 / WK 1

Notes: ① diluted to 100mL w/ 50mL DI water, ② diluted to 100mL w/ 90mL DI water

Reviewed by: [signature]

Date Reviewed: Jan. 21, 2020

Client: Tecks

W.O.#: 1922795

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR_UFR1	Nov. 20/19	Nov. 21/19	50	7.3	7.4	144	10 ①	1.7	170	SY
GH_ER2			50	7.6	7.7	150	10 ①	2.4	240	
CM_MC1			50	7.7	7.8	152	~~10~~ 50	6.9	~~240~~ 138	
LC_SLC			50	SY 7.3	7.5	142	10 ①	2.0	200	
FR_FRCP1			50	10.6	10.7	210	10 ①	7.4	740	
FR_FRABCH			50	12.0	12.1	238	10 ①	6.6	660	
GH_FR1			50	11.0	11.1	218	10 ①	4.8	480	
GH_ERC			50	8.4	8.5	166	10 ①	1.8	180	
CM_MC2			50	11.5	11.6	228	10 ①	5.7	570	
~~RG_MIDAG~~		~~Nov. 22/19~~	~~50~~	~~9.6~~	~~9.7~~	~~190~~	~~10 ①~~	~~2.8~~	~~280~~	
EV_MC2	Nov. 20/19	Nov. 27/19	50	9.6	9.7	190	10 ①	5.1	310	SY
EV_HCl			50	11.0	11.1	218	10 ①	4.0	400	
LC_LCDSSL			50	10.5	10.6	208	10 ①	4.6	460	
LC_LC3			50	12.1	12.2	240	10 ①	6.6	660	
LC_LC5			50	10.5	10.6	208	10 ①	3.9	390	
LC_DCDS		Nov. 25/19	50	7.9	8.0	156	10 ①	3.5	350	
~~EDTA control~~			~~50~~	~~3.3~~	~~3.4~~	~~64~~	~~10 ①~~	~~1.2~~	~~120~~	
~~FR_FRCP1 + EDTA~~			~~50~~	~~11.1~~	~~11.2~~	~~220~~	~~10 ①~~	~~6.4~~	~~640~~	
~~CM_MC2 + EDTA~~			~~50~~	~~11.0~~	~~11.1~~	~~218~~	~~10 ①~~	~~5.5~~	~~550~~	
~~RG_MIDAG + EDTA~~			~~50~~	~~9.6~~	~~9.7~~	~~190~~	~~10 ①~~	~~3.8~~	~~380~~	

~~Day 7~~ Week 2

Notes: ① diluted w/ DI water to 100mL

Reviewed by: [signature]

Date Reviewed: Jan. 29, 2020

Client: Teck

W.O.#: 1922795

PS 4/6

Hardness and Alkalinity Datasheet

Sample ID	Alkalinity: Subsample Date	Alkalinity: Date Measured	Alkalinity: Sample Volume (mL)	Alkalinity: (mL) 0.02N HCL/H_2SO_4 used to pH 4.5	Alkalinity: (mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Alkalinity: Total Alkalinity (mg/L$CaCO_3$)	Hardness: Sample Volume (mL)	Hardness: Volume of 0.01M EDTA Used (mL)	Hardness: Total Hardness (mg/L $CaCO_3$)	Technician
FR_UFR1	Nov.27/19	Nov.28/19	50	7.1	7.2	140	10 ①	1.9	190	SY
GH_ER2			50	7.8	7.9	154	10 ①	2.3	230	
CM_MC1			50	6.9	7.0	136	10 ①	1.3	130	
LC_SLC			50	7.6	7.7	150	10 ①	2.0	200	
FR_FRCP1			50	13.6	13.7	270	10 ①	7.2	720	
~~Jag 14~~ FR_FRABCH		Nov. 29/19	50	12.3	12.4	244	10 ①	6.5	650	
GH_FR1			50	10.9	11.0	216	10 ①	4.9	490	
WK 3 GH_ERC			50	8.4	8.5	166	10 ①	1.7	170	
CM_MC2			50	11.6	11.7	230	10 ①	5.7	570	
~~RG_MIDAG~~			~~50~~	~~9.6~~	~~9.7~~	~~190~~	~~10 ①~~	~~3.8~~	~~380~~	
EV_MC2	Nov. 27/19	Nov. 29/19	50	9.7	9.9	190	10 ①	3.2	320	SY
EV_HC1			50	10.5	10.6	208	10 ①	4.2	420	
LC_LCDSSLLC SY ~~LC-DSSL~~			50	10.3	10.4	204	10 ①	5.0	500	
LC_LC3			50	12.0	12.1	238	10 ①	~~6.0~~ ②	620	6.2 ②
LC_LC5			50	10.1	10.2	200	10 ①	4.4	440	
LC_DCDS			50	7.8	7.9	154	10 ①	4.0	400	
~~EDTA Control~~			~~50~~	~~3.3~~	~~3.4~~	~~64~~	~~10 ①~~	~~1.2~~	~~120~~	
~~FR_FRCP1 + EDTA~~			~~50~~	~~11.6~~	~~11.7~~	~~230~~	~~10 ①~~	~~7.7~~	~~770~~	
~~CM_MC2 + EDTA~~			~~50~~	~~10.9~~	~~11.1~~	~~214~~	~~10 ①~~	~~5.5~~	~~550~~	
~~RG_MIDAG + EDTA~~			~~50~~	~~9.5~~	~~9.6~~	~~188~~	~~10 ①~~	~~3.6~~	~~360~~	

Notes: ① diluted to 100mL w/ 90mL DI Water

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Client: Teck

W.O.#: 19227~~8~~5

PS 5/6

Hardness and Alkalinity Datasheet

Sample ID	Alkalinity: Subsample Date	Alkalinity: ② Dec 6/19 Date Measured	Alkalinity: Sample Volume (mL)	Alkalinity: (mL) 0.02N HCL/H_2SO_4 used to pH 4.5	Alkalinity: (mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Alkalinity: Total Alkalinity (mg/L$CaCO_3$)	Hardness: Sample Volume (mL)	Hardness: Volume of 0.01M EDTA Used (mL)	Hardness: Total Hardness (mg/L $CaCO_3$)	Technician
FR_UFR1	Dec. 4/19	~~50~~ ①	50	7.7	7.8	152	10 ①	2.3	230	8
GH_ER2				8.1	8.2	160		2.8	280	8
CM_MC1				7.6	7.7	150		2.5	250	8
LC_SLC				7.6	7.7	150		3.2	320	8
FR_FRCP1				14.4	14.5	286		9.9	990	8
FR_FRABCH				12.2	12.3	242		7.5	750	8
GH_FR1				10.8	10.9	214		5.5	550	8
GH_ERC				8.1	8.2	160		3.7	370	8
CM_MC2				11.2	11.3	222		7.0	700	8
~~RG_MIDAG~~				~~9.6~~	~~9.7~~	~~190~~		~~4.5~~	~~450~~	~~8~~
EV_MC2	Dec. 4/19	Dec. 6/19	50	9.4	9.5	186	10 ①	4.2	420	8
EV_HC1				10.5	10.6	208		5.2	520	8
LC_LCDSSLCC				10.3	10.4	204		5.5	550	8
LC_LC3				11.5	11.6	228		8.5	850	8
LC_LC5				9.8	9.9	194		5.6	560	8
LC_DCDS				8.1	8.2	160		6.5	650	8
~~EDTA CONTROL~~				~~3.5~~	~~3.6~~	~~68~~		~~2.9~~	~~290~~	~~8~~
~~FR_FRCP1+EDTA~~				~~14.3~~	~~14.4~~	~~284~~		~~10.1~~	~~1010~~	~~8~~
~~CM_MC2+EDTA~~				~~11.2~~	~~11.3~~	~~222~~		~~6.0~~	~~600~~	~~8~~
~~RG_MIDAG+EDTA~~				~~9.3~~	~~9.2~~ 9.4	~~184~~		~~4.8~~	~~480~~	~~8~~

~~Jan 21~~

Week ~~8~~ 4

Notes: ① Diluted to 100mL w/ 90mL DI water

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Client: Teck

W.O.#: 192275

R3 6/6

Hardness and Alkalinity Datasheet

		Alkalinity						Hardness			
	Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
week 5	Dechlor	Dec. 11/19	Dec 11/19	100	0.9	0.9	7	100	1.0	10	MM
	FR_UFR1	↓	↓	50	7.6	7.7	MD ~~150~~ 150	50	9.3	186	MD
	GH-ER2			50	7.5	7.6	MD ~~140~~ 148	50	8.6	172	↓
	CM-MC1			50	7.1	7.2	MD ~~100~~ 140	50	8.7	174	
	LC_SLC			50	7.0	7.1	MD ~~690~~ 138	50	11.0	220	
	FR_FRABCH			50	11.2	11.3	222	10①	6.7	670	
	FR_FRCP1			50	11.4	11.6	224	10①	8.5	850	
	GH-FR1			50	10.0	10.1	198	10①	5.7	570	
	GH-ERC			50	7.8	7.9	154	50	~~9.4~~ 9.4	188	
	CM-MC2			50	10.5	10.6	208	10①	5.9	590	
	EV_MC2			50	8.5	8.6	168	10①	3.6	360	
	EV_MC1			50	9.6	9.8	188	10①	5.0	500	
	LC_DCDS			50	7.3	7.4	144	10①	4.9	490	
	LC_LC3			50	10.7	10.9	210	10①	7.6	760	
	LC_LC5			50	9.1	9.2	180	10①	4.5	450	
	LC_LCDSSLCC	↓	↓	50	9.4	9.5	186	10①	4.9	490	↓

Notes: ① diluted to 100mL with DI water

Reviewed by: [signature]

Date Reviewed: Jan. 24, 2020

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Batch ID:	09-0261-3280	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	18-2867-3301	13 Nov-19	13 Nov-19	15h	Teck Coal	
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)		
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

- Only 3 replicates used in statistical analyses (Rep A excluded due to possible poor egg quality.)

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	control	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪ ⑫ ⑬ ⑭ ⑮ ⑯ ⑰ ⑱ ⑲ ⑳ ㉑ ㉒ ㉓ ㉔ ㉕ ㉖ ㉗ ㉘ ㉙ ㉚ ㉛ ㉜ ㉝ ㉞ ㉟ ㊱ ㊲ ㊳ ㊴ ㊵ ㊶ ㊷ ㊸ ㊹ ㊺ ㊻ ㊼ ㊽ ㊾ ㊿

① reference sites

+20 mg/L Ca

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	CM_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	CM_MC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	LC_SLC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	FR_FRABCH passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	Control passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	GH_FR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	LC_LCDSSLCC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	GH_ER2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	GH_ERC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	FR_UFR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	EV_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	EV_HC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	LC_DCDS passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	LC_LC3 passed proportion normal	1

Salmonid Embryo Survival and Development Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	LC_LC5 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	FR_FRCP1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	LC_LC3 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	FR_FRCP1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	CM_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	CM_MC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	GH_ERC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	LC_DCDS passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	FR_UFR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	FR_FRABCH passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	LC_SLC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	EV_HC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	GH_ER2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	LC_LC5 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	EV_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	LC_LCDSSLCC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	GH_FR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.8205	Control passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	LC_LC3 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	FR_FRCP1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	EV_HC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	GH_FR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	LC_DCDS passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	CM_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	LC_SLC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	Control passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	FR_FRABCH passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	EV_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	LC_LCDSSLCC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	CM_MC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	GH_ER2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	GH_ERC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	LC_LC5 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2592	FR_UFR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	GH_FR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_LC3 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_LC5 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_SLC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	EV_HC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_FRCP1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	GH_ER2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	Control passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	GH_ERC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	EV_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_LCDSSLCC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_UFR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	LC_DCDS passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	CM_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	CM_MC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.5499	FR_FRABCH passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	LC_SLC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	LC_LC3 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	Control failed proportion normal	1

Salmonid Embryo Survival and Development Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	GH_FR1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	GH_ER2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	FR_FRCP1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	FR_FRABCH failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	EV_MC2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	GH_ERC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	EV_HC1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	FR_UFR1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	LC_LCDSSLCC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	LC_LC5 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	LC_DCDS failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	CM_MC2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0346	CM_MC1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	FR_UFR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	Control passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	LC_LCDSSLCC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	FR_FRCP1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	GH_FR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	CM_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	LC_LC3 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	EV_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	LC_SLC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	CM_MC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	EV_HC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	LC_DCDS passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	GH_ERC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	LC_LC5 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	GH_ER2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	FR_FRABCH passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	LC_LC3 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	CM_MC1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	GH_FR1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	GH_ERC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	LC_LC5 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	FR_FRCP1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	GH_ER2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	FR_FRABCH failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	LC_DCDS failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	LC_SLC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	CM_MC2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	EV_MC2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	LC_LCDSSLCC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	FR_UFR1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	EV_HC1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	2.0E-05	Control failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	FR_UFR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	FR_FRABCH passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	CM_MC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	Control passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	GH_FR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	LC_SLC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	GH_ER2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	LC_DCDS passed proportion normal	1

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	LC_LC3 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	CM_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	FR_FRCP1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	LC_LC5 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	GH_ERC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	EV_HC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	EV_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.9527	LC_LCDSSLCC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	FR_FRCP1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	CM_MC2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	LC_SLC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	LC_LC3 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	EV_MC2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	GH_ER2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	CM_MC1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	GH_ERC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	FR_UFR1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	FR_FRABCH failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	Control failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	LC_LC5 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	GH_FR1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	LC_LCDSSLCC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	LC_DCDS failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	EV_HC1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	FR_UFR1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	CM_MC1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	EV_HC1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	FR_FRABCH failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	EV_MC2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	LC_SLC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	Control failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	LC_LC3 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	GH_ERC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	GH_ER2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	FR_FRCP1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	CM_MC2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	LC_LC5 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	GH_FR1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	LC_DCDS failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0033	LC_LCDSSLCC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	LC_SLC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	LC_DCDS passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	CM_MC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	GH_ER2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	LC_LC5 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	GH_FR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	LC_LCDSSLCC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	CM_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	LC_LC3 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	Control passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	EV_HC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	EV_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	FR_FRCP1 passed proportion normal	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	FR_UFR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	FR_FRABCH passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1415	GH_ERC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	LC_LC3 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	LC_DCDS failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	LC_LC5 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	CM_MC1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	GH_ER2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	GH_ERC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	Control failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	FR_FRCP1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	FR_UFR1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	EV_MC2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	FR_FRABCH failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	EV_HC1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	LC_LCDSSLCC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	LC_SLC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	GH_FR1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	3.7E-05	CM_MC2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	LC_LCDSSLCC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	GH_ERC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	CM_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	LC_LC3 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	Control passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	GH_FR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	LC_LC5 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	GH_ER2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	FR_UFR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	EV_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	FR_FRABCH passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	LC_DCDS passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	LC_SLC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	EV_HC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	FR_FRCP1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0625	CM_MC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	GH_ERC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	FR_UFR1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	Control failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	EV_MC2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	LC_DCDS failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	CM_MC2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	LC_LC3 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	LC_LCDSSLCC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	EV_HC1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	LC_LC5 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	FR_FRCP1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	FR_FRABCH failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	LC_SLC failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	CM_MC1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	GH_ER2 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	9.1E-04	GH_FR1 failed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	LC_LC5 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	FR_FRCP1 passed proportion normal	1

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Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	LC_LC3 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	GH_ERC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	LC_DCDS passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	FR_UFR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	EV_HC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	CM_MC1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	GH_ER2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	EV_MC2 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	LC_SLC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	FR_FRABCH passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	GH_FR1 passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	LC_LCDSSLCC passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	Control passed proportion normal	1
04-1041-3873	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.1734	CM_MC2 passed proportion normal	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	EV_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	CM_MC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	Control passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	FR_FRCP1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	LC_DCDS passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	FR_FRABCH passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	FR_UFR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	LC_LCDSSLCC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	EV_HC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	CM_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	LC_LC3 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	LC_LC5 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	LC_SLC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	GH_ER2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	GH_ERC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0764	GH_FR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	CM_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	LC_SLC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	EV_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	FR_FRCP1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	FR_FRABCH passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	LC_LC5 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	LC_LC3 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	Control passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	LC_DCDS passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	GH_FR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	FR_UFR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	EV_HC1 passed survival rate	1

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08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	LC_LCDSSLCC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	GH_ERC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	GH_ER2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	CM_MC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	LC_LCDSSLCC failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	GH_FR1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	EV_HC1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	CM_MC1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	FR_FRCP1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	LC_SLC failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	LC_LC5 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	Control failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	GH_ER2 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	GH_ERC failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	LC_LC3 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	CM_MC2 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	LC_DCDS failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	EV_MC2 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	FR_UFR1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.1E-04	FR_FRABCH failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRABCH passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_UFR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_SLC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_FR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	Control passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ER2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_HC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_DCDS passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	GH_ERC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LCDSSLCC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	EV_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC3 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	CM_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	LC_LC5 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	1.0000	FR_FRCP1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	GH_ERC failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	FR_FRCP1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	Control failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	GH_ER2 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	LC_LCDSSLCC failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	LC_LC5 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	LC_DCDS failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	CM_MC1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	FR_UFR1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	FR_FRABCH failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	EV_HC1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	LC_LC3 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	EV_MC2 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	CM_MC2 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	GH_FR1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0383	LC_SLC failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	FR_FRABCH failed survival rate	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	FR_FRCP1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	LC_DCDS failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	LC_SLC failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	CM_MC1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	LC_LC3 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	LC_LC5 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	FR_UFR1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	GH_ERC failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	LC_LCDSSLCC failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	Control failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	EV_HC1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	EV_MC2 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	CM_MC2 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	GH_ER2 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0249	GH_FR1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	CM_MC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	LC_LC3 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	CM_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	LC_LC5 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	GH_FR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	GH_ER2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	LC_LCDSSLCC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	FR_FRCP1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	FR_UFR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	EV_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	FR_FRABCH passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	EV_HC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	Control passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	GH_ERC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	LC_DCDS passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4213	LC_SLC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	FR_FRCP1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	FR_FRABCH failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	EV_HC1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	LC_LC5 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	GH_FR1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	GH_ERC failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	CM_MC1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	CM_MC2 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	FR_UFR1 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	LC_LCDSSLCC failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	LC_DCDS failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	LC_LC3 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	LC_SLC failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	GH_ER2 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	Control failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	6.7E-04	EV_MC2 failed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	FR_UFR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	GH_ER2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	CM_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	FR_FRCP1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	LC_LC5 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	LC_LC3 passed survival rate	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	LC_DCDS passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	EV_HC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	GH_ERC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	CM_MC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	LC_LCDSSLCC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	GH_FR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	Control passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	FR_FRABCH passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	LC_SLC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.4353	EV_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	GH_ERC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	FR_UFR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	Control passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	EV_HC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	LC_DCDS passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	LC_LCDSSLCC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	GH_FR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	EV_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	LC_LC3 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	CM_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	FR_FRABCH passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	LC_LC5 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	LC_SLC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	CM_MC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	FR_FRCP1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.0518	GH_ER2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	LC_LC5 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	LC_DCDS passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	EV_HC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	EV_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	LC_LC3 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	CM_MC2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	FR_FRCP1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	LC_LCDSSLCC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	FR_UFR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	GH_FR1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	Control passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	FR_FRABCH passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	LC_SLC passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	CM_MC1 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	GH_ER2 passed survival rate	1
08-0390-6804	Survival Rate	Fisher Exact/Bonferroni-Holm Test	0.5142	GH_ERC passed survival rate	1

Salmonid Embryo Survival and Development Test **Nautilus Environmental**

Proportion Normal Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	N	3	0.8889	0.6499	1.0000	0.8333	1.0000	0.0556	0.0962	10.83%	0.00%
① FR_UFR1		3	0.8667	0.5681	1.0000	0.7333	0.9667	0.0694	0.1202	13.87%	2.50%
① GH_ER2		3	0.8667	0.7839	0.9495	0.8333	0.9000	0.0193	0.0333	3.85%	2.50%
① CM_MC1		3	0.7889	0.4542	1.0000	0.6667	0.9333	0.0778	0.1347	17.08%	11.25%
① LC_SLC		3	0.8192	0.5561	1.0000	0.7241	0.9333	0.0611	0.1059	12.93%	7.84%
FR_FRABCH		3	0.7199	0.5571	0.8827	0.6667	0.7931	0.0378	0.0655	9.10%	19.01%
FR_FRCP1		3	0.7636	0.6691	0.8581	0.7241	0.8000	0.0220	0.0380	4.98%	14.09%
GH_FR1	±20	3	0.5738	0.2716	0.8760	0.4333	0.6452	0.0702	0.1216	21.20%	35.45%
GH_ERC	mg/L Cu	3	0.8529	0.5911	1.0000	0.7586	0.9667	0.0609	0.1054	12.36%	4.05%
CM_MC2		3	0.6667	0.5839	0.7495	0.6333	0.7000	0.0193	0.0333	5.00%	25.00%
EV_MC2		3	0.6667	0.5011	0.8323	0.6000	0.7333	0.0385	0.0667	10.00%	25.00%
EV_HC1		3	0.7667	0.5476	0.9857	0.6667	0.8333	0.0509	0.0882	11.50%	13.75%
LC_DCDS		3	0.5850	0.2990	0.8709	0.4828	0.7097	0.0665	0.1151	19.68%	34.19%
LC_LC3		3	0.7367	0.3574	1.0000	0.5667	0.8621	0.0881	0.1527	20.72%	17.13%
LC_LC5		3	0.6391	0.3642	0.9140	0.5172	0.7333	0.0639	0.1107	17.31%	28.10%
LC_LCDSSLCC		3	0.7640	0.6804	0.8476	0.7333	0.8000	0.0194	0.0337	4.41%	14.05%

Survival Rate Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	N	3	0.9000	0.6809	1.0000	0.8333	1.0000	0.0509	0.0882	9.80%	0.00%
① FR_UFR1		3	0.9111	0.7387	1.0000	0.8333	0.9667	0.0401	0.0694	7.62%	-1.23%
① GH_ER2		3	0.9111	0.7027	1.0000	0.8333	1.0000	0.0484	0.0839	9.21%	-1.23%
① CM_MC1		3	0.8667	0.6476	1.0000	0.7667	0.9333	0.0509	0.0882	10.18%	3.70%
① LC_SLC		3	0.8751	0.6245	1.0000	0.7586	0.9333	0.0582	0.1009	11.53%	2.77%
FR_FRABCH		3	0.7540	0.5073	1.0000	0.6667	0.8621	0.0574	0.0993	13.17%	16.22%
FR_FRCP1		3	0.8092	0.7174	0.9010	0.7667	0.8333	0.0213	0.0369	4.57%	10.09%
GH_FR1	±20 mg/L Cu	~~3~~ 23	~~0.6976~~ 0.6206	~~0.0315~~	~~1.0000~~	~~0.6452~~ 0.4667	0.7500	0.0524	~~0.0741~~ 0.1433	~~10.63%~~	~~22.49%~~
GH_ERC		3	0.8985	0.6771	1.0000	0.8333	1.0000	0.0514	0.0891	9.92%	0.17%
CM_MC2		3	0.7333	0.5143	0.9524	0.6333	0.8000	0.0509	0.0882	12.03%	18.52%
EV_MC2		3	0.7222	0.4693	0.9752	0.6333	0.8333	0.0588	0.1018	14.10%	19.75%
EV_HC1		3	0.8000	0.6344	0.9656	0.7333	0.8667	0.0385	0.0667	8.33%	11.11%
LC_DCDS		3	0.6539	0.4557	0.8522	0.5625	0.7097	0.0461	0.0798	12.21%	27.34%
LC_LC3		3	0.8137	0.6952	0.9323	0.7667	0.8621	0.0276	0.0477	5.86%	9.58%
LC_LC5		3	0.7421	0.6250	0.8593	0.7000	0.7931	0.0272	0.0472	6.36%	17.54%
LC_LCDSSLCC		3	0.8084	0.6730	0.9438	0.7586	0.8667	0.0315	0.0545	6.74%	10.17%

① Reference Sites

Salmonid Embryo Survival and Development Test **Nautilus Environmental**

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Control	N	1.0000	0.8333	0.8333
① FR_UFR1		0.9667	0.7333	0.9000
① GH_ER2		0.8333	0.9000	0.8667
① CM_MC1		0.9333	0.7667	0.6667
① LC_SLC		0.9333	0.8000	0.7241
FR_FRABCH		0.6667	0.7931	0.7000
FR_FRCP1		0.7667	0.7241	0.8000
GH_FR1	+20 mg/L Cu	0.6452	0.6429	0.4333
GH_ERC		0.8333	0.7586	0.9667
CM_MC2		0.6333	0.6667	0.7000
EV_MC2		0.6667	0.7333	0.6000
EV_HC1		0.8000	0.6667	0.8333
LC_DCDS		0.7097	0.4828	0.5625
LC_LC3		0.7812	0.5667	0.8621
LC_LC5		0.6667	0.5172	0.7333
LC_LCDSSLCC		0.8000	0.7333	0.7586

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Control	N	1.0000	0.8667	0.8333
① FR_UFR1		0.9667	0.8333	0.9333
① GH_ER2		0.8333	1.0000	0.9000
① CM_MC1		0.9333	0.9000	0.7667
① LC_SLC		0.9333	0.9333	0.7586
FR_FRABCH		0.6667	0.8621	0.7333
FR_FRCP1		0.7667	0.8276	0.8333
GH_FR1	+20 mg/L Cu	0.6452	0.7500	0.4667
GH_ERC		0.8333	0.8621	1.0000
CM_MC2		0.6333	0.7667	0.8000
EV_MC2		0.7000	0.8333	0.6333
EV_HC1		0.8000	0.7333	0.8667
LC_DCDS		0.7097	0.6897	0.5625
LC_LC3		0.8125	0.7667	0.8621
LC_LC5		0.7000	0.7931	0.7333
LC_LCDSSLCC		0.8000	0.8667	0.7586

① Reference Sites

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Proportion Normal Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
Control	N	30/30	25/30	25/30
① FR_UFR1		29/30	22/30	27/30
① GH_ER2		25/30	27/30	26/30
① CM_MC1		28/30	23/30	20/30
① LC_SLC		28/30	24/30	21/29
FR_FRABCH	+20	20/30	23/29	21/30
FR_FRCP1	ug/L Cu	23/30	21/29	24/30
GH_FR1		20/31	18/28	13/30
GH_ERC		25/30	22/29	29/30
CM_MC2		19/30	20/30	21/30
EV_MC2		20/30	22/30	18/30
EV_HC1		24/30	20/30	25/30
LC_DCDS		22/31	14/29	18/32
LC_LC3		25/32	17/30	25/29
LC_LC5		20/30	15/29	22/30
LC_LCDSSLCC		24/30	22/30	22/29

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
Control	N	30/30	26/30	25/30
① FR_UFR1		29/30	25/30	28/30
① GH_ER2		25/30	30/30	27/30
① CM_MC1		28/30	27/30	23/30
① LC_SLC		28/30	28/30	22/29
FR_FRABCH		20/30	25/29	22/30
FR_FRCP1		23/30	24/29	25/30
GH_FR1	+20	20/31	21/28	14/30
GH_ERC	ug/L Cu	25/30	25/29	30/30
CM_MC2		19/30	23/30	24/30
EV_MC2		21/30	25/30	19/30
EV_HC1		24/30	22/30	26/30
LC_DCDS		22/31	20/29	18/32
LC_LC3		26/32	23/30	25/29
LC_LC5		21/30	23/29	22/30
LC_LCDSSLCC		24/30	26/30	22/29

① Reference Sites

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	08-0390-6804	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:18	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-0261-3280	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	18-2867-3301	13 Nov-19	13 Nov-19	15h	Teck Coal	
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)		
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

5 Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	control	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	0.6943	Exact	1.0000	Non-Significant Effect
		GH_ER2	0.6943	Exact	1.0000	Non-Significant Effect
		CM_MC1	0.3216	Exact	1.0000	Non-Significant Effect
		LC_SLC	0.3962	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.0076	Exact	0.0764	Non-Significant Effect
		FR_FRCP1	0.0643	Exact	0.5142	Non-Significant Effect
		GH_FR1*	0.0000	Exact	1.1E-04	Significant Effect
		GH_ERC	0.5880	Exact	1.0000	Non-Significant Effect
		CM_MC2*	0.0032	Exact	0.0383	Significant Effect
		EV_MC2*	0.0019	Exact	0.0249	Significant Effect
		EV_HC1	0.0468	Exact	0.4213	Non-Significant Effect
		LC_DCDS*	0.0000	Exact	6.7E-04	Significant Effect

Analyst: _____ QA: Feb. 3/20

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	08-0390-6804	**Endpoint:** Survival Rate	**CETIS Version:** CETISv1.9.4
Analyzed:	31 Jan-20 11:18	**Analysis:** STP 2xK Contingency Tables	**Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC3	0.0725	Exact	0.4353	Non-Significant Effect
		LC_LC5	0.0047	Exact	0.0518	Non-Significant Effect
		LC_LCDSSLCC	0.0643	Exact	0.5142	Non-Significant Effect

+20 mg/L CV

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control	N	81	9	90	0.9	0.1	-22.73%
① FR_UFR1		82	8	90	0.9111	0.08889	-24.24%
① GH_ER2		82	8	90	0.9111	0.08889	-24.24%
① CM_MC1		78	12	90	0.8667	0.1333	-18.18%
① LC_SLC		78	11	89	0.8764	0.1236	-19.51%
FR_FRABCH		67	22	89	0.7528	0.2472	-2.66%
FR_FRCP1		72	17	89	0.809	0.191	-10.32%
GH_FR1		55	34	89	0.618	0.382	15.73%
GH_ERC		80	9	89	0.8989	0.1011	-22.57%
CM_MC2		66	24	90	0.7333	0.2667	0.0%
EV_MC2		65	25	90	0.7222	0.2778	1.52%
EV_HC1		72	18	90	0.8	0.2	-9.09%
LC_DCDS		60	32	92	0.6522	0.3478	11.07%
LC_LC3		74	17	91	0.8132	0.1868	-10.89%
LC_LC5		66	23	89	0.7416	0.2584	-1.12%
LC_LCDSSLCC		72	17	89	0.809	0.191	-10.32%

+20 mg/L CV

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Control	N	1.0000	0.8667	0.8333
① FR_UFR1		0.9667	0.8333	0.9333
① GH_ER2		0.8333	1.0000	0.9000
① CM_MC1		0.9333	0.9000	0.7667
① LC_SLC		0.9333	0.9333	0.7586
FR_FRABCH		0.6667	0.8621	0.7333
FR_FRCP1		0.7667	0.8276	0.8333
GH_FR1		0.6452	0.7500	0.4667
GH_ERC		0.8333	0.8621	1.0000
CM_MC2		0.6333	0.7667	0.8000
EV_MC2		0.7000	0.8333	0.6333
EV_HC1		0.8000	0.7333	0.8667
LC_DCDS		0.7097	0.6897	0.5625
LC_LC3		0.8125	0.7667	0.8621
LC_LC5		0.7000	0.7931	0.7333
LC_LCDSSLCC		0.8000	0.8667	0.7586

+20 mg/L CV

① Reference Sites

Analyst: [signature] QA: Feb. 3/20

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

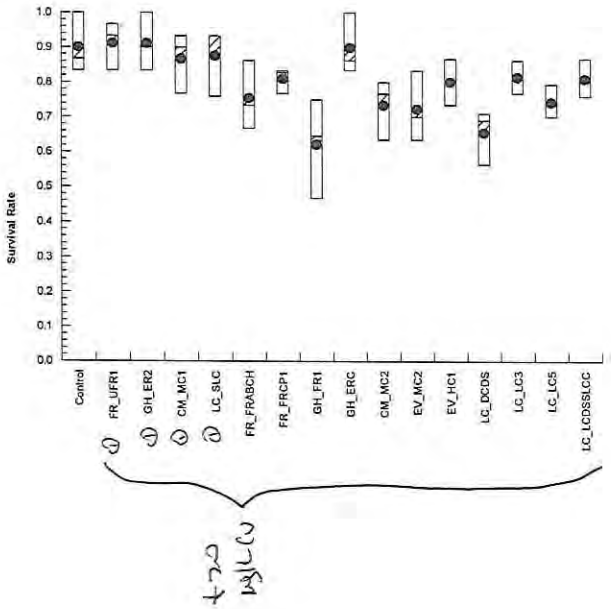
Analysis ID:	08-0390-6804	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:18	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
Control	N	30/30	26/30	25/30
③ FR_UFR1		29/30	25/30	28/30
① GH_ER2		25/30	30/30	27/30
④ CM_MC1		28/30	27/30	23/30
② LC_SLC		28/30	28/30	22/29
FR_FRABCH		20/30	25/29	22/30
FR_FRCP1		23/30	24/29	25/30
GH_FR1		20/31	21/28	14/30
GH_ERC		25/30	25/29	30/30
CM_MC2		19/30	23/30	24/30
EV_MC2		21/30	25/30	19/30
EV_HC1		24/30	22/30	26/30
LC_DCDS		22/31	20/29	18/32
LC_LC3		26/32	23/30	25/29
LC_LC5		21/30	23/29	22/30
LC_LCDSSLCC		24/30	26/30	22/29

+20 mg/L Cu

Graphics



③ ① ④ ② Reference Sites

+20 mg/L Cu

Analyst: WW QA: Feb 3/20

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	04-1041-3873	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:18	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-0261-3280	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	18-2867-3301	13 Nov-19	13 Nov-19	15h	Teck Coal	
① FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)		
① GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
① CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
① LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	control	Teck Coal	Control	
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
① GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
① CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

+20 ug/L CV

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		① FR_UFR1	0.4103	Exact	0.8205	Non-Significant Effect
		① GH_ER2	0.4103	Exact	0.8205	Non-Significant Effect
		① CM_MC1	0.0518	Exact	0.2592	Non-Significant Effect
		① LC_SLC	0.1375	Exact	0.5499	Non-Significant Effect
		FR_FRABCH*	0.0035	Exact	0.0346	Significant Effect
		FR_FRCP1	0.0217	Exact	0.1734	Non-Significant Effect
		GH_FR1*	0.0000	Exact	2.0E-05	Significant Effect
		GH_ERC	0.3176	Exact	0.9527	Non-Significant Effect
		CM_MC2*	0.0003	Exact	0.0033	Significant Effect
		EV_MC2*	0.0003	Exact	0.0033	Significant Effect
		EV_HC1	0.0236	Exact	0.1415	Non-Significant Effect
		LC_DCDS*	0.0000	Exact	3.7E-05	Significant Effect

Analyst: YW QA: Feb 3/20

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID: 04-1041-3873 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.9.4
Analyzed: 31 Jan-20 11:18 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
		LC_LC3	0.0069	Exact	0.0625	Non-Significant Effect
		LC_LC5*	0.0001	Exact	9.1E-04	Significant Effect
		LC_LCDSSLCC	0.0217	Exact	0.1734	Non-Significant Effect

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control	N	80	10	90	0.8889	0.1111	-33.33%
FR_UFR1		78	12	90	0.8667	0.1333	-30.0%
GH_ER2		78	12	90	0.8667	0.1333	-30.0%
CM_MC1		71	19	90	0.7889	0.2111	-18.33%
LC_SLC		73	16	89	0.8202	0.1798	-23.03%
FR_FRABCH		64	25	89	0.7191	0.2809	-7.87%
FR_FRCP1		68	21	89	0.764	0.236	-14.61%
GH_FR1		51	38	89	0.573	0.427	14.04%
GH_ERC		76	13	89	0.8539	0.1461	-28.09%
CM_MC2		60	30	90	0.6667	0.3333	0.0%
EV_MC2		60	30	90	0.6667	0.3333	0.0%
EV_HC1		69	21	90	0.7667	0.2333	-15.0%
LC_DCDS		54	38	92	0.587	0.413	11.96%
LC_LC3		67	24	91	0.7363	0.2637	-10.44%
LC_LC5		57	32	89	0.6404	0.3596	3.93%
LC_LCDSSLCC		68	21	89	0.764	0.236	-14.61%

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Control	N	1.0000	0.8333	0.8333
FR_UFR1		0.9667	0.7333	0.9000
GH_ER2		0.8333	0.9000	0.8667
CM_MC1		0.9333	0.7667	0.6667
LC_SLC		0.9333	0.8000	0.7241
FR_FRABCH		0.6667	0.7931	0.7000
FR_FRCP1		0.7667	0.7241	0.8000
GH_FR1		0.6452	0.6429	0.4333
GH_ERC		0.8333	0.7586	0.9667
CM_MC2		0.6333	0.6667	0.7000
EV_MC2		0.6667	0.7333	0.6000
EV_HC1		0.8000	0.6667	0.8333
LC_DCDS		0.7097	0.4828	0.5625
LC_LC3		0.7812	0.5667	0.8621
LC_LC5		0.6667	0.5172	0.7333
LC_LCDSSLCC		0.8000	0.7333	0.7586

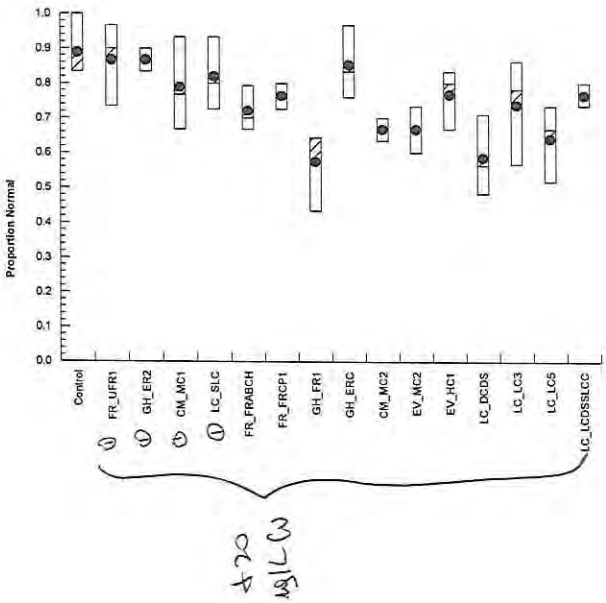
Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	04-1041-3873	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:18	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Proportion Normal Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
Control	N	30/30	25/30	25/30
① FR_UFR1		29/30	22/30	27/30
① GH_ER2		25/30	27/30	26/30
① CM_MC1		28/30	23/30	20/30
① LC_SLC		28/30	24/30	21/29
FR_FRABCH		20/30	23/29	21/30
FR_FRCP1	+20 mg/L Cu	23/30	21/29	24/30
GH_FR1		20/31	18/28	13/30
GH_ERC		25/30	22/29	29/30
CM_MC2		19/30	20/30	21/30
EV_MC2		20/30	22/30	18/30
EV_HC1		24/30	20/30	25/30
LC_DCDS		22/31	14/29	18/32
LC_LC3		25/32	17/30	25/29
LC_LC5		20/30	15/29	22/30
LC_LCDSSLCC		24/30	22/30	22/29

Graphics



① Reference Sites

+20 mg/L Cu

Salmonid Embryo Survival and Development Test

Nautilus Environmental

Analysis ID:	02-0811-5486	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:18	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-0261-3280	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
① GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
① CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
① LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
① GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
① CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

+20 µg/L Cu

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Upstream Control		① GH_ER2	0.6029	Exact	0.6029	Non-Significant Effect
① (FR_UFR1)		① CM_MC1	0.2388	Exact	0.9552	Non-Significant Effect
		① LC_SLC	0.3051	Exact	0.9152	Non-Significant Effect
		FR_FRABCH*	0.0038	Exact	0.0346	Significant Effect
		FR_FRCP1	0.0389	Exact	0.2723	Non-Significant Effect
		GH_FR1*	0.0000	Exact	3.5E-05	Significant Effect
		GH_ERC	0.4902	Exact	0.9805	Non-Significant Effect
		CM_MC2*	0.0015	Exact	0.0165	Significant Effect
		EV_MC2*	0.0009	Exact	0.0105	Significant Effect
		EV_HC1	0.0274	Exact	0.2192	Non-Significant Effect
		LC_DCDS*	0.0000	Exact	2.3E-04	Significant Effect
		LC_LC3	0.0444	Exact	0.2218	Non-Significant Effect
		LC_LC5*	0.0023	Exact	0.0228	Significant Effect
		LC_LCDSSLCC	0.0389	Exact	0.2723	Non-Significant Effect

+20 µg/L Cu

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID: 02-0811-5486 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 31 Jan-20 11:18 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
① FR_UFR1	U	82	8	90	0.9111	0.08889	-24.24%
① GH_ER2		82	8	90	0.9111	0.08889	-24.24%
① CM_MC1		78	12	90	0.8667	0.1333	-18.18%
① LC_SLC		78	11	89	0.8764	0.1236	-19.51%
FR_FRABCH		67	22	89	0.7528	0.2472	-2.66%
FR_FRCP1	+20	72	17	89	0.809	0.191	-10.32%
GH_FR1	ug/L Cu	55	34	89	0.618	0.382	15.73%
GH_ERC		80	9	89	0.8989	0.1011	-22.57%
CM_MC2		66	24	90	0.7333	0.2667	0.0%
EV_MC2		65	25	90	0.7222	0.2778	1.52%
EV_HC1		72	18	90	0.8	0.2	-9.09%
LC_DCDS		60	32	92	0.6522	0.3478	11.07%
LC_LC3		74	17	91	0.8132	0.1868	-10.89%
LC_LC5		66	23	89	0.7416	0.2584	-1.12%
LC_LCDSSLCC		72	17	89	0.809	0.191	-10.32%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1	U	0.9667	0.8333	0.9333
① GH_ER2		0.8333	1.0000	0.9000
① CM_MC1		0.9333	0.9000	0.7667
① LC_SLC		0.9333	0.9333	0.7586
FR_FRABCH		0.6667	0.8621	0.7333
FR_FRCP1		0.7667	0.8276	0.8333
GH_FR1	+20	0.6452	0.7500	0.4667
GH_ERC	ug/L Cu	0.8333	0.8621	1.0000
CM_MC2		0.6333	0.7667	0.8000
EV_MC2		0.7000	0.8333	0.6333
EV_HC1		0.8000	0.7333	0.8667
LC_DCDS		0.7097	0.6897	0.5625
LC_LC3		0.8125	0.7667	0.8621
LC_LC5		0.7000	0.7931	0.7333
LC_LCDSSLCC		0.8000	0.8667	0.7586

Survival Rate Binomials

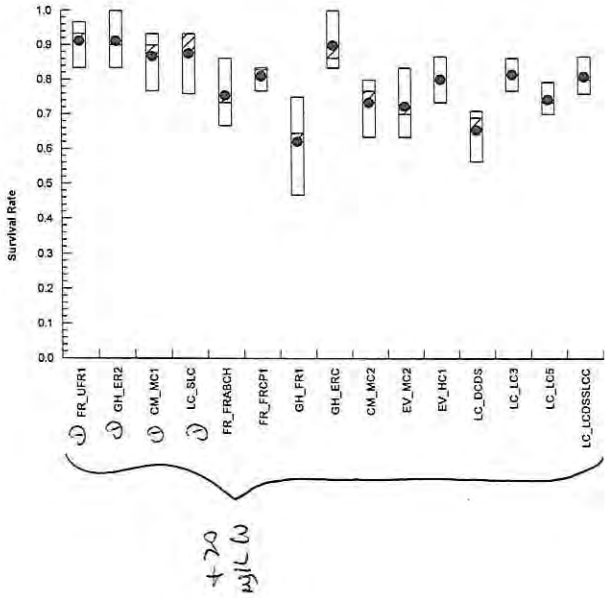
Sample	Code	Rep 1	Rep 2	Rep 3
① GH_ER2		25/30	30/30	27/30
① CM_MC1		28/30	27/30	23/30
① LC_SLC		28/30	28/30	22/29
FR_FRABCH		20/30	25/29	22/30
FR_FRCP1		23/30	24/29	25/30
GH_FR1		20/31	21/28	14/30
GH_ERC	+20	25/30	25/29	30/30
CM_MC2	ug/L Cu	19/30	23/30	24/30
EV_MC2		21/30	25/30	19/30
EV_HC1		24/30	22/30	26/30
LC_DCDS		22/31	20/29	18/32
LC_LC3		26/32	23/30	25/29
LC_LC5		21/30	23/29	22/30
LC_LCDSSLCC		24/30	26/30	22/29

① Reference Sites

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	02-0811-5486	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:18	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference Sites

+20 mg/L Cu

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	00-6647-6784	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:18	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-0261-3280	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
⑤ GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
⑤ CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
① LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
⑤ GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
⑤ CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

+20 mg/L Cu

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Upstream Control		⑤ GH_ER2	0.5865	Exact	0.5865	Non-Significant Effect
① (FR_UFR1)		⑤ CM_MC1	0.1180	Exact	0.4719	Non-Significant Effect
		① LC_SLC	0.2583	Exact	0.7748	Non-Significant Effect
		FR_FRABCH	0.0117	Exact	0.1056	Non-Significant Effect
		FR_FRCP1	0.0569	Exact	0.3985	Non-Significant Effect
		GH_FR1*	0.0000	Exact	1.3E-04	Significant Effect
		GH_ERC	0.4879	Exact	0.9758	Non-Significant Effect
		CM_MC2*	0.0012	Exact	0.0136	Significant Effect
		EV_MC2*	0.0012	Exact	0.0136	Significant Effect
		EV_HC1	0.0612	Exact	0.3061	Non-Significant Effect
		LC_DCDS*	0.0000	Exact	2.4E-04	Significant Effect
		LC_LC3	0.0216	Exact	0.1730	Non-Significant Effect
		LC_LC5*	0.0004	Exact	0.0044	Significant Effect
		LC_LCDSSLCC	0.0569	Exact	0.3985	Non-Significant Effect

+20 mg/L Cu

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID: 00-6647-6784 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.9.4
Analyzed: 31 Jan-20 11:18 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
① FR_UFR1	U	78	12	90	0.8667	0.1333	-30.0%
⑤ GH_ER2		78	12	90	0.8667	0.1333	-30.0%
⑤ CM_MC1		71	19	90	0.7889	0.2111	-18.33%
① LC_SLC		73	16	89	0.8202	0.1798	-23.03%
FR_FRABCH		64	25	89	0.7191	0.2809	-7.87%
FR_FRCP1	+20	68	21	89	0.764	0.236	-14.61%
GH_FR1	mg/L Cu	51	38	89	0.573	0.427	14.04%
GH_ERC		76	13	89	0.8539	0.1461	-28.09%
CM_MC2		60	30	90	0.6667	0.3333	0.0%
EV_MC2		60	30	90	0.6667	0.3333	0.0%
EV_HC1		69	21	90	0.7667	0.2333	-15.0%
LC_DCDS		54	38	92	0.587	0.413	11.96%
LC_LC3		67	24	91	0.7363	0.2637	-10.44%
LC_LC5		57	32	89	0.6404	0.3596	3.93%
LC_LCDSSLCC		68	21	89	0.764	0.236	-14.61%

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1	U	0.9667	0.7333	0.9000
⑤ GH_ER2		0.8333	0.9000	0.8667
⑤ CM_MC1		0.9333	0.7667	0.6667
① LC_SLC		0.9333	0.8000	0.7241
FR_FRABCH		0.6667	0.7931	0.7000
FR_FRCP1	+20	0.7667	0.7241	0.8000
GH_FR1	mg/L Cu	0.6452	0.6429	0.4333
GH_ERC		0.8333	0.7586	0.9667
CM_MC2		0.6333	0.6667	0.7000
EV_MC2		0.6667	0.7333	0.6000
EV_HC1		0.8000	0.6667	0.8333
LC_DCDS		0.7097	0.4828	0.5625
LC_LC3		0.7812	0.5667	0.8621
LC_LC5		0.6667	0.5172	0.7333
LC_LCDSSLCC		0.8000	0.7333	0.7586

Proportion Normal Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
① GH_ER2		25/30	27/30	26/30
⑤ CM_MC1		28/30	23/30	20/30
① LC_SLC		28/30	24/30	21/29
FR_FRABCH		20/30	23/29	21/30
FR_FRCP1		23/30	21/29	24/30
GH_FR1	+20	20/31	18/28	13/30
GH_ERC	mg/L Cu	25/30	22/29	29/30
CM_MC2		19/30	20/30	21/30
EV_MC2		20/30	22/30	18/30
EV_HC1		24/30	20/30	25/30
LC_DCDS		22/31	14/29	18/32
LC_LC3		25/32	17/30	25/29
LC_LC5		20/30	15/29	22/30
LC_LCDSSLCC		24/30	22/30	22/29

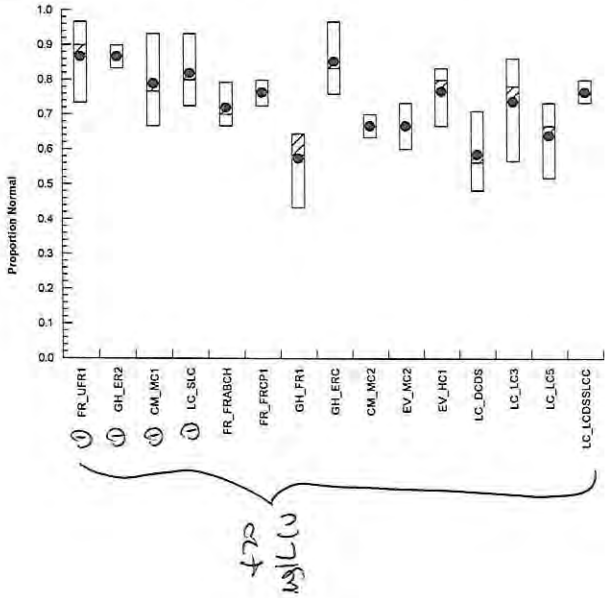
① Reference STEs

Analyst: [illegible] QA: Feb-3/20

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	00-6647-6784	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:18	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference Sites

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	01-7516-2991	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:20	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-0261-3280	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

t20 ug/L Cu

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Receiving Water (GH_ER2)	①	FR_UFR1	0.6029	Exact	0.6029	Non-Significant Effect
	①	CM_MC1	0.2388	Exact	0.9552	Non-Significant Effect
	①	LC_SLC	0.3051	Exact	0.9152	Non-Significant Effect
		FR_FRABCH*	0.0038	Exact	0.0346	Significant Effect
		FR_FRCP1	0.0389	Exact	0.2723	Non-Significant Effect
		GH_FR1*	0.0000	Exact	3.5E-05	Significant Effect
		GH_ERC	0.4902	Exact	0.9805	Non-Significant Effect
		CM_MC2*	0.0015	Exact	0.0165	Significant Effect
		EV_MC2*	0.0009	Exact	0.0105	Significant Effect
		EV_HC1	0.0274	Exact	0.2192	Non-Significant Effect
		LC_DCDS*	0.0000	Exact	2.3E-04	Significant Effect
		LC_LC3	0.0444	Exact	0.2218	Non-Significant Effect
		LC_LC5*	0.0023	Exact	0.0228	Significant Effect
		LC_LCDSSLCC	0.0389	Exact	0.2723	Non-Significant Effect

t20 ug/L Cu

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID: 01-7516-2991 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 31 Jan-20 11:20 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
① FR_UFR1		82	8	90	0.9111	0.08889	-24.24%
① GH_ER2	R	82	8	90	0.9111	0.08889	-24.24%
① CM_MC1		78	12	90	0.8667	0.1333	-18.18%
① LC_SLC		78	11	89	0.8764	0.1236	-19.51%
FR_FRABCH		67	22	89	0.7528	0.2472	-2.66%
FR_FRCP1	+20 ug/L Cu	72	17	89	0.809	0.191	-10.32%
GH_FR1		55	34	89	0.618	0.382	15.73%
GH_ERC		80	9	89	0.8989	0.1011	-22.57%
CM_MC2		66	24	90	0.7333	0.2667	0.0%
EV_MC2		65	25	90	0.7222	0.2778	1.52%
EV_HC1		72	18	90	0.8	0.2	-9.09%
LC_DCDS		60	32	92	0.6522	0.3478	11.07%
LC_LC3		74	17	91	0.8132	0.1868	-10.89%
LC_LC5		66	23	89	0.7416	0.2584	-1.12%
LC_LCDSSLCC		72	17	89	0.809	0.191	-10.32%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		0.9667	0.8333	0.9333
① GH_ER2	R	0.8333	1.0000	0.9000
① CM_MC1		0.9333	0.9000	0.7667
① LC_SLC		0.9333	0.9333	0.7586
FR_FRABCH		0.6667	0.8621	0.7333
FR_FRCP1		0.7667	0.8276	0.8333
GH_FR1	+20 ug/L Cu	0.6452	0.7500	0.4667
GH_ERC		0.8333	0.8621	1.0000
CM_MC2		0.6333	0.7667	0.8000
EV_MC2		0.7000	0.8333	0.6333
EV_HC1		0.8000	0.7333	0.8667
LC_DCDS		0.7097	0.6897	0.5625
LC_LC3		0.8125	0.7667	0.8621
LC_LC5		0.7000	0.7931	0.7333
LC_LCDSSLCC		0.8000	0.8667	0.7586

Survival Rate Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		29/30	25/30	28/30
① CM_MC1		28/30	27/30	23/30
① LC_SLC		28/30	28/30	22/29
FR_FRABCH		20/30	25/29	22/30
FR_FRCP1		23/30	24/29	25/30
GH_FR1	+20 ug/L Cu	20/31	21/28	14/30
GH_ERC		25/30	25/29	30/30
CM_MC2		19/30	23/30	24/30
EV_MC2		21/30	25/30	19/30
EV_HC1		24/30	22/30	26/30
LC_DCDS		22/31	20/29	18/32
LC_LC3		26/32	23/30	25/29
LC_LC5		21/30	23/29	22/30
LC_LCDSSLCC		24/30	26/30	22/29

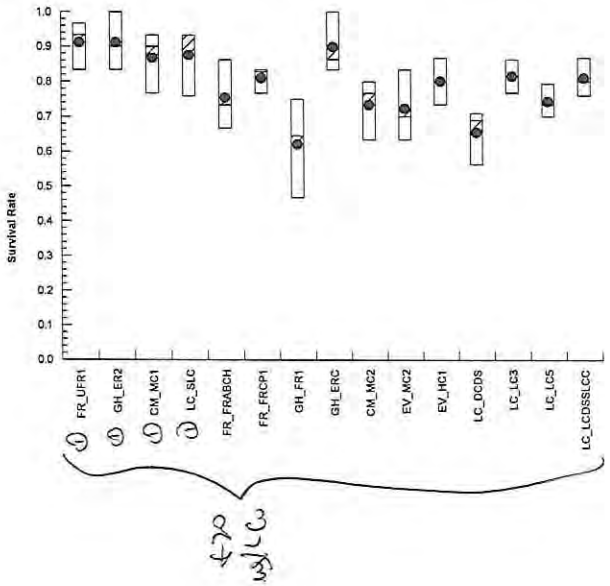
① Reference STHS

Analyst: Feb. 3/20 QA:

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	01-7516-2991	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:20	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference STGs

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-6403-5684	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:20	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-0261-3280	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
⑤ GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
③ CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
④ LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference STDS

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
⑤ GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
③ CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
④ LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

+20 mg/L Cu

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Receiving Water		① FR_UFR1	0.5865	Exact	0.5865	Non-Significant Effect
① (GH-ER2)		⑤ CM_MC1	0.1180	Exact	0.4719	Non-Significant Effect
		③ LC_SLC	0.2583	Exact	0.7748	Non-Significant Effect
		FR_FRABCH	0.0117	Exact	0.1056	Non-Significant Effect
		FR_FRCP1	0.0569	Exact	0.3985	Non-Significant Effect
		GH_FR1*	0.0000	Exact	1.3E-04	Significant Effect
		GH_ERC	0.4879	Exact	0.9758	Non-Significant Effect
		CM_MC2*	0.0012	Exact	0.0136	Significant Effect
		EV_MC2*	0.0012	Exact	0.0136	Significant Effect
		EV_HC1	0.0612	Exact	0.3061	Non-Significant Effect
		LC_DCDS*	0.0000	Exact	2.4E-04	Significant Effect
		LC_LC3	0.0216	Exact	0.1730	Non-Significant Effect
		LC_LC5*	0.0004	Exact	0.0044	Significant Effect
		LC_LCDSSLCC	0.0569	Exact	0.3985	Non-Significant Effect

+20 mg/L Cu

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-6403-5684	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:20	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		78	12	90	0.8667	0.1333	-30.0%
GH_ER2	R	78	12	90	0.8667	0.1333	-30.0%
CM_MC1		71	19	90	0.7889	0.2111	-18.33%
LC_SLC		73	16	89	0.8202	0.1798	-23.03%
FR_FRABCH		64	25	89	0.7191	0.2809	-7.87%
FR_FRCP1	+20	68	21	89	0.764	0.236	-14.61%
GH_FR1	ug/L Cu	51	38	89	0.573	0.427	14.04%
GH_ERC		76	13	89	0.8539	0.1461	-28.09%
CM_MC2		60	30	90	0.6667	0.3333	0.0%
EV_MC2		60	30	90	0.6667	0.3333	0.0%
EV_HC1		69	21	90	0.7667	0.2333	-15.0%
LC_DCDS		54	38	92	0.587	0.413	11.96%
LC_LC3		67	24	91	0.7363	0.2637	-10.44%
LC_LC5		57	32	89	0.6404	0.3596	3.93%
LC_LCDSSLCC		68	21	89	0.764	0.236	-14.61%

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		0.9667	0.7333	0.9000
GH_ER2	R	0.8333	0.9000	0.8667
CM_MC1		0.9333	0.7667	0.6667
LC_SLC		0.9333	0.8000	0.7241
FR_FRABCH		0.6667	0.7931	0.7000
FR_FRCP1	+20	0.7667	0.7241	0.8000
GH_FR1	ug/L Cu	0.6452	0.6429	0.4333
GH_ERC		0.8333	0.7586	0.9667
CM_MC2		0.6333	0.6667	0.7000
EV_MC2		0.6667	0.7333	0.6000
EV_HC1		0.8000	0.6667	0.8333
LC_DCDS		0.7097	0.4828	0.5625
LC_LC3		0.7812	0.5667	0.8621
LC_LC5		0.6667	0.5172	0.7333
LC_LCDSSLCC		0.8000	0.7333	0.7586

Proportion Normal Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		29/30	22/30	27/30
CM_MC1		28/30	23/30	20/30
LC_SLC		28/30	24/30	21/29
FR_FRABCH		20/30	23/29	21/30
FR_FRCP1		23/30	21/29	24/30
GH_FR1	+20	20/31	18/28	13/30
GH_ERC	ug/L Cu	25/30	22/29	29/30
CM_MC2		19/30	20/30	21/30
EV_MC2		20/30	22/30	18/30
EV_HC1		24/30	20/30	25/30
LC_DCDS		22/31	14/29	18/32
LC_LC3		25/32	17/30	25/29
LC_LC5		20/30	15/29	22/30
LC_LCDSSLCC		24/30	22/30	22/29

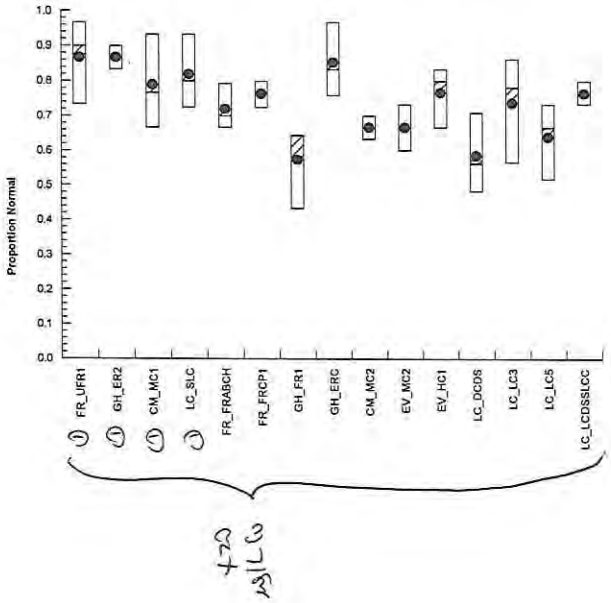
① Reference STus

Analyst: _____ QA: Feb 3/20

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-6403-5684	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:20	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference STRS

Salmonid Embryo Survival and Development Test

Nautilus Environmental

Analysis ID:	11-3018-1093	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:22	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-0261-3280	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
① GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
① CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
① LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference STTDS

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
① GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
① CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

+20 ug/L C

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		① FR_UFR1	0.8824	Exact	1.0000	Non-Significant Effect
① (CM_MC1)		① GH_ER2	0.8824	Exact	1.0000	Non-Significant Effect
		① LC_SLC	0.6616	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.0395	Exact	0.3555	Non-Significant Effect
		FR_FRCP1	0.1994	Exact	1.0000	Non-Significant Effect
		GH_FR1*	0.0001	Exact	0.0016	Significant Effect
		GH_ERC	0.8162	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.0197	Exact	0.2168	Non-Significant Effect
		EV_MC2	0.0130	Exact	0.1560	Non-Significant Effect
		EV_HC1	0.1587	Exact	1.0000	Non-Significant Effect
		LC_DCDS*	0.0006	Exact	0.0076	Significant Effect
		LC_LC3	0.2185	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.0269	Exact	0.2686	Non-Significant Effect
		LC_LCDSSLCC	0.1994	Exact	1.0000	Non-Significant Effect

+20 ug/L C

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID: 11-3018-1093 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 31 Jan-20 11:22 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
① FR_UFR1		82	8	90	0.9111	0.08889	-24.24%
⑥ GH_ER2		82	8	90	0.9111	0.08889	-24.24%
⑤ CM_MC1	XC	78	12	90	0.8667	0.1333	-18.18%
④ LC_SLC		78	11	89	0.8764	0.1236	-19.51%
FR_FRABCH		67	22	89	0.7528	0.2472	-2.66%
FR_FRCP1	+20	72	17	89	0.809	0.191	-10.32%
GH_FR1	ug/L Cu	55	34	89	0.618	0.382	15.73%
GH_ERC		80	9	89	0.8989	0.1011	-22.57%
CM_MC2		66	24	90	0.7333	0.2667	0.0%
EV_MC2		65	25	90	0.7222	0.2778	1.52%
EV_HC1		72	18	90	0.8	0.2	-9.09%
LC_DCDS		60	32	92	0.6522	0.3478	11.07%
LC_LC3		74	17	91	0.8132	0.1868	-10.89%
LC_LC5		66	23	89	0.7416	0.2584	-1.12%
LC_LCDSSLCC		72	17	89	0.809	0.191	-10.32%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		0.9667	0.8333	0.9333
⑥ GH_ER2		0.8333	1.0000	0.9000
⑤ CM_MC1	XC	0.9333	0.9000	0.7667
④ LC_SLC		0.9333	0.9333	0.7586
FR_FRABCH		0.6667	0.8621	0.7333
FR_FRCP1		0.7667	0.8276	0.8333
GH_FR1	+20	0.6452	0.7500	0.4667
GH_ERC	ug/L Cu	0.8333	0.8621	1.0000
CM_MC2		0.6333	0.7667	0.8000
EV_MC2		0.7000	0.8333	0.6333
EV_HC1		0.8000	0.7333	0.8667
LC_DCDS		0.7097	0.6897	0.5625
LC_LC3		0.8125	0.7667	0.8621
LC_LC5		0.7000	0.7931	0.7333
LC_LCDSSLCC		0.8000	0.8667	0.7586

Survival Rate Binomials

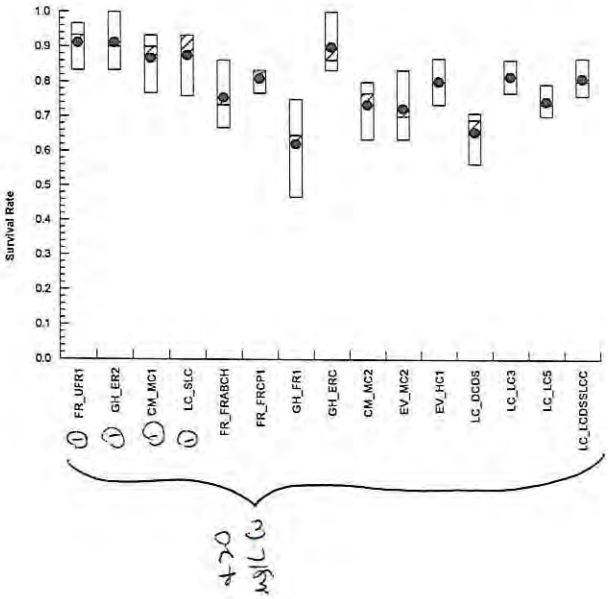
Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		29/30	25/30	28/30
⑥ GH_ER2		25/30	30/30	27/30
⑤ LC_SLC		28/30	28/30	22/29
FR_FRABCH		20/30	25/29	22/30
FR_FRCP1		23/30	24/29	25/30
GH_FR1		20/31	21/28	14/30
GH_ERC	+20	25/30	25/29	30/30
CM_MC2	ug/L Cu	19/30	23/30	24/30
EV_MC2		21/30	25/30	19/30
EV_HC1		24/30	22/30	26/30
LC_DCDS		22/31	20/29	18/32
LC_LC3		26/32	23/30	25/29
LC_LC5		21/30	23/29	22/30
LC_LCDSSLCC		24/30	26/30	22/29

① Reference Sites

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-3018-1093	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:22	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference Sites

+20 mg/L Cu

Analyst: [signature] QA: Feb. 3/20

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-6218-4172	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:22	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-0261-3280	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
⑥ GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
⑤ CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
① LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
⑥ GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
⑤ CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

+20 mg/L Cu

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Site Control		① FR_UFR1	0.9434	Exact	1.0000	Non-Significant Effect
⑤ (CM_MC1)		⑥ GH_ER2	0.9434	Exact	1.0000	Non-Significant Effect
		① LC_SLC	0.7631	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.1813	Exact	1.0000	Non-Significant Effect
		FR_FRCP1	0.4132	Exact	1.0000	Non-Significant Effect
		GH_FR1*	0.0016	Exact	0.0219	Significant Effect
		GH_ERC	0.9087	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.0467	Exact	0.5140	Non-Significant Effect
		EV_MC2	0.0467	Exact	0.5140	Non-Significant Effect
		EV_HC1	0.4289	Exact	1.0000	Non-Significant Effect
		LC_DCDS*	0.0026	Exact	0.0340	Significant Effect
		LC_LC3	0.2557	Exact	1.0000	Non-Significant Effect
		LC_LC5	0.0207	Exact	0.2484	Non-Significant Effect
		LC_LCDSSLCC	0.4132	Exact	1.0000	Non-Significant Effect

+20 mg/L Cu

Analyst: YYL QA: Feb. 3/20

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID: 03-6218-4172 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.9.4
Analyzed: 31 Jan-20 11:22 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1		78	12	90	0.8667	0.1333	-30.0%
GH_ER2		78	12	90	0.8667	0.1333	-30.0%
CM_MC1	XC	71	19	90	0.7889	0.2111	-18.33%
LC_SLC		73	16	89	0.8202	0.1798	-23.03%
FR_FRABCH		64	25	89	0.7191	0.2809	-7.87%
FR_FRCP1		68	21	89	0.764	0.236	-14.61%
GH_FR1	+20 ug/L Cu	51	38	89	0.573	0.427	14.04%
GH_ERC		76	13	89	0.8539	0.1461	-28.09%
CM_MC2		60	30	90	0.6667	0.3333	0.0%
EV_MC2		60	30	90	0.6667	0.3333	0.0%
EV_HC1		69	21	90	0.7667	0.2333	-15.0%
LC_DCDS		54	38	92	0.587	0.413	11.96%
LC_LC3		67	24	91	0.7363	0.2637	-10.44%
LC_LC5		57	32	89	0.6404	0.3596	3.93%
LC_LCDSSLCC		68	21	89	0.764	0.236	-14.61%

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		0.9667	0.7333	0.9000
GH_ER2		0.8333	0.9000	0.8667
CM_MC1	XC	0.9333	0.7667	0.6667
LC_SLC		0.9333	0.8000	0.7241
FR_FRABCH		0.6667	0.7931	0.7000
FR_FRCP1		0.7667	0.7241	0.8000
GH_FR1	+20 ug/L Cu	0.6452	0.6429	0.4333
GH_ERC		0.8333	0.7586	0.9667
CM_MC2		0.6333	0.6667	0.7000
EV_MC2		0.6667	0.7333	0.6000
EV_HC1		0.8000	0.6667	0.8333
LC_DCDS		0.7097	0.4828	0.5625
LC_LC3		0.7812	0.5667	0.8621
LC_LC5		0.6667	0.5172	0.7333
LC_LCDSSLCC		0.8000	0.7333	0.7586

Proportion Normal Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
FR_UFR1		29/30	22/30	27/30
GH_ER2		25/30	27/30	26/30
LC_SLC		28/30	24/30	21/29
FR_FRABCH		20/30	23/29	21/30
FR_FRCP1		23/30	21/29	24/30
GH_FR1	+20 ug/L Cu	20/31	18/28	13/30
GH_ERC		25/30	22/29	29/30
CM_MC2		19/30	20/30	21/30
EV_MC2		20/30	22/30	18/30
EV_HC1		24/30	20/30	25/30
LC_DCDS		22/31	14/29	18/32
LC_LC3		25/32	17/30	25/29
LC_LC5		20/30	15/29	22/30
LC_LCDSSLCC		24/30	22/30	22/29

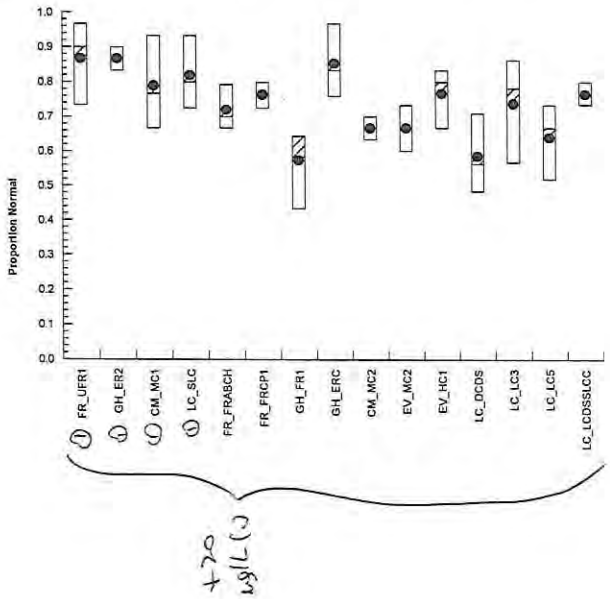
① Reference STAs

Feb 3/20

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-6218-4172	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:22	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference Sites

+20 ug/L Cl

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-2604-5890	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:23	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-0261-3280	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
⑥ FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
⑤ GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
④ CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
① LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference STGs

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
⑥ FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
⑤ GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
④ CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Unamended Sample		① FR_UFR1	0.8404	Exact	1.0000	Non-Significant Effect
① (LC_SLC)		⑤ GH_ER2	0.8404	Exact	1.0000	Non-Significant Effect
		④ CM_MC1	0.5115	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.0263	Exact	0.2369	Non-Significant Effect
		FR_FRCP1	0.1517	Exact	1.0000	Non-Significant Effect
		GH_FR1*	0.0001	Exact	8.1E-04	Significant Effect
		GH_ERC	0.7614	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.0126	Exact	0.1381	Non-Significant Effect
		EV_MC2	0.0081	Exact	0.0970	Non-Significant Effect
		EV_HC1	0.1180	Exact	0.9437	Non-Significant Effect
		LC_DCDS*	0.0003	Exact	0.0041	Significant Effect
		LC_LC3	0.1675	Exact	0.8376	Non-Significant Effect
		LC_LC5	0.0175	Exact	0.1746	Non-Significant Effect
		LC_LCDSSLCC	0.1517	Exact	1.0000	Non-Significant Effect

Analyst: YVL QA: Feb. 3/20

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID: 11-2604-5890 **Endpoint:** Survival Rate **CETIS Version:** CETISv1.9.4
Analyzed: 31 Jan-20 11:23 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
① FR_UFR1		82	8	90	0.9111	0.08889	-24.24%
② GH_ER2		82	8	90	0.9111	0.08889	-24.24%
③ CM_MC1		78	12	90	0.8667	0.1333	-18.18%
④ LC_SLC	US	78	11	89	0.8764	0.1236	-19.51%
FR_FRABCH		67	22	89	0.7528	0.2472	-2.66%
FR_FRCP1		72	17	89	0.809	0.191	-10.32%
GH_FR1	+20 ug/L Cu	55	34	89	0.618	0.382	15.73%
GH_ERC		80	9	89	0.8989	0.1011	-22.57%
CM_MC2		66	24	90	0.7333	0.2667	0.0%
EV_MC2		65	25	90	0.7222	0.2778	1.52%
EV_HC1		72	18	90	0.8	0.2	-9.09%
LC_DCDS		60	32	92	0.6522	0.3478	11.07%
LC_LC3		74	17	91	0.8132	0.1868	-10.89%
LC_LC5		66	23	89	0.7416	0.2584	-1.12%
LC_LCDSSLCC		72	17	89	0.809	0.191	-10.32%

Survival Rate Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		0.9667	0.8333	0.9333
② GH_ER2		0.8333	1.0000	0.9000
③ CM_MC1		0.9333	0.9000	0.7667
④ LC_SLC	US	0.9333	0.9333	0.7586
FR_FRABCH		0.6667	0.8621	0.7333
FR_FRCP1		0.7667	0.8276	0.8333
GH_FR1	+20 ug/L Cu	0.6452	0.7500	0.4667
GH_ERC		0.8333	0.8621	1.0000
CM_MC2		0.6333	0.7667	0.8000
EV_MC2		0.7000	0.8333	0.6333
EV_HC1		0.8000	0.7333	0.8667
LC_DCDS		0.7097	0.6897	0.5625
LC_LC3		0.8125	0.7667	0.8621
LC_LC5		0.7000	0.7931	0.7333
LC_LCDSSLCC		0.8000	0.8667	0.7586

Survival Rate Binomials

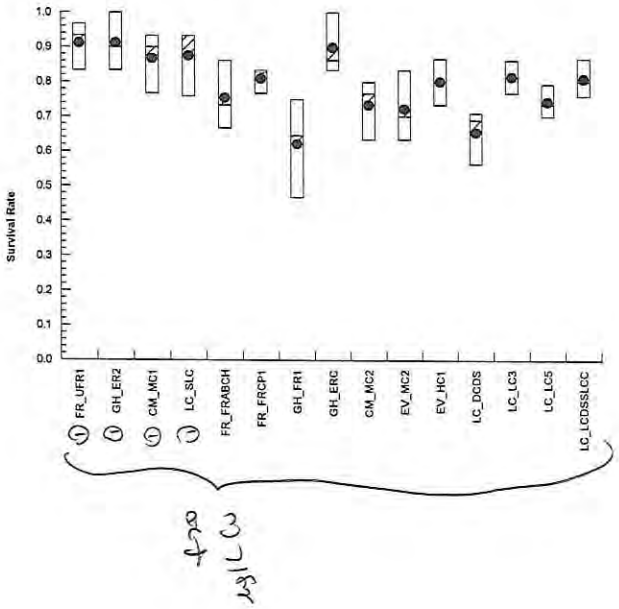
Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		29/30	25/30	28/30
② GH_ER2		25/30	30/30	27/30
③ CM_MC1		28/30	27/30	23/30
FR_FRABCH		20/30	25/29	22/30
FR_FRCP1		23/30	24/29	25/30
GH_FR1	+20 ug/L Cu	20/31	21/28	14/30
GH_ERC		25/30	25/29	30/30
CM_MC2		19/30	23/30	24/30
EV_MC2		21/30	25/30	19/30
EV_HC1		24/30	22/30	26/30
LC_DCDS		22/31	20/29	18/32
LC_LC3		26/32	23/30	25/29
LC_LC5		21/30	23/29	22/30
LC_LCDSSLCC		24/30	26/30	22/29

① Reference STAS

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-2604-5890	**Endpoint:**	Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:23	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference Stus

Analyst: _____ QA: Feb 3/20

CETIS Analytical Report

Test Code/ID: 192275a / 11-9024-0589

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-3899-5989	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:23	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	09-0261-3280	**Test Type:**	Survival-Development	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
⑤ FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
⑥ GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
④ CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
① LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference STDS

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
⑤ FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
⑥ GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
④ CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

+20 mg/L Cu

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Unamended Sample		⑤ FR_UFR1	0.8557	Exact	1.0000	Non-Significant Effect
① (LC-SLC)		⑥ GH_ER2	0.8557	Exact	1.0000	Non-Significant Effect
		④ CM_MC1	0.3672	Exact	1.0000	Non-Significant Effect
		FR_FRABCH	0.0770	Exact	0.6926	Non-Significant Effect
		FR_FRCP1	0.2302	Exact	1.0000	Non-Significant Effect
		GH_FR1*	0.0003	Exact	0.0038	Significant Effect
		GH_ERC	0.7914	Exact	1.0000	Non-Significant Effect
		CM_MC2	0.0143	Exact	0.1573	Non-Significant Effect
		EV_MC2	0.0143	Exact	0.1573	Non-Significant Effect
		EV_HC1	0.2421	Exact	1.0000	Non-Significant Effect
		LC_DCDS*	0.0005	Exact	0.0063	Significant Effect
		LC_LC3	0.1198	Exact	0.9583	Non-Significant Effect
		LC_LC5	0.0054	Exact	0.0652	Non-Significant Effect
		LC_LCDSSLCC	0.2302	Exact	1.0000	Non-Significant Effect

+20 mg/L Cu

Analyst: [signature] QA: Feb 3/20

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID: 11-3899-5989 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.9.4
Analyzed: 31 Jan-20 11:23 **Analysis:** STP 2xK Contingency Tables **Status Level:** 1

Data Summary

Sample	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
① FR_UFR1		78	12	90	0.8667	0.1333	-30.0%
① GH_ER2		78	12	90	0.8667	0.1333	-30.0%
① CM_MC1		71	19	90	0.7889	0.2111	-18.33%
① LC_SLC	US	73	16	89	0.8202	0.1798	-23.03%
FR_FRABCH		64	25	89	0.7191	0.2809	-7.87%
FR_FRCP1		68	21	89	0.764	0.236	-14.61%
GH_FR1	+20	51	38	89	0.573	0.427	14.04%
GH_ERC	ug/L Cu	76	13	89	0.8539	0.1461	-28.09%
CM_MC2		60	30	90	0.6667	0.3333	0.0%
EV_MC2		60	30	90	0.6667	0.3333	0.0%
EV_HC1		69	21	90	0.7667	0.2333	-15.0%
LC_DCDS		54	38	92	0.587	0.413	11.96%
LC_LC3		67	24	91	0.7363	0.2637	-10.44%
LC_LC5		57	32	89	0.6404	0.3596	3.93%
LC_LCDSSLCC		68	21	89	0.764	0.236	-14.61%

Proportion Normal Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		0.9667	0.7333	0.9000
① GH_ER2		0.8333	0.9000	0.8667
① CM_MC1		0.9333	0.7667	0.6667
① LC_SLC	US	0.9333	0.8000	0.7241
FR_FRABCH		0.6667	0.7931	0.7000
FR_FRCP1		0.7667	0.7241	0.8000
GH_FR1	+20	0.6452	0.6429	0.4333
GH_ERC	ug/L Cu	0.8333	0.7586	0.9667
CM_MC2		0.6333	0.6667	0.7000
EV_MC2		0.6667	0.7333	0.6000
EV_HC1		0.8000	0.6667	0.8333
LC_DCDS		0.7097	0.4828	0.5625
LC_LC3		0.7812	0.5667	0.8621
LC_LC5		0.6667	0.5172	0.7333
LC_LCDSSLCC		0.8000	0.7333	0.7586

Proportion Normal Binomials

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		29/30	22/30	27/30
① GH_ER2		25/30	27/30	26/30
① CM_MC1		28/30	23/30	20/30
FR_FRABCH		20/30	23/29	21/30
FR_FRCP1	+20	23/30	21/29	24/30
GH_FR1	ug/L Cu	20/31	18/28	13/30
GH_ERC		25/30	22/29	29/30
CM_MC2		19/30	20/30	21/30
EV_MC2		20/30	22/30	18/30
EV_HC1		24/30	20/30	25/30
LC_DCDS		22/31	14/29	18/32
LC_LC3		25/32	17/30	25/29
LC_LC5		20/30	15/29	22/30
LC_LCDSSLCC		24/30	22/30	22/29

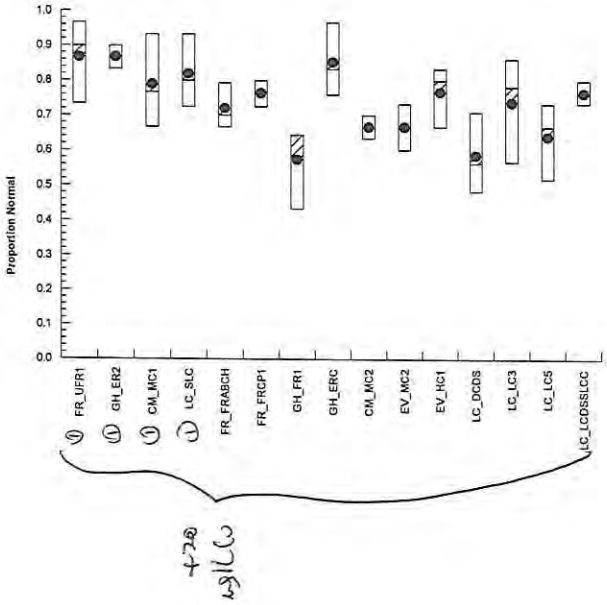
① Reference Sites

Analyst: [illegible] QA: Feb 3/20

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-3899-5989	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 11:23	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1

Graphics



① Reference STTs

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Batch ID:	17-8759-9746	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	18-2867-3301	13 Nov-19	13 Nov-19	15h	Teck Coal	
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)		
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

- Only 3 replicates used in statistical analyses. (Rep A excluded due to possible poor egg quality.)

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	control	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

(1) Reference Sites

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	GH_ERC passed length-mm	1

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8253	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.1095	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8891	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8416	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	EV_MC2 passed length-mm	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8685	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.0802	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8880	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	LC_LC5 passed length-mm	1

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SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.8533	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9007	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9190	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	GH_ERC passed length-mm	1

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9508	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9650	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9596	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	FR_FRCP1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	GH_ER2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9545	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	LC_LCDSSLCC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	GH_ER2 passed length-mm	1

Analyst: [signature] QA: Feb 3/20

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Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	CM_MC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	LC_SLC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	FR_FRABCH passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	Control passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	GH_ERC passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	FR_UFR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	LC_LC5 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	GH_FR1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	CM_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	EV_MC2 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	EV_HC1 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	LC_DCDS passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	LC_LC3 passed length-mm	1
15-8516-8808	Length-mm	Dunnett Multiple Comparison Test	0.9961	FR_FRCP1 passed length-mm	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9348	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.6722	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	EV_HC1 passed mean dry weight-mg	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9333	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9903	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9383	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	LC_DCDS passed mean dry weight-mg	1

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test **Nautilus Environmental**

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.7620	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9991	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9861	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9914	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	FR_FRABCH passed mean dry weight-mg	1

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9540	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9918	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9915	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	Control passed mean dry weight-mg	1

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

SIngle Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9885	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	FR_FRCP1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9593	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	LC_LCDSSLCC passed mean dry weight-	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	GH_ER2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	CM_MC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	LC_SLC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	FR_FRABCH passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	Control passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	GH_ERC passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	FR_UFR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	LC_LC5 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	GH_FR1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	CM_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	EV_MC2 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	EV_HC1 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	LC_DCDS passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	LC_LC3 passed mean dry weight-mg	1
18-8425-1769	Mean Dry Weight-mg	Dunnett Multiple Comparison Test	0.9979	FR_FRCP1 passed mean dry weight-mg	1

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	N	3	21.17	19.84	22.5	20.74	21.77	0.3083	0.534	2.52%	0.00%
FR_UFR1		3	20.85	18.64	23.05	20.21	21.86	0.5133	0.889	4.26%	1.53%
GH_ER2		3	19.6	18.89	20.31	19.3	19.86	0.1646	0.285	1.45%	7.40%
CM_MC1		3	21	18.12	23.88	19.93	22.23	0.6683	1.158	5.51%	0.80%
LC_SLC		3	20.88	18.37	23.39	20.16	22.04	0.5841	1.012	4.84%	1.36%
FR_FRABCH		3	20.94	19.15	22.73	20.16	21.58	0.4161	0.7207	3.44%	1.06%
FR_FRCP1		3	19.49	15.34	23.64	17.88	21.22	0.965	1.672	8.58%	7.93%
GH_FR1		3	21	18.81	23.19	20.07	21.83	0.5087	0.8811	4.20%	0.81%
GH_ERC		3	20.91	19.03	22.78	20.46	21.78	0.4362	0.7556	3.61%	1.23%
CM_MC2		3	21.03	19.25	22.82	20.46	21.84	0.4158	0.7203	3.42%	0.63%
EV_MC2		3	21.1	19.87	22.32	20.68	21.64	0.285	0.4937	2.34%	0.35%
EV_HC1		3	21.23	19.8	22.67	20.83	21.9	0.3342	0.5788	2.73%	-0.30%
LC_DCDS		3	21.32	19.27	23.37	20.83	22.27	0.4768	0.8258	3.87%	-0.71%
LC_LC3		3	21.28	19.56	23.01	20.67	22.04	0.4003	0.6933	3.26%	-0.54%
LC_LC5		3	21.25	19.33	23.18	20.73	22.14	0.4472	0.7745	3.64%	-0.40%
LC_LCDSSLCC		3	21.79	20.96	22.62	21.41	22.02	0.1922	0.3329	1.53%	-2.94%

Mean ~~Dry~~ Weight-mg Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	N	3	102.7	78.01	127.4	92.8	112.7	5.742	9.946	9.68%	0.00%
FR_UFR1		3	102.6	80.79	124.4	92.5	108.4	5.068	8.778	8.56%	0.12%
GH_ER2		3	96.58	76.63	116.5	87.41	102.3	4.636	8.029	8.31%	5.98%
CM_MC1		3	102.5	95.85	109.2	99.57	104.8	1.553	2.691	2.62%	0.18%
LC_SLC		3	107.3	87.81	126.8	98.64	113.9	4.527	7.84	7.31%	-4.44%
FR_FRABCH		3	102.8	73.38	132.1	95.5	116.4	6.827	11.83	11.51%	-0.03%
FR_FRCP1		3	98.1	68.48	127.7	84.8	107.8	6.882	11.92	12.15%	4.50%
GH_FR1		3	112	65.51	158.4	98.57	133.3	10.8	18.7	16.70%	-9.00%
GH_ERC		3	106.5	96.33	116.6	102.7	110.8	2.361	4.089	3.84%	-3.67%
CM_MC2		3	107.5	86.82	128.3	97.92	112.6	4.816	8.341	7.76%	-4.70%
EV_MC2		3	103.6	87.87	119.3	97.37	110	3.648	6.319	6.10%	-0.83%
EV_HC1		3	107.6	101.1	114.2	104.6	109.5	1.528	2.647	2.46%	-4.79%
LC_DCDS		3	107.6	98.72	116.4	104.5	111.5	2.058	3.564	3.31%	-4.72%
LC_LC3		3	106.9	81.46	132.4	95.2	114.2	5.916	10.25	9.59%	-4.08%
LC_LC5		3	103.9	99.01	108.8	102.3	106.1	1.137	1.969	1.89%	-1.15%
LC_LCDSSLCC		3	110.4	103	117.8	108.6	113.8	1.718	2.976	2.70%	-7.49%

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Control	N	21.77	21	20.74
FR_UFR1		21.86	20.46	20.21
GH_ER2		19.86	19.65	19.3
CM_MC1		22.23	20.83	19.93
LC_SLC		22.04	20.45	20.16
FR_FRABCH		21.58	21.1	20.16
FR_FRCP1		21.22	19.38	17.88
GH_FR1		21.83	21.09	20.07
GH_ERC		21.78	20.46	20.48
CM_MC2		21.84	20.8	20.46
EV_MC2		21.64	20.96	20.68
EV_HC1		21.9	20.98	20.83
LC_DCDS		22.27	20.83	20.86
LC_LC3		22.04	20.67	21.14
LC_LC5		22.14	20.89	20.73
LC_LCDSSLCC		22.02	21.94	21.41

Mean ~~Dry~~ Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Control	N	102.7	112.7	92.8
FR_UFR1		106.9	108.4	92.5
GH_ER2		100	102.3	87.41
CM_MC1		103.2	104.8	99.57
LC_SLC		113.9	109.3	98.64
FR_FRABCH		95.5	116.4	96.36
FR_FRCP1		107.8	101.7	84.8
GH_FR1		104	133.3	98.57
GH_ERC		106	110.8	102.7
CM_MC2		112.1	112.6	97.92
EV_MC2		103.3	110	97.37
EV_HC1		108.8	109.5	104.6
LC_DCDS		104.5	111.5	106.7
LC_LC3		114.2	111.3	95.2
LC_LC5		103.3	106.1	102.3
LC_LCDSSLCC		108.8	113.8	108.6

① Reference STDs.

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	15-8516-8808	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Jan-20 14:21	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8759-9746	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	18-2867-3301	13 Nov-19	13 Nov-19	15h	Teck Coal	
① FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)		
② GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
③ CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
④ LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	control	Teck Coal	Control	
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
② GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
③ CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
④ LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	15-8516-8808	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Jan-20 14:21	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed length-mm	8.67%
		GH_ER2 passed length-mm	8.67%
		CM_MC1 passed length-mm	8.67%
		LC_SLC passed length-mm	8.67%
		FR_FRABCH passed length-mm	8.67%
		FR_FRCP1 passed length-mm	8.67%
		GH_FR1 passed length-mm	8.67%
		GH_ERC passed length-mm	8.67%
		CM_MC2 passed length-mm	8.67%
		EV_MC2 passed length-mm	8.67%
		EV_HC1 passed length-mm	8.67%
		LC_DCDS passed length-mm	8.67%
		LC_LC3 passed length-mm	8.67%
		LC_LC5 passed length-mm	8.67%
		LC_LCDSSLCC passed length-mm	8.67%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	①	FR_UFR1	0.4748	2.693	1.836	4	CDF	0.8253	Non-Significant Effect
	②	GH_ER2	2.299	2.693	1.836	4	CDF	0.1095	Non-Significant Effect
	③	CM_MC1	0.2479	2.693	1.836	4	CDF	0.8891	Non-Significant Effect
	⑤	LC_SLC	0.423	2.693	1.836	4	CDF	0.8416	Non-Significant Effect
		FR_FRABCH	0.3291	2.693	1.836	4	CDF	0.8685	Non-Significant Effect
		FR_FRCP1	2.462	2.693	1.836	4	CDF	0.0802	Non-Significant Effect
		GH_FR1	0.2523	2.693	1.836	4	CDF	0.8880	Non-Significant Effect
		GH_ERC	0.3834	2.693	1.836	4	CDF	0.8533	Non-Significant Effect
		CM_MC2	0.1971	2.693	1.836	4	CDF	0.9007	Non-Significant Effect
		EV_MC2	0.1076	2.693	1.836	4	CDF	0.9190	Non-Significant Effect
		EV_HC1	-0.09438	2.693	1.836	4	CDF	0.9508	Non-Significant Effect
		LC_DCDS	-0.221	2.693	1.836	4	CDF	0.9650	Non-Significant Effect
		LC_LC3	-0.1687	2.693	1.836	4	CDF	0.9596	Non-Significant Effect
		LC_LC5	-0.1242	2.693	1.836	4	CDF	0.9545	Non-Significant Effect
		LC_LCDSSLCC	-0.912	2.693	1.836	4	CDF	0.9961	Non-Significant Effect

+20 3/L C

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15.4953	1.03302	15	1.482	0.1707	Non-Significant Effect
Error	22.3028	0.696961	32			
Total	37.7981		47			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	9.069	30.58	0.8739	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9589	0.9345	0.0911	Normal Distribution

① Reference Sites

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	15-8516-8808	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Jan-20 14:21	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	N	3	21.17	19.84	22.5	21	20.74	21.77	0.3083	2.52%	0.00%
① FR_UFR1		3	20.85	18.64	23.05	20.46	20.21	21.86	0.5133	4.26%	1.53%
① GH_ER2		3	19.6	18.89	20.31	19.65	19.3	19.86	0.1646	1.45%	7.40%
① CM_MC1		3	21	18.12	23.88	20.83	19.93	22.23	0.6683	5.51%	0.80%
① LC_SLC		3	20.88	18.37	23.39	20.45	20.16	22.04	0.5841	4.84%	1.36%
FR_FRABCH		3	20.94	19.15	22.73	21.1	20.16	21.58	0.4161	3.44%	1.06%
FR_FRCP1		3	19.49	15.34	23.64	19.38	17.88	21.22	0.965	8.58%	7.93%
GH_FR1		3	21	18.81	23.19	21.1	20.07	21.83	0.5087	4.20%	0.81%
GH_ERC		3	20.91	19.03	22.78	20.48	20.46	21.78	0.4362	3.61%	1.23%
CM_MC2		3	21.03	19.25	22.82	20.8	20.46	21.84	0.4158	3.42%	0.63%
EV_MC2		3	21.1	19.87	22.32	20.96	20.68	21.64	0.285	2.34%	0.35%
EV_HC1		3	21.23	19.8	22.67	20.98	20.83	21.9	0.3341	2.73%	-0.30%
LC_DCDS		3	21.32	19.27	23.37	20.86	20.83	22.27	0.4768	3.87%	-0.71%
LC_LC3		3	21.28	19.56	23.01	21.14	20.67	22.04	0.4003	3.26%	-0.54%
LC_LC5		3	21.25	19.33	23.18	20.89	20.73	22.14	0.4472	3.64%	-0.40%
LC_LCDSSLCC		3	21.79	20.96	22.62	21.94	21.41	22.02	0.1922	1.53%	-2.94%

+20 ug/L Cu

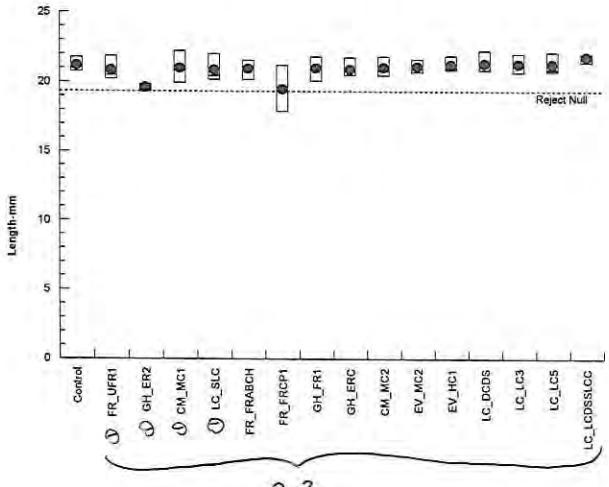
Length-mm Detail

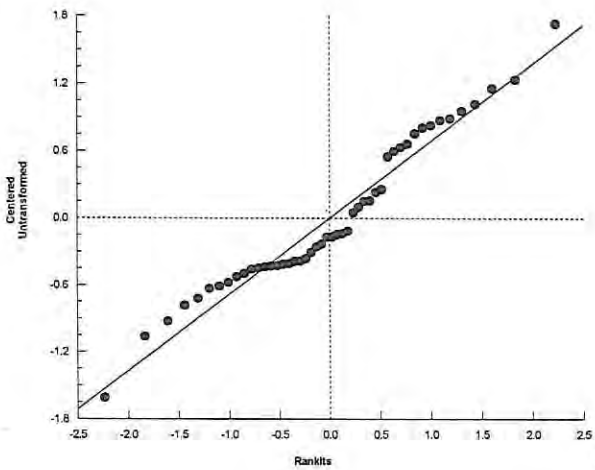
Sample	Code	Rep 1	Rep 2	Rep 3
Control	N	21.77	21	20.74
① FR_UFR1		21.86	20.46	20.21
① GH_ER2		19.86	19.65	19.3
① CM_MC1		22.23	20.83	19.93
① LC_SLC		22.04	20.45	20.16
FR_FRABCH		21.58	21.1	20.16
FR_FRCP1		21.22	19.38	17.88
GH_FR1		21.83	21.09	20.07
GH_ERC		21.78	20.46	20.48
CM_MC2		21.84	20.8	20.46
EV_MC2		21.64	20.96	20.68
EV_HC1		21.9	20.98	20.83
LC_DCDS		22.27	20.83	20.86
LC_LC3		22.04	20.67	21.14
LC_LC5		22.14	20.89	20.73
LC_LCDSSLCC		22.02	21.94	21.41

+20 ug/L Cu

① Reference Sites

Graphics





+20 ug/L Cu

CETIS Analytical Report

Report Date: 31 Jan-20 13:19 (p 1 of 3)
Test Code/ID: 192275b / 03-9217-8512

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	18-8425-1769	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 13:11	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Batch ID:	17-8759-9746	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	18-2867-3301	13 Nov-19	13 Nov-19	15h	Teck Coal	
① FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)		
① GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
① CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
① LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	control	Teck Coal	Control	
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
① GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
① CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

+20 mg/L CU

① Reference Sites

Feb 3/20

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	18-8425-1769	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 13:11	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	18.57%
		GH_ER2 passed mean dry weight-mg	18.57%
		CM_MC1 passed mean dry weight-mg	18.57%
		LC_SLC passed mean dry weight-mg	18.57%
		FR_FRABCH passed mean dry weight-mg	18.57%
		FR_FRCP1 passed mean dry weight-mg	18.57%
		GH_FR1 passed mean dry weight-mg	18.57%
		GH_ERC passed mean dry weight-mg	18.57%
		CM_MC2 passed mean dry weight-mg	18.57%
		EV_MC2 passed mean dry weight-mg	18.57%
		EV_HC1 passed mean dry weight-mg	18.57%
		LC_DCDS passed mean dry weight-mg	18.57%
		LC_LC3 passed mean dry weight-mg	18.57%
		LC_LC5 passed mean dry weight-mg	18.57%
		LC_LCDSSLCC passed mean dry weight-mg	18.57%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	①	FR_UFR1	0.01705	2.693	19.08	4	CDF	0.9348	Non-Significant Effect
	①	GH_ER2	0.8666	2.693	19.08	4	CDF	0.6722	Non-Significant Effect
	①	CM_MC1	0.02657	2.693	19.08	4	CDF	0.9333	Non-Significant Effect
	①	LC_SLC	-0.6442	2.693	19.08	4	CDF	0.9903	Non-Significant Effect
		FR_FRABCH	-0.004925	2.693	19.08	4	CDF	0.9383	Non-Significant Effect
		FR_FRCP1	0.6524	2.693	19.08	4	CDF	0.7620	Non-Significant Effect
		GH_FR1	-1.306	2.693	19.08	4	CDF	0.9991	Non-Significant Effect
		GH_ERC	-0.5321	2.693	19.08	4	CDF	0.9861	Non-Significant Effect
		CM_MC2	-0.6809	2.693	19.08	4	CDF	0.9914	Non-Significant Effect
		EV_MC2	-0.1196	2.693	19.08	4	CDF	0.9540	Non-Significant Effect
		EV_HC1	-0.6941	2.693	19.08	4	CDF	0.9918	Non-Significant Effect
		LC_DCDS	-0.6848	2.693	19.08	4	CDF	0.9915	Non-Significant Effect
		LC_LC3	-0.5917	2.693	19.08	4	CDF	0.9885	Non-Significant Effect
		LC_LC5	-0.1663	2.693	19.08	4	CDF	0.9593	Non-Significant Effect
		LC_LCDSSLCC	-1.086	2.693	19.08	4	CDF	0.9979	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	758.18	50.5454	15	0.6714	0.7920	Non-Significant Effect
Error	2408.98	75.2805	32			
Total	3167.16		47			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	18.28	30.58	0.2483	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9714	0.9345	0.2882	Normal Distribution

① Reference sites

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	18-8425-1769	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 13:11	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Mean ~~Dry~~ Weight-mg Summary

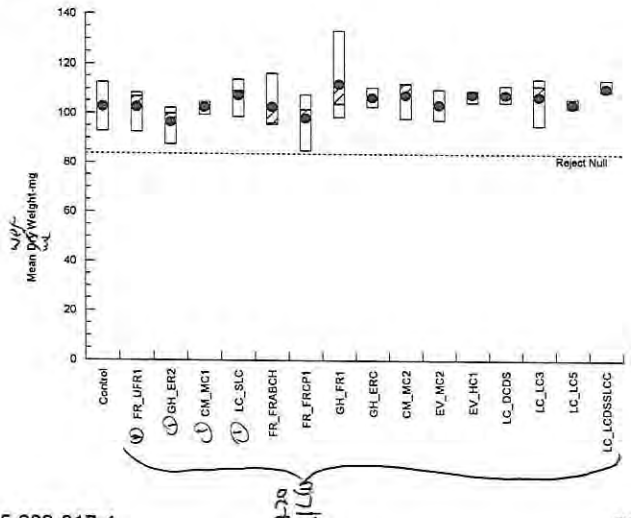
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
Control	N	3	102.7	78.01	127.4	102.7	92.8	112.7	5.742	9.68%	0.00%
FR_UFR1		3	102.6	80.79	124.4	106.9	92.5	108.4	5.068	8.56%	0.12%
GH_ER2		3	96.58	76.63	116.5	100	87.41	102.3	4.636	8.31%	5.98%
CM_MC1		3	102.5	95.85	109.2	103.2	99.57	104.8	1.553	2.62%	0.18%
LC_SLC		3	107.3	87.81	126.8	109.3	98.64	113.9	4.527	7.31%	-4.44%
FR_FRABCH		3	102.8	73.38	132.1	96.36	95.5	116.4	6.827	11.51%	-0.03%
FR_FRCP1		3	98.1	68.48	127.7	101.7	84.8	107.8	6.882	12.15%	4.50%
GH_FR1		3	112	65.51	158.4	104	98.57	133.3	10.8	16.70%	-9.00%
GH_ERC		3	106.5	96.33	116.6	106	102.7	110.8	2.361	3.84%	-3.67%
CM_MC2		3	107.5	86.82	128.3	112.1	97.92	112.6	4.816	7.76%	-4.70%
EV_MC2		3	103.6	87.87	119.3	103.3	97.37	110	3.648	6.10%	-0.83%
EV_HC1		3	107.6	101.1	114.2	108.8	104.6	109.5	1.528	2.46%	-4.79%
LC_DCDS		3	107.6	98.72	116.4	106.7	104.5	111.5	2.058	3.31%	-4.72%
LC_LC3		3	106.9	81.46	132.4	111.3	95.2	114.2	5.916	9.59%	-4.08%
LC_LC5		3	103.9	99.01	108.8	103.3	102.3	106.1	1.137	1.89%	-1.15%
LC_LCDSSLCC		3	110.4	103	117.8	108.8	108.6	113.8	1.718	2.69%	-7.49%

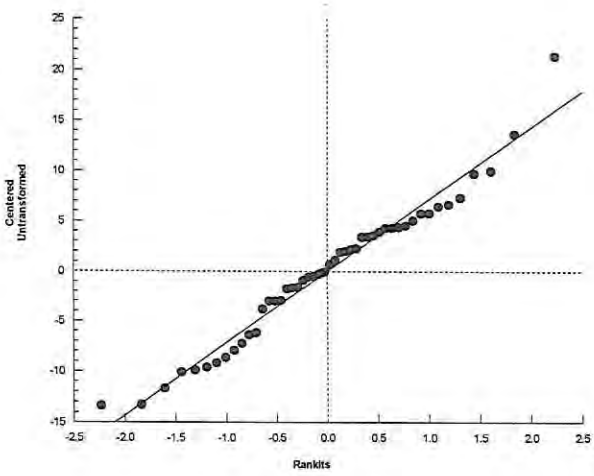
Mean ~~Dry~~ Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3
Control	N	102.7	112.7	92.8
FR_UFR1		106.9	108.4	92.5
GH_ER2		100	102.3	87.41
CM_MC1		103.2	104.8	99.57
LC_SLC		113.9	109.3	98.64
FR_FRABCH		95.5	116.4	96.36
FR_FRCP1		107.8	101.7	84.8
GH_FR1		104	133.3	98.57
GH_ERC		106	110.8	102.7
CM_MC2		112.1	112.6	97.92
EV_MC2		103.3	110	97.37
EV_HC1		108.8	109.5	104.6
LC_DCDS		104.5	111.5	106.7
LC_LC3		114.2	111.3	95.2
LC_LC5		103.3	106.1	102.3
LC_LCDSSLCC		108.8	113.8	108.6

① Reference Sites

Graphics





CETIS Analytical Report

Salmonid Embryo-Alevin~~-Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	08-9974-1257	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Jan-20 14:22	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8759-9746	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

	Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
③	FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
④	GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
⑤	CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
①	LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
	FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
	FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
	GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
	GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
	CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
	EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
	EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
	LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
	LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
	LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
	LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

	Sample Code	Material Type	Sample Source	Station Location	Lat/Long
③	FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
④	GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
⑤	CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
①	LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
	FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
	FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
	GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
	GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
	CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
	EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
	EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
	LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
	LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
	LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
	LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

① Reference Sites

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	08-9974-1257	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Jan-20 14:22	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed length-mm	8.93%
		CM_MC1 passed length-mm	8.93%
		LC_SLC passed length-mm	8.93%
		FR_FRABCH passed length-mm	8.93%
		FR_FRCP1 passed length-mm	8.93%
		GH_FR1 passed length-mm	8.93%
		GH_ERC passed length-mm	8.93%
		CM_MC2 passed length-mm	8.93%
		EV_MC2 passed length-mm	8.93%
		EV_HC1 passed length-mm	8.93%
		LC_DCDS passed length-mm	8.93%
		LC_LC3 passed length-mm	8.93%
		LC_LC5 passed length-mm	8.93%
		LC_LCDSSLCC passed length-mm	8.93%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Upstream Control (FR_UFR1)		① GH_ER2	1.789	2.68	1.863	4	CDF	0.2474	Non-Significant Effect
		⑥ CM_MC1	-0.2226	2.68	1.863	4	CDF	0.9624	Non-Significant Effect
		① LC_SLC	-0.05084	2.68	1.863	4	CDF	0.9412	Non-Significant Effect
		FR_FRABCH	-0.1429	2.68	1.863	4	CDF	0.9535	Non-Significant Effect
		FR_FRCP1	1.949	2.68	1.863	4	CDF	0.1938	Non-Significant Effect
		GH_FR1	-0.2182	2.68	1.863	4	CDF	0.9620	Non-Significant Effect
		GH_ERC	-0.0897	2.68	1.863	4	CDF	0.9467	Non-Significant Effect
		CM_MC2	-0.2724	2.68	1.863	4	CDF	0.9673	Non-Significant Effect
		EV_MC2	-0.3602	2.68	1.863	4	CDF	0.9745	Non-Significant Effect
		EV_HC1	-0.5583	2.68	1.863	4	CDF	0.9859	Non-Significant Effect
		LC_DCDS	-0.6826	2.68	1.863	4	CDF	0.9905	Non-Significant Effect
		LC_LC3	-0.6312	2.68	1.863	4	CDF	0.9888	Non-Significant Effect
		LC_LC5	-0.5876	2.68	1.863	4	CDF	0.9872	Non-Significant Effect
		LC_LCDSSLCC	-1.36	2.68	1.863	4	CDF	0.9992	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15.3095	1.09354	14	1.51	0.1674	Non-Significant Effect
Error	21.7326	0.724419	30			
Total	37.0421		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	8.53	29.14	0.8599	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9597	0.9308	0.1188	Normal Distribution

① Reference Sites

CETIS Analytical Report

Report Date: 12 Jan-20 14:31 (p 3 of 3)
Test Code/ID: 192275b / 03-9217-8512

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	08-9974-1257	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Jan-20 14:22	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Length-mm Summary

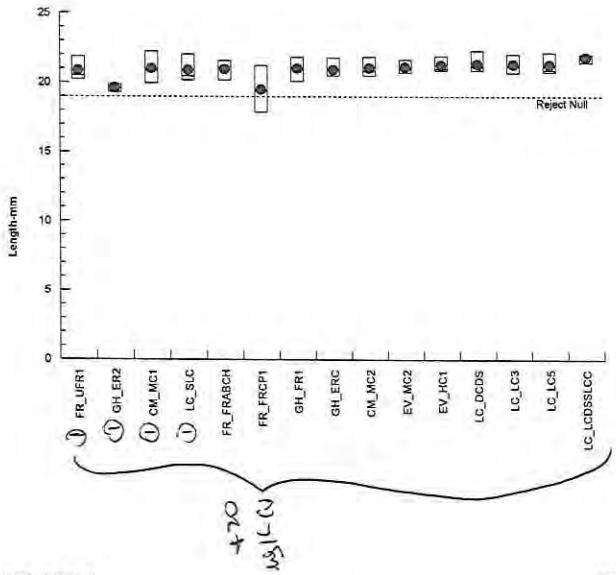
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
① FR_UFR1	U	3	20.85	18.64	23.05	20.46	20.21	21.86	0.5133	4.26%	0.00%
① GH_ER2		3	19.6	18.89	20.31	19.65	19.3	19.86	0.1646	1.45%	5.96%
① CM_MC1		3	21	18.12	23.88	20.83	19.93	22.23	0.6683	5.51%	-0.74%
① LC_SLC		3	20.88	18.37	23.39	20.45	20.16	22.04	0.5841	4.84%	-0.17%
FR_FRABCH		3	20.94	19.15	22.73	21.1	20.16	21.58	0.4161	3.44%	-0.48%
FR_FRCP1	+20 ug/L Cu	3	19.49	15.34	23.64	19.38	17.88	21.22	0.965	8.58%	6.50%
GH_FR1		3	21	18.81	23.19	21.1	20.07	21.83	0.5087	4.20%	-0.73%
GH_ERC		3	20.91	19.03	22.78	20.48	20.46	21.78	0.4362	3.61%	-0.30%
CM_MC2		3	21.03	19.25	22.82	20.8	20.46	21.84	0.4158	3.42%	-0.91%
EV_MC2		3	21.1	19.87	22.32	20.96	20.68	21.64	0.285	2.34%	-1.20%
EV_HC1		3	21.23	19.8	22.67	20.98	20.83	21.9	0.3341	2.73%	-1.86%
LC_DCDS		3	21.32	19.27	23.37	20.86	20.83	22.27	0.4768	3.87%	-2.28%
LC_LC3		3	21.28	19.56	23.01	21.14	20.67	22.04	0.4003	3.26%	-2.10%
LC_LC5		3	21.25	19.33	23.18	20.89	20.73	22.14	0.4472	3.64%	-1.96%
LC_LCDSSLCC		3	21.79	20.96	22.62	21.94	21.41	22.02	0.1922	1.53%	-4.53%

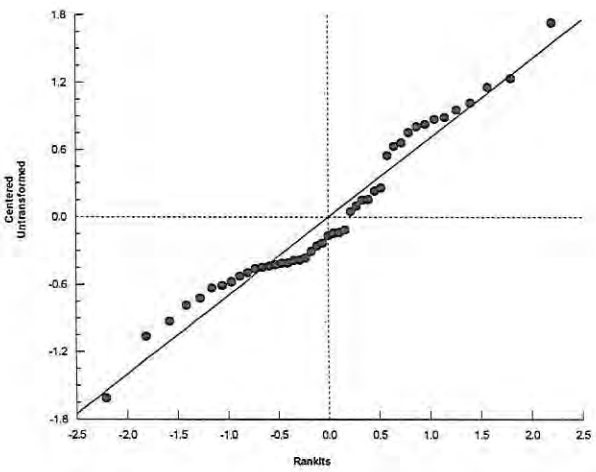
Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1	U	21.86	20.46	20.21
① GH_ER2		19.86	19.65	19.3
① CM_MC1		22.23	20.83	19.93
① LC_SLC		22.04	20.45	20.16
FR_FRABCH		21.58	21.1	20.16
FR_FRCP1	+20 ug/L Cu	21.22	19.38	17.88
GH_FR1		21.83	21.09	20.07
GH_ERC		21.78	20.46	20.48
CM_MC2		21.84	20.8	20.46
EV_MC2		21.64	20.96	20.68
EV_HC1		21.9	20.98	20.83
LC_DCDS		22.27	20.83	20.86
LC_LC3		22.04	20.67	21.14
LC_LC5		22.14	20.89	20.73
LC_LCDSSLCC		22.02	21.94	21.41

① Reference Sites

Graphics





Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	14-1538-0315	**Endpoint:**	Mean ~~Dry~~ Wet Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 13:11	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8759-9746	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Analysis ID: 14-1538-0315 **Endpoint:** Mean ~~Dry~~ WRT Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 31 Jan-20 13:11 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	GH_ER2 passed mean dry weight-mg	18.31%
		CM_MC1 passed mean dry weight-mg	18.31%
		LC_SLC passed mean dry weight-mg	18.31%
		FR_FRABCH passed mean dry weight-mg	18.31%
		FR_FRCP1 passed mean dry weight-mg	18.31%
		GH_FR1 passed mean dry weight-mg	18.31%
		GH_ERC passed mean dry weight-mg	18.31%
		CM_MC2 passed mean dry weight-mg	18.31%
		EV_MC2 passed mean dry weight-mg	18.31%
		EV_HC1 passed mean dry weight-mg	18.31%
		LC_DCDS passed mean dry weight-mg	18.31%
		LC_LC3 passed mean dry weight-mg	18.31%
		LC_LC5 passed mean dry weight-mg	18.31%
		LC_LCDSSLCC passed mean dry weight-mg	18.31%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Upstream Control (FR_UFR1)		GH_ER2	0.8586	2.68	18.79	4	CDF	0.6652	Non-Significant Effect
		CM_MC1	0.009617	2.68	18.79	4	CDF	0.9318	Non-Significant Effect
		LC_SLC	-0.6683	2.68	18.79	4	CDF	0.9901	Non-Significant Effect
		FR_FRABCH	-0.02221	2.68	18.79	4	CDF	0.9369	Non-Significant Effect
		FR_FRCP1	0.6421	2.68	18.79	4	CDF	0.7566	Non-Significant Effect
		GH_FR1	-1.337	2.68	18.79	4	CDF	0.9991	Non-Significant Effect
		GH_ERC	-0.555	2.68	18.79	4	CDF	0.9858	Non-Significant Effect
		CM_MC2	-0.7054	2.68	18.79	4	CDF	0.9912	Non-Significant Effect
		EV_MC2	-0.1382	2.68	18.79	4	CDF	0.9530	Non-Significant Effect
		EV_HC1	-0.7187	2.68	18.79	4	CDF	0.9916	Non-Significant Effect
		LC_DCDS	-0.7093	2.68	18.79	4	CDF	0.9913	Non-Significant Effect
		LC_LC3	-0.6153	2.68	18.79	4	CDF	0.9882	Non-Significant Effect
		LC_LC5	-0.1853	2.68	18.79	4	CDF	0.9585	Non-Significant Effect
		LC_LCDSSLCC	-1.114	2.68	18.79	4	CDF	0.9979	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	742.827	53.059	14	0.7199	0.7384	Non-Significant Effect
Error	2211.12	73.704	30			
Total	2953.95		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	18.19	29.14	0.1981	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9669	0.9308	0.2219	Normal Distribution

① Reference Sites

Salmonid Embryo-Alevin ~~Ery~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	14-1538-0315	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 13:11	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Mean ~~Dry~~ Weight-mg Summary

	Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
①	FR_UFR1	U	3	102.6	80.79	124.4	106.9	92.5	108.4	5.068	8.56%	0.00%
②	GH_ER2		3	96.58	76.63	116.5	100	87.41	102.3	4.636	8.31%	5.87%
③	CM_MC1		3	102.5	95.85	109.2	103.2	99.57	104.8	1.553	2.62%	0.07%
④	LC_SLC		3	107.3	87.81	126.8	109.3	98.64	113.9	4.527	7.31%	-4.57%
	FR_FRABCH		3	102.8	73.38	132.1	96.36	95.5	116.4	6.827	11.51%	-0.15%
	FR_FRCP1		3	98.1	68.48	127.7	101.7	84.8	107.8	6.882	12.15%	4.39%
	GH_FR1		3	112	65.51	158.4	104	98.57	133.3	10.8	16.70%	-9.13%
	GH_ERC		3	106.5	96.33	116.6	106	102.7	110.8	2.361	3.84%	-3.79%
	CM_MC2		3	107.5	86.82	128.3	112.1	97.92	112.6	4.816	7.76%	-4.82%
	EV_MC2		3	103.6	87.87	119.3	103.3	97.37	110	3.648	6.10%	-0.94%
	EV_HC1		3	107.6	101.1	114.2	108.8	104.6	109.5	1.528	2.46%	-4.91%
	LC_DCDS		3	107.6	98.72	116.4	106.7	104.5	111.5	2.058	3.31%	-4.85%
	LC_LC3		3	106.9	81.46	132.4	111.3	95.2	114.2	5.916	9.59%	-4.20%
	LC_LC5		3	103.9	99.01	108.8	103.3	102.3	106.1	1.137	1.89%	-1.27%
	LC_LCDSSLCC		3	110.4	103	117.8	108.8	108.6	113.8	1.718	2.69%	-7.61%

+20 vs LCC

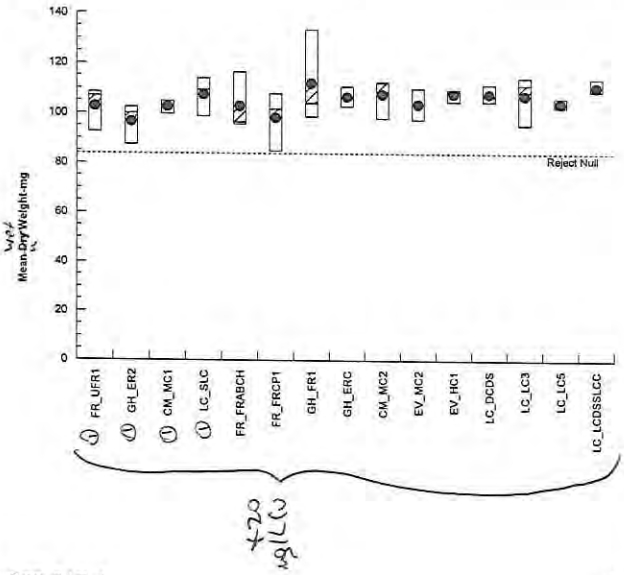
Mean ~~Dry~~ Weight-mg Detail

	Sample	Code	Rep 1	Rep 2	Rep 3
①	FR_UFR1	U	106.9	108.4	92.5
②	GH_ER2		100	102.3	87.41
③	CM_MC1		103.2	104.8	99.57
④	LC_SLC		113.9	109.3	98.64
	FR_FRABCH		95.5	116.4	96.36
	FR_FRCP1		107.8	101.7	84.8
	GH_FR1		104	133.3	98.57
	GH_ERC		106	110.8	102.7
	CM_MC2		112.1	112.6	97.92
	EV_MC2		103.3	110	97.37
	EV_HC1		108.8	109.5	104.6
	LC_DCDS		104.5	111.5	106.7
	LC_LC3		114.2	111.3	95.2
	LC_LC5		103.3	106.1	102.3
	LC_LCDSSLCC		108.8	113.8	108.6

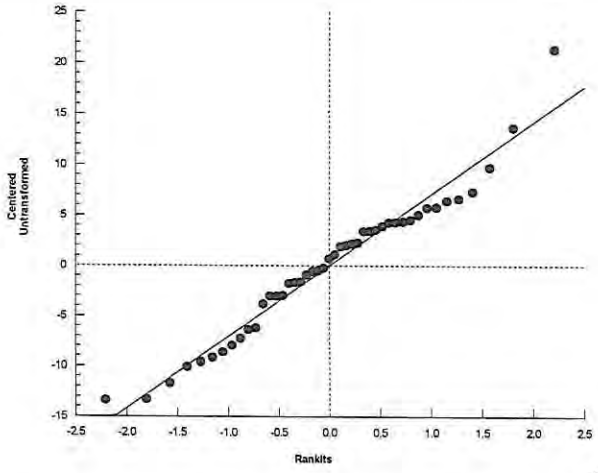
+20 vs LCC

① Reference Sites

Graphics



+20 vs LCC



Feb 3/20

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	16-3243-5585	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Jan-20 14:23	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8759-9746	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
① GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
① CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
① LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
① GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
① CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

420 with CJ

Jan 28/20

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Analysis ID: 16-3243-5585 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 12 Jan-20 14:23 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed length-mm	9.50%
		CM_MC1 passed length-mm	9.50%
		LC_SLC passed length-mm	9.50%
		FR_FRABCH passed length-mm	9.50%
		FR_FRCP1 passed length-mm	9.50%
		GH_FR1 passed length-mm	9.50%
		GH_ERC passed length-mm	9.50%
		CM_MC2 passed length-mm	9.50%
		EV_MC2 passed length-mm	9.50%
		EV_HC1 passed length-mm	9.50%
		LC_DCDS passed length-mm	9.50%
		LC_LC3 passed length-mm	9.50%
		LC_LC5 passed length-mm	9.50%
		LC_LCDSSLCC passed length-mm	9.50%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Receiving Water (GH-ER2)		① FR_UFR1	-1.789	2.68	1.863	4	CDF	0.9999	Non-Significant Effect
		① CM_MC1	-2.012	2.68	1.863	4	CDF	0.9999	Non-Significant Effect
		① LC_SLC	-1.84	2.68	1.863	4	CDF	0.9999	Non-Significant Effect
		FR_FRABCH	-1.932	2.68	1.863	4	CDF	0.9999	Non-Significant Effect
		FR_FRCP1	0.1602	2.68	1.863	4	CDF	0.9032	Non-Significant Effect
		GH_FR1	-2.007	2.68	1.863	4	CDF	0.9999	Non-Significant Effect
		GH_ERC	-1.879	2.68	1.863	4	CDF	0.9999	Non-Significant Effect
		CM_MC2	-2.062	2.68	1.863	4	CDF	1.0000	Non-Significant Effect
		EV_MC2	-2.149	2.68	1.863	4	CDF	1.0000	Non-Significant Effect
		EV_HC1	-2.347	2.68	1.863	4	CDF	1.0000	Non-Significant Effect
		LC_DCDS	-2.472	2.68	1.863	4	CDF	1.0000	Non-Significant Effect
		LC_LC3	-2.42	2.68	1.863	4	CDF	1.0000	Non-Significant Effect
		LC_LC5	-2.377	2.68	1.863	4	CDF	1.0000	Non-Significant Effect
		LC_LCDSSLCC	-3.149	2.68	1.863	4	CDF	1.0000	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15.3095	1.09354	14	1.51	0.1674	Non-Significant Effect
Error	21.7326	0.724419	30			
Total	37.0421		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	8.53	29.14	0.8599	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9597	0.9308	0.1188	Normal Distribution

① Reference Sites

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test

Nautilus Environmental

Analysis ID:	16-3243-5585	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Jan-20 14:23	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Length-mm Summary

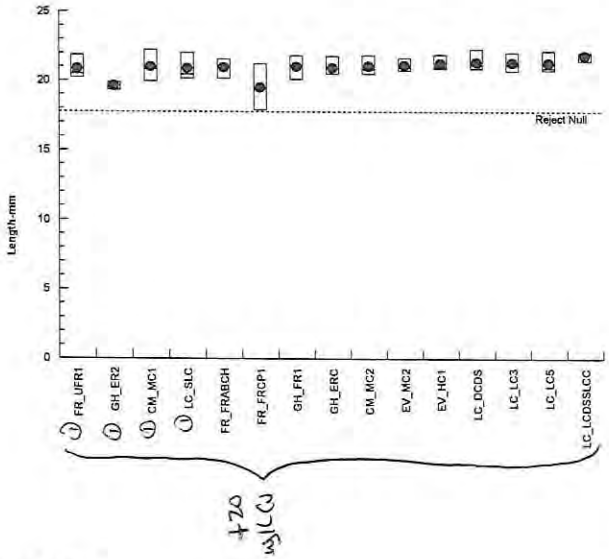
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
① FR_UFR1		3	20.85	18.64	23.05	20.46	20.21	21.86	0.5133	4.26%	0.00%
① GH_ER2	R	3	19.6	18.89	20.31	19.65	19.3	19.86	0.1646	1.45%	5.96%
① CM_MC1		3	21	18.12	23.88	20.83	19.93	22.23	0.6683	5.51%	-0.74%
① LC_SLC		3	20.88	18.37	23.39	20.45	20.16	22.04	0.5841	4.84%	-0.17%
FR_FRABCH		3	20.94	19.15	22.73	21.1	20.16	21.58	0.4161	3.44%	-0.48%
FR_FRCP1	+20	3	19.49	15.34	23.64	19.38	17.88	21.22	0.965	8.58%	6.50%
GH_FR1	ug/L Cu	3	21	18.81	23.19	21.1	20.07	21.83	0.5087	4.20%	-0.73%
GH_ERC		3	20.91	19.03	22.78	20.48	20.46	21.78	0.4362	3.61%	-0.30%
CM_MC2		3	21.03	19.25	22.82	20.8	20.46	21.84	0.4158	3.42%	-0.91%
EV_MC2		3	21.1	19.87	22.32	20.96	20.68	21.64	0.285	2.34%	-1.20%
EV_HC1		3	21.23	19.8	22.67	20.98	20.83	21.9	0.3341	2.73%	-1.86%
LC_DCDS		3	21.32	19.27	23.37	20.86	20.83	22.27	0.4768	3.87%	-2.28%
LC_LC3		3	21.28	19.56	23.01	21.14	20.67	22.04	0.4003	3.26%	-2.10%
LC_LC5		3	21.25	19.33	23.18	20.89	20.73	22.14	0.4472	3.64%	-1.96%
LC_LCDSSLCC		3	21.79	20.96	22.62	21.94	21.41	22.02	0.1922	1.53%	-4.53%

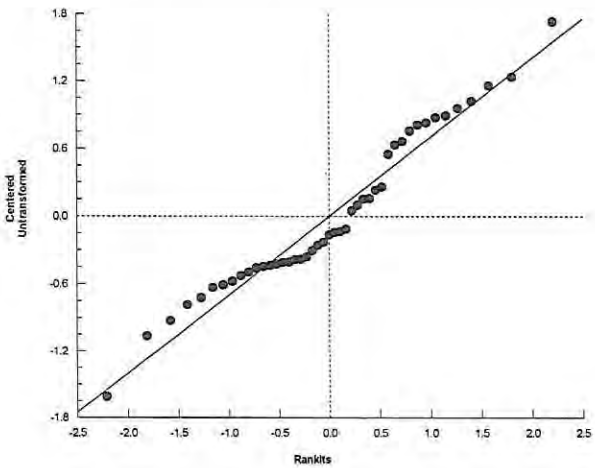
Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		21.86	20.46	20.21
① GH_ER2	R	19.86	19.65	19.3
① CM_MC1		22.23	20.83	19.93
① LC_SLC		22.04	20.45	20.16
FR_FRABCH		21.58	21.1	20.16
FR_FRCP1	+20	21.22	19.38	17.88
GH_FR1	ug/L Cu	21.83	21.09	20.07
GH_ERC		21.78	20.46	20.48
CM_MC2		21.84	20.8	20.46
EV_MC2		21.64	20.96	20.68
EV_HC1		21.9	20.98	20.83
LC_DCDS		22.27	20.83	20.86
LC_LC3		22.04	20.67	21.14
LC_LC5		22.14	20.89	20.73
LC_LCDSSLCC		22.02	21.94	21.41

① Reference Sites

Graphics





CETIS Analytical Report

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	19-6747-2818	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 13:13	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8759-9746	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	19-6747-2818	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 13:13	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	19.45%
		CM_MC1 passed mean dry weight-mg	19.45%
		LC_SLC passed mean dry weight-mg	19.45%
		FR_FRABCH passed mean dry weight-mg	19.45%
		FR_FRCP1 passed mean dry weight-mg	19.45%
		GH_FR1 passed mean dry weight-mg	19.45%
		GH_ERC passed mean dry weight-mg	19.45%
		CM_MC2 passed mean dry weight-mg	19.45%
		EV_MC2 passed mean dry weight-mg	19.45%
		EV_HC1 passed mean dry weight-mg	19.45%
		LC_DCDS passed mean dry weight-mg	19.45%
		LC_LC3 passed mean dry weight-mg	19.45%
		LC_LC5 passed mean dry weight-mg	19.45%
		LC_LCDSSLCC passed mean dry weight-mg	19.45%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Receiving Water (GH_ER2)		FR_UFR1	-0.8586	2.68	18.79	4	CDF	0.9948	Non-Significant Effect
		CM_MC1	-0.849	2.68	18.79	4	CDF	0.9946	Non-Significant Effect
		LC_SLC	-1.527	2.68	18.79	4	CDF	0.9996	Non-Significant Effect
		FR_FRABCH	-0.8808	2.68	18.79	4	CDF	0.9952	Non-Significant Effect
		FR_FRCP1	-0.2165	2.68	18.79	4	CDF	0.9618	Non-Significant Effect
		GH_FR1	-2.195	2.68	18.79	4	CDF	1.0000	Non-Significant Effect
		GH_ERC	-1.414	2.68	18.79	4	CDF	0.9993	Non-Significant Effect
		CM_MC2	-1.564	2.68	18.79	4	CDF	0.9996	Non-Significant Effect
		EV_MC2	-0.9968	2.68	18.79	4	CDF	0.9968	Non-Significant Effect
		EV_HC1	-1.577	2.68	18.79	4	CDF	0.9997	Non-Significant Effect
		LC_DCDS	-1.568	2.68	18.79	4	CDF	0.9996	Non-Significant Effect
		LC_LC3	-1.474	2.68	18.79	4	CDF	0.9995	Non-Significant Effect
		LC_LC5	-1.044	2.68	18.79	4	CDF	0.9973	Non-Significant Effect
		LC_LCDSSLCC	-1.973	2.68	18.79	4	CDF	0.9999	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	742.827	53.059	14	0.7199	0.7384	Non-Significant Effect
Error	2211.12	73.704	30			
Total	2953.95		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	18.19	29.14	0.1981	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9669	0.9308	0.2219	Normal Distribution

(1) Reference Sites

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	19-6747-2818	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 13:13	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Mean ~~Dry~~ Weight-mg Summary

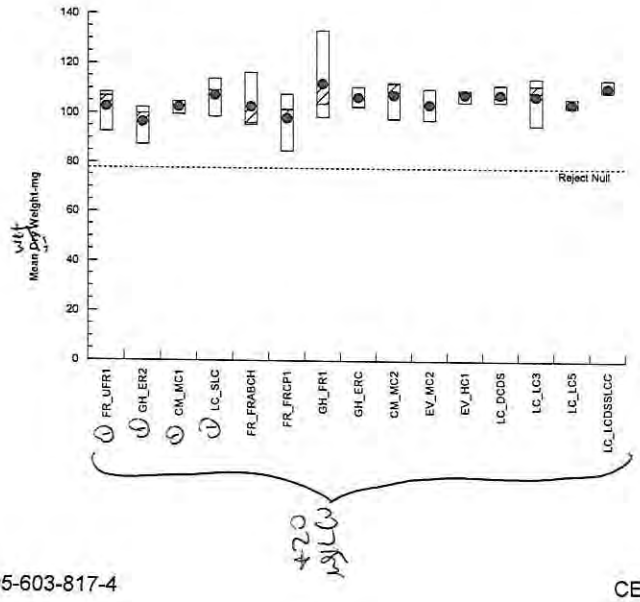
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
① FR_UFR1		3	102.6	80.79	124.4	106.9	92.5	108.4	5.068	8.56%	0.00%
① GH_ER2	R	3	96.58	76.63	116.5	100	87.41	102.3	4.636	8.31%	5.87%
① CM_MC1		3	102.5	95.85	109.2	103.2	99.57	104.8	1.553	2.62%	0.07%
① LC_SLC		3	107.3	87.81	126.8	109.3	98.64	113.9	4.527	7.31%	-4.57%
FR_FRABCH		3	102.8	73.38	132.1	96.36	95.5	116.4	6.827	11.51%	-0.15%
FR_FRCP1		3	98.1	68.48	127.7	101.7	84.8	107.8	6.882	12.15%	4.39%
GH_FR1	+20 ug/L Cu	3	112	65.51	158.4	104	98.57	133.3	10.8	16.70%	-9.13%
GH_ERC		3	106.5	96.33	116.6	106	102.7	110.8	2.361	3.84%	-3.79%
CM_MC2		3	107.5	86.82	128.3	112.1	97.92	112.6	4.816	7.76%	-4.82%
EV_MC2		3	103.6	87.87	119.3	103.3	97.37	110	3.648	6.10%	-0.94%
EV_HC1		3	107.6	101.1	114.2	108.8	104.6	109.5	1.528	2.46%	-4.91%
LC_DCDS		3	107.6	98.72	116.4	106.7	104.5	111.5	2.058	3.31%	-4.85%
LC_LC3		3	106.9	81.46	132.4	111.3	95.2	114.2	5.916	9.59%	-4.20%
LC_LC5		3	103.9	99.01	108.8	103.3	102.3	106.1	1.137	1.89%	-1.27%
LC_LCDSSLCC		3	110.4	103	117.8	108.8	108.6	113.8	1.718	2.69%	-7.61%

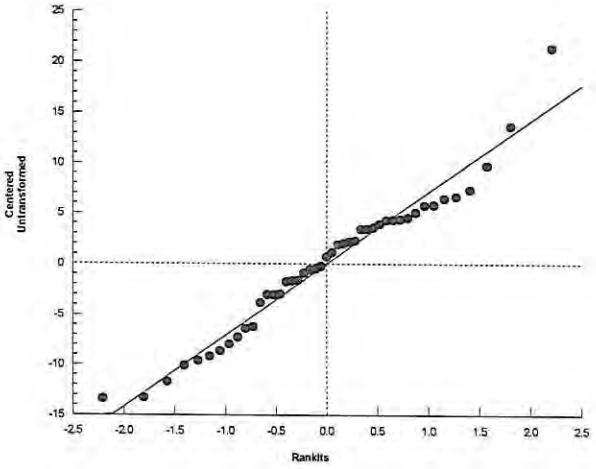
Mean ~~Dry~~ Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		106.9	108.4	92.5
① GH_ER2	R	100	102.3	87.41
① CM_MC1		103.2	104.8	99.57
① LC_SLC		113.9	109.3	98.64
FR_FRABCH		95.5	116.4	96.36
FR_FRCP1	+20 ug/L Cu	107.8	101.7	84.8
GH_FR1		104	133.3	98.57
GH_ERC		106	110.8	102.7
CM_MC2		112.1	112.6	97.92
EV_MC2		103.3	110	97.37
EV_HC1		108.8	109.5	104.6
LC_DCDS		104.5	111.5	106.7
LC_LC3		114.2	111.3	95.2
LC_LC5		103.3	106.1	102.3
LC_LCDSSLCC		108.8	113.8	108.6

① Reference Sites

Graphics





Analyst: WW QA: Feb-3/20

CETIS Analytical Report

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	02-6888-9681	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Jan-20 14:24	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8759-9746	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
① GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
① CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
① LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
① GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
① CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

Analyst: YL QA: JM 28/1/20

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Analysis ID: 02-6888-9681 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 12 Jan-20 14:24 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed length-mm	8.87%
		GH_ER2 passed length-mm	8.87%
		LC_SLC passed length-mm	8.87%
		FR_FRABCH passed length-mm	8.87%
		FR_FRCP1 passed length-mm	8.87%
		GH_FR1 passed length-mm	8.87%
		GH_ERC passed length-mm	8.87%
		CM_MC2 passed length-mm	8.87%
		EV_MC2 passed length-mm	8.87%
		EV_HC1 passed length-mm	8.87%
		LC_DCDS passed length-mm	8.87%
		LC_LC3 passed length-mm	8.87%
		LC_LC5 passed length-mm	8.87%
		LC_LCDSSLCC passed length-mm	8.87%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control (CM_MC1)		FR_UFR1	0.2226	2.68	1.863	4	CDF	0.8890	Non-Significant Effect
		GH_ER2	2.012	2.68	1.863	4	CDF	0.1753	Non-Significant Effect
		LC_SLC	0.1717	2.68	1.863	4	CDF	0.9007	Non-Significant Effect
		FR_FRABCH	0.07962	2.68	1.863	4	CDF	0.9194	Non-Significant Effect
		FR_FRCP1	2.172	2.68	1.863	4	CDF	0.1336	Non-Significant Effect
		GH_FR1	0.004317	2.68	1.863	4	CDF	0.9326	Non-Significant Effect
		GH_ERC	0.1329	2.68	1.863	4	CDF	0.9089	Non-Significant Effect
		CM_MC2	-0.04988	2.68	1.863	4	CDF	0.9411	Non-Significant Effect
		EV_MC2	-0.1377	2.68	1.863	4	CDF	0.9529	Non-Significant Effect
		EV_HC1	-0.3358	2.68	1.863	4	CDF	0.9726	Non-Significant Effect
		LC_DCDS	-0.46	2.68	1.863	4	CDF	0.9810	Non-Significant Effect
		LC_LC3	-0.4087	2.68	1.863	4	CDF	0.9778	Non-Significant Effect
		LC_LC5	-0.365	2.68	1.863	4	CDF	0.9748	Non-Significant Effect
		LC_LCDSSLCC	-1.138	2.68	1.863	4	CDF	0.9981	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15.3095	1.09354	14	1.51	0.1674	Non-Significant Effect
Error	21.7326	0.724419	30			
Total	37.0421		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	8.53	29.14	0.8599	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9597	0.9308	0.1188	Normal Distribution

① Reference Sites

Salmonid Embryo-Alevin-Fry Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	02-6888-9681	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Jan-20 14:24	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Length-mm Summary

Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
① FR_UFR1		3	20.85	18.64	23.05	20.46	20.21	21.86	0.5133	4.26%	0.00%
① GH_ER2		3	19.6	18.89	20.31	19.65	19.3	19.86	0.1646	1.45%	5.96%
① CM_MC1	XC	3	21	18.12	23.88	20.83	19.93	22.23	0.6683	5.51%	-0.74%
① LC_SLC		3	20.88	18.37	23.39	20.45	20.16	22.04	0.5841	4.84%	-0.17%
FR_FRABCH		3	20.94	19.15	22.73	21.1	20.16	21.58	0.4161	3.44%	-0.48%
FR_FRCP1		3	19.49	15.34	23.64	19.38	17.88	21.22	0.965	8.58%	6.50%
GH_FR1		3	21	18.81	23.19	21.1	20.07	21.83	0.5087	4.20%	-0.73%
GH_ERC		3	20.91	19.03	22.78	20.48	20.46	21.78	0.4362	3.61%	-0.30%
CM_MC2		3	21.03	19.25	22.82	20.8	20.46	21.84	0.4158	3.42%	-0.91%
EV_MC2		3	21.1	19.87	22.32	20.96	20.68	21.64	0.285	2.34%	-1.20%
EV_HC1		3	21.23	19.8	22.67	20.98	20.83	21.9	0.3341	2.73%	-1.86%
LC_DCDS		3	21.32	19.27	23.37	20.86	20.83	22.27	0.4768	3.87%	-2.28%
LC_LC3		3	21.28	19.56	23.01	21.14	20.67	22.04	0.4003	3.26%	-2.10%
LC_LC5		3	21.25	19.33	23.18	20.89	20.73	22.14	0.4472	3.64%	-1.96%
LC_LCDSSLCC		3	21.79	20.96	22.62	21.94	21.41	22.02	0.1922	1.53%	-4.53%

+20 ug/L Cu

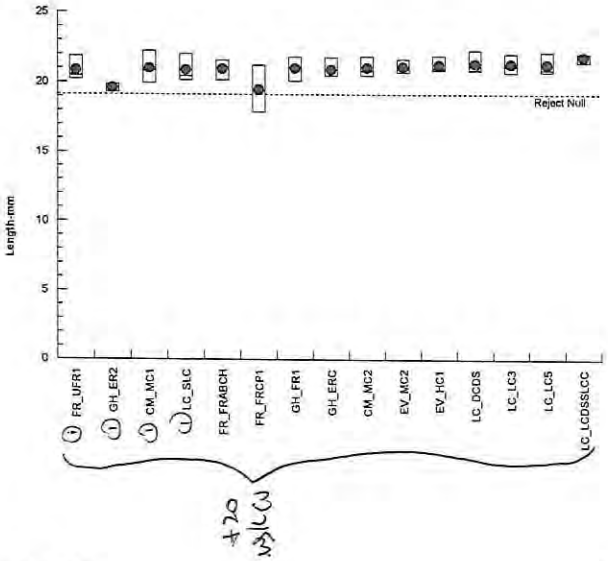
Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		21.86	20.46	20.21
① GH_ER2		19.86	19.65	19.3
① CM_MC1	XC	22.23	20.83	19.93
① LC_SLC		22.04	20.45	20.16
FR_FRABCH		21.58	21.1	20.16
FR_FRCP1		21.22	19.38	17.88
GH_FR1		21.83	21.09	20.07
GH_ERC		21.78	20.46	20.48
CM_MC2		21.84	20.8	20.46
EV_MC2		21.64	20.96	20.68
EV_HC1		21.9	20.98	20.83
LC_DCDS		22.27	20.83	20.86
LC_LC3		22.04	20.67	21.14
LC_LC5		22.14	20.89	20.73
LC_LCDSSLCC		22.02	21.94	21.41

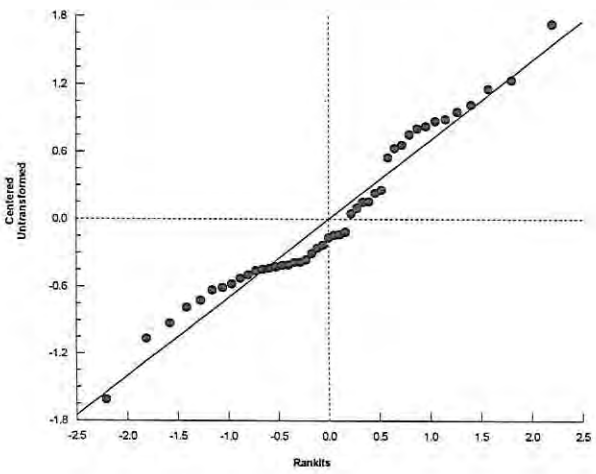
+20 ug/L Cu

① Reference Sites

Graphics



+20 ug/L Cu



Analyst: [signature] QA: [signature] 28/20

CETIS Analytical Report

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	09-5790-3792	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 13:14	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8759-9746	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID: 09-5790-3792 **Endpoint:** Mean ~~Dry~~ Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 31 Jan-20 13:14 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	LC_SLC passed mean dry weight-mg	18.32%
		FR_FRABCH passed mean dry weight-mg	18.32%
		FR_FRCP1 passed mean dry weight-mg	18.32%
		GH_FR1 passed mean dry weight-mg	18.32%
		GH_ERC passed mean dry weight-mg	18.32%
		CM_MC2 passed mean dry weight-mg	18.32%
		EV_MC2 passed mean dry weight-mg	18.32%
		EV_HC1 passed mean dry weight-mg	18.32%
		LC_DCDS passed mean dry weight-mg	18.32%
		LC_LC3 passed mean dry weight-mg	18.32%
		LC_LC5 passed mean dry weight-mg	18.32%
		LC_LCDSSLCC passed mean dry weight-mg	18.32%
		FR_UFR1 passed mean dry weight-mg	18.32%
		GH_ER2 passed mean dry weight-mg	18.32%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Site Control		FR_UFR1	-0.009617	2.68	18.79	4	CDF	0.9349	Non-Significant Effect
		GH_ER2	0.849	2.68	18.79	4	CDF	0.6695	Non-Significant Effect
		LC_SLC	-0.6779	2.68	18.79	4	CDF	0.9904	Non-Significant Effect
		FR_FRABCH	-0.03183	2.68	18.79	4	CDF	0.9383	Non-Significant Effect
		FR_FRCP1	0.6325	2.68	18.79	4	CDF	0.7603	Non-Significant Effect
		GH_FR1	-1.346	2.68	18.79	4	CDF	0.9991	Non-Significant Effect
		GH_ERC	-0.5646	2.68	18.79	4	CDF	0.9862	Non-Significant Effect
		CM_MC2	-0.715	2.68	18.79	4	CDF	0.9915	Non-Significant Effect
		EV_MC2	-0.1478	2.68	18.79	4	CDF	0.9541	Non-Significant Effect
		EV_HC1	-0.7283	2.68	18.79	4	CDF	0.9919	Non-Significant Effect
		LC_DCDS	-0.7189	2.68	18.79	4	CDF	0.9916	Non-Significant Effect
		LC_LC3	-0.6249	2.68	18.79	4	CDF	0.9886	Non-Significant Effect
		LC_LC5	-0.1949	2.68	18.79	4	CDF	0.9595	Non-Significant Effect
		LC_LCDSSLCC	-1.124	2.68	18.79	4	CDF	0.9980	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	742.827	53.059	14	0.7199	0.7384	Non-Significant Effect
Error	2211.12	73.704	30			
Total	2953.95		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	18.19	29.14	0.1981	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9669	0.9308	0.2219	Normal Distribution

Reference Stus

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	09-5790-3792	**Endpoint:**	Mean ~~Dry~~ Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 13:14	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Mean ~~Dry~~ Weight-mg Summary

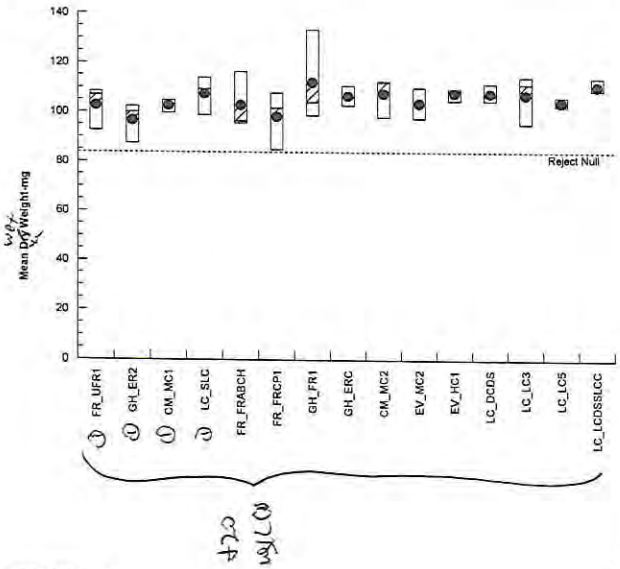
	Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
①	FR_UFR1		3	102.6	80.79	124.4	106.9	92.5	108.4	5.068	8.56%	0.00%
②	GH_ER2		3	96.58	76.63	116.5	100	87.41	102.3	4.636	8.31%	5.87%
③	CM_MC1	XC	3	102.5	95.85	109.2	103.2	99.57	104.8	1.553	2.62%	0.07%
④	LC_SLC		3	107.3	87.81	126.8	109.3	98.64	113.9	4.527	7.31%	-4.57%
	FR_FRABCH		3	102.8	73.38	132.1	96.36	95.5	116.4	6.827	11.51%	-0.15%
	FR_FRCP1	+20	3	98.1	68.48	127.7	101.7	84.8	107.8	6.882	12.15%	4.39%
	GH_FR1	mg/L Cu	3	112	65.51	158.4	104	98.57	133.3	10.8	16.70%	-9.13%
	GH_ERC		3	106.5	96.33	116.6	106	102.7	110.8	2.361	3.84%	-3.79%
	CM_MC2		3	107.5	86.82	128.3	112.1	97.92	112.6	4.816	7.76%	-4.82%
	EV_MC2		3	103.6	87.87	119.3	103.3	97.37	110	3.648	6.10%	-0.94%
	EV_HC1		3	107.6	101.1	114.2	108.8	104.6	109.5	1.528	2.46%	-4.91%
	LC_DCDS		3	107.6	98.72	116.4	106.7	104.5	111.5	2.058	3.31%	-4.85%
	LC_LC3		3	106.9	81.46	132.4	111.3	95.2	114.2	5.916	9.59%	-4.20%
	LC_LC5		3	103.9	99.01	108.8	103.3	102.3	106.1	1.137	1.89%	-1.27%
	LC_LCDSSLCC		3	110.4	103	117.8	108.8	108.6	113.8	1.718	2.69%	-7.61%

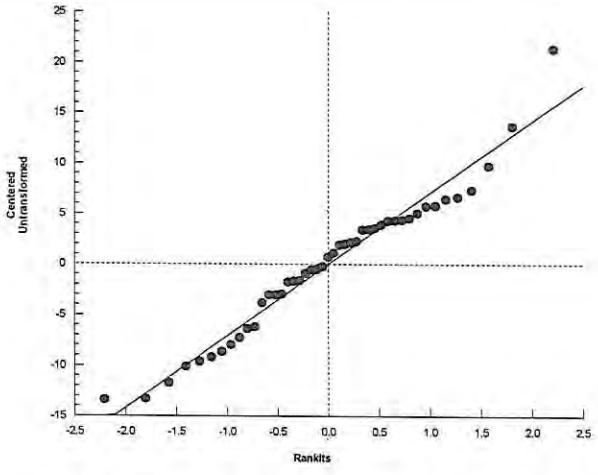
Mean ~~Dry~~ Weight-mg Detail

	Sample	Code	Rep 1	Rep 2	Rep 3
①	FR_UFR1		106.9	108.4	92.5
②	GH_ER2		100	102.3	87.41
③	CM_MC1	XC	103.2	104.8	99.57
④	LC_SLC		113.9	109.3	98.64
	FR_FRABCH		95.5	116.4	96.36
	FR_FRCP1	+20	107.8	101.7	84.8
	GH_FR1	mg/L Cu	104	133.3	98.57
	GH_ERC		106	110.8	102.7
	CM_MC2		112.1	112.6	97.92
	EV_MC2		103.3	110	97.37
	EV_HC1		108.8	109.5	104.6
	LC_DCDS		104.5	111.5	106.7
	LC_LC3		114.2	111.3	95.2
	LC_LC5		103.3	106.1	102.3
	LC_LCDSSLCC		108.8	113.8	108.6

① Reference Sites

Graphics





Analyst: [signature] QA: Feb-3/20

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test

Nautilus Environmental

Analysis ID:	16-5374-3135	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Jan-20 14:29	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8759-9746	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
① GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
① CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
① LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
① GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
① CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

Analyst: YL QA: Jan 28/20

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Analysis ID: 16-5374-3135 **Endpoint:** Length-mm **CETIS Version:** CETISv1.9.4
Analyzed: 12 Jan-20 14:29 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed length-mm	8.92%
		GH_ER2 passed length-mm	8.92%
		CM_MC1 passed length-mm	8.92%
		FR_FRABCH passed length-mm	8.92%
		FR_FRCP1 passed length-mm	8.92%
		GH_FR1 passed length-mm	8.92%
		GH_ERC passed length-mm	8.92%
		CM_MC2 passed length-mm	8.92%
		EV_MC2 passed length-mm	8.92%
		EV_HC1 passed length-mm	8.92%
		LC_DCDS passed length-mm	8.92%
		LC_LC3 passed length-mm	8.92%
		LC_LC5 passed length-mm	8.92%
		LC_LCDSSLCC passed length-mm	8.92%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Unamended Samp		① FR_UFR1	0.05084	2.68	1.863	4	CDF	0.9247	Non-Significant Effect
		① GH_ER2	1.84	2.68	1.863	4	CDF	0.2294	Non-Significant Effect
		① CM_MC1	-0.1717	2.68	1.863	4	CDF	0.9569	Non-Significant Effect
		① FR_FRABCH	-0.09209	2.68	1.863	4	CDF	0.9470	Non-Significant Effect
		FR_FRCP1	2	2.68	1.863	4	CDF	0.1786	Non-Significant Effect
		GH_FR1	-0.1674	2.68	1.863	4	CDF	0.9564	Non-Significant Effect
		GH_ERC	-0.03885	2.68	1.863	4	CDF	0.9394	Non-Significant Effect
		CM_MC2	-0.2216	2.68	1.863	4	CDF	0.9623	Non-Significant Effect
		EV_MC2	-0.3094	2.68	1.863	4	CDF	0.9705	Non-Significant Effect
		EV_HC1	-0.5075	2.68	1.863	4	CDF	0.9835	Non-Significant Effect
		LC_DCDS	-0.6317	2.68	1.863	4	CDF	0.9889	Non-Significant Effect
		LC_LC3	-0.5804	2.68	1.863	4	CDF	0.9869	Non-Significant Effect
		LC_LC5	-0.5367	2.68	1.863	4	CDF	0.9850	Non-Significant Effect
		LC_LCDSSLCC	-1.309	2.68	1.863	4	CDF	0.9990	Non-Significant Effect

① (LC-SLC)

+20 w/ C3

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15.3095	1.09354	14	1.51	0.1674	Non-Significant Effect
Error	21.7326	0.724419	30			
Total	37.0421		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	8.53	29.14	0.8599	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9597	0.9308	0.1188	Normal Distribution

① Reference Sites

Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	16-5374-3135	**Endpoint:**	Length-mm	**CETIS Version:**	CETISv1.9.4
Analyzed:	12 Jan-20 14:29	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Length-mm Summary

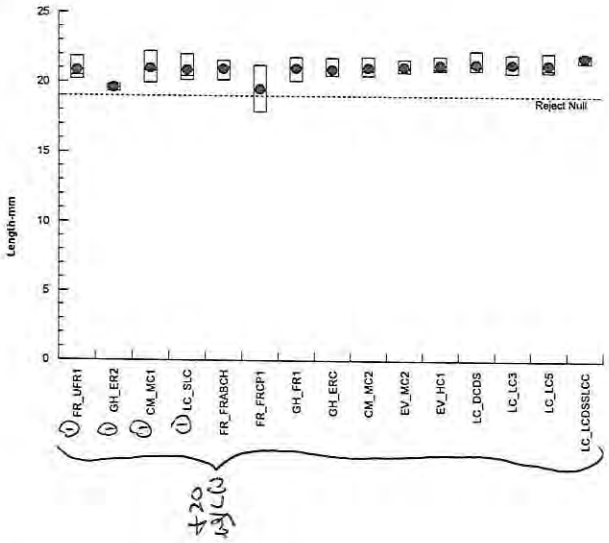
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
① FR_UFR1		3	20.85	18.64	23.05	20.46	20.21	21.86	0.5133	4.26%	0.00%
① GH_ER2		3	19.6	18.89	20.31	19.65	19.3	19.86	0.1646	1.45%	5.96%
① CM_MC1		3	21	18.12	23.88	20.83	19.93	22.23	0.6683	5.51%	-0.74%
① LC_SLC	US	3	20.88	18.37	23.39	20.45	20.16	22.04	0.5841	4.84%	-0.17%
FR_FRABCH		3	20.94	19.15	22.73	21.1	20.16	21.58	0.4161	3.44%	-0.48%
FR_FRCP1	+20	3	19.49	15.34	23.64	19.38	17.88	21.22	0.965	8.58%	6.50%
GH_FR1	ug/L Cu	3	21	18.81	23.19	21.1	20.07	21.83	0.5087	4.20%	-0.73%
GH_ERC		3	20.91	19.03	22.78	20.48	20.46	21.78	0.4362	3.61%	-0.30%
CM_MC2		3	21.03	19.25	22.82	20.8	20.46	21.84	0.4158	3.42%	-0.91%
EV_MC2		3	21.1	19.87	22.32	20.96	20.68	21.64	0.285	2.34%	-1.20%
EV_HC1		3	21.23	19.8	22.67	20.98	20.83	21.9	0.3341	2.73%	-1.86%
LC_DCDS		3	21.32	19.27	23.37	20.86	20.83	22.27	0.4768	3.87%	-2.28%
LC_LC3		3	21.28	19.56	23.01	21.14	20.67	22.04	0.4003	3.26%	-2.10%
LC_LC5		3	21.25	19.33	23.18	20.89	20.73	22.14	0.4472	3.64%	-1.96%
LC_LCDSSLCC		3	21.79	20.96	22.62	21.94	21.41	22.02	0.1922	1.53%	-4.53%

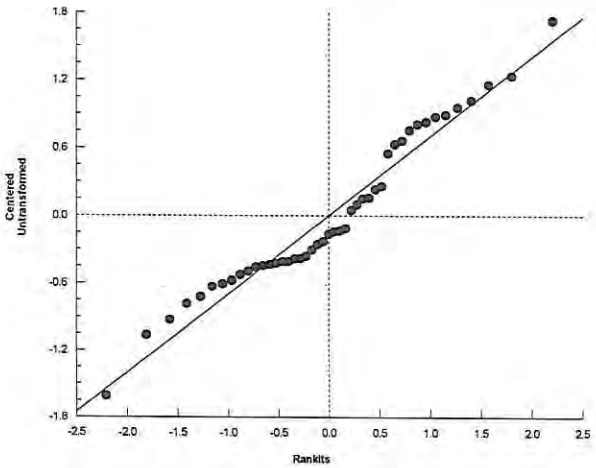
Length-mm Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		21.86	20.46	20.21
① GH_ER2		19.86	19.65	19.3
① CM_MC1		22.23	20.83	19.93
① LC_SLC	US	22.04	20.45	20.16
FR_FRABCH		21.58	21.1	20.16
FR_FRCP1	+20	21.22	19.38	17.88
GH_FR1	ug/L Cu	21.83	21.09	20.07
GH_ERC		21.78	20.46	20.48
CM_MC2		21.84	20.8	20.46
EV_MC2		21.64	20.96	20.68
EV_HC1		21.9	20.98	20.83
LC_DCDS		22.27	20.83	20.86
LC_LC3		22.04	20.67	21.14
LC_LC5		22.14	20.89	20.73
LC_LCDSSLCC		22.02	21.94	21.41

① Reference Sites

Graphics





Salmonid Embryo-Alevin-~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	17-5262-7344	**Endpoint:**	Mean Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	31 Jan-20 13:17	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	17-8759-9746	**Test Type:**	Survival-Development-Growth	**Analyst:**	Yvonne Lam
Start Date:	13 Nov-19 14:50	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	13 Dec-19 09:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	29d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
① FR_UFR1	08-6945-2424	12 Nov-19 09:49	13 Nov-19 11:30	29h (0 °C)	Teck Coal	
① GH_ER2	14-9952-9322	12 Nov-19 12:03	13 Nov-19 11:30	27h (0 °C)		
① CM_MC1	04-3284-1213	12 Nov-19 10:45	13 Nov-19 11:30	28h (0 °C)		
① LC_SLC	05-4724-5694	12 Nov-19 13:07	13 Nov-19 11:30	26h (1.5 °C)		
FR_FRABCH	02-5959-2694	12 Nov-19 10:39	13 Nov-19 11:30	28h (0 °C)		
FR_FRCP1	21-2090-9148	12 Nov-19 11:30	13 Nov-19 11:30	27h (0 °C)		
GH_FR1	12-2825-5207	12 Nov-19 14:33	13 Nov-19 11:30	24h (0 °C)		
GH_ERC	21-3387-4816	12 Nov-19 13:41	13 Nov-19 11:30	25h (1.2 °C)		
CM_MC2	02-5668-3961	12 Nov-19 12:11	13 Nov-19 11:30	27h (0 °C)		
EV_MC2	06-7376-7316	12 Nov-19 10:35	13 Nov-19 11:30	28h (0 °C)		
EV_HC1	03-0087-5543	12 Nov-19 09:15	13 Nov-19 11:30	30h (0 °C)		
LC_DCDS	05-9778-0225	12 Nov-19 11:00	13 Nov-19 11:30	28h (0 °C)		
LC_LC3	19-1971-9965	12 Nov-19 13:28	13 Nov-19 11:30	25h (1.2 °C)		
LC_LC5	03-8413-9244	12 Nov-19 10:00	13 Nov-19 11:30	29h (0.9 °C)		
LC_LCDSSLCC	14-1813-9342	12 Nov-19 10:32	13 Nov-19 11:30	28h (1.8 °C)		

① Reference Sites

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
① FR_UFR1	Water Sample	Teck Coal	FR_UFR1_MON_2019-11-1	
① GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2019-11-04_	
① CM_MC1	Water Sample	Teck Coal	CM_MC1_WS_2019-11-12	
① LC_SLC	Water Sample	Teck Coal	LC_SLC_WS_2019-08-19_	
FR_FRABCH	Water Sample	Teck Coal	FR_FRABCH_MON_2019-	
FR_FRCP1	Water Sample	Teck Coal	FR_FRCP1_WS_2019-11-1	
GH_FR1	Water Sample	Teck Coal	GH_FR1_WS_2019-11-04_	
GH_ERC	Water Sample	Teck Coal	GH_ERC_WS_2019-11-04	
CM_MC2	Water Sample	Teck Coal	CM_MC2_WS_2019-11-12	
EV_MC2	Water Sample	Teck Coal	EV_MC2_WS_2019_Q4_W	
EV_HC1	Water Sample	Teck Coal	EV_HC1_WS_2019_Q4_W	
LC_DCDS	Water Sample	Teck Coal	LC_DCDS_WS_2019-08-19	
LC_LC3	Water Sample	Teck Coal	LC_LC3_WS_2019-08-19_	
LC_LC5	Water Sample	Teck Coal	LC_LC5_WS_2019-08-19_	
LC_LCDSSLCC	Water Sample	Teck Coal	LC_LCDSSLCC_WS_2019-	

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test **Nautilus Environmental**

Analysis ID: 17-5262-7344 **Endpoint:** Mean ~~Dry~~ Weight-mg **CETIS Version:** CETISv1.9.4
Analyzed: 31 Jan-20 13:17 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Data Transform	Alt Hyp	Comparison Result	PMSD
Untransformed	C > T	FR_UFR1 passed mean dry weight-mg	17.51%
		GH_ER2 passed mean dry weight-mg	17.51%
		CM_MC1 passed mean dry weight-mg	17.51%
		FR_FRABCH passed mean dry weight-mg	17.51%
		FR_FRCP1 passed mean dry weight-mg	17.51%
		GH_FR1 passed mean dry weight-mg	17.51%
		GH_ERC passed mean dry weight-mg	17.51%
		CM_MC2 passed mean dry weight-mg	17.51%
		EV_MC2 passed mean dry weight-mg	17.51%
		EV_HC1 passed mean dry weight-mg	17.51%
		LC_DCDS passed mean dry weight-mg	17.51%
		LC_LC3 passed mean dry weight-mg	17.51%
		LC_LC5 passed mean dry weight-mg	17.51%
		LC_LCDSSLCC passed mean dry weight-mg	17.51%

Dunnett Multiple Comparison Test

Sample I	vs	Sample II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
① Unamended Sampl		① FR_UFR1	0.6683	2.68	18.79	4	CDF	0.7463	Non-Significant Effect
(LC_SLC)		⑥ GH_ER2	1.527	2.68	18.79	4	CDF	0.3521	Non-Significant Effect
		① CM_MC1	0.6779	2.68	18.79	4	CDF	0.7424	Non-Significant Effect
		FR_FRABCH	0.6461	2.68	18.79	4	CDF	0.7550	Non-Significant Effect
		FR_FRCP1	1.31	2.68	18.79	4	CDF	0.4510	Non-Significant Effect
		GH_FR1	-0.6683	2.68	18.79	4	CDF	0.9901	Non-Significant Effect
		GH_ERC	0.1134	2.68	18.79	4	CDF	0.9129	Non-Significant Effect
		CM_MC2	-0.03709	2.68	18.79	4	CDF	0.9391	Non-Significant Effect
		EV_MC2	0.5302	2.68	18.79	4	CDF	0.7982	Non-Significant Effect
		EV_HC1	-0.05042	2.68	18.79	4	CDF	0.9411	Non-Significant Effect
		LC_DCDS	-0.04097	2.68	18.79	4	CDF	0.9397	Non-Significant Effect
		LC_LC3	0.05305	2.68	18.79	4	CDF	0.9243	Non-Significant Effect
		LC_LC5	0.483	2.68	18.79	4	CDF	0.8144	Non-Significant Effect
		LC_LCDSSLCC	-0.4461	2.68	18.79	4	CDF	0.9802	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	742.827	53.059	14	0.7199	0.7384	Non-Significant Effect
Error	2211.12	73.704	30			
Total	2953.95		44			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	18.19	29.14	0.1981	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9669	0.9308	0.2219	Normal Distribution

① Reference Sites

Salmonid Embryo-Alevin ~~Fry~~ Survival Development and Growth Test — **Nautilus Environmental**

Analysis ID:	17-5262-7344	**Endpoint:**	Mean ~~Dry~~ Weight-mg
Analyzed:	31 Jan-20 13:17	**Analysis:**	Parametric-Control vs Treatments
CETIS Version:	CETISv1.9.4		
Status Level:	1		

Mean ~~Dry~~ Weight-mg Summary

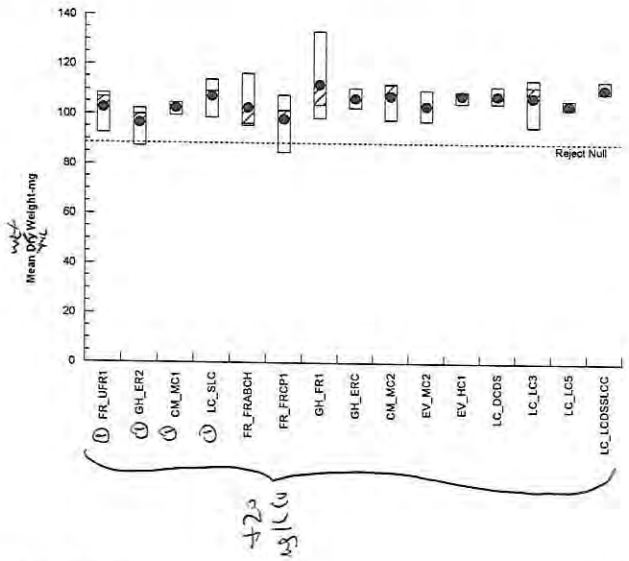
Sample	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
① FR_UFR1		3	102.6	80.79	124.4	106.9	92.5	108.4	5.068	8.56%	0.00%
② GH_ER2		3	96.58	76.63	116.5	100	87.41	102.3	4.636	8.31%	5.87%
③ CM_MC1		3	102.5	95.85	109.2	103.2	99.57	104.8	1.553	2.62%	0.07%
④ LC_SLC	US	3	107.3	87.81	126.8	109.3	98.64	113.9	4.527	7.31%	-4.57%
FR_FRABCH		3	102.8	73.38	132.1	96.36	95.5	116.4	6.827	11.51%	-0.15%
FR_FRCP1		3	98.1	68.48	127.7	101.7	84.8	107.8	6.882	12.15%	4.39%
GH_FR1		3	112	65.51	158.4	104	98.57	133.3	10.8	16.70%	-9.13%
GH_ERC		3	106.5	96.33	116.6	106	102.7	110.8	2.361	3.84%	-3.79%
CM_MC2		3	107.5	86.82	128.3	112.1	97.92	112.6	4.816	7.76%	-4.82%
EV_MC2		3	103.6	87.87	119.3	103.3	97.37	110	3.648	6.10%	-0.94%
EV_HC1		3	107.6	101.1	114.2	108.8	104.6	109.5	1.528	2.46%	-4.91%
LC_DCDS		3	107.6	98.72	116.4	106.7	104.5	111.5	2.058	3.31%	-4.85%
LC_LC3		3	106.9	81.46	132.4	111.3	95.2	114.2	5.916	9.59%	-4.20%
LC_LC5		3	103.9	99.01	108.8	103.3	102.3	106.1	1.137	1.89%	-1.27%
LC_LCDSSLCC		3	110.4	103	117.8	108.8	108.6	113.8	1.718	2.69%	-7.61%

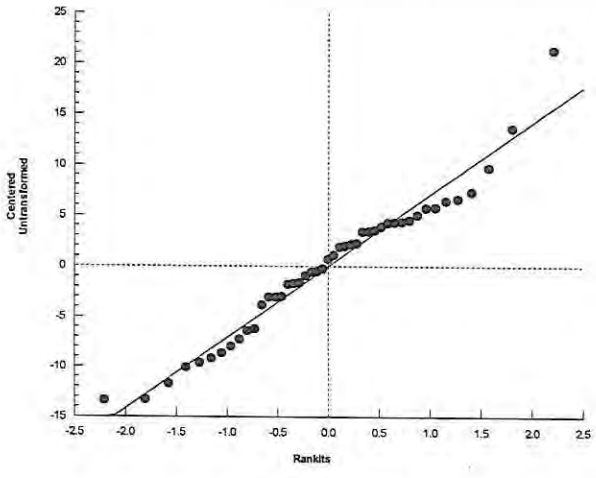
Mean ~~Dry~~ Weight-mg Detail

Sample	Code	Rep 1	Rep 2	Rep 3
① FR_UFR1		106.9	108.4	92.5
② GH_ER2		100	102.3	87.41
③ CM_MC1		103.2	104.8	99.57
④ LC_SLC	US	113.9	109.3	98.64
FR_FRABCH		95.5	116.4	96.36
FR_FRCP1		107.8	101.7	84.8
GH_FR1		104	133.3	98.57
GH_ERC		106	110.8	102.7
CM_MC2		112.1	112.6	97.92
EV_MC2		103.3	110	97.37
EV_HC1		108.8	109.5	104.6
LC_DCDS		104.5	111.5	106.7
LC_LC3		114.2	111.3	95.2
LC_LC5		103.3	106.1	102.3
LC_LCDSSLCC		108.8	113.8	108.6

① Reference Sites

Graphics





Analyst: _____ QA: Feb-3/20

APPENDIX E - Chain-of-custody forms

Teck

Page 1 of 1

COC ID: 20191112-1400 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Scott Roughead			Lab Contact				Email 1:	david.burroughs@teck.com	X	X	X
Email	scott.roughead@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	britt.anderson@teck.com	X	X	X
Address				Address	8664 Commerce Court			Email 3:	scott.roughead@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	jared.reyenne@teck.com	X	X	X
Postal Code		Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 6:				
Phone Number	1-250-433-6976			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 7-d C.dubia P/F	7-d C.dubia P/F (EDTA)	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)					
									N	N	N	N	N	N						
FR_FRCPI_WS_2019-11-12_N	FR_FRCPI	WS		2019/11/12	11:30	G	~~5~~ 4 x 20L			X	X	X	X	X	X					0.0
FR_UFRI_MON_2019-11-12_N	FR_UFRI	WS		2019/11/12	9:49	G	~~4~~ 4 x 20L			X		X	X	X						0.0
FR_FRABCH_MON_2019-11-12_NP	FR_FRABCH	WS		2019/11/12	10:39	G	~~4~~ 4 x 20L			X		X	X	X						0.0
										192276	192278	192274	192275	192277	192279					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
sample description for all samples : clear, colorless, odorless, no particulates	Britt Anderson	November 12 2019	Tyrone Hamilton	Nautilus - Burnaby
			Nov. 13/19 @ 11:30	Q4-W1

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Britt Anderson	Mobile #	4039907060
Sampler's Signature		Date/Time	November 12 2019

Teck

COC ID:	Q4 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jenni Kropp			Lab Contact	Emma Marus			Email 1:	Leigh.Stickney	X	X	X
Email	jennifer.kropp@teck.com			Email				Email 2:	jennifer.kropp@teck.com	X	X	X
Address	PO Box 5000			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			X
								Email 4:	jaydon.francis@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	Brendan.Peachey@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 6:	DL-Equis-GHO-Feild@teck.com	X	X	X
Phone Number	250 865 3274			Phone Number				PO number	610307			

SAMPLE DETAILS / ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
									72h P. subcapitata P/F	7d C.dubia P/F	28-d Hyallella P/F	30-d embryo EA P/F (20 ug/L Cu)								
GH_ER2_WS_2019-11-04_N	GH_ER2	WS		12-Nov	12:03	G	4x20L		x	x	x	x								0.0
GH_ERC_WS_2019-11-04_N	GH_ERC	WS		12-Nov	13:41	G	4x20L		x	x	x	x								1.2
GH_FR1_WS_2019-11-04_N	GH_FR1	WS		12-Nov	14:33	G	4x20L		x	x	x	x								0.0
									192274	192276	192277	192275								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
sample description for all samples: clear, colorless, odorless. no particulates.				Tyrone Hamilton	Nautilus - Burnaby	
				Nov. 13/19 @ 11:30	Q4-W1	

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	WEEKLY_CHRONIC_11122019_1	TURNAROUND TIME:	Regular	RUSH:	No

PROJECT/CLIENT INFO			
Facility Name / Job#	Coal Mountain Operations		
Project Manager	Jay Jones		
Email	Jay.Jones@teck.com		
Address	PO Box 3000		
City	Sparwood	Province	BC
Postal Code	V0B 2G0	Country	Canada
Phone Number	1-250-425-7321		

LABORATORY			
Lab Name	Nautilus Environmental		
Lab Contact	Richard Chea		
Email	richard@nautilusenvironmental.ca		
Address	8664 commerce Court		
City	Burnaby	Province	BC
Postal Code	V5A 4N7	Country	Canada
Phone Number	604-420-8773		

OTHER INFO				
Report Format / Distribution		Excel	PDF	EDD
Email 1:	Scott.Holmgren@teck.com	X	X	X
Email 2:	teckcoal@equisonline.com			X
Email 3:	Victoria.Sharpe@teck.com	X	X	X
Email 4	Don.Sacino@teck.com	X	X	X
Email 5:	Jay.Jones@teck.com	X	X	X
PO number				

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	PRESERV.	ANALYSIS: 7-d C.dubia P/F	7-d C.dubia P/F (EDTA)	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)	28-d Hyalella Nickel Testing					
CM_MC1_WS_2019-11-12_N	CM_MC1	WS	No	11/12/2019	10:45	G	12x2L			X		X	X	X		X					0.0
CM_MC2_WS_2019-11-12_N	CM_MC2	WS	No	11/12/2019	12:11	G	5x2L			X	X	X	X	X	X						0.0
RG_MIDAG_WS_2019-11-12_N	RG_MIDAG	WS	No	11/12/2019	11:43	G	2x2L			X	X			X	X						0.0
										192276	192278	192274	192275	192277	192279	192280					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Sample description for all samples: clear, colorless, odorless, no particulates.			Tyrone Nautilus	Nautilus - Burnaby
			Nov. 13/19 @ 11:30	Q4 - W1

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Victoria Sharpe/Shelby Holden	Mobile #	250 425 7522
Sampler's Signature	VSharpe / SH	Date/Time	November 12, 2019

Teck

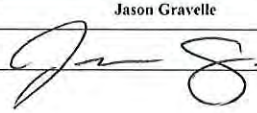
COC ID: 20191112CRN1B | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q3 Chronic Sampling			Lab Contact	Richard Chea			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email	Richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	8664 Commerce Court			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3				Imperial Square Lake City			Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00610856			
Postal Code	V1C 4C3	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED											Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								FILTERED	No	No	No	No							
								PRESERVED	No	No	No	No							
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	28-d H. azteca P/F	7-d C.dubia P/F	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)							
EV_HC1_WS_2019_Q4_WK1_N	EV_HC1	WS	N	11/12/2019	9:15	G	4x20L		4										0.0
EV_MC2_WS_2019_Q4_WK1_N	EV_MC2	WS	N	11/12/2019	10:35	G	4x20L		4										0.0
									192277	192276	192274	192275							
					Total		8												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphinia testing to occur at 20 degrees) sample description for all samples: clear, colorless, odorless, no particulates	Jason Gravelle	12-Nov-19	Tyrone Hamilton Nautilus - Burnaby	Nov. 13/19 @ 11:30 Q4 - W1

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jason Gravelle	Mobile #	
Sampler's Signature		Date/Time	November 12, 2019

Teck

Page 1 of 1

COC ID: 20191112 Chronic tox

TURNAROUND TIME:

RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	carla.froymanparker@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			x
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	kennedy.allen@teck.com	x	x	
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number	VPO00608154			
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 7-d C.dubia P/F	72-hr P. subcapitata P/F	28-d Hyalella P/F	30-d embryo EA P/F (20 ug/L Cu)								
1	LC_LCDSSLCC_WS_2019-08-19_N	LC_LCDSSLCC	WS	N	12-Nov	10:32	G	4			X	X	X	X								L.8
2	LC_SLC_WS_2019-08-19_N	LC_SLC	WS	N	12-Nov	13:07	G	4			X	X	X	X								L.5
3	LC_LC3_WS_2019-08-19_N	LC_LC3	WS	N	12-Nov	13:28	G	4			X	X	X	X								L.2
4	LC_LC5_WS_2019-08-19_N	LC_LC5	WS	N	12-Nov	10:00	G	4x2L			X	X	X	X								0.9
5	LC_DCDS_WS_2019-08-19_N	LC_DCDS	WS	N	12-Nov	11:00	G	4x2L			X	X	X	X								0.0
											19227 6	19227 4	19227 7	19227 5								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide preliminary update as results are available	K. Cambell/D.Tymstra	12-Nov	Tyme Hamilton	Nov. 13/19 @ ~~8:30~~ 11:30
3 samples arrived unlabelled → issue was resolved w/ Teck.			Nautilus - Burnaby	Q4 - W1

SERVICE REQUEST (rush - subject to availability)	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	November 12, 2019

sample description for 1, 2, 4, & 5 : clear, colorless, odorless, no particulates

3 : clear, yellow, odorless, no particulates

Teck

COC ID: 20191119-1400

TURNAROUND TIME:

RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Scott Roughead			Lab Contact				Email 1:	david.burroughs@teck.com	X	X	X
Email	scott.roughead@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	britt.anderson@teck.com	X	X	X
Address				Address	8664 Commerce Court			Email 3:	scott.roughead@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	jared.ceyenne@teck.com	X	X	X
Postal Code		Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 6:				
Phone Number	1-250-433-6976			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)												
								FIL												
								PRESERV	N	N	N	N	N							
Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)	NAUT_48hr_DM_P/F WO # 192339	NAUT_Package_96Hr_RT WO# 192340							
FR_FRCP1_WS_2019-11-19_N	FR_FRCP1	WS		2019/11/19	12:45	G	5x20L		X	X	X									1.2
FR_UFR1_WS_2019-11-19_N	FR_UFR1	WS		2019/11/19	9:25	G	4x20L		X	X										0.0
FR_FRABCH_WS_2019-11-19_NP	FR_FRABCH	WS		2019/11/19	12:08	G	4x20L		X	X										0.0
FR_SP1_MON_2019-11-04_N	FR_SP1	WS		2019-11-18	11:22	G	1x20L					X	X							0.1
									192275	192277	192279	192307	192308							
									192275	192277	192279	192307	192308							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Britt Anderson	November 19 2019	Tyme Hamilton	Nov 20/19 @ 11:30
			Nautilus - Burnaby	04-W2

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Britt Anderson	Mobile #	4039907060
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	November 19 2019
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q4 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jenni Kropp			Lab Contact	Emma Marus			Email 1:	Leigh.Stickney	X	X	X
Email	jennifer.kropp@teck.com			Email				Email 2:	jennifer.kropp@teck.com	X	X	X
Address	PO Box 5000			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			X
								Email 4:	jaydon.francis@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	Brendan.Peachey@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 6:	DL-Equis-GHO-Feild@teck.com	X	X	X
Phone Number	250 865 3274			Phone Number				PO number	610307			

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Perserved or both (F, P, F/P)											
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	72h P. subcapitata P/F	7d C.dubia P/F	28-d Hyallella P/F	30-d embryo EA P/F (20 ug/L Cu)							
GH_ER2_WS_2019-11-19_N	GH_ER2	WS		19-Nov	10:08	G	4 x 20L				x	x							0.0
GH_ERC_WS_2019-11-19_N	GH_ERC	WS		19-Nov	11:13	G	4 x 20L				x	x							0.0
GH_FR1_WS_2019-11-19_N	GH_FR1	WS		19-Nov	12:26	G	4 x 20L				x	x							0.0
											192277	192279							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				Tyrone Nowlan	Nov. 20/19	@ 11:50
				Nautilus - Burnaby	Q4 - W2	

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	WEEKLY_CHRONIC_11192019_2	TURNAROUND TIME:	Regular	RUSH:	No

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Richard Chea			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 3:	Victoria.Sharpe@teck.com	X	X	X
								Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 5:	Jay.jones@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED — Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	7-d C.dubia P/F	7-d C.dubia P/F (EDTA)	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)	28-d Hyalella Nickel Testing					
CM_MC1_WS_2019-11-19_N	CM_MC1	WS	No	11/19/2019	9:34	G	12 x 20L	X		X	X	X		X					0.0
CM_MC2_WS_2019-11-19_N	CM_MC2	WS	No	11/19/2019	11:05	G	5 x 20L	X	X	X	X	X	X						0.0
RG_MIDAG_WS_2019-11-19_N	RG_MIDAG	WS	No	11/19/2019	10:24	G	2 x 20L	X	X			X	X						0.0
								192276	192278	192274	192275	192277	192279	192280					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Tyrone Hamilton	Nautilus - Burnaby
			Nov. 20/19 @ 11:50	Q4-W2

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Victoria Sharpe/Shelby Holden	Mobile #	250 425 7522
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	[signature]	Date/Time	November 19, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20191119CRN2B | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q3 Chronic Sampling			Lab Contact	Richard Chea			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email	Richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	8664 Commerce Court			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3				Imperial Square Lake City			Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00610856			
Postal Code	V1C 4C3	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED										Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								FILTERED	No	No	No	No						
								PRESERVED	No	No	No	No						
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	28-d H. azteca P/F	30-d embryo EA P/F (20 ug/L Cu)								
EV_HC1_WS_2019_Q4_WK2_N	EV_HC1	WS	N	11/19/2019	8:40	G	4 x 2 1L		4									0.0
EV_MC2_WS_2019_Q4_WK2_N	EV_MC2	WS	N	11/19/2019	10:05	G	4 x 2 1L		4									0.0
					Total		8		192277	192275								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)	Jason Gravelle	19-Nov-19	Tyme Nautilus - Burnaby	Nov. 20/19 @ 11:50 Q4-W2

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jason Gravelle	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	November 19, 2019
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20191119 Chronic tox

TURNAROUND TIME:

RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	carla.froymanparker@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			x
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	kennedy.allen@teck.com	x	x	
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number	VPO0008154			
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Fil.	PRESERV.	ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)	ANALYSIS: 28-d Hyalella P/F											
LC_LCDSSLCC_WS_2019-11-19_N	LC_LCDSSLCC	WS	N	19-Nov	10:29	G	4x2			X	X											0.0
LC_SLC_WS_2019-11-19_N	LC_SLC	WS	N	19-Nov	11:50	G	4			X	X											0.0
LC_LC3_WS_2019-11-19_N	LC_LC3	WS	N	19-Nov	12:30	G	4			X	X											0.0
LC_LC5_WS_2019-11-19_N	LC_LC5	WS	N	19-Nov	9:50	G	4			X	X											0.0
LC_DCDS_WS_2019-11-19_N	LC_DCDS	WS	N	19-Nov	11.17	G	4			X	X											0.0
										192275	192277											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	19-Nov	Tyme Hamilton	Nov. 20/19 @ 11:50
			Nautilus - Burnaby	Q4-W2

SERVICE REQUEST (rush - subject to availability)	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	November 19, 2019

Teck

COC ID: 20191126-1400 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Scott Roughead			Lab Contact				Email 1:	david.burroughs@teck.com	X	X	X
Email	scott.roughead@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	britt.anderson@teck.com	X	X	X
Address				Address	8664 Commerce Court			Email 3:	scott.roughead@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	jared.ceyenne@teck.com	X	X	X
Postal Code		Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 6:				
Phone Number	1-250-433-6976			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV.	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)								
								FIL.											
								PRESERV.	N	N	N								
								ANALYSIS											
FR_FRCP1_WS_2019-11-26_N	FR_FRCP1	WS		2019/11/26	11:00	G	5 x 20L		X	X	X								0.0
FR_UFR1_WS_2019-11-26_N	FR_UFR1	WS		2019/11/26	8:51	G	4 x 20L		X	X									0.0
FR_FRABCH_MON_2019-11-26_NP	FR_FRABCH	WS		2019/11/26	10:15	G	4 ↓		X	X									0.0
									192275	192277	192279								
									192275	192277	192279								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
All samples arrived slushy	Britt Anderson	November 26 2019	Tyme Hamilton	Nov. 26/19 @ 11:54
			Nautilus - Burnaby	Q4-W3

SERVICE REQUEST (rush - subject to availability)	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Britt Anderson	Mobile #	4039907060
Sampler's Signature		Date/Time	November 26 2019

Teck

COC ID:	Q4 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jenni Kropp			Lab Contact	Emma Marus			Email 1:	Leigh.Stickney	X	X	X
Email	jennifer.kropp@teck.com			Email				Email 2:	jennifer.kropp@teck.com	X	X	X
Address	PO Box 5000			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			X
								Email 4:	jaydon.francis@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	Brendan.Peachey@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 6:	DL-Equis-GHO-Feild@teck.com	X	X	X
Phone Number	250 865 3274			Phone Number				PO number	610307			

SAMPLE DETAILS

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A 72h P. subcapitata P/F	#N/A 7d C.dubia P/F	#N/A 28-d Hyallella P/F	#N/A 30-d embryo EA P/F (20 ug/L Cu)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_ER2_WS_2019-11-26_N	GH_ER2	WS		26-Nov	11:42	G	4 x2				x	x								0.0
GH_ERC_WS_2019-11-26_N	GH_ERC	WS		26-Nov	13:32	G	4				x	x								1.9
GH_FR1_WS_2019-11-26_N	GH_FR1	WS		26-Nov	14:35	G	4				x	x								0.0
											192277	192275								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
All samples arrived slushy				Tyme Hamilton	Nov. 27/19	@ 11:54
				Nautilus - Burnaby	Q4-W3	

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	WEEKLY_CHRONIC_11262019_3	TURNAROUND TIME:	Regular	RUSH:	No

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Richard Chea			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 3:	Victoria.Sharpe@teck.com	X	X	X
								Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 5:	Jay.Jones@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	PRESERV	ANALYSIS: 7-d C.dubia P/F	7-d C.dubia P/F (EDTA)	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)	28-d Hyalella Nickel Testing					
CM_MC1_WS_2019-11-26_N	CM_MC1	WS	No	11/26/2019	10:03	G	12 x1						X	X		X					0.0
CM_MC2_WS_2019-11-26_N	CM_MC2	WS	No	11/26/2019	11:47	G	5 x2						X	X	X						0.0
RG_MIDAG_WS_2019-11-26_N	RG_MIDAG	WS	No	11/26/2019	10:50	G	2 x2							X	X						0.0
													192275	192277	192279	192280					
													192275	192277	192279	192280					
													192275	192277	192279	192280					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
All samples arrived Nushig			Tyrone Hamilton	Nov. 26/19 @ 11:54
			Nautilus - Burnaby	Q4 - W3

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Victoria Sharpe/Shelby Holden	Mobile #	250 425 7522
Sampler's Signature	V Sharpe/SH	Date/Time	November 26, 2019

Teck

COC ID:	20191126CRN3B	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q3 Chronic Sampling			Lab Contact	Richard Chea			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email	Richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Email	Cameron.griffin@teck.com			Address	8664 Commerce Court			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3				Imperial Square Lake City			Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00610856			
Postal Code	V1C 4C3	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED											Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								FILTERED	No	No	No	No							
								PRESERVED	No	No	No	No							
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	28-d H. azteca P/F	30-d embryo EA P/F (20 ug/L Cu)									
EV_HC1_WS_2019_Q4_WK3_N	EV_HC1	WS	N	11/26/2019	8:25	G	4	x2 DL	4										0.0
EV_MC2_WS_2019_Q4_WK3_N	EV_MC2	WS	N	11/26/2019	9:45	G	4	↓	4										0.0
									192277	192275									
					Total		8												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphinia testing to occur at 20 degrees) All containers arrived slushy	Kimberley Hackett	26-Nov-19	Tyme Hamilton Nautilus - Burnaby	Nov. 27/19 @ 11:54 Q4 - W3

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Kimberley Hackett	Mobile #	
Sampler's Signature	Kim Hackett	Date/Time	November 26, 2019

Teck

COC ID: 20191126 Chronic tox

TURNAROUND TIME:

RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	carla.froymanparker@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			x
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	kennedy.allen@teck.com	x	x	
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number	VPO00603154			
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRES/BG.	ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)	ANALYSIS: 28-d Hyalella P/F											
LC_LCDSSLCC_WS_2019-11-26_N	LC_LCDSSLCC	WS	N	26-Nov	10:45	G	4 x2			X	X											0.0
LC_SLC_WS_2019-11-26_N	LC_SLC	WS	N	26-Nov	9:20	G	4			X	X											
LC_LC3_WS_2019-11-26_N	LC_LC3	WS	N	26-Nov	10:15	G	4			X	X											
LC_LC5_WS_2019-11-26_N	LC_LC5	WS	N	26-Nov	9:10	G	4			X	X											
LC_DCDS_WS_2019-11-26_N	LC_DCDS	WS	N	26-Nov	10:20	G	4			X	X											
										192275	192277											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	K. Cambell/D.Tymstra	26-Nov	Tyrone Hamilton	Nov. 26/19 @ 11:54
All containers arrived slushy			Nautilus - Burnaby	Q4-43

SERVICE REQUEST (rush - subject to availability)	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	November 26, 2019

Teck

COC ID: 20191203-1400 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Scott Roughead			Lab Contact				Email 1:	david.burroughs@teck.com	X	X	X
Email	scott.roughead@teck.com			Email	BCinfo@nautilusenvironmental ca			Email 2:	britt.anderson@teck.com	X	X	X
Address				Address	8664 Commerce Court			Email 3:	scott.roughead@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	jared.ceyenne@teck.com	X	X	X
Postal Code		Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 6:				
Phone Number	1-250-433-6976			Phone Number	604-420-8773							

SAMPLE DETAILS | **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	PRESERV.	ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)	ANALYSIS: 28-d Hyalella P/F	ANALYSIS: 28-d Hyalella P/F (EDTA)	
									N	N	N		
FR_FRCP1_WS_2019-12-03_N	FR_FRCP1	WS		2019/12/03		G	5 ~~4~~			X	X	X	21
FR_UFR1_MON_2019-12-02_N	FR_UFR1	WS		2019/12/03		G	4			X	X		23
FR_FRABCH_MON_2019-12-02_NP	FR_FRABCH	WS		2019/12/03		G	4			X	X		26
										192275	192277	192279	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Britt Anderson	December 3, 2019	Tyrone Hamilton	Dec. 4/19 @ 11:58
			Nautilus - Burnaby	Q4 - W4

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Britt Anderson	Mobile #	4039907060
Sampler's Signature		Date/Time	December 3, 2019

Teck

COC ID:	Q4 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jenni Kropp			Lab Contact	Emma Marus			Email 1:	Leigh.Stickney	X	X	X
Email	jennifer.kropp@teck.com			Email				Email 2:	jennifer.kropp@teck.com	X	X	X
Address	PO Box 5000			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			X
								Email 4:	jaydon.francis@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	Brendan.Peachey@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 6:	DL-Equis-GHO-Feild@teck.com	X	X	X
Phone Number	250 865 3274			Phone Number				PO number		610307		

SAMPLE DETAILS								ANALYSIS REQUESTED											
								Please indicate below Filtered, Perserved or both (F, P, F/P)											
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	72h P. subcapitata P/F	7d C.dubia P/F	28-d Hyallelia P/F	30-d embryo EA P/F (20 ug/L Cu)							
GH_ER2_WS_2019-12-02_N	GH_ER2	WS		3-Dec	12:03	G	4 x2				x	x							2.9
GH_ERC_WS_2019-12-02_N	GH_ERC	WS		3-Dec	12:51	G	4				x	x							2.6
GH_FR1_WS_2019-12-02_N	GH_FR1	WS		3-Dec	14:28	G	4				x	x							0.6
											192277	192275							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				Tyrone Hamilton	Dec 4/19	@11:58
				Nautilus - Burnaby	Q4-W4	

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name		Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	WEEKLY_CHRONIC_12032019_4	TURNAROUND TIME:	Regular	RUSH:	No

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Richard Chea			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 3:	Victoria.Sharpe@teck.com	X	X	X
								Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 5:	Jay.Jones@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED												Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								Filt												
								PRESERV.												
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	7-d C.dubia P/F	7-d C.dubia P/F (EDTA)	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)	28-d Hyalella Nickel Testing					
CM_MC1_WS_2019-12-03_N	CM_MC1	WS	No	12/3/2019	9:15	G	12 x 2L					X	X		X					0.1
CM_MC2_WS_2019-12-03_N	CM_MC2	WS	No	12/3/2019	10:54	G	5 x 2L					X	X	X						0.0
RG_MIDAG_WS_2019-12-03_N	RG_MIDAG	WS	No	12/3/2019	10:07	G	2 x 2L					X 192275	X 192277	X 192279	192280					0.0

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Tyrone Hamilton	Dec. 4/19 @ 11:58
			Nautilus - Burnaby	Q4 - W4

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Victoria Sharpe/Shelby Holden	Mobile #	250 425 7522
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	VSharpe / SHolden	Date/Time	December 3, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	20191203CRN4B	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Elkview Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Job Description	Q3 Chronic Sampling			Lab Contact	Richard Chea			Email 1:	Bryan.Ogden@teck.com	X	X	X
Project Manager	Cam Griffin			Email	Richard@nautilusenvironmental.ca			Email 2:	teckcoal@aquisonline.com			X
Email	Cameron.griffin@teck.com			Address	8664 Commerce Court			Email 3:	Kimberley.Hackett@teck.com	X	X	X
Address	RR#1 HWY# 3				Imperial Square Lake City			Email 4:	Cameron.Griffin@teck.com	X	X	X
								Email 5:	Teck.Lab.Results@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00610856			
Postal Code	V1C 4C3	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-8137			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED										Filtered - F, Field, L: Lab, FL: Field & Lab, N: None
								FILTERED	No	No	No	No						
								PRESERVED	No	No	No	No						
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	28-d H. azteca P/F	30-d embryo EA P/F (20 ug/L Cu)								
EV_HC1_WS_2019_Q4_WK4_N	EV_HC1	WS	N	12/3/2019	12:15	G	4 x 2.0L		4									0.0
EV_MC2_WS_2019_Q4_WK4_N	EV_MC2	WS	N	12/3/2019	13:15	G	4 x 2.0L		4									0.0
									192277	192275								
					Total		8											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail (Daphnia testing to occur at 20 degrees)	Jason Gravelle	3-Dec-19	Tyrone Hamilton Nautilus - Burnaby	Dec. 4/19 @ 11:38 Q4-W4

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jason Gravelle	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	December 3, 2019
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20191203 Chronic tox | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	carla.froymanparker@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	kennedy.allen@teck.com	x	x	
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number	VPO00608154			
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS | ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL.	PRES/RV.	ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F											
LC_LCDSSLCC_WS_2019-12-03_N	LC_LCDSSLCC	WS	N	Dec 3	10:05	G	4x2			X	X											Q.D
LC_SLC_WS_2019-12-03_N	LC_SLC	WS	N	Dec 3	9:05	G	4			X	X											
LC_LC3_WS_2019-12-03_N	LC_LC3	WS	N	Dec 3	9:45	G	4			X	X											
LC_LC5_WS_2019-12-03_N	LC_LC5	WS	N	↓	10:04	G	4			X	X											
LC_DCDS_WS_2019-12-03_N	LC_DCDS	WS	N	↓	11:31	G	4			X	X											↓
										192275	192277											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide preliminary update as results are available	K. Cambell/D.Tymstra	3-Dec	Tyson Hamilton	Dec 4/19 @ 11:38
			Burnaby - Nautilus	Q4-W4

SERVICE REQUEST (rush - subject to availability)	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	December 3, 2019

Teck

COC ID:	20191210-1400	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Scott Roughead			Lab Contact				Email 1:	david.burroughs@teck.com	X	X	X
Email	scott.roughead@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	britt.anderson@teck.com	X	X	X
Address				Address	8664 Commerce Court			Email 3:	scott.roughead@teck.com	X	X	X
								Email 4:	teckcoal@equisonline.com			X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	jared.ceyenne@teck.com	X	X	X
Postal Code		Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 6:				
Phone Number	1-250-433-6976			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED — Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt. / PRESERV. / ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)											
								N											
FR_FRCP1_WS_2019-12-10_N	FR_FRCP1	WS		2019/12/10		G	3 x 20L	X											0.0
FR_UFR1_WS_2019-12-10_N	FR_UFR1	WS		2019/12/10		G	3	X											0.0
FR_FRABCH_WS_2019-12-10_NP	FR_FRABCH	WS		2019/12/10		G	3	X											0.0

192275

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Britt Anderson	December 10, 2019	Tyrone Hamilton	Dec. 11/19 @ 12:11
			Nautilus - Burnaby	Q4 - W5

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Britt Anderson	Mobile #	4039907060
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	December 10, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	Q4 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO

Facility Name	Greenhills Operations		
Project Manager	Jenni Kropp		
Email	jennifer.kropp@teck.com		
Address	PO Box 5000		
City	Elkford	Province	BC
Postal Code	V0B 1H0	Country	Canada
Phone Number	250 865 3274		

LABORATORY

Lab Name	Nautilus Environmental		
Lab Contact	Emma Marus		
Email			
Address	8664 Commerce Court		
City	Burnaby	Province	BC
Postal Code	V5A 4N7	Country	Can
Phone Number			

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Leigh.Stickney	X	X	X
Email 2:	jennifer.kropp@teck.com	X	X	X
Email 3:	teckcoal@equisonline.com			X
Email 4:	jaydon.francis@teck.com	X	X	X
Email 5:	Brendan.Peachey@teck.com	X	X	X
Email 6:	DL-Equis-GHO-Feild@teck.com	X	X	X
PO number	610307			

SAMPLE DETAILS

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A 72h P. subcapitata P/F	#N/A 7d C.dubia P/F	#N/A 28-d Hyallella P/F	#N/A 30-d embryo EA P/F (20 ug/L Cu)	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
GH_ER2_WS_2019-12-10_N	GH_ER2	WS		10-Dec	10:20	G	3 x2					x								0.0
GH_ERC_WS_2019-12-10_N	GH_ERC	WS		10-Dec	11:30	G	3					x								0.0
GH_FR1_WS_2019-12-10_N	GH_FR1	WS		10-Dec	12:35	G	3					x								0.0
												192275								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				Tyrone Hamilton	Dec. 11/19	@ 12:11
				Nautilus - Burnaby	12-12-19	

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID:	WEEKLY_CHRONIC_12102019_5	TURNAROUND TIME:	Regular	RUSH:	No

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Coal Mountain Operations			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Richard Chea			Email 1:	Scott.Holmgren@teck.com	X	X	X
Email	Jay.Jones@teck.com			Email	richard@nautilusenvironmental.ca			Email 2:	teckcoal@equisonline.com			X
								Email 3:	Victoria.Sharpe@teck.com	X	X	X
								Email 4	Don.Sacino@teck.com	X	X	X
Address	PO Box 3000			Address	8664 commerce Court			Email 5:	Jay.Jones@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-425-7321			Phone Number	604-420-8773							

SAMPLE DETAILS								ANALYSIS REQUESTED											Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
							FIL												
							PRESERV												
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS 7-d C.dubia P/F	7-d C.dubia P/F (EDTA)	72-hr P. subcapitata P/F	30-d embryo EA P/F (20 ug/L Cu)	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)	28-d Hyalella Nickel Testing					
CM_MC1_WS_2019-12-10_N	CM_MC1	WS	No	12/10/2019	11:37	G	11	X			X								0.0
CM_MC2_WS_2019-12-10_N	CM_MC2	WS	No	12/10/2019	9:24	G	3				X								0.0
											192275								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Tyrone Hamilton	Dec 11/19 @ 12:11
			Nautilus - Burnaby	Q4-W5

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Victoria Sharpe/Shelby Holden	Mobile #	250 425 7522
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	V Sharpe	Date/Time	December 10, 2019
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: 20191210CRN5B | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO

Facility Name / Job#	Elkview Operations
Job Description	Q4 Chronic Sampling
Project Manager	Cam Griffin
Email	Cameron.griffin@teck.com
Address	RR#1 HWY# 3
City	Sparwood
Province	BC
Postal Code	V1C 4C3
Country	Canada
Phone Number	1-250-425-8137

LABORATORY

Lab Name	Nautilus Environmental
Lab Contact	Richard Chea
Email	Richard@nautilusenvironmental.ca
Address	8664 Commerce Court
	Imperial Square Lake City
City	Burnaby
Province	BC
Postal Code	V5A 4N7
Country	Canada
Phone Number	604-420-8773

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	Bryan.Ogden@teck.com	X	X	X
Email 2:	teckcoal@equisonline.com			X
Email 3:	Kimberley.Hackett@teck.com	X	X	X
Email 4:	Cameron.Griffin@teck.com	X	X	X
Email 5:	Teck.Lab.Results@teck.com	X	X	X
PO number	VPO00669831			

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30-d embryo EA P/F (20 ug/L Cu)									
FILTERED									No	No	No	No						
PRESERVED									No	No	No	No						
EV_HC1_WS_2019_Q4_WK5_N	EV_HC1	WS	N	12/10/2019	9:15	G	3 x 20L		3									0.0
EV_MC2_WS_2019_Q4_WK5_N	EV_MC2	WS	N	12/10/2019	10:30	G	3 x 1L		3									0.0
									192275									
					Total		6											

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Toxicity 96-Hr/48-HR = 96 Hr Rainbow Trout pass/fail & 48 Hr Daphnia pass/fail
(Daphnia testing to occur at 20 degrees)

RELINQUISHED BY/AFFILIATION

Jason Gravelle

DATE/TIME

10-Dec-19

ACCEPTED BY/AFFILIATION

Tyrone Hamilton
Nautilus - Burnaby

DATE/TIME

Dec. 11/19 @ 12:11
Q4 - WS

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jason Gravelle	Mobile #	
Sampler's Signature		Date/Time	December 10, 2019

Teck

COC ID:	20191210 Chronic tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Carla Froyman Parker			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	carla.froymanparker@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	carla.froymanparker@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	kirsten.campbell@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			x
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	kennedy.allen@teck.com	x	x	
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number	VPO00616189			
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 30-d embryo EA P/F (20 ug/L Cu)												
LC_LCDSSLCC_WS_2019-12-10_N	LC_LCDSSLCC	WS	N	10-Dec	10:45	G	3 x2			X												Q.P
LC_SLC_WS_2019-12-10_N	LC_SLC	WS	N	10-Dec	9:52	G	3			X												0.0
LC_LC3_WS_2019-12-10_N	LC_LC3	WS	N	10-Dec	10:20	G	3			X												0.0
LC_LC5_WS_2019-12-10_N	LC_LC5	WS	N	10-Dec	9:33	G	3			X												0.0
LC_DCDS_WS_2019-12-10_N	LC_DCDS	WS	N	10-Dec	10:42	G	3			X												0.0
										192275												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide preliminary update as results are available	K. Cambell/D.Tymstra	10-Dec	Tyrone Hamilton	Dec. 11/19 @ 12:11
			Nautilus - Burnaby	Q4-WS

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	December 10, 2019

END OF REPORT

Results of Toxicity Identification Evaluation

April 29, 2020

Memo: Results of TIE testing for FR_FRCP1

To	Cait Good	*From*	Melanie Gallant; James Elphick
Affiliation	Teck Coal Ltd.	*Tel*	(403) 253-7121; (604) 420-8773
e-mail	Cait.Good@teck.com	*e-mail*	melanie@nautilusenvironmental.ca james@nautilusenvironmental.ca

Introduction

Nautilus Environmental conducted chronic toxicity tests in 2019 for Teck Coal Ltd. with samples collected from various locations as part of a quarterly toxicity testing program. Toxicity testing included:

- *Ceriodaphnia dubia* 7-d survival and reproduction,
- *Pseudokirchneriella subcapitata* 72-h growth inhibition,
- *Hyalella azteca* 28-d survival and growth,
- *Pimephales promelas* 32-d survival and growth and
- *Oncorhynchus mykiss* embryo-alevin development.

Samples collected as part of quarterly monitoring from FR_FRCP1 have previously exhibited toxicity in a subset of chronic toxicity tests. Consequently, testing using a Toxicity Identification Evaluation (TIE) approach was incorporated into the testing program using *C. dubia* and *H. azteca*, in order to evaluate the potential role of divalent metal cations as a cause of toxicity. In particular, an EDTA treatment was incorporated concurrently with the testing program in order to evaluate the role of metals in causing toxicity. The results of these test treatments are summarized in this memo.

Methods

TIE treatments involve physico-chemical manipulations of the sample, followed by toxicity tests on the treated and untreated samples to provide information on the cause of toxicity. Treatments are based on general guidance provided by the USEPA. The following TIE treatment was performed on the samples:

- **Ethylenediaminetetraacetic acid (EDTA) chelation**: the sample was treated with 5 mg/L EDTA, which is a chelating agent that binds divalent metal cations, such as copper, cadmium, nickel and zinc, and reduces their bioavailability. Thus, a reduction in toxicity following treatment with EDTA indicates that a metal that can be chelated with EDTA may be responsible for toxicity.

Treated and untreated samples were tested concurrently, so that any effect of the treatment could be discerned. A control treatment in which EDTA was added to laboratory control water was tested to ensure that the treatment itself did not produce adverse effects.

Results and Discussion

The results for *C. dubia* survival are presented in Table 1. The untreated FR_FRCP1 sample from the first quarter resulted in 100% mortality, and EDTA treatment removed this adverse response, indicating that divalent metal cations were the likely cause of toxicity; the samples tested in the other three quarters produced little or no effect on survival.

A sample collected from the reference location, FR_UFR1, in the fourth quarter resulted in 50% mortality; the surviving organisms had no impairment of reproduction. In order to confirm whether this was an anomalous response or a real toxicological effect, the sample was re-tested, and a sample that was collected from FR_UFR1 the following week was also tested for toxicity with *C. dubia*. This follow-up testing showed no effects on survival or reproduction in either of the FR_UFR1 samples (data not shown); thus, it appears that this initial result was an anomalous response.

The results for *C. dubia* reproduction are presented in Table 2. The sample collected in the first quarter exhibited a substantial reduction in reproduction relative to the upstream site water (FR_UFR1), whereas those collected in the second, third and fourth quarters produced reproduction that was generally similar that observed in the site control. EDTA treatment improved the reproduction in the first quarter sample, although it was not sufficient to entirely remove the adverse response. The effectiveness of EDTA at improving survival and reproduction is consistent with the conclusion that divalent cationic metals were a likely cause of adverse effects in the first quarter sample.

Results of *H. azteca* tests performed in 2019 are summarized in Tables 3 and 4. Results are not shown for the second quarter, since the control performance criteria for survival and growth were not met during that test and the test results were considered invalid.

Survival of *H. azteca* was similar in the FR_FRCP1 samples to that observed in the upstream reference water, FR_UFR1. However, growth was reduced in the fourth quarter sample relative to both FR_UFR1 and the laboratory control. Treatment of the sample with EDTA did not substantially improve growth, indicating that metals were likely not entirely responsible for the observed effect.

EDTA treatments conducted in 2019 produced adverse responses in the EDTA controls in some instances, including in the EDTA treated control for *C. dubia* tested in the third quarter, which had somewhat reduced reproduction relative to the control, as well as in the EDTA treated control for *H. azteca* in the first quarter, which had lower survival than the control. These data demonstrate that EDTA itself can produce adverse responses in these toxicity tests, and that the 5 mg/L EDTA treatment is close to a threshold for adverse effects. However, reducing the treatment concentration may result in the treatment becoming insufficient to bind the divalent metals that are present in the sample.

Additional TIE efforts, in addition to EDTA treatments, may be appropriate to characterize the cause of toxicity during quarterly sampling events in 2020, if adverse responses are observed that are not effectively treated with EDTA.

Table 1. ***Ceriodaphnia dubia*** **survival (%) in EDTA treatments of samples from FR_FRCP1.**

Sample date	Treatment	Control	FR_UFR1	FR_FRCP1
First quarter 2019 sample				
27 Feb, 2019	Untreated	100	100	0
	EDTA-treated	100	--	100
Second quarter 2019 sample				
7 May, 2019	Untreated	100	100	100
	EDTA-treated	100	--	100
Third quarter 2019 sample				
20 Aug, 2019	Untreated	100	100	90
	EDTA-treated	100	--	100
Fourth quarter 2019 sample				
12 Nov, 2019	Untreated	100	50	90
	EDTA-treated	90	--	100

Table 2. ***Ceriodaphnia dubia*** **reproduction (mean ± SD) in EDTA treatments of samples from FR_FRCP1.**

Sample date	Treatment	Control	FR_UFR1	FR_FRCP1
First quarter 2019 sample				
27 Feb, 2019	Untreated	22.3 ± 1.8	22.4 ± 3.1	0.0 ± 0.0
	EDTA-treated	22.4 ± 3.4	--	9.7 ± 2.4
Second quarter 2019 sample				
7 May, 2019	Untreated	23.5 ± 2.8	18.5 ± 3.4	18.7 ± 3.6
	EDTA-treated	19.4 ± 2.2	--	20.1 ± 1.9
Third quarter 2019 sample				
20 Aug, 2019	Untreated	21.4 ± 6.5	20.2 ± 5.7	16.1 ± 5.6
	EDTA-treated	14.7 ± 4.1	--	17.8 ± 6.7
Fourth quarter 2019 sample				
12 Nov, 2019	Untreated	20.8 ± 3.4	14.4 ± 8.5	17.4 ± 4.2
	EDTA-treated	22.6 ± 3.4	--	17.5 ± 5.6

Table 3. ***Hyalella azteca*** **survival (mean ± SD) in EDTA treatments of samples from FR_FRCP1.**

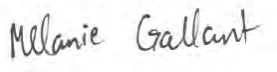
Sample date	Treatment	Control	FR_UFR1	FR_FRCP1
First quarter 2019 sample				
26 Feb, 2019	Untreated	90.0 ± 14.1	70.0 ± 27.4	70.0 ± 20.0
	EDTA-treated	66.0 ± 15.2	--	76.0 ± 15.2
Third quarter 2019 sample				
20 Aug, 2019	Untreated	96.0 ± 5.5	92.0 ± 8.4	92.0 ± 11.0
	EDTA-treated	96.0 ± 5.5	--	84.0 ± 15.2
Fourth quarter 2019 sample				
12 Nov, 2019	Untreated	96.0 ± 8.9	94.0 ± 8.9	92.0 ± 4.5
	EDTA-treated	96.0 ± 8.9	--	72.0 ± 13.0

Table 4. ***Hyalella azteca*** **growth (mean ± SD) in EDTA treatments of samples from FR_FRCP1.**

Sample date	Treatment	Control	FR_UFR1	FR_FRCP1
First quarter 2019 sample				
26 Feb, 2018	Untreated	0.11 ± 0.03	0.07 ± 0.04	0.08 ± 0.02
	EDTA-treated	0.07 ± 0.02	--	0.08 ± 0.02
Third quarter 2019 sample				
20 Aug, 2019	Untreated	0.46 ± 0.16	0.36 ± 0.11	0.34 ± 0.15
	EDTA-treated	0.61 ± 0.18	--	0.39 ± 0.20
Fourth quarter 2019 sample				
12 Nov, 2019	Untreated	0.39 ± 0.18	0.56 ± 0.21	0.14 ± 0.03
	EDTA-treated	0.50 ± 0.22	--	0.19 ± 0.05

Please contact the undersigned if you have any questions regarding these results.

Yours truly,





Melanie Gallant, PhD.
Environmental Toxicologist

James Elphick, RPBio.
Environmental Toxicologist

April 29, 2020

Memo: Results of TIE testing for CM_MC2

To	Cait Good	*From*	Melanie Gallant; James Elphick
Affiliation	Teck Coal Ltd.	*Tel*	(403) 253-7121; (604) 420-8773
e-mail	Cait.Good@teck.com	*e-mail*	melanie@nautilusenvironmental.ca; james@nautilusenvironmental.ca

Introduction

Nautilus Environmental conducted chronic toxicity tests in 2019 for Teck Coal Ltd. with samples collected from various locations as part of a quarterly toxicity testing program. Toxicity testing included:

- *Ceriodaphnia dubia* 7-d survival and reproduction,
- *Pseudokirchneriella subcapitata* 72-h growth inhibition,
- *Hyalella azteca* 28-d survival and growth,
- *Pimephales promelas* 32-d survival and growth and
- *Oncorhynchus mykiss* embryo-alevin development.

Samples collected as part of quarterly monitoring for Teck Coal Ltd. from CM_MC2 have previously periodically exhibited toxicity in chronic toxicity tests using *C. dubia* and *H. azteca*. Consequently, Nautilus Environmental previously conducted a Toxicity Identification Evaluation (TIE) in order to determine the cause of toxicity. The results of this TIE identified nickel as the most likely cause of adverse effects in samples from this location to both species.

Testing using a Toxicity Identification Evaluation (TIE) approach was incorporated into the testing program using *C. dubia* and *H. azteca*, in order to evaluate the potential role of divalent metal cations as a cause of toxicity; an EDTA treatment was applied to CM_MC2 and RG_MIDAG samples collected quarterly in 2019. The results of these test treatments are summarized in this memo.

Methods

TIE treatments involve physico-chemical manipulations of the sample, followed by toxicity tests on the treated and untreated samples to provide information on the cause of toxicity. Treatments are based on general guidance provided by the USEPA for TIEs. The following TIE treatment was performed on the samples:

- **Ethylenediaminetetraacetic acid (EDTA) chelation**: the sample was treated with 5 mg/L EDTA, which is a chelating agent that binds divalent metal cations, such as copper, cadmium, nickel and zinc, and reduces their bioavailability. Thus, a reduction in toxicity following treatment with EDTA indicates that a metal that can be chelated with EDTA may be responsible for toxicity.

Treated and untreated samples were tested concurrently, so that any effect of the treatment could be discerned. A control treatment in which EDTA was added to laboratory control water was tested concurrently to ensure that the treatment itself did not produce adverse effects.

Results and Discussion

There were no effects on survival of *C. dubia* in CM_MC2 or RG_MIDAG tested in any quarter with the survival in all samples meeting the performance criteria for an control (i.e., ≥80% survival; Table 1). The results of *C. dubia* reproduction in EDTA treatments conducted on samples from CM_MC2 and RG_MIDAG are shown in Table 2. There were no adverse responses observed in samples from RG_MIDAG, indicating that samples from this location did not exhibit toxicity. However, samples from CM_MC2 exhibited reduced reproduction relative to the upstream reference water (i.e., CM_MC1) in the first quarter sample. Treatment with EDTA reduced toxicity in this sample. Thus, consistent with prior findings for this site, divalent metal cations were a likely contributor to the adverse response in this sample.

Results of *H. azteca* tests performed in 2019 are summarized in Tables 3 and 4 for survival and growth, respectively. Results are not shown for the second quarter, since the control performance criteria for survival and growth were not met during that test and the test results were considered invalid. There were no adverse responses observed in samples from RG_MIDAG. Conversely, growth of *H. azteca* was lower in the CM_MC2 samples collected in the first, third and fourth quarters than in the CM_MC1 site water control. EDTA treatment improved growth in each quarter, although not sufficiently to entirely remove the adverse effect. Regardless, the data are consistent with the conclusion that a divalent metal was contributing to toxicity.

EDTA treatments conducted in 2019 produced adverse responses in the EDTA controls in some instances, including in the EDTA treated control for *C. dubia* tested in the third quarter, which had somewhat reduced reproduction relative to the control, as well as in the EDTA treated control for *H. azteca* in the first quarter, which had lower survival than the control. The CM_MC2 samples that were treated with EDTA also produced lower survival in the first and fourth quarter tests than the untreated CM_MC2 samples. These data demonstrate that EDTA itself can produce adverse responses in these toxicity tests, and that the 5 mg/L EDTA treatment is close to a threshold for adverse effects. However, reducing the treatment concentration may result in the treatment becoming insufficient to bind the divalent metals that are present in the sample.

Table 1. ***Ceriodaphnia dubia*** **survival (%) in EDTA treatments of samples from CM_MC2 and RG_MIDAG.**

Sample date	Treatment	Control	CM_MC1	CM_MC2	RG_MIDAG
First quarter 2019 sample					
27 Feb, 2019	Untreated	100	100	100	--
	EDTA-treated	100	--	100	--
Second quarter 2019 sample					
7 May, 2019	Untreated	100	90	90	100
	EDTA-treated	100	--	90	100
Third quarter 2019 sample					
20 Aug, 2019	Untreated	100	100	80	90
	EDTA-treated	100	--	100	70
Fourth quarter 2019 sample					
12 Nov, 2019	Untreated	100	100	90	100
	EDTA-treated	90	--	100	100

Table 2. ***Ceriodaphnia dubia*** **reproduction (mean ± SD) in EDTA treatments of samples from CM_MC2 and RG_MIDAG.**

Sample date	Treatment	Control	CM_MC1	CM_MC2	RG_MIDAG
First quarter 2019 sample					
27 Feb, 2019	Untreated	22.3 ± 1.8	25.9 ± 3.6	14.5 ± 4.3	--
	EDTA-treated	22.4 ± 3.4	--	18.9 ± 1.5	--
Second quarter 2019 sample					
7 May, 2019	Untreated	23.5 ± 2.8	17.8 ± 4.1	16.7 ± 3.0	20.1 ± 2.4
	EDTA-treated	19.4 ± 2.2	--	18.4 ± 5.5	20.0 ± 3.8
Third quarter 2019 sample					
20 Aug, 2019	Untreated	21.4 ± 6.5	15.7 ± 6.1	18.0 ± 4.1	20.9 ± 5.6
	EDTA-treated	14.7 ± 4.1	--	22.8 ± 2.3	19.3 ± 5.4
Fourth quarter 2019 sample					
12 Nov, 2019	Untreated	20.8 ± 3.4	18.1 ± 4.6	17.9 ± 3.8	20.7 ± 3.1
	EDTA-treated	22.6 ± 3.4	--	18.8 ± 2.7	20.8 ± 1.9

Table 3. ***Hyalella azteca*** **survival (mean ± SD) in EDTA treatments of samples from CM_MC2 and RG_MIDAG.**

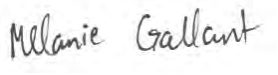
Sample date	Treatment	Control	CM_MC1	CM_MC2	RG_MIDAG
First quarter 2019 sample					
26 Feb, 2019	Untreated	90.0 ± 14.1	88.0 ± 8.4	96.0 ± 5.5	--
	EDTA-treated	66.0 ± 15.2	--	70.0 ± 25.5	--
Third quarter 2019 sample					
20 Aug, 2019	Untreated	96.0 ± 5.5	86.0 ± 8.9	86.0 ± 13.4	94.0 ± 5.5
	EDTA-treated	96.0 ± 5.5	--	84.0 ± 16.7	84.0 ± 20.7
Fourth quarter 2019 sample					
12 Nov, 2019	Untreated	96.0 ± 8.9	92.0 ± 11.0	76.0 ± 26.1	94.0 ± 8.9
	EDTA-treated	96.0 ± 8.9	--	40.0 ± 15.8	94.0 ± 8.9

Table 4. ***Hyalella azteca*** **growth (mean ± SD) in EDTA treatments of samples from CM_MC2 and RG_MIDAG.**

Sample date	Treatment	Control	CM_MC1	CM_MC2	RG_MIDAG
First quarter 2019 sample					
26 Feb, 2018	Untreated	0.11 ± 0.03	0.11 ± 0.05	0.07 ± 0.03	--
	EDTA-treated	0.07 ± 0.02	--	0.08 ± 0.03	--
Third quarter 2019 sample					
20 Aug, 2019	Untreated	0.46 ± 0.16	0.49 ± 0.20	0.27 ± 0.12	0.49 ± 0.26
	EDTA-treated	0.61 ± 0.18	--	0.38 ± 0.12	0.57 ± 0.21
Fourth quarter 2019 sample					
12 Nov, 2019	Untreated	0.39 ± 0.18	0.37 ± 0.20	0.21 ± 0.02	0.32 ± 0.27
	EDTA-treated	0.50 ± 0.22	--	0.28 ± 0.03	0.46 ± 0.24

Please contact the undersigned if you have any questions regarding these results.

Yours truly,





Melanie Gallant, PhD.
Environmental Toxicologist

James Elphick, RPBio.
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Acute Toxicity

1.0 INTRODUCTION

This appendix is included to meet the acute toxicity related reporting requirements of Permit 107517 Section 10.3 (amended 25 August 2018). Laboratory reports for acute toxicity tests conducted in 2019 are provided in Appendix H of Teck 2020[1]. Teck has authored this appendix to provide a summary of the results.

Summary of 2019 Acute Toxicity Testing

Acute toxicity test results for rainbow trout (*Oncorhynchus mykiss*) and *Daphnia magna* are provided in Appendix H. In 2019, 397 96-h rainbow trout 100% (single concentration) and 404 48-h *D. magna* 100% (single concentration) acute lethality toxicity tests were conducted as a requirement of Permit 107517. Of the 397 rainbow trout acute toxicity tests, three (0.76%) exhibited greater than 50% mortality and as such were considered failed test results based on Permit 107517 criteria. The three rainbow trout failures occurred at Goddard Creek Sedimentation Pond Decant (EV_GC2 – EMS# 208043). Of the *D. magna* acute toxicity tests, one (0.25%) exhibited greater than 50% mortality and as such was considered a failed test result based on Permit 107517 criteria. The single failure occurred at the discharge of Cataract Creek (GH_CC1 – EMS# 0200384). Details of the test failures are provided below.

In response to the failed toxicity testing results, Teck followed the requirements of Permit 107517 Section 10.2.2 and the Adaptive Management Plan response framework with respect to notification, confirmatory testing (i.e., LC50 follow-up tests), took corrective action where possible, and provided follow-up test information to applicable regulators and KNC when it became available. Teck also completed additional investigative Toxicity Identification Evaluation (TIE) testing including the addition of antiscalant at various concentrations.

Rainbow Trout Toxicity Failures

There were three consecutive rainbow trout toxicity test failures in 2019 from water collected from station EV_GC2 on February 12, 19, and 22. In response to the failed toxicity tests, Teck prevented the main Goddard pond (downstream of flocculant station) from decanting by pumping down the water level in the pond to an infiltration area and bypassing the upstream water around the main pond from February 27 to March 3. This action was completed in accordance with an Inspectors Directive issued by Environment Canada on February 26 to prevent the release of Goddard Main Pond water to the Goddard marsh until two consecutive toxicity tests passed the acute toxicity testing limit. The flocculant station was also shut down on February 22 and the main pond bypass system was initiated on February 27. Teck currently hypothesizes, based on observations during laboratory testing and water quality screening, that residual flocculant in the water as a result of over-dosing flocculant at the Goddard Creek flocculant station was likely responsible for adverse effects observed in the failed rainbow trout tests. Evidence supporting this hypothesis includes:

- Nautilus laboratory observed black debris in test tanks at the beginning and end of toxicity tests.
- Water quality constituents in the water samples associated with the rainbow trout acute toxicity test failures (EV_GC2 on 12, 19 and 22 February 2019) were below British Columbia Ministry of Environment and Climate Change Strategy Water Quality Guidelines (BC WQG) for the Protection of Freshwater Aquatic Life (BC ENV 2019), with the exception of total selenium which was greater than the 30-day average BC WQG. The BC WQG for selenium is intended to prevent chronic bioaccumulation of selenium in tissue and not

[1] Teck Ltd. 2020. Permit 107517 – Annual Water Quality Monitoring Report. Dated 31 March 2019.

direct acute effects; therefore, selenium concentrations greater than the BC WQG would not be interpreted to cause acute effects.

- BC ENV does not provide an approved maximum WQG for selenium; however, the lowest acute toxicity threshold for rainbow trout available in the literature is 4,200 µg/L selenite (BC ENV 2014; US EPA 2016). Total selenium concentrations in samples that failed the acute toxicity test ranged from 31 to 40 µg/L. Because reported concentrations were below the lowest acute toxicity value for rainbow trout reported in the literature, it is not expected that selenium would be responsible for the observed rainbow trout toxicity in the laboratory.

Daphnia magna Toxicity Failures

The single *D. magna* toxicity test failure in 2019 was from testing on water collected May 3, 2019 from the discharge of Cataract Creek (GH_CC1). Teck currently hypothesizes, based on the results of additional investigative studies and recent scientific literature (e.g., Bogart et al. 2016), that the formation of calcite precipitate was likely responsible for adverse effects observed in the failed *D. magna* test. Evidence supporting this hypothesis includes:

- Laboratory staff noted precipitate within the test vessel and on *D. magna* carapaces at test termination in tests in which adverse effects on survival were observed. These observations are consistent with precipitate-related test mortalities in *D. magna* (Bogart et al. 2016).
- In the TIE studies, treatments that reduced precipitate formation via the addition of antiscalant substantially reduced or eliminated toxicity and precipitate formation in a dose-dependent manner.
  - The TIE testing showed a dose-dependent effect of antiscalant on the removal of toxicity, when *D. magna* were exposed to 100% (v/v) sample water (Figure 1).
- Water quality constituents in the water sample associated with the *D. magna* acute toxicity test failure at station GH_CC1 on 03 May 2019 were generally below BC WQG for the Protection of Freshwater Aquatic Life (BC ENV 2019). Exceedances of long-term chronic BC WQGs were noted for the following constituents: sulphate, nitrate, selenium, and uranium. No exceedances of short-term acute BC WQGs occurred.
  - **Sulphate** (1,950 mg/L) was below the lowest available *D. magna* acute toxicity value reported in the literature (3,000 mg/L; 48-hour LC_{50}), considering the water sample was very hard (Mount et al. 1997).
  - **Nitrate** (27 mg/L as N) was below the lowest available *D. magna* acute toxicity value reported in the literature (462 mg/L as N; 48-hour LC_{50}; CCME 2012), considering the water sample was very hard.
  - **Selenium** (567 µg/L total selenium) was greater than the lowest 48-hour LC_{50} for *D. magna* available reported in US EPA (2016) for selenite (220 µg/L) but less than that for selenate (2,000 µg/L), indicating that selenium may have contributed to toxicity if a significant proportion was present as selenite. Review of previous data indicates that zero percent effect was associated higher selenium concentrations (604 µg/L at GH_CC1 on October 1, 2018; 633 µg/L at GH_CC1 on April 1, 2019).
  - **Uranium** (18 µg/L total uranium) was below to lowest available *D. magna* acute toxicity value reported in the literature (6,400 µg/L; 48-hour LC_{50}; CCME 2011).

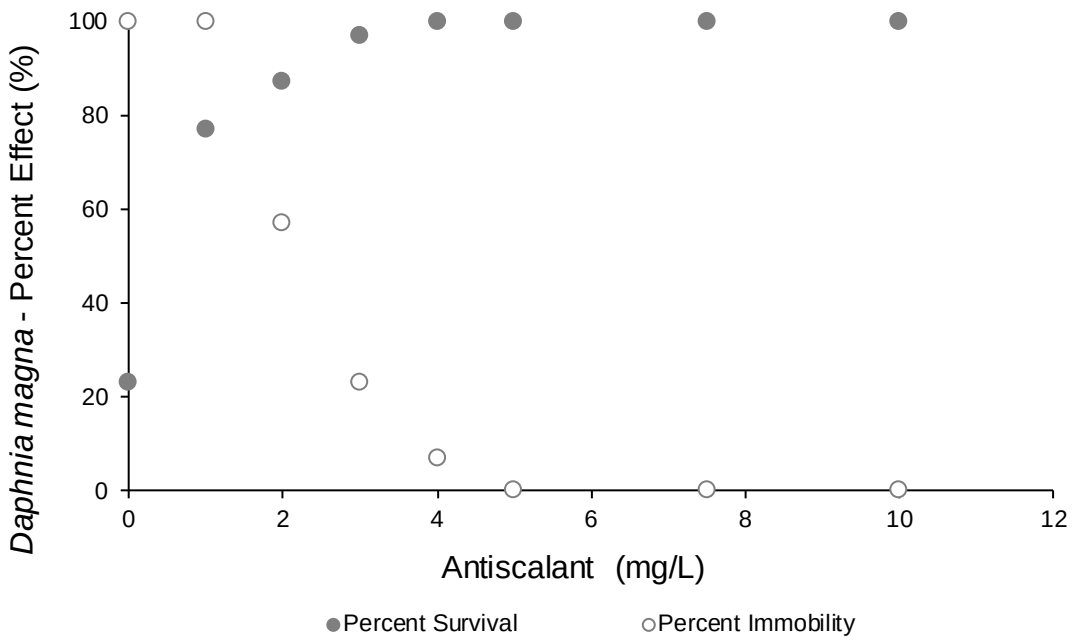

Figure 1. Effect of antiscalant on *Daphnia magna* survival and immobility in GH_CC1 water collected on 3 May 2019.

The *Daphnia magna* Acute Toxicity Compliance Action Plan outlines additional investigation into characterization of calcite formation to determine mineral precipitate kinetics and how toxicity test responses are affected under different conditions. Testing on May 3, 2019 was completed to assess toxicity response of dosing different concentrations of antiscalant (Figure 1). This work was conducted to support permitting and implementation for Swift and Cataract Creeks through the newly constructed Swift Water Management System.

In addition to laboratory studies, the results of calcite monitoring programs continue to help improve Teck's understanding of the potential implications in the receiving environment

2.0 REFERENCES

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Mount DR, Gulley DD, Hockett JR, Garrison TD, Evans JD. 1997. Statistical models to predict the toxicity of major ions to *Ceriodaphnia dubia, Daphnia magna* and *Pimephales promelas* (Fathead Minnows). Environmental Toxicology and Chemistry 16: 2009-2019.

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APPENDIX C

Water Quality Screening

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2							Q3							Q4								
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia and P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19 (*H. azteca*)		Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia and P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia and P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia and P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV	Mean	CV						Mean	CV						Mean	CV	Mean	CV					Mean	CV	Mean	CV
Field Measured																																					
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.1	8.5	8.5	8.0	8.2	8.3	0.03	8.3	0.03	8.3	8.1	8.0	8.3	8.3	8.2	0.017	8.4	8.4	8.4	8.5	8.5	8.4	0.01	8.4	0.01	8.1	8.2	8.2	8.2	8.4	8.2	0.01	8.2	0.013
Temperature	°C	-	-	-	0	0	0	0	0	0	0	0	0	0.70	2.7	2.1	2.2	4.5	2.4	0.56	8.1	8.2	7.8	7.3	7.2	7.9	0	7.7	0	0	0.50	0	0	0	0.13	2	0.1	2.24
Conventional Parameters																																					
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.3	8.2	8.2	8.1	8.1	8.2	0.010	8.2	0.0102	8.3	8.2	8.1	8.3	7.4	8.1	0.047	8.4	8.3	8.4	8.4	8.3	8.4	0.006	8.4	0.0066	8.3	8.3	8.2	8.2	8.3	8.3	0.007	8.3	0.007
Hardness, as $CaCO_3$	mg/L	-	-	-	194	199	183	161	152	184	0.092	178	0.115	133	129	133	121	124	128	0.042	172	174	192	180	181	180	0.05	180	0.044	178	188	181	195	189	186	0.041	186	0.036
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	-	182	159	148	134	114	156	0.13	147	0.17	126	116	121	117	112	118	0.045	143	149	149	147	151	147	0.02	148	0.02	143	139	141	149	156	143	0.03	146	0.047
Total dissolved solids	mg/L	-	-	-	249	219	244	182	163	224	0.14	211	0.18	164	138	132	134	118	137	0.12	190	185	376	194	216	236	0.39	232	0.35	188	206	184	187	223	191	0.05	198	0.084
Total suspended solids	mg/L	-	-	-	<1.0	<1.0	<1.0	9.6	<1.0	2.8	1.5	2.3	1.7	<1.0	7.8	1.5	3.6	3.3	3.3	0.8	1.1	1.9	<1.0	<1.0	<1.0	1.0	0.4	0.9	0.4	1.4	1.1	<1.0	30	<1.0	8.2	1.7	6.6	1.9
Total organic carbon	mg/L	-	-	-	0.63	<0.5	<0.5	4.1	3.0	1.3	1.4	1.6	1.0	1.8	1.7	2.0	1.2	0.88	1.5	0.3	1.2	0.97	0.72	1.0	0.68	0.98	0.2	0.92	0.2	0.67	0.73	<0.5	3.9	<0.50	1.4	1.2	1.2	1.279
Dissolved organic carbon	mg/L	-	-	-	0.92	<0.5	<0.5	3.0	3.1	1.1	1.1	1.5	0.9	1.8	1.6	1.6	1.2	0.92	1.4	0.24	1.0	0.96	0.71	1.1	0.66	0.94	0.2	0.88	0.2	0.71	0.74	<0.5	1.2	2.32	0.72	0.4	1.0	1
Turbidity	NTU	-	-	-	0.51	0.60	0.18	8.7	3.1	2.5	1.7	2.6	1.4	1.4	4.2	0.71	0.61	1.6	1.7	0.86	0.55	0.19	0.17	0.40	0.24	0.33	0.6	0.31	0.5	0.17	0.27	0.20	2.8	0.12	0.85	1.5	0.7	1.6
Conductivity	µS/cm	-	-	-	363	436	360	295	248	364	0.16	340	0.21	278	206	245	253	191	235	0.15	309	307	328	327	324	318	0.04	319	0.03	302	325	335	338	343	325	0.05	329	0.049
Oxidation-reduction potential	mV	-	-	-	429	439	402	408	403	420	0.041	416	0.04	386	443	438	294	408	394	0.15	424	453	302	456	432	409	0.178	413	0.154	386	373	387	452	463	400	0.089	412	0.1
Acidity To pH 8.3, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	1.1	1.4	1.0	0.88	0.22	0.9	0.19	<1.0	2.2	1.6	1.7	<10	2.2	1.7	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0.0
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	182	159	148	134	114	156	0.13	147	0.17	126	116	121	115	112	118	0.047	138	147	144	144	147	143	0.03	144	0.03	143	139	141	149	156	143	0.03	146	0.047
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	1.8	<1.0	0.76	0.47	5.0	2.0	4.6	3.4	4.0	3.8	0	3.8	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0.0
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																					
Bromide	mg/L	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0
Calcium	mg/L	-	-	-	55	54	50	44	42	51	0.093	49	0.119	35	36	37	32	35	35	0.046	47	48	52	48	50	49	0.047	49	0.041	49	52	49	52	53	50	0.029	51	0.035
Chloride	mg/L	150	600	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	0
Fluoride	mg/L	-	1.4 - 1.6[d]	-	0.14	0.14	0.074	0.090	0.11	0.11	0.29	0.11	0.25	0.15	0.17	0.16	0.16	0.14	0.15	0.061	0.16	0.16	0.15	0.15	0.16	0.16	0.02	0.16	0.03	0.16	0.11	0.15	0.13	0.14	0.14	0.16	0.14	0.14
Magnesium	mg/L	-	-	-	14	16	14	12	12	14	0.11	14	0.13	11	9.6	10	9.8	9.0	9.9	0.078	13	13	15	14	14	14	0.06	14	0.05	13	15	14	16	14	14	0.07	14	0.065
Potassium	mg/L	-	-	-	0.34	0.36	0.34	0.46	0.41	0.38	0.14	0.38	0.13	0.32	0.33	0.27	0.31	0.36	0.32	0.1	0.41	0.40	0.49	0.46	0.40	0.44	0.09	0.43	0.09	0.34	0.36	0.36	0.41	0.36	0.37	0.09	0.37	0.076
Sodium	mg/L	-	-	-	0.69	0.71	0.78	0.72	0.67	0.72	0.052	0.71	0.056	0.66	0.58	0.56	0.61	0.54	0.59	0.078	0.71	0.70	0.74	0.77	0.70	0.73	0.045	0.72	0.044	0.69	0.68	0.65	0.77	0.70	0.7	0.07	0.7	0.061
Sulphate	mg/L	309 - 429[b, c]	-	309 - 481[b]	49	51	53	40	27	48	0.12	44	0.24	23	14	15	15	9.6	15	0.31	28	30	33	34	37	31	0.09	32	0.11	43	42	45	45	43	44	0.03	44	0.025
Major anion sum	meq/L	-	-	-	4.7	4.3	4.1	3.5	2.9	4.1	0.12	3.9	0.18	3.0	2.6	2.8	2.7	2.5	2.7	0.074	3.5	3.6	3.7	3.6	3.8	3.6	0.03	3.6	0.03	3.8	3.7	3.8	3.9	4.0	3.8	0.03	3.8	0.038
Major cation sum	meq/L	-	-	-	3.9	4.0	3.7	3.3	3.1	3.7	0.088	3.6	0.113	2.7	2.6	2.7	2.5	2.5	2.6	0.039	3.5	3.5	3.9	3.7	3.7	3.6	0.05	3.6	0.044	3.6	3.8	3.7	3.9	3.8	3.7	0.039	3.8	0.035
Nutrients																																					
Nitrate	mg-N/L	3.0	33	1.8 - 3.1[d]	0.23	0.21	0.23	0.27	0.16	0.24	0.1	0.22	0.18	<0.005	0.070	0.012	0.018	0.075	0.036	0.94	0.0050	<0.005	0.036	0.0057	<0.005	0.012	1.24	0.01	1.32	0.13	0.15	0.18	0.18	0.192	0.16	0.15	0.17	0.15
Nitrite	mg-N/L	0.020[d]	0.060[e]	-	<0.001	0.0033	<0.001	<0.001	<0.001	0.0012	1.0	0.0011	1.0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0	<0.001	0.0	<0.001	<0.001	<0.001	0.0011	<0.001	0.000065	0.1	0.000662	0.07
Total ammonia	mg-N/L	0.37 - 1.3[f]	1.9 - 6.6[g]	-	<0.005	0.011	0.057	0.012	<0.005	0.02	1.2	0.017	1.3	0.016	<0.005	0.071	0.057	<0.005	0.03	1.0	0.021	0.0065	0.0050	0.0050	0.020	0.0095	0.8	0.012	0.7	0.019	0.013	0.047	0.016	0.012	0.024	0.7	0.021	0.69
Total Kjeldahl nitrogen	mg-N/L	-	-	-	<0.05	0.069	0.066	0.29	0.17	0.11	1.0	0.12	0.8	0.058	0.17	0.12	<0.05	0.17	0.11	0.53	0.057	<0.05	0.15	0.32	<0.05	0.14	0.9	0.12	1.0	0.064	<0.05	0.069	1.4	<0.05	0.38	1.7	0.31	1.88
Orthophosphate	mg-P/L	-	-	-	0.0058	0.0045	0.0043	0.014	0.0092	0.0072	0.65	0.0076	0.54	0.0032	0.0039	0.0028	0.0040	0.0015	0.0031	0.33	<0.001	0.0019	0.0013	0.0017	<0.001	0.0014	0.3	0.0012	0.35	0.0026	0.0022	0.0032	0.0032	0.004	0.0028	0.17	0.0031	0.24
Phosphorus	mg-P/L	-	-	-	0.0049	0.0068	0.0037	0.037	0.0089	0.013	1.2	0.012	1.1	0.0064	0.012	0.0076	0.0063	0.0088	0.0082	0.29	0.0026	0.0032	<0.002	<0.002	<0.002	0.002	0.3	0.0018	0.3	0.0031	0.0036	0.0031	0.049	0.004	0.015	1.6	0.013	2
Total Metals																																					
Aluminum	mg/L	-	-	-	0.0030	0.0047	0.0036	0.65	0.17	0.17	2.0	0.17	1.7	0.057	0.099	0.028	0.035	0.043	0.052	0.54	0.0097	0.0032	0.0039	0.0061	0.0071	0.0057	0.5	0.006	0.4	0.0048	0.0051	0.0035	0.25	0.0038	0.067	1.9	0.054	2.06
Antimony	mg/L	0.0090	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Arsenic	mg/L	-	0.0050	-	<0.0001	<0.0001	0.00012	0.00023	0.00016	0.00011	0.55	0.00012	0.45	0.00011	0.00018	0.00014	0.00011	0.00013	0.00013	0.21	<0.0001	0.00010	0.00010	0.00011	0.00011	0.00009	0.06	0.000094	0.06	0.00011	<0.0001	<0.0001	0.00030	0.00011	0.00013	0.77	0.00012	0.7
Barium	mg/L	1.0	2.0	-	0.076	0.073	0.068	0.070	0.049	0.072	0.048	0.067	0.161	0.048	0.042	0.045	0.041	0.036	0.042	0.11	0.069	0.064	0.065	0.068	0.069	0.064	0.059	0.065	0.062	0.064	0.063	0.068	0.072	0.068	0.067	0.058	0.067	0.052
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	0.000023	<0.00002	0.000013	0.11	0.000013	0.11	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.0	<0.00002	0.0	<0.00002	<0.00002	<0.00002	0.000025	<0.00002	0.000014	0.18	0.000013	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	1.2	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	0.020	<0.01	0.0088	1	0.008	1
Cadmium	mg/L	-	-	-	0.000012	0.000012	0.000051	0.000047	0.000022	0.000019	1.0	0.000002	0.8	0.000010	0.000020	0.000011	0.0000088	0.0000090	0.000012	0.41	0.0000090	0.000012	0.000011	0.000012	0.000011	0.000010	0.1	0.000011	0.1	0.0000096	0.000013	0.000012	0.00011	0.0000011	0.0000036	1.4	0.0000031	1.46
Calcium	mg/L	-	-	-	54	54	50	43	40	50	0.10	48	0.133	38	34	37	36	32	35	0.072	50	50	49	52	54	50	0.024	51	0.04	50	50	50	57	51	52	0.068	51	0.059
Chromium	mg/L	0.0010[h]	-	-	<0.0001	0.00011	0.00031	**0.0012[h(b)]**	0.00036	0.00042	1.3	0.00041	1.1	0.00024	0.00071	0.00017	0.00014	0.00018	0.00029	0.83	0.00016	0.00015	0.00017	<0.0001	0.00028	0.00013	0.2	0.00016	0.4	0.00011	0.00015	0.00015	0.00060	0.00014	0.00025	0.9	0.00023	0.902
Cobalt	mg/L	0.0040	0.11	-	<0.0001	<0.0001	<0.0001	0.00019	<0.0001	0.000085	0.53	0.000078	0.52	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0	<0.0001	0.0	<0.0001	<0.0001	<0.0001	0.0001	0.000083	0.48	0.000076	0
Copper	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	0.00081	<0.0005	0.00039	0.4	0.00036	0.38	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0	<0.0005	0.0	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	0.00049	0.72	0.00044	1
Iron	mg/L	-	1.0	-	<0.01	<0.01	<0.01	0.30	0.096	0.073	1.8	0.082	1.5	0.026	0.11	0.027	0.032	0.038	0.047	0.78	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	<0.01	0.0	<0.01	<0.01	<0.01	0.32	<0.01	0.084	1.9	0.068	2
Lead	mg/L	0.0074 - 0.011[b]	0.10 - 0.20[b]	-	<0.00005	<0.00005	<0.00005	0.00022	0.000069	0.000075	1.2	0.000073	1.0	<0.00005	0.000096	<0.00005	<0.00005	<0.00005	<0.00005	0.52	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0	<0.00005	0.0	<0.00005	<0.00005	<0.00005	0.00040	<0.00005	0.00012	1.5	0.00010	2
Lithium	mg/L	-	-	-	0.0016	0.0017	0.0017	0.0020	0.0014	0.0018	0.099	0.0017	0.129	0.0013	0.0012	0.0012	0.0012	0.0012	0.0012	0.037	0.0016	0.0016	0.0017	0.0018	0.0019	0.0017	0.057	0.0017	0.076	0.0017	0.0016	0.0016	0.0020	0.0016	0.0017	0.11	0.0017	0.102
Magnesium	mg/L	-	-	-	15	14	13	13	11	13	0.077	13	0.113	11	9.9	11	10.0	9.4	10	0.065	14	13	14	14	13	14	0.032	14	0.03	14	14	14	14	15	14	0.022	14	0.034
Manganese	mg/L	1.1 - 1.5[b]	1.9 - 2.8[b]	-	0.00027	0.00056	0.00034	0.0065	0.0021	0.0019	1.6	0.0019	1.4	0.00060	0.0071	0.0013	0.0021	0.0028	0.0028	0.93	0.00068	0.00058	0.00066	0.0049	0.0049	0.0066	0.1	0.00058	0.2	0.00047	0.00055	0.00031	0.020	0.00027	0.0052	1.8	0.0042	0.03
Mercury	mg/L	0.000010	-	-	<0.0000005	<0.0000005	<0.0000005	0.0000041	0.0000024	0.0000012	1.5	0.0000014	1.1	0.0000012	0.0000023	0.0000011	0.00000086	0.0000090	0.0000013	0.47	0.00000068	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0.00000036	0.3	0.00000034	0.2	<0.0000005	<0.0000005	<0.0000005	0.0000021	<0.0000005	0.0000007	1.1	0.00000061	1
Molybdenum	mg/L	1.0	2.0	-	0.00055	0.00052	0.00040	0.00051	0.00052	0.00049	0.13	0.0005	0.12	0.00056	0.00062	0.00054	0.00059	0.00054	0.00057	0.062	0.00066	0.00075	0.00062	0.00067	0.00065	0.00068	0.08	0.00067	0.07	0.00056	0.00056	0.00056	0.00056	0.00057	0.00056	0.01	0.00056	0.012
Nickel	mg/L	0.005[f]	-	-	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	0.00049	0.72	0.00044	0.72	<0.0005	0.00065	<0.0005	<0.0005	<0.0005	0.00033	0.2	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0	<0.0005	0.0	<0.0005	<0.0005	<0.0005	0.00087	<0.0005	0.00041	0.46	0.00037	0
Potassium	mg/L	-	-	-	0.34	0.35	0.38	0.54	0.38	0.4	0.23	0.4	0.21	0.32	0.36	0.30	0.32	0.35	0.33	0.07	0.40	0.38	0.40	0.41	0.40	0.4	0.03	0.4	0.03	0.34	0.33	0.38	0.58	0.37	0.41	0.29	0.4	0.256
Selenium	mg/L	0.0020	-	0.019	0.00071	0.00086	0.00085	0.00088	0.00066	0.00082	0.09	0.00079	0.122	0.00071	0.00061	0.00059	0.00054	0.00047	0.00058	0.15	0.00063	0.00065	0.00068	0.00060	0.00081	0.00064	0.053	0.00067	0.124	0.00086	0.00073	0.00087	0.0012	0.00081	0.0009	0.20	0.00088	0.18
Silicon	mg/L	-	-	-	1.9	1.8	1.7	3.0	2.2	2.1	0.28	2.1	0.24	2.0	2.0	1.8	1.9	1.8	1.9	0.049	2.2	2.0	2.0	1.9	2.0	2.0	0.07	2.0	0.06	1.8	1.8	1.9	2.5	2.0	2.0	0.18	2.0	0.157
Silver	mg/L	0.0015[b]	0.030[b]	-	<0.00001	<0.00001	<0.00001	0.000048	0.000019	0.000016	1.2	0.000016	1.0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0	<0.00001	0.0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0	<0.00001	0
Sodium	mg/L	0.69	0.73	0.69	0.68	0.59	0.7	0.032	0.67	0.076	0.66	0.57	0.60	0.62	0.54	0.6	0.083	0.69	0.66	0.71	0.71	0.69	0.69	0.034	0.69	0.029	0.66	0.67	0.71	0.77	0.72	0.7	0.071	0.71	0.062			
Strontium	mg/L	0.11	0.10	0.080	0.079	0.096	0.12	0.092	0.14	0.065	0.063	0.067	0.071	0.067	0.067	0.043	0.095	0.093	0.11	0.097	0.10	0.098	0.07	0.099	0.06	0.085	0.093	0.095	0.099	0.09	0.093	0.07	0.093	0.057			
Thallium	mg/L	0.00080	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0	<0.00001	0.0	<0.00001	<0.00001	<0.00001	0.000012	<0.00001	0.0000068	0.15	0.0000064	0
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	0.00014	<0.0001	<0.0001	<0.0001	<0.0001	0.0000073	0	0.0000068	0.26
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	0.017	<0.01	0.008	0.44	0.0074	0.42	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	<0.01	0.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	<0.01	0
Uranium	mg/L	0.0085	-	-	0.00047	0.00053	0.00042	0.00047	0.00037	0.00047	0.098	0.00045	0.138	0.00041	0.00034	0.00032	0.00037	0.00032	0.00035	0.1	0.00047	0.00043	0.00048	0.00050	0.00045	0.00047	0.062	0.00047	0.056	0.00049	0.00047	0.00051	0.00054	0.00049	0.0005	0.065	0.0005	0.057
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	0.0025	0.00082	0.0008	1.2	0.0008	1.1	<0.0005	0.00068	<0.0005	<0.0005	<0.0005	0.00034	0.24	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0	<0.0005	0.0	<0.0005	<0.0005	<0.0005	0.0012	<0.0005	0.00048	0.7	0.00044	1
Zinc	mg/L	0.031 - 0.092	0.056 - 0.12	-	0.014	<0.003	<0.003	0.0045	<0.003	0.0053	1.0	0.0045	1.0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	<0.003	<0.003	0.0030	<0.003	0.0019	0.0	0.0018	0.0	<0.003	<0.003	<0.003	0.0097	<0.003	0.0036	0.9	0.0031	1
Dissolved Metals																																					
Aluminum	mg/L	0.050[j]	0.10[j]	-	<0.003	<0.003	<0.003	**0.11[kn, kb,]**	0.047	0.029	1.9	0.032	1.5	0.012	0.0084	0.0039	<0.003	<0.003	<0.003	0.0055	0.73	<0.003	<0.003	<0.003	0.0032	<0.003	0.0019	0.1	0.0018	0.0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0	<0.003	0
Antimony	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2						Q3								Q4							
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia and P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19 (*H. azteca*)		Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia and P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia and P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia and P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV	Mean	CV						Mean	CV						Mean	CV	Mean	CV					Mean	CV	Mean	CV
Field Measured																																					
pH		6.5 - 9.0	6.5 - 9.0	-	8.2	8.1	8.2	8.4	8.1	8.2	0.02	8.2	0.01	8.1	8.1	8.2	8.0	8.0	8.1	0.01	8.3	8.3	7.8	7.9	8.0	8.1	0.03	8.1	0.03	7.5	7.8	8.2	8.0	8.1	7.9	0.04	7.9	0.035
Temperature	°C	-	-	-	0.1	0	1.4	2.9	2.8	1.1	1.2	1.4	1.0	4.4	5.5	4.0	4.6	5.6	4.8	0.15	9.9	7.9	8.9	8.0	8.3	8.7	0.1	8.6	0.1	0.60	2.9	0.60	0.80	0.30	1.2	0.9	1.0	1.01
Conventional Parameters																																					
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.2	8.2	8.2	8.2	8.2	0	8.2	0	8.2	8.2	8.3	8.4	8.1	8.2	0.014	8.3	8.3	8.3	8.4	8.3	8.3	0	8.3	0	8.3	8.3	8.2	8.2	8.4	8.3	0	8.3	0.01
Hardness, as $CaCO_3$	mg/L	-	-	-	172	173	163	166	163	169	0.028	167	0.029	168	151	164	155	141	156	0.069	154	153	148	153	155	152	0.018	153	0.018	158	165	164	154	171	160	0.032	162	0.041
Total alkalinity, as $CaCO_3$	mg/L	20[d]	-	-	150	159	146	144	141	150	0.044	148	0.047	144	136	147	136	120	137	0.077	133	137	139	141	140	138	0.025	138	0.023	145	144	147	149	161	146	0.015	149	0.046
Total dissolved solids	mg/L	-	-	-	181	179	212	167	188	185	0.1	185	0.09	174	167	161	163	144	162	0.069	154	167	160	177	165	165	0.06	165	0.05	178	188	170	152	164	172	0.09	170	0.08
Total suspended solids	mg/L	-	-	-	<1.0	2.0	<1.0	1.8	3.0	1.2	0.44	1.6	0.53	5.0	50	7.0	8.3	79	30	1.1	1.1	1.5	2.1	<1.0	9.0	1.3	0.38	2.8	1.2	1.4	1.5	2.0	1.5	1.1	1.6	0.17	1.5	0.2
Total organic carbon	mg/L	-	-	-	<0.50	<0.5	<0.5	0.57	1.2	0.33	0.11	0.51	0.62	0.86	1.4	1.0	1.3	1.3	1.2	0.19	0.79	0.64	0.50	0.59	0.65	0.63	0.19	0.63	0.17	<0.5	<0.5	0.68	<0.5	<0.5	0.36	0.25	0.34	0.24
Dissolved organic carbon	mg/L	-	-	-	<0.50	0.63	<0.5	0.85	1.2	0.5	0.33	0.63	0.45	<0.5	0.89	0.87	1.5	0.92	0.88	0.39	0.65	0.61	0.56	0.64	0.66	0.62	0.07	0.62	0.06	<0.5	<0.5	0.53	<0.5	<0.5	0.32	0.05	0.31	0
Turbidity	NTU	-	-	-	0.45	0.41	0.55	0.61	2.0	0.51	0.18	0.81	0.84	3.2	16	2.3	4.2	44	14.0	1.3	0.51	0.41	0.87	0.42	2.1	0.55	0.39	0.87	0.84	0.64	1.3	0.57	0.60	0.15	0.77	0.43	0.64	0.6
Conductivity	µS/cm	-	-	-	305	312	307	295	286	305	0.023	301	0.035	298	293	307	294	262	291	0.059	274	277	274	283	286	277	0.015	279	0.02	279	294	296	299	322	292	0.031	298	0.052
Oxidation-reduction potential	mV	-	-	-	410	465	468	463	465	452	0.061	454	0.055	452	448	356	326	418	400	0.14	360	481	477	484	439	451	0.134	448	0.117	456	420	331	465	257	418	0.146	386	0.23
Acidity To pH 8.3, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	1.3	<1.0	0.66	0.2	8.0	1.2	<1.0	<1.0	<1.0	2.6	1	2.1	1	1.6	<1.0	<1.0	<1.0	<1.0	0.78	0	0.72	0.37
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	150	159	146	144	141	150	0.044	148	0.047	144	136	147	131	120	136	0.08	133	134	138	139	140	136	0.022	137	0.023	145	143	147	149	154	146	0.018	148	0.029
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	5.0	<1.0	1.4	1.3	<1.0	3.2	<1.0	2.2	<1.0	1.6	1	1.4	1	<1.0	1.6	<1.0	<1.0	7.0	0.78	0	2.0	1.3
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																					
Bromide	mg/L	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0
Calcium	mg/L	-	-	-	50	49	46	47	47	48	0.045	48	0.039	47	43	48	44	41	45	0.059	44	44	43	43	45	43	0.018	44	0.021	44	48	46	43	50	45	0.046	46	0.061
Chloride	mg/L	150	600	-	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	0	<0.5	<0.5	0.80	0.83	<0.5	0.48	0.26	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	0
Fluoride	mg/L	-	1.4 - 1.6[e]	-	0.16	0.15	0.086	0.15	0.17	0.14	0.25	0.14	0.23	0.17	0.16	0.17	0.15	0.13	0.15	0.099	0.15	0.17	0.16	0.16	0.19	0.16	0.04	0.17	0.08	0.17	0.13	0.13	0.10	0.18	0.14	0.2	0.14	0.21
Magnesium	mg/L	-	-	-	12	12	12	12	11	12	0.024	12	0.044	12	11	11	11	9.3	11	0.1	11	10	10	11	11	11	0.04	11	0.034	12	11	12	11	11	12	0.038	12	0.037
Potassium	mg/L	-	-	-	0.29	0.34	0.31	0.38	0.35	0.33	0.11	0.33	0.1	0.32	0.33	0.34	0.35	0.33	0.33	0.036	0.34	0.34	0.34	0.39	0.35	0.35	0.07	0.35	0.06	0.33	0.35	0.34	0.34	0.32	0.34	0.03	0.33	0.034
Sodium	mg/L	-	-	-	0.67	0.76	0.77	0.77	0.74	0.74	0.063	0.74	0.055	0.76	0.62	0.87	0.82	0.57	0.73	0.18	0.61	0.65	0.67	0.67	0.68	0.65	0.044	0.65	0.044	0.72	0.69	0.72	0.70	0.70	0.71	0.021	0.71	0.018
Sulphate	mg/L	309 - 429[b, c]	-	309 - 481[b]	24	24	25	24	23	24	0.015	24	0.022	23	19	20	18	13	19	0.18	16	18	18	17	19	17	0.036	18	0.061	23	22	23	23	23	23	0.015	23	0.013
Major anion sum	meq/L	-	-	-	3.5	3.7	3.5	3.4	3.3	3.5	0.036	3.5	0.04	3.4	3.2	3.4	3.1	2.7	3.1	0.089	3.0	3.1	3.2	3.2	3.2	3.1	0.026	3.1	0.027	3.4	3.4	3.4	3.5	3.7	3.4	0.013	3.5	0.041
Major cation sum	meq/L	-	-	-	3.5	3.5	3.3	3.4	3.3	3.4	0.028	3.4	0.028	3.4	3.1	3.3	3.1	2.9	3.2	0.069	3.1	3.1	3.0	3.1	3.2	3.1	0.017	3.1	0.018	3.2	3.3	3.3	3.3	3.1	3.5	3.2	0.03	3.3	0.037
Nutrients																																						
Nitrate	mg-N/L	3.0	33	2.0 - 2.8[d]	0.11	0.10	0.10	0.12	0.11	0.11	0.048	0.11	0.042	0.073	0.11	0.098	0.085	0.098	0.092	0.14	0.036	0.031	0.029	0.030	0.058	0.032	0.09	0.037	0.332	0.075	0.089	0.076	0.087	0.092	0.082	0.09	0.084	0.09
Nitrite	mg-N/L	0.020[d]	0.060[d]	-	0.002	<0.001	<0.001	<0.001	<0.001	0.00075	0.33	0.0007	0.32	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0	<0.001	0.0	<0.001	<0.001	<0.001	0.0012	<0.001	0.00068	0.15	0.00064	0.14
Total ammonia	mg-N/L	0.47 - 2.1[f]	2.4 - 14[d]	-	<0.0050	<0.005	<0.005	0.0065	0.0059	0.0035	0.21	0.004	0.17	0.011	0.016	0.020	0.0086	0.015	0.014	0.32	0.029	0.011	0.0072	0.0077	0.014	0.014	0.76	0.014	0.66	0.013	0.022	0.0085	0.0066	0.0053	0.013	0.55	0.011	0.62
Total Kjeldahl nitrogen	mg-N/L	-	-	-	<0.050	0.25	0.091	0.16	0.071	0.13	0.66	0.12	0.68	0.064	0.27	0.053	0.068	0.34	0.16	0.85	0.079	<0.05	0.077	0.089	0.059	0.068	0.25	0.066	0.24	0.054	0.074	<0.05	<0.05	<0.05	0.045	0.26	0.041	0.26
Orthophosphate	mg-P/L	-	-	-	0.0023	<0.001	<0.001	0.0011	<0.001	0.0011	0.58	0.00098	0.58	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0	<0.001	0.0	<0.001	0.0016	<0.001	<0.001	0.0016	0.00078	0.39	0.00094	0.35
Phosphorus	mg-P/L	-	-	-	0.0033	0.0029	0.0095	0.0038	0.0033	0.0049	0.64	0.0046	0.61	0.0060	0.0059	0.0077	0.014	0.090	0.035	1.1	<0.002	<0.002	<0.002	0.0048	0.0069	0.002	0.72	0.0029	0.76	<0.002	<0.002	0.0046	<0.002	<0.002	0.0018	0.68	0.0017	1
Total Metals																																						
Aluminum	mg/L	-	-	-	0.0048	0.0046	0.0068	0.013	0.043	0.0074	0.56	0.014	1.12	0.041	0.45	0.029	0.14	0.40	0.21	0.94	0.011	0.018	<0.012	0.012	0.015	0.012	0.27	0.012	0.23	0.015	<0.003	0.021	0.015	0.0057	0.013	0.58	0.012	0.64
Antimony	mg/L	0.0090	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Arsenic	mg/L	-	0.0050	-	0.00011	0.00012	<0.0001	0.00014	<0.0001	0.00011	0.16	0.000094	0.18	0.00014	0.00046	0.00046	0.00013	0.00020	0.00042	0.00027	0.59	0.00011	0.00013	0.00011	0.00014	0.00014	0.00012	0.12	0.00013	0.12	0.00011	<0.0001	0.00013	0.00017	<0.0001	0.00012	0.27	0.0001	0.29
Barium	mg/L	1.0	-	-	0.048	0.048	0.047	0.047	0.052	0.047	0.013	0.048	0.041	0.045	0.049	0.040	0.040	0.042	0.043	0.091	0.040	0.039	0.041	0.041	0.044	0.04	0.024	0.041	0.044	0.047	0.045	0.046	0.043	0.046	0.045	0.039	0.045	0.035
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.00034	0.39	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Cadmium	mg/L	0.00026 - 0.00033[b]	0.00076 - 0.0011[b]	0.00017 - 0.00022[b]	0.000006	0.0000057	<0.000005	0.0000063	0.0000072	0.0000051	0.11	0.0000055	0.15	0.0000067	0.0000073	0.0000065	0.0000095	<0.000005	0.0000065	0.25	0.0000075	0.0000384	0.0000055	<0.000005	0.0000069	0.0000096	0.27	0.0000062	0.23	0.0000059	0.0000073	0.0000066	0.0000081	0.0000058	0.0000067	0.14	0.0000067	0.14
Chromium	mg/L	-	-	-	0.00021	0.00025	0.00025	0.00025	0.00028	0.00024	0.083	0.00025	0.10	0.00021	0.00022	0.00023	0.00027	0.00020	0.00023	0.12	0.00020	0.00019	0.00018	0.00021	0.00034	0.0002	0.066	0.00022	0.294	0.00027	0.00031	0.00022	0.00024	0.00024	0.00026	0.151	0.00026	0.14
Cobalt	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Copper	mg/L	0.0002 - 0.0008[f]	0.0001 - 0.0049[f]	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	**0.00021[bkc]**	**0.0006[4bkc]**	**0.00032[bkc]**	**0.00024[bkc]**	<0.0002	**0.00035[bkc]**	1	**0.00030[bkc]**	0.6
Iron	mg/L	-	0.35	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0.0
Lead	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0.00
Lithium	mg/L	-	-	-	0.0016	0.0017	0.0017	0.0017	0.0019	0.0017	0.03	0.0017	0.064	0.0017	0.0015	0.0016	0.0016	0.0013	0.0015	0.098	0.0017	0.0017	0.0017	0.0016	0.0017	0.0017	0.03	0.0017	0.027	0.0017	0.0018	0.0016	0.0018	0.0019	0.0017	0.056	0.0018	0.06
Manganese	mg/L	-	-	-	0.0003	0.00031	0.00034	0.00064	0.00062	0.00041	0.38	0.00045	0.37	0.00013	0.00021	0.00058	<0.0001	0.00021	0.00024	0.82	0.00059	0.00078	0.00065	0.00048	0.00046	0.00063	0.2	0.00059	0.22	0.00054	0.0011	0.00049	0.00060	0.00049	0.00069	0.42	0.00065	0.41
Mercury	mg/L	-	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0
Molybdenum	mg/L	-	-	-	0.00109	0.0011	0.0011	0.0010	0.00097	0.0011	0.02	0.001	0.043	0.0010	0.0011	0.0010	0.0010	0.00081	0.001	0.1	0.00096	0.00097	0.00094	0.00092	0.00100	0.00095	0.024	0.00096	0.032	0.00098	0.0010	0.00098	0.00099	0.0010	0.0010	0.028	0.001	0.03
Nickel	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Selenium	mg/L	-	-	-	0.0011	0.0012	0.0012	0.0011	0.0012	0.0011	0.031	0.0012	0.027	0.0011	0.00093	0.00088	0.00076	0.00083	0.00091	0.15	0.00086	0.00084	0.00071	0.00077	0.00083	0.00079	0.084	0.0008	0.075	0.0011	0.0010	0.00091	0.0011	0.0010	0.001	0.086	0.001	0.07
Silicon	mg/L	-	-	-	1.6	1.7	1.7	1.6	1.7	1.7	0.037	1.7	0.033	1.7	1.6	1.7	1.7	1.7	1.7	0.042	1.8	1.8	1.7	1.8	1.8	1.8	0.04	1.8	0.035	1.8	1.7	1.7	2.0	1.9	1.8	0.069	1.8	0.062
Silver	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Strontium	mg/L	-	-	-	0.22	0.22	0.21	0.20	0.20	0.21	0.056	0.21	0.055	0.22	0.21	0.22	0.23	0.20	0.22	0.061	0.21	0.21	0.22	0.21	0.22	0.21	0.031	0.21	0.029	0.21	0.21	0.20	0.21	0.22	0.21	0.018	0.21	0.028
Thallium	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0.0
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	0.0085	-	-	0.00078	0.00081	0.00078	0.00086	0.00082	0.00081	0.042	0.00081	0.037	0.00072	0.00077	0.00083	0.00076	0.00061	0.00074	0.11	0.00065	0.00073	0.00066	0.00069	0.00071	0.00068	0.053	0.00069	0.048	0.00073	0.00075	0.00074	0.00076	0.00077	0.00074	0.02	0.00075	0.024
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Zinc	mg/L	0.037 - 0.077	0.062 - 0.10	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	0.0054	<0.003	<0.003	0.0055	0.0031	0.44	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	<0.003	<0.003	0.0039	<0.003	0.0021	0	0.002	0
Dissolved Metals																																					
Aluminum	mg/L	0.050[g]	0.10[g]	-	<0.003	<0.003	<0.003	<0.003	0.0053	<0.003	0	0.0023	0	<0.003	0.0036	<0.003	<0.003	0.0037	0.0024	0.15	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	0.0051	<0.003	<0.003	<0.003	0.0024	0	0.0022	0
Antimony	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Arsenic	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	0.00011	0.00012	0.00011	0.00011	0.00010	0.00011	0.064	0.00011	0.00011	0.00010	<0.0001	<0.0001	0.000093	0	0.000084	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Barium	mg/L	-	-	-	0.049	0.049	0.047	0.049	0.049	0.049	0.024	0.049	0.021	0.045	0.043	0.043	0.038	0.036	0.041	0.093	0.042	0.040	0.043	0.044	0.046	0.042	0.045	0.043	0.053	0.043	0.045	0.049	0.046	0.047	0.046	0.056	0.046	0.05
Beryllium	mg/L	-	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2								Q3						Q4						
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia and P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19 (*H. azteca*)		Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia and P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia and P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia and P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV	Mean	CV						Mean	CV						Mean	CV	Mean	CV						Mean	CV	Mean	CV
Field Measured																																							
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.1	8.2	8.2	8.3	8.1	8.2	0.01	8.2	0.01	8.3	8.3	8.3	8.4	8.3	8.3	0.0054	8.2	8.4	7.9	8.3	8.3	8.2	0.03	8.2	0.02	7.8	8.1	7.9	8.1	7.9	8.3	7.9	0.02	8.0	0.025
Temperature	°C	-	-	-	1.5	1.4	1.7	2.7	1.6	1.8	0.33	1.8	0.3	1.9	1.5	1.5	2.1	2.8	2.0	0.27	9.0	6.5	9.1	7.7	7.0	8.1	0.15	7.9	0.15	0.40	0.90	0.30	0.50	0.60	0.53	0.5	0.54	0.43
Conventional Parameters																																							
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.2	8.2	8.1	8.1	8.2	0.0061	8.2	0.0067	8.2	8.0	8.2	8.3	8.0	8.1	0.016	8.4	8.4	8.3	8.3	8.4	8.4	0.0069	8.4	0.0066	8.3	8.4	8.1	8.3	8.1	8.3	0.0152	8.2	0.016
Hardness, as $CaCO_3$	mg/L	-	-	-	156	145	146	169	161	154	0.073	155	0.065	133	96	108	91	85	103	0.19	156	151	154	140	152	150	0.047	151	0.041	142	143	147	163	144	149	0.065	148	0.059
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	-	179	154	165	147	152	161	0.087	159	0.08	125	90	110	91	88	101	0.16	146	147	149	145	147	147	0.012	147	0.01	141	138	155	147	144	145	0.052	145	0.045
Total dissolved solids	mg/L	-	-	-	209	166	164	186	186	181	0.12	182	0.1	167	115	119	117	93	122	0.22	135	157	169	166	172	157	0.1	160	0.09	171	178	162	143	133	164	0.09	157	0.12
Total suspended solids	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	4.8	<1	0	1.4	1	1.3	10	2.4	4.2	11	5.7	0.76	<1.0	1.9	<1.0	<1.0	<1.0	0.85	1	0.78	1	<1.0	<1.0	<1.0	<1.0	<1.0	<1	0	<1	0.0
Total organic carbon	mg/L	-	-	-	0.62	<0.5	<0.5	0.54	<0.5	0.42	0.14	0.38	0.14	7.4	5.5	3.0	3.7	3.2	4.6	0.41	0.95	0.84	0.84	0.95	0.76	0.9	0.07	0.87	0.09	0.76	1.1	0.59	1.1	0.61	0.88	0.28	0.84	0.273
Dissolved organic carbon	mg/L	-	-	-	0.55	<0.5	<0.5	0.59	<0.5	0.41	0.11	0.38	0.11	3.6	4.8	2.7	3.6	2.9	3.5	0.24	0.99	0.81	0.81	0.93	0.78	0.89	0.1	0.86	0.11	0.84	1.3	0.55	1.2	0.61	0.95	0.33	0.88	0
Turbidity	NTU	-	-	-	0.26	0.37	0.22	0.18	1.8	0.26	0.32	0.56	1.22	0.77	7.5	1.1	3.5	7.3	4.0	0.81	0.25	0.27	0.18	0.30	0.20	0.25	0.2	0.24	0.21	0.16	0.30	0.32	0.20	0.17	0.25	0.32	0.23	0.3
Conductivity	µS/cm	-	-	-	302	309	301	306	303	305	0.012	304	0.011	253	188	220	191	176	206	0.15	287	284	287	282	286	285	0.009	285	0.008	246	274	258	275	278	263	0.053	266	0.052
Oxidation-reduction potential	mv	-	-	-	420	415	404	408	398	412	0.017	409	0.021	411	397	329	333	416	377	0.11	274	319	447	282	419	331	0.242	348	0.229	382	422	412	408	268	406	0.042	378	0.17
Acidity To pH 8.3, as $CaCO_3$	mg/l	-	-	-	1.6	1.1	2.5	1.5	<1.0	1.7	0.35	1.4	0.41	1.8	2.7	<1.0	1.7	1.0	1.5	0.46	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0.0	<1.0	<1.0	<1.0	<1.0	1.7	<1.0	0.0	0.74	0.42
Bicarbonate alkalinity, as $CaCO_3$	mg/l	-	-	-	179	154	165	147	152	161	0.087	159	0.08	125	90	110	89	88	100	0.17	141	144	145	143	141	143	0.012	143	0.013	141	135	155	147	144	145	0.059	144	0.051
Carbonate alkalinity, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	2.6	<1.0	0.9	0.78	4.8	3.4	3.2	2.0	5.8	3.4	0	3.8	0	<1.0	3.4	<1.0	<1.0	<1.0	1.2	1	1.1	1.0
Hydroxide alkalinity, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																							
Bromide	mg/L	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0
Calcium	mg/L	-	-	-	43	40	41	47	46	43	0.076	43	0.074	38	26	29	26	22	28	0.21	43	42	42	39	42	41	0.041	41	0.036	38	40	41	45	39	41	0.075	41	0.072
Chloride	mg/L	150	600	-	0.68	0.61	0.68	0.75	0.77	0.68	0.084	0.7	0.091	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.00	<0.5	0.00	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.00	<0.5	0
Fluoride	mg/L	-	1.3 - 1.5[b]	-	0.070	0.065	0.036	0.073	0.081	0.061	0.28	0.065	0.26	0.071	0.054	0.065	0.055	0.049	0.059	0.15	0.079	0.076	0.078	0.076	0.080	0.077	0.02	0.078	0.02	0.077	0.058	0.064	0.053	0.073	0.063	0.16	0.065	0.15
Magnesium	mg/L	-	-	-	12	11	11	12	11	11	0.07	11	0.062	9.6	7.2	8.5	6.7	7.3	7.9	0.15	12	12	12	11	12	12	0.059	12	0.052	11	10	11	12	12	11	0.061	11	0.055
Potassium	mg/L	-	-	-	0.49	0.45	0.41	0.46	0.45	0.45	0.071	0.45	0.062	0.37	0.36	0.37	0.32	0.30	0.34	0.089	0.54	0.51	0.52	0.49	0.52	0.51	0.037	0.52	0.033	0.40	0.39	0.40	0.45	0.40	0.41	0.068	0.41	0.06
Sodium	mg/L	-	-	-	3.5	3.2	3.1	3.7	3.6	3.4	0.084	3.4	0.076	2.7	1.3	1.7	1.3	1.0	1.6	0.42	3.1	3.1	3.1	3.1	3.3	3.1	0.011	3.1	0.031	3.1	2.9	3.2	3.3	3.1	3.1	0.055	3.1	0.048
Sulphate	mg/L	309[b]	-	309[b]	17	17	17	18	18	17	0.039	17	0.047	13	5.6	8.1	5.8	5.6	7.5	0.41	13	14	14	13	14	14	0.023	14	0.024	14	13	14	15	14	14	0.035	14	0.034
Major anion sum	meq/L	-	-	-	4.0	3.4	3.7	3.4	3.4	3.6	0.074	3.6	0.068	2.8	1.9	2.4	2.0	1.9	2.2	0.18	3.2	3.2	3.3	3.2	3.2	3.2	0.012	3.2	0.011	3.1	3.0	3.4	3.2	3.2	3.2	0.048	3.2	0.041
Major cation sum	meq/L	-	-	-	3.3	3.1	3.1	3.5	3.4	3.2	0.071	3.3	0.065	2.8	2.0	2.2	1.9	1.8	2.1	0.19	3.3	3.2	3.2	3.0	3.2	3.2	0.045	3.2	0.04	3.0	3.0	3.1	3.4	3.0	3.1	0.065	3.1	0.058
Nutrients																																							
Nitrate	mg-N/L	3.0	33	1.3 - 2.6[c]	0.059	0.055	0.060	0.057	0.074	0.058	0.037	0.061	0.124	0.0086	0.0079	0.0089	<0.005	0.023	0.0102	0.7	0.012	0.013	0.017	0.018	0.040	0.015	0.217	0.02	0.589	0.019	0.020	0.027	0.038	0.040	0.026	0.338	0.029	0.34
Nitrite	mg-N/L	0.020[d]	0.060[d]	-	0.0011	<0.001	<0.001	<0.001	<0.001	0.00065	0.08	0.00062	0.07	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	<0.001	<0.001	<0.001	0.0084	<0.001	0.0	0.0021	1.59	<0.001	0.0012	<0.001	<0.001	<0.001	0.00068	0.15	0.00064	0.14
Total ammonia	mg-N/L	0.16 - 2.1[e]	0.83 - 16[f]	-	0.0069	0.011	<0.005	0.017	<0.005	0.0094	0.57	0.008	0.64	<0.005	0.027	0.023	0.0075	0.013	0.024	0.014	0.63	<0.005	<0.005	0.0054	<0.005	<0.005	0.0032	0.06	0.0031	0.06	0.0053	0.0075	<0.005	0.0080	0.0051	0.0058	0.26	0.0057	0.25
Total Kjeldahl nitrogen	mg-N/L	-	-	-	<0.05	<0.05	<0.05	<0.05	0.050	<0.05	0	0.03	0	<0.05	0.27	0.086	<0.05	0.14	0.11	0.85	<0.05	<0.05	0.17	<0.05	0.070	0.06	1	0.062	1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0.0
Orthophosphate	mg-P/L	-	-	-	0.0033	0.0030	0.0030	0.0034	0.0032	0.0032	0.065	0.0032	0.056	0.0041	0.0047	0.0039	0.0040	0.0038	0.0041	0.086	0.0047	0.0043	0.0039	0.0041	0.0044	0.0043	0.08	0.0043	0.071	0.0041	0.0038	0.0040	0.0051	0.0047	0.0043	0.137	0.0043	0.12
Phosphorus	mg-P/L	-	-	-	0.0032	0.0042	0.0035	0.0039	0.0038	0.0037	0.12	0.0037	0.1	0.0045	0.016	0.010	0.012	0.015	0.011	0.39	0.0048	0.0037	0.0024	0.0040	0.0059	0.0037	0.27	0.0042	0.31	0.0040	0.0032	0.0045	0.0042	0.0036	0.004	0.14	0.0039	0
Total Metals																																							
Aluminum	mg/L	-	-	-	0.0041	<0.003	<0.003	0.0032	0.016	0.0026	0.2	0.0052	1.07	0.032	0.22	0.11	0.25	0.34	0.19	0.65	0.0075	0.0080	0.0057	0.011	0.0062	0.008	0.25	0.0076	0.25	0.0096	0.0058	0.0061	0.0064	<0.003	0.007	0.25	0.0059	0.4
Antimony	mg/L	0.0090	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Arsenic	mg/L	0.00015	0.0050	-	0.00015	0.00016	0.00020	0.00016	0.00014	0.00017	0.13	0.00016	0.14	0.00022	0.00029	0.00028	0.00030	0.00039	0.0003	0.21	0.00023	0.00021	0.00019	0.00021	0.00019	0.00021	0.08	0.00021	0.08	0.00018	0.00019	0.00019	0.00019	0.00018	0.00019	0.03	0.00019	0.03
Barium	mg/L	1.0	-	-	0.053	0.056	0.054	0.058	0.059	0.055	0.04	0.056	0.047	0.041	0.031	0.036	0.029	0.026	0.033	0.18	0.061	0.054	0.057	0.052	0.050	0.054	0.043	0.053	0.047	0.047	0.047	0.050	0.047	0.047	0.048	0.034	0.048	0.03
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	0.000023	<0.00002	0	0.000013	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	-	-	-	0.013	0.012	0.012	0.014	0.014	0.013	0.075	0.013	0.077	0.013	<0.01	<0.01	<0.01	<0.01	<0.01	0.066	0.2	0.016	0.016	0.016	0.015	0.016	0.016	0.032	0.016	0.028	0.013	0.013	0.013	0.014	0.013	0.038	0.013	0
Cadmium	mg/L	0.00019 - 0.00031[b]	0.00050 - 0.0010[b]	0.00012 - 0.00021[g]	0.0000084	0.0000060	0.0000086	0.000011	0.000014	0.0000084	0.22	0.0000095	0.3	0.0000079	0.000015	0.000013	0.000010	0.000018	0.000013	0.3	0.000010	0.000014	0.000011	0.000010	0.0000058	0.000011	0.18	0.00001	0.3	0.0000083	0.0000072	0.0000080	0.000012	0.0000084	0.0000089	0.25	0.0000088	0.22
Chromium	mg/L	-	-	-	0.00016	0.00019	0.00014	0.00017	0.00020	0.00017	0.13	0.00017	0.14	0.00013	0.00021	0.00021	0.00021	0.00025	0.0002	0.22	0.00022	0.00021	0.00017	0.00018	0.00017	0.0002	0.12	0.00019	0.12	0.00027	0.00016	0.00019	0.00023	0.00027	0.00021	0.23	0.00022	0.22
Cobalt	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Copper	mg/L	0.0002 - 0.0026[h]	0.0011 - 0.0156[h]	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	0.00021	0.00021	**0.00057[bio]**	0.00032	<0.0002	0.00033	1	0.00028	0.6
Iron	mg/L	-	0.35	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	0.035	<0.01	0.016	0.013	0.015	0.71	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0.0
Lead	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0.00
Lithium	mg/L	-	-	-	0.0048	0.0039	0.0041	0.0048	0.0050	0.0044	0.11	0.0045	0.11	0.0040	0.0022	0.0026	0.0022	0.0016	0.0025	0.36	0.0048	0.0049	0.0047	0.0048	0.0051	0.0048	0.02	0.0049	0.03	0.0041	0.0043	0.0045	0.0048	0.0042	0.0044	0.07	0.0044	0.06
Manganese	mg/L	-	-	-	0.0014	0.00015	0.00014	0.00016	<0.0001	0.00015	0.065	0.00013	0.178	0.00011	0.00093	0.00037	0.00037	0.00064	0.00048	0.64	0.00021	0.00018	0.00016	0.00019	0.00012	0.00019	0.113	0.00017	0.199	0.00010	<0.0001	0.00010	<0.0001	<0.0001	0.000075	0.00	0.00007	0.0
Mercury	mg/L	-	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0
Molybdenum	mg/L	-	-	-	0.00085	0.00090	0.00083	0.00092	0.00085	0.00088	0.046	0.00087	0.042	0.00084	0.00051	0.00064	0.00057	0.00047	0.00061	0.24	0.0010	0.00094	0.00091	0.0010	0.00099	0.00097	0.055	0.00097	0.048	0.00083	0.00085	0.00088	0.00085	0.00089	0.00085	0.023	0.00086	0.03
Nickel	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Selenium	mg/L	-	-	-	0.00027	0.00029	0.00028	0.00028	0.00032	0.00028	0.028	0.00029	0.073	0.00027	0.00021	0.00022	0.00022	0.00015	0.00021	0.21	0.00024	0.00021	0.00020	0.00020	0.00018	0.00021	0.105	0.00021	0.118	0.00026	0.00021	0.00025	0.00029	0.00027	0.00025	0.139	0.00026	0.12
Silicon	mg/L	-	-	-	2.2	2.0	2.0	2.1	2.1	2.1	0.053	2.1	0.046	2.1	2.1	2.2	2.1	2.1	2.1	0.027	2.3	2.4	2.6	2.3	2.3	2.4	0.054	2.4	0.05	2.2	2.0	2.1	2.1	2.2	2.1	0.034	2.1	0.037
Silver	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Strontium	mg/L	0.16	-	-	0.16	0.16	0.15	0.17	0.16	0.16	0.056	0.16	0.049	0.13	0.081	0.098	0.079	0.061	0.089	0.28	0.15	0.15	0.14	0.15	0.16	0.15	0.048	0.15	0.062	0.14	0.13	0.15	0.15	0.14	0.14	0.052	0.14	0.045
Thallium	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	0.00013	<0.0001	0.00007	0	0.000066	0.2
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	-	-	-	0.00023	0.00024	0.00021	0.00025	0.00027	0.00023	0.085	0.00024	0.101	0.00022	0.00014	0.00016	0.00014	0.00012	0.00015	0.24	0.00027	0.00024	0.00023	0.00023	0.00023	0.00024	0.079	0.00024	0.074	0.00023	0.00021	0.00024	0.00023	0.00024	0.00022	0.045	0.00023	0.043
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Zinc	mg/L	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	0.0
Dissolved Metals																																							
Aluminum	mg/L	0.050[i]	0.10[i]	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	0.0036	0.044	0.013	0.024	0.020	0.021	0.72	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0
Antimony	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Arsenic	mg/L	0.00015	0.00013	0.00012	0.00015	0.00014	0.00014	0.11	0.00014	0.09	0.00020	0.00023	0.00024	0.00024	0.00029	0.00024	0.14	0.00023	0.00022	0.00019	0.00019	0.00019	0.00021	0.1	0.0002	0.1	0.00017	0.00016	0.00024	0.00018	0.00016	0.00019	0.19	0.00018	0
Barium	mg/L	0.058	0.054	0.050	0.060	0.061	0.055	0.08	0.056	0.08	0.039	0.029	0.034	0.027	0.025	0.031	0.19	0.052	0.052	0.056	0.051	0.054	0.053	0.038	0.053	0.035	0.044	0.045	0.048	0.047	0.049	0.046	0.04	0.046	0.043
Beryllium	mg/L	-	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2								Q3								Q4							
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia* and *P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia* and *P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia* and *P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia* and *P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV						Mean	CV							Mean	CV	Mean	CV					Mean	CV	Mean	CV
Field Measured																																			
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.2	7.1	8.2	8.1	8.0	0.06	8.0	8.4	7.9	7.8	8.2	8.1	0.03	7.8	7.4	8.1	8.3	8.3	7.9	0.05	8.0	0.05	8.2	8.4	8.0	8.0	8.2	8.2	0.02	8.2	0.021
Temperature	°C	-	-	-	0.10	0.10	0.30	0.30	0.70	0.3	0.82	2.2	2.7	2.5	3.0	0.40	2.2	0.48	5.0	3.2	5.6	4.9	5.5	4.7	0.22	4.8	0.2	0.30	1.7	0.10	0.30	0.5	0.6	1.23	0.58	1.11
Conventional Parameters																																			
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.1	8.0	8.2	8.1	8.1	0.01	8.2	8.2	8.3	8.4	8.2	8.3	0.011	8.3	8.3	8.3	8.3	8.3	8.3	0.00	8.3	0.00	8.1	8.2	8.2	8.2	8.3	8.2	0.006	8.2	0.009
Hardness, as $CaCO_3$	mg/L	-	-	-	216	233	223	214	201	217	0.054	167	130	145	142	102	137	0.17	171	178	183	180	189	178	0.029	180	0.037	203	196	194	194	210	197	0.022	199	0.035
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	-	154	157	140	144	136	146	0.062	140	108	128	127	104	121	0.12	138	139	142	140	138	140	0.012	139	0.012	145	137	146	145	155	143	0.029	146	0.044
Total dissolved solids	mg/L	-	-	-	277	263	265	255	242	260	0.05	197	134	149	154	110	149	0.21	205	208	206	236	217	214	0.07	214	0.061	230	231	232	238	196	233	0.015	225	0.074
Total suspended solids	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1	0	<1.0	2.7	<1.0	1.8	4.4	2.0	0.72	<1.0	<1.0	<1.0	<1.0	<1.0	<1	0	<1	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1	0	<1	0.0
Total organic carbon	mg/L	-	-	-	0.71	0.79	<0.5	0.59	0.82	0.63	0.21	0.77	2.6	2.3	2.3	1.9	2.0	0.36	0.84	0.63	0.66	0.62	<0.5	0.69	0.15	0.6	0.2	1.0	1.1	0.99	<0.5	<0.5	0.84	0.33	0.72	0.414
Dissolved organic carbon	mg/L	-	-	-	0.67	0.55	0.53	0.57	0.82	0.63	0.19	0.94	2.7	1.7	1.9	1.9	1.8	0.34	0.72	0.66	0.69	0.61	<0.5	0.67	0.07	0.59	0.15	0.81	0.95	0.76	<0.5	<0.5	0.69	0.27	0.6	0
Turbidity	NTU	-	-	-	0.45	1.7	0.13	<0.1	0.31	0.53	1.3	0.68	1.9	0.21	0.48	1.9	1.0	0.78	0.24	0.31	0.18	0.16	0.12	0.22	0.3	0.2	0.4	0.14	0.18	0.64	0.13	<0.1	0.27	0.9	0.23	1.0
Conductivity	µS/cm	-	-	-	428	406	411	427	361	407	0.067	343	235	281	262	208	266	0.19	320	336	348	349	341	338	0.04	339	0.035	333	362	369	372	389	359	0.05	365	0.056
Oxidation-reduction potential	mV	-	-	-	428	432	393	459	433	429	0.055	470	417	411	429	439	433	0.054	450	297	472	301	291	380	0.247	362	0.25	503	478	401	489	441	468	0.098	462	0.09
Acidity To pH 8.3, as $CaCO_3$	mg/L	-	-	-	1.4	1.7	1.3	1.7	<1.0	1.3	0.22	<1.0	2.6	<1.0	2.3	<1.0	1.3	0.63	1.5	<1.0	<1.0	<1.0	<1.0	0.75	0.33	0.7	0.32	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0.0
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	154	157	140	144	136	146	0.062	140	108	126	122	104	120	0.12	138	139	142	139	136	140	0.012	139	0.016	145	137	146	145	155	143	0.029	146	0.044
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	1.8	4.2	<1.0	1.5	0.92	<1.0	<1.0	<1.0	1.2	1.6	0.68	0	0.86	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0.0
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																			
Bromide	mg/L	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0
Calcium	mg/L	-	-	-	55	61	57	56	53	56	0.05	44	37	40	40	28	38	0.16	46	47	48	47	50	47	0.021	47	0.036	56	54	50	52	57	53	0.049	54	0.056
Chloride	mg/L	150	600	-	0.71	0.69	0.83	0.71	0.53	0.69	0.15	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.0	<0.5	0.0	<0.5	<0.5	0.52	0.61	<0.5	0.41	0.13	0.38	0
Fluoride	mg/L	-	1.3 - 1.7[(d)]	-	0.37	0.37	0.37	0.37	0.45	0.39	0.09	0.35	0.21	0.25	0.21	0.20	0.24	0.27	0.33	0.30	0.30	0.32	0.33	0.31	0.045	0.32	0.043	0.37	0.27	0.39	0.25	0.35	0.32	0.232	0.32	0.2
Magnesium	mg/L	-	-	-	19	20	20	18	17	19	0.071	14	9.0	11	9.9	7.6	10	0.23	14	15	15	16	15	15	0.056	15	0.051	16	15	17	16	16	16	0.049	16	0.043
Potassium	mg/L	-	-	-	0.39	0.39	0.42	0.39	0.39	0.39	0.031	0.34	0.28	0.32	0.30	0.24	0.29	0.13	0.34	0.38	0.36	0.36	0.36	0.36	0.046	0.36	0.04	0.37	0.36	0.36	0.39	0.38	0.37	0.037	0.37	0.037
Sodium	mg/L	-	-	-	1.2	1.3	1.3	1.3	1.1	1.2	0.057	0.80	0.47	0.69	0.53	0.36	0.57	0.31	0.72	0.82	0.82	0.81	0.74	0.79	0.064	0.78	0.063	0.95	0.93	1.0	1.1	1.1	1.0	0.071	1.0	0.068
Sulphate	mg/L	309 - 429[(b, c)]	-	309 - 481[(b)]	82	84	84	78	68	79	0.086	46	12	20	15	8.6	20	0.73	41	45	48	52	50	46	0.099	47	0.092	61	61	65	67	65	63	0.05	63	0.044
Major anion sum	meq/L	-	-	-	4.8	4.9	4.6	4.6	4.2	4.6	0.064	3.8	2.4	3.0	2.9	2.3	2.9	0.2	3.7	3.7	3.9	3.9	3.8	3.8	0.03	3.8	0.026	4.2	4.0	4.3	4.3	4.5	4.2	0.032	4.3	0.04
Major cation sum	meq/L	-	-	-	4.4	4.7	4.5	4.3	4.1	4.4	0.053	3.4	2.6	2.7	2.9	2.1	2.7	0.17	3.5	3.6	3.7	3.6	3.8	3.6	0.03	3.6	0.036	4.1	4.0	3.9	3.9	4.3	4.0	0.022	4.0	0.034
Nutrients																																			
Nitrate	mg-N/L	3.0	33	1.5 - 3.5[(d)]	0.15	0.13	0.14	0.13	0.14	0.14	0.054	0.059	0.12	0.081	0.099	0.15	0.1	0.35	0.12	0.100	0.090	0.096	0.12	0.1	0.119	0.1	0.126	0.13	0.12	0.15	0.15	0.14	0.14	0.097	0.14	0.09
Nitrite	mg-N/L	0.020[(e)]	0.060[(e)]	-	<0.001	<0.001	0.0011	<0.001	<0.001	0.00062	0.07	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	<0.001	<0.001	0.0015	<0.001	0.00075	0.33	0.0007	0.32	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0	<0.001	0.0
Total ammonia	mg-N/L	0.32 - 2.1[(f)]	1.7 - 22[(g)]	-	0.0050	<0.005	<0.005	0.063	0.046	0.024	1.2	<0.005	0.017	0.0089	0.0076	<0.005	0.0077	0.63	0.0053	<0.005	<0.005	0.010	0.0072	0.0052	0.5	0.0056	0.4	0.015	0.012	<0.005	<0.005	0.0081	0.0078	0.6	0.0079	0.53
Total Kjeldahl nitrogen	mg-N/L	-	-	-	<0.05	<0.05	<0.05	0.12	0.17	0.073	0.76	<0.05	0.11	0.063	<0.05	0.18	0.08	0.67	<0.05	<0.05	0.057	0.12	<0.05	0.058	0.62	0.051	0.63	0.054	0.059	<0.05	<0.05	<0.05	0.041	0.1	0.038	0.11
Orthophosphate	mg-P/L	0.0038	0.0032	0.00229	0.0029	0.0047	0.0035	0.22	0.0019	0.0018	0.0016	0.0023	0.0022	0.002	0.15	0.0016	0.0016	0.0014	0.0018	0.0017	0.0016	0.09	0.0018	0.0020	0.0018	0.0022	0.0019	0.002	0.31	0.0019	0.09
Phosphorus	mg-P/L	-	-	-	0.0034	0.0040	0.0034	0.0025	0.0057	0.0038	0.31	0.0022	0.0065	0.0041	0.0042	0.0065	0.0046	0.41	0.0037	<0.002	<0.002	<0.002	<0.002	0.0017	0.51	0.0015	0.49	<0.002	<0.002	0.0033	0.0025	<0.002	0.002	0.31	0.0021	0
Total Metals																																			
Aluminum	mg/L	-	-	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	0.0032	0.026	0.0075	0.014	0.037	0.018	0.79	<0.003	0.0032	<0.003	0.0033	<0.003	0.0024	0	0.0022	0.14	0.0045	0.014	0.015	<0.003	<0.003	0.0087	1	0.0073	0.83
Antimony	mg/L	0.0090	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Arsenic	mg/L	-	0.0050	-	<0.0001	<0.0001	0.00011	0.00011	<0.0001	0.000074	0.07	0.00011	0.00014	0.00014	0.00013	0.00017	0.00014	0.16	0.00011	0.00010	0.00012	0.00010	0.00012	0.00011	0.09	0.00014	0.12	0.00014	0.00012	0.00010	<0.0001	0.0001	0.0001	0.19	0.0001	0.18
Barium	mg/L	1.0	-	-	0.048	0.048	0.046	0.053	0.042	0.048	0.084	0.035	0.024	0.030	0.025	0.021	0.027	0.2	0.038	0.039	0.042	0.040	0.039	0.04	0.041	0.04	0.036	0.040	0.043	0.044	0.039	0.044	0.042	0.055	0.042	0.055
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	1.2	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Cadmium	mg/L	0.00015	0.00139	-	0.000015	0.000015	0.000015	0.000015	0.000015	0.000015	0	0.000013	0.000025	0.000013	0.000015	0.000024	0.000018	0.32	0.000015	0.000024	0.000013	0.000016	0.000015	0.000017	0.27	0.000017	0.23	0.000014	0.000015	0.000016	0.000013	0.000012	0.000014	0.1	0.000014	0.12
Calcium	mg/L	-	-	-	60	56	58	62	52	58	0.07	45	34	38	41	32	38	0.14	46	49	49	49	48	48	0.035	48	0.031	51	55	58	55	55	55	0.054	55	0.047
Chromium	mg/L	0.0010[(h)]	-	-	0.00021	0.00015	0.00013	0.00016	0.00014	0.00016	0.2	0.00015	0.00018	0.00016	0.00020	0.00024	0.00019	0.19	0.00020	0.00019	0.00023	0.00021	<0.0003	0.00021	0.08	0.0002	0.22	0.00016	0.00020	0.00019	0.00019	0.00015	0.00019	0.09	0.00018	0.122
Cobalt	mg/L	0.0040	0.11	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Copper	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Iron	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0.022	<0.01	0.013	0.031	0.015	0.6	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	0.013	0.018	<0.01	<0.01	0.01	0	0.0092	0
Lead	mg/L	0.0066 - 0.013[(b)]	0.084 - 0.24[(b)]	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Lithium	mg/L	-	-	-	0.0048	0.0044	0.0044	0.0047	0.0047	0.0046	0.041	0.0030	0.0016	0.0018	0.0017	0.0011	0.0018	0.38	0.0029	0.0028	0.0029	0.0032	0.0029	0.003	0.059	0.0029	0.052	0.0035	0.0039	0.0042	0.0039	0.0042	0.0039	0.074	0.0039	0.073
Magnesium	mg/L	-	-	-	18	18	18	19	17	18	0.055	14	8.7	11	10	7.8	10	0.23	14	15	15	16	15	15	0.049	15	0.042	17	17	17	17	18	17	0.023	17	0.041
Manganese	mg/L	1.1 - 1.6[(b)]	1.7 - 3.1[(b)]	-	<0.0001	<0.0001	<0.0001	0.00018	<0.0001	0.000076	0.47	0.00013	0.0013	0.00026	0.00070	0.0014	0.00076	0.77	0.00017	0.00013	0.00014	0.00019	0.00015	0.00016	0.17	0.00016	0.15	0.00069	0.00045	0.0012	0.00016	<0.0001	0.00063	0.72	0.00052	0.88
Mercury	mg/L	0.000010	-	-	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0	<0.0000005	0.0000011	0.00000062	0.00000070	0.0000012	0.00000076	0.38	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0	<0.0000005	0	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0	<0.0000005	0
Molybdenum	mg/L	1.0	2.0	-	0.0014	0.0013	0.0014	0.0013	0.0012	0.0013	0.048	0.0010	0.00051	0.00075	0.00067	0.00045	0.00068	0.33	0.0012	0.0012	0.0012	0.0012	0.0012	0.0012	0.03	0.0012	0.027	0.0012	0.0024	0.0013	0.0013	0.0015	0.0016	0.363	0.0015	0.32
Nickel	mg/L	0.005[(i)]	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Potassium	mg/L	-	-	-	0.40	0.42	0.39	0.43	0.39	0.41	0.044	0.34	0.26	0.30	0.28	0.25	0.28	0.12	0.33	0.36	0.35	0.36	0.36	0.35	0.041	0.35	0.036	0.35	0.41	0.40	0.37	0.37	0.38	0.071	0.38	0.062
Selenium	mg/L	0.0020	-	0.019	0.0019	0.0016	0.0016	0.0017	0.0015	0.0017	0.093	0.0013	0.00050	0.00090	0.00056	0.00049	0.00075	0.46	0.0013	0.0013	0.0013	0.0014	0.0015	0.0013	0.033	0.0013	0.075	0.0016	0.0015	0.0015	0.0016	0.0016	0.0016	0.035	0.0016	0.03
Silicon	mg/L	-	-	-	2.3	2.1	2.0	2.4	2.2	2.2	0.07	1.9	1.5	1.8	1.7	1.6	1.7	0.094	2.0	2.2	2.1	2.1	2.0	2.1	0.027	2.1	0.029	2.0	2.2	2.3	2.1	2.3	2.1	0.055	2.2	0.058
Silver	mg/L	0.0015[(b)]	0.0030[(b)]	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Sodium	mg/L	-	-	-	1.2	1.2	1.1	1.4	1.1	1.2	0.094	0.80	0.49	0.61	0.51	0.36	0.55	0.3	0.72	0.80	0.85	0.81	0.72	0.8	0.069	0.78	0.075	0.94	1.1	1.1	1.0	1.1	1.0	0.059	1.0	0.055
Strontium	mg/L	-	-	-	0.20	0.20	0.18	0.20	0.18	0.19	0.048	0.15	0.073	0.097	0.089	0.059	0.093	0.37	0.14	0.14	0.15	0.15	0.15	0.14	0.041	0.14	0.04	0.16	0.17	0.17	0.17	0.18	0.17	0.024	0.17	0.036
Thallium	mg/L	0.00080	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0.0
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	-	-	-	0.0017	0.0018	0.0018	0.0017	0.0017	0.0017	0.033	0.0013	0.00072	0.00096	0.00085	0.00051	0.00087	0.35	0.0013	0.0017	0.0015	0.0017	0.0017	0.0016	0.109	0.0016	0.10	0.0017	0.0017	0.0016	0.0017	0.0018	0.0017	0.043	0.0017	0.039
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Zinc	mg/L	0.017 - 0.11	0.042 - 0.14	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	0.0065	0.010	<0.003	<0.003	0.0035	0.0033	0.05	0.63	<0.003	0.0058	<0.003	<0.003	<0.003	0.0026	1	0.0024	1	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0
Dissolved Metals																																			
Aluminum	mg/L	0.050[(j)]	0.10[(j)]	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0.0040	<0.003	<0.003	0.0032	0.0023	0.19	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0
Antimony	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Arsenic	mg/L	-	-	-	0.00013	0.00014	0.00011	0.00011	0.00011	0.00012	0.12	0.00011	0.00013	0.00011	0.00012	0.00011	0.00012	0.077	0.00013	0.00011	0.00011	0.00010	0.00010	0.00011	0.11	0.00011	0.11	0.00011	0.00012	<0.0001	<0.0001	0.0001	0.000083	0.12	0.000076	0
Barium	mg/L	-	-	-	0.047	0.051	0.049	0.050	0.046	0.049	0.046	0.036	0.027	0.030	0.027	0.020	0.028	0.21	0.038	0.040	0.043	0.041	0.039	0.04	0.043	0.04	0.041	0.042	0.040	0.044	0.043	0.043	0.042	0.04	0.042	0.036
Beryllium	mg/L	-	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2							Q3							Q4						
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia and P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19 (*H. azteca*)		Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia and P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia and P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia and P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV	Mean	CV						Mean	CV						Mean	CV	Mean	CV						Mean	CV	Mean	CV
Field Measured																																							
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.0	8.0	8.0	8.4	8.2	8.1	0.02	8.1	0.02	8.3	8.3	8.2	8.2	8.1	8.2	0.01	8.2	8.2	8.2	8.3	8.3	8.2	0.01	8.2	0.01	8.2	8.4	8.1	8.1	8.2	0.02	8.2	0.015
Temperature	°C	-	-	-	-0.1	0.10	0	0	1.5	0.038	1.5	0.33	2.0	6.6	5.8	3.8	4.5	6.9	5.5	0.24	8.7	8.9	9.2	8.7	7.9	8.9	0.0	8.7	0.1	-0.1	1.9	-0.1	-0.1	-0.1	0.51	1.8	0.42	1.9
Conventional Parameters																																							
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.0	8.1	8.1	8.3	8.2	8.1	0.015	8.1	0.014	8.4	8.2	8.2	8.4	8.3	8.3	0.012	8.4	8.2	8.4	8.4	8.3	8.4	0.012	8.3	0.011	8.3	8.3	8.3	8.2	8.2	8.3	0.006	8.3	0.0066
Hardness, as $CaCO_3$	mg/L	-	-	-	2,680	2,590	2,470	689	544	2107	0.45	1795	0.6	478	259	402	285	247	334	0.3	403	432	476	481	461	448	0.08	451	0.07	709	652	748	1,150	809	815	0.28	814	0.24
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	-	403	431	409	213	181	364	0.28	327	0.37	194	138	176	158	142	162	0.15	193	196	193	204	198	197	0.03	197	0.02	237	205	245	288	238	244	0.14	243	0.12
Total dissolved solids	mg/L	-	-	-	3,470	3,540	3,490	829	617	2,832	0.47	2,389	0.64	661	315	491	345	280	418	0.38	476	562	579	626	626	561	0.11	574	0.11	1,010	891	1,010	1,470	1,050	1,095	0.23	1,086	0.2
Total suspended solids	mg/L	-	-	-	3.0	5.0	2.5	9.9	3.7	5.1	0.66	4.8	0.62	<1.0	40	2.0	6.3	9.3	12	1.4	1.2	1.9	<1.0	<1.0	<1.0	0.42	0.92	0.42	1.9	2.1	<1.0	<1.0	1.3	0.47	1.1	0.5
Total organic carbon	mg/L	-	-	-	1.8	1.4	1.5	1.5	2.4	1.5	0.15	1.7	0.26	1.6	1.4	1.3	1.1	0.87	1.2	0.24	0.98	0.93	0.72	0.95	0.77	0.9	0.13	0.87	0.13	1.1	1.1	0.66	1.8	0.54	1.2	0.4	1.0	0.47
Dissolved organic carbon	mg/L	-	-	-	2.0	1.6	1.4	1.3	2.2	1.6	0.19	1.7	0.23	1.2	1.1	1.3	1.2	0.87	1.1	0.14	0.92	0.88	0.69	0.97	0.75	0.87	0.14	0.84	0.14	0.94	0.86	<0.5	1.4	1.32	0.87	0.44	0.96	0.39
Turbidity	NTU	-	-	-	0.75	0.47	0.18	10	8.0	2.9	1.7	3.9	1.2	1.2	12	0.56	1.3	5.8	4.2	1.2	0.62	0.30	0.30	0.32	0.22	0.39	0.4	0.35	0.4	0.25	0.43	0.48	0.46	0.31	0.41	0.3	0.39	0.26
Conductivity	µS/cm	-	-	-	3,460	3,480	3,360	1,150	829	2,863	0.4	2,456	0.55	917	427	727	574	474	624	0.32	708	742	800	846	791	774	0.08	777	0.07	1,080	1,060	1,230	1,660	1,310	1,258	0.22	1,268	0.19
Oxidation-reduction potential	mV	-	-	-	453	421	420	464	416	440	0.051	435	0.051	409	451	441	308	391	400	0.14	341	431	383	468	459	406	0.137	416	0.129	388	407	411	443	446	412	0.055	419	0.059
Acidity To pH 8.3, as $CaCO_3$	mg/L	-	-	-	14	13	14	1.2	1.0	10	0.59	8.4	0.8	<1.0	2.0	1.4	1.9	<1.0	1.3	0.38	<1.0	1.3	<1.0	<1.0	<1.0	0.7	0.21	0.66	0.2	<1.0	<1.0	2.5	3.1	3.3	1.7	0.65	2.0	0.56
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	403	431	409	213	181	364	0.28	327	0.37	187	138	176	154	140	159	0.14	187	196	188	199	198	193	0.03	194	0.03	233	205	245	288	238	243	0.14	242	0.12
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<0.5	0	6.8	<1.0	<1.0	3.8	2.0	2.7	0.9	6.0	<1.0	5.2	4.8	<1.0	4.1	1	3.4	1	4.0	<1.0	<1.0	<1.0	<1.0	1.4	1	1.2	1.1
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<0.5	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																							
Bromide	mg/L	-	-	-	<0.5	<0.25	<0.25	<0.05	<0.05	<0.13	1.4	<0.11	1.69	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0	<0.05	0.0	<0.25	<0.05	<0.25	<0.25	<0.25	<0.1	1.0	<0.11	0.85
Calcium	mg/L	-	-	-	440	423	392	143	120	350	0.4	304	0.52	102	64	89	66	59	76	0.24	91	99	109	107	105	102	0.08	102	0.07	139	137	150	210	178	159	0.22	163	0.19
Chloride	mg/L	150	600	-	6.6	6.8	6.7	2.0	1.1	5.5	0.43	4.6	0.62	1.2	<0.5	0.70	<0.5	<0.5	0.53	0.56	0.71	0.83	0.92	0.93	0.92	0.85	0.12	0.86	0.11	<2.5	2.1	<2.5	<2.5	<2.50	1.5	0.14	1.4	0.13
Fluoride	mg/L	-	1.7 - 2.7[28]	-	<0.2	<0.1	<0.1	0.11	0.16	0.078	0.63	0.095	0.48	0.19	0.22	0.21	0.19	0.20	0.2	0.072	0.22	0.22	0.20	0.20	0.22	0.21	0.06	0.21	0.05	0.24	0.14	0.19	0.17	0.10	0.18	0.24	0.17	0.22
Magnesium	mg/L	-	-	-	383	372	361	81	59	299	0.49	251	0.66	55	24	44	29	24	35	0.38	43	45	50	52	48	47	0.09	47	0.08	88	75	91	152	89	101	0.34	99	0.31
Potassium	mg/L	-	-	-	4.9	4.8	4.6	2.2	1.7	4.1	0.31	3.6	0.42	1.7	0.84	1.3	1.0	1.0	1.2	0.29	1.6	1.7	2.0	2.0	1.7	1.8	0.1	1.8	0.09	2.2	2.1	2.5	3.0	2.7	2.4	0.17	2.5	0.15
Sodium	mg/L	-	-	-	2.3	2.0	2.2	2.4	1.5	2.2	0.077	2.1	0.174	1.6	0.82	1.3	1.0	0.91	1.1	0.27	1.4	1.5	1.5	1.6	1.5	1.5	0.064	1.5	0.056	2.0	1.8	2.1	2.9	2.1	2.2	0.21	2.2	0.18
Sulphate	mg/L	429[b, c]	-	481[d]	**1,910**[(bh, E)]	**1,970**[(bh, E)]	**2,070**[(bh, E)]	371	247	**1,580**[(bh, E)]	0.51	**1,314**[(bh, E)]	0.7	271	104	186	117	83	152	0.5	176	204	227	234	231	210	0.12	214	0.11	**483**[(bh, E)]	357	**476**[(bh)]	**733**[(bh, E)]	**458**[(bh)]	**512**[(bh, E)]	0.31	**501**[(bh, E)]	0.28
Major anion sum	meq/L	-	-	-	50	50	54	13	9.6	42	0.46	35	0.62	10	5.2	8.2	6.1	5.0	7.0	0.33	8.1	8.8	9.3	9.7	9.5	9.0	0.08	9.1	0.07	16	13	16	23	15.6	17	0.25	17	0.22
Major cation sum	meq/L	-	-	-	54	52	50	14	11	42	0.45	36	0.6	9.7	5.2	8.1	5.8	5.0	6.8	0.3	8.2	8.7	9.6	9.7	9.3	9.1	0.08	9.1	0.07	14	13	15	23	16.3	16	0.28	16	0.24
Nutrients																																							
Nitrate	mg-N/L	3.0	33	7.5 - 15[d]	**29**[(bh, E)]	**30**[(bh, E)]	**31**[(bh, E)]	**17**[(bh, E)]	**10**[(bh)]	**27**[(bh, E)]	0.24	**29**[(bh, E)]	0.4	**12**[(bh)]	**4.0**[(bh)]	**10**[(bh)]	**6.4**[(bh)]	**6.3**[(bh)]	**7.2**[(bh, E)]	0.41	**7.9**[(bh)]	**8.7**[(bh)]	**9.6**[(bh)]	**9.9**[(bh)]	**9.2**[(bh)]	**9.0**[(bh)]	0.1	**9.1**[(bh)]	0.09	**17**[(bh, E)]	**14**[(bh)]	**17**[(bh, E)]	**21**[(bh, E)]	**19**[(bh, E)]	**17**[(bh, E)]	0.17	**18**[(bh, E)]	0.15
Nitrite	mg-N/L	0.020 - 0.080[(bf)]	0.060 - 0.24[(e)]	-	0.013	0.026	<0.005	0.010	0.0072	0.013	0.68	0.012	0.69	0.0086	0.0020	0.0013	0.0012	0.0018	0.003	1.1	0.0064	0.0088	0.017	**0.021**[(bh)]	0.016	0.013	0.52	0.014	0.44	0.011	0.0099	0.011	0.015	0.020	0.012	0.18	0.013	0.3
Total ammonia	mg-N/L	0.30 - 1.8[f]	1.6 - 9.3[(g)]	-	0.0078	0.012	0.019	0.013	0.011	0.013	0.35	0.013	0.31	0.036	0.014	0.019	0.012	0.0098	0.018	0.59	0.041	0.016	0.060	0.056	0.033	0.043	0.46	0.041	0.43	0.059	0.019	0.029	0.021	0.129	0.032	0.58	0.052	0.9
Total Kjeldahl nitrogen	mg-N/L	-	-	-	<0.05	0.16	<0.05	0.41	0.38	0.16	1.1	0.2	0.9	0.36	0.56	<0.05	0.080	0.10	0.23	0.99	0.066	0.11	1.1	<0.25	0.070	0.36	1.4	0.3	1.5	<0.05	<0.05	<0.05	<0.05	<0.050	<0.05	0.0	<0.05	0
Orthophosphate	mg-P/L	-	-	-	0.0030	0.0012	0.0015	0.0016	0.0032	0.0018	0.44	0.0021	0.44	<0.001	<0.001	<0.001	<0.001	<0.001	<0.0005	0	<0.001	0.0019	<0.001	<0.001	0.0011	0.00085	0.53	0.0009	0.44	<0.001	<0.001	<0.001	<0.001	0.0011	<0.001	0.0	0.00062	0.072
Phosphorus	mg-P/L	-	-	-	0.0028	0.0048	0.0027	0.011	0.0075	0.0054	0.76	0.0058	0.63	0.0024	0.041	0.0051	0.0092	0.013	0.014	1.1	0.0050	0.0026	0.0020	<0.002	<0.002	<0.002	0.027	0.54	0.0023	0.56	0.0021	0.0022	<0.002	<0.002	0.003	0.0016	0.06	0.0018	0.12
Total Metals																																							
Aluminum	mg/L		-	-	<0.006	<0.006	<0.003	0.072	0.10	0.02	1.7	0.037	1.3	0.014	0.24	0.014	0.053	0.065	0.077	1.2	0.0047	0.0038	0.0082	0.0046	<0.003	0.0053	0.4	0.0046	0.4	0.0034	0.015	0.0034	0.0043	0.004	0.0065	0.9	0.0061	0.81
Antimony	mg/L	0.0090	-	-	0.00045	0.00048	0.00047	0.00032	0.00027	0.00043	0.17	0.0004	0.24	0.00037	0.00017	0.00020	0.00019	0.00014	0.00021	0.42	0.00024	0.00030	0.00029	0.00031	0.00028	0.00029	0.11	0.00028	0.1	0.00034	0.00030	0.00036	0.00041	0.00035	0.00035	0.13	0.00035	0.11
Arsenic	mg/L		0.0050	-	<0.0002	<0.0002	0.00023	0.00016	0.00020	0.00015	0.19	0.00016	0.16	0.00013	0.00003	0.00011	0.00012	0.00014	0.00017	0.46	0.00011	0.00012	0.00010	0.00013	0.00012	0.00012	0.11	0.00012	0.1	0.00012	0.0001	<0.0001	0.00019	0.00014	0.00012	0.35	0.00012	0.29
Barium	mg/L	1.0	-	-	0.019	0.021	0.020	0.083	0.072	0.036	0.88	0.043	0.74	0.069	0.051	0.057	0.049	0.041	0.053	0.2	0.065	0.071	0.079	0.085	0.075	0.075	0.11	0.075	0.1	0.071	0.072	0.076	0.073	0.081	0.073	0.03	0.075	0.056
Beryllium	mg/L	0.00013	-	-	<0.00004	<0.00004	<0.00002	<0.00002	<0.00002	<0.00015	0.77	<0.00014	0.78	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.0	<0.00002	0
Bismuth	mg/L		-	-	<0.0001	<0.0001	<0.00005	<0.00005	<0.00005	<0.00038	0.77	<0.000035	0.78	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0.0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0	<0.00005	0
Boron	mg/L		-	-	<0.02	<0.01	<0.02	0.010	<0.01	0.0088	0.66	0.008	0.68	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0.011	0.011	0.011	<0.01	0.0095	0.05	0.0086	0.06	<0.01	0.010	0.011	0.011	0.01	0.0093	0.06	0.0096	0.057
Cadmium	mg/L	0.00041 - 0.00046[(bl)]	0.0015 - 0.0028[(bl)]	0.00029 - 0.00032[(k)]	<0.00001	0.00010	<0.00001	0.00038	0.00058	0.00014	1.0	0.00023	0.9	0.00043	0.00034	0.00032	0.00025	0.00023	0.00031	0.25	0.00042	0.00037	0.00044	0.00043	0.00036	0.00041	0.1	0.00044	0.1	<0.00005	0.00049	0.0000075	0.00016	0.000053	0.00032	1.0	0.000036	0.8
Chromium	mg/L		-	-	<0.0002	<0.0001	<0.0002	<0.0001	<0.0001	<0.00075	0.77	<0.00007	0.78	0.00012	0.00012	<0.0001	<0.0001	<0.0003	0.000098	0.87	<0.0001	<0.0001	<0.0001	<0.0001	0.00011	<0.0001	0.000065	0.08	0.000062	0.07	<0.0001	0.00012	<0.0001	<0.0001	<0.0001	0.000068	0.15	0.000064	0.14
Cobalt	mg/L		-	-	<0.0002	<0.0001	<0.0002	0.00015	0.00019	0.00010	0.48	0.00012	0.37	0.00017	<0.0001	<0.0001	<0.0001	<0.0001	0.000074	0.42	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0	<0.0001	0.0	<0.0001	0.00011	0.00012	0.00012	0.0002	0.0001	0.1	0.00011	0.17
Copper	mg/L	0.0002 - 0.0014[(f)]	0.001 - 0.0085[(f)]	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.00025	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0002	0.00023	<0.0002	0.00029	0.0003	0.00018	0	0.0002	0.23
Iron	mg/L		-	0.35	<0.02	<0.01	<0.02	<0.01	<0.01	<0.0075	0.77	<0.007	0.78	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	<0.01	0.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	<0.01	0
Lead	mg/L		-	-	<0.0001	<0.00005	<0.0001	<0.00005	<0.00005	<0.00038	0.77	<0.000035	0.78	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0	<0.00005	0.0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0	<0.00005	0
Lithium	mg/L		-	-	0.074	0.071	0.073	0.055	0.032	0.068	0.14	0.061	0.3	0.030	0.013	0.023	0.017	0.015	0.019	0.36	0.024	0.028	0.030	0.030	0.029	0.028	0.11	0.028	0.1	0.042	0.038	0.045	0.059	0.056	0.046	0.2	0.048	0.19
Manganese	mg/L		-	-	0.00053	0.00014	0.00033	0.014	0.010	0.0038	1.8	0.0051	1.3	0.0049	0.0020	0.0028	0.0015	0.0018	0.0026	0.54	0.0027	0.0033	0.0025	0.0032	0.0033	0.0029	0.1	0.003	0.1	0.0017	0.0066	0.0057	0.0050	0.0090	0.0048	0.4	0.0056	0.47
Mercury	mg/L		-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.0000025	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0
Molybdenum	mg/L		-	-	0.0031	0.0029	0.0029	0.0019	0.0016	0.0027	0.21	0.0025	0.27	0.0017	0.00084	0.0013	0.0011	0.00093	0.0012	0.29	0.0014	0.0014	0.0016	0.0015	0.0016	0.0015	0.05	0.0015	0.06	0.0018	0.0017	0.0020	0.0024	0.0021	0.002	0.16	0.002	0.14
Nickel	mg/L		-	-	0.040	0.036	0.038	0.0060	0.0055	0.03	0.54	0.025	0.71	0.0078	0.0022	0.0033	0.0025	0.0012	0.0034	0.76	0.0034	0.0033	0.0038	0.0042	0.0040	0.0037	0.11	0.0037	0.1	0.0086	0.0074	0.0089	0.016	0.0091	0.01	0.39	0.01	0.35
Selenium	mg/L		-	-	0.65	0.77	0.66	0.11	0.076	0.55	0.54	0.45	0.73	0.068	0.022	0.049	0.032	0.022	0.038	0.52	0.051	0.056	0.061	0.065	0.062	0.058	0.11	0.059	0.1	0.12	0.098	0.14	0.27	0.145	0.16	0.47	0.15	0.42
Silicon	mg/L		-	-	2.7	2.7	2.7	1.9	2.0	2.5	0.16	2.4	0.17	1.4	1.5	1.6	1.5	1.5	1.5	0.043	1.8	2.0	2.2	2.0	1.8	2.0	0.08	1.9	0.08	1.9	2.4	2.0	2.0	2.0	0.13	2.0	0.12
Silver	mg/L		-	-	<0.00002	<0.00001	<0.00002	<0.00002	<0.00001	<0.00001	0.77	<0.000007	0.78	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0	<0.00001	0.0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0	<0.00001	0
Strontium	mg/L		-	-	0.27	0.25	0.25	0.18	0.16	0.24	0.16	0.22	0.22	0.14	0.095	0.12	0.11	0.088	0.11	0.17	0.13	0.14	0.16	0.15	0.15	0.14	0.09	0.14	0.08	0.16	0.17	0.18	0.21	0.19	0.18	0.14	0.18	0.12
Thallium	mg/L		-	-	0.000041	0.000032	0.000035	<0.00001	<0.00001	0.000028	0.48	0.000024	0.62	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0	<0.00001	0.0	0.000012	0.000012	0.000013	0.000017	0.00001	0.000014	0.18	0.000014	0.15
Tin	mg/L		-	-	<0.0002	<0.0001	<0.0002	<0.0001	<0.0001	<0.00075	0.77	<0.00007	0.78	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0	<0.0001	0.0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0	<0.0001	0
Titanium	mg/L		-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.005	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L		-	-	0.020	0.020	0.020	0.0048	0.0033	0.016	0.47	0.014	0.64	0.0032	0.0014	0.0023	0.0018	0.0015	0.002	0.36	0.0027	0.0030	0.0029	0.0032	0.0029	0.0029	0.07	0.0029	0.06	0.0050	0.0047	0.0057	0.0081	0.0057	0.0059	0.26	0.0059	0.23
Vanadium	mg/L		-	-	<0.001	<0.0005	<0.001	<0.0005	<0.0005	<0.00038	0.77	<0.00035	0.78	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0	<0.0005	0.0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.0	<0.0005	0
Zinc	mg/L		0.13 - 0.19	0.15 - 0.34	<0.002	0.0012	<0.002	<0.001	0.0016	0.00093	0.57	0.0011	0.43	<0.001	<0.001	0.0011	<0.001	<0.001	<0.001	0.072	0.0011	<0.001	0.0010	0.0015	0.0011	0.001	0.23	0.001	0.2	<0.001	0.0017	<0.001	0.0037	0.0027	0.0016	0.8	0.0018	0.64
Dissolved Metals																																							
Aluminum	mg/L	0.050[j]	0.10[j]	-	<0.003	<0.003	<0.003	<0.003	0.0037	<0.003	0	0.0019	0	<0.003	0.0035	<0.003	<0.003	<0.003	0.0019	0.12	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0
Antimony	mg/L	-	-	-	0.00048	0.00045	0.00047	0.00028	0.00027	0.00042	0.22	0.00039	0.27	0.00034	0.00014	0.00020	0.00016	0.00013	0.00019	0.44	0.00023	0.00024	0.00029	0.00026	0.00028	0.00026	0.1	0.00026	0.1	0.00029	0.00029	0.00035	0.00039	0.00034	0.00033	0.15	0.00033	0.13
Arsenic	mg/L	-	-	-	<0.0002	0.00016	<0.0002	0.00010	0.00013	0.00012	0.41	0.00012	0.37	<0.0001	0.00011	0.00011	<0.0001	<0.0001	0.000074	0.074	0.00012	0.00011	0.00011	0.00010	<0.0001	0.00011	0.07	0.000098	0.09	0.00011	<0.0001	<0.0001	0.00012	0.0001	0.000083	0.12	0.00009	0.11
Barium	mg/L	-	-	-	0.017	0.020	0.019	0.083	0.076	0.035	0.93	0.043	0.78	0.069	0.043	0.060	0.045	0.042	0.052	0.24	0.064	0.072	0.087	0.088	0.080	0.078	0.15	0.078	0.13	0.068	0.074	0.075	0.071	0.080	0.072	0.04	0.073	0.06
Beryllium	mg/L	-	-	-	<0.00004	<0.00002	<0.00004	<0.00002	<0.00002	<0.00015	0.77	<0.00014	0.78	<0.00002	<0.00002	<0.00002

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2						Q3							Q4								
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia and P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19 (*H. azteca*)		Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia and P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia and P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia and P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV	Mean	CV						Mean	CV						Mean	CV	Mean	CV						Mean	CV	Mean	CV
Field Measured																																							
pH	-	6.5 - 9.0	6.5 - 9.0	-	7.9	8.1	8.1	8.1	8.1	8.1	0.01	8.1	0.01	7.9	8.1	8.0	8.0	8.0	8.0	0.01	8.0	8.1	8.0	7.9	8.0	8.0	0.01	8.0	0.01	8.0	8.0	8.1	8.0	0.0	8.0	0.0056
Temperature	°C	-	-	-	0	0	1.8	2.2	2.9	1.0	1.2	1.4	1.0	4.3	4.7	3.4	4.2	5.7	4.5	0.2	7.9	6.5	7.5	7.0	6.9	7.2	0.1	7.2	0.1	0	3.3	0.20	2.8	1.2	1.6	1.1	1.5	1.0
Conventional Parameters																																							
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.1	8.1	8.1	8.1	8.1	0.0062	8.1	0.0055	8.3	8.2	8.4	8.3	8.2	8.3	0.0101	8.4	8.2	8.3	8.3	8.2	8.3	0.0098	8.3	0.0101	8.3	8.3	8.3	8.2	8.3	0.000	8.3	0.0054
Hardness, as $CaCO_3$	mg/L	-	-	-	657	634	644	665	715	650	0.021	663	0.047	568	396	492	391	302	430	0.238	481	518	557	552	539	527	0.067	529	0.059	548	613	590	595	601	587	0.047	589	0.042
Total alkalinity, as $CaCO_3$	mg/L	20[a]			243	249	235	238	221	241	0.025	237	0.044	223	165	201	176	156	184	0.149	221	228	224	239	236	228	0.035	230	0.034	240	228	239	242	242	237	0.027	238	0.025
Total dissolved solids	mg/L	-	-	-	909	896	927	802	777	884	0.063	862	0.079	824	487	598	488	340	547	0.328	629	648	672	703	760	663	0.048	682	0.075	756	793	753	758	772	765	0.025	766	0.022
Total suspended solids	mg/L	-	-	-	1.2	<1.0	1.2	<1.0	4.3	0.85	0.14	1.5	0.93	1.6	15	3.1	5.6	30	11	1.06	<1.0	1.8	1.2	3.1	13	1.7	0.57	3.9	1.29	35	<1.0	<1.0	1.1	<1.0	9.4	1.83	7.6	2.0
Total organic carbon	mg/L	-	-	-	0.63	<0.5	0.69	0.74	1.7	0.58	0.18	0.8	0.59	0.79	2.2	1.3	1.5	0.87	1.3	0.42	0.84	0.81	<0.5	<0.5	0.76	0.54	0.35	0.58	0.29	1.3	0.91	<0.5	1.0	<0.5	0.87	0.39	0.75	0.47
Dissolved organic carbon	mg/L	-	-	-	0.89	<0.5	0.53	0.73	1.6	0.6	0.3	0.8	0.56	0.65	1.4	1.4	1.4	0.92	1.1	0.3	0.84	0.61	0.51	<0.5	0.70	0.55	0.29	0.58	0.24	<0.5	0.52	<0.5	0.96	3.2	0.5	0.46	1.0	1.1
Turbidity	NTU	-	-	-	0.42	0.29	0.22	0.35	3.7	0.32	0.27	0.99	1.51	0.81	8.6	0.91	2.1	11	4.6	1.01	0.51	0.34	0.32	0.53	3.1	0.43	0.26	0.95	1.24	4.6	0.24	0.13	0.34	0.11	1.3	1.65	1.1	1.8
Conductivity	µS/cm	-	-	-	1,170	1,240	1,160	1,110	1,020	1,170	0.046	1,140	0.072	1,090	704	904	753	562	803	0.251	855	869	963	949	930	909	0.06	913	0.053	876	985	1,010	1,000	1,040	968	0.064	982	0.064
Oxidation-reduction potential	mv	-	-	-	410	456	462	386	476	429	0.086	438	0.087	437	453	459	355	342	409	0.137	464	445	476	477	400	466	0.032	452	0.071	316	398	455	427	444	402	0.154	410	0.14
Acidity To pH 8.3, as $CaCO_3$	mg/l	-	-	-	3.8	3.1	2.6	3.3	1.5	3.2	0.16	2.9	0.31	<1.0	<1.0	<1.0	<1.0	2.7	<1.0	0.94	0.81	1.6	3.1	<1.0	<1.0	1.4	1.4	0.7	1.4	0.61	<1.0	<1.0	1.3	1.4	2.1	0.93	0.22	1.2	0.39
Bicarbonate alkalinity, as $CaCO_3$	mg/l	-	-	-	243	249	235	238	221	241	0.025	237	0.044	223	165	195	172	156	182	0.148	216	228	221	237	236	226	0.04	228	0.04	240	225	239	242	242	237	0.033	238	0.03
Carbonate alkalinity, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	6.2	4.0	<1.0	2.3	1	5.4	<1.0	3.0	2.6	<1.0	2.9	1	2.4	1	<1.0	3.2	<1.0	<1.0	<1.0	1.2	1	1.0	0.95
Hydroxide alkalinity, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																							
Bromide	mg/L	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.05	<0.25	<0.1	1.0	<0.11	0.85	<0.25	<0.05	<0.05	<0.05	<0.05	1.99	<0.05	<0.05	<0.25	<0.25	<0.25	<0.075	1.54	<0.085	1.29	<0.25	<0.05	<0.25	<0.25	<0.25	<0.25	<0.1	1.0	<0.11	0.85
Calcium	mg/L	-	-	-	158	138	143	151	163	148	0.06	151	0.068	121	92	110	89	72	97	0.197	108	118	126	122	121	119	0.065	119	0.057	125	138	130	135	140	132	0.043	134	0.046
Chloride	mg/L	150	600	-	<2.5	<2.5	<2.5	2.1	<2.5	1.5	0.15	1.4	0.14	<2.5	0.89	1.2	0.80	<0.5	0.88	0.89	1.1	1.1	<2.5	<2.5	<2.5	1.2	0.68	1.2	0.64	<2.5	1.3	<2.5	<2.5	<2.5	1.3	0.49	1.3	0.43
Fluoride	mg/L	-	1.8 - 2.1[b]	-	0.14	<0.1	<0.1	0.091	0.14	0.083	0.26	0.094	0.25	0.15	0.20	0.17	0.15	0.18	0.17	0.12	0.19	0.19	0.19	0.17	0.20	0.19	0.06	0.19	0.06	0.18	0.11	0.11	<0.1	<0.1	0.11	0.32	0.1	0.34
Magnesium	mg/L	-	-	-	64	71	70	70	75	69	0.045	70	0.056	64	55	61	51	41	29	46	0.292	52	55	59	60	58	56	0.07	57	0.061	57	65	64	63	61	62	0.059	62	0.052
Potassium	mg/L	-	-	-	1.5	1.6	1.6	1.8	2.0	1.6	0.087	1.7	0.121	1.9	1.2	1.4	1.3	1.1	1.4	0.202	1.8	1.8	2.0	2.0	1.9	1.9	0.065	1.9	0.058	1.6	1.8	1.8	1.7	1.7	1.7	0.054	1.7	0.05
Sodium	mg/L	-	-	-	2.5	2.5	2.8	2.8	2.8	2.6	0.075	2.7	0.07	2.7	1.4	1.8	1.5	1.1	1.7	0.35	2.0	2.1	2.1	2.3	2.2	2.1	0.049	2.1	0.043	2.3	2.3	2.3	2.4	2.4	2.3	0.026	2.3	0.023
Sulphate	mg/L	429[b, c]	-	481[b]	339	348	393	336	331	354	0.075	349	0.072	360	174	233	168	114	210	0.448	213	230	251	242	258	234	0.07	239	0.075	298	274	308	295	284	294	0.049	292	0.045
Major anion sum	meq/L	-	-	-	13	14	15	13	13	14	0.045	14	0.052	13	7.6	9.8	7.7	6.0	8.9	0.32	9.9	11	11	11	11	11	0.049	11	0.052	12	12	13	12	12	12	0.036	12	0.031
Major cation sum	meq/L	-	-	-	13	13	13	14	15	13	0.024	13	0.049	12	8.0	9.9	7.9	6.1	8.7	0.239	9.7	11	11	11	11	11	0.068	11	0.059	11	12	12	12	12	12	0.046	12	0.041
Nutrients																																							
Nitrate	mg-N/L	3.0	33	9.1 - 155[d]	21[Mn, E]	22[Mn, E]	24[Mn, E]	20[Mn, E]	19[Mn, E]	22[Mn, E]	0.079	21[Mn, E]	0.091	20[Mn, E]	8.4[Mn]	13[Mn]	9.2[Mn]	7.5[Mn]	12[Mn]	0.439	14[Mn]	15[Mn]	17[Mn, E]	17[Mn, E]	18[Mn, E]	16[Mn, E]	0.095	16[Mn, E]	0.101	19[Mn, E]	18[Mn, E]	19[Mn, E]	19[Mn, E]	19[Mn, E]	19[Mn, E]	0.027	19[Mn, E]	0.024
Nitrite	mg-N/L	0.020 - 0.040[pH]	0.060 - 0.12[H]	-	0.0080	0.011	<0.005	0.0055	<0.005	0.0068	0.42	0.0059	0.45	<0.005	0.0021	0.0012	0.0017	0.0015	0.0018	0.86	0.0045	0.0062	0.0066	0.0078	0.0065	0.0063	0.22	0.0063	0.19	<0.005	0.0035	<0.005	<0.005	<0.005	0.0028	0.27	0.0027	0.25
Total ammonia	mg-N/L	0.48 - 1.8[f]	2.5 - 9.3[g]	-	0.0084	0.018	0.29	0.0069	0.0088	0.08	1.7	0.066	1.9	0.0080	0.014	0.021	0.011	0.0066	0.012	0.5	0.011	0.0093	0.014	0.010	0.057	0.011	0.2	0.02	1.0	0.016	0.027	0.013	0.011	0.011	0.017	0.4	0.016	0.42
Total Kjeldahl nitrogen	mg-N/L	-	-	-	<0.05	0.092	<0.05	0.23	0.47	0.093	0.9	0.17	1.1	0.13	0.67	<0.05	<0.05	<0.05	0.17	1.5	<0.25	0.072	0.23	<0.05	<0.25	0.11	0.9	0.12	0.9	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0	<0.05	0
Orthophosphate	mg-P/L	-	-	-	0.0025	0.0014	<0.001	0.0024	0.0025	0.0017	0.44	0.0019	0.38	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0	<0.001	<0.001	<0.001	0.0012	0.0012	0.00068	0.15	0.00078	0.14	0.0014	0.0010	0.0014	<0.001	0.0022	0.0011	0.21	0.0013	0.38
Phosphorus	mg-P/L	-	-	-	0.013	0.0036	0.0025	0.0044	0.0022	0.0058	0.81	0.0051	0.86	0.0039	0.021	0.0060	0.0085	0.038	0.015	0.92	<0.002	0.0024	<0.002	<0.002	<0.002	0.0014	0.15	0.0013	0.14	0.065	0.012	0.0074	<0.002	0.0021	0.021	1.36	0.018	1.5
Total Metals																																							
Aluminum	mg/L	-	-	-	<0.003	0.0032	0.0031	0.0035	0.051	0.0028	0.08	0.012	1.72	0.076	0.19	0.041	0.049	0.17	0.1	0.66	0.0049	<0.003	0.0048	0.0065	<0.003	0.0044	0.32	0.0038	0.38	0.036	<0.003	0.013	0.011	<0.003	0.016	0.91	0.013	1.1
Antimony	mg/L	0.0090	-	-	<0.0001	<0.0001	<0.0001	<0.0001	0.00013	<0.0001	0	0.000066	0	0.00019	0.00017	0.00014	0.00018	0.00013	0.00016	0	0.00018	0.00021	0.00015	0.00017	0.00014	0.00018	0	0.00017	0	0.00013	0.00011	0.00011	0.00010	<0.0001	0.00011	0	0.0001	0.12
Arsenic	mg/L	0.00010	0.0050	-	<0.00010	<0.0001	<0.0001	<0.0001	0.00012	0.000063	0.0	0.000074	0.12	0.00014	0.00028	0.00016	0.00012	0.00020	0.00018	0.35	0.00011	0.00010	<0.0001	0.00010	0.00012	0.00009	0.06	0.00009	0.09	0.00017	<0.0001	<0.0001	<0.0001	0.00008	0.44	0.000074	0.42
Barium	mg/L	1.0	-	-	0.11	0.11	0.10	0.10	0.11	0.098	0.011	0.061	0.1	0.065	0.093	0.070	0.074	0.064	0.051	0.07	0.217	0.081	0.087	0.088	0.097	0.092	0.088	0.073	0.089	0.066	0.092	0.095	0.097	0.093	0.088	0.094	0.024	0.095	0.028
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	1.2	-	-	0.011	0.011	0.012	0.011	0.010	0.011	0.044	0.011	0.064	0.015	<0.01	<0.01	<0.01	<0.01	0.007	0.319	0.012	0.012	0.012	0.014	0.012	0.013	0.08	0.012	0.072	0.012	0.012	0.012	0.011	0.012	0.012	0.043	0.012	0.038
Cadmium	mg/L	-	-	-	0.0000034	0.0000039	0.0000039	0.0000033	0.0000053	0.0000036	0.088	0.0000039	0.21	0.0000069	0.0000076	0.0000042	0.0000047	0.0000072	0.0000036	0.295	0.0000035	0.0000052	0.0000036	0.0000032	0.0000039	0.0000034	0.0000036	0.083	0.0000036	0.075	0.0000065	0.0000033	0.0000035	0.0000034	0.0000029	0.0000041	0.389	0.0000039	0.38
Calcium	mg/L	-	-	-	156	155	146	144	142	150	0.041	149	0.044	140	87	110	95	71	100	0.262	116	120	122	129	126	122	0.045	123	0.041	134	143	133	137	139	137	0.033	137	0.029
Chromium	mg/L	0.0010[h]	-	-	0.00026	0.00016	0.00021	0.00012	0.00016	0.00019	0.32	0.00018	0.3	0.00033	0.00040	0.00016	0.00019	0.00040	0.0003	0.39	0.00023	0.00013	0.00020	0.00013	0.00035	0.00017	0.29	0.00021	0.44	0.00016	0.00010	0.00015	0.00013	0.00016	0.00014	0.2	0.00014	0.18
Cobalt	mg/L	0.0040	0.11	-	0.00020	0.00025	0.00024	0.00025	0.00033	0.00024	0.1	0.00025	0.19	0.00030	0.00027	0.00016	0.00014	0.00022	0.00022	0.32	0.00011	0.00014	0.00015	0.00015	0.00014	0.14	0.00014	0.12	0.00023	0.00016	0.00016	0.00015	0.00018	0.2	0.00017	0.19
Copper	mg/L	<0.0005	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	0.0010	0.00061	<0.0005	<0.0005	<0.0005	0.00047	0	0.00075	0.00076	0.00054	<0.0005	<0.0005	0.00092	<0.0005	0.00054	0	0.00052	<0.0005	0.0010	<0.0005	<0.0005	0.00051	1	0.00046	0.51
Iron	mg/L	-	1.0	-	0.015	0.014	0.018	0.018	0.077	0.016	0.13	0.027	0.89	0.16	0.32	0.059	0.074	0.27	0.18	0.65	0.013	0.070	0.013	0.016	<0.01	0.015	0.12	0.013	0.2	0.12	<0.01	0.029	0.023	0.015	0.044	1.13	0.038	1.2
Lead	mg/L	0.016 - 0.020[Bl]	0.33 - 0.42[G]	-	<0.00005	<0.00005	<0.00005	<0.00005	0.000051	<0.00005	0	0.00003	0	0.0019	0.00025	<0.00005	0.000062	0.00023	0.0005	2	0.000057	<0.00005	<0.00005	0.000051	<0.00005	0.00004	0	0.000037	0	0.00019	<0.00005	<0.00005	<0.00005	<0.00005	0.000065	1	0.000057	1.1
Lithium	mg/L	-	-	-	0.031	0.033	0.034	0.033	0.033	0.033	0.046	0.033	0.04	0.034	0.020	0.027	0.023	0.017	0.024	0.279	0.030	0.030	0.036	0.037	0.033	0.033	0.105	0.033	0.091	0.034	0.036	0.032	0.032	0.035	0.033	0.055	0.034	0.054
Magnesium	mg/L	-	-	-	69	67	62	66	66	66	0.047	66	0.041	67	40	51	42	30	46	0.305	53	53	57	61	55	56	0.063	56	0.055	65	65	66	64	68	65	0.015	65	0.022
Manganese	mg/L	1.9 - 2.6[Bl]	3.4[G]	-	0.0049	0.0050	0.0061	0.0057	0.0086	0.0054	0.11	0.0061	0.25	0.013	0.021	0.0059	0.0098	0.0054	0.019	0.013	0.042	0.053	0.0047	0.047	0.041	0.0045	0.05	0.0044	0.07	0.018	0.0040	0.0064	0.0061	0.0054	0.0083	0.77	0.0077	0.74
Mercury	mg/L	0.000010	-	-	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0.00000075	<0.0000005	0	0.0000035	0	<0.0000005	0.0000030	0.00000070	0.00000669	0.0000017	0.0000013	1	<0.0000005	<0.0000005	0.00000054	0.0000017	0.00000092	0.00000068	1	0.00000072	1	0.0000024	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0.0000008	1	0.00000669	1.3
Molybdenum	mg/L	1.0	2.0	-	0.00057	0.00063	0.00060	0.00060	0.00083	0.0006	0.042	0.00065	0.159	0.00081	0.00098	0.00084	0.0010	0.00076	0.00088	0.127	0.0011	0.0011	0.00094	0.0010	0.00099	0.001	0.058	0.001	0.052	0.00063	0.00081	0.00073	0.00069	0.00068	0.00071	0.106	0.00071	0.094
Nickel	mg/L	0.005[D]	-	-	<0.0005	0.0006	0.0005	0.0005	0.0013	0.0005	0.085	0.0006	0.526	0.0020	0.0025	0.0019	0.0021	0.0019	0.0021	0.117	0.0019	0.0014	0.0012	0.0012	0.0011	0.0014	0.232	0.0014	0.235	0.0012	0.0009	0.0009	0.0006	0.0006	0.0009	0.284	0.0008	0.3
Potassium	mg/L	-	-	-	1.5	1.6	1.5	1.6	1.7	1.6	0.04	1.6	0.047	2.0	1.2	1.7	1.5	1.4	1.1	1.4	0.25	1.8	1.8	1.8	1.8	1.8	0.012	1.8	0.012	1.7	1.8	1.7	1.8	1.7	1.7	0.032	1.7	0.028
Selenium	mg/L	0.0020	-	0.019	0.089[Mn, E]	0.099[Mn, E]	0.087[Mn, E]	0.097[Mn, E]	0.081[Mn, E]	0.093[Mn, E]	0.063	0.091[Mn, E]	0.082	0.087[Mn, E]	0.042[Mn, E]	0.056[Mn, E]	0.046[Mn, E]	0.030[Mn, E]	0.052[Mn, E]	0.413	0.057[Mn, E]	0.063[Mn, E]	0.066[Mn, E]	0.071[Mn, E]	0.070[Mn, E]	0.064[Mn, E]	0.091	0.065[Mn, E]	0.087	0.077[Mn, E]	0.081[Mn, E]	0.090[Mn, E]	0.079[Mn, E]	0.085[Mn, E]	0.082[Mn, E]	0.07	0.082[Mn, E]	0.063
Silicon	mg/L	-	-	-	2.3	2.4	2.3	2.3	2.4	2.3	0.021	2.4	0.024	2.0	2.1	1.8	1.8	1.8	1.9	0.083	2.3	2.2	2.2	2.2	2.2	2.2	0.013	2.2	0.013	2.4	2.4	2.7	2.5	2.6	2.5	0.063	2.5	0.058
Silver	mg/L	0.0015[E]	0.0030[D]	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Sodium	mg/L	-	-	-	2.7	2.7	2.4	2.5	2.5	2.6	0.051	2.6	0.048	3.3	1.4	1.8	1.5	1.1	1.8	0.473	2.0	1.9	2.2	2.3	2.0	2.1	0.085	2.1	0.08	2.3	2.3	2.5	2.5	2.6	2.4	0.043	2.4	0.052
Strontium	mg/L	-	-	-	0.20	0.20	0.20	0.18	0.18	0.19	0.049	0.19	0.057	0.17	0.13	0.13	0.12	0.094	0.13	0.202	0.15	0.15	0.16	0.16	0.17	0.16	0.029	0.16	0.037	0.16	0.16	0.17	0.17	0.17	0.16	0.019	0.17	0.03
Thallium	mg/L	0.00080	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	0.000011	<0.00001	<0.00001	<0.00001	0.0000072	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	0.00012	<0.0001	<0.0001	<0.0001	<0.0001	0.000064	0	<0.0001	<0.0001	<0.0001	0.00061	<0.0001	0.00019	1	0.00016	1	<0.0001	<0.0001	<0.0001	0.00015	<0.0001	0.000075	0	0.00007	0.32
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	0.0085	-	-	0.0031	0.0033	0.0030	0.0032	0.0031	0.0031	0.045	0.0031	0.04	0.0033	0.0021	0.0024	0.0024	0.0017	0.0024	0.254	0.0029	0.0029	0.0032	0.0033	0.0030	0.0031	0.066	0.0031	0.058	0.0030	0.0031	0.0033	0.0031	0.0031	0.0031	0.035	0.0031	0.03
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	0.0012	<0.0005	<0.0005	0.0010	0.00059	1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Zinc	mg/L	0.17 - 0.19	0.19 - 0.34	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	0.011	0.0052	<0.003	0.0035	0.0039	0.0051	1	0.0043	<0.003	<0.003	<0.003	<0.003	0.0022	0	0.0021	0	<0.003	<0.003	<0.003	<0.003	0.0032	<0.003	0	0.0018	0.049
Dissolved Metals																																							
Aluminum	mg/L	0.050[J]	0.10[J]	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0
Antimony	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2								Q3						Q4							
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia and P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19 (*H. azteca*)		Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia and P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia and P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia and P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV	Mean	CV						Mean	CV						Mean	CV	Mean	CV						Mean	CV	Mean	CV
Field Measured																																							
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.1	8.0	7.9	8.3	8.0	8.1	0.02	8.1	0.02	8.3	8.2	8.4	8.2	8.3	8.2	0.011	8.4	8.2	8.2	7.9	7.9	8.2	0.03	8.1	0.03	7.7	7.8	8.0	8.0	8.0	7.9	0.02	7.9	0.018
Temperature	°C	-	-	-	0	0	0	0.10	1.3	0.025	2.0	0.28	2.0	6.5	6.3	4.1	6.4	6.3	5.9	0.17	11	6.6	9.8	8.0	8.2	8.9	0.2	8.7	0.2	0	1.9	-0.3	-0.1	-0.1	0.53	1.7	0.43	1.9
Conventional Parameters																																							
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.2	8.1	8.2	8.2	8.2	0.0061	8.2	0.0055	8.3	8.3	8.4	8.5	8.3	8.4	0.011	8.4	8.3	8.4	8.4	8.3	8.4	0.006	8.4	0.0066	8.3	8.3	8.3	8.3	8.3	8.3	0.000	8.3	0
Hardness, as $CaCO_3$	mg/L	-	-	-	548	526	517	553	493	536	0.032	527	0.046	516	339	424	362	251	378	0.26	406	413	413	435	429	417	0.03	419	0.029	474	469	468	450	480	465	0.023	468	0.024
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	-	216	215	208	208	199	212	0.021	209	0.033	206	159	190	166	134	171	0.16	195	195	202	197	196	197	0.017	197	0.015	203	201	208	198	210	203	0.021	204	0.024
Total dissolved solids	mg/L	-	-	-	728	705	730	717	616	720	0.016	699	0.068	626	400	462	419	289	439	0.28	473	516	551	557	505	524	0.074	520	0.066	614	620	593	566	589	598	0.041	596	0.036
Total suspended solids	mg/L	-	-	-	<1.0	3.1	<1.0	2.2	4.7	1.6	0.65	2.2	0.71	<1.0	31	3.1	6.3	18	12	1.1	2.1	3.2	1.4	4.6	<1.0	2.8	0.49	2.4	0.62	1.3	<1.0	<1.0	<1.0	7.7	0.7	0.21	2.1	1.4
Total organic carbon	mg/L	-	-	-	0.77	0.76	0.79	0.97	2.5	0.82	0.12	1.2	0.66	1.4	1.1	1.6	1.2	1.1	1.3	0.16	1.2	1.1	0.88	1.5	0.85	1.1	0.22	1.1	0.23	0.56	0.82	0.94	0.60	0.96	0.73	0.25	0.78	0.24
Dissolved organic carbon	mg/L	-	-	-	0.76	0.66	0.83	0.98	2.5	0.81	0.17	1.1	0.65	1.5	0.75	1.4	0.98	1.0	1.1	0.26	0.97	0.81	0.61	1.5	0.66	0.98	0.4	0.92	0.4	0.55	0.84	0.83	0.63	0.69	0.71	0.2	0.71	0.18
Turbidity	NTU	-	-	-	0.45	0.56	0.32	2.2	4.0	0.89	1.0	1.5	1.1	0.82	4.2	0.88	1.7	9.4	3.4	1.1	1.2	0.72	0.35	0.84	0.43	0.77	0.4	0.7	0.5	0.30	0.20	0.94	0.26	0.26	0.43	0.8	0.39	0.79
Conductivity	µS/cm	-	-	-	977	912	955	945	865	947	0.029	931	0.047	888	618	752	671	480	682	0.22	705	728	742	769	756	736	0.036	740	0.034	743	813	811	790	875	789	0.041	806	0.059
Oxidation-reduction potential	mv	-	-	-	438	472	436	417	413	441	0.052	435	0.054	421	414	439	464	418	431	0.048	365	471	450	364	488	413	0.136	428	0.138	500	423	313	406	345	411	0.187	397	0.18
Acidity To pH 8.3, as $CaCO_3$	mg/l	-	-	-	2.0	1.4	2.4	1.8	1.3	1.9	0.22	1.8	0.25	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0
Bicarbonate alkalinity, as $CaCO_3$	mg/l	-	-	-	216	215	208	208	199	212	0.021	209	0.033	206	159	185	157	134	168	0.17	188	191	193	191	190	191	0.011	191	0.01	200	197	208	198	210	201	0.025	203	0.03
Carbonate alkalinity, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	5.2	8.6	<1.0	3.1	1.1	6.4	3.8	8.4	6.6	6.2	6.3	0	6.3	0	3.0	4.0	<1.0	<1.0	<1.0	2.0	1	1.7	0.83
Hydroxide alkalinity, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																							
Bromide	mg/L	-	-	-	<0.25	<0.25	<0.05	<0.05	<0.25	<0.075	1.54	<0.085	1.29	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0	<0.05	0.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0	<0.05	0
Calcium	mg/L	-	-	-	127	121	112	116	110	119	0.054	117	0.059	113	76	96	83	61	86	0.23	90	94	93	95	96	93	0.023	94	0.026	106	112	100	97	110	104	0.065	105	0.061
Chloride	mg/L	150	600	-	<2.5	<2.5	1.9	2.2	<2.5	1.7	0.16	1.6	0.16	2.0	1.1	1.4	1.1	0.54	1.2	0.44	1.1	1.3	1.4	1.4	1.6	1.3	0.11	1.3	0.13	1.7	1.5	1.7	1.6	1.9	1.6	0.05	1.7	0.092
Fluoride	mg/L	-	1.7 - 2.0[m]	-	0.16	0.11	0.12	0.16	0.13	0.14	0.19	0.13	0.16	0.16	0.18	0.18	0.16	0.17	0.17	0.055	0.16	0.18	0.19	0.17	0.20	0.17	0.05	0.18	0.08	0.17	0.12	0.13	0.11	0.18	0.13	0.18	0.14	0.22
Magnesium	mg/L	-	-	-	56	54	58	64	53	58	0.071	57	0.074	57	36	45	38	24	40	0.31	44	43	44	48	46	45	0.046	45	0.041	51	46	53	50	50	50	0.057	50	0.05
Potassium	mg/L	-	-	-	1.1	1.3	1.2	1.4	1.5	1.3	0.11	1.3	0.13	1.3	1.0	1.3	1.1	0.79	1.1	0.19	1.3	1.3	1.4	1.4	1.3	1.4	0.05	1.3	0.04	1.2	1.2	1.3	1.2	1.2	1.2	0.04	1.2	0.033
Sodium	mg/L	-	-	-	2.4	2.3	2.6	2.6	2.4	2.5	0.05	2.5	0.048	2.3	1.5	2.0	1.7	1.1	1.7	0.28	2.0	2.1	2.0	2.1	2.1	2.1	0.039	2.1	0.035	2.2	2.2	2.3	2.2	2.3	2.2	0.03	2.3	0.033
Sulphate	mg/L	429[n, o]	-	481[n]	287	279	296	278	289	285	0.029	286	0.026	265	151	193	160	90	172	0.37	164	181	192	197	196	184	0.08	186	0.074	239	222	235	221	237	229	0.04	231	0.037
Major anion sum	meq/L	-	-	-	11	11	11	11	11	11	0.02	11	0.021	10	6.8	8.4	7.2	4.9	7.5	0.27	7.9	8.3	8.8	8.8	8.7	8.4	0.048	8.5	0.044	9.8	9.4	9.8	9.3	9.9	9.6	0.027	9.7	0.028
Major cation sum	meq/L	-	-	-	11	11	10.0	11	10	11	0.032	11	0.046	11	6.9	8.6	7.3	5.1	7.7	0.26	8.2	8.4	8.4	8.8	8.7	8.5	0.03	8.5	0.029	9.6	9.5	9.5	9.1	9.7	9.4	0.022	9.5	0.024
Nutrients																																							
Nitrate	mg-N/L	3.0	33	7.6 - 15[d]	11[(bb)]	12[(bb)]	12[(bb)]	9.7[(bb)]	10[(bb)]	11[(bb)]	0.098	11[(bb)]	0.099	9.6[(bb)]	5.7[(bb)]	7.7[(bb)]	6.9[(bb)]	4.7[(bb)]	6.9[(bb)]	0.27	8.0[(bb)]	8.6[(bb)]	9.4[(bb)]	9.1[(bb)]	9.6[(bb)]	8.8[(bb)]	0.07	8.9[(bb)]	0.072	10[(bb)]	11[(bb)]	9.9[(bb)]	9.9[(bb)]	10[(bb)]	10[(bb)]	0.051	10[(bb)]	0.046
Nitrite	mg-N/L	0.020 - 0.040[p]	0.060 - 0.12[p]	-	0.0086	<0.005	0.0042	0.0052	<0.005	0.0051	0.38	0.0046	0.37	0.0070	0.0034	0.0016	0.0030	0.0024	0.0035	0.6	0.0062	0.0047	0.0079	0.0056	0.0044	0.0061	0.22	0.0058	0.24	0.0032	0.0031	<0.001	0.0035	0.0027	0.0026	0.45	0.0026	0.38
Total ammonia	mg-N/L	0.30 - 2.1[f]	1.6 - 11[g]	-	0.0067	0.016	<0.005	0.023	0.015	0.012	0.69	0.013	0.58	0.034	<0.005	0.013	0.022	0.012	0.017	0.66	0.0078	0.039	0.0050	0.0051	0.014	0.014	1.17	0.014	1.02	<0.005	0.012	0.0074	0.0081	0.0062	0.0075	0.38	0.0072	0.36
Total Kjeldahl nitrogen	mg-N/L	-	-	-	0.089	<0.05	<0.05	0.47	0.39	0.185	1.3	0.2	1.0	0.50	0.54	<0.05	<0.05	<0.05	0.32	0.8	<0.25	<0.25	<0.05	<0.25	0.48	<0.1	1.0	0.18	0.9	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0	<0.05	0
Orthophosphate	mg-P/L	-	-	-	0.0019	0.0013	0.0019	0.0038	0.0037	0.0022	0.49	0.0025	0.46	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	<0.001	<0.001	<0.001	0.0015	<0.001	0.0	0.0007	0.32	<0.001	<0.001	0.0010	0.0019	0.0012	0.00098	0.46	0.001	0.38
Phosphorus	mg-P/L	-	-	-	0.0025	0.0036	0.0029	0.0069	0.0094	0.004	0.5	0.0051	0.59	0.0030	0.032	0.0061	0.0063	0.021	0.014	0.91	<0.002	0.0021	0.0020	0.0025	0.0030	0.0019	0.13	0.0021	0.2	<0.002	<0.002	<0.002	<0.002	0.0081	0.0	0.0	0.0024	1.1
Total Metals																																							
Aluminum	mg/L	-	-	-	<0.003	<0.003	0.0038	0.044	0.100	0.013	1.6	0.03	1.4	0.011	0.27	0.016	0.073	0.14	0.1	1.1	0.0041	0.0062	<0.009	0.0099	0.0092	0.0062	0.4	0.0068	0.4	0.0054	0.0034	0.0033	<0.003	0.083	0.0034	0.3	0.019	1.8
Antimony	mg/L	0.0090	-	-	0.00012	0.00013	0.00013	0.00018	0.00026	0.00014	0.19	0.00016	0.36	0.00019	0.00017	0.00019	0.00017	0.00012	0.00017	0.17	0.00015	0.00015	0.00014	0.00015	0.00014	0.00015	0.03	0.00015	0.04	0.00012	0.00011	0.00012	0.00012	0.00013	0.00012	0.04	0.00012	0.059
Arsenic	mg/L	0.0053	0.0050	-	0.00013	0.00010	0.00011	0.00015	0.00017	0.00012	0.18	0.00013	0.22	0.00015	0.00036	0.00012	0.00017	0.00021	0.0002	0.47	0.00010	0.00011	<0.0001	0.00011	0.00011	0.000093	0.06	0.000096	0.06	0.00011	0.00012	0.00011	0.00014	0.00015	0.00012	0.12	0.00013	0.14
Barium	mg/L	1.0	-	-	0.12	0.12	0.11	0.098	0.12	0.046	0.11	0.086	0.09	0.10	0.080	0.078	0.072	0.056	0.078	0.22	0.086	0.083	0.094	0.096	0.099	0.09	0.069	0.091	0.074	0.11	0.10	0.10	0.10	0.11	0.1	0.012	0.1	0.025
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	1.2	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	0.010	0.011	0.0063	0	0.0072	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Cadmium	mg/L	-	-	-	0.000022	0.000021	0.000025	0.000026	0.000037	0.000023	0.11	0.000026	0.25	0.000025	0.000090	0.000014	0.000025	0.000041	0.00039	0.77	0.000023	0.000025	0.000020	0.000022	0.08	0.000022	0.09	0.000022	0.09	0.000028	0.000019	0.000020	0.000018	0.000039	0.000021	0.21	0.000025	0.36
Calcium	mg/L	-	-	-	129	116	116	128	114	122	0.059	121	0.06	116	79	86	88	59	85	0.24	89	90	94	98	95	92	0.044	93	0.04	107	113	113	107	119	110	0.031	112	0.045
Chromium	mg/L	0.0010[h]	-	-	0.00013	0.00011	0.00012	0.00014	0.00023	0.00013	0.1	0.00015	0.33	0.00013	0.00057	0.00015	0.00065	0.00036	0.00037	0.64	0.00042	0.00014	0.00017	0.00026	0.00018	0.00025	0.51	0.00023	0.48	0.00013	0.00014	0.00016	0.00015	0.00024	0.00015	0.09	0.00016	0.27
Cobalt	mg/L	0.0040	0.11	-	<0.0001	0.00011	<0.0001	0.00013	0.00020	0.000085	0.17	0.00011	0.39	0.00012	0.00027	<0.0001	<0.0001	0.00013	0.00056	0.56	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0	<0.0001	0.0	<0.0001	<0.0001	<0.0001	0.00014	0.0	0.0	0.000068	0.26
Copper	mg/L	-	-	-	<0.0005	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	0.00086	<0.0005	0.00063	<0.0005	0.00045	0.35	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	0.0011	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00047	1	0.00042	0.65
Iron	mg/L	-	1.0	-	<0.01	<0.01	<0.01	0.027	0.11	0.013	0.8	0.02	1.0	0.021	0.48	0.026	0.083	0.20	0.16	1.2	0.011	0.056	0.016	0.019	0.030	0.016	0.4	0.019	0.4	0.011	<0.01	<0.01	<0.01	0.14	0.0068	0.1	0.034	1.7
Lead	mg/L	0.014 - 0.020[b]	0.26 - 0.42[b]	-	<0.00005	<0.00005	<0.00005	<0.00005	0.00053	<0.00005	0	0.000031	0	<0.00005	0.00038	<0.00005	<0.00005	<0.00005	0.00017	0.00012	1.1	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	0.00012	0.0	0	0.000043	0.68
Lithium	mg/L	-	-	-	0.017	0.017	0.018	0.018	0.017	0.017	0.04	0.017	0.036	0.019	0.013	0.016	0.017	0.011	0.015	0.21	0.017	0.019	0.018	0.021	0.021	0.019	0.074	0.019	0.09	0.019	0.020	0.019	0.017	0.019	0.019	0.055	0.019	0.049
Magnesium	mg/L	-	-	-	56	55	55	66	61	58	0.094	58	0.084	57	36	43	39	24	40	0.3	41	42	44	49	47	44	0.083	45	0.076	53	48	54	51	52	51	0.049	52	0.043
Manganese	mg/L	1.7 - 2.6[i]	3.3 - 3.4[i]	-	0.0012	0.0011	0.011	0.029	0.071	0.0016	0.55	0.0027	0.96	0.0021	0.025	0.024	0.0044	0.012	0.0091	1.1	0.0023	0.0027	0.0025	0.029	0.0090	0.0026	0.1	0.0025	0.14	0.0017	0.0012	0.0017	0.0014	0.0041	0.0015	0.18	0.002	0.58
Mercury	mg/L	0.000010	-	-	<0.0000005	<0.0000005	<0.0000005	0.00000052	0.0000013	0.00000032	0.03	0.00000051	0.69	<0.0000005	0.0000021	<0.0000005	0.00000072	0.0000014	0.00000094	0.75	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0.00000051	<0.0000005	0.0	0.0000003	0.01	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0.00000067	0.0	0.0	0.00000033	0.23
Molybdenum	mg/L	1.0	2.0	-	0.0012	0.0013	0.0012	0.0019	0.0027	0.0014	0.24	0.0016	0.39	0.0018	0.0011	0.0014	0.0013	0.00090	0.0013	0.25	0.0013	0.00100	0.0010	0.00098	0.0011	0.0011	0.14	0.0011	0.12	0.00089	0.0010	0.00090	0.00086	0.00087	0.00091	0.07	0.00091	0.067
Nickel	mg/L	0.005[l]	-	-	0.0017	0.0015	0.0016	0.0023	0.0039	0.0018	0.21	0.0022	0.44	0.0025	0.0026	0.0018	0.0016	0.0014	0.002	0.28	0.0017	0.0012	0.0011	0.0012	0.0010	0.0013	0.21	0.0013	0.22	0.0012	0.00088	0.0011	0.0011	0.0014	0.0011	0.13	0.0011	0.17
Potassium	mg/L	-	-	-	1.2	1.2	1.4	1.3	1.6	1.3	0.067	1.3	0.137	1.3	1.1	1.2	1.1	0.81	1.1	0.17	1.3	1.3	1.4	1.3	1.3	1.3	0.034	1.3	0.03	1.3	1.3	1.3	1.2	1.3	1.3	0.044	1.3	0.039
Selenium	mg/L	0.0020	-	0.019	0.060[(bh, E)]	0.064[(bh, E)]	0.062[(bh, E)]	0.070[(bh, E)]	0.062[(bh, E)]	0.064[(bh, E)]	0.068	0.064[(bh, E)]	0.06	0.059[(bh, E)]	0.031[(bh, E)]	0.044[(bh, E)]	0.037[(bh, E)]	0.021[(bh, E)]	0.038[(bh, E)]	0.37	0.043[(bh, E)]	0.041[(bh, E)]	0.044[(bh, E)]	0.044[(bh, E)]	0.045[(bh, E)]	0.043[(bh, E)]	0.033	0.043[(bh, E)]	0.035	0.053[(bh, E)]	0.053[(bh, E)]	0.055[(bh, E)]	0.052[(bh, E)]	0.056[(bh, E)]	0.054[(bh, E)]	0.028	0.054[(bh, E)]	0.026
Silicon	mg/L	-	-	-	2.4	2.6	2.4	2.6	2.5	2.5	0.041	2.5	0.036	2.1	2.3	1.9	2.1	1.9	2.0	0.067	2.2	2.3	2.2	2.4	2.5	2.2	0.045	2.3	0.064	2.5	2.3	2.6	2.4	2.7	2.4	0.038	2.5	0.06
Silver	mg/L	0.0015[b]	0.0030[b]	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Sodium	mg/L	-	-	-	2.4	2.6	2.4	3.1	2.5	2.6	0.12	2.6	0.11	2.5	1.7	1.9	1.8	1.1	1.8	0.28	1.9	2.0	2.0	2.2	2.2	2.0	0.06	2.1	0.06	2.5	2.2	2.2	2.3	2.3	2.3	0.05	2.3	0.042
Strontium	mg/L	-	-	-	0.19	0.18	0.16	0.18	0.16	0.18	0.061	0.17	0.072	0.16	0.12	0.14	0.13	0.098	0.13	0.18	0.14	0.14	0.15	0.14	0.14	0.14	0.028	0.14	0.026	0.15	0.16	0.15	0.16	0.16	0.16	0.023	0.16	0.02
Thallium	mg/L	0.00080	-	-	<0.00001	0.000012	<0.00001	<0.00001	<0.00001	0.0000068	0.15	0.0000064	0.14	<0.00001	0.000010	<0.00001	<0.00001	<0.00001	0.000006	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0	<0.00001	0.0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.0	<0.00001	0
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	0.00011	<0.0001	<0.000065	0	0.000062	0.072
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	-	-	-	0.0028	0.0027	0.0027	0.0032	0.0031	0.0028	0.092	0.0029	0.089	0.0027	0.0017	0.0024	0.0019	0.0014	0.002	0.26	0.0022	0.0023	0.0023	0.0025	0.0023	0.0023	0.062	0.0023	0.055	0.0027	0.0025	0.0024	0.0025	0.0024	0.0025	0.061	0.0025	0.057
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Zinc	mg/L	0.13 - 0.19	0.15 - 0.34	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	0.0057	<0.003	<0.003	<0.003	0.0023	0.52	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	<0.003	<0.003	<0.003	0.0037	0.0	0	0.0019	0.16
Dissolved Metals																																							
Aluminum	mg/L	0.050[j]	0.10[j]	-	<0.003	0.0043	<0.003	<0.003	<0.003	0.0022	0.3	0.0021	0.28	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0	<0.003	0.0	<0.003	<0.003	<0.003	<0.003

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2								Q3				Q4							
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia* and *P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia* and *P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia* and *P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia* and *P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV						Mean	CV						Mean	CV	Mean	CV			Mean	CV	Mean	CV
Field Measured																																	
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.1	8.1	8.2	8.3	8.4	8.2	0.02	8.1	8.0	8.3	8.3	8.1	8.2	0.016	8.3	8.3	8.3	8.3	8.2	8.3	0.0	8.3	0.01	8.3	8.3	8.3	7.8	8.2	8.2	0.03	8.2	0.016
Temperature	°C	-	-	-	0.10	0	1.0	0.80	1.0	0.58	0.85	4.0	4.8	4.5	7.3	0.80	4.3	0.54	9.0	7.1	11	7.9	8.2	8.7	0.18	8.6	0.16	0.10	1.8	0	0.50	0.20	0.6	1.38	0.52	0.8
Conventional Parameters																																	
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.3	8.1	8.2	8.3	8.3	8.2	0.011	8.3	8.3	8.4	8.5	6.9	8.1	0.082	8.3	8.4	8.4	8.4	8.4	8.4	0.006	8.4	0.005	8.3	8.3	8.3	8.3	8.3	8.3	0.00	8.3	0
Hardness, as $CaCO_3$	mg/L				427	451	446	414	442	436	0.035	416	331	319	315	221	320	0.22	345	346	359	365	388	354	0.028	361	0.049	425	412	394	397	427	407	0.035	411	0.035
Total alkalinity, as $CaCO_3$	mg/L	20[a]			192	224	196	184	189	197	0.08	188	150	176	167	140	164	0.12	182	189	189	188	191	187	0.018	188	0.018	212	185	189	194	194	195	0.061	195	0.08
Total dissolved solids	mg/L	-	-	-	571	554	586	576	547	567	0.028	543	383	405	380	261	394	0.25	445	457	465	482	474	462	0.034	465	0.031	538	501	523	505	492	517	0.033	512	0.028
Total suspended solids	mg/L	-	-	-	<1.0	<1.0	1.5	5.0	3.7	2.2	0.81	4.1	38	2.8	6.7	21	15	1.0	1.8	1.2	1.3	<1.0	<2.0	1.2	0.28	1.2	0.36	2.1	<1.0	<1.0	2.2	<1.0	1.3	0.5	1.2	0.81
Total organic carbon	mg/L	-	-	-	0.68	<0.5	<0.5	0.81	1.2	0.63	0.43	0.62	3.7	1.4	1.2	1.4	1.7	0.72	1.3	0.77	0.62	0.58	0.56	0.83	0.42	0.77	0.42	<0.5	0.58	0.96	0.68	0.61	0.62	0.32	0.62	0.43
Dissolved organic carbon	mg/L	-	-	-	1	<1	1	1	1	0.71	0.42	1	1	1	1	1	0.99	0.26	1	1	1	1	1	0.71	0.22	0.68	0.21	<1	1	1	1	1	0.62	0.42	0.62	0.42
Turbidity	NTU	-	-	-	0.34	0.94	0.52	3.6	1.5	1.4	0.96	0.60	10	0.63	0.55	9.4	4.3	1.2	0.56	0.53	0.25	0.33	0.13	0.42	0.36	0.36	0.51	0.33	0.14	0.43	0.50	0.10	0.35	0.45	0.3	0.96
Conductivity	µS/cm	-	-	-	812	708	787	807	777	778	0.054	770	581	655	601	441	610	0.2	635	660	673	671	687	660	0.026	665	0.029	684	708	729	726	774	712	0.029	724	0.054
Oxidation-reduction potential	mV	-	-	-	375	354	413	434	423	400	0.085	437	398	453	432	335	411	0.114	411	306	358	276	258	338	0.176	322	0.195	475	403	481	398	453	439	0.102	442	0.085
Acidity To pH 8.3, as $CaCO_3$	mg/L	-	-	-	<1.0	2.7	<1.0	1.1	<1.0	1.1	0.71	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	1
Bicarbonate alkalinity, as $CaCO_3$	mg/l	-	-	-	192	224	196	180	189	196.2	0.08	188	149	170	157	140	160.8	0.12	178	184	184	184	185	183	0.02	183	0.02	208	183	189	194	194	193.5	0.06	193.6	0.08
Carbonate alkalinity, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	4.6	<1.0	1.3	1.22	<1.0	1.6	6	9.8	<1.0	3.7	1.1	4.2	5.4	4.8	3.8	6	5	0.15	5	0.18	4.8	2	<1.0	<1.0	<1.0	2.0	0.92	1.7	1.2
Hydroxide alkalinity, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0.0
Major Ions																																	
Bromide	mg/L	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0
Calcium	mg/L	-	-	-	98	106	102	97	108	102	0.048	94	78	74	74	52	75	0.2	81	79	84	84	90	82	0.028	84	0.051	104	96	88	96	104	96	0.067	97	0.048
Chloride	mg/L	150	600	-	4.7	4.5	4.6	4.7	3.8	4.5	0.086	3.8	1.7	2.2	1.9	0.99	2.1	0.49	2.6	2.7	2.9	3.0	3.1	2.8	0.058	2.8	0.074	4.8	2.7	4.4	3.4	4.4	3.8	0.245	3.9	0.09
Fluoride	mg/L	-	1.7 - 1.9[b]	-	0.21	0.19	0.19	0.20	0.21	0.2	0.055	0.24	0.20	0.21	0.18	0.21	0.21	0.096	0.22	0.22	0.19	0.21	0.21	0.21	0.073	0.21	0.064	0.24	0.15	0.16	0.12	0.20	0.17	0.308	0.17	0.05
Magnesium	mg/L	-	-	-	44	45	46	42	42	44	0.048	44	33	33	32	22	33	0.24	35	36	38	39	36	36	0.033	37	0.048	40	42	42	39	41	41	0.041	41	0.048
Potassium	mg/L	-	-	-	0.99	1.0	1.1	1.0	1.1	1.1	0.048	1.1	0.97	1.1	0.99	0.82	0.99	0.11	1.1	1.2	1.2	1.2	1.2	1.2	0.023	1.2	0.021	1.1	1.1	1.1	1.1	1.1	1.1	0.018	1.1	0.048
Sodium	mg/L	-	-	-	3.4	3.6	3.8	3.6	3.1	3.5	0.071	3.1	2.1	2.4	2.2	1.5	2.2	0.26	2.5	2.7	2.7	2.9	2.7	2.7	0.062	2.7	0.054	3.6	3.1	3.7	3.2	3.4	3.4	0.094	3.4	0.071
Sulphate	mg/L	429[b, c]		481[b]	211	224	223	202	216	215	0.042	218	123	149	127	82	140	0.36	145	149	151	154	162	150	0.025	152	0.042	193	180	192	191	189	189	0.032	189	0.042
Major anion sum	meq/L	-	-	-	9.1	10.0	9.4	8.6	9.1	9.2	0.054	9.1	6.0	7.2	6.5	4.8	6.7	0.24	7.3	7.5	7.6	7.6	7.9	7.5	0.02	7.6	0.029	9.0	8.2	8.5	8.6	8.6	8.6	0.04	8.6	0.054
Major cation sum	meq/L	-	-	-	8.7	9.2	9.1	8.5	9.0	8.9	0.035	8.5	6.7	6.5	6.4	4.5	6.5	0.22	7.0	7.1	7.3	7.5	7.9	7.2	0.028	7.4	0.048	8.7	8.4	8.1	8.1	8.7	8.3	0.035	8.4	0.035
Nutrients																																	
Nitrate	mg-N/L	3.0	33	6.7 - 14[d]	**9.5**[Mn]	**9.8**[Mn]	**9.8**[Mn]	**8.5**[Mn]	**9.0**[Mn]	**9.5**[Mn]	0.059	**9.7**[Mn]	**5.3**[Mn]	**6.8**[Mn]	**5.9**[Mn]	**4.0**[Mn]	**6.3**[Mn]	0.34	**7.4**[Mn]	**7.6**[Mn]	**7.8**[Mn]	**7.7**[Mn]	**8.2**[Mn]	**7.6**[Mn]	0.022	**7.7**[Mn]	0.038	**8.8**[Mn]	**9.0**[Mn]	**8.7**[Mn]	**9.2**[Mn]	**8.8**[Mn]	**8.9**[Mn]	0.025	**8.5**[Mn]	0.059
Nitrite	mg-N/L	0.020 - 0.060[e]	0.060 - 0.18[e]	-	0.0019	0.0073	0.0024	0.0021	0.0022	0.0032	0.73	0.0031	0.0010	0.0023	0.0023	<0.001	0.0018	0.5	0.0043	0.0038	0.0041	0.0033	0.0030	0.0039	0.11	0.0037	0.15	0.0019	0.0022	<0.001	<0.001	0.0017	0.0013	0.49	0.0014	0.73
Total ammonia	mg-N/L	0.50 - 1.8[f]	2.6 - 9.1[g]	-	0.0077	0.0050	0.039	0.035	0.012	0.02	0.81	<0.005	<0.005	0.048	<0.005	<0.005	0.012	1.66	0.0056	0.0087	<0.005	0.0075	0.016	0.0061	0.28	0.0081	0.56	0.023	0.015	<0.005	<0.005	0.019	0.011	0.81	0.012	0.81
Total Kjeldahl Nitrogen	mg-N/L	-	-	-	0.24	0.43	0.056	0.44	0.33	0.3	0.53	0.47	0.60	0.44	<0.05	0.54	0.41	0.52	0.082	0.33	<0.05	<0.25	<0.05	0.14	0.95	0.12	1.1	<0.05	<0.05	<0.05	<0.05	<0.05	<0.025	0.0	<0.025	1
Orthophosphate	mg-P/L	-	-	-	<0.001	0.0011	0.0017	0.0015	0.0013	0.0012	0.23	<0.001	<0.001	<0.001	0.0023	<0.001	0.00086	1	<0.001	0.0010	<0.001	<0.001	<0.001	0.00063	0.0	0.0006	0.0	0.0011	<0.001	<0.001	<0.001	<0.001	0.00065	0.08	0.00062	0.23
Phosphorus	mg-P/L	-	-	-	<0.002	0.0036	0.0031	0.0076	0.0049	0.004	0.53	0.0037	0.044		0.0069	0.023	0.017	0.98	0.0029	<0.002	<0.002	<0.002	<0.002	<0.002	0.0015	0.31	0.0014	0.29	<0.002	0.0042	<0.002	<0.002	<0.002	0.0018	0.61	0.0016	0.53
Total Metals																																	
Aluminum	mg/L	-	-	-	0.0040	0.0083	0.0066	0.071	0.026	0.023	1.2	0.022	0.10	0.021	0.021	0.16	0.065	1.0	0.0039	0.0058	0.0054	0.037	0.0046	0.013	1.2	0.011	1.3	0.0042	0.0037	0.013	0.0077	0.013	0.0072	0.6	0.0083	1.21
Antimony	mg/L	0.0090	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.000076	0.12	0.00013	0.00013	0.00013	0.00013	0.00013	0.00026	0.0	0.00012	0.00013	0.00014	0.00013	0.00011	0.00013	0.06	0.00013	0.09	0.00011	0.00010	0.00011	0.00012	0.00011	0.00011	0.07	0.00011	0.118
Arsenic	mg/L	-	0.0050	-	<0.0001	<0.0001	<0.0001	<0.0001	0.00010	0.00006	0.0	0.00012	0.00025	0.00014	0.00013	0.00024	0.00018	0.36	0.00010	<0.0001	<0.0001	0.00013	<0.0001	0.000083	0.18	0.000076	0.18	0.00011	<0.0001	<0.0001	<0.0001	<0.0001	0.000065	0.08	0.000062	0.0
Barium	mg/L	1.0	-	-	0.10	0.094	0.11	0.094	0.099	0.053	0.090	0.071	0.080	0.068	0.056	0.073	0.17	0.083	0.088	0.091	0.092	0.099	0.088	0.048	0.091	0.067	0.087	0.090	0.092	0.097	0.09	0.022	0.091	0.053
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	<0.01	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	0.012	<0.01	<0.01	0.0068	0	0.0064	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Cadmium	mg/L	0.00038 - 0.00046[h]	0.0013 - 0.0028[h]	0.00026 - 0.00032[h]	0.000011	0.000012	0.000013	0.000015	0.000016	0.000013	0.15	0.000016	0.000023	0.000024	0.000029	0.000025	0.000023	0.21	0.000019	0.000017	0.000015	0.000016	0.000015	0.000017	0.11	0.000016	0.1	0.000015	0.000017	0.000020	0.000013	0.000016	0.000016	0.19	0.000016	0.15
Chromium	mg/L	-	-	-	0.00013	0.00015	0.00013	0.00013	0.00011	0.00013	0.11	0.00015	0.00012	0.00014	0.00013	0.00011	0.00013	0.12	0.00011	0.00011	0.00012	0.00013	0.00012	0.00013	0.08	0.00012	0.08	0.00012	0.00012	0.00014	0.00014	0.00014	0.00013	0.09	0.00013	0.109
Cobalt	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Copper	mg/L	0.0002 - 0.0009[i]	0.0012 - 0.0054[i]	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	**0.00028**[Mn]	0.00033	0.00025	<0.0002	**0.0042**[Mn]	0.00024	0	0.00028	0.0
Iron	mg/L	-	0.35	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Lead	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Lithium	mg/L	-	-	-	0.018	0.018	0.018	0.019	0.020	0.020	0.06	0.019	0.018	0.020	0.018	0.012	0.019	0.18	0.019	0.019	0.020	0.021	0.020	0.019	0.02	0.020	0.029	0.020	0.019	0.020	0.018	0.019	0.019	0.019	0.075	0.019	0.064
Manganese	mg/L	-	-	-	0.00016	0.00016	0.00017	<0.00005	0.0012	0.0004	1.2	<0.0001	0.00016	0.00026	0.00035	0.00040	0.00024	0.51	0.00028	0.00023	0.00020	<0.00001	0.00022	0.00019	0.4	0.0002	0.3	0.00033	0.00032	0.00028	0.00028	0.00015	0.0003	0.1	0.00027	1.18
Mercury	mg/L	-	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0
Molybdenum	mg/L	-	-	-	0.0012	0.0013	0.0012	0.0013	0.0013	0.0013	0.043	0.0012	0.0012	0.0011	0.0011	0.00090	0.0011	0.1	0.0012	0.0011	0.0012	0.0012	0.0012	0.0012	0.041	0.0012	0.036	0.0013	0.0010	0.0012	0.0010	0.0013	0.0012	0.12	0.0012	0.04
Nickel	mg/L	0.00063	0.00070	0.00059	0.00049	0.00060	0.00059	0.00049	0.00060	0.0007	0.17	0.00079	0.0010	0.0011	0.0011	0.0010	0.00099	0.12	0.00080	0.00099	0.00082	0.00084	0.00075	0.00086	0.1	0.00084	0.11	0.00080	0.00081	0.00078	0.00062	0.00070	0.00075	0.12	0.00074	0.17
Selenium	mg/L	-	-	-	0.050	0.054	0.051	0.049	0.050	0.051	0.037	0.047	0.029	0.032	0.028	0.019	0.031	0.33	0.037	0.039	0.037	0.035	0.037	0.037	0.045	0.037	0.039	0.041	0.044	0.042	0.048	0.044	0.044	0.071	0.044	0.037
Silicon	mg/L	-	-	-	2.3	2.3	2.3	2.2	2.3	2.3	0.017	1.7	1.8	2.0	1.8	1.8	1.8	0.044	2.1	2.4	2.2	2.3	2.2	2.2	0.058	2.2	0.05	2.3	2.1	2.1	2.3	2.3	2.2	0.06	2.2	0.017
Silver	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Strontium	mg/L	-	-	-	0.19	0.20	0.19	0.19	0.18	0.19	0.049	0.17	0.14	0.14	0.14	0.094	0.13	0.19	0.14	0.14	0.16	0.16	0.17	0.15	0.054	0.15	0.065	0.18	0.17	0.18	0.18	0.18	0.18	0.037	0.18	0.049
Thallium	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	-	-	-	0.0023	0.0023	0.0024	0.0023	0.0025	0.0024	0.038	0.0021	0.0017	0.0020	0.0017	0.0012	0.0017	0.2	0.0019	0.0021	0.0020	0.0021	0.0020	0.002	0.069	0.002	0.06	0.0023	0.0022	0.0022	0.0024	0.0024	0.0023	0.038	0.0023	0.038
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Zinc	mg/L	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0	<0.001	0.0010	0.0011	<0.001	<0.001	0.00078	0	0.00072	0	0.0014	<0.001	0.0012	<0.001	0.0011	0.0009	0	0.00094	0.0
∑ Toxic Units																																	
WQGs	-	-	-	-	6.17	7.67	6.32	5.65	5.76	5.99	-	6.19	4.77	4.88	4.42	4.44	4.80	-	4.92	5.32	5.16	5.48	5.61	5.15	-	5.33	-	6.14	5.51	5.07	5.41	5.77	5.37	-	5.48	-
WQGs/EVWQP Benchmarks					3.69	5.07	3.73	3.46	3.19	3.50	-	3.69	3.52	3.30	3.07	3.72	3.33	-	3.14	3.49	3.25	3.59	3.55	3.30	-	3.45	-	3.85	3.20	2.87	3.07	3.48	3.09	-	3.19	-

(a) = guideline is a minimum value, unless the background concentration or value is lower.
(b) = guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (221 to 451 mg/L). The guideline is calculated based on the individual hardness value for each sample.
(c) = for some samples, water hardness was greater than 250 mg/L. At this hardness, no BC ENV water quality guideline has been established for sulphate; however, the observed data were screened against the guideline for very hard water (i.e., 429 mg/L) for comparative purposes.
(d) = the EVWQP benchmark for nitrate is hardness dependent and applies within a hardness range of 67 to 500 mg/L. The guideline range shown is based on the hardness range observed in the dataset (221 to 451 mg/L). The guideline is calculated based on the individual hardness value for each sample and was calculated using the Elk River intercept. The minimum EVWQP guideline is 3 mg/L.
(e) = guideline is chloride dependent. The guideline range shown is based on the chloride concentration range observed in the dataset (0.99 to 4.70 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(f) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.50 mg-N/L) is based on the combination of field pH (8.4) and water temperature (1.0°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.
(g) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (2.61 mg-N/L) is based on the combination of field pH (8.4) and water temperature (1.0°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.
(h) = guideline is for chromium VI.
(i) = guideline is based on site-specific testing conducted in the Elk Valley with *C. dubia* and *H. azteca*.
(j) = guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.8 to 8.4). The guideline is calculated based on the individual pH for each sample.
(k) = the EVWQP benchmark for dissolved cadmium is hardness dependent and applies up to a hardness range of 285 mg/L. The guideline range shown is based on the hardness range observed in the dataset (221 to 451 mg/L). The guideline is calculated based on the individual hardness value for each sample.
(l) = the guideline for dissolved copper was calculated using the BC ENV Biotic Ligand Model (BLM) tool using the full model, quick normalization approach. Humic acid content of 10% was assumed based on guidance from BC ENV (2019).
(Mn) = concentration is higher than the 30-day mean BC ENV guideline or outside the recommended pH, DO or total alkalinity range.
(E) = concentration is higher than the EVWQP benchmarks guideline.
Bolded concentrations are higher than water quality guidelines.
Shaded concentrations are higher than the EVWQP benchmark (e.g., for nitrate, total selenium, dissolved cadmium or sulphate).
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision after comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Concentrations were screened against available Working and Approved British Columbia Ministry of Environment and Climate Change Strategy (BC ENV) Water Quality Guidelines for the Protection of Aquatic Life; Accessed January 2020 from: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines.
- = no guideline or no data.
BC ENV = British Columbia Ministry of Environment & Climate Change Strategy; EVWQP = Elk Valley Water Quality Plan guidelines; *C. dubia* = *Ceriodaphnia dubia* ; *P. subcapitata* = *Pseudokirchneriella subcapitata* ; *H. azteca* = *Hyalella azteca* ; *P. promelas* =

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2							Q3									Q4							
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia and P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia and P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia and P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia and P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV						Mean	CV						Mean	CV	Mean	CV						Mean	CV	Mean	CV
Field Measured																																				
pH	-	6.5 - 9.0	6.5 - 9.0	-	7.8	8.1	7.8	8.0	8.5	8.0	0.04	8.9	8.4	8.1	8.7	8.3	8.5	0.038	8.7	8.6	8.0	8.7	8.5	8.5	0.04	8.5	0.03	8.3	8.3	8.2	8.1	8.1	8.2	0.01	8.2	0.012
Temperature	°C	-	-	-	0.10	0.10	0.10	0.10	0.50	0.18	0.99	4.8	5.0	3.1	5.8	7.1	5.2	0.28	11	9.7	9.5	9.6	8.6	9.9	0.07	9.7	0.08	0.80	1.0	0.50	0.40	0.3	0.68	0.41	0.6	0.49
Conventional Parameters																																				
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.2	8.1	8.1	8.2	8.2	0.0067	8.7	8.3	8.3	8.3	8.1	8.3	0.026	8.4	8.4	8.4	8.3	8.3	8.4	0.006	8.4	0.0066	8.2	8.2	8.2	8.3	8.3	8.2	0.0061	8.2	0.007
Hardness, as $CaCO_3$	mg/L	-	-	-	298	307	292	301	247	289	0.083	228	211	180	180	158	191	0.15	273	296	307	307	339	296	0.054	304	0.078	386	395	385	445	399	403	0.071	402	0.062
Total alkalinity, as $CaCO_3$	mg/L	20[a]			201	199	155	158	140	171	0.16	125	113	119	117	118	0.037		133	133	137	131	138	134	0.02	134	0.02	149	145	152	153	158	150	0.02	151	0.032
Total dissolved solids	mg/L	-	-	-	384	381	373	372	328	368	0.062	291	253	217	219	190	234	0.17	354	369	382	426	452	383	0.081	397	0.103	546	553	575	540	569	554	0.028	557	0.027
Total suspended solids	mg/L	-	-	-	2.0	<1.0	<1.0	<1.0	3.5	1.4	0.78	9.2	8.3	<1.0	1.6	2.2	4.4	0.91	1.7	2.3	<1.0	2.3	<1.0	1.7	0.36	1.5	0.45	<1.0	<1.0	<1.0	2.0	<1.0	0.88	0.57	0.8	0.6
Total organic carbon	mg/L	-	-	-	1.7	1.6	1.3	1.7	2.8	1.8	0.32	3.5	4.3	2.9	2.2	2.4	3.1	0.28	2.4	2.5	2.4	6.8	2.1	3.5	0.61	3.2	0.61	1.6	1.9	2.3	1.7	1.8	1.9	0.16	1.9	0.141
Dissolved organic carbon	mg/L	-	-	-	1.5	1.6	1.5	1.6	2.6	1.8	0.27	2.7	2.3	2.4	2.1	1.9	2.3	0.12	2.1	2.4	2.1	1.9	2.0	2.1	0.09	2.1	0.08	1.6	1.8	2.1	1.7	1.6	1.8	0.12	1.7	0
Turbidity	NTU	-	-	-	1.5	1.6	0.83	1.3	6.4	2.3	0.99	3.5	6.2	1.8	1.0	1.3	2.8	0.78	0.98	1.2	0.74	0.99	0.99	0.97	0.18	0.97	0.15	0.31	0.25	0.78	0.65	0.22	0.5	0.52	0.44	0.6
Conductivity	µS/cm	-	-	-	592	562	564	568	500	557	0.061	453	400	368	376	325	384	0.12	558	573	577	619	650	582	0.045	595	0.064	665	732	745	775	780	729	0.064	739	0.062
Oxidation-reduction potential	mv	-	-	-	370	398	425	407	456	411	0.078	413	446	442	362	320	397	0.14	398	305	420	438.0	293	390	0.152	371	0.181	315	388	432	242	373	344	0.243	350	0.21
Acidity To pH 8.3, as $CaCO_3$	mg/l	-	-	-	1.3	1.3	<1.0	1.7	<1.0	1.1	0.27	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1	<1.0	<1.0	0.0	<1.0	0.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0.0
Bicarbonate alkalinity, as $CaCO_3$	mg/l	-	-	-	201	199	155	158	140	171	0.16	115	113	118	116	117	116	0.017	127	128	131	128	134	129	0.01	130	0.02	149	145	152	153	158	150	0.02	151	0.032
Carbonate alkalinity, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	9.8	<1.0	1.2	1.2	<1.0	2.6	1.5	6	4.6	5.8	2.4	4	4.7	0	4.6	0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	0	1.0	0.0
Hydroxide alkalinity, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	1.0	0	1.0	0
Major Ions																																				
Bromide	mg/L	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0	<0.25	<0.25	<0.25	<0.25	<0.05	<0.25	0	<0.11	1
Calcium	mg/L	-	-	-	74	77	71	74	63	72	0.073	58	52	45	45	40	48	0.15	68	72	74	73	82	72	0.042	74	0.073	96	97	94	114	101	100	0.093	100	0.08
Chloride	mg/L	150	600	-	7.8	7.9	7.9	7.3	6.0	7.4	0.11	4.6	3.4	2.9	2.8	2.2	3.2	0.28	6.6	7.3	7.5	8.4	9.3	7.5	0.1	7.8	0.13	13	11	13	12	12	12	0.09	12	0
Fluoride	mg/L	-	1.5 - 1.9[b]	-	0.097	0.10	0.052	0.069	0.10	0.084	0.26	0.11	0.11	0.11	0.096	0.11	0.11	0.06	0.082	0.10	0.11	0.097	0.10	0.098	0.11	0.098	0.1	0.12	<0.1	0.12	<0.1	0.096	0.085	0.14	0.087	0.14
Magnesium	mg/L	-	-	-	28	28	28	28	21	27	0.11	21	20	16	17	14	17	0.15	25	28	30	30	32	28	0.07	29	0.09	36	37	37	39	36	37	0.04	37	0.036
Potassium	mg/L	-	-	-	2.2	2.1	2.1	2.2	2.3	2.2	0.032	1.7	1.6	1.4	1.4	1.3	1.5	0.1	1.9	2.1	2.3	2.2	2.3	2.1	0.068	2.1	0.065	2.2	2.3	2.4	2.4	2.4	2.3	0.043	2.3	0.037
Sodium	mg/L	-	-	-	1.6	1.7	1.7	1.8	1.9	1.7	0.076	1.4	1.2	1.3	1.2	1.1	1.2	0.11	2.3	2.6	2.7	2.6	2.6	2.5	0.066	2.5	0.059	2.8	2.7	2.6	2.6	2.5	2.7	0.022	2.7	0.031
Sulphate	mg/L	309 - 429[b,c]		309 - 481[b]	82	85	84	78	73	80	0.063	65	49	42	40	34	46	0.26	88	96	98	108	116	98	0.084	101	0.108	141	135	145	148	135	142	0.04	141	0.042
Major anion sum	meq/L	-	-	-	7.1	7.1	6.2	6.0	5.6	6.4	0.11	4.8	4.0	3.9	3.8	3.5	4.0	0.12	5.8	6.1	6.2	6.5	6.9	6.1	0.04	6.3	0.06	8.2	7.9	8.4	8.6	8.2	8.3	0.04	8.3	0.031
Major cation sum	meq/L	-	-	-	6.1	6.3	6.0	6.1	5.1	5.9	0.081	4.7	4.3	3.7	3.7	3.3	3.9	0.14	5.6	6.1	6.3	6.3	6.9	6.1	0.054	6.3	0.077	7.9	8.1	7.9	9.1	8.1	8.2	0.069	8.2	0.06
Nutrients																																				
Nitrate	mg-N/L	3.0	33	2.4 - 6.7[d,g]	**16**[Mn, E]	**16**[Mn, E]	**15**[Mn, E]	**14**[Mn, E]	**15**[Mn, E]	**15**[Mn, E]	0.055	**12**[Mn, E]	**8.7**[Mn, E]	**7.6**[Mn, E]	**6.9**[Mn, E]	**5.5**[Mn, E]	**8.1**[Mn, E]	0.3	**16**[Mn, E]	**17**[Mn, E]	**17**[Mn, E]	**19**[Mn, E]	**20**[Mn, E]	**17**[Mn, E]	0.073	**18**[Mn, E]	0.092	**27**[Mn, E]	**27**[Mn, E]	**28**[Mn, E]	**30**[Mn, E]	**27**[Mn, E]	**28**[Mn, E]	0.051	**28**[Mn, E]	0.05
Nitrite	mg-N/L	0.040 - 0.20[e]	0.12 - 0.60[e]	-	0.0086	0.014	0.010	0.019	0.025	0.015	0.44	0.015	0.0093	0.0082	0.0084	0.0090	0.010	0.29	0.058	0.055	0.058	0.063	0.057	0.058	0.06	0.058	0.05	0.019	0.021	0.0091	<0.005	0.013	0.013	0.6	0.013	0.52
Total ammonia	mg-N/L	0.13 - 2.1[f]	0.68 - 11[g]	-	0.0099	0.050	0.0095	0.026	0.049	0.029	0.69	0.022	0.021	0.0054	<0.005	0.012	0.013	0.66	0.038	0.044	0.040	0.092	0.037	0.053	0.49	0.05	0.47	0.097	0.040	0.022	0.024	0.028	0.046	0.78	0.042	0.75
Total Kjeldahl nitrogen	mg-N/L	-	-	-	0.55	0.32	<0.05	0.34	0.45	0.34	0.56	0.76	0.66	0.40	0.24	0.47	0.51	0.41	<0.25	<0.05	<0.25	2.5	<0.05	0.68	1.67	0.55	1.88	<0.05	<0.05	<0.05	<0.05	<0.05	<0.025	0.0	<0.025	0.0
Orthophosphate	mg-P/L	-	-	-	0.031	0.032	0.032	0.029	0.033	0.031	0.043	<0.001	<0.001	0.024	0.018	0.0079	0.01	1.0	<0.001	0.0013	<0.001	<0.001	0.0026	0.0007	0.214	0.0011	0.643	0.026	0.027	0.027	0.032	0.031	0.028	0.096	0.028	0.09
Phosphorus	mg-P/L	-	-	-	0.026	0.030	0.034	0.030	0.036	0.031	0.12	0.012	0.037		0.025	0.023	0.025	0.36	0.019	0.0067	0.012	0.15	0.0084	0.047	1.47	0.039	1.59	0.026	0.023	0.024	0.039	0.081	0.028	0.28	0.039	1
Total Metals																																				
Aluminum	mg/L	-	-	-	0.0085	0.0099	0.011	0.016	0.12	0.034	1.5	0.019	0.050	0.041	0.019	0.016	0.029	0.54	0.0066	0.053	0.0058	0.021	0.0068	0.022	1.0	0.019	1.1	0.0036	<0.003	0.0040	0.0046	0.0070	0.0034	0.2	0.0041	0.37
Antimony	mg/L	0.0090	-	-	0.00049	0.00046	0.00049	0.00051	0.00064	0.00052	0.14	0.00044	0.00045	0.00036	0.00037	0.00031	0.00039	0.15	0.00051	0.00052	0.00052	0.00052	0.00050	0.00052	0.01	0.00051	0.02	0.00053	0.00049	0.00051	0.00051	0.00052	0.00051	0.03	0.00051	0
Arsenic	mg/L	-	0.0050	-	0.00035	0.00035	0.00035	0.00032	0.00039	0.00035	0.071	0.00032	0.00037	0.00036	0.00031	0.00033	0.00034	0.077	0.00029	0.00035	0.00030	0.00033	0.00032	0.00034	0.11	0.00034	0.101	0.00032	0.00034	0.00033	0.00039	0.00035	0.00035	0.09	0.00035	0.08
Barium	mg/L	1.0	-	-	0.22	0.24	0.24	0.22	0.18	0.22	0.11	0.16	0.15	0.15	0.15	0.14	0.15	0.03	0.22	0.21	0.20	0.23	0.23	0.21	0.06	0.22	0.06	0.26	0.24	0.27	0.26	0.26	0.26	0.05	0.26	0.043
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	1.2	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	0.011	0.011	<0.01	0.011	<0.01	0.0095	0	0.0086	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Cadmium	mg/L	-	-	-	0.000089	0.000081	0.000079	0.000092	0.00012	0.000091	0.16	0.000078	0.000078	0.000080	0.000068	0.000055	0.000072	0.14	0.000077	0.000069	0.000041	0.000045	0.000040	0.000058	0.3	0.000055	0.32	0.00013	0.00012	0.00012	0.00014	0.00014	0.00013	0.06	0.00013	0.06
Calcium	mg/L	-	-	-	76	72	73	73	65	72	0.055	55	48	43	44	46	47	0.11	74	71	72	75	81	73	0.03	74	0.053	94	92	110	106	103	100	0.089	101	0.078
Chromium	mg/L	0.0010[h]	-	-	<0.0001	<0.0001	0.00010	0.00010	0.00025	0.00011	0.61	0.00014	0.00015	0.00016	<0.0002	<0.0001	0.00012	0.3	0.00012	0.00020	0.00013	0.00015	0.00015	0.00015	0.24	0.00014	0.27	<0.0001	<0.0001	<0.0001	0.00011	<0.0001	0.000065	0.08	0.000062	0.072
Cobalt	mg/L	0.0040	0.11	-	0.00011	0.00011	<0.0001	0.00014	0.00041	0.00016	0.81	0.00016	0.00025	0.00023	0.00015	<0.0001	0.00017	0.37	0.00016	0.00017	0.00013	0.00015	0.00012	0.00015	0.11	0.00015	0.14	0.00011	0.00012	0.00011	0.00011	0.00012	0.00011	0.04	0.00011	0
Copper	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	0.00052	<0.0005	<0.0005	<0.0005	<0.0005	0.00032	0	0.0003	0	<0.0005	<0.0005	<0.0005	<0.0005	0.00075	<0.0005	0	0.00035	0
Iron	mg/L	-	1.0	-	<0.01	<0.01	<0.01	0.013	0.078	0.021	1.4	0.017	0.080	0.043	0.019	0.019	0.036	0.76	<0.01	0.061	<0.01	0.034	<0.01	0.026	0.9	0.022	1.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	<0.01	0
Lead	mg/L	0.0090 - 0.020[h]	0.15 - 0.42[h]	-	<0.00005	<0.00005	<0.00005	<0.00005	0.000072	0.000034	0.29	<0.00005	0.000071	<0.00005	<0.00005	<0.00005	0.000034	0.27	<0.00005	0.000053	<0.00005	<0.00005	<0.00005	0.000032	0.05	0.000031	0.04	<0.00005	<0.00005	<0.00005	<0.00005	0.000060	<0.00005	0.0	0.000032	0
Lithium	mg/L	-	-	-	0.012	0.011	0.011	0.012	0.011	0.012	0.045	0.0093	0.010	0.0095	0.010	0.0097	0.0098	0.041	0.015	0.016	0.016	0.015	0.017	0.015	0.032	0.016	0.053	0.016	0.015	0.018	0.015	0.017	0.016	0.072	0.016	0.068
Magnesium	mg/L	-	-	-	26	25	26	28	23	25	0.07	22	18	17	17	16	18	0.12	30	28	29	31	33	30	0.042	30	0.06	36	38	38	38	39	37	0.021	38	0.031
Manganese	mg/L	1.3 - 3.4[h]	2.3 - 3.4[h]	-	0.0018	0.0022	0.0015	0.0028	0.015	0.0047	1.3	0.0046	0.0078	0.0048	0.0028	0.0024	0.0045	0.48	0.0013	0.0031	0.00098	0.0022	0.0017	0.0019	0.5	0.0019	0.4	0.0012	0.00092	0.00095	0.0013	0.0018	0.0011	0.2	0.0012	0.28
Mercury	mg/L	0.000010	-	-	0.00000076	0.00000081	0.00000065	0.00000089	0.0000020	0.000001	0.54	0.0000012	0.0000024	0.0000015	0.0000011	0.0000015	0.0000016	0.33	0.00000089	0.0000014	0.00000087	0.0000026	0.00000066	0.0000014	0.55	0.0000013	0.6	0.00000067	0.00000060	0.00000073	0.00000060	0.00000066	0.00000065	0.1	0.00000065	0
Molybdenum	mg/L	1.0	2.0	-	0.0033	0.0033	0.0034	0.0034	0.0041	0.0035	0.1	0.0031	0.0027	0.0025	0.0025	0.0021	0.0026	0.15	0.0036	0.0039	0.0038	0.0039	0.0039	0.0038	0.04	0.0038	0.04	0.0041	0.0041	0.0042	0.0043	0.0044	0.0042	0.02	0.0042	0.03
Nickel	mg/L	0.005[i]	-	-	0.0034	0.0033	0.0033	0.0033	0.0034	**0.0056**[Mn]	0.25	0.0045	0.0048	0.0050	0.0048	0.0038	0.0046	0.11	**0.0074**[Mn]	**0.0068**[Mn]	**0.0069**[Mn]	**0.0070**[Mn]	**0.0071**[Mn]	**0.0070**[Mn]	0.04	**0.0070**[Mn]	0.03	**0.0059**[Mn]	**0.0056**[Mn]	**0.0060**[Mn]	**0.0061**[Mn]	**0.0056**[Mn]	**0.0059**[Mn]	0.04	**0.0058**[Mn]	0.03
Potassium	mg/L	-	-	-	2.1	2.1	2.1	2.1	2.3	2.1	0.052	1.7	1.5	1.4	1.4	1.3	1.4	0.11	2.2	2.0	2.1	2.2	2.3	2.1	0.05	2.2	0.052	2.4	2.3	2.6	2.4	2.4	2.4	0.052	2.4	0.045
Selenium	mg/L	0.0020	-	0.019	**0.019**[Mn]	**0.019**[Mn]	**0.019**[Mn]	**0.021**[Mn, E]	**0.022**[Mn, E]	**0.020**[Mn, E]	0.071	**0.020**[Mn, E]	**0.013**[Mn]	**0.013**[Mn]	**0.014**[Mn]	**0.011**[Mn]	**0.014**[Mn]	0.24	**0.033**[Mn, E]	**0.035**[Mn, E]	**0.036**[Mn, E]	**0.037**[Mn, E]	**0.040**[Mn, E]	**0.035**[Mn, E]	0.048	**0.036**[Mn, E]	0.072	**0.048**[Mn, E]	**0.047**[Mn, E]	**0.052**[Mn, E]	**0.052**[Mn, E]	**0.051**[Mn, E]	**0.050**[Mn, E]	0.053	**0.050**[Mn, E]	0.05
Silicon	mg/L	-	-	-	2.8	2.5	2.6	2.9	2.9	2.8	0.065	1.8	1.8	2.4	2.3	2.0	2.1	0.15	1.7	1.8	1.7	1.5	1.7	1.7	0.066	1.7	0.059	2.7	2.6	2.8	2.8	2.9	2.7	0.038	2.8	0.046
Silver	mg/L	0.0015[h]	0.030[h]	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Sodium	mg/L	-	-	-	1.5	1.5	1.5	1.7	1.9	1.6	0.11	1.4	1.2	1.1	1.2	1.0	1.2	0.098	2.6	2.6	2.5	2.6	2.6	2.6	0.01	2.6	0.02	2.6	2.6	2.7	2.8	2.6	2.7	0.03	2.7	0.03
Strontium	mg/L	-	-	-	0.10	0.11	0.11	0.10	0.092	0.1	0.052	0.079	0.069	0.060	0.064	0.066	0.068	0.11	0.11	0.11	0.11	0.12	0.12	0.11	0.035	0.11	0.057	0.14	0.14	0.15	0.15	0.14	0.14	0.04	0.14	0.035
Thallium	mg/L	0.00080	-	-	0.000012	0.000011	<0.00001	0.000011	0.000019	0.000012	0.31	0.000011	0.000011	<0.00001	0.000010	<0.00001	0.0000084	0.065	0.000013	0.000016	0.000014	0.000014	0.000017	0.000014	0.09	0.000015	0.11	0.000011	0.000012	0.000013	<0.00001	0.000013	0.00001	0.13	0.000011	0
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	0.00007	0.32
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	-	-	-	0.0015	0.0016	0.0017	0.0016	0.0014	0.0016	0.06	0.0012	0.00100	0.00085	0.00080	0.00062	0.00089	0.23	0.0012	0.0014	0.0015	0.0016	0.0016	0.0014	0.105	0.0014	0.106	0.0019	0.0019	0.0020	0.0020	0.0021	0.002	0.035	0.002	0.049
Vanadium	mg/L	-	-	-	0.0011	0.0011	0.0011	0.0012	0.0012	0.0011	0.044	0.0012	0.0010	0.0011	0.0011	0.00099	0.0011	0.085	0.0012	0.0012	0.0011	0.0011	0.0010	0.0011	0.035	0.0011	0.055	0.0010	0.0011	0.0010	0.0011	0.0011	0.0011	0.044	0.0011	0
Zinc	mg/L	0.059 - 0.19	0.084 - 0.30	-	0.0025	0.0026	0.0025	0.0028	0.0035	0.0028	0.15	<0.001	<0.001	0.0020	0.0014	<0.001	0.00098	0.45	<0.001	<0.001	<0.001	<0.001	<0.001	0.0089	<0.001	0.0	0.0022	1.62	0.0043	0.0042	0.0038	0.0047	0.0042	0.0043	0.09	0.0042	0.08
Dissolved Metals																																				
Aluminum	mg/L	0.050[j]	0.10[j]	-	<0.003	<0.003	<0.003	<0.003	0.0051	0.0022	0.42	<0.003	0.0041	0.0051	0.0039	0.0037	0.0037	0.21	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0	<0.003	0.0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0.0	<0.003	0
Antimony	mg/L	-	-	-	0.00046	0.00047	0.00047	0.00046	0.00068	0.00051	0.19	0.00048	0.00045	0.00038	0.00038	0.00032	0.0004	0.16	0.00048	0.00047	0.00048	0.00051	0.00051	0.00049	0.04	0.00049	0.04	0.00047	0.00048	0.00048	0.00051	0.00049	0.00049	0.04	0.00049	0
Arsenic	mg/L	-	-	-	0.00036	0.00041	0.00035	0.00036	0.00041	0.00038	0.078	0.00032	0.00031	0.00029	0.00027	0.00028	0.00029	0.071	0.00033	0.00030	0.00027	0.00031	0.00029	0.0003	0.083	0.0003	0.075	0.00033	0.00031	0.00030	0.00036	0.00033	0.00033	0.081	0.00033	0
Barium	mg/L	-	-	-	0.23	0.23	0.24	0.23	0.23	0.22	0.1	0.16	0.16	0.14	0.15	0.14	0.15	0.062	0.21	0.20	0.21	0.20	0.24	0.2	0.04	0.21	0.08	0.23	0.26	0.27	0.26	0.25	0.25	0.06	0.26	0.056

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2							Q3						Q4									
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia and P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia and P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia and P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia and P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV						Mean	CV						Mean	CV	Mean	CV					Mean	CV	Mean	CV
Field Measured																																			
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.0	7.9	8.7	8.3	7.9	8.2	0.04	8.0	8.0	8.2	8.0	8.0	8.0	0.011	8.2	8.2	7.6	7.8	7.8	8.0	0.04	7.9	0.03	7.5	7.6	7.8	7.8	7.8	7.7	0.02	7.7	0.018
Temperature	°C	-	-	-	3.9	3.7	3.7	3.9	3.9	3.8	0.029	5.2	6.5	4.2	5.7	7.2	5.8	0.2	11	9.2	10	8.6	8.8	9.7	0.097	9.5	0.095	4.6	4.6	4.6	5.8	5.1	4.9	0.122	4.9	0.11
Conventional Parameters																																			
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.1	8.0	8.1	8.1	8.0	8.1	0.0068	8.2	8.2	8.3	8.4	8.2	8.3	0.011	8.3	8.3	8.3	8.3	8.2	8.3	0.000	8.3	0.0054	8.2	8.3	8.1	8.2	8.4	8.2	0.010	8.2	0.014
Hardness, as $CaCO_3$	mg/L	-	-	-	179	169	179	189	182	180	0.04	179	175	184	173	151	172	0.074	163	165	164	165	169	164	0.006	165	0.014	186	184	175	184	207	182	0.027	187	0.063
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	-	154	154	154	155	154	154	0.0029	149	142	148	141	128	142	0.059	146	149	146	149	148	148	0.0117	148	0.0103	151	149	150	155	168	151	0.0174	155	0.051
Total dissolved solids	mg/L	-	-	-	216	230	230	202	206	217	0.06	193	191	175	184	161	181	0.073	170	185	183	195	181	183	0.056	183	0.049	223	213	194	193	186	206	0.072	202	0.077
Total suspended solids	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	1.2	0.64	0.14	1.1	73	14	15	121	45	1.1	<1.0	2.2	<1.0	<1.0	<1.0	0.93	0.65	0.84	0.64	16	<1.0	<1.0	5.0	<1.0	5.4	1.27	4.4	1.4
Total organic carbon	mg/L	-	-	-	<0.5	<0.5	0.74	<0.5	0.53	0.25	0.41	<0.5	2.0	0.92	0.82	1.3	1.1	0.53	0.87	0.60	3.8	0.63	0.58	1.5	1.05	1.3	1.08	<0.5	<0.5	0.53	<0.50	<0.5	0.32	0.05	0.31	0.044
Dissolved organic carbon	mg/L	-	-	-	<0.5	<0.5	0.66	0.51	0.66	0.47	0.18	<0.5	<0.5	0.79	0.60	1.0	0.58	0.38	0.61	0.58	<0.5	0.67	<0.5	0.53	0.13	0.47	0.16	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	0.0	<0.5	0
Turbidity	NTU	-	-	-	0.21	0.43	0.14	0.15	0.39	0.26	0.52	0.85	20	3.4	4.5	58	17	1.4	0.65	0.84	0.47	0.55	1.3	0.63	0.25	0.76	0.42	1.2	0.22	0.27	0.15	0.12	0.45	1.06	0.38	1.1
Conductivity	µS/cm	-	-	-	337	331	351	343	330	338	0.026	334	335	337	321	285	322	0.068	297	305	304	310	319	304	0.018	307	0.027	315	332	341	354	381	336	0.049	345	0.072
Oxidation-reduction potential	mV	-	-	-	425	391	418	446	410	418	0.048	499	414	474	361	366	423	0.15	342	222	443	356	341	341	0.267	341	0.231	512	401	440	441	370	449	0.103	433	0.12
Acidity To pH 8.3, as $CaCO_3$	mg/L	-	-	-	1.3	1.3	1.2	1.7	1.3	1.4	0.14	<1.0	<1.0	<1.0	1.4	<1.0	0.68	0.26	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0.0	<1.0	<1.0	<1.0	2.1	<1.0	0.9	0.61	0.82	0.6
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	154	154	154	155	154	154	0.0029	149	142	146	136	128	140	0.06	146	149	142	147	148	146	0.0202	146	0.0185	151	149	150	155	159	151	0.0174	153	0.027
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	2.0	5.4	<1.0	1.8	1.1	<1.0	<1.0	3.4	1.4	<1.0	1.5	1	1.3	1	<1.0	<1.0	<1.0	<1.0	8.6	<1.0	0	2.1	1.6
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																			
Bromide	mg/L	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0
Calcium	mg/L	-	-	-	51	48	49	53	53	51	0.041	49	49	52	49	43	48	0.066	45	47	46	45	47	46	0.014	46	0.019	51	53	47	50	60	50	0.048	52	0.093
Chloride	mg/L	150	600	-	<0.5	<0.5	<0.5	<0.5	0.54	0.31	0.06	0.63	0.57	0.81	0.81	<0.5	0.61	0.23	<0.5	<0.5	<0.5	<0.5	0.52	<0.5	0.0	0.3	0.03	<0.5	<0.5	<0.5	<0.5	<0.5	0.0	<0.5	0
Fluoride	mg/L	-	1.5 - 1.6[b]	-	0.15	0.13	0.11	0.14	0.17	0.14	0.14	0.16	0.16	0.17	0.14	0.13	0.15	0.095	0.15	0.18	0.17	0.16	0.18	0.16	0.07	0.17	0.07	0.17	0.13	0.17	0.11	0.16	0.14	0.2	0.15	0.18
Magnesium	mg/L	-	-	-	13	12	14	14	13	13	0.064	14	13	13	12	11	13	0.097	12	12	12	12	12	12	0.017	12	0.017	14	13	14	14	14	14	0.06	14	0.052
Potassium	mg/L	-	-	-	0.32	0.32	0.35	0.37	0.35	0.34	0.064	0.33	0.36	0.38	0.38	0.37	0.36	0.049	0.38	0.39	0.41	0.43	0.42	0.4	0.059	0.4	0.053	0.41	0.39	0.40	0.43	0.40	0.41	0.037	0.41	0.034
Sodium	mg/L	-	-	-	0.88	0.88	1.0	1.1	0.98	0.97	0.095	0.94	0.86	1.0	0.95	0.71	0.89	0.13	0.75	0.79	0.83	0.84	0.85	0.8	0.055	0.81	0.054	1.1	0.95	1.0	1.1	1.1	1.0	0.075	1.1	0.073
Sulphate	mg/L	309 - 429[b, c]	-	309 - 481[b]	31	32	34	32	35	33	0.055	35	33	29	25	20	28	0.21	22	23	25	25	28	24	0.067	25	0.104	39	35	39	43	42	39	0.087	40	0.08
Major anion sum	meq/L	-	-	-	3.8	3.8	3.8	3.8	3.9	3.8	0.011	3.8	3.6	3.6	3.4	3.0	3.5	0.084	3.4	3.4	3.5	3.5	3.5	3.6	0.016	3.5	0.022	3.9	3.8	3.9	4.1	4.3	3.9	0.034	4.0	0.053
Major cation sum	meq/L	-	-	-	3.6	3.4	3.6	3.8	3.7	3.6	0.04	3.6	3.6	3.7	3.5	3.1	3.5	0.074	3.3	3.4	3.3	3.3	3.4	3.3	0.006	3.3	0.013	3.8	3.7	3.6	3.7	4.2	3.7	0.027	3.8	0.062
Nutrients																																			
Nitrate	mg-N/L	3.0	33	2.2 - 3.1[d]	0.54	0.54	0.55	0.55	0.57	0.55	0.023	0.56	0.51	0.47	0.37	0.38	0.46	0.18	0.22	0.25	0.32	0.34	0.46	0.28	0.21	0.32	0.303	0.73	0.58	0.71	0.87	0.91	0.72	0.165	0.76	0.17
Nitrite	mg-N/L	0.020[e]	0.060[e]	-	0.0019	<0.001	<0.001	<0.001	<0.001	0.00078	0.52	0.0011	<0.001	<0.001	<0.001	<0.001	0.00062	0.072	<0.001	<0.001	<0.001	0.0023	<0.001	<0.001	0.00095	0.68	0.00086	0.68	<0.001	0.0013	<0.001	0.002	<0.001	0.00098	0.29	0.00088	0.3
Total ammonia	mg-N/L	0.25 - 2.0[f]	1.3 - 20[g]	-	0.0099	0.096	<0.005	0.0060	<0.005	0.023	1.7	0.012	0.0073	<0.005	0.015	0.012	0.0098	0.41	0.0092	<0.005	<0.005	<0.005	0.029	0.0042	0.5	0.0092	1.1	0.0055	0.024	<0.005	0.011	0.0057	0.011	0.8	0.0099	0.83
Total Kjeldahl nitrogen	mg-N/L	-	-	-	<0.05	0.099	0.11	0.094	0.15	0.1	0.38	0.059	0.33	0.085	0.058	0.58	0.22	1.0	<0.05	<0.05	0.13	0.35	0.055	0.13	1.07	0.12	1.1	0.18	0.17	0.24	0.27	0.11	0.22	0.22	0.2	0.32
Orthophosphate	mg-P/L	-	-	-	0.0011	<0.001	0.0011	0.0015	0.0014	0.0011	0.19	<0.001	<0.001	<0.001	<0.001	0.0011	0.00062	0.072	<0.001	<0.001	<0.001	<0.001	0.0012	<0.001	0.0	0.00064	0.14	<0.001	0.0011	0.0011	0.0017	0.0016	0.0011	0.29	0.0012	0.27
Phosphorus	mg-P/L	-	-	-	<0.002	0.0028	0.0021	<0.002	<0.002	0.001	0.36	0.0036	0.082		0.014	0.16	0.055	1.2	<0.002	0.0025	<0.002	0.0041	<0.002	0.0022	0.46	0.0019	0.47	<0.002	<0.002	<0.002	<0.002	<0.002	<0.002	0.0	<0.002	0
Total Metals																																			
Aluminum	mg/L	-	-	-	<0.003	<0.003	<0.003	0.0036	0.0051	0.0026	0.34	0.033	0.62	0.083	0.21	0.82	0.35	0.99	0.0092	0.0079	<0.012	0.0052	0.0045	0.0071	0.4	0.0066	0.47	0.0042	0.0042	<0.003	0.006	0.0032	0.004	0.33	0.0039	0.33
Antimony	mg/L	0.0090	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0.00010	<0.0001	<0.0001	0.00011	0.000072	0.062	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Arsenic	mg/L	-	0.0050	-	<0.0001	<0.0001	<0.0001	0.00013	<0.0001	0.000066	0.2	0.00014	0.00058	0.00014	0.00022	0.00075	0.00037	0.77	0.00010	0.00011	<0.0001	0.00013	0.00014	0.000098	0.15	0.00011	0.17	0.00011	0.00010	0.00011	0.00015	0.00010	0.00012	0.19	0.00011	0.18
Barium	mg/L	1.0	-	-	0.061	0.056	0.054	0.056	0.062	0.058	0.063	0.055	0.061	0.047	0.047	0.052	0.052	0.12	0.047	0.047	0.048	0.053	0.055	0.049	0.062	0.05	0.075	0.064	0.058	0.063	0.064	0.065	0.063	0.045	0.063	0.044
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0.000052	<0.00002	<0.00002	<0.00002	0.00006	0.74	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00003	0.74	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	1.2	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.002	0.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	<0.01	0.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	<0.01	0
Cadmium	mg/L	-	-	-	0.0000065	0.0000073	0.0000067	0.0000071	0.0000075	0.0000077	0.059	0.000012	0.000097	0.000018	0.000030	0.00013	0.000056	0.91	0.000010	0.000012	0.000010	0.0000095	0.0000085	0.00001	0.091	0.000010	0.117	0.0000076	0.0000084	0.0000097	0.0000100	0.0000066	0.0000089	0.126	0.0000085	0.17
Calcium	mg/L	-	-	-	57	49	49	54	57	52	0.062	52	58	54	47	51	53	0.061	45	49	46	47	50	47	0.053	47	0.053	54	56	57	56	61	56	0.036	56	0.04
Chromium	mg/L	0.0010[h]	-	-	0.00028	0.00029	0.00021	0.00029	0.00029	0.00027	0.13	0.00032	**0.0016**[Mn]	0.00037	0.00058	**0.0021**[Mn]	0.00099	0.81	0.00034	0.00029	0.00024	0.00018	0.00028	0.00026	0.26	0.00027	0.22	0.00026	0.00024	0.00026	0.00029	0.00025	0.00026	0.08	0.00026	0.072
Cobalt	mg/L	0.0040	0.11	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0.00039	<0.0001	<0.0001	0.00057	0.00022	0.98	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Copper	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0001	0.0013	<0.0005	<0.0005	0.0016	0.00073	0.73	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Iron	mg/L	-	1.0	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	0.041	0.87	0.088	0.18	**1.4**[Mn]	0.52	1.2	0.014	0.017	0.012	<0.01	<0.01	0.012	0	0.011	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Lead	mg/L	0.0083 - 0.011[b]	0.13 - 0.21[b]	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0.00060	0.000058	0.00012	0.00084	0.00033	1.1	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Lithium	mg/L	0.0028	0.0029	0.0033	0.0032	0.0032	0.0035	0.0031	0.092	0.0025	0.0032	0.0021	0.0025	0.0033	0.0027	0.19	0.0023	0.0025	0.0026	0.0029	0.0030	0.0026	0.097	0.0027	0.108	0.0028	0.0033	0.0034	0.0036	0.0032	0.083	0.0033	0.091			
Magnesium	mg/L	-	-	-	13	12	14	14	13	13	0.068	14	14	12	13	12	13	0.081	11	11	12	13	13	12	0.063	12	0.077	14	13	14	15	14	14	0.058	14	0.05
Manganese	mg/L	1.2 - 1.5[b]	2.1 - 2.8[b]	-	0.00013	0.00023	0.00011	0.00040	0.00064	0.0003	0.73	0.0027	0.045	0.0051	0.0097	0.075	0.028	1.1	0.0021	0.0018	0.0016	0.0011	0.0013	0.0017	0.24	0.0016	0.24	0.00052	0.00047	0.00027	0.00076	0.00025	0.00051	0.4	0.00045	0.46
Mercury	mg/L	0.000010	-	-	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0	<0.0000005	0.0000040	0.0000011	0.0000011	0.0000049	0.0000023	0.89	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0	<0.0000005	0	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0	<0.0000005	0
Molybdenum	mg/L	1.0	2.0	-	0.0010	0.0011	0.0010	0.0010	0.0011	0.001	0.037	0.0010	0.0011	0.00093	0.0011	0.00088	0.00099	0.082	0.0011	0.0011	0.0012	0.0011	0.0011	0.0011	0.074	0.0011	0.064	0.0011	0.0010	0.0011	0.0011	0.0011	0.037	0.0011	0.033
Nickel	mg/L	0.005[i]	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0.0019	<0.0005	<0.0005	0.0025	0.001	0.93	0.00066	<0.0005	<0.0005	<0.0005	<0.0005	0.00035	0	0.00033	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Potassium	mg/L	-	-	-	0.33	0.36	0.39	0.36	0.38	0.37	0.063	0.36	0.63	0.40	0.44	0.70	0.5	0.3	0.38	0.37	0.41	0.39	0.41	0.39	0.047	0.39	0.046	0.44	0.39	0.44	0.42	0.43	0.42	0.05	0.42	0.043
Selenium	mg/L	0.0020	-	0.019	0.0018	**0.0022**[Mn]	**0.0020**[Mn]	**0.0025**[Mn]	**0.0027**[Mn]	**0.0024**[Mn]	0.16	**0.0024**[Mn]	**0.0028**[Mn]	**0.0021**[Mn]	**0.0021**[Mn]	0.0016	**0.0022**[Mn]	0.21	0.0014	0.0015	0.0017	0.0016	0.0019	0.0015	0.08	0.0016	0.11	**0.0024**[Mn]	**0.0020**[Mn]	**0.0026**[Mn]	**0.0030**[Mn]	**0.0033**[Mn]	**0.0025**[Mn]	0.17	**0.0027**[Mn]	0.19
Silicon	mg/L	-	-	-	1.7	1.8	1.6	1.8	1.7	1.7	0.046	1.8	2.7	1.9	2.2	3.0	2.3	0.22	1.9	1.9	1.9	1.9	2.0	1.9	0.011	1.9	0.025	2.1	1.9	2.0	2.0	2.1	2.0	0.029	2.0	0.028
Silver	mg/L	0.0015[5]	0.0030[5]	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.71	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Sodium	mg/L	-	-	-	0.87	0.95	0.93	1.1	1.0	0.97	0.076	1.0	1.0	0.98	0.97	0.72	0.93	0.13	0.74	0.77	0.81	0.80	0.84	0.78	0.044	0.79	0.052	1.1	0.96	1.1	1.2	1.1	1.1	0.075	1.1	0.073
Strontium	mg/L	-	-	-	0.21	0.22	0.19	0.23	0.22	0.21	0.052	0.22	0.22	0.21	0.23	0.19	0.21	0.068	0.21	0.20	0.21	0.22	0.23	0.21	0.033	0.22	0.055	0.22	0.22	0.21	0.23	0.21	0.22	0.027	0.22	0.026
Thallium	mg/L	0.00080	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0.000031	<0.00001	<0.00001	<0.00001	0.000040	0.00017	0.83	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	0.00018	<0.00010	<0.0001	0.000083	0	0.000076	0.47
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	0.0085	-	-	0.00082	0.00090	0.00081	0.00087	0.00092	0.00086	0.056	0.00085	0.00092	0.00086	0.00081	0.00081	0.00085	0.056	0.00075	0.00076	0.00074	0.00079	0.00073	0.00076	0.028	0.00075	0.029	0.00085	0.00080	0.00087	0.00087	0.00086	0.00085	0.041	0.00085	0.036
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0.0030	<0.0005	0.00092	0.0038	0.0016	0.94	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Zinc	mg/L	0.047 - 0.095	0.072 - 0.12	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0.0080	<0.003	0.0031	0.010	0.0049	0.71	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0
Dissolved Metals																																			
Aluminum	mg/L	0.050[j]	0.10[j]	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	<0.003	<0.003	<0.003	0.0056	0.0023	0.5	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0
Antimony	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Arsenic	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0.00012	0.00011	0.00012	0.00010	0.0001	0.086	0.00010	<0.0001	<0.0001	<0.0001	<0.0001	0.000075	0	0.00007	0	<0.0001	0.00010	<0.0001	0.0001	<0.0001	0.000075	0	0.00007	0
Barium	mg/L	-	-	-	0.057	0.052	0.057	0.060	0.058	0.057	0.049	0.054	0.052	0.051	0.044	0.039	0.048	0.13	0.049	0.050	0.052	0.053	0.053	0.051	0.038	0.051	0.039	0.061	0.057	0.064	0.063	0.065	0.061	0.054	0.062	0.054
Beryllium	mg/L	-	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2								Q3							Q4							
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia and P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia and P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia and P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia and P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV						Mean	CV						Mean	CV	Mean	CV					Mean	CV	Mean	CV
Field Measured																																			
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.2	8.3	8.4	8.3	8.3	0.01	8.2	8.0	8.4	8.2	8.1	8.2	0.02	8.2	8.5	8.2	8.0	8.3	8.2	0.03	8.2	0.02	8.2	8.2	8.1	8.3	8.3	8.2	0.01	8.2	0.01
Temperature	°C	-	-	-	0.10	0	1.1	0.60	2.1	0.78	1.1	4.0	4.3	3.8	4.9	6.0	4.6	0.2	9.2	7.8	8.3	7.8	7.7	8.3	0.1	8.2	0.1	0.20	1.9	0.10	0	0	0.55	1.6	0.48	1.66
Conventional Parameters																																			
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.2	8.2	8.3	8.1	8.2	0.0086	8.5	8.2	8.5	8.4	8.3	8.4	0.0156	8.4	8.3	8.4	8.4	8.3	8.4	0.006	8.4	0.0066	8.3	8.3	8.2	8.2	8.5	8.3	0.007	8.3	0.015
Hardness, as $CaCO_3$	mg/L				425	438	432	419	305	404	0.14	368	241	275	252	226	272	0.21	377	390	388	383	377	385	0.02	383	0.02	423	411	427	404	437	416	0.03	420	0.031
Total alkalinity, as $CaCO_3$	mg/L	20[a]			197	212	191	188	169	191	0.081	193	150	177	167	154	168	0.104	194	191	191	193	194	192	0.008	193	0.008	204	191	206	206	216	202	0.036	205	0.044
Total dissolved solids	mg/L	-	-	-	520	525	556	509	357	493	0.16	453	251	316	289	260	314	0.26	416	431	488	496	468	458	0.09	460	0.08	503	494	546	526	559	517	0.05	526	0.052
Total suspended solids	mg/L	-	-	-	1.1	1.3	<1.0	<3.0	2.6	1.4	0.66	8.7	7.1	<1.0	1.5	<1.0	3.7	1.02	<1.0	1.2	<1.0	1.5	<1.0	0.93	0.26	0.84	0.26	1.1	2.6	3.6	<1.0	<1.0	2.0	0.64	1.7	0.7
Total organic carbon	mg/L	-	-	-	0.88	0.58	0.54	1.0	1.1	0.82	0.31	0.97	2.7	2.1	1.5	1.5	1.7	0.38	1.1	0.78	1.0	0.66	1.2	0.89	0.23	0.96	0.24	<0.5	1.2	0.64	0.82	<0.50	0.72	0.4	0.62	0.444
Dissolved organic carbon	mg/L	-	-	-	0.96	0.63	0.51	1.1	1.1	0.85	0.31	0.87	2.4	2.3	1.3	1.4	1.6	0.4	1.1	0.75	0.95	0.69	1.1	0.87	0.2	0.91	0.21	<0.5	1.0	<0.5	0.85	<0.50	0.59	0.44	0.52	0
Turbidity	NTU	-	-	-	1.6	0.29	0.30	0.67	1.7	0.91	0.76	2.0	5.0	0.64	1.0	0.89	1.9	0.95	0.84	0.76	1.1	1.2	0.76	0.96	0.2	0.92	0.2	0.40	0.90	1.3	0.47	0.23	0.78	0.56	0.67	0.7
Conductivity	µS/cm	-	-	-	757	772	750	741	540	712	0.14	693	427	543	496	449	522	0.2	662	655	666	666	652	662	0.01	660	0.01	652	702	726	723	766	701	0.05	714	0.058
Oxidation-reduction potential	mV	-	-	-	407	421	403	375	351	391	0.072	411	410	335	383	419	392	0.088	377	495	465	337	349	419	0.177	405	0.176	325	405	370	460	260	390	0.146	364	0.21
Acidity To pH 8.3, as $CaCO_3$	mg/L	-	-	-	2.3	1.4	1.5	<1.0	<2.0	1.3	0.38	<1.0	4.1	<1.0	1.6	<1.0	1.4	0.93	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0.0	<1.0	<1.0	<1.0	2.2	<1.0	0.93	0.65	0.84	0.64
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	197	212	191	188	169	191	0.081	184	150	170	162	154	164	0.083	184	187	186	189	194	187	0.011	188	0.02	204	187	206	206	199	201	0.046	200	0.04
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	8.8	<1.0	6.4	5.0	<1.0	4.2	1	9.6	4.0	5.4	3.4	<1.0	5.6	0	4.6	1	<1.0	3.6	<1.0	<1.0	17.4	1.3	1	4.5	1.6
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																			
Bromide	mg/L	-	-	-	<0.05	<0.05	<0.05	<0.05	0.12	0.043	0.68	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0	<0.05	0.0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0	<0.05	0
Calcium	mg/L	-	-	-	88	93	95	89	73	88	0.1	80	57	62	58	51	61	0.18	77	80	80	78	79	79	0.02	79	0.02	87	84	91	88	92	87	0.03	88	0.035
Chloride	mg/L	150	600	-	1.3	1.3	1.4	1.2	5.2	2.1	0.86	1.1	<0.5	0.67	0.61	<0.5	0.57	0.41	0.98	1.1	1.2	1.2	1.2	1.1	0.1	1.1	0.09	1.4	1.3	1.4	1.4	1.7	1.4	0.04	1.5	0
Fluoride	mg/L	-	1.7 - 2.0[b]	-	0.22	0.19	0.090	0.22	0.14	0.17	0.33	0.21	0.18	0.20	0.20	0.18	0.19	0.07	0.17	0.22	0.23	0.26	0.21	0.22	0.17	0.22	0.15	0.22	0.20	0.23	0.16	0.25	0.2	0.15	0.21	0.16
Magnesium	mg/L	-	-	-	50	50	47	48	30	45	0.19	41	24	29	26	24	29	0.25	45	46	46	46	44	46	0.01	45	0.02	50	49	49	45	50	48	0.04	48	0.042
Potassium	mg/L	-	-	-	0.83	0.80	0.82	0.88	0.92	0.85	0.056	0.88	0.60	0.62	0.68	0.63	0.68	0.167	0.95	0.96	0.97	1.1	0.89	0.96	0.046	0.96	0.06	0.83	0.86	0.88	0.90	0.91	0.87	0.037	0.88	0.038
Sodium	mg/L	-	-	-	1.8	1.6	1.7	1.6	4.2	2.2	0.52	1.6	1.1	1.2	1.1	0.97	1.2	0.21	1.6	1.8	1.8	1.7	1.7	1.5	1.7	0.05	1.6	0.06	1.6	1.7	1.7	1.7	1.8	1.7	0.03	1.7	0.037
Sulphate	mg/L	429[c, c]	-	481[3]	215	236	229	197	125	200	0.22	186	79	118	100	83	113	0.38	169	178	180	187	179	179	0.04	179	0.04	213	205	221	216	224	214	0.03	216	0.034
Major anion sum	meq/L	-	-	-	8.5	9.3	8.7	8.0	6.2	8.1	0.14	7.8	4.7	6.1	5.5	4.8	5.8	0.22	7.5	7.6	7.7	7.8	7.7	7.6	0.02	7.7	0.02	8.6	8.2	8.8	8.7	9.1	8.6	0.03	8.7	0.039
Major cation sum	meq/L	-	-	-	8.6	8.9	8.7	8.5	6.3	8.2	0.13	7.5	4.9	5.6	5.1	4.6	5.5	0.21	7.6	7.9	7.9	7.8	7.6	7.8	0.02	7.7	0.02	8.5	8.3	8.6	8.2	8.8	8.4	0.02	8.5	0.031
Nutrients																																			
Nitrate	mg-N/L	3.0	33	3.4 - 7.2[d]	1.2	1.1	1.1	0.98	1.7	1.2	0.22	0.86	0.41	0.57	0.47	0.40	0.54	0.35	0.64	0.62	0.62	0.64	0.64	0.64	0.02	0.63	0.01	0.96	0.93	1.0	1.0	1.1	0.99	0.05	1.0	0.06
Nitrite	mg-N/L	0.020 - 0.060[e]	0.060 - 0.18[e]	-	<0.001	0.0027	0.0020	<0.001	<0.001	0.0012	0.63	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0	0.0013	0.0013	0.0016	<0.001	0.0010	0.0012	0.21	0.0011	0.22	0.0010	<0.001	<0.001	<0.001	<0.001	0.00063	0.0	0.0006	0.0
Total ammonia	mg-N/L	0.37 - 1.2[f]	1.9 - 6.2[g]	-	0.014	<0.005	0.043	<0.005	0.021	0.016	1.0	<0.005	0.041	0.012	0.026	0.013	0.019	0.8	0.0089	<0.005	0.011	<0.005	0.019	0.0062	0.5	0.0086	0.6	0.0066	0.020	0.0095	0.011	0.010	0.012	0.5	0.012	0.45
Total Kjeldahl nitrogen	mg-N/L	-	-	-	0.13	0.22	0.18	0.19	0.37	0.22	0.42	0.15	0.15	0.097	<0.05	0.29	0.14	0.63	0.18	0.17	0.44	0.54	0.33	0.33	0.56	0.33	0.48	0.34	0.32	0.29	0.13	0.22	0.27	0.35	0.26	0.33
Orthophosphate	mg-P/L	-	-	-	0.0073	0.0077	0.0077	0.0076	0.0041	0.0069	0.23	0.0022	0.0050	0.0050	0.00556	0.0040	0.0044	0.31	0.0034	0.0028	<0.001	<0.001	0.0030	0.0018	0.69	0.002	0.56	0.0065	0.0061	0.0068	0.0075	0.0076	0.0067	0.09	0.0069	0.09
Phosphorus	mg-P/L	-	-	-	0.0082	0.0098	0.0067	0.0094	0.0063	0.0081	0.19	0.0080	0.0097		0.0065	0.0075	0.0079	0.15	0.0085	0.010	0.013	0.0083	0.0056	0.001	0.21	0.009	0.32	0.0058	0.0068	0.011	0.0064	0.0082	0.0074	0.3	0.0076	0
Total Metals																																			
Aluminum	mg/L	-	-	-	0.0066	0.0043	0.0042	0.016	0.032	0.013	0.94	0.044	0.094	0.023	0.028	0.015	0.041	0.78	0.0082	0.012	0.026	0.015	0.0093	0.015	0.49	0.014	0.5	0.0064	0.016	0.051	0.0095	0.0060	0.021	0.98	0.018	1.06
Antimony	mg/L	0.0090	-	-	<0.0001	<0.0001	<0.0001	<0.0001	0.00011	0.000062	0.07	0.00010	<0.0001	<0.0001	<0.0001	<0.0001	0.00006	0.0	<0.0001	0.00010	<0.0001	<0.0001	0.00011	0.000063	0.0	0.000072	0.06	<0.0001	0.00012	<0.0001	0.00011	<0.00010	0.000083	0.12	0.000076	0
Arsenic	mg/L	-	0.0050	-	0.00022	0.00017	0.00017	0.00015	0.00023	0.00019	0.19	0.00017	0.00023	0.00021	0.00018	0.00017	0.00019	0.14	0.00018	0.00018	0.00020	0.00019	0.00019	0.00019	0.05	0.00020	0.04	0.00015	0.00017	0.00017	0.00017	0.00016	0.00017	0.06	0.00016	0.05
Barium	mg/L	1.0	-	-	0.069	0.069	0.071	0.059	0.11	0.075	0.24	0.050	0.036	0.044	0.041	0.039	0.042	0.13	0.055	0.059	0.064	0.058	0.060	0.059	0.07	0.059	0.06	0.056	0.061	0.061	0.067	0.064	0.061	0.08	0.062	0.069
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	0.010	0.006	0.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	<0.01	0.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	<0.01	0
Cadmium	mg/L	0.00039 - 0.00046[h]	0.0014 - 0.0028[g]	0.00027 - 0.00032[k]	0.000017	0.000017	0.000017	0.000017	0.000026	0.000019	0.21	0.000017	0.000016	0.000014	0.000012	0.0000091	0.000014	0.23	0.000011	0.000011	0.000012	0.000013	0.000011	0.000012	0.1	0.000012	0.09	0.0000095	0.000015	0.000014	0.000018	0.000014	0.000014	0.25	0.000014	0.22
Chromium	mg/L	-	-	-	0.00017	0.00018	0.00014	0.00012	0.00011	0.00014	0.21	<0.0006	0.00011	0.00012	0.00011	0.00013	0.00015	1.4	0.00013	0.00012	0.00021	0.00017	0.00013	0.00016	0.26	0.00015	0.25	0.00015	0.00014	0.00021	0.00013	0.00016	0.00016	0.23	0.00016	0.2
Cobalt	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Copper	mg/L	0.00020 - 0.0016[f]	0.0011 - 0.0094[g]	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.00020	<0.0002	<0.0002	0.00022	<0.0002	0.00013	0	0.00012	0.1
Iron	mg/L	-	0.35	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0.0
Lead	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0.00
Lithium	mg/L	-	-	-	0.0061	0.0060	0.0063	0.0059	0.011	0.0071	0.33	0.0063	0.0039	0.0047	0.0047	0.0037	0.0047	0.22	0.0072	0.0073	0.0067	0.0070	0.0066	0.0071	0.04	0.007	0.04	0.0066	0.0067	0.0073	0.0068	0.0068	0.0069	0.05	0.0068	0.04
Manganese	mg/L	-	-	-	0.0025	0.0020	0.0033	0.0037	0.0013	0.0026	0.38	0.00057	0.00086	0.0011	0.00035	0.0011	0.00078	0.4	0.0027	0.0029	0.0032	0.0046	0.0039	0.0033	0.27	0.0034	0.24	0.0057	0.0040	0.0041	0.0056	0.0036	0.0048	0.19	0.0046	0.22
Mercury	mg/L	-	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0
Molybdenum	mg/L	-	-	-	0.00099	0.00095	0.00093	0.00088	0.00088	0.00092	0.053	0.00092	0.00060	0.00081	0.00070	0.00060	0.00073	0.191	0.00098	0.00095	0.00099	0.00093	0.00094	0.00096	0.028	0.00096	0.026	0.00094	0.00093	0.0010	0.00096	0.00091	0.00096	0.044	0.00095	0.04
Nickel	mg/L	-	-	-	0.00051	<0.0005	<0.0005	<0.0005	0.0014	0.00053	0.74	0.00077	0.00064	0.00063	0.00056	0.00056	0.00063	0.14	0.00064	0.00061	0.00064	<0.0005	0.00072	0.00054	0.12	0.00057	0.14	<0.0005	0.00050	0.00052	0.00053	0.00054	0.00045	0.03	0.00047	0
Selenium	mg/L	-	-	-	0.048	0.048	0.042	0.037	0.014	0.038	0.37	0.043	0.017	0.023	0.023	0.018	0.025	0.43	0.038	0.039	0.038	0.036	0.037	0.038	0.04	0.038	0.04	0.041	0.041	0.044	0.048	0.045	0.044	0.08	0.044	0.08
Silicon	mg/L	-	-	-	2.1	2.1	2.2	2.0	2.3	2.1	0.048	1.7	1.5	1.7	1.9	1.7	1.7	0.069	2.2	2.2	2.3	2.2	2.1	2.2	0.018	2.2	0.024	2.1	2.1	2.2	2.1	2.2	2.1	0.025	2.1	0.024
Silver	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Strontium	mg/L	-	-	-	0.14	0.15	0.15	0.13	0.18	0.15	0.13	0.11	0.094	0.096	0.094	0.078	0.094	0.12	0.12	0.12	0.11	0.12	0.12	0.12	0.03	0.13	0.03	0.13	0.13	0.14	0.13	0.14	0.13	0.05	0.13	0.046
Thallium	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	0.00017	<0.00010	0.00008	0	0.000074	0.42
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	-	-	-	0.0026	0.0028	0.0027	0.0028	0.0013	0.0024	0.26	0.0026	0.0013	0.0016	0.0016	0.0013	0.0017	0.34	0.0023	0.0022	0.0024	0.0024	0.0024	0.0023	0.05	0.0023	0.04	0.0027	0.0026	0.0028	0.0028	0.0029	0.0027	0.04	0.0028	0.043
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Zinc	mg/L	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	0	0.0012	<0.001	0.0018	<0.001	0.001	0.001	0	0.001	0.33
∑ Toxic Units																																			
WQGs	-	-	-	-	3.04	3.73	3.51	2.70	2.82	2.99	-	2.97	2.10	2.07	2.18	2.03	2.15	-	2.48	2.67	2.75	2.95	2.56	2.74	-	2.61	-	3.06	2.37	3.39	2.52	3.20	2.45	-	2.43	-
WQGs/EVWQP Benchmarks	-	-	-	-	2.79	3.48	3.27	2.49	2.61	2.75	-	2.81	2.07	2.00	2.13	2.01	2.09	-	2.35	2.53	2.61	2.81	2.43	2.60	-	2.47	-	2.84	2.17	3.17	2.31	2.96	2.23	-	2.21	-

(a) = guideline is a minimum value, unless the background concentration or value is lower.
(b) = guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (226 to 473 mg/L). The guideline is calculated based on the individual hardness value for each sample.
(c) = for some samples, water hardness was greater than 250 mg/L. At this hardness, no BC ENV water quality guideline has been established for sulphate; however, the observed data were screened against the guideline for very hard water (i.e., 429 mg/L) for comparative purposes.
(d) = the EVWQP benchmark for nitrate is hardness dependent and applies within a hardness range of 67 to 500 mg/L. The guideline range shown is based on the hardness range observed in the dataset (226 to 473 mg/L). The guideline is calculated based on the individual hardness value for each sample and was calculated using the Elk River intercept. The minimum EVWQP guideline is 3 mg/L.
(e) = guideline is chloride dependent. The guideline range shown is based on the chloride concentration range observed in the dataset (0.25 to 5.23 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(f) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.37 mg-N/L) is based on the combination of field pH (8.5) and water temperature (10.7°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.
(g) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (1.92 mg-N/L) is based on the combination of field pH (8.5) and water temperature (10.7°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.
(h) = guideline is for chromium VI.
(i) = guideline is based on site-specific testing conducted in the Elk Valley with *C. dubia* and *H. azteca*.
(j) = guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (8.0 to 8.5). The guideline is calculated based on the individual pH for each sample.
(k) = the EVWQP benchmark for dissolved cadmium is hardness dependent and applies up to a hardness range of 285 mg/L. The guideline range shown is based on the hardness range observed in the dataset (226 to 473 mg/L). The guideline is calculated based on the individual hardness value for each sample.
(l) = the guideline for dissolved copper was calculated using the BC ENV Biotic Ligand Model (BLM) tool using the full model, quick normalization approach. Humic acid content of 10% was assumed based on guidance from BC ENV (2019).
(Mn) = concentration is higher than the 30-day mean BC ENV guideline or outside the recommended pH, DO or total alkalinity range.
(E) = concentration is higher than the EVWQP benchmarks guideline.
Bolded concentrations are higher than water quality guidelines.
Shaded concentrations are higher than the EVWQP benchmark (e.g., for nitrate, total selenium, dissolved cadmium or sulphate).
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision after comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Concentrations were screened against available Working and Approved British Columbia Ministry of Environment and Climate Change Strategy (BC ENV) Water Quality Guidelines for the Protection of Aquatic Life; Accessed January 2020 from: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines.
- = no guideline or no data.
BC ENV = British Columbia Ministry of Environment & Climate Change Strategy; EVWQP = Elk Valley Water Quality Plan guidelines; *C. dubia* = *Ceriodaphnia dubia*; *P. subcapitata* = *Pseudokirchneriella subcapitata*; *H. azteca* = *Hyalella azteca*; *P. promelas* = *Pimephales promelas*; *O. mykiss* = *Oncorhynchus mykiss*; CV = coefficient of variation; ∑ = s

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2							Q3								Q4							
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia and P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19 (*H. azteca*)		Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia and P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia and P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia and P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV	Mean	CV						Mean	CV						Mean	CV	Mean	CV						Mean	CV	Mean	CV
Field Measured																																						
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.1	8.1	8.2	8.2	8.2	8.2	0.01	8.2	0.01	8.4	8.3	8.4	8.5	8.2	8.4	0.01	8.3	8.3	8.2	8.3	8.3	8.3	0.01	8.3	0.01	8.3	0.01	8.3	8.3	8.3	0.01	8.3	0.0054
Temperature	°C	-	-	-	-0.1	-0.1	0.20	0.50	1.9	0.2	0.9	0.54	1.4	4.0	3.7	3.3	3.7	4.0	3.7	0.1	12	7.9	13	9.8	8.9	10	0.2	10	0.2	0	1.8	-0.1	0	0	0.46	1.9	0.43	1.8
Conventional Parameters																																						
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.2	8.3	8.2	8.2	8.2	0.0061	8.2	0.0054	8.4	8.1	8.3	8.4	8.2	8.3	0.0157	8.4	8.4	8.4	8.4	8.3	8.4	0.000	8.4	0.0053	8.4	8.4	8.3	8.2	8.4	0.0069	8.3	0.01
Hardness, as $CaCO_3$	mg/L	-	-	-	579	540	618	726	578	616	0.13	608	0.12	391	238	285	244	185	269	0.29	542	549	589	514	590	549	0.06	557	0.06	578	559	609	645	579	598	0.06	594	0.057
Total alkalinity, as $CaCO_3$	mg/L	20[a6]	-	-	229	219	228	222	215	225	0.021	223	0.027	164	124	153	139	116	139	0.143	204	205	217	214	209	210	0.031	210	0.027	217	207	230	231	213	221	0.052	220	0.048
Total dissolved solids	mg/L	-	-	-	809	761	869	949	751	847	0.096	828	0.099	504	276	360	325	229	339	0.309	674	670	767	725	753	709	0.065	718	0.062	773	766	803	756	751	775	0.026	770	0.027
Total suspended solids	mg/L	-	-	-	<1.0	1.9	<1.0	<1.0	2.1	0.85	0.53	1.1	0.5	2.8	45	6.8	8.2	29	18	0.98	<1.0	1.3	2.2	<1.0	<1.0	1.1	0.5	1.0	0.52	14	<1.0	1.5	5.5	1.5	5.4	1.12	4.6	1.2
Total organic carbon	mg/L	-	-	-	0.86	<0.5	<0.5	0.79	0.80	0.80	0.54	0.35	0.59	0.3	1.9	3.5	1.7	2.0	1.8	0.35	1.0	0.68	0.72	0.85	0.65	0.82	0.18	0.78	0.19	0.84	1.1	<0.5	1.2	0.6	0.82	0.35	0.78	0.36
Dissolved organic carbon	mg/L	-	-	-	0.66	<0.5	<0.5	0.83	0.80	0.5	0.32	0.56	0.28	2.0	3.1	1.7	1.8	1.7	2.1	0.29	0.95	0.78	0.72	0.80	0.61	0.81	0.12	0.77	0.16	0.78	0.93	<0.5	1.2	0.7	0.78	0.36	0.76	0.34
Turbidity	NTU	-	-	-	0.60	0.50	0.29	1.1	1.3	0.61	0.53	0.75	0.55	1.6	28	2.3	4.7	15	10	1.1	0.53	0.42	0.26	0.96	0.46	0.54	0.55	0.53	0.5	3.4	0.58	0.73	3.6	0.4	2.1	0.79	1.7	0.92
Conductivity	µS/cm	-	-	-	1,060	1,040	1,150	1,230	1,050	1,120	0.078	1106	0.074	723	460	590	511	392	535	0.238	931	951	998	935	1,020	954	0.032	967	0.041	868	981	1,030	995	995	969	0.072	974	0.064
Oxidation-reduction potential	mV	-	-	-	417	419	361	428	454	406	0.075	416	0.082	406	421	342	368	415	390	0.087	292	295	457	286	436	333	0.25	353	0.242	307	423	315	364	284	352	0.152	339	0.16
Acidity To pH 8.3, as $CaCO_3$	mg/L	-	-	-	3.4	1.9	1.5	1.6	<1.0	2.1	0.42	1.8	0.51	<1.0	<1.0	<1.0	<1.0	1.3	<1.0	0.66	0.2	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0.0	<1.0	<1.0	<1.0	<1.0	2.9	<1.0	0.0	0.98	0.87
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	229	219	223	222	215	223	0.019	222	0.023	159	124	151	133	116	137	0.132	197	199	208	206	204	203	0.026	203	0.023	211	203	230	226	213	218	0.058	217	0.051
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	4.6	<1.0	<1.0	1.5	1.2	1.3	1.2	5.2	<1.0	2.0	5.6	<1.0	2.8	0.8	7.0	6.0	9.0	7.6	4.8	7.4	0.2	6.9	0.2	6.2	3.8	<1.0	4.8	<1.0	3.8	0.6	3.2	0.73
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																						
Bromide	mg/L	-	-	-	<0.25	<0.25	<0.05	<0.25	<0.25	<0.1	1.0	<0.105	0.85	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0	<0.05	<0.05	<0.25	<0.05	2.0	<0.05	1.69	<0.05	0.24	<0.05	<0.25	<0.25	<0.25	<0.05	<0.1	1.0	<0.085	1.3
Calcium	mg/L	-	-	-	130	119	147	168	141	141	0.15	141	0.13	90	55	63	57	41	61	0.29	121	122	129	115	129	122	0.05	123	0.05	127	128	140	148	126	136	0.07	134	0.073
Chloride	mg/L	150	600	-	3.8	4.1	4.9	12	12	6.1	0.61	7.2	0.57	2.3	0.70	1.7	0.95	0.61	1.2	0.57	2.1	2.1	2.5	2.2	3.2	2.2	0.08	2.4	0.19	3.3	2.8	3.4	3.4	2.8	3.2	0.09	3.1	0.097
Fluoride	mg/L	-	1.6 - 2.1[f6]	-	0.12	<0.1	0.073	0.11	0.11	0.088	0.23	0.093	0.19	0.12	0.088	0.11	0.098	0.087	0.10	0.13	0.13	0.12	0.13	0.12	0.13	0.12	0.04	0.13	0.04	0.14	<0.1	0.12	0.13	0.14	0.11	0.16	0.12	0.14
Magnesium	mg/L	-	-	-	62	59	61	75	55	64	0.11	62	0.12	41	25	31	25	20	28	0.28	59	60	65	55	65	59	0.07	61	0.07	63	58	63	67	64	63	0.06	63	0.051
Potassium	mg/L	-	-	-	1.8	1.7	1.8	2.2	1.9	1.9	0.12	1.9	0.11	1.1	0.82	1.1	1.1	0.93	0.77	0.93	0.16	1.9	1.8	2.0	1.9	2.1	1.9	0.04	1.9	0.05	1.8	1.9	1.9	1.9	1.7	1.9	0.04	1.8	0.051
Sodium	mg/L	-	-	-	14	13	15	20	16	15	0.21	15	0.18	7.0	3.2	4.5	4.7	3.4	4.6	0.33	11	11	12	11	12	11	0.06	11	0.06	12	11	12	13	12	12	0.06	12	0.055
Sulphate	mg/L	429[b, c]	-	481[b]	343	370	412	**491**[bin, k]	404	404	0.16	404	0.14	219	107	152	126	86	138	0.37	313	327	377	328	383	336	0.08	346	0.09	358	345	385	388	354	369	0.06	366	0.053
Major anion sum	meq/L	-	-	-	12	11	13	15	12	13	0.11	13	0.1	8.1	4.8	6.4	5.5	4.2	5.8	0.26	11	11	13	11	13	11	0.06	12	0.07	12	12	13	13	12	12	0.05	12	0.05
Major cation sum	meq/L	-	-	-	12	11	13	15	12	13	0.13	13	0.12	8.1	4.9	5.9	5.1	3.9	5.6	0.29	11	12	12	11	12	11	0.05	12	0.06	12	12	13	14	12	13	0.06	12	0.056
Nutrients																																						
Nitrate	mg-N/L	3.0	33	5.6 - 15[d]	**3.3**[bin]	**3.3**[bin]	**4.0**[bin]	**4.9**[bin]	**3.4**[bin]	**3.9**[bin]	0.2	**3.8**[bin]	0.18	2.0	1.1	1.6	1.2	0.75	1.3	0.36	2.4	2.5	2.9	2.6	2.9	2.6	0.08	2.7	0.09	2.9	2.8	**3.2**[bin]	**3.1**[bin]	2.9	3.0	0.06	3.0	0.054
Nitrite	mg-N/L	0.020 - 0.20[e]	0.060 - 0.60[e]	-	0.012	0.0092	0.017	0.011	0.0089	0.012	0.28	0.011	0.28	0.0026	0.0010	<0.001	0.0023	0.0018	0.0016	0.45	0.0043	0.0047	0.0080	0.0058	<0.005	0.0057	0.29	0.0051	0.29	0.0037	<0.005	<0.005	<0.005	0.0028	0.23	0.0027	0.41
Total ammonia	mg-N/L	0.24 - 2.1[f]	1.3 - 25[f6]	-	0.0087	0.0077	0.0051	0.043	0.014	0.016	1.1	0.016	1.0	0.015	0.072	0.021	0.036	0.029	0.034	0.6	<0.005	0.0050	0.0088	0.0080	0.0052	0.0061	0.3	0.0059	0.3	0.0072	0.014	<0.005	0.014	0.018	0.0094	0.5	0.011	0.48
Total Kjeldahl nitroaen	mg-N/L	-	-	-	0.33	0.31	0.25	0.14	0.44	0.26	0.35	0.29	0.38	0.30	0.38	0.21	0.081	0.37	0.27	0.47	0.37	0.46	0.27	0.58	0.29	0.42	0.32	0.4	0.33	0.40	0.37	0.17	0.44	0.06	0.35	0.36	0.29	0.58
Orthophosphate	mg-P/L	-	-	-	0.0024	0.0018	0.0019	0.0021	0.0018	0.0021	0.13	0.002	0.13	<0.001	0.0034	0.0020	0.0016	0.0040	0.0023	0.55	<0.001	0.0011	<0.001	<0.001	<0.001	0.00065	0.08	0.00062	0.07	<0.001	<0.001	<0.001	0.0015	0.0018	0.00075	0.33	0.00096	0.39
Phosphorus	mg-P/L	-	-	-	0.0047	0.0047	0.0040	0.0061	0.0043	0.0049	0.18	0.0048	0.17	0.0040	0.039	0.012	0.015	0.036	0.021	0.73	0.0022	<0.002	<0.002	0.0032	<0.002	0.0019	0.31	0.0017	0.31	0.018	<0.002	<0.002	0.0094	0.0022	0.0073	1.03	0.0063	1.1
Total Metals																																						
Aluminum	mg/L	-	-	-	0.0053	0.0032	0.0040	0.015	0.021	0.0069	0.8	0.0096	0.8	0.072	0.48	0.050	0.28	0.64	0.3	0.85	0.0060	0.023	0.0050	0.019	<0.009	0.013	0.69	0.012	0.71	0.23	0.0070	0.0085	0.059	0.010	0.076	1.39	0.063	1.5
Antimony	mg/L	0.0090	-	-	0.00023	0.00024	0.00030	0.00041	0.00027	0.0003	0.28	0.00029	0.25	0.00013	0.00010	0.00015	0.00016	0.00010	0.00013	0.22	0.00021	0.00020	0.00021	0.00022	0.00021	0.00021	0.04	0.00021	0.03	0.00021	0.00020	0.00021	0.00019	0.00023	0.0002	0.05	0.00021	0.071
Arsenic	mg/L	-	0.0050	-	0.00021	0.00020	0.00029	0.00024	0.00019	0.00024	0.17	0.00023	0.18	0.00017	0.00054	0.00021	0.00026	0.00043	0.0032	0.49	0.00019	0.00025	0.00017	0.00019	0.00018	0.0002	0.17	0.0002	0.16	0.00028	0.00019	0.00019	0.00022	0.00019	0.00022	0.19	0.00021	0.18
Barium	mg/L	1.0	-	-	0.078	0.087	0.080	0.085	0.078	0.082	0.053	0.082	0.052	0.056	0.048	0.041	0.041	0.035	0.044	0.179	0.066	0.070	0.073	0.069	0.067	0.069	0.043	0.069	0.04	0.066	0.061	0.066	0.065	0.062	0.065	0.037	0.064	0.036
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	0.00002	0.00002	<0.00002	0.00002	0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	1.2	-	-	0.028	0.031	0.031	0.034	0.031	0.031	0.079	0.031	0.068	0.019	0.012	0.017	0.016	0.012	0.015	0.205	0.027	0.030	0.029	0.030	0.031	0.029	0.049	0.029	0.052	0.031	0.029	0.027	0.026	0.028	0.028	0.078	0.028	0.068
Cadmium	mg/L	-	-	-	0.000020	0.000022	0.000025	0.000038	0.000034	0.000026	0.3	0.000029	0.27	0.000027	0.00010	0.00010	0.00012	0.000098	0.00009	0.4	0.00016	0.000032	0.000018	0.000022	0.000016	0.000022	0.34	0.000021	0.34	0.000024	0.000040	0.000027	0.000032	0.000025	0.000031	0.23	0.000033	0.22
Calcium	mg/L	-	-	-	130	140	142	169	141	145	0.11	144	0.1	86	56	73	61	42	63	0.27	124	120	128	125	126	124	0.03	125	0.02	131	128	140	127	133	132	0.04	132	0.039
Chromium	mg/L	0.0010[f3]	-	-	0.00022	0.00018	0.00018	0.00017	0.00016	0.00019	0.12	0.00018	0.13	0.00024	0.00084	0.00031	0.00059	**0.0011**[bin]	0.00062	0.59	0.00019	0.00020	0.00014	0.00022	<0.0002	0.00019	0.18	0.00017	0.18	0.00052	0.00037	0.00020	0.00024	0.00017	0.00033	0.43	0.0003	0.48
Cobalt	mg/L	0.0040	0.11	-	0.00065	0.00065	0.0011	0.0018	0.0015	0.001	0.5	0.0011	0.44	0.00088	0.0019	0.00047	0.0021	0.0022	0.0015	0.52	0.00067	0.0018	0.00060	0.0010	0.00059	0.001	0.53	0.00092	0.54	0.0027	0.0015	0.0018	0.0027	0.0016	0.0022	0.29	0.0021	0.29
Copper	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	0.0010	<0.0005	0.00052	0.00094	0.0006	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Iron	mg/L	-	1.0	-	<0.01	<0.01	<0.01	<0.01	0.025	<0.01	0	0.009	1	0.071	0.88	0.051	0.27	0.75	0.4	1	0.27	0.043	<0.01	0.022	<0.01	0.019	1	0.016	1	<0.01	<0.01	0.011	0.083	0.012	0.074	0.01	0.061	1.3
Lead	mg/L	0.010 - 0.020[f5]	0.18 - 0.42[f5]	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	0.00075	<0.00005	0.00015	0.00043	0.00028	1	<0.00005	0.000078	<0.00005	<0.00005	<0.00005	0.000038	0	0.000036	0	0.00014	<0.00005	<0.00005	0.000066	<0.000050	0.000063	1	0.000056	0.68
Lithium	mg/L	-	-	-	0.016	0.018	0.018	0.024	0.019	0.019	0.19	0.019	0.16	0.0096	0.0062	0.0075	0.0079	0.0057	0.0074	0.21	0.016	0.016	0.016	0.018	0.017	0.017	0.05	0.017	0.04	0.018	0.018	0.018	0.017	0.018	0.018	0.02	0.018	0.024
Magnesium	mg/L	-	-	-	59	64	68	78	61	67	0.12	66	0.12	40	24	32	26	20	28	0.27	59	59	65	60	66	61	0.05	62	0.05	59	63	67	61	64	63	0.05	63	0.045
Manganese	mg/L	1.4 - 2.6[f5]	2.6 - 3.4[f5]	-	0.0041	0.0043	0.0069	0.011	0.012	0.0067	0.52	0.0077	0.48	0.0081	0.044	0.0050	0.019	0.032	0.022	0.76	0.0037	0.012	0.0067	0.0045	0.0030	0.0068	0.89	0.006	0.91	0.021	0.0070	0.0083	0.018	0.008	0.041	0.52	0.013	0.53
Mercury	mg/L	0.000010	-	-	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0	<0.0000005	0	0.00000088	0.0000027	0.00000093	0.00000098	0.0000020	0.0000015	1	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0	<0.0000005	0	0.00000081	<0.0000005	<0.0000005	0.00000057	<0.00000050	0.00000047	0	0.00000043	0.32
Molybdenum	mg/L	1.0	2.0	-	0.0020	0.0024	0.0031	0.0034	0.0019	0.0027	0.23	0.0025	0.26	0.00094	0.00066	0.00083	0.00090	0.00081	0.00083	0.13	0.0011	0.00095	0.0011	0.0012	0.0011	0.0011	0.08	0.0011	0.07	0.0011	0.0012	0.0011	0.0011	0.0011	0.0013	0.03	0.0011	0.026
Nickel	mg/L	0.005[f]	-	-	**0.013**[bin]	**0.013**[bin]	**0.016**[bin]	**0.019**[bin]	**0.014**[bin]	**0.015**[bin]	0.19	**0.015**[bin]	0.17	**0.0084**[bin]	**0.0073**[bin]	**0.0084**[bin]	**0.013**[bin]	**0.013**[bin]	**0.010**[bin]	0.27	**0.017**[bin]	**0.020**[bin]	**0.018**[bin]	**0.021**[bin]	**0.020**[bin]	**0.019**[bin]	0.1	**0.019**[bin]	0.09	**0.021**[bin]	**0.020**[bin]	**0.023**[bin]	**0.023**[bin]	**0.021**[bin]	**0.022**[bin]	0.07	**0.022**[bin]	0.062
Potassium	mg/L	-	-	-	1.7	1.7	2.0	2.2	1.9	1.9	0.13	1.9	0.11	1.2	0.94	1.1	1.2	0.98	1.1	0.1	1.7	1.9	2.0	1.9	2.0	1.9	0.05	1.9	0.05	2.0	1.8	2.1	2.0	1.8	2.0	0.06	1.9	0.07
Selenium	mg/L	0.0020	-	0.019	**0.0078**[bin]	**0.0085**[bin]	**0.0085**[bin]	**0.0098**[bin]	**0.0087**[bin]	**0.0087**[bin]	0.096	**0.0087**[bin]	0.084	**0.0071**[bin]	**0.0043**[bin]	**0.0074**[bin]	**0.0052**[bin]	**0.0029**[bin]	**0.0054**[bin]	0.353	**0.0084**[bin]	**0.0084**[bin]	**0.0090**[bin]	**0.0078**[bin]	**0.0094**[bin]	**0.0084**[bin]	0.058	**0.0086**[bin]	0.072	**0.0093**[bin]	**0.0090**[bin]	**0.011**[bin]	**0.0088**[bin]	**0.0093**[bin]	**0.0095**[bin]	0.105	**0.0095**[bin]	0.092
Silicon	mg/L	-	-	-	2.4	2.7	2.5	2.4	2.5	2.5	0.051	2.5	0.044	2.0	2.4	2.1	2.4	3.0	2.4	0.16	2.2	2.1	2.0	2.0	2.0	2.0	0.043	2.1	0.041	2.9	2.3	2.3	2.4	2.5	2.5	0.108	2.5	0.094
Silver	mg/L	0.0015[f3]	0.030[f3]	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Sodium	mg/L	-	-	-	13	14	15	20	16	16	0.21	16	0.18	7.1	3.6	4.4	4.8	3.5	4.7	0.31	11	11	12	12	12	11	0.04	11	0.05	11	12	13	13	12	12	0.06	12	0.049
Strontium	mg/L	-	-	-	0.40	0.44	0.45	0.57	0.41	0.46	0.16	0.45	0.15	0.26	0.14	0.19	0.20	0.14	0.19	0.25	0.40	0.37	0.39	0.40	0.38	0.39	0.03	0.39	0.03	0.37	0.39	0.41	0.39	0.40	0.39	0.03	0.39	0.032
Thallium	mg/L	0.00080	-	-	0.000011	0.000011	0.000013	0.000017	0.000014	0.000013	0.22	0.000013	0.19	0.000011	0.000031	0.000010	0.000015	0.000029	0.000019	0.52	0.000015	0.000016	0.000017	0.000016	0.000017	0.000016	0.05	0.000016	0.05	0.000023	0.000016	0.000016	0.000016	0.000016	0.000018	0.2	0.000017	0.18
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	0.00049	<0.0001	0.00023	<0.00010	0.00021	1	0.00017	0.97
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	0.0085	-	-	0.0034	0.0037	0.0041	0.0045	0.0036	0.0039	0.13	0.0038	0.12	0.0019	0.0011	0.0014	0.0013	0.00091	0.0013	0.28	0.0028	0.0028	0.0030	0.0029	0.0032	0.0029	0.03	0.003	0.05	0.0035	0.0033	0.0035	0.0033	0.0034	0.0034	0.04	0.0034	0.037
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	0.0012	<0.0005	0.00078	0.0016	0.0008	1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	0.00067	<0.0005	<0.0005	<0.0005	<0.0005	0.00036	0	0.00033	0.23
Zinc	mg/L	0.079 - 0.19	0.10 - 0.34	-	<0.003	<0.003	<0.003	<0.003	0.0031	<0.003	0	0.0018	0	<0.003	0.0092	0.0085	0.0096	0.0097	0.0077	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	0.0042	<0.003	<0.003	0.0036	<0.0030	0.0027	0	0.0025	0.22
Dissolved Metals																																						
Aluminum	mg/L	0.050[g]	0.10[g]	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	0.0037	0.012	0.0046	0.0070	0.0073	0.0069	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0
Antimony	mg/L	-	-	-	0.00022	0.00023	0.00030	0.00039	0.00030	0.00029	0.28	0.00029	0.24	0.00013	<0.0001	0.00012	0.00014	<0.0001	0.000098	0.18	0.00021	0.00019	0.00

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1						Q2	Q3						Q4					
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia*)	Mar 05	Mar 12	Mar 19	Feb 26, Mar 5, 12, 19 (*H. azteca*)		May 7 (*C. dubia*)	Aug 20 (*C. dubia*)	Aug 27	Sep 03	Sep 10	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Nov 12 (*C. dubia*)	Nov 19	Nov 26	Dec 03	Nov 12, 19, 26, Dec 3 (*H. azteca*)	
									Mean	CV						Mean	CV					Mean	CV
Field Measured																							
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.0	7.9	8.1	8.1	8.0	0.01		7.9	8.2	7.6	8.2	8.0	0.04	8.1	8.2	8.1	8.1	8.1	0.0062
Temperature	°C	-	-	-	0.10	0.10	0.20	0	0.1	0.82	2.8	9.6	7.4	11	6.8	8.8	0.23	0.80	1.7	0.10	0.40	0.75	0.93
Conventional Parameters																							
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.2	8.1	8.0	8.1	0.012	8.3	8.4	8.3	8.4	8.4	8.4	0.006	8.3	8.4	8.2	8.3	8.3	0.0098
Hardness, as $CaCO_3$	mg/L	-	-	-	377	374	396	428	394	0.063	263	292	310	329	195	282	0.212	357	350	357	419	371	0.087
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	-	185	200	182	179	187	0.05	151	163	163	169	130	156	0.113	175	175	183	187	180	0.033
Total dissolved solids	mg/L	-	-	-	526	482	513	568	522	0.068	316	331	381	432	261	351	0.208	459	456	460	464	460	0.0072
Total suspended solids	mg/L	-	-	-	<1.0	1.6	<1.0	5.4	2.0	1.1	12	<1.0	1.4	1.5	1.6	1.3	0.2	<1.0	<1.0	<1.0	<1.0	<1	0
Total organic carbon	mg/L	-	-	-	0.61	<0.5	<0.5	0.88	0.5	0.36	1.4	0.97	0.96	0.71	2.9	1.4	0.74	0.75	0.88	<0.5	0.53	0.6	0.3
Dissolved organic carbon	mg/L	-	-	-	<0.5	<0.5	0.65	0.94	0.52	0.4	1.2	0.78	0.94	0.69	<0.5	0.67	0.28	0.62	0.98	<0.5	<0.5	0.53	0.43
Turbidity	NTU	-	-	-	0.32	0.29	0.42	1.8	0.7	1.0	0.93	0.49	0.63	0.49	0.85	0.62	0.3	0.25	0.32	0.40	0.47	0.36	0.27
Conductivity	µS/cm	-	-	-	419	706	725	770	655	0.24	481	549	585	615	366	529	0.21	585	661	658	688	648	0.068
Oxidation-reduction potential	mV	-	-	-	433	371	379	419	401	0.075	394	373	451	296	339	365	0.18	454	398	414	405	418	0.06
Acidity To pH 8.3, as $CaCO_3$	mg/L	-	-	-	2.3	1.7	3.7	2.7	2.6	0.32	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	<1.0	<1.0	<1.0	<1.0	0
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	185	200	182	179	187	0.05	151	157	163	165	128	153	0.112	172	171	183	187	178	0.045
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	5.4	<1.0	4.2	2.2	3.1	1	3.0	3.8	<1.0	<1.0	2.0	0.73
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	0
Major Ions																							
Bromide	mg/L	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	0
Calcium	mg/L	-	-	-	93	90	101	102	96	0.062	66	73	78	81	53	71	0.179	85	86	85	104	90	0.1
Chloride	mg/L	150	600	-	2.6	2.6	2.9	4.4	3.1	0.27	1.6	0.98	1.2	1.3	0.56	1.0	0.32	2.2	1.9	2.0	2.1	2.0	0.065
Fluoride	mg/L	-	1.5 - 1.9[b]	-	0.17	0.14	0.098	0.16	0.14	0.22	0.18	0.15	0.20	0.22	0.25	0.21	0.22	0.19	0.19	0.19	0.17	0.18	0.042
Magnesium	mg/L	-	-	-	35	36	35	42	37	0.088	24	27	28	31	16	25	0.267	35	33	35	39	36	0.064
Potassium	mg/L	-	-	-	0.93	0.99	0.91	1.1	0.98	0.087	0.74	0.89	0.92	1.0	0.52	0.83	0.257	0.89	0.90	0.90	0.99	0.92	0.051
Sodium	mg/L	-	-	-	7.8	8.0	7.7	10	8.4	0.13	4.6	4.7	4.8	5.4	2.3	4.3	0.32	6.3	6.0	6.5	7.6	6.6	0.1
Sulphate	mg/L	309 - 429[b, c]	-	309 - 481[b]	197	200	222	225	211	0.069	110	128	149	166	70	128	0.327	187	183	195	208	193	0.057
Major anion sum	meq/L	-	-	-	8.0	8.4	8.5	8.5	8.4	0.028	5.4	6.0	6.5	7.0	4.1	5.9	0.211	7.6	7.5	7.9	8.3	7.8	0.045
Major cation sum	meq/L	-	-	-	7.9	7.9	8.3	9.0	8.3	0.066	5.5	6.1	6.4	6.8	4.0	5.8	0.214	7.4	7.3	7.4	8.7	7.7	0.089
Nutrients																							
Nitrate	mg-N/L	3.0	33	4.9 - 13[d]	1.8	1.7	2.0	2.2	1.9	0.098	0.92	0.89	1.00	1.1	0.58	0.89	0.25	1.4	1.5	1.5	1.7	1.5	0.066
Nitrite	mg-N/L	0.020 - 0.060[d]	0.060 - 0.18[e]	-	<0.001	<0.005	<0.001	0.0034	0.0017	1.14	0.0012	0.0014	0.0014	0.0021	0.0011	0.0015	0.28	0.0012	<0.001	<0.001	<0.001	0.00068	0.15
Total ammonia	mg-N/L	0.74 - 1.8[f]	3.8 - 11[g]	-	<0.005	0.0070	0.0061	0.026	0.01	1.0	0.0090	0.011	0.012	0.0068	0.0098	0.0098	0.2	<0.005	0.016	0.0079	0.0064	0.0081	0.58
Total Kjeldahl nitrogen	mg-N/L	-	-	-	0.15	0.18	0.20	0.31	0.21	0.33	0.13	0.29	0.16	0.49	0.12	0.27	0.63	0.30	0.44	0.25	0.21	0.3	0.33
Orthophosphate	mg-P/L	-	-	-	0.0034	0.0028	0.0033	0.0040	0.0034	1.2	<0.001	<0.001	0.0018	0.0013	0.0017	0.0013	0.28	0.0022	0.0022	0.0029	0.0024	0.0024	0.14
Phosphorus	mg-P/L	-	-	-	0.0037	0.0047	0.0042	0.014	0.0067	0.74		0.0023	<0.002		0.0043	0.0022	0.52	0.0059	<0.002	0.0030	0.0027	0.0032	0.55
Total Metals																							
Aluminum	mg/L	-	-	-	<0.003	<0.003	<0.003	0.097	0.025	1.9	0.035	0.010	0.0096	0.0065	0.031	0.014	0.8	0.069	0.0043	0.0078	0.039	0.03	1.0
Antimony	mg/L	0.0090	-	-	0.00017	0.00013	0.00014	0.00017	0.00015	0.14	0.00011	0.00014	0.00014	0.00021	0.00012	0.00014	0.07	0.00013	0.00012	0.00012	0.00011	0.00012	0.068
Arsenic	mg/L	-	0.0050	-	0.00021	0.00021	0.00020	0.00030	0.00023	0.2	0.00019	0.00029	0.00028	0.00026	0.00052	0.00034	0.36	0.00025	0.00021	0.00022	0.00027	0.00024	0.12
Barium	mg/L	1.0	-	-	0.080	0.085	0.085	0.086	0.084	0.033	0.062	0.059	0.070	0.075	0.031	0.058	0.335	0.065	0.067	0.072	0.072	0.069	0.056
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0
Boron	mg/L	1.2	-	-	0.016	0.017	0.013	0.019	0.017	0.073	0.014	0.015	0.016	0.015	0.013	0.014	0.212	0.014	0.013	0.012	0.013	0.014	0.063
Cadmium	mg/L	-	-	-	0.000022	0.000017	0.000016	0.000038	0.000023	0.45	0.000020	0.000012	0.000016	0.000023	0.000022	0.000018	0.27	0.000021	0.000026	0.000019	0.000021	0.000022	0.13
Calcium	mg/L	-	-	-	86	95	95	108	96	0.093	66	77	75	82	50	71	0.204	91	93	101	89	94	0.057
Chromium	mg/L	0.0010[[h]]	-	-	0.00018	0.00017	0.00020	0.00030	0.00021	0.28	0.00020	0.00024	0.00021	0.00025	0.00028	0.00025	0.12	0.00036	0.00019	0.00023	0.00021	0.00025	0.31
Cobalt	mg/L	0.0040	0.11	-	<0.0001	<0.0001	<0.0001	0.00066	0.0002	1.4	0.00014	0.00016	0.00016	0.00013	0.00021	0.00017	0.2	0.00034	0.00018	0.00016	0.00032	0.00025	0.37
Copper	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0
Iron	mg/L	-	1.0	-	<0.01	<0.01	<0.01	0.10	0.029	1.6	0.045	0.011	0.010	<0.01	0.035	0.015	0.8	0.080	<0.01	0.013	0.042	0.035	0.93
Lead	mg/L	0.0092 - 0.020[[b]]	0.15 - 0.42[[b]]	-	<0.00005	<0.00005	<0.00005	0.000084	0.00004	0.43	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.0	0.0000057	<0.00005	<0.00005	<0.00005	0.000033	0.11
Lithium	mg/L	-	-	-	0.0088	0.0098	0.0095	0.012	0.010	0.12	0.0070	0.0080	0.0081	0.0083	0.0043	0.0072	0.27	0.0087	0.0086	0.0090	0.0087	0.0088	0.02
Magnesium	mg/L	-	-	-	32	36	35	42	36	0.12	24	25	29	31	16	25	0.27	32	36	35	34	34	0.046
Manganese	mg/L	1.3 - 2.5[[b]]	2.3 - 3.4[[b]]	-	0.00041	0.00036	0.00052	0.0065	0.0019	1.6	0.0018	0.0020	0.0026	0.0020	0.0030	0.0024	0.2	0.0042	0.0013	0.0013	0.0033	0.0025	0.58
Mercury	mg/L	0.000010	-	-	<0.0000005	<0.0000005	<0.0000005	0.0000061	0.00000034	0.16	0.00000054	<0.0000005	<0.0000005	<0.0000005	<0.0000005	<0.0000005	0.0	<0.0000005	0.00000057	<0.0000005	<0.0000005	0.00000033	0.11
Molybdenum	mg/L	1.0	2.0	-	0.0012	0.0013	0.0014	0.0015	0.0013	0.12	0.00092	0.00085	0.00082	0.00084	0.00077	0.00082	0.04	0.00086	0.00087	0.00087	0.00087	0.00087	0.0067
Nickel	mg/L	0.005[[i]]	-	-	0.0021	0.0022	0.0026	0.0044	0.0028	0.38	0.0011	0.0041	0.0043	0.0038	0.0028	0.0038	0.18	**0.0051**[(Mn)]	**0.0052**[(Mn)]	0.0045	**0.0051**[(Mn)]	**0.0051**[(Mn)]	0.067
Potassium	mg/L	-	-	-	0.87	0.89	0.94	1.1	0.94	0.095	0.73	0.83	0.96	1.00	0.49	0.82	0.284	0.92	0.89	0.96	0.99	0.94	0.049
Selenium	mg/L	0.0020	-	0.019	**0.0049**[(Mn)]	**0.0052**[(Mn)]	**0.0051**[(Mn)]	**0.0058**[(Mn)]	**0.0053**[(Mn)]	0.074	**0.0043**[(Mn)]	**0.0040**[(Mn)]	**0.0040**[(Mn)]	**0.0047**[(Mn)]	**0.0027**[(Mn)]	**0.0039**[(Mn)]	0.217	**0.0054**[(Mn)]	**0.0055**[(Mn)]	**0.0059**[(Mn)]	**0.0052**[(Mn)]	**0.0055**[(Mn)]	0.054
Silicon	mg/L	-	-	-	1.8	2.0	2.0	2.2	2.0	0.086	1.8	1.9	1.9	1.9	1.6	1.8	0.101	2.0	1.8	1.8	2.0	1.9	0.05
Silver	mg/L	0.0015[[b]]	0.0030[[b]]	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0
Sodium	mg/L	-	-	-	6.9	7.6	7.7	10	8.1	0.18	5.2	4.6	5.1	5.5	2.3	4.4	0.33	6.2	6.4	6.0	7.1	6.4	0.072
Strontium	mg/L	-	-	-	0.30	0.31	0.31	0.34	0.32	0.058	0.21	0.23	0.25	0.26	0.15	0.22	0.216	0.26	0.26	0.27	0.27	0.27	0.028
Thallium	mg/L	0.00080	-	-	<0.00001	<0.00001	<0.00001	0.000015	0.0000075	0.22	<0.00001	0.000022	0.000017	0.000018	0.000043	0.000025	0.49	0.000020	0.000014	0.000012	0.000014	0.000015	0.23
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	1.1
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	0
Uranium	mg/L	0.0085	-	-	0.0020	0.0021	0.0021	0.0024	0.0021	0.081	0.0015	0.0015	0.0015	0.0015	0.0011	0.0014	0.138	0.0019	0.0019	0.0020	0.0020	0.0019	0.039
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0
Zinc	mg/L	0.062 - 0.19	0.088 - 0.29	-	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	0
Dissolved Metals																							
Aluminum	mg/L	0.050[[j]]	0.10[[j]]	-	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	0
Antimony	mg/L	-	-	-	0.00012	0.00013	0.00014	0.00015	0.00014	0.096	0.00012	0.00012	0.00013	0.00013	<0.0001	0.00011	0.118	0.00011	0.00012	0.00011	0.00011	0.00011	0.044
Arsenic	mg/L	-	-	-	0.00022	0.00020	0.00019	0.00021	0.00021	0.063	0.00019	0.00031	0.00023	0.00024	0.00050	0.00032	0.391	0.00022	0.00022	0.00018	0.00024	0.00022	0.12
Barium	mg/L	-	-	-	0.079	0.089	0.079	0.085	0.085	0.047	0.056	0.057	0.062	0.075	0.032	0.056	0.321	0.073	0.071	0.068	0.063	0.068	0.071
Beryllium	mg/L	-	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0
Boron	mg/L	-	-	-	0.016	0.015	0.015	0.017	0.016	0.061	0.013	0.014	0.014	0.017	<0.01	0.013	0.209	0.014	0.013	0.012	0.014	0.013	0.072
Cadmium	mg/L	0.00030 - 0.00046[[b]]	0.00097 - 0.0026[[b]]	0.00020 - 0.00032[[b]]	0.000017	0.000020	0.000016	0.000021	0.000018	0.13	0.000011	0.000013	0.000017	0.000020	0.0000063	0.000014	0.41	0.000014	0.000016	0.000014	0.000022	0.000017	0.21
Chromium	mg/L	-	-	-	0.00020	0.00018	0.00015	0.00020	0.00018	0.12	0.00017	0.00019	0.00016	0.00016	0.00025	0.00019	0.22	0.00017	0.00019	0.00016	0.00019	0.00018	0.21
Cobalt	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0.00011	<0.0001	<0.0001	<0.0001	0.000065	0	0.00017	0.00015	0.00013	0.00015	0.00015	0.11
Copper	mg/L	0.0002 - 0.0008[[f]]	0.0011 - 0.0048[[f]]	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0002	0.00042	**0.00021**[(Mn)]	**0.00051**[(Mn)]	0.00031	0.5
Iron	mg/L	-	0.35	-	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	0
Lead	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0
Lithium	mg/L	-	-	-	0.0098	0.0085	0.0094	0.011	0.0098	0.12	0.0066	0.0081	0.0083	0.0089	0.0042	0.0074	0.29	0.0080	0.0083	0.0076	0.0092	0.0083	0.082
Manganese	mg/L	-	-	-	0.00021	0.00025	0.00029	<0.0001	0.0002	0.41	0.00025	0.00061	0.00077	0.0010	0.00080	0.00081	0.22	0.0010	0.00092	0.00079	0.00076	0.00087	0.14
Mercury	mg/L	-	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0
Molybdenum	mg/L	-	-	-	0.0012	0.0012	0.0013	0.0015	0.0013	0.088	0.00092	0.00084	0.00091	0.00090	0.00075	0.00085	0.087	0.00084	0.00085	0.00084	0.00088	0.00085	0.025
Nickel	mg/L	-	-	-	0.0020	0.0023	0.0024	0.0037	0.0026	0.29	0.0019	0.0040	0.0039	0.0037	0.0022	0.0035	0.24	0.0047	0.0048	0.0040	0.0052	0.0047	0.11
Selenium	mg/L	-	-	-	0.0057	0.0053	0.0053	0.0070	0.0058	0.14	0.0044	0.0043	0.0041	0.0046	0.0027	0.0039	0.21	0.0064	0.0054	0.0059	0.0060	0.0059	0.066
Silicon	mg/L	-	-	-	1.9	2.0	1.9	1.9	1.9	0.03	1.7	1.9	1.9	1.9	1.5	1.8	0.111	1.8	1.8	1.6	1.8	1.7	0.047
Silver	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0
Strontium	mg/L	-	-	-	0.30	0.33	0.33	0.33	0.32	0.043	0.20	0.23	0.26	0.27	0.15	0.22	0.244	0.27	0.26	0.28	0.30	0.27	0.073
Thallium	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	0.000010	0.000020	0.000018	0.000017	0.000037	0.000023	0	0.000010	0.000013	0.000011	0.000013	0.000012	0.13
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	0
Uranium	mg/L	-	-	-	0.0020	0.0021	0.0021	0.0023	0.0021	0.068	0.0013	0.0014	0.0016	0.0015	0.0011	0.0014	0.15	0.0018	0.0017	0.0017	0.0020	0.0018	0.057
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0
Zinc	mg/L	-	-	-	<0.001	<0.001	<0.001	<0.001	<0.001	0	<0.001	<0.001	<0.001	<0.001	0.0013	0.0007	0	0.0010	0.0012	0.0012	0.0011	0.0011	0.085
∑ Toxic Units																							
WQGs	-	-	-	-	5.08	5.15	3.78	4.43	4.13	-	2.51	3.56	3.40	4.00	4.68	3.54	-	3.82	3.70	4.07	5.81	3.93	-
WQGs/EVWQP Benchmarks	-	-	-	-	4.59	4.70	3.25	3.84	3.61	-	2.30	3.35	3.15	3.72	4.58	3.33	-	3.44	3.32	3.67	5.36	3.53	-

(a) = guideline is a minimum value, unless the background concentration or value is lower.
(b) = guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (163 to 428 mg/L). The guideline is calculated based on the individual hardness value for each sample.
(c) = for some samples, water hardness was greater than 250 mg/L. At this hardness, no BC ENV water quality guideline has been established for sulphate; however, the observed data were screened against the guideline for very hard water (i.e., 429 mg/L) for comparative purposes.
(d) = the EVWQP benchmark for nitrate is hardness dependent and applies within a hardness range of 67 to 500 mg/L. The guideline range shown is based on the hardness range observed in the dataset (163 to 428 mg/L). The guideline is calculated based on the individual hardness value for each sample and was calculated using the Elk River intercept. The minimum EVWQP guideline is 3 mg/L.
(e) = guideline is chloride dependent. The guideline range shown is based on the chloride concentration range observed in the dataset (0.56 to 4.37 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(f) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.74 mg-N/L) is based on the combination of field pH (8.2) and water temperature (7.4°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.
(g) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (3.83 mg-N/L) is based on the combination of field pH (8.2) and water temperature (7.4°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.
(h) = guideline is for chromium VI.
(i) = guideline is based on site-specific testing conducted in the Elk Valley with *C. dubia* and *H. azteca*.
(j) = guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.6 to 8.2). The guideline is calculated based on the individual pH for each sample.
(k) = the EVWQP benchmark for dissolved cadmium is hardness dependent and applies up to a hardness range of 285 mg/L. The guideline range shown is based on the hardness range observed in the dataset (163 to 428 mg/L). The guideline is calculated based on the individual hardness value for each sample.
(l) = the guideline for dissolved copper was calculated using the BC ENV Biotic Ligand Model (BLM) tool using the full model, quick normalization approach. Humic acid content of 10% was assumed based on guidance from BC ENV (2019).
(Mn) = concentration is higher than the 30-day mean BC ENV guideline or outside the recommended pH, DO or total alkalinity range.
Bolded concentrations are higher than water quality guidelines.
Shaded concentrations are higher than the EVWQP benchmark (e.g., for nitrate, total selenium, dissolved cadmium or sulphate).
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision after comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Concentrations were screened against available Working and Approved British Columbia Ministry of Environment and Climate Change Strategy (BC ENV) Water Quality Guidelines for the Protection of Aquatic Life; Accessed January 2020 from: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines.
- = no guideline or no data.
BC ENV = British Columbia Ministry of Environment & Climate Change Strategy; EVWQP = Elk Valley Water Quality Plan guidelines; *C. dubia* = *Ceriodaphnia dubia* ; *P. subcapitata* = *Pseudokirchneriella subcapitata* ; *H. azteca* = *Hyalella azteca* ; *P. promelas* = *Pimephales promelas* ; *O. mykiss* = *Oncorhynchus mykiss* ; CV = coefficient of variation; ∑ = sum of; WQGs = Water Quality Guidelines; CaCO3 = calcium carbonate; mg/L = milligrams per litre; µS/cm = microsiemens per centimeter; NTU = nephelometric turbidity units; meq/L = milliequivalents per litre; mg-N/L = milligrams of Nitrogen per litre; mg-P/L = milligrams of Phosphorus per litre.

BC ENV (B.C. Ministry of Climate Chande Strategy). 2019. Copper Water Quality guideline for the Protection of Aquatic Life-Technical Report. Water Quality Guideline Series, WQG-03-1. Prov

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2								Q3								Q4							
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia* and *P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia* and *P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia* and *P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia* and *P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV						Mean	CV						Mean	CV	Mean	CV						Mean	CV	Mean	CV
Field Measured																																			
pH	-	6.5 - 9.0	6.5 - 9.0	-	7.9	8.0	8.1	8.0	7.8	8.0	0.01	8.0	7.8	8.1	8.1	7.9	8.0	0.02	8.0	7.8	7.7	7.9	8.2	7.9	0.02	7.9	0.02	8.0	7.9	7.9	8.1	8.0	8.0	0.01	8.0	0.01
Temperature	°C	-	-	-	0.60	0.40	0.50	1.4	2.2	1.0	0.75	4.0	5.4	4.3	5.4	6.4	5.1	0.19	11	8.0	9.2	8.4	9.0	9.1	0.14	9.1	0.12	0.30	3.2	0.90	0.50	0.70	1.2	1.09	1.1	1.06
Conventional Parameters																																			
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.2	8.1	8.2	8.2	8.2	0.0055	8.3	8.0	8.2	8.3	8.1	8.2	0.0159	8.5	8.3	8.4	8.3	8.2	8.4	0.0114	8.3	0.0137	8.3	8.3	8.2	8.1	8.4	8.2	0.0116	8.3	0.014
Hardness, as $CaCO_3$	mg/L	-	-	-	321	366	355	327	359	346	0.059	179	107	152	138	123	140	0.197	281	289	312	249	266	283	0.092	279	0.085	317	285	312	283	320	299	0.059	303	0.059
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	-	188	197	183	180	181	186	0.038	120	79	117	103	88	101	0.175	168	174	180	156	177	170	0.06	171	0.055	185	167	182	156	193	173	0.081	177	0.085
Total dissolved solids	mg/L	-	-	-	385	446	442	421	446	428	0.061	213	127	191	163	136	166	0.219	304	330	387	313	353	334	0.112	337	0.099	388	341	394	338	381	365	0.082	368	0.073
Total suspended solids	mg/L	-	-	-	1.0	2.3	<1.0	1.9	<1.0	1.2	0.5	4.0	54	4.0	8.1	20	18	1.18	<1.0	1.6	2.2	5.5	1.0	2.5	0.82	2.2	0.87	1.0	1.7	<1.0	<1.0	<1.0	0.93	0.38	0.84	0.4
Total organic carbon	mg/L	-	-	-	1.6	0.58	0.84	0.99	1.3	1.1	0.37	2.3	4.3	2.6	2.4	2.3	2.8	0.31	1.3	0.88	0.91	0.94	0.88	1.0	0.17	0.97	0.16	0.81	0.84	<0.5	0.88	<0.5	0.7	0.25	0.61	0.313
Dissolved organic carbon	mg/L	-	-	-	1.4	0.63	0.66	1.2	1.4	1.1	0.36	1.7	3.9	2.3	2.0	2.3	2.4	0.35	1.4	0.81	0.95	0.99	0.80	1.0	0.24	0.99	0.25	0.75	0.88	<0.5	0.81	<0.5	0.67	0.25	0.59	0
Turbidity	NTU	-	-	-	1.3	0.33	1.0	2.1	0.74	1.0	0.62	2.2	30	1.7	4.3	11	9.8	1.21	0.68	0.45	0.60	1.4	0.49	0.78	0.54	0.72	0.54	0.34	0.56	0.25	0.21	0.17	0.34	0.46	0.31	0.5
Conductivity	µS/cm	-	-	-	600	669	645	609	632	631	0.044	359	197	324	288	214	276	0.252	509	520	565	468	498	516	0.077	512	0.069	519	516	567	495	590	524	0.058	537	0.073
Oxidation-reduction potential	mV	-	-	-	347	395	423	436	317	384	0.13	416	418	432	440	338	409	0.1	328	462	458	444	454	423	0.15	429	0.13	356	463	459	414	446	423	0.12	428	0.1
Acidity To pH 8.3, as $CaCO_3$	mg/L	-	-	-	2.7	2.0	2.2	<1.0	<2.0	1.7	0.37	<1.0	3.3	1.8	2.2	1.1	1.8	0.53	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<1.0	0.0	<1.0	<1.0	<1.0	2.0	1.6	0.88	0.57	1.0	0.45
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	188	197	183	180	181	186	0.038	119	79	117	103	88	101	0.173	160	171	175	153	177	165	0.061	167	0.062	181	166	184	156	178	172	0.076	173	0.068
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	1.2	<1.0	<1.0	<1.0	<1.0	0.64	0	7.6	3.6	4.4	2.4	<1.0	4.5	0	3.7	1	3.8	<1.0	<1.0	<1.0	14	1.3	1	3.9	1.5
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																			
Bromide	mg/L	-	-	-	<0.05	0.24	0.15	<0.05	<0.05	0.093	0.9	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0	<0.05	<0.05	0.062	<0.05	<0.05	0.034	0.2	0.032	0.2	0.061	<0.05	0.056	<0.05	<0.05	0.042	0.1	0.038	0
Calcium	mg/L	-	-	-	76	86	86	78	77	80	0.061	46	29	38	35	32	36	0.179	68	69	73	61	65	67	0.077	67	0.068	74	70	76	70	79	72	0.042	74	0.053
Chloride	mg/L	150	600	-	3.6	4.2	4.8	5.2	0.99	3.8	0.44	2.2	0.56	1.7	1.4	0.97	1.4	0.47	2.7	2.7	3.4	1.9	2.4	2.7	0.22	2.6	0.2	4.4	3.2	4.1	3.0	3.8	3.7	0.18	3.7	0
Fluoride	mg/L	-	1.3 - 1.9[b]	-	0.14	0.13	0.052	0.14	0.21	0.13	0.42	0.12	0.094	0.12	0.10	0.11	0.11	0.09	0.12	0.16	0.15	0.21	0.13	0.16	0.24	0.15	0.22	0.15	0.14	0.16	0.095	0.16	0.14	0.22	0.14	0.2
Magnesium	mg/L	-	-	-	32	37	34	32	41	35	0.11	16	8.3	14	12	11	12	0.24	27	29	32	24	25	28	0.12	27	0.11	32	27	30	26	30	29	0.1	29	0.087
Potassium	mg/L	-	-	-	0.91	1.1	1.1	1.0	0.75	0.97	0.15	0.66	0.46	0.60	0.51	0.45	0.54	0.17	0.92	0.87	1.0	0.85	0.79	0.91	0.08	0.89	0.09	0.97	0.84	0.91	0.86	0.94	0.89	0.06	0.9	0.058
Sodium	mg/L	-	-	-	3.9	3.8	4.2	4.6	1.3	3.6	0.36	2.6	1.2	2.1	1.7	1.6	1.8	0.28	3.2	3.5	3.7	3.1	3.0	3.4	0.08	3.3	0.09	4.0	3.7	4.0	3.7	3.8	3.8	0.05	3.8	0.041
Sulphate	mg/L	309 - 429[c, c]	-	309 - 481[b]	129	164	160	128	174	151	0.14	61	21	50	42	29	40	0.4	98	106	124	91	99	105	0.13	104	0.12	134	112	129	110	132	121	0.1	123	0.093
Major anion sum	meq/L	-	-	-	6.7	7.7	7.3	6.5	7.4	7.1	0.068	3.8	2.1	3.5	3.0	2.4	2.9	0.243	5.6	5.9	6.4	5.2	5.7	5.7	0.09	5.7	0.078	6.8	5.9	6.6	5.6	6.9	6.2	0.09	6.3	0.09
Major cation sum	meq/L	-	-	-	6.6	7.5	7.3	6.8	7.3	7.1	0.055	3.7	2.2	3.1	2.8	2.5	2.9	0.199	5.8	6.0	6.4	5.1	5.5	5.8	0.091	5.8	0.084	6.5	5.9	6.4	5.8	6.6	6.2	0.06	6.3	0.059
Nutrients																																			
Nitrate	mg-N/L	3.0	33	1.5 - 6.9[cd]	2.0	2.8	2.8	1.9	0.89	2.1	0.38	0.61	0.23	0.62	0.52	0.41	0.48	0.34	1.2	1.4	1.7	1.1	1.3	1.4	0.2	1.3	0.18	1.8	1.6	1.8	1.5	2.1	1.7	0.09	1.8	0.13
Nitrite	mg-N/L	0.020 - 0.080[cd]	0.060 - 0.24[cd]	-	0.0017	0.0061	0.0030	0.0032	<0.001	0.0029	0.68	<0.001	<0.001	<0.001	<0.001	<0.001	<0.001	0.0	0.0024	0.0018	0.0018	0.0012	0.0016	0.0018	0.27	0.0018	0.25	0.0014	0.0015	0.0062	0.0095	<0.001	0.0047	0.85	0.0038	0.99
Total ammonia	mg-N/L	0.37 - 2.1[cf]	1.9 - 11[cg]	-	0.023	0.015	0.058	0.010	0.016	0.025	0.78	<0.005	0.0088	0.0099	0.019	<0.005	0.0086	0.68	0.013	0.011	0.019	0.010	0.021	0.013	0.29	0.015	0.32	0.010	0.012	0.010	0.0097	0.012	0.01	0.07	0.011	0.08
Total Kjeldahl nitrogen	mg-N/L	-	-	-	0.23	0.28	0.26	0.22	0.25	0.25	0.11	0.36	0.30	0.15	<0.05	0.24	0.21	0.58	0.46	0.21	0.95	0.89	0.44	0.63	0.56	0.59	0.53	0.40	0.45	0.27	0.20	0.23	0.33	0.35	0.31	0.35
Orthophosphate	mg-P/L	-	-	-	0.0039	0.0041	0.0050	0.0057	0.0078	0.0053	0.3	<0.001	0.016	0.0095	0.0097	0.011	0.0092	0.57	0.0016	0.0023	0.0018	0.0021	0.0027	0.002	0.16	0.0021	0.2	0.0038	0.0022	0.0028	0.0028	0.0035	0.0029	0.23	0.003	0.21
Phosphorus	mg-P/L	-	-	-	0.0056	0.0050	0.0070	0.0094	0.0097	0.0073	0.29	0.0047	0.080	0.020	0.033	0.03	0.101	0.026	0.0026	0.0036	0.0028	0.010	0.0032	0.0049	0.77	0.0045	0.73	0.0035	0.0024	0.0031	0.0028	0.0050	0.003	0.16	0.0034	0.21
Total Metals																																			
Aluminum	mg/L	-	-	-	<0.003	<0.003	0.026	0.069	0.026	0.025	1.1	0.084	0.60	0.087	0.17	0.27	0.24	0.9	0.0066	0.0070	0.0063	0.0056	0.0038	0.019	1.3	0.016	1.4	0.0037	0.0095	<0.003	0.0056	0.0040	0.0051	0.6	0.0049	0.54
Antimony	mg/L	0.0090	-	-	<0.0001	0.00013	0.00013	<0.0001	<0.0001	0.000082	0.2	0.00010	0.00011	<0.0001	<0.0001	<0.0001	0.000072	0.06	0.00011	0.00012	0.00012	0.00011	0.00010	0.00012	0.05	0.00011	0.07	0.00010	0.00010	0.00011	<0.0001	0.00011	0.00009	0.06	0.000094	0
Arsenic	mg/L	-	0.0050	-	0.00016	0.00014	0.00016	0.00019	0.00021	0.00017	0.16	0.00018	0.00049	0.00023	0.00027	0.00036	0.00031	0.4	0.00016	0.00018	0.00018	0.00018	0.00027	0.00020	0.0002	0.25	0.0002	0.22	0.00015	0.00015	0.00015	0.00018	0.00016	0.00016	0.1	0.00016	0.08
Barium	mg/L	1.0	-	-	0.11	0.12	0.12	0.12	0.058	0.1	0.25	0.084	0.073	0.070	0.056	0.050	0.067	0.2	0.10	0.11	0.12	0.098	0.10	0.11	0.08	0.11	0.08	0.11	0.10	0.11	0.11	0.11	0.03	0.11	0.036
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0.000043	<0.00002	<0.00002	<0.00002	0.000017	1	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	1.2	-	-	0.011	0.013	0.012	0.011	<0.01	0.01	0.11	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	0.012	0.011	0.012	0.012	<0.01	0.011	0.05	0.011	0.05	0.012	0.011	0.012	<0.01	0.012	0.01	0.1	0.012	0.01
Cadmium	mg/L	0.00021 - 0.00046[ch]	0.00057 - 0.0028[ch]	0.00013 - 0.00032[ci]	0.000020	0.000023	0.000020	0.000026	0.000015	0.000021	0.2	0.000016	0.000029	0.000022	0.000021	0.000019	0.000021	0.24	0.000023	0.000021	0.000022	0.000012	0.000018	0.000019	0.27	0.000019	0.24	0.000020	0.000027	0.000025	0.000018	0.000018	0.000022	0.19	0.000022	0.19
Chromium	mg/L	-	-	-	0.00013	0.00016	0.00011	0.00011	<0.0001	0.00011	0.21	<0.0007	0.00019	0.00013	0.00014	0.00016	0.00019	1.26	0.00013	0.00012	0.00016	0.00015	0.00014	0.00014	0.13	0.00014	0.11	0.00012	0.00013	0.00025	0.00020	0.00013	0.00018	0.35	0.00017	0.34
Cobalt	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Copper	mg/L	0.00020 - 0.0017[ci]	0.0017 - 0.0104[ci]	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0.0005	<0.0005	<0.0005	<0.0005	0.0003	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.00020	0.0003	<0.0002	<0.00020	<0.0002	0.00016	0	0.00015	0.4
Iron	mg/L	-	0.35	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0.033	<0.01	<0.01	<0.01	0.011	1	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	0.011	<0.01	0	0.0062	0.07
Lead	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0.00
Lithium	mg/L	-	-	-	0.011	0.017	0.017	0.011	0.0052	0.012	0.39	0.0061	0.0024	0.0047	0.0050	0.0038	0.0044	0.32	0.011	0.011	0.012	0.0089	0.0094	0.011	0.12	0.01	0.12	0.013	0.012	0.013	0.010	0.014	0.012	0.12	0.012	0.12
Manganese	mg/L	-	-	-	0.0012	0.0012	0.0015	0.0021	0.012	0.0037	1.3	0.00026	0.0014	0.00053	0.00095	0.0010	0.00084	0.5	0.00061	0.00087	0.00085	0.00040	0.00066	0.00068	0.3	0.00068	0.3	0.0012	0.00087	0.0012	0.0011	0.00088	0.0011	0.2	0.0011	0.17
Mercury	mg/L	-	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0
Molybdenum	mg/L	-	-	-	0.00086	0.0011	0.0011	0.00085	0.00075	0.00093	0.17	0.00068	0.00044	0.00059	0.00055	0.00045	0.00054	0.19	0.00096	0.00088	0.00090	0.00088	0.00080	0.00091	0.04	0.00088	0.07	0.00093	0.00083	0.00089	0.00082	0.00096	0.00088	0.05	0.0009	0.06
Nickel	mg/L	-	-	-	0.00072	0.0023	0.0020	0.00062	0.00058	0.0013	0.68	0.00096	0.00084	0.00097	0.0012	0.0010	0.00099	0.12	0.0011	0.00091	0.0010	0.00095	0.00074	0.0010	0.08	0.00094	0.14	0.0016	0.0011	0.00093	0.00072	0.0011	0.0011	0.36	0.0011	0
Selenium	mg/L	-	-	-	0.020	0.024	0.021	0.018	0.033	0.023	0.26	0.0058	0.0017	0.0046	0.0043	0.0033	0.0039	0.39	0.013	0.015	0.017	0.0098	0.011	0.013	0.22	0.013	0.21	0.015	0.013	0.014	0.013	0.017	0.014	0.05	0.014	0.11
Silicon	mg/L	-	-	-	2.5	2.5	2.4	2.4	1.9	2.3	0.11	1.7	1.7	2.1	1.9	1.8	1.9	0.1	2.3	2.3	2.6	2.2	2.3	2.4	0.06	2.3	0.06	2.3	2.3	2.4	2.3	2.4	2.3	0.02	2.4	0.023
Silver	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Strontium	mg/L	-	-	-	0.18	0.20	0.21	0.18	0.11	0.18	0.22	0.12	0.073	0.098	0.088	0.074	0.09	0.2	0.17	0.16	0.16	0.16	0.16	0.16	0.03	0.16	0.03	0.18	0.17	0.18	0.17	0.19	0.18	0.03	0.18	0.034
Thallium	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0.0
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	0.0085	-	-	0.0013	0.0020	0.0017	0.0015	0.0023	0.0017	0.25	0.00065	0.00039	0.00057	0.00049	0.00040	0.0005	0.22	0.0011	0.0011	0.0012	0.0012	0.0011	0.0012	0.06	0.0011	0.06	0.0014	0.0013	0.0014	0.0012	0.0014	0.0013	0.08	0.0014	0.073
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0.0025	0.00059	0.00088	0.0015	0.0012	1	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Zinc	mg/L	0.013 - 0.19	0.039 - 0.31	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0.0066	<0.003	<0.003	0.0033	0.0029	1	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0
Dissolved Metals																																			
Aluminum	mg/L	0.050[ci]	0.10[ci]	-	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	0.0076	0.041	0.0096	0.015	0.014	0.017	1	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0	<0.003	<0.003	<0.003	<0.003	<0.003	<0.003	0	<0.003	0
Antimony	mg/L	-	-	-	<0.0001	0.00012	0.00014	<0.0001	<0.0001	0.000082	0.22	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.0	0.00011	0.00010	0.00011	0.00011	<0.0001	0.00011	0.05	0.000096	0.06	0.00011	0.00010	<0.0001	<0.0001	0.00010	0.000078	0.06	0.000082	0
Arsenic	mg/L	-	-	-	0.00015	<0.0001	0.00015	0.00014	0.00019	0.00014	0.24	0.00018	0.00022	0.00018	0.00023	0.00020	0.0002	0.11	0.00019	0.00018	0.00016	0.00024	0.00017	0.00019	0.18	0.00019	0.17	0.00016	0.00013	0.00022	0.00013	0.00014	0.00016	0.27	0.00016	0
Barium	mg/L	-	-	-	0.12	0.12	0.12	0.13	0.055	0.11	0.28	0.083	0.056	0.064	0.052	0.046	0.06	0.24	0.11	0.11	0.11	0.096	0.10	0.11	0.07	0.11	0.07	0.12	0.10	0.12	0.11	0.11	0.11	0.06	0.11	0.052
Beryllium	mg/L	-	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	-	-	-	0.011	0.012	0.012	0.011	<0.01	0.01	0.08	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.0	0.012	0.012	0.012	<0.01	0.011	0.01	0.1	0.01	0.09	0.010	0.010	0.011	<0.01	0.010	0.009	0.06	0.0092	0
Cadmium	mg/L	0.00021 - 0.00046[ch]	0.00057 - 0.0028[ch]	0.00013 - 0.00032[ci]	0.000020	0.000023	0.000020	0.000026	0.000015	0.000021	0.2	0.000016	0.000029	0.000022	0.000021	0.000019	0.000021	0.24	0.000023	0.000021	0.000022	0.000012	0.000018	0.000019	0.27	0.000019	0.24	0.000020	0.000027	0.000025	0.000018	0.000018	0.000022	0.19	0.000022	0.19
Chromium	mg/L	-	-	-	0.00013	0.00016	0.00011	0.00011	<0.0001	0.00011	0.21	<0.0007	0.00019	0.00013	0.00014	0.00016	0.00019	1.26	0.00013	0.00012	0.00016	0.00015	0.00014	0.00014	0.13	0.00014	0.11	0.00012	0.00013	0.00025	0.00020	0.00013	0.00018	0.35	0.

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q1					Q2							Q3							Q4									
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	Feb 26 (*C. dubia* and *P. subcapitata*)	Mar 05	Mar 12	Mar 19	Mar 26	Feb 26, Mar 5, 12, 19, 26 (*P. promelas*)		May 7 (*C. dubia* and *P. subcapitata*)	May 14	May 21	May 28	Jun 04	May 7, 14, 21, 28, Jun 4 (*O. mykiss*)		Aug 20 (*C. dubia* and *P. subcapitata*)	Aug 27	Sep 03	Sep 10	Sep 17	Aug 20, 27, Sep 3, 10 (*H. azteca*)		Aug 20, 27, Sep 3, 10, 17 (*P. promelas*)		Nov 12 (*C. dubia* and *P. subcapitata*)	Nov 19	Nov 26	Dec 03	Dec 10	Nov 12, 19, 26, Dec 3 (*H. azteca*)		Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*)	
										Mean	CV						Mean	CV						Mean	CV	Mean	CV					Mean	CV	Mean	CV
Field Measured																																			
pH	-	6.5 - 9.0	6.5 - 9.0	-	7.7	8.0	7.8	7.9	8.0	7.9	0.02	7.8	7.9	7.8	7.9	8.2	7.9	0.021	7.7	7.6	7.7	7.7	8.2	7.7	0.01	7.8	0.03	7.9	8.1	8.0	8.0	7.7	8.0	0.01	7.9	0.02
Temperature	°C	-	-	-	2.4	3.1	3.9	3.6	3.8	3.4	0.18	4.9	4.5	3.8	4.5	6.6	4.9	0.216	6.4	5.9	7.8	6.1	6.8	6.6	0.13	6.6	0.11	4.3	3.9	0.1	3.4	4.6	2.9	0.66	3.3	0.56
Conventional Parameters																																			
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.1	7.9	8.3	8.0	8.1	0.02	8.2	8.2	8.3	8.4	7.3	8.1	0.055	8.1	8.1	8.2	8.2	8.2	8.2	0.007	8.2	0.007	8.2	8.2	8.2	8.2	8.4	8.2	0.00	8.2	0.011
Hardness, as $CaCO_3$	mg/L				746	696	745	617	638	688	0.087	521	438	401	420	279	412	0.212	497	507	515	580	573	525	0.072	534	0.073	663	674	649	651	728	659	0.018	673	0.048
Total alkalinity, as $CaCO_3$	mg/L	$20^{(a)}$			227	218	203	203	201	210	0.055	198	160	184	178	145	173	0.12	201	209	213	226	216	212	0.049	213	0.043	214	219	227	228	226	222	0.03	223	0.027
Total dissolved solids	mg/L	-	-	-	1,040	898	1,020	869	797	925	0.11	693	530	528	504	334	518	0.246	675	685	677	799	795	709	0.08	726	0.09	896	864	921	863	970	886	0.03	903	0.049
Total suspended solids	mg/L	-	-	-	<1.0	<1.0	1.8	16	2.5	4.3	1.5	<1.0	3.1	<1.0	1.4	1.3	1.4	0.646	<1.0	1.7	<1.0	1.7	<1.0	1.1	0.4	0.98	0.4	2.4	<1.0	<1.0	<1.0	1.3	0.98	0.7	1.0	0.58
Total organic carbon	mg/L	-	-	-	1.1	0.86	0.61	3.9	0.83	1.5	0.94	<0.5	0.78	1.3	0.67	<0.5	0.64	0.488	0.73	0.64	0.57	<0.5	0.51	0.55	0.18	0.54	0.18	0.72	1.0	<0.5	0.87	0.78	0.71	0.31	0.73	0.26
Dissolved organic carbon	mg/L	-	-	-	0.85	0.91	0.62	0.74	0.89	0.8	0.15	<0.5	<0.5	0.60	0.50	<0.5	0.37	0.121	0.55	<0.5	0.63	<0.5	0.54	0.42	0.15	0.44	0.12	0.56	0.52	<0.5	0.51	0.65	0.46	0.06	0.5	0.12
Turbidity	NTU	-	-	-	1.1	0.91	0.70	52	1.6	11	2.0	0.53	2.4	0.29	0.32	0.78	0.86	1.009	0.35	0.52	0.38	0.34	0.39	0.4	0.2	0.4	0.2	0.41	0.42	0.59	0.30	0.26	0.43	0.3	0.4	0.32
Conductivity	µS/cm	-	-	-	1,390	1,130	1,310	1,130	1,100	1,212	0.11	958	789	821	793	547	782	0.19	901	902	970	1,040	1,020	953	0.07	967	0.07	1,010	1,110	1,120	1,130	1,270	1,093	0.05	1,128	0.082
Oxidation-reduction potential	mV	-	-	-	382	318	441	451	470	412	0.15	454	429	451	328	387	410	0.129	241	283	314	275	307	278	0.11	284	0.1	441	416	402	434	409	423	0.04	420	0.039
Acidity To pH 8.3, as $CaCO_3$	mg/L	-	-	-	4.0	4.8	4.1	2.7	2.1	3.5	0.31	<1.0	<1.0	<1.0	3.1	<1.0	1.0	0.921	6.2	3.5	3.8	2.8	2.1	4.1	0.36	3.7	0.42	1.3	2.8	<1.0	2.9	<1.0	1.9	0.53	1.6	0.6
Bicarbonate alkalinity, as $CaCO_3$	mg/l	-	-	-	227	218	203	203	201	210	0.055	198	160	181	171	145	171	0.118	201	209	213	226	216	212	0.049	213	0.043	214	219	227	228	214	222	0.03	220	0.031
Carbonate alkalinity, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	2.2	7.6	<1.0	2	1.462	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Hydroxide alkalinity, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.00	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																			
Bromide	mg/L	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	0	<0.25	<0.05	<0.05	<0.05	<0.05	<0.045	1.988	<0.05	<0.05	<0.25	<0.25	<0.25	<0.075	2	<0.085	1	<0.25	<0.05	<0.25	<0.25	<0.25	<0.1	1	<0.11	0.85
Calcium	mg/L	-	-	-	154	152	157	136	142	148	0.079	112	99	90	93	61	91	0.24	110	115	114	124	125	116	0.082	118	0.074	142	150	136	145	162	143	0.084	147	0.082
Chloride	mg/L	150	600	-	42	27	50	23	21	33	0.39	13	5.6	8.8	8.6	2.8	7.8	0.495	17	15	19	16	23	17	0.1	18	0.16	31	7.3	8.9	8.4	35	14	0.82	18	0.76
Fluoride	mg/L	-	$1.7 - 2.1^{(b)}$	-	0.21	0.14	<0.1	0.13	0.19	0.14	0.31	0.26	0.24	0.23	0.19	0.25	0.23	0.117	0.23	0.23	0.18	0.20	0.22	0.21	0.11	0.21	0.1	0.24	0.15	0.18	0.13	0.11	0.17	0.28	0.16	0.31
Magnesium	mg/L	-	-	-	88	77	86	67	69	77	0.12	58	46	43	46	31	45	0.218	54	54	56	66	64	57	0.1	58	0.1	75	73	75	70	78	73	0.03	74	0.042
Potassium	mg/L	-	-	-	2.0	1.9	2.4	1.8	1.8	2.0	0.073	1.5	1.5	1.5	1.5	1.2	1.4	0.10	1.6	1.6	1.6	1.7	1.7	1.6	0.055	1.6	0.049	1.8	1.8	1.8	1.8	1.9	1.8	0.042	1.8	0.051
Sodium	mg/L	-	-	-	14	13	21	12	10	14	0.26	8.4	5.1	6.0	6.4	3.9	6.0	0.284	8.4	8.2	9.0	8.5	10	8.5	0.06	8.8	0.08	13	7.5	7.7	7.6	14	8.9	0.29	9.9	0.32
Sulphate	mg/L	$429^{(a, c)}$	-	$481^{(d)}$	**$490^{(Min, E)}$**	416	**$523^{(Min, E)}$**	375	411	**$443^{(Min)}$**	0.14	333	218	209	196	123	216	0.35	254	249	279	312	319	274	0.11	283	0.11	408	350	399	410	427	392	0.07	399	0.073
Major anion sum	meq/L	-	-	-	17	15	17	13	14	15	0.1	12	8.6	8.9	8.5	5.9	8.8	0.255	10	10	11	12	12	11	0.08	11	0.08	15	13	14	15	15	14	0.05	14	0.057
Major cation sum	meq/L	-	-	-	16	15	16	13	13	14	0.091	11	9.0	8.4	8.7	5.8	8.5	0.211	10	11	11	12	12	11	0.071	11	0.073	14	14	13	13	15	14	0.019	14	0.053
Nutrients																																			
Nitrate	mg-N/L	3.0	33	8.4 - $15^{(b)}$	**$7.5^{(Min)}$**	**$11^{(Min)}$**	**$9.5^{(Min)}$**	**$12^{(Min)}$**	**$11^{(Min)}$**	**$11^{(Min)}$**	0.17	**$13^{(Min)}$**	**$9.6^{(Min)}$**	**$8.4^{(Min)}$**	**$7.8^{(Min)}$**	**$4.9^{(Min)}$**	**$9.6^{(Min)}$**	0.337	**$9.1^{(Min)}$**	**$8.8^{(Min)}$**	**$8.8^{(Min)}$**	**$9.7^{(Min)}$**	**$9.2^{(Min)}$**	**$9.1^{(Min)}$**	0.05	**$9.1^{(Min)}$**	0.04	**$12^{(Min)}$**	**$16^{(Min, E)}$**	**$18^{(Min, E)}$**	**$18^{(Min, E)}$**	**$11^{(Min)}$**	**$16^{(Min, E)}$**	0.18	**$15^{(Min)}$**	0.22
Nitrite	mg-N/L	0.040 - $0.20^{(e)}$	0.12 - $0.60^{(e)}$	-	<0.005	0.021	<0.005	<0.005	<0.005	0.0062	1.2	<0.005	<0.001	<0.001	<0.001	<0.001	<0.0009	1.988	<0.001	<0.001	<0.005	<0.005	<0.005	<0.0015	1.5	<0.0017	1.3	<0.005	0.0014	<0.005	<0.005	<0.005	0.0022	0.8	0.0023	0.71
Total ammonia	mg-N/L	0.48 - $2.0^{(f)}$	2.5 - $12^{(g)}$	-	0.0077	0.0058	0.0066	0.043	0.0086	0.014	1.1	<0.005	0.0060	0.064	<0.005	<0.005	0.015	1.693	0.0087	0.0056	0.0050	0.012	0.014	0.0079	0.4	0.0091	0.4	0.012	0.013	0.100	<0.005	0.0067	0.032	1.4	0.027	1.5
Total Kjeldahl Nitrogen	mg-N/L	-	-	-	0.23	0.44	0.12	0.50	0.14	0.29	0.61	<0.05	0.52	0.32	<0.05	0.34	0.25	0.825	0.15	<0.05	<0.05	0.20	<0.05	0.1	0.75	0.085	0.84	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0.0	<0.05	0
Orthophosphate	mg-P/L	-	-	-	<0.001	0.0010	0.0012	0.0018	0.0022	0.0013	0.4	0.0011	0.0017	0.0018	0.0023	0.0018	0.0017	0.246	0.0019	0.0021	0.0011	0.0016	0.0019	0.0017	0.26	0.0017	0.23	0.0018	0.0024	0.0024	0.0029	0.0016	0.0024	0.19	0.0022	0.23
Phosphorus	mg-P/L	-	-	-	0.0057	0.0052	0.0046	0.021	0.0045	0.0082	0.88	0.0033	0.0049	0.0033	0.0042	0.0039	0.173	<0.002	<0.002	0.0045	0.0025	0.0026	0.0023	0.53	0.0023	0.45	0.0050	0.0024	0.0029	0.0043	0.0029	0.0037	0.33	0.0035	0.31
Total Metals																																			
Aluminum	mg/L	-	-	-	0.0041	0.0034	0.0040	0.47	0.017	0.099	2.1	0.0033	0.026	0.0041	0.0038	0.0091	0.0092	1.034	<0.003	0.0057	0.0046	<0.003	0.0037	0.0033	0.4	0.0034	0.3	<0.003	0.0055	<0.003	0.0041	<0.003	0.0032	0.4	0.0028	0.39
Antimony	mg/L	0.0090	-	-	0.00026	0.00025	0.00024	0.00039	0.00029	0.00029	0.21	0.00027	0.00036	0.00027	0.00029	0.00035	0.00031	0.142	0.00028	0.00029	0.00033	0.00029	0.00025	0.0003	0.07	0.00029	0.1	0.00028	0.00035	0.00036	0.00036	0.00029	0.00034	0.11	0.00033	0.12
Arsenic	mg/L	-	0.0050	-	<0.0001	<0.0001	<0.0001	0.00019	0.00012	0.000092	0.42	0.00013	0.00018	0.00014	0.00013	0.00016	0.00015	0.146	<0.0001	<0.0001	0.00011	0.00011	0.0001	0.00008	0.07	0.000074	0.07	<0.0001	0.00013	0.00016	0.00016	<0.0001	0.00013	0.23	0.00011	0.27
Barium	mg/L	1.0	-	-	0.059	0.068	0.064	0.083	0.048	0.064	0.2	0.042	0.029	0.034	0.031	0.024	0.032	0.216	0.049	0.049	0.054	0.056	0.052	0.052	0.06	0.052	0.06	0.063	0.066	0.072	0.067	0.062	0.067	0.05	0.066	0.059
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	0.000020	<0.00002	0.000012	0.0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.00	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.0	<0.00002	0.0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0.0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	1.2	-	-	0.015	0.012	0.015	0.016	0.016	0.015	0.055	0.015	0.012	0.012	0.014	0.011	0.013	0.128	0.015	0.016	0.018	0.016	0.017	0.016	0.077	0.015	0.07	0.016	0.015	0.019	0.016	0.018	0.017	0.105	0.017	0.098
Cadmium	mg/L	0.00045 - 0.00046[B]	0.0017 - 0.0028[B]	0.00032 - 0.00032[N]	0.000088	0.00012	0.00011	0.00014	0.00017	0.00013	0.25	0.00016	0.00031	0.00029	0.00029	**0.00033[B]**	0.00027	0.252	0.00030	0.00028	0.00027	**0.00039[B]**	0.00025	0.00031	0.06	0.0003	0.07	0.00017	0.00031	0.00024	0.00026	0.00018	0.00024	0.25	0.00023	0.26
Chromium	mg/L	-	-	-	0.00012	0.00017	0.00012	0.00013	0.00012	0.00013	0.16	0.00016	0.00014	0.00015	0.00012	0.00016	0.00015	0.115	<0.0001	0.00012	<0.0001	0.00010	0.00012	0.00008	0.13	0.000088	0.12	0.00014	0.00013	0.00011	0.00014	0.00012	0.00013	0.11	0.00013	0.1
Cobalt	mg/L	-	-	-	0.00030	0.00021	0.00028	0.00016	0.00013	0.00022	0.34	<0.0001	0.00014	<0.0001	0.00010	0.00011	0.00009	0.192	0.00012	<0.0001	0.00013	<0.0001	0.00014	0.000088	0.17	0.000098	0.18	0.00019	<0.0001	<0.0001	<0.0001	0.00026	0.000085	0.53	0.00012	0.61
Copper	mg/L	0.0002 - $0.0006^{(i)}$	0.0008 - $0.0034^{(i)}$	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	0.00030	**0.00107[Min]**	**0.00036[Min]**	**0.00032[Min]**	**0.00055[Min]**	**0.0051[Min]**	1	**0.00052[Min]**	0.62
Iron	mg/L	-	0.35	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	0.13	<0.01	0	0.03	1.8
Lead	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0.00	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Lithium	mg/L	-	-	-	0.047	0.052	0.050	0.051	0.047	0.049	0.044	0.037	0.035	0.030	0.032	0.022	0.031	0.187	0.041	0.043	0.039	0.039	0.041	0.04	0.041	0.041	0.036	0.049	0.052	0.046	0.052	0.054	0.05	0.055	0.05	0.06
Manganese	mg/L	-	-	-	0.062	0.039	0.066	0.023	0.019	0.042	0.52	0.00049	0.0033	0.0042	0.0070	0.0021	0.0034	0.713	0.021	0.0018	0.022	0.0062	0.029	0.013	0.8	0.016	0.72	0.044	0.00033	0.00085	0.00018	0.065	0.011	1.92	0.022
Mercury	mg/L	-	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0.00	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0
Molybdenum	mg/L	-	-	-	0.0075	0.0051	0.0063	0.0042	0.0044	0.0055	0.25	0.0032	0.0027	0.0025	0.0025	0.0017	0.0025	0.205	0.0036	0.0036	0.0042	0.0036	0.0042	0.0037	0.08	0.0038	0.09	0.0057	0.0020	0.0021	0.0021	0.0066	0.003	0.61	0.0037	0.61
Nickel	mg/L	-	-	-	0.0057	0.0063	0.0062	0.0069	0.0070	0.0064	0.083	0.0058	0.0072	0.0027	0.0026	0.0069	0.0068	0.087	0.0084	0.0079	0.0081	0.010	0.0078	0.0086	0.123	0.0085	0.117	0.0070	0.010	0.0099	0.0097	0.0075	0.0092	0.161	0.0089	0.17
Selenium	mg/L	-	-	-	0.034	0.045	0.039	0.047	0.050	0.043	0.15	0.044	0.056	0.028	0.024	0.030	0.036	0.361	0.034	0.030	0.032	0.056	0.036	0.038	0.32	0.038	0.28	0.047	0.11	0.11	0.12	0.045	0.096	0.35	0.086	0.43
Silicon	mg/L	-	-	-	2.0	2.1	2.0	2.1	2.1	2.1	0.025	1.9	1.7	2.0	2.0	1.8	1.9	0.079	2.1	2.3	2.3	2.3	2.2	2.2	0.034	2.2	0.031	2.1	2.3	2.1	2.4	2.2	2.2	0.06	2.2	0.052
Silver	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.00	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Strontium	mg/L	-	-	-	0.25	0.26	0.25	0.25	0.22	0.25	0.063	0.19	0.17	0.15	0.17	0.11	0.16	0.19	0.19	0.20	0.21	0.22	0.21	0.2	0.053	0.21	0.048	0.23	0.24	0.23	0.25	0.25	0.23	0.039	0.24	0.043
Thallium	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0.063	<0.00001	0.000014	0.000011	<0.00001	0.000016	0.00001	0.263	0.000012	0.000012	0.000011	0.000014	0.000012	0.000012	0	0.000012	0	<0.00001	0.000012	0.000011	0.000012	<0.00001	0.000010	0	0.000009	0.11
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0.00	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0.00	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	-	-	-	0.0056	0.0049	0.0048	0.0041	0.0051	0.0049	0.11	0.0036	0.0034	0.0035	0.0032	0.0021	0.0031	0.195	0.0035	0.0036	0.0038	0.0048	0.0042	0.0039	0.15	0.004	0.13	0.0050	0.0056	0.0056	0.0065	0.0055	0.0057	0.11	0.0056	0.096
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0.00	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Zinc	mg/L	-	-	-	0.0026	0.0033	0.0036	0.0056	0.0061	0.0042	0.36	0.0048	0.010	0.011	0.012	0.014	0.01	0.324	0.013	0.012	0.0098	0.014	0.011	0.012	0.14	0.012	0.13	0.0068	0.011	0.0088	0.0085	0.0067	0.0087	0.18	0.0083	
∑ Toxic Units																																			
WQGs	-	-	-	-	8.39	8.85	8.96	10.95	8.87	9.27	-	10.65	9.82	8.37	7.93	7.75	9.48	-	9.06	9.86	9.09	11.25	8.84	10.19	-	9.32	-	9.54	13.04	12.99	12.12	10.10	11.97	-	11.56	-
WQGs/EVWQP Benchmarks					6.34	5.91	6.39	7.78	5.98	6.33	-	7.24	7.57	6.47	6.16	6.98	7.24	-	6.85	7.71	6.92	8.94	6.54	7.97	-	7.09	-	6.38	8.96	8.30	7.44	7.22	7.82	-	7.67	-

(a) = guideline is a minimum value, unless the background concentration or value is lower.
(b) = guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (276 to746 mg/L). The guideline is calculated based on the individual hardness value for each sample.
(c) = for some samples, water hardness was greater than 250 mg/L. At this hardness, no BC ENV water quality guideline has been established for sulphate; however, the observed data were screened against the guideline for very hard water (i.e., 429 mg/L) for comparative purposes.
(d) = the EVWQP benchmark for nitrate is hardness dependent and applies within a hardness range of 57 to 500 mg/L. The guideline range shown is based on the hardness range observed in the dataset (276 to746 mg/L). The guideline is calculated based on the individual hardness value for each sample and was calculated using the Elk River intercept. The minimum EVWQP guideline is 3 mg/L.
(e) = guideline is chloride dependent. The guideline range shown is based on the chloride concentration range observed in the dataset (2.82 to 49.6 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.
(f) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.48 mg-N/L) is based on the combination of field pH (8.4) and water temperature (4.1°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.
(g) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (2.52 mg-N/L) is based on the combination of field pH (8.4) and water temperature (4.1°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.
(h) = guideline is for chromium VI.
(i) = guideline is based on site-specific testing conducted in the Elk Valley with *C. dubia* and *H. azteca*.
(j) = guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.6 to 8.4). The guideline is calculated based on the individual pH for each sample.
(k) = the EVWQP benchmark for dissolved cadmium is hardness dependent and applies up to a hardness range of 285 mg/L. The guideline range shown is based on the hardness range observed in the dataset (276 to 746 mg/L). The guideline is calculated based on the individual hardness value for each sample.
(l) = the guideline for dissolved copper was calculated using the BC ENV Biotic Ligand Model (BLM) tool using the full model, quick normalization approach. Humic acid content of 10% was assumed based on guidance from BC ENV (2019).
(Min) = concentration is higher than the 30-day mean BC ENV guideline or outside the recommended pH, DO or total alkalinity range.
(E) = concentration is higher than the EVWQP benchmarks guideline.
Bolded concentrations are higher than water quality guidelines.
Shaded concentrations are higher than the EVWQP benchmark (e.g., for nitrate, total selenium, dissolved cadmium or sulphate).
Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision after comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.
Concentrations were screened against available Working and Approved British Columbia Ministry of Environment and Climate Change Strategy (BC ENV) Water Quality Guidelines for the Protection of Aquatic Life; Acc

Parameter	Unit	Guidelines for the protection of Aquatic Life: 30-day mean (BC ENV)	Guidelines for the protection of Aquatic Life: Maximum (BC ENV)	Guidelines for the protection of Aquatic Life: EVWQP Benchmarks	Q1: Feb 26 (*C. dubia and P. subcapitata*)	Q1: Mar 05	Q1: Mar 12	Q1: Mar 19	Q1: Mar 26	Q1: Feb 26, Mar 5, 12, 19, 26 (*P. promelas*) Mean	Q1: Feb 26, Mar 5, 12, 19, 26 (*P. promelas*) CV	Q2: May 7 (*C. dubia and P. subcapitata*)	Q2: May 14	Q2: May 21	Q2: May 28	Q2: Jun 04	Q2: May 7, 14, 21, 28, Jun 4 (*O. mykiss*) Mean	Q2: May 7, 14, 21, 28, Jun 4 (*O. mykiss*) CV	Q3: Aug 20 (*C. dubia and P. subcapitata*)	Q3: Aug 27	Q3: Sep 03	Q3: Sep 10	Q3: Sep 17	Q3: Aug 20, 27, Sep 3, 10 (*H. azteca*) Mean	Q3: Aug 20, 27, Sep 3, 10 (*H. azteca*) CV	Q3: Aug 20, 27, Sep 3, 10, 17 (*P. promelas*) Mean	Q3: Aug 20, 27, Sep 3, 10, 17 (*P. promelas*) CV	Q4: Nov 12 (*C. dubia and P. subcapitata*)	Q4: Nov 19	Q4: Nov 26	Q4: Dec 03	Q4: Dec 10	Q4: Nov 12, 19, 26, Dec 3 (*H. azteca*) Mean	Q4: Nov 12, 19, 26, Dec 3 (*H. azteca*) CV	Q4: Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*) Mean	Q4: Nov 12, 19, 26, Dec 3, 10 (*O. mykiss*) CV
Field Measured																																						
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.0	8.2	7.9	8.2	8.1	8.1	0.02	8.3	8.2	8.1	8.2	8.3	8.2	0.01	8.1	7.9	8.2	7.9	8.2	8.0	0.02	8.1	0.02	8.3	8.4	8.2	8.2	8.2	8.3	0.01	8.3	0.011
Temperature	°C	-	-	-	0.10	0.10	1.6	1.8	2.4	1.2	0.87	4.8	4.2	3.6	5.1	1.2	3.8	0.41	6.4	5.8	8.4	6.1	6.8	6.7	0.18	6.7	0.15	2.5	3.1	1.8	2.4	2.4	2.5	0.22	2.4	0.19
Conventional Parameters																																						
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.1	8.1	8.3	8.2	8.2	0.01	8.3	8.2	8.4	8.5	6.7	8.0	0.093	8.2	8.3	8.3	8.3	8.3	8.3	0.006	8.3	0.005	8.2	8.3	8.3	8.3	8.4	8.3	0.006	8.3	0.0085
Hardness, as $CaCO_3$	mg/L				543	567	576	493	500	536	0.071	405	292	303	287	200	297	0.24	375	395	400	397	406	392	0.029	395	0.03	482	507	484	484	518	489	0.024	495	0.033
Total alkalinity, as $CaCO_3$	mg/L	20[a]			198	219	192	202	187	200	0.061	179	136	174	159	100	150	0.22	184	186	191	188	191	187	0.016	188	0.016	192	194	201	198	204	196	0.021	198	0.025
Total dissolved solids	mg/L	-	-	-	740	724	717	709	639	706	0.055	552	335	388	325	228	366	0.33	511	494	520	534	536	515	0.033	519	0.033	637	614	694	675	641	655	0.055	652	0.049
Total suspended solids	mg/L	-	-	-	2.5	5.9	<1.0	<1.0	1.2	2.1	1.0	1.2	4.3	<1.0	1.4	3.5	2.2	0.69	<1.0	1.5	<1.0	<1.0	<1.0	0.75	0.3	0.7	0.3	1.3	<1.0	<1.0	<1.0	<1.0	0.7	0.2	0.66	0.2
Total organic carbon	mg/L	-	-	-	0.81	<0.5	<0.5	0.57	0.87	0.55	0.32	<0.5	1.5	0.88	1.5	1.3	1.1	0.4	0.77	0.55	0.61	0.82	0.54	0.69	0.19	0.66	0.2	<0.5	0.79	<0.5	<0.5	0.65	0.39	0.38	0.44	0.3
Dissolved organic carbon	mg/L	-	-	-	0.62	<0.5	<0.5	0.67	1.3	0.62	0.54	0.61	1.5	1.0	1.2	0.93	1.0	0.31	0.69	<0.5	0.65	0.80	0.55	0.6	0.21	0.59	0.2	<0.5	0.86	<0.5	<0.5	0.51	0.4	0.45	0.42	0.38
Turbidity	NTU	-	-	-	0.24	1.2	0.21	1.0	0.89	0.71	0.64	0.39	2.5	0.45	0.47	1.6	1.1	0.87	0.17	0.23	0.21	0.27	0.18	0.22	0.19	0.21	0.19	0.37	0.23	0.53	0.15	<0.1	0.32	0.52	0.27	0.66
Conductivity	µS/cm	-	-	-	1,010	913	949	945	915	946	0.041	803	535	620	532	407	579	0.25	703	717	746	743	758	727	0.029	733	0.031	772	851	884	878	960	846	0.061	869	0.078
Oxidation-reduction potential	mV	-	-	-	392	424	386	434	480	423	0.089	490	383	460	439	401	435	0.10	267	272	261	244	305	261	0.047	270	0.083	516	477	402	490	441	471	0.104	465	0.096
Acidity To pH 8.3, as $CaCO_3$	mg/L	-	-	-	1.8	2.8	1.2	1.4	<1.0	1.5	0.46	<1.0	<1.0	<1.0	1.2	<1.0	0.64	0.14	1.5	<1.0	<1.0	<1.0	<1.0	0.75	0.33	0.7	0.32	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0.0	<0.5	0
Bicarbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	198	219	192	198	187	199	0.061	179	136	171	152	100	148	0.21	184	186	188	185	187	186	0.009	186	0.009	192	194	201	198	192	196	0.021	195	0.02
Carbonate alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	3.4	<1.0	1.1	1.0	<1.0	<1.0	2.4	7.0	<1.0	2.2	1.2	<1.0	<1.0	3.0	3.0	3.2	1.8	0.7	2.0	0.6	<1.0	<1.0	<1.0	<1.0	12	<1.0	0.0	2.7	1.7
Hydroxide alkalinity, as $CaCO_3$	mg/L	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	0	<1.0	0
Major Ions																																						
Bromide	mg/L	-	-	-	<0.25	<0.25	<0.25	<0.25	<0.25	<0.25	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	0	<0.05	0	<0.05	<0.05	<0.05	<0.25	<0.25	<0.05	2	<0.065	1.7
Calcium	mg/L	-	-	-	123	128	125	115	120	122	0.041	92	71	72	70	47	70	0.23	88	90	93	93	92	91	0.028	91	0.024	106	120	108	115	122	112	0.057	114	0.062
Chloride	mg/L	150	600	-	19	20	20	15	13	17	0.19	9.6	3.0	4.9	3.8	1.7	4.6	0.66	8.5	8.6	9.4	9.3	10.0	8.9	0.05	9.1	0.07	15	6.2	7.4	8.5	19	9.3	0.43	11	0.49
Fluoride	mg/L	-	1.6 - 2.1[b]	-	0.21	0.13	0.13	0.13	0.20	0.16	0.26	0.25	0.23	0.24	0.23	0.23	0.24	0.048	0.26	0.25	0.21	0.24	0.23	0.24	0.08	0.24	0.08	0.24	0.17	0.24	0.12	<0.1	0.19	0.3	0.16	0.4
Magnesium	mg/L	-	-	-	57	60	64	50	48	56	0.12	43	28	30	27	20	30	0.28	38	41	41	40	43	40	0.04	40	0.04	53	50	52	48	52	51	0.04	51	0.038
Potassium	mg/L	-	-	-	1.3	1.4	1.6	1.3	1.3	1.4	0.099	1.1	0.87	1.0	0.86	0.77	0.93	0.16	1.1	1.2	1.2	1.2	1.2	1.2	0.04	1.2	0.035	1.2	1.2	1.3	1.3	1.3	1.3	0.025	1.3	0.027
Sodium	mg/L	-	-	-	8.5	9.9	11	8.1	7.2	9.0	0.18	6.1	3.0	4.0	3.5	2.3	3.8	0.38	5.4	5.9	6.1	5.7	6.2	5.8	0.05	5.8	0.05	8.0	5.8	6.1	6.2	8.3	6.5	0.16	6.9	0.17
Sulphate	mg/L	429[c, c]	-	481[b]	306	329	340	292	301	314	0.064	226	117	138	104	74	132	0.44	175	179	185	187	197	182	0.03	185	0.046	257	243	268	282	280	263	0.063	266	0.061
Major anion sum	meq/L	-	-	-	12	12	12	11	11	12	0.053	9.2	5.6	6.9	5.8	3.8	6.2	0.32	8.1	8.2	8.4	8.4	8.7	8.2	0.02	8.3	0.029	10	9.9	11	11	11	10	0.044	11	0.048
Major cation sum	meq/L	-	-	-	11	12	12	10	10	11	0.075	8.4	6.0	6.0	5.9	4.1	6.1	0.25	7.8	8.2	8.3	8.2	8.4	8.1	0.029	8.2	0.03	10	10	10.0	10.0	11	10	0.021	10	0.032
Nutrients																																						
Nitrate	mg-N/L	3.0	33	6.0 - 15[d]	**8.1**[Bin]	**8.3**[Min]	**9.8**[Min]	**9.8**[Min]	**9.4**[Min]	**9.1**[Min]	0.091	**8.5**[Min]	**4.8**[Min]	**5.6**[Min]	**4.1**[Min]	2.8	**5.2**[Min]	0.42	**6.7**[Min]	**6.4**[Min]	**6.4**[Min]	**6.2**[Min]	**6.5**[Min]	**6.4**[Min]	0.032	**6.4**[Min]	0.028	**8.5**[Min]	**10**[Min]	**11**[Min]	**12**[Min]	**9.2**[Min]	**10**[Min]	0.144	**10**[Min]	0.14
Nitrite	mg-N/L	0.020 - 0.20[e]	0.060 - 0.60[e]	-	0.0085	0.015	<0.005	<0.005	<0.005	0.0062	0.7	0.0010	<0.001	<0.001	<0.001	<0.001	0.0006	0	0.0011	0.0011	0.0018	<0.001	<0.001	0.0011	0.33	0.001	0.34	<0.001	0.0040	<0.001	<0.005	<0.005	0.0019	1.1	0.002	1.0
Total ammonia	mg-N/L	0.39 - 2.0[f]	2.0 - 14[g]	-	<0.005	<0.005	0.041	0.042	0.012	0.02	0.94	0.020	<0.005	0.011	<0.005	<0.005	0.0076	0.86	0.0062	0.0099	0.0080	0.0075	0.020	0.0079	0.19	0.01	0.55	0.014	0.013	0.017	0.011	0.0061	0.014	0.18	0.012	0.33
Total Kjeldahl nitrogen	mg-N/L	-	-	-	0.059	0.41	<0.05	0.51	<0.05	0.21	1.1	<0.05	0.56	0.37	0.17	0.40	0.3	0.66	<0.25	0.18	0.12	<0.05	<0.05	0.11	0.8	0.094	0.9	<0.05	<0.05	<0.05	0.096	<0.05	0.043	0.5	0.039	0.52
Orthophosphate	mg-P/L	-	-	-	0.0020	0.0017	0.0013	0.0015	0.0017	0.0016	0.16	0.0010	0.0011	<0.001	0.0015	0.0016	0.0011	0.25	0.0014	0.0015	<0.001	0.0012	0.0014	0.0012	0.19	0.0012	0.17	0.0012	<0.001	0.0017	0.0014	0.0017	0.0012	0.25	0.0013	0.24
Phosphorus	mg-P/L	-	-	-	<0.002	0.0033	0.0029	0.0035	0.0034	0.0028	0.22	0.0036	0.0057	0.0041	0.0036	0.0066	0.0045	0.36	<0.002	<0.002	0.017	<0.002	0.0021	0.005	1.5	0.0044	1.52	0.0034	0.0021	<0.002	0.0021	<0.002	0.0022	0.31	0.0019	0.32
Total Metals																																						
Aluminum	mg/L	-	-	-	<0.003	<0.003	<0.003	0.019	0.0081	0.0063	1.1	<0.003	0.023	0.0065	0.0076	0.023	0.012	0.79	<0.003	0.0043	0.0031	0.0084	<0.003	0.0043	0.6	0.0038	0.6	0.0067	<0.003	<0.003	0.0040	<0.003	0.0034	0.5	0.003	0.53
Antimony	mg/L	0.0090	-	-	0.00017	0.00015	0.00017	0.00019	0.00019	0.00017	0.096	0.00020	0.00023	0.00018	0.00015	0.00019	0.00019	0.15	0.00019	0.00020	0.00021	0.00018	0.00017	0.0002	0.066	0.00019	0.083	0.00019	0.00021	0.00021	0.00021	0.00021	0.00021	0.049	0.00021	0.043
Arsenic	mg/L	-	0.0050	-	<0.00001	<0.0001	0.00013	<0.00001	<0.00001	0.000078	0.17	0.00011	0.00018	0.00013	0.00012	<0.00001	0.00014	0.2	0.00011	0.00011	0.00010	<0.00001	<0.00001	0.000078	0.06	0.000072	0.06	0.00012	0.00012	0.00012	<0.00001	0.00024	0.0	0.00011	0.084
Barium	mg/L	1.0	-	-	0.084	0.082	0.084	0.081	0.066	0.079	0.096	0.052	0.032	0.041	0.035	0.027	0.037	0.26	0.054	0.057	0.064	0.060	0.063	0.059	0.07	0.06	0.067	0.071	0.068	0.076	0.073	0.077	0.072	0.047	0.073	0.051
Beryllium	mg/L	0.00013	-	-	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002	0	<0.00002	0
Bismuth	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Boron	mg/L	1.2	-	-	0.012	0.011	0.012	0.012	0.013	0.012	0.059	0.011	<0.01	<0.01	<0.01	<0.01	0.006	0	0.012	0.012	0.014	0.012	0.011	0.013	0.08	0.012	0.09	0.012	0.011	0.012	0.012	0.011	0.012	0.043	0.012	0.047
Cadmium	mg/L	0.00035 - 0.00046[h]	0.0012 - 0.0028[h]	0.00024 - 0.00032[h]	0.000081	0.000081	0.000086	0.000078	0.000087	0.000082	0.048	0.000079	0.00011	0.00014	0.00012	0.00013	0.00012	0.21	0.00015	0.00018	0.00014	0.00014	0.00013	0.00015	0.129	0.00015	0.139	0.00011	0.00010	0.00010	0.000098	0.00012	0.0001	0.044	0.00011	0.088
Chromium	mg/L	-	-	-	0.00012	0.00019	0.00016	0.00012	0.00011	0.00014	0.24	0.00018	0.00014	0.00013	0.00014	0.00016	0.00015	0.13	0.00013	0.00014	0.00013	0.00011	0.00012	0.00013	0.1	0.00013	0.09	0.00016	0.00014	0.00012	0.00016	0.00013	0.00015	0.13	0.00014	0.13
Cobalt	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0
Copper	mg/L	0.0002 - 0.0010[f]	0.001 - 0.0061[f]	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	**0.0068**[Min]	**0.00066**[Min]	**0.00024**[Min]	<0.00020	0.0003	**0.0042**[Min]	1	**0.0004**[Min]	0.57
Iron	mg/L	-	0.35	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Lead	mg/L	-	-	-	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	0	<0.00005	0
Lithium	mg/L	-	-	-	0.035	0.035	0.037	0.034	0.037	0.036	0.038	0.028	0.017	0.019	0.017	0.012	0.019	0.31	0.028	0.030	0.028	0.027	0.027	0.028	0.052	0.028	0.053	0.032	0.036	0.032	0.034	0.035	0.033	0.065	0.034	0.059
Manganese	mg/L	-	-	-	0.0035	0.0046	0.0023	0.0017	0.0023	0.0029	0.4	<0.0001	0.0001	0.00066	<0.0001	0.00079	0.00068	0.045	0.00076	0.0031	0.0028	0.0016	0.00048	0.0035	0.002	0.61	0.0023	0.54	0.0046	0.00037	0.00030	0.00021	0.0052	0.0014	1.58	0.0021	1.2
Mercury	mg/L	-	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	0	<0.000005	0
Molybdenum	mg/L	-	-	-	0.0033	0.0034	0.0027	0.0026	0.0027	0.0029	0.13	0.0020	0.0015	0.0016	0.0014	0.0012	0.0016	0.21	0.0021	0.0022	0.0023	0.0023	0.0022	0.0022	0.05	0.0022	0.04	0.0030	0.0017	0.0017	0.0019	0.0033	0.002	0.3	0.0023	0.33
Nickel	mg/L	-	-	-	0.0029	0.0032	0.0033	0.0032	0.0036	0.0032	0.072	0.0029	0.0031	0.0037	0.0029	0.0032	0.0031	0.11	0.0041	0.0044	0.0040	0.0038	0.0037	0.0041	0.061	0.004	0.07	0.0037	0.0044	0.0041	0.0039	0.0035	0.004	0.072	0.0039	0.084
Selenium	mg/L	-	-	-	0.038	0.043	0.046	0.044	0.045	0.043	0.074	0.033	0.027	0.021	0.014	0.016	0.022	0.36	0.029	0.030	0.028	0.027	0.030	0.029	0.045	0.029	0.046	0.038	0.063	0.065	0.071	0.041	0.059	0.244	0.056	0.27
Silicon	mg/L	-	-	-	2.3	2.2	2.3	2.2	2.3	2.3	0.019	2.0	1.6	2.0	1.9	1.6	1.8	0.11	2.2	2.5	2.3	2.4	2.3	2.3	0.058	2.3	0.051	2.2	2.3	2.1	2.5	2.3	2.3	0.061	2.3	0.053
Silver	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Strontium	mg/L	-	-	-	0.24	0.26	0.24	0.24	0.21	0.24	0.067	0.18	0.13	0.15	0.13	0.090	0.14	0.24	0.18	0.18	0.19	0.20	0.19	0.19	0.047	0.19	0.041	0.21	0.22	0.22	0.22	0.23	0.22	0.02	0.22	0.027
Thallium	mg/L	-	-	-	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	0	<0.00001	0
Tin	mg/L	-	-	-	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	0	<0.0001	0	<0.0001	<0.0001	0.00013	<0.0001	<0.0001	0.00007	0	0.000066	0.2
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	0	<0.01	0
Uranium	mg/L	-	-	-	0.0037	0.0038	0.0037	0.0035	0.0038	0.0037	0.034	0.0027	0.0020	0.0024	0.0019	0.0014	0.0021	0.25	0.0026	0.0030	0.0028	0.0030	0.0030	0.0028	0.074	0.0029	0.066	0.0035	0.0038	0.0037	0.0043	0.0038	0.0038	0.086	0.0038	0.075
Vanadium	mg/L	-	-	-	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	0	<0.0005	0
Zinc	mg/L	-	-	-	0.0027	0.0030	0.0030	0.0030	0.0032	0.003	0.06	0.0023	0.0044	0.0055	0.0044	0.0070	0.0047	0.36	0.0059	0.0064	0.0049	0.0049	0.0055	0.0055	0.136	0.0055	0.118	0.0050	0.0043	0.0039	0.0035	0.0043	0.0042	0.153	0.0042	0.13
∑ Toxic Units																																						
WQGs	-	-	-	-	6.75	8.22	8.67	7.10	6.68	7.14	-	6.51	4.61	5.05	4.07	4.29	4.78	-	6.02	7.62	5.95	5.82	6.63	6.21	-	6.23	-	9.23	7.36	8.22	7.98	6.95	7.81	-	7.70	-
WQGs/EVWQP Benchmarks	-	-	-	-	4.58	5.99	6.04	4.49	4.18	4.71	-	4.39	3.62	3.89	3.26	3.98	3.70	-	4.48	6.14	4.42	4.34	5.06	4.71	-	4.72	-	7.01	4.72	5.33	4.82	4.53	5.18	-	5.06	-

(a) = guideline is a minimum value, unless the background concentration or value is lower.

(b) = guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (200 to 604 mg/L). The guideline is calculated based on the individual hardness value for each sample.

(c) = for some samples, water hardness was greater than 250 mg/L. At this hardness, no BC ENV water quality guideline has been established for sulphate; however, the observed data were screened against the guideline for very hard water (i.e., 429 mg/L) for comparative purposes.

(d) = the EVWQP benchmark for nitrate is hardness dependent and applies within a hardness range of 67 to 500 mg/L. The guideline range shown is based on the hardness range observed in the dataset (200 to 604 mg/L). The guideline is calculated based on the individual hardness value for each sample and was calculated using the Elk River intercept. The minimum EVWQP guideline is 3 mg/L.

(e) = guideline is chloride dependent. The guideline range shown is based on the chloride concentration range observed in the dataset (1.72 to 23.4 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(f) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (0.39 mg-N/L) is based on the combination of field pH (8.5) and water temperature (4.1°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

(g) = the ammonia guideline is pH and temperature dependent. The guideline that results in the minimum ammonia guideline (2.01 mg-N/L) is based on the combination of field pH (8.5) and water temperature (4.1°C). Guidelines calculated with temperature and pH values falling outside the defined range (i.e., pH 6.0 to 10.0 and temperature 0°C to 30°C) should be used with caution, as the WQG does not necessarily accurately reflect toxic effects at the low and high pH and temperature extremes. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

(h) = guideline is for chromium VI.

(i) = guideline is based on site-specific testing conducted in the Elk Valley with *C. dubia* and *H. azteca*.

(j) = guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (7.5 to 8.5). The guideline is calculated based on the individual pH for each sample.

(k) = the EVWQP benchmark for dissolved cadmium is hardness dependent and applies up to a hardness range of 285 mg/L. The guideline range shown is based on the hardness range observed in the dataset (200 to 604 mg/L). The guideline is calculated based on the individual hardness value for each sample.

(l) = the guideline for dissolved copper was calculated using the BC ENV Biotic Ligand Model (BLM) tool using the full model, quick normalization approach. Humic acid content of 10% was assumed based on guidance from BC ENV (2019).

(Min) = concentration is higher than the 30-day mean BC ENV guideline or outside the recommended pH, DO or total alkalinity range.

(E) = concentration is higher than the EVWQP benchmarks guideline.

Bolded concentrations are higher than water quality guidelines.

Shaded concentrations are higher than the EVWQP benchmark (e.g., for nitrate, total selenium, dissolved cadmium or sulphate).

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision after comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal

APPENDIX D

Water Quality Response

Table D-1: *C. dubia* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	Mean Survival (Control Normalized)	Mean Reproduction (Control Normalized)	ALKALINITY TOTAL (As CaCO3) lab measured.-N-mg/l	ALUMINUM-D-mg/l	ALUMINUM-T-mg/l	ANTIMONY-D-mg/l	ANTIMONY-T-mg/l	ARSENIC-D-mg/l	ARSENIC-T-mg/l	BARIUM-D-mg/l	BARIUM-T-mg/l	BERYLLIUM-D-mg/l	BERYLLIUM-T-mg/l	BISMUTH-D-mg/l	BISMUTH-T-mg/l	BORON-D-mg/l	BORON-T-mg/l	BROMIDE-D-mg/l	CADMIUM-D-mg/l	CADMIUM-T-mg/l
Reference																						
2015	Q1	Reference (FR_UFR1)	111	103	149	< 0.0030	0.0032	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.077	0.077	< 0.00010	< 0.00010	< 0.00050	< 0.00050	< 0.010	< 0.010	< 0.050	< 0.000010	0.000011
2015	Q1	Reference (FR_UFR1)	100	93	149	< 0.0030	0.0032	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.077	0.077	< 0.00010	< 0.00010	< 0.00050	< 0.00050	< 0.010	< 0.010	< 0.050	< 0.000010	0.000011
2015	Q1	Reference (FR_UFR1)	100	102	145	< 0.0030	0.0059	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.075	0.078	< 0.00010	< 0.00010	< 0.00050	< 0.00050	< 0.010	< 0.010	< 0.050	0.000011	< 0.000010
2015	Q2	Reference (FR_UFR1)	100	92	119	0.0092	0.083	< 0.00010	< 0.00010	0.00012	0.00014	0.042	0.043	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000074	0.000013
2015	Q2	Reference (GH_ER2)	100	93	157	< 0.0030	0.076	< 0.00010	< 0.00010	0.00011	0.00016	0.046	0.048	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.000016
2015	Q3	Reference (FR_UFR1)	111	106	159	< 0.0030	0.0078	< 0.00010	< 0.00010	0.00011	0.00012	0.076	0.076	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000057	0.0000083
2015	Q4	Reference (FR_UFR1)	100	112	146	< 0.0030	0.0046	< 0.00010	< 0.00010	< 0.00010	0.0001	0.074	0.075	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.0000083
2015	Q4	Reference (GH_ER2)	100	110	147	< 0.0030	0.0046	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.047	0.049	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000053	0.0000069
2016	Q1	Reference (FR_UFR1)	111	114	138	< 0.0030	0.0048	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.074	0.073	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000054	0.0000062
2016	Q2	Reference (FR_UFR1)	100	98	110	0.015	0.11	< 0.00010	< 0.00010	0.00011	0.00014	0.04	0.042	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000062	0.000016
2016	Q2	Reference (GH_ER2)	90	74	143	0.0036	0.2	< 0.00010	< 0.00010	0.00011	0.00024	0.042	0.044	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000076	0.000025
2016	Q3	Reference (FR_UFR1)	100	99	160	< 0.0030	0.013	< 0.00010	< 0.00010	< 0.00010	0.0001	0.074	0.077	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000055	0.000011
2016	Q4	Reference (FR_UFR1)	100	92	141	0.011	0.051	< 0.00010	< 0.00010	< 0.00010	0.00015	0.069	0.064	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000057	0.0000058
2016	Q4	Reference (GH_ER2)	100	95	143	< 0.0030	0.0075	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.042	0.038	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.0000079
2017	Q1	Reference (FR_UFR1)	100	131	146	<0.001	0.0046	<0.0001	0.00026	<0.0001	0.00012	0.073	0.073	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.00001	0.000011
2017	Q2	Reference (CM_MC1)	100	118	133	0.004	0.02	<0.0001	<0.0001	0.00022	0.0002	0.048	0.046	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.013	<0.05	0.000012	0.000015
2017	Q2	Reference (FR_UFR1)	100	104	113	0.089	0.15	<0.0001	<0.0001	0.00015	0.00019	0.053	0.051	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000016	0.000023
2017	Q2	Reference (GH_ER2)	90	83	153	<0.003	0.077	<0.0001	<0.0001	<0.0001	0.00014	0.05	0.051	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000098	0.000019
2017	Q3	Reference (CM_MC1)	100	118	141	0.0026	0.021	<0.0001	<0.0001	0.00022	0.00024	0.05	0.046	<0.00002	<0.00002	<0.00005	<0.00005	0.018	0.013	<0.05	0.00001	0.000015
2017	Q3	Reference (FR_UFR1)	100	109	148	0.0015	0.0071	<0.0001	0.00011	<0.0001	0.00013	0.068	0.069	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000008	0.000012
2017	Q3	Reference (GH_ER2)	100	122	130	0.0027	0.012	<0.0001	0.00019	0.00011	0.00012	0.043	0.043	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000081	0.0000078
2017	Q4	Reference (CM_MC1)	100	101	134	<0.003	0.0086	<0.0001	<0.0001	0.00016	0.00019	0.051	0.051	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.05	0.0000068	0.0000083
2017	Q4	Reference (FR_UFR1)	100	102	138	<0.003	0.0037	<0.0001	<0.0001	<0.0001	0.00011	0.072	0.072	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000069	0.00001
2017	Q4	Reference (GH_ER2)	100	97	155	<0.003	0.0061	<0.0001	<0.0001	<0.0001	0.00011	0.049	0.048	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000056	0.0000074
2018	Q1	Reference (CM_MC1)	100	77	173	<0.003	<0.003	<0.0001	<0.0001	0.00017	0.00018	0.058	0.053	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.05	0.0000078	0.0000058
2018	Q1	Reference (FR_UFR1)	100	88	137	<0.003	<0.003	<0.0001	<0.0001	<0.0001	<0.0001	0.085	0.068	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000062	0.0000096
2018	Q1	Reference (GH_ER2)	80	68	153	<0.003	<0.003	<0.0001	<0.0001	<0.0001	0.00013	0.046	0.048	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000058	0.0000062
2018	Q2	Reference (CM_MC1)	100	127	117	0.023	0.14	<0.0001	<0.0001	0.00023	0.00024	0.042	0.039	<0.00002	<0.00002	<0.00005	<0.00005	0.011	0.013	<0.05	0.00001	0.000019
2018	Q2	Reference (FR_UFR1)	100	101	106	0.022	0.13	<0.0001	<0.0001	0.00012	0.00016	0.042	0.045	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.000031
2018	Q2	Reference (GH_ER2)	90	76	140	0.0039	0.24	<0.0001	<0.0001	0.00011	0.00025	0.048	0.049	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000086	0.000043
2018	Q2	Reference (LC_SLC)	100	77	126	<0.003	0.012	<0.0001	<0.0001	0.00013	0.0002	0.039	0.035	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	<0.000005	0.000015
2018	Q3	Reference (CM_MC1)	80	97	145	<0.003	0.011	<0.0001	<0.0001	0.00018	0.0002	0.055	0.054	<0.00002	<0.00002	<0.00005	<0.00005	0.015	0.016	<0.05	0.000012	0.000012
2018	Q3	Reference (FR_UFR1)	90	111	152	<0.003	0.0046	<0.0001	<0.0001	0.00011	0.0001	0.076	0.066	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	<0.000005	0.000011
2018	Q3	Reference (GH_ER2)	100	96	134	<0.003	0.64	<0.0001	<0.0001	0.00011	0.00061	0.043	0.054	<0.00002	0.000066	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000009	0.00013
2018	Q3	Reference (LC_SLC)	100	107	140	<0.003	0.003	<0.0001	<0.0001	0.00012	0.00011	0.048	0.041	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.000014
2018	Q4	Reference (CM_MC1)	111	126	131	<0.003	0.01	<0.0001	<0.0001	0.00017	0.0002	0.045	0.043	<0.00002	<0.00002	<0.00005	<0.00005	0.014	0.015	<0.05	0.0000068	0.0000085
2018	Q4	Reference (FR_UFR1)	100	111	150	<0.003	<0.003	<0.0001	<0.0001	<0.0001	<0.0001	0.071	0.067	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000055	0.000008
2018	Q4	Reference (GH_ER2)	111	113	146	<0.003	0.031	<0.0001	<0.0001	<0.0001	0.00014	0.05	0.046	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000055	0.0000097
2018	Q4	Reference (LC_SLC)	111	104	143	<0.003	<0.003	<0.0001	<0.0001	0.00011	0.00015	0.041	0.045	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.000013
2019	Q1	Reference (CM_MC1)	90	89	179	<0.003	0.0041	<0.0001	<0.0001	0.00015	0.00015	0.058	0.053	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.013	<0.05	0.0000084	0.0000097
2019	Q1	Reference (FR_UFR1)	100	70	182	<0.003	0.003	<0.0001	<0.0001	<0.0001	<0.0001	0.074	0.076	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000078	0.000012
2019	Q1	Reference (GH_ER2)	100	83	150	<0.003	0.0048	<0.0001	<0.0001	<0.0001	0.00011	0.049	0.048	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000058	0.0000053
2019	Q1	Reference (LC_SLC)	100	93	154	<0.003	<0.003	<0.0001	<0.0001	0.00013	<0.0001	0.047	0.048	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000012	0.000015
2019	Q2	Reference (CM_MC1)	90	69	125	0.0036	0.032	<0.0001	<0.0001	0.0002	0.00022	0.039	0.041	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.05	0.0000079	0.000014
2019	Q2	Reference (FR_UFR1)	100	79	126	0.012	0.057	<0.0001	<0.0001	0.00011	0.00011	0.049	0.048	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000073	0.00001
2019	Q2	Reference (GH_ER2)	90	75	144	<0.003	0.041	<0.0001	<0.0001	0.00011	0.00014	0.045	0.045	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000067	0.000013
2019	Q2	Reference (LC_SLC)	100	83	140	<0.003	0.0032	<0.0001	<0.0001	0.00011	0.00011	0.036	0.035	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000007	0.000013
2019	Q3	Reference (CM_MC1)	100	73	146	<0.003	0.0075	<0.0001	<0.0001	0.00023	0.00023	0.052	0.051	<0.00002	<0.00002	<0.00005	<0.00005	0.016	0.016	<0.05	0.00001	0.000016
2019	Q3	Reference (FR_UFR1)	100	94	143	<0.003	0.0097	<0.0001	<0.0001	0.00012	<0.0001	0.061	0.059	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000006	0.000009
2019	Q3	Reference (GH_ER2)	90	101	133	<0.003	0.011	<0.0001	<0.0001	0.00011	0.00011	0.042	0.04	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000075	0.0000088
2019	Q3	Reference (LC_SLC)	80	72	138	<0.003	<0.003	<0.0001	<0.0001	0.00013	0.00011	0.038	0.038	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000095	0.000015
2019	Q4	Reference (CM_MC1)	100	87	141	<0.003	0.0096	<0.0001	<0.0001	0.00017	0.00018	0.044	0.047	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.05	0.0000083	0.0000081
2019	Q4	Reference (FR_UFR1)	100	90	143	<0.003	0.0048	<0.0001	<0.0001	<0.0001	0.00011	0.068	0.064	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.0000096
2019	Q4	Reference (GH_ER2)	100	98	145	<0.003	0.015	<0.0001	<0.0001	<0.0001	0.00011	0.043	0.047	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000059	0.0000098
2019	Q4	Reference (LC_SLC)	100	83	145	<0.003	0.0045	<0.0001	<0.0001	0.00011	0.00014	0.042	0.04	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000097	0.000014
Tests categorized as no adverse response																						
2015	Q1	CM_MC2	111	87	213	0.0097	0.032	0.00017	0.00019	0.00017	0.00022	0.072	0.072	< 0.00010	< 0.00010	< 0.00050	< 0.00050	0.024	0.025	< 0.10	0.000022	0.000023
2015	Q1	EV_HC1	100	97	135	0.003	0.009	0.0001	0.0001	0.00013	0.00014	0.041	0.042	0.0001	0.0001	0.0005	0.0005	0.01	0.01	0.05	0.000017	0.000016
2015	Q1	EV_MC2	100	96	193	0.0037	0.019	< 0.00010	< 0.00010	0.00015	0.00018	0.11	0.11	< 0.00010	< 0.00010	< 0.00050	< 0.00050	0.014	0.016	< 0.050	0.000055	0.000044
2015	Q1	GH_ERC	100	96	155	< 0.0030	0.028	< 0.00010	0.00012	< 0.00010	0.00015	0.055	0.056	< 0.00010	< 0.00010	< 0.00050	< 0.00050	< 0.010	< 0.010	< 0.050	< 0.000010	< 0.000010
2015	Q1	GH_FR1	111	99	202	< 0.0030	0.0048	0.00014	0.00014	< 0.00010	0.00014	0.12	0.13	< 0.00010	< 0.00010	< 0.00050	< 0.00050	0.012	< 0.010	< 0.10	0.000021	0.000024
2015	Q1	LC_LCDSSLCC	111	98	195	< 0.0030	0.0052	0.00022	0.00022	0.00011	0.00013	0.096	0.093	< 0.00010	< 0.00010	< 0.00050	< 0.00050	0.013	0.014	< 0.10	0.000086	0.00011
2015	Q2	EV_HC1	100	97	110	0.0032	0.05	0.0001	0.0001	0.00013	0.00016	0.025	0.025	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.000013	0.000021
2015	Q2	EV_MC2	100	90	116	< 0.0070	0.36	< 0.00010	0.00011	0.00018	0.00033	0.062	0.067	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000018	0.000064
2015	Q2	FR_FRCP1	100	94	147	< 0.0030	0.073	0.00022	0.00022	< 0.00010	0.00015	0.064	0.065	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.00003	0.00005
2015	Q2	GH_ERC	100	91	161	< 0.0030	0.13	< 0.00010	< 0.00010	< 0.00010	0.00017	0.05	0.051	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000007	0.000022
2015	Q2	GH_FR1	100	103	167	< 0.0030	0.053	0.00017	0.00017	0.0001	0.00014	0.085	0.087	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000021	0.000035
2015	Q2	LC_DCDS	111	87	92	0.029	0.18	0.00015	0.00019	0.00027	0.00036	0.093	0.096	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.000039	0.000067
2015	Q2	LC_LC3	90	77	168	<0.0030	0.011	0.00029	0.0003	0.00013	0.00015	0.035	0.035	<0.00010	<0.00010	<0.000050	<0.000050	0.012	0.012	<0.10	0.00035	0.00038
2015	Q2	LC_LC5	111	93	167	0.0041	0.022	0.00012	0.00014	0.00011	0.00013	0.077	0.079	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.000035	0.000034
2015	Q3	CM_MC2	111	104	198	< 0.0030	0.016	0.00018	0.00021	0.00019	0.00021	0.069	0.069	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.027	0.029	< 0.10	0.0000099	0.000018
2015	Q3	EV_HC1	111	123	192	0.0049	0.034	< 0.00010	0.00011	0.00017	0.00024	0.058	0.059	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	0.011	< 0.050	0.000017	0.000025
2015	Q3	EV_MC2	111	114	194	0.003	0.0085	0.00041	0.00044	0.00016	0.00023	0.1	0.1	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.016	0.018	< 0.10	0.000049	0.000056
2015	Q3	FR_FRCP1	111	119	198	< 0.0030	0.022	0.00027	0.00033	0.0001	0.00019	0.076	0.076	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.013	0.014	< 0.10	0.000038	0.000047
2015	Q3	GH_ERC	111	100	142	< 0.0030	0.083	< 0.00010	< 0.00010	< 0.00010	0.00017	0.046	0.049	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000059	0.000016
2015	Q3	GH_FR1	111	114	182	< 0.0030	0.013	0.00022	0.00025	0.00014	0.0002	0.098	0.10	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.01	0.011	< 0.050	0.000019	0.000021
2015	Q3	LC_LCDSSLCC	111	107	181	< 0.0030	0.013	0.00019	0.00026	< 0.00010	0.00011	0.06	0.063	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.012	0.013	< 0.10	0.00025	0.00026
2015	Q4	EV_HC1	100	119	195	< 0.0030	0.0058	< 0.00010	0.00012	0.00014	0.00015	0.06	0.063	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	0.01	< 0.25	0.000013	0.000018
2015	Q4	EV_MC2	100	111	193	< 0.0030	0.0056	0.00035	0.00038	0.00014	0.00019	0.11	0.11	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.016	0.016	< 0.25	0.000037	0.000047
2015	Q4	GH_ERC	100	120	151	< 0.0030	0.007	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.058	0.06	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.0000073
2015	Q4	GH_FR1	100	124	188	< 0.0030	0.004	0.00011	0.00015	< 0.00010	0.00014	0.12	0.12	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	0.011	< 0.25	0.000015	0.000024
2015	Q4	LC_DCDS	111	103	133	<0.0050	<0.015	<0.00050	<0.00050	<0.00050	<0.00050	0.14	0.15	<0.00050	<0.00050	<0.00025	<0.00025	<0.050	<0.050	<0.050	<0.0000025	0.00006
2015	Q4	LC_LC5	100	77	167	<0.0050	<0.015	<0.00050	<0.00050	<0.00050	<0.00050	0.11	0.11	<0.00050	<0.00050	<0.00025	<0.00025	<0.050	<0.050	<0.050	<0.0000025	0.00004
2015	Q4	LC_LCDSSLCC	100	85	197	< 0.0050	< 0.015	< 0.00050	< 0.00050	< 0.00050	< 0.00050	0.085	0.091	< 0.00050	< 0.00050	< 0.00025	< 0.00025	< 0.050	< 0.050	< 0.050	0.00024	0.00026
2016	Q1	EV_HC1	111	113	191	< 0.0030	0.0096	< 0.00010	< 0.00010	0.00015	0.00016	0.067	0.065	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.25	0.000017	0.000019
2016	Q1	EV_MC2	111	109	179	< 0.0030	0.031	0.00025	0.00025	0.00013	0.00016	0.11	0.11	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.013	0.013	< 0.25	0.000035	0.000036
2016	Q1	GH_ERC	100	101	152	< 0.0030	0.0031	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.067	0.066	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.0000065
2016	Q1	GH_FR1	89	92	190	< 0.0030	0.004	0.00012	0.00014	< 0.00010	< 0.00010	0.12	0.11	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.25	0.000014	0.000018
2016	Q1	LC_LCDSSLCC	111	109	193	< 0.0030	0.0074	0.0002	0.00025	< 0.00010	0.00013	0.086	0.089	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.012	0.013	< 0.25	0.000083	0.000076
2016	Q2	LC_LC5	100	95	153	<0.0030	0.12	0.00015	0.00024	0.00011	0.00018	0.069	0.071	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.0000022	0.000063
2016	Q3	EV_HC1	100	89	192	0.014	0.073	< 0.00010	< 0.00010	0.00016	0.00021	0.065	0.066	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000016	0.000027
2016	Q3	EV_MC2	100	96	204	< 0.0030	0.0054	0.00021	0.00022	0.00018	0.00018	0.1	0.1	< 0.000020	< 0.000020	< 0.000050	< 0.000050	0.017	0.018	< 0.25	0.000066	0.000069
2016	Q3	GH_ERC	100	95	144	< 0.0030	0.021	< 0.00010	< 0.00010	< 0.00010	0.00011	0.049	0.05	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.0000053
2016	Q3	GH_FR1	100	100	198	< 0.0030	0.0079	< 0.00013	0.00014	< 0.00010	0.00012	0.1	0.1	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.25	0.000015	0.000016
2016	Q3	LC_LCDSSLCC	100	83	187	< 0.0030	0.0047	0.00021	0.00024	< 0.00010	0.00011	0.072	0.066	< 0.000020	< 0.000020	< 0.000050	< 0.000050	0.013	0.012	< 0.25	0.00017	0.000016
2016	Q4	EV_HC1	100	88	192	0.0054	0.076	< 0.00010	0.0001	0.00015	0.00019	0.06	0.06	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.25	0.000019	0.000024
2016	Q4	GH_ERC	100	84	148	< 0.0030	0.019	< 0.00010	< 0.00010	< 0.00010	0.00012	0.055	0.051	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	< 0.0000050
2016	Q4	GH_FR1	100	83	188	<0.003	0.012	0.00015	0.00034	<0.0001	0.00014	0.1	0.097	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000017	0.000021
2016	Q4	LC_LC5	111	97	176	<0.0030	0.0068	0.00012	0.00013	<0.00010	0.00011	0.089	0.089	<0.000020	<0.000020	<0.000050	<0.000050	<0.010	<0.010	<0.25	0.000016	0.000038
2016	Q4	LC_LCDSSLCC	100	94	176	< 0.0030	0.0056	0.00019	0.00026	< 0.00010	0.0002	0.055	0.053	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	0.01	< 0.25	0.00014	0.00015
2017	Q1	EV_HC1	100	121	197	<0.003	0.0097	<0.0001	<0.0001	0.00014	0.00017	0.065	0.066	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000014	0.000021
2017	Q1	GH_ERC	100	126	156	<0.003	0.0065	<0.0001	<0.0001	<0.0001	<0.0001	0.062	0.064	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	<0.000005	0.0000071
2017	Q1	GH_FR1	100	108	202	<0.003	0.0085	0.00012	0.00011	<0.0001	0.00011

Table D-1: *C. dubia* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	CALCIUM-T-mg/l	CARBON DISSOLVED ORGANIC-D-mg/l	CHLORIDE-D-mg/l	CHROMIUM-D-mg/l	CHROMIUM-T-mg/l	COBALT-D-mg/l	COBALT-T-mg/l	CONDUCTIVITY LAB-N-us/cm	COPPER-D-mg/l	COPPER-T-mg/l	FLUORIDE-D-mg/l	Hardness Total or Dissolved CaCO3-N-mg/l	IRON-D-mg/l	IRON-T-mg/l	LEAD-D-mg/l	LEAD-T-mg/l	LITHIUM-D-mg/l	LITHIUM-T-mg/l	MAGNESIUM-T-mg/l	MANGANESE-D-mg/l
Reference																						
2015	Q1	Reference (FR_UFR1)	56	0.84	< 1.0	0.00017	0.00017	< 0.00010	< 0.00010	367	< 0.00050	< 0.00050	0.14	197	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0019	0.0016	15	0.000054
2015	Q1	Reference (FR_UFR1)	56	0.84	< 1.0	0.00017	0.00017	< 0.00010	< 0.00010	367	< 0.00050	< 0.00050	0.14	197	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0019	0.0016	15	0.000054
2015	Q1	Reference (FR_UFR1)	57	< 0.50	< 1.0	0.00013	0.00015	< 0.00010	< 0.00010	353	< 0.00050	< 0.00050	0.14	197	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0015	0.0017	14	0.00017
2015	Q2	Reference (FR_UFR1)	38	1.8	< 1.0	0.00014	0.00046	< 0.00010	< 0.00010	245	< 0.00050	< 0.00050	0.15	129	< 0.010	0.052	< 0.000050	< 0.000050	< 0.0010	0.0012	9.2	0.00064
2015	Q2	Reference (GH_ER2)	48	0.84	1.0	0.00022	0.00037	< 0.00010	< 0.00010	303	< 0.00050	< 0.00050	0.15	160	< 0.010	0.066	< 0.000050	< 0.000050	0.0017	0.0016	11	0.0033
2015	Q3	Reference (FR_UFR1)	55	0.75	1.0	0.00013	0.00013	< 0.00010	< 0.00010	342	< 0.00050	< 0.00050	0.15	188	< 0.010	< 0.010	0.000055	< 0.000050	0.002	0.002	13	0.00062
2015	Q4	Reference (FR_UFR1)	56	0.6	< 1.0	0.00011	0.00036	< 0.00010	< 0.00010	354	< 0.00050	< 0.00050	0.16	190	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0015	0.0015	14	0.0001
2015	Q4	Reference (GH_ER2)	51	0.61	1.2	0.00022	0.00034	< 0.00010	< 0.00010	314	< 0.00050	< 0.00050	0.16	170	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0016	0.0018	11	0.0021
2016	Q1	Reference (FR_UFR1)	58	< 0.50	1.1	0.00012	< 0.00020	< 0.00010	< 0.00010	358	< 0.00050	< 0.00050	0.16	202	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0014	0.0015	15	0.0002
2016	Q2	Reference (FR_UFR1)	37	2.5	< 0.10	0.00011	0.00029	< 0.00010	< 0.00010	233	< 0.00050	< 0.00050	0.15	126	< 0.010	0.075	< 0.000050	0.00006	0.0011	0.0013	9.8	0.00045
2016	Q2	Reference (GH_ER2)	48	1.4	0.61	0.00017	0.00062	< 0.00010	< 0.00010	289	< 0.00050	< 0.00050	0.16	163	< 0.010	0.23	< 0.000050	0.00013	0.002	0.0021	11	0.0018
2016	Q3	Reference (FR_UFR1)	51	0.86	0.13	< 0.00010	0.00018	< 0.00010	< 0.00010	338	< 0.00050	< 0.00050	0.17	177	< 0.010	0.013	< 0.000050	< 0.000050	0.0017	0.0018	14	0.00027
2016	Q4	Reference (FR_UFR1)	48	1.1	0.18	< 0.00010	0.00021	< 0.00010	< 0.00010	330	< 0.00050	< 0.00050	0.16	177	< 0.010	0.022	< 0.000050	< 0.000050	0.0015	0.0018	12	0.00027
2016	Q4	Reference (GH_ER2)	48	0.64	0.36	0.00021	0.00024	< 0.00010	< 0.00010	297	< 0.00050	< 0.00050	0.17	163	< 0.010	0.013	< 0.000050	< 0.000050	0.0019	0.0017	9.6	0.0012
2017	Q1	Reference (FR_UFR1)	52	0.96	<0.5	<0.0001	0.00011	<0.0001	<0.0001	341	<0.0002	<0.0005	0.14	185	<0.01	<0.01	<0.00005	<0.00005	0.0013	0.0014	14	<0.0001
2017	Q2	Reference (CM_MC1)	36	1.8	<0.5	0.00012	0.00018	<0.0001	<0.0001	267	<0.0002	<0.0005	0.052	134	<0.01	0.021	<0.00005	<0.00005	0.0041	0.0042	10	0.00015
2017	Q2	Reference (FR_UFR1)	31	3.3	<0.5	0.00022	0.0004	<0.0001	<0.0001	239	0.0004	0.00067	0.11	121	0.054	0.13	<0.00005	0.000092	0.0011	0.0012	8.7	0.0012
2017	Q2	Reference (GH_ER2)	51	0.83	0.27	0.00021	0.00038	<0.0001	<0.0001	321	<0.0005	<0.0005	0.16	177	<0.01	0.074	<0.00005	0.000061	0.0019	0.002	12	0.00095
2017	Q3	Reference (CM_MC1)	36	1.2	<0.5	<0.0001	0.00028	<0.0001	<0.0001	265	<0.0002	<0.0005	0.054	138	<0.01	0.033	<0.00005	<0.00005	0.0044	0.0045	9.5	<0.0001
2017	Q3	Reference (FR_UFR1)	45	1.8	<0.5	<0.0001	0.00028	<0.0001	<0.0001	319	<0.0002	<0.0005	0.14	159	<0.01	0.011	<0.00005	<0.00005	0.0015	0.0015	13	0.00036
2017	Q3	Reference (GH_ER2)	40	0.79	<0.5	0.00019	0.00024	<0.0001	<0.0001	276	<0.0002	<0.0005	0.14	137	<0.01	0.02	<0.00005	<0.00005	0.0017	0.0015	9.6	0.0021
2017	Q4	Reference (CM_MC1)	41	1.6	<0.5	0.00018	0.00018	<0.0001	<0.0001	280	<0.0005	<0.0005	0.055	144	<0.01	<0.01	<0.00005	<0.00005	0.0045	0.0046	11	0.00012
2017	Q4	Reference (FR_UFR1)	50	1.1	<0.5	<0.0001	0.00012	<0.0001	<0.0001	333	<0.0005	<0.0005	0.11	185	<0.01	<0.01	<0.00005	<0.00005	0.0019	0.0017	14	<0.0001
2017	Q4	Reference (GH_ER2)	47	0.81	<0.5	0.00022	0.00026	<0.0001	<0.0001	282	<0.0005	<0.0005	0.13	161	<0.01	<0.01	<0.00005	<0.00005	0.0021	0.002	11	0.00061
2018	Q1	Reference (CM_MC1)	39	0.73	<0.5	0.00013	0.00018	<0.0001	<0.0001	307	<0.0005	<0.0005	0.055	153	<0.01	<0.01	<0.00005	<0.00005	0.0047	0.0048	11	<0.0001
2018	Q1	Reference (FR_UFR1)	53	0.5	<0.5	<0.0001	0.00011	<0.0001	<0.0001	371	<0.0005	<0.0005	0.11	198	<0.01	<0.01	<0.00005	<0.00005	0.0015	0.0014	14	<0.0001
2018	Q1	Reference (GH_ER2)	45	0.66	0.26	0.00019	0.00025	<0.0001	<0.0001	327	<0.0005	<0.0005	0.16	170	<0.01	<0.01	<0.00005	<0.00005	0.0013	0.0017	11	0.0013
2018	Q2	Reference (CM_MC1)	36	3.3	<0.5	0.00013	0.00029	<0.0001	<0.0001	238	<0.0005	0.00056	0.07	125	0.024	0.11	<0.00005	0.000073	0.0037	0.0041	9.2	0.00035
2018	Q2	Reference (FR_UFR1)	35	2.9	<0.5	0.00011	0.00027	<0.0001	<0.0001	235	<0.0005	0.00056	0.14	123	0.014	0.13	<0.00005	0.00013	0.0011	0.0013	9.5	0.00039
2018	Q2	Reference (GH_ER2)	46	1.6	<0.5	0.00018	0.00077	<0.0001	0.00012	304	<0.0005	0.00077	0.16	164	<0.01	0.34	<0.00005	0.00017	0.002	0.0023	12	0.00023
2018	Q2	Reference (LC_SLC)	42	2.3	<0.5	0.00012	0.00015	<0.0001	<0.0001	299	<0.0005	<0.0005	0.3	163	<0.01	0.012	<0.00005	<0.00005	0.003	0.0029	12	<0.0001
2018	Q3	Reference (CM_MC1)	39	1.7	<0.5	0.00021	0.0003	<0.0001	<0.0001	267	<0.0005	<0.0005	0.08	156	<0.01	0.011	<0.00005	<0.00005	0.0045	0.0048	10	0.00015
2018	Q3	Reference (FR_UFR1)	48	1.6	<0.5	0.00012	0.00012	<0.0001	<0.0001	325	<0.0005	<0.0005	0.18	183	<0.01	<0.01	<0.00005	<0.00005	0.0018	0.0018	13	0.00031
2018	Q3	Reference (GH_ER2)	49	1.5	<0.5	0.00021	0.0016	<0.0001	0.00051	270	<0.0005	0.0012	0.17	148	<0.01	0.99	<0.00005	0.00084	0.0018	0.0024	11	<0.0001
2018	Q3	Reference (LC_SLC)	46	1.2	<0.5	0.00014	0.00016	<0.0001	<0.0001	350	<0.0005	<0.0005	0.34	211	<0.01	<0.01	<0.00005	<0.00005	0.0029	0.003	15	<0.0001
2018	Q4	Reference (CM_MC1)	38	2.1	<0.5	0.00018	0.00027	<0.0001	<0.0001	268	<0.0005	<0.0005	0.07	140	<0.01	<0.01	<0.00005	<0.00005	0.0046	0.0045	11	<0.0001
2018	Q4	Reference (FR_UFR1)	51	0.72	<0.5	0.0001	0.00019	<0.0001	<0.0001	347	<0.0005	<0.0005	0.15	187	<0.01	<0.01	<0.00005	<0.00005	0.0016	0.0017	14	0.0001
2018	Q4	Reference (GH_ER2)	47	<0.5	<0.5	0.00023	0.00038	<0.0001	<0.0001	306	<0.0005	<0.0005	0.17	167	<0.01	0.037	<0.00005	<0.00005	0.0019	0.002	11	0.00039
2018	Q4	Reference (LC_SLC)	49	0.51	<0.5	0.00013	0.00021	<0.0001	<0.0001	369	<0.0005	<0.0005	0.37	191	<0.01	<0.01	<0.00005	<0.00005	0.0033	0.0036	16	<0.0001
2019	Q1	Reference (CM_MC1)	41	0.55	0.68	0.00016	0.0003	<0.0001	<0.0001	302	<0.0005	<0.0005	0.07	156	<0.01	<0.01	<0.00005	<0.00005	0.0048	0.0043	11	0.00014
2019	Q1	Reference (FR_UFR1)	54	0.92	<0.5	<0.0001	<0.0001	<0.0001	<0.0001	363	<0.0005	<0.0005	0.14	194	<0.01	<0.01	<0.00005	<0.00005	0.0015	0.0016	15	<0.0001
2019	Q1	Reference (GH_ER2)	51	<0.5	<0.5	0.00021	0.00028	<0.0001	<0.0001	305	<0.0005	<0.0005	0.16	172	<0.01	<0.01	<0.00005	<0.00005	0.0016	0.0016	11	0.00034
2019	Q1	Reference (LC_SLC)	60	0.67	0.71	0.00014	0.00021	<0.0001	<0.0001	428	<0.0005	<0.0005	0.37	216	<0.01	<0.01	<0.00005	<0.00005	0.0044	0.0048	18	<0.0001
2019	Q2	Reference (CM_MC1)	36	3.6	<0.5	0.00013	0.0002	<0.0001	<0.0001	253	<0.0005	<0.0005	0.071	133	<0.01	0.03	<0.00005	<0.00005	0.004	0.004	9.9	0.00011
2019	Q2	Reference (FR_UFR1)	38	1.8	<0.5	0.00014	0.00024	<0.0001	<0.0001	278	<0.0005	<0.0005	0.15	133	<0.01	0.026	<0.00005	<0.00005	0.0012	0.0013	11	0.00013
2019	Q2	Reference (GH_ER2)	50	<0.5	<0.5	0.00021	0.00036	<0.0001	<0.0001	298	<0.0005	<0.0005	0.17	168	<0.01	0.045	<0.00005	<0.00005	0.0017	0.0019	12	0.00013
2019	Q2	Reference (LC_SLC)	45	0.94	<0.5	0.00016	0.00015	<0.0001	<0.0001	343	<0.0005	<0.0005	0.35	167	<0.01	<0.01	<0.00005	<0.00005	0.0029	0.003	14	<0.0001
2019	Q3	Reference (CM_MC1)	44	0.99	<0.5	0.00022	0.00026	<0.0001	<0.0001	287	<0.0005	<0.0005	0.079	156	<0.01	<0.01	<0.00005	<0.00005	0.0048	0.0049	11	0.00021
2019	Q3	Reference (FR_UFR1)	50	1.0	<0.5	0.00011	0.00016	<0.0001	<0.0001	309	<0.0005	<0.0005	0.16	172	<0.01	<0.01	<0.00005	<0.00005	0.0015	0.0016	14	0.0003
2019	Q3	Reference (GH_ER2)	42	0.65	<0.5	0.0002	0.00033	<0.0001	<0.0001	274	<0.0005	<0.0005	0.15	154	<0.01	0.014	<0.00005	<0.00005	0.0017	0.0016	10.0	0.00059
2019	Q3	Reference (LC_SLC)	46	0.72	<0.5	0.00016	0.0002	<0.0001	<0.0001	320	<0.0005	<0.0005	0.33	171	<0.01	<0.01	<0.00005	<0.00005	0.0026	0.0029	14	<0.0001
2019	Q4	Reference (CM_MC1)	40	0.84	<0.5	0.00027	0.00029	<0.0001	<0.0001	246	0.00021	<0.0005	0.077	142	<0.01	<0.01	<0.00005	<0.00005	0.0041	0.0044	10	0.0001
2019	Q4	Reference (FR_UFR1)	50	0.71	<0.5	0.00012	0.00011	<0.0001	<0.0001	302	0.00028	<0.0005	0.16	178	<0.01	<0.01	<0.00005	<0.00005	0.0016	0.0017	14	<0.0001
2019	Q4	Reference (GH_ER2)	48	<0.5	<0.5	0.00027	0.00028	<0.0001	<0.0001	279	0.00021	<0.0005	0.17	158	<0.01	0.016	<0.00005	<0.00005	0.0017	0.0018	12	0.00054
2019	Q4	Reference (LC_SLC)	51	0.81	<0.5	0.00016	0.00016	<0.0001	<0.0001	333	0.00022	<0.0005	0.37	203	<0.01	<0.01	<0.00005	<0.00005	0.0037	0.0035	17	<0.0001
Tests categorized as no adverse response																						
2015	Q1	CM_MC2	106	0.93	3.4	0.00019	0.00024	0.00074	0.00079	826	< 0.00050	< 0.00050	0.14	445	< 0.010	0.031	< 0.000050	< 0.000050	0.011	0.011	46	0.0046
2015	Q1	EV_HC1	60	0.82	1.5	0.00014	0.00018	0.0001	0.0001	453	0.0005	0.0005	0.15	274	0.01	0.013	0.00005	0.00005	0.0047	0.0047	31	0.001
2015	Q1	EV_MC2	91	1.7	11	0.00012	< 0.00020	< 0.00010	< 0.00010	665	0.0012	0.00076	0.15	381	< 0.010	0.024	< 0.000050	< 0.000050	0.015	0.015	33	0.0024
2015	Q1	GH_ERC	55	0.64	<1	0.00029	0.00034	< 0.00010	< 0.00010	345	< 0.00050	< 0.00050	0.15	191	< 0.010	0.036	< 0.000050	0.0002	0.0019	0.002	13	0.00035
2015	Q1	GH_FR1	114	1.1	2.6	0.00021	0.00015	< 0.00010	< 0.00010	851	< 0.00050	< 0.00050	0.18	475	< 0.010	< 0.010	< 0.000050	< 0.000050	0.016	0.015	49	0.0017
2015	Q1	LC_LCDSSLCC	123	1.1	2.7	0.00016	0.00021	< 0.00010	< 0.00010	940	< 0.00050	< 0.00050	0.24	536	< 0.010	< 0.010	< 0.000050	< 0.000050	0.031	0.031	53	0.000074
2015	Q2	EV_HC1	47	1.1	1.3	0.00013	0.00021	0.0001	0.0001	350	0.0005	0.0005	0.13	205	0.01	0.051	0.00005	0.000056	0.0044	0.0042	21	0.00053
2015	Q2	EV_MC2	44	1.9	2.9	0.0002	0.0007	< 0.00010	0.00022	299	< 0.00050	0.00073	0.12	159	< 0.010	0.39	< 0.000050	0.00028	0.0054	0.0052	13	0.0003
2015	Q2	FR_FRCP1	73	1.6	1.2	< 0.00010	0.00028	< 0.00010	0.00012	573	< 0.00050	< 0.00050	0.2	302	< 0.010	0.11	< 0.000050	0.00014	0.019	0.018	29	0.0032
2015	Q2	GH_ERC	53	0.96	<1	0.00017	0.00054	< 0.00010	< 0.00010	338	< 0.00050	< 0.00050	0.15	179	< 0.010	0.15	< 0.000050	0.00011	0.0022	0.0023	12	0.00072
2015	Q2	GH_FR1	81	1.4	1.4	< 0.00010	0.0002	< 0.00010	< 0.00010	614	< 0.00050	< 0.00050	0.17	332	< 0.010	0.07	< 0.000050	0.000063	0.014	0.014	34	0.0011
2015	Q2	LC_DCDS	25	2.2	1.1	0.00012	0.00042	<0.00010	<0.00010	189	<0.00050	0.00059	0.093	96	0.014	0.14	<0.000050	0.00013	0.0051	0.0051	8.4	0.0008
2015	Q2	LC_LC3	93	0.74	1.9	0.00017	0.00019	0.0001	0.00011	760	<0.00050	<0.00050	0.21	401	<0.010	<0.010	<0.000050	<0.000050	0.03	0.03	41	0.0001
2015	Q2	LC_LC5	75	1.2	1.5	0.00016	0.00021	<0.00010	<0.00010	576	<0.00050	<0.00050	0.19	300	0.013	0.031	<0.000050	<0.000050	0.014	0.014	30	0.0025
2015	Q3	CM_MC2	104	0.86	2.1	0.00019	0.00023	0.00026	0.00034	802	< 0.00050	< 0.00050	0.12	458	< 0.010	0.022	< 0.000050	< 0.000050	0.013	0.014	51	0.0018
2015	Q3	EV_HC1	75	1.1	1.4	0.00015	0.00024	< 0.00010	< 0.00010	625	< 0.00050	< 0.00050	0.21	373	< 0.010	0.027	< 0.000050	< 0.000050	0.0069	0.0068	41	0.0028
2015	Q3	EV_MC2	87	1.0	9.6	0.00013	0.00019	< 0.00010	< 0.00010	686	< 0.00050	< 0.00050	0.18	384	< 0.010	0.018	< 0.000050	< 0.000050	0.022	0.021	35	0.00067
2015	Q3	FR_FRCP1	109	0.93	1.5	0.0001	0.00017	< 0.00010	< 0.00010	815	< 0.00050	< 0.00050	0.2	471	< 0.010	0.033	< 0.000050	< 0.000050	0.03	0.031	51	0.0031
2015	Q3	GH_ERC	49	0.75	<1	0.00019	0.00037	< 0.00010	< 0.00010	284	< 0.00050	< 0.00050	0.16	160	< 0.010	0.088	< 0.000050	0.00007	0.0017	0.002	11	0.00058
2015	Q3	GH_FR1	90	0.87	1.6	0.00012	0.00015	< 0.00010	< 0.00010	657	< 0.00050	< 0.00050	0.18	374	< 0.010	0.016	< 0.000050	< 0.000050	0.015	0.015	37	0.00089
2015	Q3	LC_LCDSSLCC	92	0.83	2.0	0.00011	0.0002	< 0.00010	< 0.00010	660	< 0.00050	< 0.00050	0.24	355	< 0.010	< 0.010	< 0.000050	< 0.000050	0.021	0.023	34	0.0002
2015	Q4	EV_HC1	93	0.63	1.8	0.00013	0.00022	< 0.00010	< 0.00010	732	< 0.00050	< 0.00050	0.2	431	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0069	0.0067	50	0.0018
2015	Q4	EV_MC2	102	0.6	8.7	0.00012	0.00015	< 0.00010	< 0.00010	733	< 0.00050	< 0.00050	0.16	415	< 0.010	0.014	< 0.000050	< 0.000050	0.023	0.022	39	0.0013
2015	Q4	GH_ERC	58	< 0.50	1.2	0.00022	0.00026	< 0.00010	< 0.00010	355	< 0.00050	< 0.00050	0.16	190	< 0.010	< 0.010	< 0.000050	< 0.000050	0.002	0.0021	13	0.00063
2015	Q4	GH_FR1	106	< 0.50	1.7	0.00012	0.00013	< 0.00010	< 0.00010	760	< 0.00050	< 0.00050	0.16	436	< 0.010	< 0.010	< 0.000050	< 0.000050	0.017	0.017	43	0.0011
2015	Q4	LC_DCDS	36	2.3	<0.50	<0.00050	<0.00050	<0.00050	<0.00050	251	<0.0010	<0.0025	0.075	150	<0.050	<0.050	<0.00025	<0.00025	0.0074	0.0072	14	<0.00050
2015	Q4	LC_LC5	99	0.84	1.5	<0.00050	<0.00050	<0.00050	<0.00050	627	<0.0010	<0.0025	0.17	424	<0.050	<0.050	<0.00025	<0.00025	0.019	0.019	43	<0.00050
2015	Q4	LC_LCDSSLCC	117	0.74	2.2	< 0.00050	< 0.00050	< 0.00050	< 0.00050	770	< 0.0010	< 0.0025	0.18	499	< 0.050	< 0.050	< 0.00025	< 0.00025	0.036	0.036	54	< 0.00050
2016	Q1	EV_HC1	95	0.65	2.1	0.00016	< 0.00020	< 0.00010	< 0.00010	745	< 0.00050	< 0.00050	0.21	443	< 0.010	< 0.020	< 0.000050	< 0.000050	0.0066	0.0065	51	0.0013
2016	Q1	EV_MC2	94	0.85	9.2	0.00013	0.00018	< 0.00010	< 0.00010	700	< 0.00050	< 0.00050	0.15	395	< 0.010	0.038	< 0.000050	0.000053	0.018	0.018	37	0.0012
2016	Q1	GH_ERC	67	< 0.50	1.3	0.00024	< 0.00030	< 0.00010	< 0.00010	419	< 0.00050	< 0.00050	0.16	231	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0023	0.0025	16	0.00026
2016	Q1	GH_FR1	119	0.51	2.5	0.00012	0.00013	< 0.00010	< 0.00010	885	< 0.00050	< 0.00050	0.18	507	< 0.010	< 0.010	< 0.000050	< 0.000050	0.015	0.014	52	0.001
2016	Q1	LC_LCDSSLCC	134	< 0.50	17	0.00014	< 0.00020	< 0.00010	< 0.00010	1010	< 0.00050	< 0.00050	0.24	572	< 0.010	< 0.010	< 0.000050	< 0.000050	0.037	0.038	60	0.0058
2016	Q2	LC_LC5	71	1.6	1.5	0.00011	0.00038	<0.00010	0.00011	540	<0.00050	<0.00050	0.2	285	<0.010	0.17	<0.000050	0.00012	0.015	0.015	28	0.00058
2016	Q3	EV_HC1	81	0.95	1.1	0.00016	0.00025	< 0.00010	< 0.00010	652	< 0.00050	< 0.00050	0.23	368	< 0.010	0.063	< 0.000050	0.000076	0.0084	0.0083	44	0.0054
2016	Q3	EV_MC2	111	0.83	13	0.00012	0.00015	< 0.00010	< 0.00010	793	< 0.00050	< 0.00050	0.17	435	< 0.010	0.01	< 0.000050	< 0.000050	0.031	0.033	42	0.0009
2016	Q3	GH_ERC	45	0.58	0.37	0.0002	0.00027	< 0.00010	< 0.00010	317	< 0.00050	< 0.00050	0.18	161	< 0.010	0.024	< 0.000050	< 0.000050	0.0024	0.0024	11	0.00045
2016	Q3	GH_FR1	89	0.8	1.5	< 0.00010	0.00017	< 0.00010	< 0.00010	732	< 0.00050	< 0.00050	0.2	379	< 0.010	0.016	< 0.000050	< 0.000050	0.017	0.017	40	0.00092
2016	Q3	LC_LCDSSLCC	91	< 0.50	4.7	0.00012	0.00027	< 0.00010	< 0.00010	754	< 0.00050	< 0.00050	0.25	403	< 0.010	< 0.010	< 0.000050	< 0.000050	0.034	0.032	37	0.0009
2016	Q4	EV_HC1	82	1.4	1.3	0.00014	0.00023	< 0.00010	< 0.00010	668	< 0.00050	< 0.00050	0.2	386	< 0.010	0.058	< 0.000050	< 0.000050	0.0077	0.0081	46	0.0021
2016	Q4	GH_ERC	51	< 0.50	0.44	0.0002	0.00035	< 0.00010	< 0.00010	327	< 0.00050	0.00054	0.16	186	< 0.010	0.028	< 0.000050	< 0.000050	0.0026	0.0022	12	0.00044
2016	Q4	GH_FR1	94	0.75	1.5	0.0001	0.00019	<0.0001	<0.0001	735	<0.0005	<0.0005	0.16	411	<0.01	0.022	<0.00005	<0.00005	0.017	0.017	44	0.00072
2016	Q4	LC_LC5	85	0.58	2.5	<0.00010	0.00018	<0.00010	<0.00010	649	<0.00050	<0.00050	0.21	356	<0.010	<0.010	<0.000050	<0.000050	0.019	0.02	38	0.00028
2016	Q4	LC_LCDSSLCC	83	0.91	6.8	0.0001	0.00019	< 0.00010	< 0.00010	700	< 0.00050	< 0.00050	0.21	384	< 0.010	< 0.010	< 0.000050	< 0.000050	0.027	0.026	35	0.002
2017	Q1	EV_HC1	89	0.72	1.3	0.00015	0.00023	<0.0001	<0.0001	704	<0.0005	<0.0005	0.22	411	<0.01	0.017	<0.00005	<0.00005	0.0064	0.0065	47	0.0024
2017	Q1	GH_ERC	56	<0.5	0.38	0.00026	0.00027	<0.0001	<0.0001	354	<0.0005	<0.0005	0.14	190	<0.01	<0.01	<0.00005	<0.00005	0.0031	0.0035	14	0.00012
2017	Q1	GH_FR1	115	0.57	1.8	<0.0001	0.00014	<0.0001	<0.0001	843	<0.0005	<0.0005	0.14	479	<0.01	0.011	<0.00005	<0.00005	0.016	0.016	49	0.0012
2017	Q2	EV_MC2	48	2.9	4.3	<0.0001	0.00025	0.00011	0.00025	402	0.00031	0.00074	0.099	199	0.021	0.15	<0.00005	0.00016	0.0082	0.0077	17	0.0019
2017	Q2	GH_ERC	56	0.79	0.5	0.00023	0.0005	<0.0001	<0.0001	368	<0.0005	<0.0005	0.16	187	<0.01	0.13	<0.00005	0.00008	0.0029	0.0032	15	0.00083
2017	Q2	GH_FR1	92	3.4	1.7	<0.0001	0.0012	<0.0001	0.00037

Table D-1: *C. dubia* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	MANGANESE-T-mg/l	MERCURY-D-mg/l	MERCURY-T-mg/l	MOLYBDENUM-D-mg/l	MOLYBDENUM-T-mg/l	NICKEL-D-mg/l	NICKEL-T-mg/l	NITRATE NITROGEN (NO3) AS N-N-mg/l	NITRITE NITROGEN (NO2) AS N-N-mg/l	NITROGEN AMMONIA (AS N)-N-mg/l	ORTHO-PHOSPHATE-N-mg/l	pH LAB-N-ph units	PHOSPHORUS-N-mg/l	POTASSIUM-T-mg/l	SELENIUM-D-mg/l	SELENIUM-T-mg/l	SILVER-D-mg/l	SILVER-T-mg/l	SODIUM-T-mg/l	STRONTIUM-D-mg/l
Reference																						
2015	Q1	Reference (FR_UFR1)	0.00018	< 0.000010	< 0.000010	0.00053	0.00054	< 0.00050	< 0.00050	0.13	< 0.0010	< 0.0050	0.0032	8.4	0.0042	0.4	0.00069	0.00073	< 0.000010	< 0.000010	0.77	0.088
2015	Q1	Reference (FR_UFR1)	0.00018	< 0.000010	< 0.000010	0.00053	0.00054	< 0.00050	< 0.00050	0.13	< 0.0010	< 0.0050	0.0032	8.4	0.0042	0.4	0.00069	0.00073	< 0.000010	< 0.000010	0.77	0.088
2015	Q1	Reference (FR_UFR1)	0.00037	< 0.000010	< 0.000010	0.00056	0.00055	< 0.00050	< 0.00050	0.13	< 0.0010	< 0.0050	0.0027	8.3	0.0035	0.42	0.00076	0.00073	< 0.000010	< 0.000010	0.72	0.089
2015	Q2	Reference (FR_UFR1)	0.0025	< 0.0000050	< 0.0000050	0.00052	0.00062	< 0.00050	< 0.00050	0.066	< 0.0010	< 0.0050	0.0042	8.4	0.01	0.37	0.00048	0.00049	< 0.000010	< 0.000010	0.56	0.061
2015	Q2	Reference (GH_ER2)	0.0059	< 0.0000050	< 0.0000050	0.00092	0.00094	< 0.00050	< 0.00050	0.086	< 0.0010	< 0.0050	< 0.0010	8.3	0.008	0.37	0.00079	0.00087	< 0.000010	< 0.000010	0.73	0.2
2015	Q3	Reference (FR_UFR1)	0.0015	< 0.0000050	< 0.0000050	0.00068	0.00068	< 0.00050	< 0.00050	0.019	< 0.0010	< 0.0050	0.0029	8.4	0.0054	0.52	0.00047	0.00043	< 0.000010	< 0.000010	0.69	0.093
2015	Q4	Reference (FR_UFR1)	0.00031	< 0.0000050	< 0.0000050	0.00065	0.00059	< 0.00050	< 0.00050	0.022	< 0.0010	< 0.0050	0.0017	8.4	0.0022	0.42	0.00069	0.00062	< 0.000010	< 0.000010	0.69	0.095
2015	Q4	Reference (GH_ER2)	0.0027	< 0.0000050	< 0.0000050	0.001	0.0010	< 0.00050	< 0.00050	0.078	< 0.0010	< 0.0050	0.0015	8.3	< 0.0020	0.35	0.00072	0.00078	< 0.000010	< 0.000010	0.67	0.21
2016	Q1	Reference (FR_UFR1)	0.00034	< 0.0000050	< 0.00000050	0.00058	0.00056	< 0.00050	< 0.00050	0.17	< 0.0010	< 0.0050	0.0032	8.3	0.0036	0.37	0.0008	0.00078	< 0.000010	< 0.000010	0.68	0.089
2016	Q2	Reference (FR_UFR1)	0.0021	< 0.0000050	0.0000014	0.00061	0.00062	< 0.00050	< 0.00050	0.034	< 0.0010	< 0.0050	0.0041	8.3	0.0078	0.34	0.00052	0.00055	< 0.000010	< 0.000010	0.63	0.063
2016	Q2	Reference (GH_ER2)	0.012	< 0.0000050	0.00000098	0.00091	0.00093	< 0.00050	0.0005	0.12	< 0.0010	< 0.0050	0.0011	8.2	0.016	0.46	0.00083	0.00083	< 0.000010	< 0.000010	0.75	0.2
2016	Q3	Reference (FR_UFR1)	0.0011	< 0.0000050	< 0.00000050	0.00063	0.00063	< 0.00050	< 0.00050	0.057	< 0.0010	< 0.0050	0.0031	8.2	0.0038	0.47	0.00056	0.00063	< 0.000010	< 0.000010	0.68	0.095
2016	Q4	Reference (FR_UFR1)	0.00073	< 0.0000050	0.00000056	0.00057	0.00056	< 0.00050	< 0.00050	0.1	< 0.0010	< 0.0050	0.0023	8.3	0.0028	0.38	0.00069	0.00068	< 0.000010	< 0.000010	0.7	0.093
2016	Q4	Reference (GH_ER2)	0.0021	< 0.0000050	< 0.0000050	0.00097	0.001	< 0.00050	< 0.00050	0.071	< 0.0010	< 0.0050	< 0.0010	8.3	< 0.0020	0.36	0.00087	0.00083	< 0.000010	< 0.000010	0.61	0.24
2017	Q1	Reference (FR_UFR1)	0.00027	<0.000005	<0.0000005	0.00062	0.00062	<0.0005	<0.0005	0.22	<0.001	<0.005	0.0049	8.3	0.0071	0.38	0.0012	0.0010	<0.00001	<0.00001	0.77	0.097
2017	Q2	Reference (CM_MC1)	0.00057	<0.000005	0.0000011	0.00074	0.0008	<0.0005	<0.0005	0.012	<0.001	<0.005	0.0029	8.2	0.0094	0.43	0.00029	0.00025	<0.00001	<0.00001	2.7	0.14
2017	Q2	Reference (FR_UFR1)	0.0035	<0.000005	0.0000031	0.00048	0.0005	0.00052	0.00069	0.098	<0.001	0.011	0.0087	8.3	0.02	0.38	0.0007	0.0006	<0.00001	0.00002	0.62	0.064
2017	Q2	Reference (GH_ER2)	0.0054	<0.000005	0.00000082	0.00094	0.00095	<0.0005	<0.0005	0.12	<0.001	<0.005	<0.001	8.4	0.0058	0.41	0.00086	0.00098	<0.00001	<0.00001	0.73	0.21
2017	Q3	Reference (CM_MC1)	0.001	<0.000005	0.00000067	0.00088	0.00085	<0.0005	<0.0005	0.012	<0.001	0.0067	0.005	8.2	0.06	0.45	0.00019	0.00024	<0.00001	<0.00001	2.0	0.14
2017	Q3	Reference (FR_UFR1)	0.0011	<0.000005	<0.0000005	0.00064	0.00068	<0.0005	<0.0005	0.011	<0.001	0.01	0.0027	8.4	0.0078	0.48	0.0006	0.00059	<0.00001	<0.00001	0.69	0.088
2017	Q3	Reference (GH_ER2)	0.0031	<0.000005	0.00000006	0.00096	0.00098	<0.0005	<0.0005	0.037	<0.001	0.0069	0.001	8.4	0.0059	0.38	0.00067	0.00064	<0.00001	<0.00001	0.6	0.19
2017	Q4	Reference (CM_MC1)	0.00035	<0.000005	0.00000059	0.0009	0.00087	<0.0005	<0.0005	0.015	<0.001	<0.005	0.0035	8.3	0.0045	0.49	0.00019	0.00019	<0.00001	<0.00001	2.9	0.16
2017	Q4	Reference (FR_UFR1)	0.00056	<0.000005	<0.0000005	0.00055	0.00054	<0.0005	<0.0005	0.0094	0.0011	<0.005	0.0016	8.4	0.0023	0.4	0.00058	0.00055	<0.00001	<0.00001	0.72	0.1
2017	Q4	Reference (GH_ER2)	0.0016	<0.000005	<0.0000005	0.0011	0.0011	<0.0005	<0.0005	0.037	<0.001	0.0089	<0.001	8.4	<0.002	0.38	0.00089	0.00087	<0.00001	<0.00001	0.7	0.21
2018	Q1	Reference (CM_MC1)	0.00014	<0.000005	<0.0000005	0.00087	0.00096	<0.0005	<0.0005	0.04	<0.001	<0.005	0.0036	8.3	0.0046	0.45	0.00027	0.00029	<0.00001	<0.00001	3.5	0.16
2018	Q1	Reference (FR_UFR1)	0.00024	<0.000005	<0.0000005	0.00058	0.00055	<0.0005	<0.0005	0.2	<0.001	0.0099	0.0029	8.4	0.0038	0.37	0.00091	0.00098	<0.00001	<0.00001	0.67	0.099
2018	Q1	Reference (GH_ER2)	0.0015	<0.000005	<0.0000005	0.0009	0.0010	<0.0005	<0.0005	0.1	<0.001	<0.005	<0.001	8.2	<0.002	0.3	0.00093	0.00092	<0.00001	<0.00001	0.72	0.2
2018	Q2	Reference (CM_MC1)	0.0026	<0.000005	0.000002	0.00071	0.00072	<0.0005	<0.0005	0.018	<0.001	<0.005	0.0069	8.3	0.016	0.5	0.00024	0.00028	<0.00001	<0.00001	2.4	0.13
2018	Q2	Reference (FR_UFR1)	0.0076	<0.000005	0.0000026	0.0006	0.00053	<0.0005	0.00062	0.13	<0.001	0.0067	0.0079	8.3	0.027	0.42	0.0008	0.00072	<0.00001	<0.00001	0.56	0.072
2018	Q2	Reference (GH_ER2)	0.012	<0.000005	0.000002	0.00095	0.00096	<0.0005	0.00085	0.15	<0.001	0.01	0.0015	8.5	0.026	0.54	0.001	0.00091	<0.00001	<0.00001	0.76	0.2
2018	Q2	Reference (LC_SLC)	0.00073	<0.000005	0.00000064	0.00082	0.00079	<0.0005	<0.0005	0.13	<0.001	0.01	0.001	8.4	0.005	0.35	0.00087	0.00078	<0.00001	<0.00001	0.81	0.13
2018	Q3	Reference (CM_MC1)	0.0006	<0.000005	<0.0000005	0.00094	0.0009	<0.0005	<0.0005	0.019	<0.001	0.024	0.0041	8.4	0.0091	0.5	0.00018	0.00022	<0.00001	<0.00001	2.6	0.15
2018	Q3	Reference (FR_UFR1)	0.00067	<0.000005	<0.0000005	0.00064	0.00068	<0.0005	<0.0005	0.024	<0.001	0.056	<0.001	8.4	0.0095	0.45	0.0006	0.00062	<0.00001	<0.00001	0.67	0.1
2018	Q3	Reference (GH_ER2)	0.06	<0.000005	0.00000076	0.0011	0.00087	<0.0005	0.002	0.023	<0.001	0.014	<0.001	8.2	0.0086	0.6	0.00069	0.00071	<0.00001	0.000014	0.64	0.21
2018	Q3	Reference (LC_SLC)	0.00017	<0.000005	<0.0000005	0.0013	0.0012	<0.0005	<0.0005	0.089	<0.001	0.026	<0.001	8.4	0.0043	0.36	0.0012	0.0013	<0.00001	<0.00001	0.8	0.16
2018	Q4	Reference (CM_MC1)	0.00027	<0.000005	0.00000063	0.00089	0.00093	<0.0005	<0.0005	0.0088	<0.001	0.0081	0.0042	8.2	0.0037	0.42	0.00022	0.00023	<0.00001	<0.00001	3.2	0.13
2018	Q4	Reference (FR_UFR1)	0.00026	<0.000005	<0.0000005	0.00059	0.00061	<0.0005	<0.0005	0.032	<0.001	0.026	0.0023	8.4	<0.002	0.36	0.00073	0.00069	<0.00001	<0.00001	0.69	0.097
2018	Q4	Reference (GH_ER2)	0.0027	<0.000005	<0.0000005	0.001	0.001	<0.0005	<0.0005	0.054	<0.001	0.014	0.0022	8.3	<0.002	0.37	0.00091	0.00084	<0.00001	<0.00001	0.72	0.21
2018	Q4	Reference (LC_SLC)	0.00012	<0.000005	<0.0000005	0.0012	0.0013	<0.0005	<0.0005	0.13	<0.001	0.023	0.0027	8.3	0.0026	0.39	0.0017	0.0015	<0.00001	<0.00001	0.89	0.16
2019	Q1	Reference (CM_MC1)	0.00024	<0.000005	<0.0000005	0.00085	0.00082	<0.0005	<0.0005	0.059	0.0011	0.0069	0.0033	8.2	0.0032	0.43	0.00027	0.00031	<0.00001	<0.00001	3.3	0.16
2019	Q1	Reference (FR_UFR1)	0.00027	<0.000005	<0.0000005	0.00054	0.00055	<0.0005	<0.0005	0.23	<0.001	<0.005	0.0058	8.3	0.0049	0.34	0.00094	0.00071	<0.00001	<0.00001	0.69	0.11
2019	Q1	Reference (GH_ER2)	0.00065	<0.000005	<0.0000005	0.0011	0.001	<0.0005	<0.0005	0.11	0.0015	<0.005	0.0023	8.2	0.0033	0.29	0.0011	0.001	<0.00001	<0.00001	0.64	0.22
2019	Q1	Reference (LC_SLC)	<0.0001	<0.000005	<0.0000005	0.0013	0.0014	<0.0005	<0.0005	0.15	<0.001	0.005	0.0038	8.2	0.0034	0.4	0.0018	0.0019	<0.00001	<0.00001	1.2	0.19
2019	Q2	Reference (CM_MC1)	0.0012	<0.000005	0.0000008	0.00084	0.00084	<0.0005	<0.0005	0.0086	<0.001	<0.005	0.0041	8.2	0.0045	0.41	0.00027	0.00025	<0.00001	<0.00001	2.8	0.13
2019	Q2	Reference (FR_UFR1)	0.0006	<0.000005	0.0000012	0.00051	0.00056	<0.0005	<0.0005	<0.005	<0.001	0.016	0.0032	8.3	0.0064	0.32	0.00078	0.00071	<0.00001	<0.00001	0.66	0.065
2019	Q2	Reference (GH_ER2)	0.0031	<0.000005	<0.0000005	0.001	0.00097	<0.0005	<0.0005	0.073	<0.001	0.011	<0.001	8.2	0.006	0.33	0.0011	0.001	<0.00001	<0.00001	0.7	0.22
2019	Q2	Reference (LC_SLC)	0.00013	<0.000005	<0.0000005	0.001	0.001	<0.0005	<0.0005	0.059	<0.001	<0.005	0.0019	8.2	0.0022	0.34	0.0013	0.0013	<0.00001	<0.00001	0.8	0.14
2019	Q3	Reference (CM_MC1)	0.00078	<0.000005	<0.0000005	0.001	0.00092	<0.0005	<0.0005	0.012	<0.001	<0.005	0.0047	8.4	0.0048	0.47	0.00024	0.0002	<0.00001	<0.00001	3.0	0.15
2019	Q3	Reference (FR_UFR1)	0.00068	<0.000005	0.00000068	0.00064	0.00066	<0.0005	<0.0005	0.005	<0.001	0.021	<0.001	8.4	0.0026	0.4	0.0007	0.00063	<0.00001	<0.00001	0.69	0.095
2019	Q3	Reference (GH_ER2)	0.0023	<0.000005	<0.0000005	0.00096	0.00095	<0.0005	0.00066	0.036	<0.001	0.029	<0.001	8.3	<0.002	0.34	0.00086	0.00081	<0.00001	<0.00001	0.64	0.21
2019	Q3	Reference (LC_SLC)	0.00017	<0.000005	<0.0000005	0.0012	0.0012	<0.0005	<0.0005	0.12	<0.001	0.0053	0.0016	8.3	0.0037	0.33	0.0014	0.0013	<0.00001	<0.00001	0.72	0.13
2019	Q4	Reference (CM_MC1)	0.00023	<0.000005	<0.0000005	0.00083	0.00085	<0.0005	<0.0005	0.019	<0.001	0.0053	0.0041	8.3	0.004	0.4	0.00026	0.00025	<0.00001	<0.00001	3.1	0.14
2019	Q4	Reference (FR_UFR1)	0.00047	<0.000005	<0.0000005	0.00052	0.00056	<0.0005	<0.0005	0.13	<0.001	0.019	0.0026	8.3	0.0031	0.34	0.001	0.00086	<0.00001	<0.00001	0.66	0.085
2019	Q4	Reference (GH_ER2)	0.0018	<0.000005	<0.0000005	0.00098	0.00098	<0.0005	<0.0005	0.075	<0.001	0.013	<0.001	8.3	<0.002	0.35	0.0011	0.00095	<0.00001	<0.00001	0.7	0.21
2019	Q4	Reference (LC_SLC)	0.00069	<0.000005	<0.0000005	0.0013	0.0012	<0.0005	<0.0005	0.13	<0.001	0.015	0.0018	8.1	<0.002	0.35	0.0016	0.0016	<0.00001	<0.00001	0.94	0.16
Tests categorized as no adverse response																						
2015	Q1	CM_MC2	0.0064	< 0.000010	< 0.000010	0.001	0.0011	0.0095	0.0097	2.4	0.012	0.0055	0.001	8.4	0.005	1.4	0.0059	0.006	< 0.000010	< 0.000010	10	0.29
2015	Q1	EV_HC1	0.0015	0.00001	0.00001	0.00063	0.00065	0.0006	0.00064	0.8	0.001	0.005	0.0035	7.4	0.0047	0.62	0.022	0.022	0.00001	0.00001	1.2	0.085
2015	Q1	EV_MC2	0.0022	< 0.000010	< 0.000010	0.00079	0.00078	0.0007	0.00052	3.2	0.0013	< 0.0050	< 0.0010	8.3	0.0047	1.2	0.024	0.022	< 0.000010	< 0.000010	5.7	0.19
2015	Q1	GH_ERC	0.0026	< 0.000010	< 0.000010	0.00092	0.00099	< 0.00050	< 0.00050	0.44	< 0.0010	< 0.0050	< 0.0010	8.3	0.0043	0.37	0.0019	0.0019	< 0.000010	< 0.000010	0.95	0.2
2015	Q1	GH_FR1	0.0021	< 0.000010	< 0.000010	0.00095	0.00098	0.0022	0.0023	13	0.0039	< 0.0050	< 0.0010	8.3	0.0036	1.2	0.051	0.052	< 0.000010	< 0.000010	2.4	0.16
2015	Q1	LC_LCDSSLCC	0.00021	< 0.000010	< 0.000010	0.0017	0.0017	0.0036	0.0036	15	0.003	< 0.0050	< 0.0010	8.3	0.0029	1.2	0.072	0.071	< 0.000010	< 0.000010	5.9	0.23
2015	Q2	EV_HC1	0.0016	0.000005	0.0005	0.00048	0.00075	0.00083	0.57	0.001	0.0084	0.0031	7.5	0.0081	0.55	0.019	0.018	0.00001	0.00001	0.82	0.062
2015	Q2	EV_MC2	0.01	< 0.0000050	< 0.0000050	0.00059	0.00054	0.00077	0.0014	0.81	< 0.0010	< 0.0050	< 0.0010	8.1	0.037	0.67	0.0052	0.005	< 0.000010	0.000017	2.1	0.1
2015	Q2	FR_FRCP1	0.012	< 0.0000050	< 0.0000050	0.0013	0.0013	0.002	0.0024	7.4	0.0056	0.0095	0.0014	8.4	0.018	1.2	0.03	0.03	< 0.000010	< 0.000010	1.2	0.11
2015	Q2	GH_ERC	0.0081	< 0.0000050	< 0.0000050	0.00095	0.00097	< 0.00050	< 0.00050	0.31	< 0.0010	< 0.0050	< 0.0010	8.4	0.016	0.41	0.0017	0.0018	< 0.000010	< 0.000010	0.97	0.21
2015	Q2	GH_FR1	0.0044	< 0.0000050	< 0.0000050	0.0011	0.0011	0.0019	0.002	7.5	0.0028	< 0.0050	< 0.0010	8.4	0.01	1.1	0.031	0.032	< 0.000010	< 0.000010	1.7	0.12
2015	Q2	LC_DCDS	0.0025	<0.0000050	<0.0000050	0.00078	0.00083	0.00064	0.001	0.24	<0.0010	<0.0050	0.031	8.3	0.048	0.87	0.0013	0.0014	<0.000010	<0.000010	0.58	0.032
2015	Q2	LC_LC3	0.0003	<0.0000050	<0.0000050	0.0017	0.0017	0.0088	0.0092	12	<0.0020	<0.0050	0.0025	8.3	0.0034	1.3	0.05	0.05	<0.000010	<0.000010	5.1	0.16
2015	Q2	LC_LC5	0.0026	<0.0000050	<0.0000050	0.0011	0.0011	0.0013	0.0017	6.7	0.0037	<0.0050	0.0012	8.5	0.0076	1.0	0.026	0.027	<0.000010	<0.000010	2.1	0.12
2015	Q3	CM_MC2	0.0032	< 0.0000050	< 0.0000050	0.001	0.0011	0.013	0.013	2.5	0.0088	< 0.0050	< 0.0010	8.4	0.003	1.5	0.0062	0.0064	< 0.000010	< 0.000010	8.7	0.27
2015	Q3	EV_HC1	0.0051	< 0.0000050	< 0.0000050	0.00092	0.00092	0.00079	0.00079	0.87	0.0011	< 0.0050	0.004	8.4	0.0082	0.99	0.029	0.028	< 0.000010	< 0.000010	1.5	0.11
2015	Q3	EV_MC2	0.002	< 0.0000050	< 0.0000050	0.0022	0.0022	0.0047	0.0048	5.7	0.0027	0.01	0.0027	8.1	0.0052	1.5	0.023	0.023	< 0.000010	< 0.000010	4.6	0.21
2015	Q3	FR_FRCP1	0.0069	< 0.0000050	< 0.0000050	0.0015	0.0015	0.0041	0.0043	8.2	0.0049	< 0.0050	< 0.0010	8.4	0.0027	1.8	0.057	0.057	< 0.000010	< 0.000010	1.6	0.13
2015	Q3	GH_ERC	0.0078	< 0.0000050	< 0.0000050	0.00095	0.001	< 0.00050	< 0.00050	0.17	< 0.0010	< 0.0050	< 0.0010	8.3	0.0077	0.42	0.0011	0.0012	< 0.000010	< 0.000010	0.74	0.19
2015	Q3	GH_FR1	0.0023	< 0.0000050	< 0.0000050	0.00099	0.0010	0.0016	0.0017	9.1	0.0046	0.0071	< 0.0010	8.3	0.0036	1.2	0.035	0.036	< 0.000010	< 0.000010	1.8	0.13
2015	Q3	LC_LCDSSLCC	0.00054	< 0.0000050	< 0.0000050	0.0014	0.0015	0.0047	0.005	7.2	< 0.0020	< 0.0050	0.0018	8.4	0.0029	1.1	0.037	0.04	< 0.000010	< 0.000010	3.9	0.16
2015	Q4	EV_HC1	0.002	< 0.00000050	< 0.00000050	0.00097	0.00098	0.00066	0.00069	1.2	< 0.0050	< 0.0050	0.0058	8.4	0.0057	0.9	0.033	0.037	< 0.000010	< 0.000010	1.7	0.13
2015	Q4	EV_MC2	0.0018	< 0.00000050	< 0.00000050	0.002	0.0021	0.0039	0.0041	5.9	< 0.0050	< 0.0050	0.0035	8.2	0.0036	1.3	0.024	0.025	< 0.000010	< 0.000010	4.8	0.23
2015	Q4	GH_ERC	0.0013	< 0.0000050	< 0.0000050	0.00099	0.0011	< 0.00050	< 0.00050	0.46	< 0.0010	< 0.0050	0.0018	8.3	< 0.0020	0.39	0.0015	0.0016	< 0.000010	< 0.000010	0.94	0.22
2015	Q4	GH_FR1	0.0016	< 0.0000050	< 0.0000050	0.0009	0.00099	0.0012	0.0012	10	< 0.0050	< 0.0050	< 0.0010	8.4	< 0.0020	1.2	0.04	0.039	< 0.000010	< 0.000010	2.2	0.14
2015	Q4	LC_DCDS	0.00077	<0.0000050	<0.0000050	0.0011	0.001	<0.0025	<0.0025	<0.0050	0.0012	0.0094	0.0012	8.0	0.017	1.2	0.0016	0.0016	<0.000050	<0.000050	0.73	0.047
2015	Q4	LC_LC5	<0.00050	<0.0000050	<0.0000050	0.001	0.0011	<0.0025	<0.0025	9.8	<0.0010	<0.0050	0.001	7.9	0.063	1.2	0.038	0.038	<0.000050	<0.000050	3.1	0.17
2015	Q4	LC_LCDSSLCC	< 0.00050	< 0.0000050	< 0.0000050	0.0017	0.0016	0.0065	0.0071	13	0.003	< 0.0050	< 0.0010	8.3	< 0.0050	1.4	0.052	0.054	< 0.000050	< 0.000050	6.2	0.21
2016	Q1	EV_HC1	0.0016	< 0.00000050	< 0.00000050	0.00092	0.00092	0.00062	< 0.0010	1.2	< 0.0050	< 0.0050	0.0041	8.3	0.0045	0.86	0.04	0.037	< 0.000010	< 0.000010	1.7	0.13
2016	Q1	EV_MC2	0.0021	< 0.00000050	< 0.00000050	0.0015	0.0015	0.0025	0.0026	5.1	< 0.0050	< 0.0050	< 0.0010	8.1	0.0023	1.1	0.022	0.021	< 0.000010	< 0.000010	4.9	0.2
2016	Q1	GH_ERC	0.00034	< 0.0000050	< 0.0000050	0.00094	0.00092	< 0.00050	< 0.00050	0.76	< 0.0010	< 0.0050	< 0.0010	8.2	< 0.0020	0.39	0.0023	0.0023	< 0.000010	< 0.000010	1.0	0.24
2016	Q1	GH_FR1	0.0012	< 0.0000050	< 0.0000050	0.00084	0.00086	0.0014	0.0014	13	< 0.0050	< 0.0050	< 0.0010	8.3	< 0.0020	1.1	0.052	0.05	< 0.000010	< 0.000010	2.1	0.16
2016	Q1	LC_LCDSSLCC	0.0064	< 0.0000050	< 0.0000050	0.0016	0.0017	0.0034	0.0034	11	0.0098	< 0.0050	0.0011	8.3	< 0.0020	1.4	0.036	0.035	< 0.000010	< 0.000010	6.9	0.23
2016	Q2	LC_LC5	0.009	<0.0000050	0.000001	0.001	0.001	0.0016	0.002	5.9	0.0012	<0.0050	<0.0010	8.3	0.016	0.98	0.022	0.022	<0.000010	<0.000010	2.0	0.11
2016	Q3	EV_HC1	0.0081	< 0.00000050	0.0000012	0.00092	0.00091	0.00074	0.0009	0.84	0.0016	0.0088	0.0064	8.3	0.012	0.98	0.031	0.032	< 0.000010	< 0.000010	1.6	0.12
2016	Q3	EV_MC2	0.0014	< 0.00000050	0.00000085	0.0012	0.0012	0.0022	0.0024	6.5	< 0.0050	0.0073	0.004	8.1	0.0052	1.6	0.026	0.026	< 0.000010	< 0.000010	6.6	0.23
2016	Q3	GH_ERC	0.0019	< 0.0000050	< 0.0000050	0.00091	0.00087	< 0.00050	< 0.00050	0.2	< 0.0010	< 0.0050	< 0.0010	8.2	0.0049	0.42	0.00098	0.0010	< 0.000010	< 0.000010	0.7	0.21
2016	Q3	GH_FR1	0.002	< 0.0000050	< 0.00000050	0.0009	0.00097	0.0015	0.0015	9.6	0.0056	< 0.0050	< 0.0010	8.3	0.0061	1.2	0.034	0.037	< 0.000010	< 0.000010	1.9	0.13
2016	Q3	LC_LCDSSLCC	0.0018	< 0.0000050	< 0.0000050	0.0016	0.0015	0.0044	0.0046	8.6	< 0.0050	< 0.0050	0.0021	8.4	0.0027	1.4	0.027	0.027	< 0.000010	< 0.000010	5.1	0.2
2016	Q4	EV_HC1	0.0033	< 0.0000005	0.00000085	0.00091	0.00093	0.00073	0.00087	1.0	< 0.0050	< 0.0050	0.0061	8.4	0.0079	1.0	0.032	0.032	< 0.000010	< 0.000010	1.9	0.13
2016	Q4	GH_ERC	0.0027	< 0.0000050	< 0.0000050	0.0011	0.001	< 0.00050	0.00086	0.28	< 0.0010	< 0.0050	< 0.0010	8.3	< 0.0020	0.41	0.0014	0.0014	< 0.000010	< 0.000010	0.85	0.25
2016	Q4	GH_FR1	0.0017	<0.000005	<0.000005	0.001	0.0011	0.0019	0.002	8.8	<0.005	<0.005	<0.001	8.3	0.0023	1.3	0.041	0

Table D-1: *C. dubia* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	STRONTIUM-T-mg/l	SULFATE (AS SO4)-D-mg/l	THALLIUM-D-mg/l	THALLIUM-T-mg/l	TIN-D-mg/l	TIN-T-mg/l	TITANIUM-D-mg/l	TITANIUM-T-mg/l	TOTAL DISSOLVED SOLIDS (RESIDUE FILTERABLE)-N-mg/l	TOTAL KJELDAHL NITROGEN-N-mg/l	TOTAL ORGANIC CARBON-T-mg/l	TOTAL SUSPENDED SOLIDS LAB-N-mg/l	TURBIDITY LAB-N-ntu	URANIUM-D-mg/l	URANIUM-T-mg/l	VANADIUM-D-mg/l	VANADIUM-T-mg/l	ZINC-D-mg/l	ZINC-T-mg/l	∑TU-WQGs
Reference																						
2015	Q1	Reference (FR_UFR1)	0.091	47	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	229	< 0.050	0.69	< 1.0	0.13	0.00047	0.00047	< 0.0010	< 0.0010	< 0.0030	< 0.0030	2.8
2015	Q1	Reference (FR_UFR1)	0.091	47	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	229	< 0.050	0.69	< 1.0	0.13	0.00047	0.00047	< 0.0010	< 0.0010	< 0.0030	< 0.0030	2.8
2015	Q1	Reference (FR_UFR1)	0.092	46	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	222	< 0.050	< 0.50	< 1.0	0.33	0.00047	0.00047	< 0.0010	< 0.0010	< 0.0030	< 0.0030	2.7
2015	Q2	Reference (FR_UFR1)	0.066	15	< 0.000010	0.00001	< 0.00010	< 0.00010	< 0.010	< 0.010	147	0.1	2.1	2.4	1.5	0.00031	0.00033	< 0.00050	< 0.00050	< 0.0030	< 0.0030	2.7
2015	Q2	Reference (GH_ER2)	0.21	18	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	191	0.067	1.8	4.4	3.9	0.00079	0.00078	< 0.00050	0.00051	< 0.0030	< 0.0030	2.5
2015	Q3	Reference (FR_UFR1)	0.093	32	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	211	0.08	1.0	1.1	0.2	0.00042	0.00042	< 0.00050	< 0.00050	< 0.0030	< 0.0030	2.2
2015	Q4	Reference (FR_UFR1)	0.091	48	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	215	0.095	0.6	< 1.0	0.26	0.00047	0.00044	< 0.00050	< 0.00050	< 0.0030	< 0.0030	2.4
2015	Q4	Reference (GH_ER2)	0.22	22	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	171	< 0.050	< 0.50	< 1.0	0.26	0.00071	0.00072	< 0.00050	< 0.00050	< 0.0030	< 0.0030	2.4
2016	Q1	Reference (FR_UFR1)	0.09	50	< 0.000010	< 0.000010	< 0.00010	< 0.00010	0.011	0.011	244	< 0.050	< 0.50	< 1.0	0.17	0.0005	0.00049	< 0.00050	< 0.00050	< 0.0030	< 0.0030	1.9
2016	Q2	Reference (FR_UFR1)	0.065	13	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	135	0.086	2.8	1.9	1.6	0.00032	0.00033	< 0.00050	0.00051	< 0.0030	< 0.0030	2.3
2016	Q2	Reference (GH_ER2)	0.2	17	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	174	0.077	2.2	15	4.7	0.00076	0.00079	< 0.00050	0.001	< 0.0030	< 0.0030	2.6
2016	Q3	Reference (FR_UFR1)	0.098	35	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	222	0.077	0.92	1.2	0.22	0.00042	0.00044	< 0.00050	< 0.00050	< 0.0030	< 0.0030	1.2
2016	Q4	Reference (FR_UFR1)	0.095	40	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	204	0.069	1.1	< 1.0	0.85	0.00044	0.00046	< 0.00050	< 0.00050	< 0.0030	< 0.0030	1.4
2016	Q4	Reference (GH_ER2)	0.24	23	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	167	< 0.050	0.62	< 1.0	0.38	0.00076	0.00079	< 0.00050	< 0.00050	< 0.0030	< 0.0030	1.7
2017	Q1	Reference (FR_UFR1)	0.097	45	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	194	<0.05	1.0	<1	0.25	0.00046	0.00048	<0.0005	<0.0005	<0.001	<0.003	1.1
2017	Q2	Reference (CM_MC1)	0.14	11	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	148	0.098	1.9	<1	0.41	0.00018	0.0002	<0.0005	<0.0005	<0.001	<0.003	1.2
2017	Q2	Reference (FR_UFR1)	0.062	22	<0.00001	<0.00001	0.00011	<0.0001	<0.01	<0.01	143	0.18	3.7	4.4	4.7	0.00035	0.00034	0.00053	0.001	0.0013	<0.003	3.7
2017	Q2	Reference (GH_ER2)	0.21	21	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	180	0.068	1.1	6.2	3.8	0.00079	0.00079	<0.0005	0.00061	<0.003	<0.003	1.5
2017	Q3	Reference (CM_MC1)	0.13	13	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	162	0.1	1.2	<1	0.37	0.0002	0.00019	<0.0005	<0.0005	<0.001	<0.003	1.2
2017	Q3	Reference (FR_UFR1)	0.09	32	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	164	0.078	2.7	1.1	0.36	0.00037	0.00038	<0.0005	<0.0005	<0.001	<0.003	1.3
2017	Q3	Reference (GH_ER2)	0.19	15	<0.00001	<0.00001	0.00011	<0.0001	<0.01	<0.01	148	0.12	0.91	1.4	0.81	0.00053	0.00058	<0.0005	<0.0005	<0.001	<0.003	1.3
2017	Q4	Reference (CM_MC1)	0.16	13	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	166	<0.2	1.4	2.4	1.3	0.00023	0.00023	<0.0005	<0.0005	<0.003	<0.003	1.1
2017	Q4	Reference (FR_UFR1)	0.095	44	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	221	<0.05	1.0	1.2	0.45	0.00051	0.00045	<0.0005	<0.0005	<0.003	<0.003	1.1
2017	Q4	Reference (GH_ER2)	0.21	18	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	174	<0.05	0.91	<1	0.38	0.00077	0.00072	<0.0005	<0.0005	<0.003	<0.003	1.2
2018	Q1	Reference (CM_MC1)	0.17	17	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	182	<0.2	0.81	<1	0.22	0.00024	0.00024	<0.0005	<0.0005	<0.003	<0.003	1.1
2018	Q1	Reference (FR_UFR1)	0.093	49	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	216	0.064	0.59	<1	0.14	0.00054	0.00049	<0.0005	<0.0005	<0.003	<0.003	1.1
2018	Q1	Reference (GH_ER2)	0.22	23	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	186	<0.05	<0.5	<1	0.13	0.00077	0.00079	<0.0005	<0.0005	<0.003	<0.003	1.3
2018	Q2	Reference (CM_MC1)	0.12	10	<0.00001	0.000011	<0.0001	<0.0001	<0.01	<0.01	134	0.092	3.4	4.5	2.4	0.00018	0.0002	<0.0005	<0.0005	<0.001	<0.003	1.9
2018	Q2	Reference (FR_UFR1)	0.066	16	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	114	0.13	3.0	7.4	3.8	0.00033	0.00035	<0.0005	0.00065	<0.001	<0.003	2.1
2018	Q2	Reference (GH_ER2)	0.2	19	<0.00001	0.00001	<0.0001	<0.0001	<0.01	<0.01	186	0.2	1.9	17	14	0.00072	0.00075	<0.0005	0.0013	<0.001	0.0036	2.5
2018	Q2	Reference (LC_SLC)	0.12	25	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	176	0.13	2.1	1.6	0.63	0.001	0.0011	<0.0005	<0.0005	0.0015	<0.003	1.3
2018	Q3	Reference (CM_MC1)	0.14	13	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	174	0.052	1.5	<1	0.24	0.00023	0.00023	<0.0005	<0.0005	<0.001	0.0047	1.3
2018	Q3	Reference (FR_UFR1)	0.095	35	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	222	0.24	2.4	<1	0.22	0.00045	0.00043	<0.0005	<0.0005	<0.001	<0.003	1.2
2018	Q3	Reference (GH_ER2)	0.21	16	<0.00001	0.000028	<0.0001	<0.0001	<0.01	<0.01	179	0.057	1.6	6.9	0.61	0.00064	0.00081	<0.0005	0.0031	<0.001	0.0073	4.9
2018	Q3	Reference (LC_SLC)	0.14	48	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	233	<0.05	1.9	<1	0.13	0.0016	0.0016	<0.0005	<0.0005	0.0025	0.0036	1.4
2018	Q4	Reference (CM_MC1)	0.13	14	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	127	0.091	2.2	<1	0.29	0.00025	0.00023	<0.0005	<0.0005	<0.001	<0.003	1.2
2018	Q4	Reference (FR_UFR1)	0.097	44	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	195	0.079	0.66	<1	0.19	0.00053	0.0005	<0.0005	<0.0005	<0.001	<0.003	1.2
2018	Q4	Reference (GH_ER2)	0.21	21	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	168	0.24	<0.5	<1	0.28	0.00077	0.00077	<0.0005	<0.0005	<0.001	<0.003	1.4
2018	Q4	Reference (LC_SLC)	0.16	57	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	214	<0.05	0.65	<1	0.27	0.0018	0.0019	<0.0005	<0.0005	0.0015	<0.003	1.6
2019	Q1	Reference (CM_MC1)	0.15	17	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	209	<0.05	0.62	<1	0.26	0.00023	0.00023	<0.0005	<0.0005	<0.001	<0.003	2.4
2019	Q1	Reference (FR_UFR1)	0.11	49	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	249	<0.05	0.63	<1	0.51	0.00049	0.00047	<0.0005	<0.0005	<0.001	0.014	2.0
2019	Q1	Reference (GH_ER2)	0.22	24	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	181	<0.05	<0.5	<1	0.45	0.00078	0.00075	<0.0005	<0.0005	<0.001	<0.003	3.7
2019	Q1	Reference (LC_SLC)	0.2	82	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	277	<0.05	0.71	<1	0.45	0.0017	0.002	<0.0005	<0.0005	0.0016	<0.003	2.5
2019	Q2	Reference (CM_MC1)	0.13	13	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	167	<0.05	7.4	1.3	0.77	0.00022	0.00021	<0.0005	<0.0005	<0.001	<0.003	1.3
2019	Q2	Reference (FR_UFR1)	0.072	23	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	164	0.058	1.8	<1	1.4	0.00038	0.00041	<0.0005	<0.0005	<0.001	<0.003	1.9
2019	Q2	Reference (GH_ER2)	0.21	23	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	174	0.064	0.86	5.0	3.2	0.00072	0.00077	<0.0005	<0.0005	<0.001	<0.003	3.8
2019	Q2	Reference (LC_SLC)	0.15	46	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	197	<0.05	0.77	<1	0.68	0.0013	0.0013	<0.0005	<0.0005	0.0011	0.0065	2.4
2019	Q3	Reference (CM_MC1)	0.16	13	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	135	<0.05	0.95	<1	0.25	0.00027	0.00024	<0.0005	<0.0005	<0.001	<0.003	1.8
2019	Q3	Reference (FR_UFR1)	0.1	28	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	190	0.057	1.2	1.1	0.55	0.00051	0.00047	<0.0005	<0.0005	<0.001	<0.003	1.8
2019	Q3	Reference (GH_ER2)	0.21	16	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	154	0.079	0.79	1.1	0.51	0.00065	0.0007	<0.0005	<0.0005	<0.001	<0.003	2.3
2019	Q3	Reference (LC_SLC)	0.14	41	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	205	<0.05	0.84	<1	0.24	0.0013	0.0013	<0.0005	<0.0005	0.0016	<0.003	2.6
2019	Q4	Reference (CM_MC1)	0.13	14	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	171	<0.05	0.76	<1	0.16	0.00023	0.00025	<0.0005	<0.0005	<0.001	<0.003	1.6
2019	Q4	Reference (FR_UFR1)	0.092	43	<0.00001	<0.00001	<0.0001	0.00014	<0.01	<0.01	188	0.064	0.67	1.4	0.17	0.0005	0.00049	<0.0005	<0.0005	<0.001	<0.003	1.8
2019	Q4	Reference (GH_ER2)	0.21	23	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	178	0.054	<0.5	1.4	0.64	0.00073	0.00073	<0.0005	<0.0005	<0.001	<0.003	2.3
2019	Q4	Reference (LC_SLC)	0.16	61	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	230	0.054	1.0	<1	0.14	0.0017	0.0017	<0.0005	<0.0005	0.0018	<0.003	1.9
Tests categorized as no adverse response																						
2015	Q1	CM_MC2	0.3	249	0.000014	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	551	< 0.050	0.82	1.7	0.53	0.0022	0.0023	< 0.0010	< 0.0010	< 0.0030	0.0032	6.7
2015	Q1	EV_HC1	0.087	130	0.00001	0.00001	0.0001	0.0001	0.011	0.011	325	0.05	0.84	1.0	0.24	0.0017	0.0017	0.001	0.001	0.003	0.003	3.3
2015	Q1	EV_MC2	0.2	147	< 0.000010	< 0.000010	0.00018	< 0.00010	0.014	0.013	438	0.13	1.2	1.2	0.31	0.0013	0.0012	< 0.0010	< 0.0010	0.0041	< 0.0030	4.3
2015	Q1	GH_ERC	0.21	30	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	203	< 0.050	0.5	2.6	0.41	0.00081	0.00084	< 0.0010	< 0.0010	< 0.0030	0.0041	3.1
2015	Q1	GH_FR1	0.16	233	< 0.000010	< 0.000010	< 0.00010	< 0.00010	0.011	0.011	621	< 0.050	1.1	<1	0.18	0.0022	0.0022	< 0.0010	< 0.0010	< 0.0030	< 0.0030	8.1
2015	Q1	LC_LCDSSLCC	0.23	283	< 0.000010	< 0.000010	< 0.00010	< 0.00010	0.014	0.013	690	< 0.050	0.9	<1	0.29	0.0039	0.004	< 0.0010	< 0.0010	0.0038	0.0039	9.6
2015	Q2	EV_HC1	0.061	79	0.00001	0.00001	0.0001	0.0001	0.01	0.01	233	0.13	1.4	2.6	1.2	0.0012	0.0012	0.0005	0.0005	0.003	0.003	2.7
2015	Q2	EV_MC2	0.093	41	0.000011	0.000025	< 0.00010	< 0.00010	< 0.010	< 0.010	195	0.28	2.5	23	4.7	0.00051	0.00048	< 0.00050	0.0016	< 0.0030	0.0041	3.9
2015	Q2	FR_FRCP1	0.11	126	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	372	< 0.050	2.2	7.7	2.0	0.0015	0.0016	< 0.00050	0.00054	< 0.0030	< 0.0030	5.9
2015	Q2	GH_ERC	0.21	25	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	203	0.12	1.3	7.0	1.6	0.00083	0.00084	< 0.00050	0.0007	< 0.0030	< 0.0030	2.9
2015	Q2	GH_FR1	0.12	136	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	398	< 0.050	1.6	3.6	2.2	0.0016	0.0016	< 0.00050	< 0.00050	< 0.0030	< 0.0030	5.6
2015	Q2	LC_DCDS	0.033	8.7	<0.000010	0.000012	<0.00010	<0.00010	<0.010	<0.010	114	0.14	2.9	3.9	11	0.00018	0.0002	0.0013	0.0021	<0.0030	0.0034	4.2
2015	Q2	LC_LC3	0.16	197	0.000013	0.000014	<0.00010	<0.00010	<0.010	<0.010	519	<0.050	0.77	1.1	0.42	0.0033	0.0034	<0.00050	<0.00050	0.017	0.017	10
2015	Q2	LC_LC5	0.13	120	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	368	<0.050	1.4	5.1	1.1	0.0016	0.0016	<0.00050	<0.00050	0.0032	<0.0030	5.8
2015	Q3	CM_MC2	0.29	249	0.000014	0.000019	< 0.00010	< 0.00010	< 0.010	< 0.010	626	0.1	0.75	1.2	0.61	0.0024	0.0025	< 0.00050	< 0.00050	< 0.0030	< 0.0030	6.6
2015	Q3	EV_HC1	0.11	165	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	479	0.073	1.6	2.3	0.77	0.0023	0.0023	< 0.00050	< 0.00050	< 0.0030	< 0.0030	3.2
2015	Q3	EV_MC2	0.21	169	0.000013	0.000014	< 0.00010	< 0.00010	< 0.010	< 0.010	477	0.16	0.83	1.2	0.34	0.0019	0.0019	< 0.00050	< 0.00050	< 0.0030	0.0031	5.6
2015	Q3	FR_FRCP1	0.13	234	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	566	0.14	0.93	2.6	0.47	0.0027	0.0028	< 0.00050	< 0.00050	< 0.0030	< 0.0030	6.7
2015	Q3	GH_ERC	0.2	20	< 0.000010	< 0.000010	< 0.00010	0.00016	< 0.010	< 0.010	179	< 0.050	0.79	5.1	1.3	0.00065	0.00071	< 0.00050	0.00058	< 0.0030	< 0.0030	2.6
2015	Q3	GH_FR1	0.13	154	< 0.000010	< 0.000010	< 0.00010	0.00015	< 0.010	< 0.010	473	< 0.050	0.86	1.2	0.33	0.0018	0.0018	< 0.00050	< 0.00050	< 0.0030	< 0.0030	6.1
2015	Q3	LC_LCDSSLCC	0.17	157	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	447	0.12	0.64	1.4	0.35	0.0026	0.0028	< 0.00050	< 0.00050	0.0092	0.011	6.7
2015	Q4	EV_HC1	0.13	218	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	529	0.096	0.74	<1	0.29	0.0026	0.0027	< 0.00050	< 0.00050	< 0.0030	< 0.0030	3.1
2015	Q4	EV_MC2	0.23	183	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	492	0.14	0.7	1.0	0.36	0.0019	0.0019	< 0.00050	< 0.00050	< 0.0030	< 0.0030	5.1
2015	Q4	GH_ERC	0.23	37	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	214	< 0.050	0.52	<1	0.26	0.00077	0.00081	< 0.00050	< 0.00050	< 0.0030	< 0.0030	2.5
2015	Q4	GH_FR1	0.15	189	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	520	0.091	0.57	<1	0.3	0.0019	0.0019	< 0.00050	< 0.00050	< 0.0030	< 0.0030	6.4
2015	Q4	LC_DCDS	0.049	13	<0.000050	<0.000050	<0.00050	<0.00050	<0.010	<0.010	140	<0.050	2.7	4.2	1.9	0.00031	0.00033	<0.0025	<0.0025	0.011	<0.015	7.3
2015	Q4	LC_LC5	0.17	178	<0.000050	<0.000050	<0.00050	<0.00050	<0.010	<0.010	440	<0.050	1.2	<1.0	0.35	0.0021	0.0021	<0.0025	<0.0025	<0.0050	<0.015	12
2015	Q4	LC_LCDSSLCC	0.22	237	< 0.000050	< 0.000050	< 0.00050	< 0.00050	< 0.010	< 0.010	565	< 0.050	0.99	< 1.0	0.29	0.0038	0.004	< 0.0025	< 0.0025	0.0081	< 0.015	13
2016	Q1	EV_HC1	0.13	222	< 0.000010	< 0.000010	< 0.00010	< 0.00010	0.015	0.015	504	0.081	1.0	< 1.0	0.25	0.0027	0.0028	< 0.00050	< 0.00050	< 0.0030	< 0.0030	3.1
2016	Q1	EV_MC2	0.21	174	< 0.000010	0.00001	< 0.00010	< 0.00010	0.015	0.016	482	0.11	0.77	< 1.0	0.77	0.0017	0.0017	< 0.00050	< 0.00050	< 0.0030	< 0.0030	4.5
2016	Q1	GH_ERC	0.24	61	< 0.000010	< 0.000010	< 0.00010	< 0.00010	0.012	0.012	256	< 0.050	< 0.50	< 1.0	0.24	0.00099	0.00095	< 0.00050	< 0.00050	< 0.0030	< 0.0030	2.7
2016	Q1	GH_FR1	0.16	247	< 0.000010	< 0.000010	< 0.00010	< 0.00010	0.017	0.017	622	< 0.050	0.71	< 1.0	0.35	0.0022	0.0022	< 0.00050	< 0.00050	< 0.0030	< 0.0030	7.4
2016	Q1	LC_LCDSSLCC	0.24	303	< 0.000010	< 0.000010	< 0.00010	< 0.00010	0.017	0.018	713	0.07	< 0.50	< 1.0	0.35	0.0039	0.0039	< 0.00050	< 0.00050	< 0.0030	0.0034	7.4
2016	Q2	LC_LC5	0.12	105	<0.000010	<0.000010	<0.00010	<0.00010	0.013	0.014	359	0.22	2.2	16	4.2	0.0016	0.0016	<0.00050	0.00063	<0.0030	0.004	5.1
2016	Q3	EV_HC1	0.12	176	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	496	0.096	1.5	2.7	2.6	0.0023	0.0023	< 0.00050	< 0.00050	< 0.0030	< 0.0030	2.5
2016	Q3	EV_MC2	0.24	214	0.000011	0.000012	< 0.00010	< 0.00010	< 0.010	< 0.010	570	0.14	0.96	< 1.0	0.3	0.0015	0.0015	< 0.00050	< 0.00050	< 0.0030	0.0031	4.4
2016	Q3	GH_ERC	0.2	26	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	195	0.055	0.65	< 1.0	1.1	0.0007	0.00067	< 0.00050	< 0.00050	< 0.0030	< 0.0030	1.3
2016	Q3	GH_FR1	0.14	168	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	477	0.15	1.3	< 1.0	0.43	0.002	0.002	< 0.00050	< 0.00050	< 0.0030	< 0.0030	5.3
2016	Q3	LC_LCDSSLCC	0.19	187	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	508	< 0.050	0.52	< 1.0	0.28	0.0029	0.0024	< 0.00050	< 0.00050	0.0089	0.0075	5.9
2016	Q4	EV_HC1	0.13	193	< 0.000010	0.00001	< 0.00010	< 0.00010	< 0.010	< 0.010	480	0.1	1.7	1.8	2.3	0.0026	0.0026	< 0.00050	< 0.00050	< 0.0030	< 0.0030	2.6
2016	Q4	GH_ERC	0.24	32	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	203	< 0.050	0.8	3.4	1.2	0.00089	0.00084	< 0.00050	< 0.00050	< 0.0030	< 0.0030	2.0
2016	Q4	GH_FR1	0.14	196	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	517	0.13	1.1	<2	0.49	0.0021	0.0022	<0.0005	<0.0005	<0.003	<0.003	5.6
2016	Q4	LC_LC5	0.15	154	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	441	<0.050	0.95	<1.0	0.46	0.002	0.0021	<0.00050	<0.00050	<0.0030	<0.0030	5.4
2016	Q4	LC_LCDSSLCC	0.17	176	0.00001	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	487	0.13	0.91	< 1.0	0.39	0.0032	0.0031	< 0.00050	< 0.00050	0.0061	0.0078	5.2
2017	Q1	EV_HC1	0.13	204	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	492	0.081	0.89	<1	0.4	0.0027	0.0027	<0.0005	<0.0005	<0.003	<0.003	2.3
2017	Q1	GH_ERC	0.22	38	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	223	<0.05	<0.5	<1	0.13	0.00085	0.00083	<0.0005	<0.0005	<0.003	<0.003	1.4
2017	Q1	GH_FR1	0.16	232	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	618	0.1	0.63	<1	0.47	0.0024	0.0023	<0.0005	<0.0005	<0.003	<0.003	6.5
2017	Q2	EV_M

Table D-1: *C. dubia* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	∑TU-WQGs/Benchmarks	PCA Factor 1 (2015 to 2019)	PCA Factor 2 (2015 to 2019)	PCA Factor 3 (2015 to 2019)	PCA Factor 4 (2015 to 2019)	PCA Factor 5 (2015 to 2019)	PCA Factor 1 (2019)	PCA Factor 2 (2019)	PCA Factor 3 (2019)	PCA Factor 4 (2019)
Reference												
2015	Q1	Reference (FR_UFR1)	2.8	-5.4	-0.31	-5.1	2.3	-0.87	-	-	-	-
2015	Q1	Reference (FR_UFR1)	2.8	-5.4	-0.31	-5.1	2.3	-0.87	-	-	-	-
2015	Q1	Reference (FR_UFR1)	2.7	-5.3	-0.43	-4.9	2.3	-0.54	-	-	-	-
2015	Q2	Reference (FR_UFR1)	2.7	-7.6	2.4	0.092	0.76	0.94	-	-	-	-
2015	Q2	Reference (GH_ER2)	2.5	-5.2	0.84	-0.44	-0.8	2.9	-	-	-	-
2015	Q3	Reference (FR_UFR1)	2.2	-5.7	-0.99	-1.9	0.62	-0.45	-	-	-	-
2015	Q4	Reference (FR_UFR1)	2.4	-6.0	-1.6	-2.4	0.6	0.03	-	-	-	-
2015	Q4	Reference (GH_ER2)	2.4	-5.3	-1.8	-2.7	-0.97	1.9	-	-	-	-
2016	Q1	Reference (FR_UFR1)	1.8	-5.7	-2.0	-2.8	1.1	-0.07	-	-	-	-
2016	Q2	Reference (FR_UFR1)	2.3	-8.1	2.6	0.28	0.8	0.8	-	-	-	-
2016	Q2	Reference (GH_ER2)	2.6	-5.1	3.0	0.94	-0.33	3.6	-	-	-	-
2016	Q3	Reference (FR_UFR1)	1.2	-6.1	-1.6	-1.1	0.12	-0.8	-	-	-	-
2016	Q4	Reference (FR_UFR1)	1.4	-6.5	-0.45	-0.43	0.04	-0.4	-	-	-	-
2016	Q4	Reference (GH_ER2)	1.7	-5.6	-2.1	-1.9	-1.8	1.7	-	-	-	-
2017	Q1	Reference (FR_UFR1)	1.1	-5.6	-2.1	-0.89	0.024	-2.2	-	-	-	-
2017	Q2	Reference (CM_MC1)	1.2	-6.7	0.82	-0.051	-2.3	-2.2	-	-	-	-
2017	Q2	Reference (FR_UFR1)	3.7	-7.2	7.0	1.2	1.0	-0.98	-	-	-	-
2017	Q2	Reference (GH_ER2)	1.5	-5.1	0.18	0.32	-1.2	2.3	-	-	-	-
2017	Q3	Reference (CM_MC1)	1.2	-6.6	1.2	0.24	-2.6	-2.2	-	-	-	-
2017	Q3	Reference (FR_UFR1)	1.3	-6.4	-0.69	0.23	-0.56	-1.7	-	-	-	-
2017	Q3	Reference (GH_ER2)	1.3	-6.0	-0.95	-0.38	-2.2	0.31	-	-	-	-
2017	Q4	Reference (CM_MC1)	1.1	-6.3	0.3	-0.78	-2.4	-1.8	-	-	-	-
2017	Q4	Reference (FR_UFR1)	1.1	-6.2	-1.8	-1.3	-0.13	-1.3	-	-	-	-
2017	Q4	Reference (GH_ER2)	1.2	-5.5	-2.0	-1.6	-1.9	0.49	-	-	-	-
2018	Q1	Reference (CM_MC1)	1.1	-5.7	-1.1	-1.7	-2.3	-2.3	-	-	-	-
2018	Q1	Reference (FR_UFR1)	1.1	-5.9	-2.5	-1.7	0.11	-1.9	-	-	-	-
2018	Q1	Reference (GH_ER2)	1.3	-5.6	-2.5	-2.2	-1.7	0.89	-	-	-	-
2018	Q2	Reference (CM_MC1)	1.9	-7.1	4.5	1.4	-1.3	-1.0	-	-	-	-
2018	Q2	Reference (FR_UFR1)	2.1	-7.5	4.1	2.4	0.78	0.016	-	-	-	-
2018	Q2	Reference (GH_ER2)	2.5	-4.9	3.8	2.6	-0.84	2.6	-	-	-	-
2018	Q2	Reference (LC_SLC)	1.3	-5.5	-0.7	-0.2	-0.64	0.094	-	-	-	-
2018	Q3	Reference (CM_MC1)	1.3	-6.0	0.51	-0.79	-2.7	-2.2	-	-	-	-
2018	Q3	Reference (FR_UFR1)	1.2	-5.8	-1.2	-0.14	-0.57	-2.2	-	-	-	-
2018	Q3	Reference (GH_ER2)	4.9	-4.2	6.8	1.6	-1.4	4.2	-	-	-	-
2018	Q3	Reference (LC_SLC)	1.4	-4.4	-2.3	-1.4	-0.43	-0.26	-	-	-	-
2018	Q4	Reference (CM_MC1)	1.2	-6.7	0.35	-1.0	-2.5	-2.0	-	-	-	-
2018	Q4	Reference (FR_UFR1)	1.2	-6.1	-2.3	-1.4	-0.47	-1.7	-	-	-	-
2018	Q4	Reference (GH_ER2)	1.4	-5.5	-1.5	-0.91	-2.0	0.75	-	-	-	-
2018	Q4	Reference (LC_SLC)	1.6	-4.2	-2.8	-1.7	-0.47	0.0057	-	-	-	-
2019	Q1	Reference (CM_MC1)	2.4	-5.8	-1.4	-1.9	-2.2	-1.6	-5.9	-2.1	-0.16	-0.59
2019	Q1	Reference (FR_UFR1)	2.0	-5.5	-1.8	-1.4	0.4	-1.4	-5.4	-1.6	-0.37	2.2
2019	Q1	Reference (GH_ER2)	3.8	-5.7	-2.4	-2.0	-1.6	0.48	-5.8	-2.3	-1.8	-0.055
2019	Q1	Reference (LC_SLC)	2.5	-3.5	-3.0	-1.8	-0.089	0.32	-3.8	-1.5	-2.2	1.4
2019	Q2	Reference (CM_MC1)	1.3	-6.8	1.7	0.2	-2.0	-1.6	-6.4	-2.5	3.9	-1.9
2019	Q2	Reference (FR_UFR1)	1.9	-7.7	0.73	0.042	-0.12	-0.88	-7.6	-2.3	3.4	-0.28
2019	Q2	Reference (GH_ER2)	3.9	-5.6	-0.52	-0.39	-1.7	1.6	-5.4	-1.9	-0.28	-1.9
2019	Q2	Reference (LC_SLC)	2.4	-5.1	-2.4	-2.0	-0.39	0.69	-5.1	-2.3	-1.8	1.4
2019	Q3	Reference (CM_MC1)	1.8	-5.9	-0.12	-1.4	-2.8	-1.8	-5.9	-2.0	1.5	-1.7
2019	Q3	Reference (FR_UFR1)	1.8	-6.3	-1.5	-0.9	-0.77	-1.1	-6.4	-1.7	0.77	0.94
2019	Q3	Reference (GH_ER2)	2.3	-6.0	-1.5	-1.1	-2.3	0.5	-6.1	-2.0	-0.95	-0.69
2019	Q3	Reference (LC_SLC)	2.6	-5.0	-2.5	-1.9	-0.32	0.33	-5.2	-1.9	-1.5	1.4
2019	Q4	Reference (CM_MC1)	1.7	-6.7	-0.73	-1.7	-2.7	-1.6	-6.7	-2.5	0.79	-1.2
2019	Q4	Reference (FR_UFR1)	1.9	-6.0	-1.9	-1.5	-0.14	-1.8	-5.8	-2.2	-0.0085	2.3
2019	Q4	Reference (GH_ER2)	2.3	-5.7	-2.1	-1.2	-2.2	0.91	-5.7	-1.9	-1.5	-0.84
2019	Q4	Reference (LC_SLC)	1.9	-4.1	-2.8	-1.4	-0.68	0.3	-4.3	-1.6	-2.0	1.6
Tests categorized as no adverse response												
2015	Q1	CM_MC2	6.1	4.1	1.3	-3.0	-2.1	1.2	-	-	-	-
2015	Q1	EV_HC1	3.2	-2.2	0.2	-4.5	3.6	1.1	-	-	-	-
2015	Q1	EV_MC2	3.8	1.9	1.0	-4.1	3.7	0.89	-	-	-	-
2015	Q1	GH_ERC	3.1	-4.1	1.0	-4.2	0.98	2.4	-	-	-	-
2015	Q1	GH_FR1	4.7	2.6	-1.4	-3.6	3.5	0.26	-	-	-	-
2015	Q1	LC_LCDSSLCC	5.6	4.7	-1.5	-4.0	4.0	1.0	-	-	-	-
2015	Q2	EV_HC1	2.7	-4.2	1.0	-0.63	1.9	1.9	-	-	-	-
2015	Q2	EV_MC2	3.9	-3.3	6.9	1.9	1.1	2.3	-	-	-	-
2015	Q2	FR_FRCP1	4.2	0.69	1.3	2.1	2.3	1.6	-	-	-	-
2015	Q2	GH_ERC	2.9	-4.4	1.5	0.33	-0.17	3.3	-	-	-	-
2015	Q2	GH_FR1	3.8	0.41	-0.14	1.1	2.3	1.1	-	-	-	-
2015	Q2	LC_DCDS	4.3	-6.2	8.1	2.1	3.6	-3.3	-	-	-	-
2015	Q2	LC_LC3	7.7	4.0	-0.86	-1.3	1.8	1.5	-	-	-	-
2015	Q2	LC_LC5	5.0	0.064	-0.37	0.36	2.1	1.1	-	-	-	-
2015	Q3	CM_MC2	5.8	3.8	-0.39	-1.3	-3.3	1.0	-	-	-	-
2015	Q3	EV_HC1	3.0	-0.6	-0.14	0.26	1.9	1.5	-	-	-	-
2015	Q3	EV_MC2	4.7	3.9	-0.53	-0.39	0.37	-1.4	-	-	-	-
2015	Q3	FR_FRCP1	4.6	3.6	-1.4	0.57	1.9	0.76	-	-	-	-
2015	Q3	GH_ERC	2.6	-5.1	0.95	-1.3	-0.4	2.9	-	-	-	-
2015	Q3	GH_FR1	3.9	1.3	-1.3	-0.99	1.9	-0.38	-	-	-	-
2015	Q3	LC_LCDSSLCC	5.1	2.9	-1.7	-0.65	2.2	1.0	-	-	-	-
2015	Q4	EV_HC1	2.8	0.32	-2.4	-0.76	1.9	0.98	-	-	-	-
2015	Q4	EV_MC2	4.0	3.9	-2.0	-0.49	0.74	-1.1	-	-	-	-
2015	Q4	GH_ERC	2.5	-4.5	-2.1	-2.7	-0.49	1.5	-	-	-	-
2015	Q4	GH_FR1	3.8	1.5	-3.2	-1.1	2.2	0.041	-	-	-	-
2015	Q4	LC_DCDS	7.4	2.3	18	-15	0.062	-4.2	-	-	-	-
2015	Q4	LC_LC5	10	7.8	15	-16	0.22	-1.4	-	-	-	-
2015	Q4	LC_LCDSSLCC	10	11	14	-15	0.16	-0.84	-	-	-	-
2016	Q1	EV_HC1	2.8	0.7	-2.3	-1.3	3.1	2.3	-	-	-	-
2016	Q1	EV_MC2	3.6	3.1	-1.7	-0.77	2.3	1.3	-	-	-	-
2016	Q1	GH_ERC	2.6	-3.8	-2.6	-3.4	0.24	2.0	-	-	-	-
2016	Q1	GH_FR1	3.9	2.2	-3.7	-2.0	4.0	2.0	-	-	-	-
2016	Q1	LC_LCDSSLCC	4.4	5.6	-3.5	-1.1	3.0	2.6	-	-	-	-
2016	Q2	LC_LC5	4.5	0.3	1.8	1.9	3.0	2.9	-	-	-	-
2016	Q3	EV_HC1	2.4	-0.47	0.31	2.0	1.4	1.2	-	-	-	-
2016	Q3	EV_MC2	3.3	3.7	-2.0	0.19	0.18	-1.6	-	-	-	-
2016	Q3	GH_ERC	1.4	-5.5	-1.6	-1.4	-1.4	1.3	-	-	-	-
2016	Q3	GH_FR1	2.9	1.2	-2.8	0.48	1.7	-0.51	-	-	-	-
2016	Q3	LC_LCDSSLCC	3.9	3.8	-3.0	-0.097	1.2	0.29	-	-	-	-
2016	Q4	EV_HC1	2.4	0.041	-0.63	1.7	1.5	1.1	-	-	-	-
2016	Q4	GH_ERC	2.0	-4.8	-1.4	-1.1	-1.4	1.9	-	-	-	-
2016	Q4	GH_FR1	3.4	1.8	-2.4	0.55	1.7	-0.33	-	-	-	-
2016	Q4	LC_LC5	4.2	1.0	-3.5	-0.24	1.5	-0.28	-	-	-	-
2016	Q4	LC_LCDSSLCC	3.5	3.3	-2.3	0.74	1.3	0.31	-	-	-	-
2017	Q1	EV_HC1	2.1	-0.38	-2.2	0.23	1.3	0.64	-	-	-	-
2017	Q1	GH_ERC	1.4	-4.7	-2.9	-2.6	-1.1	0.37	-	-	-	-
2017	Q1	GH_FR1	3.0	1.7	-3.7	0.0015	1.7	-0.48	-	-	-	-
2017	Q2	EV_MC2	2.9	-1.8	5.1	4.0	0.5	-0.92	-	-	-	-
2017	Q2	GH_ERC	1.8	-4.0	0.46	0.71	-0.81	2.4	-	-	-	-
2017	Q2	GH_FR1	5.8	3.5	7.6	4.5	2.7	2.8	-	-	-	-
2017	Q2	LC_DCDS	3.3	-4.5	9.4	4.0	2.2	-5.4	-	-	-	-
2017	Q2	LC_LC5	3.9	1.4	1.2	4.1	1.5	0.15	-	-	-	-
2017	Q2	LC_LCDSSLCC	4.5	5.4	-1.8	1.9	0.57	-0.18	-	-	-	-
2017	Q3	EV_HC1	1.9	-0.72	-1.7	0.54	1.2	0.4	-	-	-	-
2017	Q3	EV_MC2	2.2	1.1	-1.4	1.2	0.15	-1.6	-	-	-	-
2017	Q3	GH_ERC	1.4	-5.3	-0.27	0.67	-1.6	0.93	-	-	-	-
2017	Q3	LC_LCDSSLCC	4.5	4.4	-1.8	0.84	0.91	-0.93	-	-	-	-
2017	Q4	EV_HC1	1.9	-0.87	-1.9	0.62	0.97	-0.89	-	-	-	-
2017	Q4	EV_MC2	2.2	-0.1	-1.2	0.13	-0.2	-1.8	-	-	-	-
2017	Q4	GH_ERC	1.4	-4.9	-2.0	-1.4	-1.4	0.2	-	-	-	-
2017	Q4	GH_FR1	3.0	1.7	-2.6	1.0	1.4	-1.5	-	-	-	-
2017	Q4	LC_DCDS	4.5	0.069	3.7	3.0	1.8	-7.0	-	-	-	-
2017	Q4	LC_LC5	4.0	0.91	-2.8	0.088	1.1	-1.4	-	-	-	-
2017	Q4	LC_LCDSSLCC	4.2	4.5	-2.0	0.78	0.7	-0.8	-	-	-	-
2018	Q1	CM_MC3	1.9	-1.7	-2.5	-1.2	-1.1	0.39	-	-	-	-
2018	Q1	EV_HC1	2.0	0.1	-2.7	0.28	1.0	-0.87	-	-	-	-
2018	Q1	GH_ERC	1.5	-5.1	-1.5	-1.6	-0.61	1.9	-	-	-	-
2018	Q1	GH_FR1	3.7	2.1	-3.7	0.069	1.8	-1.2	-	-	-	-
2018	Q1	LC_LCDSSLCC	4.7	6.0	-0.95	-4.8	0.19	-2.5	-	-	-	-
2018	Q2	EV_HC1	2.0	-2.3	1.7	2.9	1.1	1.1	-	-	-	-
2018	Q2	EV_MC2	4.7	-0.61	9.9	4.4	1.4	2.0	-	-	-	-
2018	Q2	LC_DCDS	10	2.8	13	6.2	0.94	-4.2	-	-	-	-
2018	Q3	EV_HC1	2.0	-0.17	-1.5	1.2	0.44	0.15	-	-	-	-
2018	Q3	EV_MC2	3.6	4.4	-0.35	1.1	-1.5	-2.0	-	-	-	-
2018	Q3	GH_ERC	1.5	-5.4	-0.16	-0.28	-0.82	2.1	-	-	-	-
2018	Q3	GH_FR1	4.0	2.6	-2.1	1.7	1.0	-1.8	-	-	-	-
2018	Q3	LC_LCDSSLCC	5.8	4.6	-1.3	0.23	1.2	0.32	-	-	-	-
2018	Q4	EV_HC1	2.1	0.13	-1.5	0.97	1.1	0.11	-	-	-	-
2018	Q4	EV_MC2	3.1	1.7	-1.3	0.85	-0.1	-1.7	-	-	-	-
2018	Q4	FR_FRABCH	3.5	3.3	-3.7	0.91	1.6	-0.44	-	-	-	-
2018	Q4	GH_ERC	2.0	-4.8	0.36	0.098	-0.86	3.2	-	-	-	-
2018	Q4	GH_FR1	3.8	2.4	-3.6	0.65	1.4	-1.3	-	-	-	-
2019	Q1	EV_HC1	2.8	-0.3	-1.8	0.59	1.0	-0.36	-0.52	0.33	0.0086	1.1
2019	Q1	EV_MC2	2.5	-0.33	-1.8	0.84	0.45	-2.4	-0.7	0.98	0.89	1.3
2019	Q1	GH_ERC	4.0	-4.9	-2.9	-2.4	-1.3	-0.22	-5.2	-2.0	-2.1	0.77
2019	Q1	GH_FR1	4.0	2.6	-3.9	0.11	1.6	-1.1	2.0	1.4	-1.5	2.3
2019	Q1	LC_DCDS	6.5	3.1	1.8	2.4	2.5	-7.0	2.9	2.7	8.0	3.4
2019	Q1	LC_LC3	6.3	8.0	-2.5	2.3	-0.54	1.1	7.5	3.7	-2.4	-1.7
2019	Q1	LC_LC5	3.7	1.6	-4.3	-0.12	1.2	-1.3	0.48	1.3	-2.1	2.4
2019	Q1	LC_LCDSSLCC	4.6	5.0	-4.1	0.42	1.1	-0.32	4.1	2.5	-2.8	1.9
2019	Q1	RG_MIDAG	4.6	0.46	-2.5	-1.2	-1.5	-1.2	-0.11	0.021	-1.0	-0.85
2019	Q2	CM_MC2	4.1	2.0	0.24	1.9	-3.6	0.85	2.1	0.76	1.6	-6.1
2019	Q2	EV_HC1	2.8	-0.86	-0.81	0.6	0.58	1.7	-0.89	0.015	0.72	-1.1
2019	Q2	EV_MC2	2.3	-3.6	1.3	0.96	-0.19	-0.51	-3.7	-0.27	4.2	-2.3
2019	Q2	FR_FRABCH	5.6	5.0	1.4	-0.097	1.6	2.4	5.6	0.61	-1.9	-2.3
2019	Q2	FR_FRCP1	5.5	4.2	-1.9	2.3	0.47	-1.1	3.5	2.4	0.75	0.77
2019	Q2	GH_ERC	4.0	-4.6	-1.6	-0.91	-1.3	1.0	-4.7	-1.4	-1.3	-0.99
2019	Q2	GH_FR1	3.6	3.0	-2.3	1.8	0.88	-2.0	2.3	2.0	0.75	1.5
2019	Q2	LC_DCDS	6.3	1.5	3.1	2.7	1.0	-5.6	1.2	2.3	11	1.0
2019	Q2	LC_LC3	7.2	5.7	-3.0	0.32	0.7	1.4	5.2	2.4	-3.2	0.55
2019	Q2	LC_LC5	3.7	1.8	-2.8	1.1	1.4	-0.27	0.95	1.6	-1.1	0.86
2019	Q2	LC_LCDSSLCC	4.4	2.7	-3.1	0.037	0.61	0.52	2.0	1.7	-2.4	1.1
2019	Q2	RG_MIDAG	2.3	-1.4	-0.41	0.66	-1.4	0.44	-1.4	-0.25	0.92	-2.3
2019	Q3	CM_MC2	6.2	4.7	-1.4	-0.31	-5.0	-0.22	4.4	-0.016	-0.22	-5.6
2019	Q3	EV_HC1	2.4	-0.86	-1.6	0.87	0.68	-0.23	-1.0	0.28	0.4	0.67
2019	Q3	EV_MC2	2.3	-0.62	-1.4	0.8	-0.11	-2.1	-1.0	1.1	1.2	0.18
2019	Q3	FR_FRABCH	4.3	2.9	-2.6	0.71	1.1	-0.077	2.4	1.5	-1.5	1.2
2019	Q3	GH_ERC	2.6	-5.2	-1.9	-1.2	-1.5	0.72	-5.4	-1.7	-1.3	-0.49
2019	Q3	GH_FR1	3.6	1.2	-2.3	1.1	1.1	-0.73	0.5	1.1	-0.21	0.98
2019	Q3	LC_DCDS	7.9	3.7	2.2	2.3	1.0	-7.3	3.3	2.4	9.5	2.6
2019	Q3	LC_LC3	6.8	6.1	-2.1	0.91	0.45	0.87	5.6	3.0	-3.5	0.41
2019	Q3	LC_LC5	3.1	1.0	-3.0	0.52	1.4	-1.1	0.12	1.2	-0.99	2.1
2019	Q3	LC_LCDSSLCC	4.5	3.4	-2.6	0.38	0.84	0.28	2.8	2.2	-2.8	1.2
2019	Q3	RG_MIDAG	3.3	0.016	-0.49	-0.7	-3.2	-0.66	-0.15	-1.5	1.0	-2.7
2019	Q4	CM_MC2	8.1	5.6	2.2	2.7	-5.6	2.8	6.3	0.93	1.8	-11
2019	Q4	EV_HC1	2.8	-0.39	-2.9	0.57	0.68	0.12	-0.65	0.53	-1.5	1.0
2019	Q4	EV_MC2	2.4	0.13	-2.6	0.77	0.0067	-2.2	-0.4	1.2	-0.2	0.93
2019	Q4	FR_FRABCH	4.7	2.4	-0.51	3.0	1.5	1.6	2.9	2.0	1.9	-1.9
2019	Q4	FR_FRCP1	6.2	5.9	-3.5	1.4	0.61	-0.63	5.2	1.9	-1.1	2.2
2019	Q4	GH_ERC	2.4	-4.4	-2.2	-0.82	-1.4	0.54	-4.6	-1.4	-1.3	-0.63
2019	Q4	GH_FR1	3.3	1.4	-3.4	-0.097	1.3	-0.31	1.1	0.8	-2.3	2.0
2019	Q4	LC_DCDS	8.1	4.9	0.81	1.9	2.1	-7.2	4.5	3.3	6.9	4.4
2019	Q4	LC_LC3	6.4	7.8	-2.4	1.6	-0.076	0.98	7.4	3.5	-3.1	-0.4
2019	Q4	LC_LC5	3.9	1.9	-4.2	0.2	0.92	-0.91	0.84	1.6	-2.5	2.4
2019	Q4	LC_LCDSSLCC	7.0	4.4	-2.5	0.37	0.88	0.85	3.9	2.5	-3.1	0.92
2019	Q4	RG_MIDAG	3.4	0.71	-0.53	0.63	-2.9	0.9	0.71	-0.25	-0.13	-4.5
Test categorized as possible or likely response (2015 to 2018)												
2015	Q1	FR_FRCP1	17	14	3.8	-10	4.2	3.7	-	-	-	-
2015	Q2	CM_MC2	5.4	0.03	4.5	1.8	-1.7	3.6	-	-	-	-
2015	Q2	LC_LCDSSLCC	4.3	0.28	-0.61	-0.33	2.1	1.3	-	-	-	-
2015	Q4	CM_MC2	4.2	2.8	-1.7	-1.6	-1.9	0.81	-	-	-	-
2015	Q4	FR_FRCP1	5.6	4.8	-2.8	-0.32	1.9	1.2	-	-	-	-
2016	Q1	CM_MC2	5.5	4.6	-1.1	-1.2	-3.6	1.5	-	-	-	-
2016	Q1	FR_FRCP1	8.8	8.5	-3.9	-1.3	4.3	3.4	-	-	-	-
2016	Q2	CM_MC2	6.1	1.8	5.9	2.6	-1.6	3.5	-	-	-	-
2016	Q2	EV_HC1	2.8	-1.0	2.0	1.4	3.1	3.6	-	-	-	-
2016	Q2	EV_MC2	4.4	-3.5	8.8	2.8	2.3	2.2	-	-	-	-
2016	Q2	FR_FRCP1	3.8	0.57	1.7	2.4	2.4	1.1	-	-	-	-
2016	Q2	GH_ERC	3.3	-3.8	4.4	1.8	0.037	4.1	-	-	-	-
2016	Q2	GH_FR1	3.6	0.13	1.4	2.0	2.5	1.1	-	-	-	-
2016	Q2	LC_DCDS	3.8	-5.9	8.8	2.3	3.5	-2.9	-	-	-	-
2016	Q2	LC_LCDSSLCC	4.4	2.1	-0.1	0.3	2.1	1.9	-	-	-	-
2016	Q3	CM_MC2	4.7	4.3	-1.8	-0.84	-3.9	-0.66	-	-	-	-
2016	Q3	FR_FRCP1	3.9	3.3	-2.7	1.3	1.6	0.18	-	-	-	-
2016	Q4	CM_MC2	4.3	1.8	2.6	2.6	-3.7	1.4	-	-	-	-
2016	Q4	EV_MC2	3.0	-3.0	5.0	2.8	1.3	-0.22	-	-	-	-
2016	Q4	FR_FRCP1	3.8	3.1	-2.3	1.4	1.6	0.28	-	-	-	-
2016	Q4	LC_DCDS	3.6	-2.0	9.4	4.0	2.6	-3.7	-	-	-	-
2017	Q1	CM_MC2	8.3	6.9	-0.83	0.77	-6.0	-0.56	-	-	-	-
2017	Q1	EV_MC2	2.8	1.4	-1.5	0.79	0.48	-1.2	-	-	-	-
2017	Q1	FR_FRCP1	7.3	6.9	-2.6	1.9	0.88	0.55	-	-	-	-
2017	Q1	LC_LCDSSLCC	3.9	5.0	-3.1	0.67	1.0	-0.036	-	-	-	-
2017	Q2	CM_MC2	8.8	5.7	4.0	3.7	-6.3	0.83	-	-	-	-
2017	Q2	CM_MC2	9.6	6.7	3.0	2.8	-7.3	0.56	-	-	-	-
2017	Q2	EV_HC1	2.3	-0.75	1.9	3.1	1.1	0.85	-	-	-	-
2017	Q2	FR_FRCP1	6.1	3.5	7.9	4.8	1.9	1.5	-	-	-	-
2017	Q3	CM_MC2	10	5.3	0.61	1.3	-7.4	-0.27	-	-	-	-
2017	Q3	FR_FRCP1	3.6	3.0	-2.0	2.7	1.2	-1.1	-	-	-	-
2017	Q3	GH_FR1	3.2	1.6	-2.6	1.5	0.89	-1.7	-	-	-	-
2017	Q4	CM_MC2	6.0	5.9	-0.61	0.51	-5.2	-0.4	-	-	-	-
2017	Q4	FR_FRCP1	5.4	5.4	-2.9	1.2	1.1	-0.36	-	-	-	-
2018	Q1	CM_MC2	6.0	6.0	-1.4	0.25	-5.1	-0.58	-	-	-	-
2018	Q1	EV_MC2	2.9	3.9	0.33	-4.1	-0.6	-3.5	-	-	-	-
2018	Q1	FR_FRCP1	6.3	6.9	-3.3	1.5	0.9	-0.57	-	-	-	-
2018	Q2	CM_MC2	8.6	5.5	4.5	3.5	-5.9	1.7	-	-	-	-
2018	Q2	CM_MC3	4.4	1.6	3.7	2.5	-4.9	1.0	-	-	-	-
2018	Q2	FR_FRCP1	5.4	2.4	5.6	4.8	1.8	2.3	-	-	-	-
2018	Q2	GH_ERC	4.4	-2.8	7.8	3.8	0.2	4.9	-	-	-	-
2018	Q2	GH_FR1	8.1	2.9	12	5.3	2.1	1.9	-	-	-	-
2018	Q2	LC_LC5	5.0	1.5	6.0	5.4	1.6	2.3	-	-	-	-
2018	Q2	LC_LCDSSLCC	5.

Table D-2: *P. subcapitata* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	Mean Cell Yield (x 104 cells/mL) (Mean)	ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	ALUMINUM-D-mg/l	ALUMINUM-T-mg/l	ANTIMONY-D-mg/l	ANTIMONY-T-mg/l	ARSENIC-D-mg/l	ARSENIC-T-mg/l	BARIUM-D-mg/l	BARIUM-T-mg/l	BERYLLIUM-D-mg/l	BERYLLIUM-T-mg/l	BISMUTH-D-mg/l	BISMUTH-T-mg/l	BORON-D-mg/l	BORON-T-mg/l	BROMIDE-D-mg/l	CADMIUM-D-mg/l	CADMIUM-T-mg/l
Reference																					
2015	Q1	Reference (FR_UFR1)	108	149	<0.0030	0.0032	<0.00010	<0.00010	<0.00010	<0.00010	0.077	0.077	<0.00010	<0.00010	<0.00050	<0.00050	<0.010	<0.010	<0.050	<0.000010	0.000011
2015	Q1	Reference (FR_UFR1)	111	149	<0.0030	0.0032	<0.00010	<0.00010	<0.00010	<0.00010	0.077	0.077	<0.00010	<0.00010	<0.00050	<0.00050	<0.010	<0.010	<0.050	<0.000010	0.000011
2015	Q1	Reference (FR_UFR1)	106	145	<0.0030	0.0059	<0.00010	<0.00010	<0.00010	<0.00010	0.075	0.078	<0.00010	<0.00010	<0.00050	<0.00050	<0.010	<0.010	<0.050	0.000011	<0.000010
2015	Q2	Reference (FR_UFR1)	122	119	0.0092	0.083	<0.00010	<0.00010	0.00012	0.00014	0.042	0.043	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.0000074	0.000013
2015	Q2	Reference (GH_ER2)	102	157	<0.0030	0.076	<0.00010	<0.00010	0.00011	0.00016	0.046	0.048	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	<0.0000050	0.000016
2015	Q3	Reference (FR_UFR1)	126	159	<0.0030	0.0078	<0.00010	<0.00010	0.00011	0.00012	0.076	0.076	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.0000057	0.0000083
2015	Q4	Reference (FR_UFR1)	122	146	<0.0030	0.0046	<0.00010	<0.00010	<0.00010	0.0001	0.074	0.075	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	<0.0000050	0.0000083
2015	Q4	Reference (GH_ER2)	132	147	<0.0030	0.0046	<0.00010	<0.00010	<0.00010	<0.00010	0.047	0.049	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.0000053	0.0000069
2016	Q1	Reference (FR_UFR1)	135	138	< 0.0030	0.0048	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.074	0.073	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000054	0.0000062
2016	Q2	Reference (FR_UFR1)	108	110	0.015	0.11	< 0.00010	< 0.00010	0.00011	0.00014	0.04	0.042	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000062	0.000016
2016	Q2	Reference (GH_ER2)	99	143	0.0036	0.2	< 0.00010	< 0.00010	0.00011	0.00024	0.042	0.044	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000076	0.000025
2016	Q3	Reference (FR_UFR1)	121	160	< 0.0030	0.013	< 0.00010	< 0.00010	< 0.00010	0.0001	0.074	0.077	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000055	0.000011
2016	Q4	Reference (FR_UFR1)	154	141	0.011	0.051	< 0.00010	< 0.00010	< 0.00010	0.00015	0.069	0.064	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000057	0.0000058
2016	Q4	Reference (GH_ER2)	152	143	< 0.0030	0.0075	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.042	0.038	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.0000079
2017	Q1	Reference (FR_UFR1)	154	146	<0.001	0.0046	<0.0001	0.00026	<0.0001	0.00012	0.073	0.073	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.00001	0.000011
2017	Q2	Reference (CM_MC1)	170	133	0.004	0.02	<0.0001	<0.0001	0.00022	0.0002	0.048	0.046	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.013	<0.05	0.000012	0.000015
2017	Q2	Reference (FR_UFR1)	141	113	0.089	0.15	<0.0001	<0.0001	0.00015	0.00019	0.053	0.051	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000016	0.000023
2017	Q2	Reference (GH_ER2)	148	153	<0.003	0.077	<0.0001	<0.0001	<0.0001	0.00014	0.05	0.051	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000098	0.000019
2017	Q3	Reference (CM_MC1)	151	141	0.0026	0.021	<0.0001	<0.0001	0.00022	0.00024	0.05	0.046	<0.00002	<0.00002	<0.00005	<0.00005	0.018	0.013	<0.05	0.00001	0.000015
2017	Q3	Reference (FR_UFR1)	161	148	0.0015	0.0071	<0.0001	0.00011	<0.0001	0.00013	0.068	0.069	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000008	0.000012
2017	Q3	Reference (GH_ER2)	158	130	0.0027	0.012	<0.0001	0.00019	0.00011	0.00012	0.043	0.043	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000081	0.0000078
2017	Q4	Reference (CM_MC1)	111	134	<0.003	0.0086	<0.0001	<0.0001	0.00016	0.00019	0.051	0.051	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.05	0.0000068	0.0000083
2017	Q4	Reference (FR_UFR1)	108	138	<0.003	0.0037	<0.0001	<0.0001	<0.0001	0.00011	0.072	0.072	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000069	0.00001
2017	Q4	Reference (GH_ER2)	110	155	<0.003	0.0061	<0.0001	<0.0001	<0.0001	0.00011	0.049	0.048	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000056	0.0000074
2018	Q1	Reference (CM_MC1)	157	173	<0.003	<0.003	<0.0001	<0.0001	0.00017	0.00018	0.058	0.053	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.05	0.0000078	0.0000058
2018	Q1	Reference (FR_UFR1)	167	137	<0.003	<0.003	<0.0001	<0.0001	<0.0001	<0.0001	0.085	0.068	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000062	0.0000096
2018	Q1	Reference (GH_ER2)	158	153	<0.003	<0.003	<0.0001	<0.0001	<0.0001	0.00013	0.046	0.048	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000058	0.0000062
2018	Q2	Reference (CM_MC1)	145	117	0.023	0.14	<0.0001	<0.0001	0.00023	0.00024	0.042	0.039	<0.00002	<0.00002	<0.00005	<0.00005	0.011	0.013	<0.05	0.00001	0.000019
2018	Q2	Reference (FR_UFR1)	75	106	0.022	0.13	<0.0001	<0.0001	0.00012	0.00016	0.042	0.045	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.000031
2018	Q2	Reference (GH_ER2)	123	140	0.0039	0.24	<0.0001	<0.0001	0.00011	0.00025	0.048	0.049	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000086	0.000043
2018	Q2	Reference (LC_SLC)	148	126	<0.003	0.012	<0.0001	<0.0001	0.00013	0.0002	0.039	0.035	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	<0.000005	0.000015
2018	Q3	Reference (CM_MC1)	100	145	<0.003	0.011	<0.0001	<0.0001	0.00018	0.0002	0.055	0.054	<0.00002	<0.00002	<0.00005	<0.00005	0.015	0.016	<0.05	0.000012	0.000012
2018	Q3	Reference (FR_UFR1)	100	152	<0.003	0.0046	<0.0001	<0.0001	0.00011	0.0001	0.076	0.066	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	<0.000005	0.000011
2018	Q3	Reference (GH_ER2)	105	134	<0.003	0.64	<0.0001	<0.0001	0.00011	0.00061	0.043	0.054	<0.00002	0.000066	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000009	0.00013
2018	Q3	Reference (LC_SLC)	106	140	<0.003	0.003	<0.0001	<0.0001	0.00012	0.00011	0.048	0.041	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.000014
2018	Q4	Reference (CM_MC1)	111	131	<0.003	0.01	<0.0001	<0.0001	0.00017	0.0002	0.045	0.043	<0.00002	<0.00002	<0.00005	<0.00005	0.014	0.015	<0.05	0.0000068	0.0000085
2018	Q4	Reference (FR_UFR1)	109	150	<0.003	<0.003	<0.0001	<0.0001	<0.0001	<0.0001	0.071	0.067	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000055	0.000008
2018	Q4	Reference (GH_ER2)	105	146	<0.003	0.031	<0.0001	<0.0001	<0.0001	0.00014	0.05	0.046	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000055	0.0000097
2018	Q4	Reference (LC_SLC)	110	143	<0.003	<0.003	<0.0001	<0.0001	0.00011	0.00015	0.041	0.045	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.000013
2019	Q1	Reference (CM_MC1)	72	179	<0.003	0.0041	<0.0001	<0.0001	0.00015	0.00015	0.058	0.053	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.013	<0.05	0.0000084	0.0000097
2019	Q1	Reference (FR_UFR1)	61	182	<0.003	0.003	<0.0001	<0.0001	<0.0001	<0.0001	0.074	0.076	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000078	0.000012
2019	Q1	Reference (GH_ER2)	59	150	<0.003	0.0048	<0.0001	<0.0001	<0.0001	0.00011	0.049	0.048	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000058	0.0000053
2019	Q1	Reference (LC_SLC)	77	154	<0.003	<0.003	<0.0001	<0.0001	0.00013	<0.0001	0.047	0.048	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000012	0.000015
2019	Q2	Reference (CM_MC1)	123	125	0.0036	0.032	<0.0001	<0.0001	0.0002	0.00022	0.039	0.041	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.05	0.0000079	0.000014
2019	Q2	Reference (FR_UFR1)	114	126	0.012	0.057	<0.0001	<0.0001	0.00011	0.00011	0.049	0.048	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000073	0.00001
2019	Q2	Reference (GH_ER2)	112	144	<0.003	0.041	<0.0001	<0.0001	0.00011	0.00014	0.045	0.045	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000067	0.000013
2019	Q2	Reference (LC_SLC)	121	140	<0.003	0.0032	<0.0001	<0.0001	0.00011	0.00011	0.036	0.035	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000007	0.000013
2019	Q3	Reference (CM_MC1)	48	146	<0.003	0.0075	<0.0001	<0.0001	0.00023	0.00023	0.052	0.051	<0.00002	<0.00002	<0.00005	<0.00005	0.016	0.016	<0.05	0.00001	0.000016
2019	Q3	Reference (FR_UFR1)	70	143	<0.003	0.0097	<0.0001	<0.0001	0.00012	<0.0001	0.061	0.059	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000006	0.000009
2019	Q3	Reference (GH_ER2)	46	133	<0.003	0.011	<0.0001	<0.0001	0.00011	0.00011	0.042	0.04	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000075	0.0000088
2019	Q3	Reference (LC_SLC)	51	138	<0.003	<0.003	<0.0001	<0.0001	0.00013	0.00011	0.038	0.038	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000095	0.000015
2019	Q4	Reference (CM_MC1)	118	141	<0.003	0.0096	<0.0001	<0.0001	0.00017	0.00018	0.044	0.047	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.05	0.0000083	0.0000081
2019	Q4	Reference (FR_UFR1)	122	143	<0.003	0.0048	<0.0001	<0.0001	<0.0001	0.00011	0.068	0.064	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.0000096
2019	Q4	Reference (GH_ER2)	113	145	<0.003	0.015	<0.0001	<0.0001	<0.0001	0.00011	0.043	0.047	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000059	0.0000098
2019	Q4	Reference (LC_SLC)	114	145	<0.003	0.0045	<0.0001	<0.0001	0.00011	0.00014	0.042	0.04	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000097	0.000014
Tests categorized as no adverse response																					
2015	Q1	CM_MC2	101	213	0.0097	0.032	0.00017	0.00019	0.00017	0.00022	0.072	0.072	<0.00010	<0.00010	<0.00050	<0.00050	0.024	0.025	<0.10	0.000022	0.000023
2015	Q1	EV_MC2	141	193	0.0037	0.019	<0.00010	<0.00010	0.00015	0.00018	0.11	0.11	<0.00010	<0.00010	<0.00050	<0.00050	0.014	0.016	<0.050	0.000055	0.000044
2015	Q1	GH_ERC	108	155	<0.0030	0.028	<0.00010	0.00012	<0.00010	0.00015	0.055	0.056	<0.00010	<0.00010	<0.00050	<0.00050	<0.010	<0.010	<0.050	<0.000010	<0.000010
2015	Q1	GH_FR1	97	202	<0.0030	0.0048	0.00014	0.00014	<0.00010	0.00014	0.12	0.13	<0.00010	<0.00010	<0.00050	<0.00050	0.012	<0.010	<0.10	0.000021	0.000024
2015	Q1	LC_LCDSSLCC	117	195	<0.0030	0.0052	0.00022	0.00022	0.00011	0.00013	0.096	0.093	<0.00010	<0.00010	<0.00050	<0.00050	0.013	0.014	<0.10	0.000086	0.00011
2015	Q2	EV_HC1	140	110	0.0032	0.05	0.0001	0.0001	0.00013	0.00016	0.025	0.025	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.000013	0.000021
2015	Q2	FR_FRCP1	140	147	<0.0030	0.073	0.00022	0.00022	<0.00010	0.00015	0.064	0.065	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.00003	0.00005
2015	Q2	GH_ERC	131	161	<0.0030	0.13	<0.00010	<0.00010	<0.00010	0.00017	0.05	0.051	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.000007	0.000022
2015	Q2	GH_FR1	125	167	<0.0030	0.053	0.00017	0.00017	0.0001	0.00014	0.085	0.087	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.000021	0.000035
2015	Q2	LC_DCDS	133	92	0.029	0.18	0.00015	0.00019	0.00027	0.00036	0.093	0.096	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.000039	0.000067
2015	Q3	EV_HC1	134	192	0.0049	0.034	<0.00010	0.00011	0.00017	0.00024	0.058	0.059	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	0.011	<0.050	0.000017	0.000025
2015	Q3	FR_FRCP1	127	198	<0.0030	0.022	0.00027	0.00033	0.0001	0.00019	0.076	0.076	<0.00010	<0.00010	<0.000050	<0.000050	0.013	0.014	<0.10	0.000038	0.000047
2015	Q3	GH_ERC	129	142	<0.0030	0.083	<0.00010	<0.00010	<0.00010	0.00017	0.046	0.049	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.0000059	0.000016
2015	Q4	EV_HC1	129	195	<0.0030	0.0058	<0.00010	0.00012	0.00014	0.00015	0.06	0.063	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	0.01	<0.25	0.000013	0.000018
2015	Q4	EV_MC2	136	193	<0.0030	0.0056	0.00035	0.00038	0.00014	0.00019	0.11	0.11	<0.00010	<0.00010	<0.000050	<0.000050	0.016	0.016	<0.25	0.000037	0.000047
2015	Q4	GH_ERC	147	151	<0.0030	0.007	<0.00010	<0.00010	<0.00010	<0.00010	0.058	0.06	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	<0.0000050	0.0000073
2015	Q4	GH_FR1	153	188	<0.0030	0.004	0.00011	0.00015	<0.00010	0.00014	0.12	0.12	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	0.011	<0.25	0.000015	0.000024
2015	Q4	LC_DCDS	118	133	<0.0050	<0.015	<0.00050	<0.00050	<0.00050	<0.00050	0.14	0.15	<0.00050	<0.00050	<0.00025	<0.00025	<0.050	<0.050	<0.050	<0.000025	0.00006
2015	Q4	LC_LC5	102	167	<0.0050	<0.015	<0.00050	<0.00050	<0.00050	<0.00050	0.11	0.11	<0.00050	<0.00050	<0.00025	<0.00025	<0.050	<0.050	<0.050	<0.000025	0.00004
2016	Q1	EV_MC2	130	179	< 0.0030	0.031	0.00025	0.00025	0.00013	0.00016	0.11	0.11	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.013	0.013	< 0.25	0.000035	0.000036
2016	Q1	GH_ERC	130	152	< 0.0030	0.0031	< 0.00010	< 0.00010	< 0.00010	< 0.00010	0.067	0.066	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.0000065
2016	Q1	LC_LCDSSLCC	130	193	< 0.0030	0.0074	0.0002	0.00025	< 0.00010	0.00013	0.086	0.089	< 0.00010	< 0.00010	< 0.000050	< 0.000050	0.012	0.013	< 0.25	0.000083	0.000076
2016	Q2	EV_HC1	114	179	0.0046	0.15	< 0.00010	0.00013	0.00013	0.00024	0.038	0.04	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000027	0.000047
2016	Q2	EV_MC2	112	98	0.018	0.42	< 0.00010	0.0002	0.00017	0.00037	0.058	0.063	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000038	0.000078
2016	Q2	GH_ERC	104	146	0.0045	0.31	< 0.00010	0.00011	< 0.00010	0.0003	0.051	0.053	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000011	0.000035
2016	Q2	LC_DCDS	119	89	0.023	0.19	0.00018	0.00027	0.00028	0.00035	0.084	0.086	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.000037	0.000076
2016	Q2	LC_LC5	85	153	<0.0030	0.12	0.00015	0.00024	0.00011	0.00018	0.069	0.071	<0.00010	<0.00010	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.000022	0.000063
2016	Q3	EV_HC1	121	192	0.014	0.073	< 0.00010	< 0.00010	0.00016	0.00021	0.065	0.066	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000016	0.000027
2016	Q3	EV_MC2	120	204	< 0.0030	0.0054	0.00021	0.00022	0.00018	0.00018	0.1	0.1	< 0.000020	< 0.000020	< 0.000050	< 0.000050	0.017	0.018	< 0.25	0.000066	0.000069
2016	Q3	FR_FRCP1	125	198	< 0.0030	0.014	0.0002	0.00022	< 0.00010	0.00012	0.071	0.073	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	0.011	< 0.25	0.000024	0.000042
2016	Q3	GH_ERC	121	144	< 0.0030	0.021	< 0.00010	< 0.00010	< 0.00010	0.00011	0.049	0.05	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	0.0000053
2016	Q3	GH_FR1	118	198	< 0.0030	0.0079	0.00013	0.00014	< 0.00010	0.00012	0.1	0.1	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.25	0.000015	0.000016
2016	Q3	LC_LCDSSLCC	120	187	< 0.0030	0.0047	0.00021	0.00024	< 0.00010	0.00011	0.072	0.066	< 0.000020	< 0.000020	< 0.000050	< 0.000050	0.013	0.012	< 0.25	0.00017	0.00016
2016	Q4	CM_MC2	156	165	0.0088	0.15	0.00014	0.00016	0.00017	0.00026	0.054	0.057	< 0.000020	< 0.000020	< 0.000050	< 0.000050	0.018	0.02	< 0.050	0.000013	0.000016
2016	Q4	EV_HC1	158	192	0.0054	0.076	< 0.00010	0.0001	0.00015	0.00019	0.06	0.06	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.25	0.000019	0.000024
2016	Q4	EV_MC2	166	122	0.023	0.23	< 0.00010	0.00011	0.00019	0.00027	0.074	0.081	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.000025	0.000039
2016	Q4	GH_ERC	157	148	< 0.0030	0.019	< 0.00010	< 0.00010	< 0.00010	0.00012	0.055	0.051	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050	< 0.0000050
2016	Q4	GH_FR1	159	188	<0.003	0.012	0.00015	0.00034	<0.0001	0.00014	0.1	0.097	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000017	0.000021
2016	Q4	LC_DCDS	184	131	0.027	0.17	0.00021	0.00036	0.00028	0.00042	0.13	0.14	<0.000020	0.000024	<0.000050	<0.000050	<0.010	<0.010	<0.050	0.000041	0.00013
2016	Q4	LC_LC5	186	176	<0.0030	0.0068	0.00012	0.00013	<0.00010	0.00011	0.089	0.089	<0.000020	<0.000020	<0.000050	<0.000050	<0.010	<0.010	<0.25	0.000016	0.000038
2016	Q4	LC_LCDSSLCC	156	176	< 0.0030	0.0056	0.00019	0.00026	< 0.00010	0.0002	0.055	0.053	< 0.000020	< 0.000020	< 0.000050	< 0.000050	< 0.010	0.01	< 0.25	0.00014	0.00015
2017	Q1	CM_MC2	172	211	0.0012	0.0081	0.00032	0.00066	0.00016	0.00021	0.072	0.075	<0.00002	<0.00002	<0.00005	<0.00005	0.029	0.031	<0.05	0.000038	0.000039
2017	Q1	EV_HC1	254	197	<0.003	0.0097	<0.0001	<0.0001	0.00014	0.00017	0.065	0.066	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000014	0.000021
2017	Q1	EV_MC2	216	176	<0.003	0.022	0.00023	0.00022	0.00012	0.00017	0.12	0.12	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.012	<0.05	0.000029	0.000035
2017	Q1	FR_FRCP1	169	251	<0.001	0.005	0.00023	0.00066	<0.0001	0.00013	0.072	0.077	<0.00002	<0.00002	<0.00005	<0.00005	0.01	0.011	<0.25	0.000052	0.000062
2017	Q1	GH_ERC	175	156	<0.003	0.0065	<0.0001	<0.0001	<0.0001	<0.0001	0.062	0.064	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	<0.000005	0.0000071
2017	Q1	GH_FR1	139	202	<0.003	0.0085	0.00012	0.00011	<0.0001	0.00011	0.12	0.12	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000014	0.000018
2017	Q1	LC_LCDSSLCC	212	196	<0.003	0.0086	0.00021	0.00024	<0.0001	0.0001	0.084	0.084	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.25	0.0001	0.000094
2017	Q2	CM_MC2	129	197	0.0057	0.11	0.00028	0.00025	0.00016	0.00027	0.067	0.063	<0.00002	<0.00002	<0.00005	<0.00005	0.027	0.027	<0.05	0.000045	0.000072
2017	Q2	CM_MC2	152	194	0.0047	0.095	0.00028	0.00035	0.00016	0.00027	0.067	0.08	<0.00002	<0.00002	<0.00005	<0.00005	0.032	0.039	<0.05	0.000043	0.00007
2017	Q2	EV_HC1	144	201	0.0078	0.072	<0.0001	0.00011	0.00018	0.00028	0.05	0.051	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000025	0.000043
2017	Q2	EV_MC2	140	143	0.

Table D-2: *P. subcapitata* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	CALCIUM-T-mg/l	CARBON, DISSOLVED ORGANIC-D-mg/l	CHLORIDE-D-mg/l	CHROMIUM-D-mg/l	CHROMIUM-T-mg/l	COBALT-D-mg/l	COBALT-T-mg/l	CONDUCTIVITY, LAB-N-us/cm	COPPER-D-mg/l	COPPER-T-mg/l	FLUORIDE-D-mg/l	Hardness, Total or Dissolved CaCO3-N-mg/l	IRON-D-mg/l	IRON-T-mg/l	LEAD-D-mg/l	LEAD-T-mg/l	LITHIUM-D-mg/l	LITHIUM-T-mg/l	MAGNESIUM-T-mg/l
Reference																					
2015	Q1	Reference (FR_UFR1)	56	0.84	<1.0	0.00017	0.00017	<0.00010	<0.00010	367	<0.00050	<0.00050	0.14	197	<0.010	<0.010	<0.000050	<0.000050	0.0019	0.0016	15
2015	Q1	Reference (FR_UFR1)	56	0.84	<1.0	0.00017	0.00017	<0.00010	<0.00010	367	<0.00050	<0.00050	0.14	197	<0.010	<0.010	<0.000050	<0.000050	0.0019	0.0016	15
2015	Q1	Reference (FR_UFR1)	57	<0.50	<1.0	0.00013	0.00015	<0.00010	<0.00010	353	<0.00050	<0.00050	0.14	197	<0.010	<0.010	<0.000050	<0.000050	0.0015	0.0017	14
2015	Q2	Reference (FR_UFR1)	38	1.8	<1.0	0.00014	0.00046	<0.00010	<0.00010	245	<0.00050	<0.00050	0.15	129	<0.010	0.052	<0.000050	<0.000050	<0.0010	0.0012	9.2
2015	Q2	Reference (GH_ER2)	48	0.84	1.0	0.00022	0.00037	<0.00010	<0.00010	303	<0.00050	<0.00050	0.15	160	<0.010	0.066	<0.000050	<0.000050	0.0017	0.0016	11
2015	Q3	Reference (FR_UFR1)	55	0.75	1.0	0.00013	0.00013	<0.00010	<0.00010	342	<0.00050	<0.00050	0.15	188	<0.010	<0.010	0.000055	<0.000050	0.002	0.002	13
2015	Q4	Reference (FR_UFR1)	56	0.6	<1.0	0.00011	0.00036	<0.00010	<0.00010	354	<0.00050	<0.00050	0.16	190	<0.010	<0.010	<0.000050	<0.000050	0.0015	0.0015	14
2015	Q4	Reference (GH_ER2)	51	0.61	1.2	0.00022	0.00034	<0.00010	<0.00010	314	<0.00050	<0.00050	0.16	170	<0.010	<0.010	<0.000050	<0.000050	0.0016	0.0018	11
2016	Q1	Reference (FR_UFR1)	58	< 0.50	1.1	0.00012	< 0.00020	< 0.00010	< 0.00010	358	< 0.00050	< 0.00050	0.16	202	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0014	0.0015	15
2016	Q2	Reference (FR_UFR1)	37	2.5	< 0.10	0.00011	0.00029	< 0.00010	< 0.00010	233	< 0.00050	< 0.00050	0.15	126	< 0.010	0.075	< 0.000050	0.00006	0.0011	0.0013	9.8
2016	Q2	Reference (GH_ER2)	48	1.4	0.61	0.00017	0.00062	< 0.00010	< 0.00010	289	< 0.00050	< 0.00050	0.16	163	< 0.010	0.23	< 0.000050	0.00013	0.002	0.0021	11
2016	Q3	Reference (FR_UFR1)	51	0.86	0.13	< 0.00010	0.00018	< 0.00010	< 0.00010	338	< 0.00050	< 0.00050	0.17	177	< 0.010	0.013	< 0.000050	< 0.000050	0.0017	0.0018	14
2016	Q4	Reference (FR_UFR1)	48	1.1	0.18	< 0.00010	0.00021	< 0.00010	< 0.00010	330	< 0.00050	< 0.00050	0.16	177	< 0.010	0.022	< 0.000050	< 0.000050	0.0015	0.0018	12
2016	Q4	Reference (GH_ER2)	48	0.64	0.36	0.00021	0.00024	< 0.00010	< 0.00010	297	< 0.00050	< 0.00050	0.17	163	< 0.010	0.013	< 0.000050	< 0.000050	0.0019	0.0017	9.6
2017	Q1	Reference (FR_UFR1)	52	0.96	<0.5	<0.0001	0.00011	<0.0001	<0.0001	341	<0.0002	<0.0005	0.14	185	<0.01	<0.01	<0.00005	<0.00005	0.0013	0.0014	14
2017	Q2	Reference (CM_MC1)	36	1.8	<0.5	0.00012	0.00018	<0.0001	<0.0001	267	<0.0002	<0.0005	0.052	134	<0.01	0.021	<0.00005	<0.00005	0.0041	0.0042	10
2017	Q2	Reference (FR_UFR1)	31	3.3	<0.5	0.00022	0.0004	<0.0001	<0.0001	239	0.0004	0.00067	0.11	121	0.054	0.13	<0.00005	0.000092	0.0011	0.0012	8.7
2017	Q2	Reference (GH_ER2)	51	0.83	0.27	0.00021	0.00038	<0.0001	<0.0001	321	<0.0005	<0.0005	0.16	177	<0.01	0.074	<0.00005	0.000061	0.0019	0.002	12
2017	Q3	Reference (CM_MC1)	36	1.2	<0.5	<0.0001	0.00028	<0.0001	<0.0001	265	<0.0002	<0.0005	0.054	138	<0.01	0.033	<0.00005	<0.00005	0.0044	0.0045	9.5
2017	Q3	Reference (FR_UFR1)	45	1.8	<0.5	<0.0001	0.00028	<0.0001	<0.0001	319	<0.0002	<0.0005	0.14	159	<0.01	0.011	<0.00005	<0.00005	0.0015	0.0015	13
2017	Q3	Reference (GH_ER2)	40	0.79	<0.5	0.00019	0.00024	<0.0001	<0.0001	276	<0.0002	<0.0005	0.14	137	<0.01	0.02	<0.00005	<0.00005	0.0017	0.0015	9.6
2017	Q4	Reference (CM_MC1)	41	1.6	<0.5	0.00018	0.00018	<0.0001	<0.0001	280	<0.0005	<0.0005	0.055	144	<0.01	<0.01	<0.00005	<0.00005	0.0045	0.0046	11
2017	Q4	Reference (FR_UFR1)	50	1.1	<0.5	<0.0001	0.00012	<0.0001	<0.0001	333	<0.0005	<0.0005	0.11	185	<0.01	<0.01	<0.00005	<0.00005	0.0019	0.0017	14
2017	Q4	Reference (GH_ER2)	47	0.81	<0.5	0.00022	0.00026	<0.0001	<0.0001	282	<0.0005	<0.0005	0.13	161	<0.01	<0.01	<0.00005	<0.00005	0.0021	0.002	11
2018	Q1	Reference (CM_MC1)	39	0.73	<0.5	0.00013	0.00018	<0.0001	<0.0001	307	<0.0005	<0.0005	0.055	153	<0.01	<0.01	<0.00005	<0.00005	0.0047	0.0048	11
2018	Q1	Reference (FR_UFR1)	53	0.5	<0.5	<0.0001	0.00011	<0.0001	<0.0001	371	<0.0005	<0.0005	0.11	198	<0.01	<0.01	<0.00005	<0.00005	0.0015	0.0014	14
2018	Q1	Reference (GH_ER2)	45	0.66	0.26	0.00019	0.00025	<0.0001	<0.0001	327	<0.0005	<0.0005	0.16	170	<0.01	<0.01	<0.00005	<0.00005	0.0013	0.0017	11
2018	Q2	Reference (CM_MC1)	36	3.3	<0.5	0.00013	0.00029	<0.0001	<0.0001	238	<0.0005	0.00056	0.07	125	0.024	0.11	<0.00005	0.000073	0.0037	0.0041	9.2
2018	Q2	Reference (FR_UFR1)	35	2.9	<0.5	0.00011	0.00027	<0.0001	<0.0001	235	<0.0005	0.00056	0.14	123	0.014	0.13	<0.00005	0.00013	0.0011	0.0013	9.5
2018	Q2	Reference (GH_ER2)	46	1.6	<0.5	0.00018	0.00077	<0.0001	0.00012	304	<0.0005	0.00077	0.16	164	<0.01	0.34	<0.00005	0.00017	0.002	0.0023	12
2018	Q2	Reference (LC_SLC)	42	2.3	<0.5	0.00012	0.00015	<0.0001	<0.0001	299	<0.0005	<0.0005	0.3	163	<0.01	0.012	<0.00005	<0.00005	0.003	0.0029	12
2018	Q3	Reference (CM_MC1)	39	1.7	<0.5	0.00021	0.0003	<0.0001	<0.0001	267	<0.0005	<0.0005	0.08	156	<0.01	0.011	<0.00005	<0.00005	0.0045	0.0048	10
2018	Q3	Reference (FR_UFR1)	48	1.6	<0.5	0.00012	0.00012	<0.0001	<0.0001	325	<0.0005	<0.0005	0.18	183	<0.01	<0.01	<0.00005	<0.00005	0.0018	0.0018	13
2018	Q3	Reference (GH_ER2)	49	1.5	<0.5	0.00021	0.0016	<0.0001	0.00051	270	<0.0005	0.0012	0.17	148	<0.01	0.99	<0.00005	0.00084	0.0018	0.0024	11
2018	Q3	Reference (LC_SLC)	46	1.2	<0.5	0.00014	0.00016	<0.0001	<0.0001	350	<0.0005	<0.0005	0.34	211	<0.01	<0.01	<0.00005	<0.00005	0.0029	0.003	15
2018	Q4	Reference (CM_MC1)	38	2.1	<0.5	0.00018	0.00027	<0.0001	<0.0001	268	<0.0005	<0.0005	0.07	140	<0.01	<0.01	<0.00005	<0.00005	0.0046	0.0045	11
2018	Q4	Reference (FR_UFR1)	51	0.72	<0.5	0.0001	0.00019	<0.0001	<0.0001	347	<0.0005	<0.0005	0.15	187	<0.01	<0.01	<0.00005	<0.00005	0.0016	0.0017	14
2018	Q4	Reference (GH_ER2)	47	<0.5	<0.5	0.00023	0.00038	<0.0001	<0.0001	306	<0.0005	<0.0005	0.17	167	<0.01	0.037	<0.00005	<0.00005	0.0019	0.002	11
2018	Q4	Reference (LC_SLC)	49	0.51	<0.5	0.00013	0.00021	<0.0001	<0.0001	369	<0.0005	<0.0005	0.37	191	<0.01	<0.01	<0.00005	<0.00005	0.0033	0.0036	16
2019	Q1	Reference (CM_MC1)	41	0.55	0.68	0.00016	0.0003	<0.0001	<0.0001	302	<0.0005	<0.0005	0.07	156	<0.01	<0.01	<0.00005	<0.00005	0.0048	0.0043	11
2019	Q1	Reference (FR_UFR1)	54	0.92	<0.5	<0.0001	<0.0001	<0.0001	<0.0001	363	<0.0005	<0.0005	0.14	194	<0.01	<0.01	<0.00005	<0.00005	0.0015	0.0016	15
2019	Q1	Reference (GH_ER2)	51	<0.5	<0.5	0.00021	0.00028	<0.0001	<0.0001	305	<0.0005	<0.0005	0.16	172	<0.01	<0.01	<0.00005	<0.00005	0.0016	0.0016	11
2019	Q1	Reference (LC_SLC)	60	0.67	0.71	0.00014	0.00021	<0.0001	<0.0001	428	<0.0005	<0.0005	0.37	216	<0.01	<0.01	<0.00005	<0.00005	0.0044	0.0048	18
2019	Q2	Reference (CM_MC1)	36	3.6	<0.5	0.00013	0.0002	<0.0001	<0.0001	253	<0.0005	<0.0005	0.071	133	<0.01	0.03	<0.00005	<0.00005	0.004	0.004	9.9
2019	Q2	Reference (FR_UFR1)	38	1.8	<0.5	0.00014	0.00024	<0.0001	<0.0001	278	<0.0005	<0.0005	0.15	133	<0.01	0.026	<0.00005	<0.00005	0.0012	0.0013	11
2019	Q2	Reference (GH_ER2)	50	<0.5	<0.5	0.00021	0.00036	<0.0001	<0.0001	298	<0.0005	<0.0005	0.17	168	<0.01	0.045	<0.00005	<0.00005	0.0017	0.0019	12
2019	Q2	Reference (LC_SLC)	45	0.94	<0.5	0.00016	0.00015	<0.0001	<0.0001	343	<0.0005	<0.0005	0.35	167	<0.01	<0.01	<0.00005	<0.00005	0.0029	0.003	14
2019	Q3	Reference (CM_MC1)	44	0.99	<0.5	0.00022	0.00026	<0.0001	<0.0001	287	<0.0005	<0.0005	0.079	156	<0.01	<0.01	<0.00005	<0.00005	0.0048	0.0049	11
2019	Q3	Reference (FR_UFR1)	50	1.0	<0.5	0.00011	0.00016	<0.0001	<0.0001	309	<0.0005	<0.0005	0.16	172	<0.01	<0.01	<0.00005	<0.00005	0.0015	0.0016	14
2019	Q3	Reference (GH_ER2)	42	0.65	<0.5	0.0002	0.00033	<0.0001	<0.0001	274	<0.0005	<0.0005	0.15	154	<0.01	0.014	<0.00005	<0.00005	0.0017	0.0016	10.0
2019	Q3	Reference (LC_SLC)	46	0.72	<0.5	0.00016	0.0002	<0.0001	<0.0001	320	<0.0005	<0.0005	0.33	171	<0.01	<0.01	<0.00005	<0.00005	0.0026	0.0029	14
2019	Q4	Reference (CM_MC1)	40	0.84	<0.5	0.00027	0.00029	<0.0001	<0.0001	246	0.00021	<0.0005	0.077	142	<0.01	<0.01	<0.00005	<0.00005	0.0041	0.0044	10
2019	Q4	Reference (FR_UFR1)	50	0.71	<0.5	0.00012	0.00011	<0.0001	<0.0001	302	0.00028	<0.0005	0.16	178	<0.01	<0.01	<0.00005	<0.00005	0.0016	0.0017	14
2019	Q4	Reference (GH_ER2)	48	<0.5	<0.5	0.00027	0.00028	<0.0001	<0.0001	279	0.00021	<0.0005	0.17	158	<0.01	0.016	<0.00005	<0.00005	0.0017	0.0018	12
2019	Q4	Reference (LC_SLC)	51	0.81	<0.5	0.00016	0.00016	<0.0001	<0.0001	333	0.00022	<0.0005	0.37	203	<0.01	<0.01	<0.00005	<0.00005	0.0037	0.0035	17
Tests categorized as no adverse response																					
2015	Q1	CM_MC2	106	0.93	3.4	0.00019	0.00024	0.00074	0.00079	826	<0.00050	<0.00050	0.14	445	<0.010	0.031	<0.000050	<0.000050	0.011	0.011	46
2015	Q1	EV_MC2	91	1.7	11	0.00012	<0.00020	<0.00010	<0.00010	665	0.0012	0.00076	0.15	381	<0.010	0.024	<0.000050	<0.000050	0.015	0.015	33
2015	Q1	GH_ERC	55	0.64	<1.0	0.00029	0.00034	<0.00010	<0.00010	345	<0.00050	<0.00050	0.15	191	<0.010	0.036	<0.000050	0.0002	0.0019	0.002	13
2015	Q1	GH_FR1	114	1.1	2.6	0.00021	0.00015	<0.00010	<0.00010	851	<0.00050	<0.00050	0.18	475	<0.010	<0.010	<0.000050	<0.000050	0.016	0.015	49
2015	Q1	LC_LCDSSLCC	123	1.1	2.7	0.00016	0.00021	<0.00010	<0.00010	940	<0.00050	<0.00050	0.24	536	<0.010	<0.010	<0.000050	<0.000050	0.031	0.031	53
2015	Q2	EV_HC1	47	1.1	1.3	0.00013	0.00021	0.0001	0.0001	350	0.0005	0.0005	0.13	205	0.01	0.051	0.00005	0.000056	0.0044	0.0042	21
2015	Q2	FR_FRCP1	73	1.6	1.2	<0.00010	0.00028	<0.00010	0.00012	573	<0.00050	<0.00050	0.2	302	<0.010	0.11	<0.000050	0.00014	0.019	0.018	29
2015	Q2	GH_ERC	53	0.96	<1.0	0.00017	0.00054	<0.00010	<0.00010	338	<0.00050	<0.00050	0.15	179	<0.010	0.15	<0.000050	0.00011	0.0022	0.0023	12
2015	Q2	GH_FR1	81	1.4	1.4	<0.00010	0.0002	<0.00010	<0.00010	614	<0.00050	<0.00050	0.17	332	<0.010	0.07	<0.000050	0.000063	0.014	0.014	34
2015	Q2	LC_DCDS	25	2.2	1.1	0.00012	0.00042	<0.00010	<0.00010	189	<0.00050	0.00059	0.093	96	0.014	0.14	<0.000050	0.00013	0.0051	0.0051	8.4
2015	Q3	EV_HC1	75	1.1	1.4	0.00015	0.00024	<0.00010	<0.00010	625	<0.00050	<0.00050	0.21	373	<0.010	0.027	<0.000050	<0.000050	0.0069	0.0068	41
2015	Q3	FR_FRCP1	109	0.93	1.5	0.0001	0.00017	<0.00010	<0.00010	815	<0.00050	<0.00050	0.2	471	<0.010	0.033	<0.000050	<0.000050	0.03	0.031	51
2015	Q3	GH_ERC	49	0.75	<1.0	0.00019	0.00037	<0.00010	<0.00010	284	<0.00050	<0.00050	0.16	160	<0.010	0.088	<0.000050	0.00007	0.0017	0.002	11
2015	Q4	EV_HC1	93	0.63	1.8	0.00013	0.00022	<0.00010	<0.00010	732	<0.00050	<0.00050	0.2	431	<0.010	<0.010	<0.000050	<0.000050	0.0069	0.0067	50
2015	Q4	EV_MC2	102	0.6	8.7	0.00012	0.00015	<0.00010	<0.00010	733	<0.00050	<0.00050	0.16	415	<0.010	0.014	<0.000050	<0.000050	0.023	0.022	39
2015	Q4	GH_ERC	58	<0.50	1.2	0.00022	0.00026	<0.00010	<0.00010	355	<0.00050	<0.00050	0.16	190	<0.010	<0.010	<0.000050	<0.000050	0.002	0.0021	13
2015	Q4	GH_FR1	106	<0.50	1.7	0.00012	0.00013	<0.00010	<0.00010	760	<0.00050	<0.00050	0.16	436	<0.010	<0.010	<0.000050	<0.000050	0.017	0.017	43
2015	Q4	LC_DCDS	36	2.3	<0.50	<0.00050	<0.00050	<0.00050	<0.00050	251	<0.0010	<0.0025	0.075	150	<0.050	<0.050	<0.00025	<0.00025	0.0074	0.0072	14
2015	Q4	LC_LC5	99	0.84	1.5	<0.00050	<0.00050	<0.00050	<0.00050	627	<0.0010	<0.0025	0.17	424	<0.050	<0.050	<0.00025	<0.00025	0.019	0.019	43
2016	Q1	EV_MC2	94	0.85	9.2	0.00013	0.00018	< 0.00010	< 0.00010	700	< 0.00050	< 0.00050	0.15	395	< 0.010	0.038	< 0.000050	0.000053	0.018	0.018	37
2016	Q1	GH_ERC	67	< 0.50	1.3	0.00024	< 0.00030	< 0.00010	< 0.00010	419	< 0.00050	< 0.00050	0.16	231	< 0.010	< 0.010	< 0.000050	< 0.000050	0.0023	0.0025	16
2016	Q1	LC_LCDSSLCC	134	< 0.50	17	0.00014	< 0.00020	< 0.00010	< 0.00010	1010	< 0.00050	< 0.00050	0.24	572	< 0.010	< 0.010	< 0.000050	< 0.000050	0.037	0.038	60
2016	Q2	EV_HC1	72	1.9	0.79	0.00011	0.00031	< 0.00010	< 0.00010	547	< 0.00050	< 0.00050	0.19	306	< 0.010	0.14	< 0.000050	0.000095	0.0064	0.0068	33
2016	Q2	EV_MC2	37	2.6	1.2	0.00014	0.00076	< 0.00010	0.00027	266	< 0.00050	0.001	0.11	141	0.012	0.46	< 0.000050	0.00039	0.0052	0.0056	11
2016	Q2	GH_ERC	53	1.3	0.79	0.00019	0.00085	< 0.00010	0.00015	342	< 0.00050	0.00065	0.16	185	< 0.010	0.38	< 0.000050	0.00022	0.0021	0.0025	13
2016	Q2	LC_DCDS	25	2.6	0.19	0.00011	0.00047	<0.00010	0.00012	192	<0.00050	0.00062	0.098	100	0.014	0.22	<0.000050	0.00016	0.0052	0.0051	8.8
2016	Q2	LC_LC5	71	1.6	1.5	0.00011	0.00038	<0.00010	0.00011	540	<0.00050	<0.00050	0.2	285	<0.010	0.17	<0.000050	0.00012	0.015	0.015	28
2016	Q3	EV_HC1	81	0.95	1.1	0.00016	0.00025	< 0.00010	< 0.00010	652	< 0.00050	< 0.00050	0.23	368	< 0.010	0.063	< 0.000050	0.000076	0.0084	0.0083	44
2016	Q3	EV_MC2	111	0.83	13	0.00012	0.00015	< 0.00010	< 0.00010	793	< 0.00050	< 0.00050	0.17	435	< 0.010	0.01	< 0.000050	< 0.000050	0.031	0.033	42
2016	Q3	FR_FRCP1	103	0.99	1.5	< 0.00010	0.00012	< 0.00010	< 0.00010	874	< 0.00050	< 0.00050	0.22	455	< 0.010	0.032	< 0.000050	< 0.000050	0.032	0.032	48
2016	Q3	GH_ERC	45	0.58	0.37	0.0002	0.00027	< 0.00010	< 0.00010	317	< 0.00050	< 0.00050	0.18	161	< 0.010	0.024	< 0.000050	< 0.000050	0.0024	0.0024	11
2016	Q3	GH_FR1	89	0.8	1.5	< 0.00010	0.00017	< 0.00010	< 0.00010	732	< 0.00050	< 0.00050	0.2	379	< 0.010	0.016	< 0.000050	< 0.000050	0.017	0.017	40
2016	Q3	LC_LCDSSLCC	91	< 0.50	4.7	0.00012	0.00027	< 0.00010	< 0.00010	754	< 0.00050	< 0.00050	0.25	403	< 0.010	< 0.010	< 0.000050	< 0.000050	0.034	0.032	37
2016	Q4	CM_MC2	79	2.3	2.1	0.00017	0.00035	0.00065	0.0011	622	< 0.00050	< 0.00050	0.11	328	< 0.010	0.15	< 0.000050	0.000098	0.01	0.01	33
2016	Q4	EV_HC1	82	1.4	1.3	0.00014	0.00023	< 0.00010	< 0.00010	668	< 0.00050	< 0.00050	0.2	386	< 0.010	0.058	< 0.000050	< 0.000050	0.0077	0.0081	46
2016	Q4	EV_MC2	48	2.8	2.9	0.00012	0.00045	< 0.00010	0.00013	359	< 0.00050	0.00065	0.12	177	0.023	0.16	< 0.000050	0.00012	0.0064	0.0068	17
2016	Q4	GH_ERC	51	< 0.50	0.44	0.0002	0.00035	< 0.00010	< 0.00010	327	< 0.00050	0.00054	0.16	186	< 0.010	0.028	< 0.000050	< 0.000050	0.0026	0.0022	12
2016	Q4	GH_FR1	94	0.75	1.5	0.0001	0.00019	<0.0001	<0.0001	735	<0.0005	<0.0005	0.16	411	<0.01	0.022	<0.00005	<0.00005	0.017	0.017	44
2016	Q4	LC_DCDS	36	2.1	1.4	<0.00010	0.00043	<0.00010	0.00021	268	<0.00050	0.0011	0.1	139	0.014	0.25	<0.000050	0.00033	0.0084	0.0079	13
2016	Q4	LC_LC5	85	0.58	2.5	<0.00010	0.00018	<0.00010	<0.00010	649	<0.00050	<0.00050	0.21	356	<0.010	<0.010	<0.000050	<0.000050	0.019	0.02	38
2016	Q4	LC_LCDSSLCC	83	0.91	6.8	0.0001	0.00019	< 0.00010	< 0.00010	700	< 0.00050	< 0.00050	0.21	384	< 0.010	< 0.010	< 0.000050	< 0.000050	0.027	0.026	35
2017	Q1	CM_MC2	128	0.85	3.9	0.00012	0.00021	0.0022	0.0024	999	<0.0002	<0.0005	0.13	529	<0.01	0.013	<0.00005	<0.00005	0.018	0.017	55
2017	Q1	EV_HC1	89	0.72	1.3	0.00015	0.00023	<0.0001	<0.0001	704	<0.0005	<0.0005	0.22	411	<0.01	0.017	<0.00005	<0.00005	0.0064	0.0065	47
2017	Q1	EV_MC2	84	0.8	7.1	0.00013	0.00023	<0.0001	<0.0001	615	<0.0005	<0.0005	0.15	334	<0.01	0.029	<0.00005	<0.00005	0.018	0.017	32
2017	Q1	FR_FRCP1	179	1.5	<2.5	<0.0001	0.00078	<0.0001	<0.0001	1430	<0.0002	<0.0005	0.13	841	<0.01	0.03	<0.00005	<0.00005	0.056	0.056	106
2017	Q1	GH_ERC	56	<0.5	0.38	0.00026	0.00027	<0.0001	<0.0001	354	<0.0005	<0.0005	0.14	190	<0.01	<0.01	<0.00005	<0.00005	0.0031	0.0035	14
2017	Q1	GH_FR1	115	0.57	1.8	<0.0001	0.00014	<0.0001	<0.0001	843	<0.0005	<0.0005	0.14	479	<0.01	0.011	<0.00005	<0.00005	0.016	0.016	49
2017	Q1	LC_LCDSSLCC	125	<0.5	13	0.00012	0.00021	<0.0001	<0.0001	954	<0.0005	<0.0005	0.21	552	<0.01	0.025	<0.00005	<0.00005	0.04	0.039	58
2017	Q2	CM_MC2	85	1.4	2.5	<0.0001	0.00028	0.005	0.0052	756	<0.0002	0.00068	0.1	383	<0.01	0.16	<0.00005	0.00012	0.015	0.015	36
2017	Q2	CM_MC2	115	1.4	2.7	0.00013	0.00031	0.0044	0.0056	783	<0.0002	<0.0005	0.12	394	<0.01	0.11	<0.00005	0.000077	0.017	0.02	47
2017	Q2	EV_HC1	71	2.6	0.79	<0.0001	0.00025	<0.0001	<0.0001	630	0.0002	0.00055	0.14	335	<0.01	0.1	<0.00005	0.000076	0.0068	0.0068	38
2017	Q2	EV_MC2	48	2.9	4.3	<0.0001	0.00025	0.00011	0.00025	402	0.00031	0.00074	0.099	199	0.021	0.15	<0.00005	0.00016	0.0082	0.0077	17
2017	Q2	FR_FRCP1	86	2.1	0.72	0.00011	0.00082	<0.0001	0.00027	725	0.00034	0.0011	0.14	392	0.018	0.49	<0.00005	0.00035	0.032	0.03	39
2017	Q2	GH_ERC	56	0.79	0.5	0.00023	0.0005	<0.0001	<0.0001	368	<0.0005	<0.0005	0.16	187	<0.01	0.13	<0.00005	0.00008	0.0029	0.0032	15
2017	Q2	GH_FR1	92	3.4	1.7	<0.0001	0.0012	<0.0001	0.00037	735	<0.0005	0.0013	0.13	404	0.013	0.55	<0.00005	0.00043	0.015	0.015	44
2017	Q2	LC_DCDS	27	3.4	0.56	<0.00010	0.00024	<0.00010	0.00016	190	0.00027	0.00063	0.07	97	0.027	0.15	<0.000050	0.00014	0.005	0.0053	8.6
2017	Q2	LC_LC5	86	1.9	2.7	<0.00010	0.00023

Table D-2: *P. subcapitata* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	MANGANESE-D-mg/l	MANGANESE-T-mg/l	MERCURY-D-mg/l	MERCURY-T-mg/l	MOLYBDENUM-D-mg/l	MOLYBDENUM-T-mg/l	NICKEL-D-mg/l	NICKEL-T-mg/l	NITRATE NITROGEN (NO3), AS N-N-mg/l	NITRITE NITROGEN (NO2), AS N-N-mg/l	NITROGEN, AMMONIA (AS N)-N-mg/l	ORTHO-PHOSPHATE-N-mg/l	pH, LAB-N-ph units	PHOSPHORUS-N-mg/l	POTASSIUM-T-mg/l	SELENIUM-D-mg/l	SELENIUM-T-mg/l	SILVER-D-mg/l	SILVER-T-mg/l
Reference																					
2015	Q1	Reference (FR_UFR1)	0.000054	0.00018	<0.000010	<0.000010	0.00053	0.00054	<0.00050	<0.00050	0.13	<0.0010	<0.0050	0.0032	8.4	0.0042	0.4	0.00069	0.00073	<0.000010	<0.000010
2015	Q1	Reference (FR_UFR1)	0.000054	0.00018	<0.000010	<0.000010	0.00053	0.00054	<0.00050	<0.00050	0.13	<0.0010	<0.0050	0.0032	8.4	0.0042	0.4	0.00069	0.00073	<0.000010	<0.000010
2015	Q1	Reference (FR_UFR1)	0.00017	0.00037	<0.000010	<0.000010	0.00056	0.00055	<0.00050	<0.00050	0.13	<0.0010	<0.0050	0.0027	8.3	0.0035	0.42	0.00076	0.00073	<0.000010	<0.000010
2015	Q2	Reference (FR_UFR1)	0.00064	0.0025	<0.0000050	<0.0000050	0.00052	0.00062	<0.00050	<0.00050	0.066	<0.0010	<0.0050	0.0042	8.4	0.01	0.37	0.00048	0.00049	<0.000010	<0.000010
2015	Q2	Reference (GH_ER2)	0.0033	0.0059	<0.0000050	<0.0000050	0.00092	0.00094	<0.00050	<0.00050	0.086	<0.0010	<0.0050	<0.0010	8.3	0.008	0.37	0.00079	0.00087	<0.000010	<0.000010
2015	Q3	Reference (FR_UFR1)	0.00062	0.0015	<0.0000050	<0.0000050	0.00068	0.00068	<0.00050	<0.00050	0.019	<0.0010	<0.0050	0.0029	8.4	0.0054	0.52	0.00047	0.00043	<0.000010	<0.000010
2015	Q4	Reference (FR_UFR1)	0.0001	0.00031	<0.0000050	<0.0000050	0.00065	0.00059	<0.00050	<0.00050	0.022	<0.0010	<0.0050	0.0017	8.4	0.0022	0.42	0.00069	0.00062	<0.000010	<0.000010
2015	Q4	Reference (GH_ER2)	0.0021	0.0027	<0.0000050	<0.0000050	0.001	0.0010	<0.00050	<0.00050	0.078	<0.0010	<0.0050	0.0015	8.3	<0.0020	0.35	0.00072	0.00078	<0.000010	<0.000010
2016	Q1	Reference (FR_UFR1)	0.0002	0.00034	< 0.0000050	< 0.00000050	0.00058	0.00056	< 0.00050	< 0.00050	0.17	< 0.0010	< 0.0050	0.0032	8.3	0.0036	0.37	0.0008	0.00078	< 0.000010	< 0.000010
2016	Q2	Reference (FR_UFR1)	0.00045	0.0021	< 0.0000050	0.0000014	0.00061	0.00062	< 0.00050	< 0.00050	0.034	< 0.0010	< 0.0050	0.0041	8.3	0.0078	0.34	0.00052	0.00055	< 0.000010	< 0.000010
2016	Q2	Reference (GH_ER2)	0.0018	0.012	< 0.0000050	0.00000098	0.00091	0.00093	< 0.00050	0.0005	0.12	< 0.0010	< 0.0050	0.0011	8.2	0.016	0.46	0.00083	0.00083	< 0.000010	< 0.000010
2016	Q3	Reference (FR_UFR1)	0.00027	0.0011	< 0.0000050	< 0.00000050	0.00063	0.00063	< 0.00050	< 0.00050	0.057	< 0.0010	< 0.0050	0.0031	8.2	0.0038	0.47	0.00056	0.00063	< 0.000010	< 0.000010
2016	Q4	Reference (FR_UFR1)	0.00027	0.00073	< 0.0000050	0.00000056	0.00057	0.00056	< 0.00050	< 0.00050	0.1	< 0.0010	< 0.0050	0.0023	8.3	0.0028	0.38	0.00069	0.00068	< 0.000010	< 0.000010
2016	Q4	Reference (GH_ER2)	0.0012	0.0021	< 0.0000050	< 0.0000050	0.00097	0.001	< 0.00050	< 0.00050	0.071	< 0.0010	< 0.0050	< 0.0010	8.3	< 0.0020	0.36	0.00087	0.00083	< 0.000010	< 0.000010
2017	Q1	Reference (FR_UFR1)	<0.0001	0.00027	<0.000005	<0.0000005	0.00062	0.00062	<0.0005	<0.0005	0.22	<0.001	<0.005	0.0049	8.3	0.0071	0.38	0.0012	0.0010	<0.00001	<0.00001
2017	Q2	Reference (CM_MC1)	0.00015	0.00057	<0.000005	0.0000011	0.00074	0.0008	<0.0005	<0.0005	0.012	<0.001	<0.005	0.0029	8.2	0.0094	0.43	0.00029	0.00025	<0.00001	<0.00001
2017	Q2	Reference (FR_UFR1)	0.0012	0.0035	<0.000005	0.0000031	0.00048	0.0005	0.00052	0.00069	0.098	<0.001	0.011	0.0087	8.3	0.02	0.38	0.0007	0.0006	<0.00001	0.00002
2017	Q2	Reference (GH_ER2)	0.00095	0.0054	<0.000005	0.00000082	0.00094	0.00095	<0.0005	<0.0005	0.12	<0.001	<0.005	<0.001	8.4	0.0058	0.41	0.00086	0.00098	<0.00001	<0.00001
2017	Q3	Reference (CM_MC1)	<0.0001	0.001	<0.000005	0.00000067	0.00088	0.00085	<0.0005	<0.0005	0.012	<0.001	0.0067	0.005	8.2	0.06	0.45	0.00019	0.00024	<0.00001	<0.00001
2017	Q3	Reference (FR_UFR1)	0.00036	0.0011	<0.000005	<0.0000005	0.00064	0.00068	<0.0005	<0.0005	0.011	<0.001	0.01	0.0027	8.4	0.0078	0.48	0.0006	0.00059	<0.00001	<0.00001
2017	Q3	Reference (GH_ER2)	0.0021	0.0031	<0.000005	0.0000006	0.00096	0.00098	<0.0005	<0.0005	0.037	<0.001	0.0069	0.001	8.4	0.0059	0.38	0.00067	0.00064	<0.00001	<0.00001
2017	Q4	Reference (CM_MC1)	0.00012	0.00035	<0.000005	0.00000059	0.0009	0.00087	<0.0005	<0.0005	0.015	<0.001	<0.005	0.0035	8.3	0.0045	0.49	0.00019	0.00019	<0.00001	<0.00001
2017	Q4	Reference (FR_UFR1)	<0.0001	0.00056	<0.000005	<0.0000005	0.00055	0.00054	<0.0005	<0.0005	0.0094	0.0011	<0.005	0.0016	8.4	0.0023	0.4	0.00058	0.00055	<0.00001	<0.00001
2017	Q4	Reference (GH_ER2)	0.00061	0.0016	<0.000005	<0.0000005	0.0011	0.0011	<0.0005	<0.0005	0.037	<0.001	0.0089	<0.001	8.4	<0.002	0.38	0.00089	0.00087	<0.00001	<0.00001
2018	Q1	Reference (CM_MC1)	<0.0001	0.00014	<0.000005	<0.0000005	0.00087	0.00096	<0.0005	<0.0005	0.04	<0.001	<0.005	0.0036	8.3	0.0046	0.45	0.00027	0.00029	<0.00001	<0.00001
2018	Q1	Reference (FR_UFR1)	<0.0001	0.00024	<0.000005	<0.0000005	0.00058	0.00055	<0.0005	<0.0005	0.2	<0.001	0.0099	0.0029	8.4	0.0038	0.37	0.00091	0.00098	<0.00001	<0.00001
2018	Q1	Reference (GH_ER2)	0.0013	0.0015	<0.000005	<0.0000005	0.0009	0.0010	<0.0005	<0.0005	0.1	<0.001	<0.005	<0.001	8.2	<0.002	0.3	0.00093	0.00092	<0.00001	<0.00001
2018	Q2	Reference (CM_MC1)	0.00035	0.0026	<0.000005	0.000002	0.00071	0.00072	<0.0005	<0.0005	0.018	<0.001	<0.005	0.0069	8.3	0.016	0.5	0.00024	0.00028	<0.00001	<0.00001
2018	Q2	Reference (FR_UFR1)	0.00039	0.0076	<0.000005	0.0000026	0.0006	0.00053	<0.0005	0.00062	0.13	<0.001	0.0067	0.0079	8.3	0.027	0.42	0.0008	0.00072	<0.00001	<0.00001
2018	Q2	Reference (GH_ER2)	0.00023	0.012	<0.000005	0.000002	0.00095	0.00096	<0.0005	0.00085	0.15	<0.001	0.01	0.0015	8.5	0.026	0.54	0.001	0.00091	<0.00001	<0.00001
2018	Q2	Reference (LC_SLC)	<0.0001	0.00073	<0.000005	0.00000064	0.00082	0.00079	<0.0005	<0.0005	0.13	<0.001	0.01	0.001	8.4	0.005	0.35	0.00087	0.00078	<0.00001	<0.00001
2018	Q3	Reference (CM_MC1)	0.00015	0.0006	<0.000005	<0.0000005	0.00094	0.0009	<0.0005	<0.0005	0.019	<0.001	0.024	0.0041	8.4	0.0091	0.5	0.00018	0.00022	<0.00001	<0.00001
2018	Q3	Reference (FR_UFR1)	0.00031	0.00067	<0.000005	<0.0000005	0.00064	0.00068	<0.0005	<0.0005	0.024	<0.001	0.056	<0.001	8.4	0.0095	0.45	0.0006	0.00062	<0.00001	<0.00001
2018	Q3	Reference (GH_ER2)	<0.0001	0.06	<0.000005	0.00000076	0.0011	0.00087	<0.0005	0.002	0.023	<0.001	0.014	<0.001	8.2	0.0086	0.6	0.00069	0.00071	<0.00001	0.000014
2018	Q3	Reference (LC_SLC)	<0.0001	0.00017	<0.000005	<0.0000005	0.0013	0.0012	<0.0005	<0.0005	0.089	<0.001	0.026	<0.001	8.4	0.0043	0.36	0.0012	0.0013	<0.00001	<0.00001
2018	Q4	Reference (CM_MC1)	<0.0001	0.00027	<0.000005	0.00000063	0.00089	0.00093	<0.0005	<0.0005	0.0088	<0.001	0.0081	0.0042	8.2	0.0037	0.42	0.00022	0.00023	<0.00001	<0.00001
2018	Q4	Reference (FR_UFR1)	0.0001	0.00026	<0.000005	<0.0000005	0.00059	0.00061	<0.0005	<0.0005	0.032	<0.001	0.026	0.0023	8.4	<0.002	0.36	0.00073	0.00069	<0.00001	<0.00001
2018	Q4	Reference (GH_ER2)	0.00039	0.0027	<0.000005	<0.0000005	0.001	0.001	<0.0005	<0.0005	0.054	<0.001	0.014	0.0022	8.3	<0.002	0.37	0.00091	0.00084	<0.00001	<0.00001
2018	Q4	Reference (LC_SLC)	<0.0001	0.00012	<0.000005	<0.0000005	0.0012	0.0013	<0.0005	<0.0005	0.13	<0.001	0.023	0.0027	8.3	0.0026	0.39	0.0017	0.0015	<0.00001	<0.00001
2019	Q1	Reference (CM_MC1)	0.00014	0.00024	<0.000005	<0.0000005	0.00085	0.00082	<0.0005	<0.0005	0.059	0.0011	0.0069	0.0033	8.2	0.0032	0.43	0.00027	0.00031	<0.00001	<0.00001
2019	Q1	Reference (FR_UFR1)	<0.0001	0.00027	<0.000005	<0.0000005	0.00054	0.00055	<0.0005	<0.0005	0.23	<0.001	<0.005	0.0058	8.3	0.0049	0.34	0.00094	0.00071	<0.00001	<0.00001
2019	Q1	Reference (GH_ER2)	0.00034	0.00065	<0.000005	<0.0000005	0.0011	0.001	<0.0005	<0.0005	0.11	0.0015	<0.005	0.0023	8.2	0.0033	0.29	0.0011	0.001	<0.00001	<0.00001
2019	Q1	Reference (LC_SLC)	<0.0001	<0.0001	<0.000005	<0.0000005	0.0013	0.0014	<0.0005	<0.0005	0.15	<0.001	0.005	0.0038	8.2	0.0034	0.4	0.0018	0.0019	<0.00001	<0.00001
2019	Q2	Reference (CM_MC1)	0.00011	0.0012	<0.000005	0.0000008	0.00084	0.00084	<0.0005	<0.0005	0.0086	<0.001	<0.005	0.0041	8.2	0.0045	0.41	0.00027	0.00025	<0.00001	<0.00001
2019	Q2	Reference (FR_UFR1)	0.00013	0.0006	<0.000005	0.0000012	0.00051	0.00056	<0.0005	<0.0005	<0.005	<0.001	0.016	0.0032	8.3	0.0064	0.32	0.00078	0.00071	<0.00001	<0.00001
2019	Q2	Reference (GH_ER2)	0.00013	0.0031	<0.000005	<0.0000005	0.001	0.00097	<0.0005	<0.0005	0.073	<0.001	0.011	<0.001	8.2	0.006	0.33	0.0011	0.001	<0.00001	<0.00001
2019	Q2	Reference (LC_SLC)	<0.0001	0.00013	<0.000005	<0.0000005	0.001	0.001	<0.0005	<0.0005	0.059	<0.001	<0.005	0.0019	8.2	0.0022	0.34	0.0013	0.0013	<0.00001	<0.00001
2019	Q3	Reference (CM_MC1)	0.00021	0.00078	<0.000005	<0.0000005	0.001	0.00092	<0.0005	<0.0005	0.012	<0.001	<0.005	0.0047	8.4	0.0048	0.47	0.00024	0.0002	<0.00001	<0.00001
2019	Q3	Reference (FR_UFR1)	0.0003	0.00068	<0.000005	0.00000068	0.00064	0.00066	<0.0005	<0.0005	0.005	<0.001	0.021	<0.001	8.4	0.0026	0.4	0.0007	0.00063	<0.00001	<0.00001
2019	Q3	Reference (GH_ER2)	0.00059	0.0023	<0.000005	<0.0000005	0.00096	0.00095	<0.0005	0.00066	0.036	<0.001	0.029	<0.001	8.3	<0.002	0.34	0.00086	0.00081	<0.00001	<0.00001
2019	Q3	Reference (LC_SLC)	<0.0001	0.00017	<0.000005	<0.0000005	0.0012	0.0012	<0.0005	<0.0005	0.12	<0.001	0.0053	0.0016	8.3	0.0037	0.33	0.0014	0.0013	<0.00001	<0.00001
2019	Q4	Reference (CM_MC1)	0.0001	0.00023	<0.000005	<0.0000005	0.00083	0.00085	<0.0005	<0.0005	0.019	<0.001	0.0053	0.0041	8.3	0.004	0.4	0.00026	0.00025	<0.00001	<0.00001
2019	Q4	Reference (FR_UFR1)	<0.0001	0.00047	<0.000005	<0.0000005	0.00052	0.00056	<0.0005	<0.0005	0.13	<0.001	0.019	0.0026	8.3	0.0031	0.34	0.001	0.00086	<0.00001	<0.00001
2019	Q4	Reference (GH_ER2)	0.00054	0.0018	<0.000005	<0.0000005	0.00098	0.00098	<0.0005	<0.0005	0.075	<0.001	0.013	<0.001	8.3	<0.002	0.35	0.0011	0.00095	<0.00001	<0.00001
2019	Q4	Reference (LC_SLC)	<0.0001	0.00069	<0.000005	<0.0000005	0.0013	0.0012	<0.0005	<0.0005	0.13	<0.001	0.015	0.0018	8.1	<0.002	0.35	0.0016	0.0016	<0.00001	<0.00001
Tests categorized as no adverse response																					
2015	Q1	CM_MC2	0.0046	0.0064	<0.000010	<0.000010	0.001	0.0011	0.0095	0.0097	2.4	0.012	0.0055	0.001	8.4	0.005	1.4	0.0059	0.006	<0.000010	<0.000010
2015	Q1	EV_MC2	0.0024	0.0022	<0.000010	<0.000010	0.00079	0.00078	0.0007	0.00052	3.2	0.0013	<0.0050	<0.0010	8.3	0.0047	1.2	0.024	0.022	<0.000010	<0.000010
2015	Q1	GH_ERC	0.00035	0.0026	<0.000010	<0.000010	0.00092	0.00099	<0.00050	<0.00050	0.44	<0.0010	<0.0050	<0.0010	8.3	0.0043	0.37	0.0019	0.0019	<0.000010	<0.000010
2015	Q1	GH_FR1	0.0017	0.0021	<0.000010	<0.000010	0.00095	0.00098	0.0022	0.0023	13	0.0039	<0.0050	<0.0010	8.3	0.0036	1.2	0.051	0.052	<0.000010	<0.000010
2015	Q1	LC_LCDSSLCC	0.000074	0.00021	<0.000010	<0.000010	0.0017	0.0017	0.0036	0.0036	15	0.003	<0.0050	<0.0010	8.3	0.0029	1.2	0.072	0.071	<0.000010	<0.000010
2015	Q2	EV_HC1	0.00053	0.0016	0.000005	0.000005	0.0005	0.00048	0.00075	0.00083	0.57	0.001	0.0084	0.0031	7.5	0.0081	0.55	0.019	0.018	0.00001	0.00001
2015	Q2	FR_FRCP1	0.0032	0.012	<0.0000050	<0.0000050	0.0013	0.0013	0.002	0.0024	7.4	0.0056	0.0095	0.0014	8.4	0.018	1.2	0.03	0.03	<0.000010	<0.000010
2015	Q2	GH_ERC	0.00072	0.0081	<0.0000050	<0.0000050	0.00095	0.00097	<0.00050	<0.00050	0.31	<0.0010	<0.0050	<0.0010	8.4	0.016	0.41	0.0017	0.0018	<0.000010	<0.000010
2015	Q2	GH_FR1	0.0011	0.0044	<0.0000050	<0.0000050	0.0011	0.0011	0.0019	0.002	7.5	0.0028	<0.0050	<0.0010	8.4	0.01	1.1	0.031	0.032	<0.000010	<0.000010
2015	Q2	LC_DCDS	0.0008	0.0025	<0.0000050	<0.0000050	0.00078	0.00083	0.00064	0.001	0.24	<0.0010	<0.0050	0.031	8.3	0.048	0.87	0.0013	0.0014	<0.000010	<0.000010
2015	Q3	EV_HC1	0.0028	0.0051	<0.0000050	<0.0000050	0.00092	0.00092	0.00079	0.00079	0.87	0.0011	<0.0050	0.004	8.4	0.0082	0.99	0.029	0.028	<0.000010	<0.000010
2015	Q3	FR_FRCP1	0.0031	0.0069	<0.0000050	<0.0000050	0.0015	0.0015	0.0041	0.0043	8.2	0.0049	<0.0050	<0.0010	8.4	0.0027	1.8	0.057	0.057	<0.000010	<0.000010
2015	Q3	GH_ERC	0.00058	0.0078	<0.0000050	<0.0000050	0.00095	0.001	<0.00050	<0.00050	0.17	<0.0010	<0.0050	<0.0010	8.3	0.0077	0.42	0.0011	0.0012	<0.000010	<0.000010
2015	Q4	EV_HC1	0.0018	0.002	< 0.00000050	< 0.00000050	0.00097	0.00098	0.00066	0.00069	1.2	<0.0050	<0.0050	0.0058	8.4	0.0057	0.9	0.033	0.037	<0.000010	<0.000010
2015	Q4	EV_MC2	0.0013	0.0018	< 0.00000050	< 0.00000050	0.002	0.0021	0.0039	0.0041	5.9	<0.0050	<0.0050	0.0035	8.2	0.0036	1.3	0.024	0.025	<0.000010	<0.000010
2015	Q4	GH_ERC	0.00063	0.0013	<0.0000050	<0.0000050	0.00099	0.0011	<0.00050	<0.00050	0.46	<0.0010	<0.0050	0.0018	8.3	<0.0020	0.39	0.0015	0.0016	<0.000010	<0.000010
2015	Q4	GH_FR1	0.0011	0.0016	<0.0000050	<0.0000050	0.0009	0.00099	0.0012	0.0012	10	<0.0050	<0.0050	<0.0010	8.4	<0.0020	1.2	0.04	0.039	<0.000010	<0.000010
2015	Q4	LC_DCDS	<0.00050	0.00077	<0.0000050	<0.0000050	0.0011	0.001	<0.0025	<0.0025	<0.0050	0.0012	0.0094	0.0012	8.0	0.017	1.2	0.0016	0.0016	<0.000050	<0.000050
2015	Q4	LC_LC5	<0.00050	<0.00050	<0.0000050	<0.0000050	0.001	0.0011	<0.0025	<0.0025	9.8	<0.0010	<0.0050	0.001	7.9	0.063	1.2	0.038	0.038	<0.000050	<0.000050
2016	Q1	EV_MC2	0.0012	0.0021	< 0.00000050	< 0.00000050	0.0015	0.0015	0.0025	0.0026	5.1	< 0.0050	< 0.0050	< 0.0010	8.1	0.0023	1.1	0.022	0.021	< 0.000010	< 0.000010
2016	Q1	GH_ERC	0.00026	0.00034	< 0.0000050	< 0.0000050	0.00094	0.00092	< 0.00050	< 0.00050	0.76	< 0.0010	< 0.0050	< 0.0010	8.2	< 0.0020	0.39	0.0023	0.0023	< 0.000010	< 0.000010
2016	Q1	LC_LCDSSLCC	0.0058	0.0064	< 0.0000050	< 0.00000050	0.0016	0.0017	0.0034	0.0034	11	0.0098	< 0.0050	0.0011	8.3	< 0.0020	1.4	0.036	0.035	< 0.000010	< 0.000010
2016	Q2	EV_HC1	0.00048	0.0037	0.00000062	0.00000077	0.00074	0.00077	0.00097	0.0012	0.82	< 0.0010	< 0.0050	0.0054	8.3	0.01	0.87	0.031	0.031	< 0.000010	< 0.000010
2016	Q2	EV_MC2	0.00014	0.013	0.0000015	0.0000018	0.00064	0.00069	0.0014	0.0022	0.78	< 0.0010	< 0.0050	0.013	8.1	0.039	0.64	0.0036	0.0033	< 0.000010	0.000017
2016	Q2	GH_ERC	0.0013	0.018	< 0.0000050	0.0000016	0.00091	0.00092	< 0.00050	0.00067	0.41	< 0.0010	< 0.0050	< 0.0010	8.3	0.027	0.55	0.0023	0.002	< 0.000010	< 0.000010
2016	Q2	LC_DCDS	0.0013	0.0045	<0.0000050	0.0000024	0.00087	0.00088	0.00079	0.0011	0.4	<0.0010	<0.0050	0.032	8.2	0.048	0.91	0.0017	0.0017	<0.000010	0.00001
2016	Q2	LC_LC5	0.00058	0.009	<0.0000050	0.000001	0.001	0.001	0.0016	0.002	5.9	0.0012	<0.0050	<0.0010	8.3	0.016	0.98	0.022	0.022	<0.000010	<0.000010
2016	Q3	EV_HC1	0.0054	0.0081	< 0.0000050	0.0000012	0.00092	0.00091	0.00074	0.0009	0.84	0.0016	0.0088	0.0064	8.3	0.012	0.98	0.031	0.032	< 0.000010	< 0.000010
2016	Q3	EV_MC2	0.0009	0.0014	< 0.0000050	0.00000085	0.0012	0.0012	0.0022	0.0024	6.5	< 0.0050	0.0073	0.004	8.1	0.0052	1.6	0.026	0.026	< 0.000010	< 0.000010
2016	Q3	FR_FRCP1	0.0045	0.0074	< 0.0000050	< 0.0000050	0.0013	0.0013	0.0049	0.0052	12	< 0.0050	< 0.0050	0.0011	8.4	0.0027	1.6	0.054	0.056	< 0.000010	< 0.000010
2016	Q3	GH_ERC	0.00045	0.0019	< 0.0000050	< 0.0000050	0.00091	0.00087	< 0.00050	< 0.00050	0.2	< 0.0010	< 0.0050	< 0.0010	8.2	0.0049	0.42	0.00098	0.0010	< 0.000010	< 0.000010
2016	Q3	GH_FR1	0.00092	0.002	< 0.0000050	< 0.0000050	0.0009	0.00097	0.0015	0.0015	9.6	0.0056	< 0.0050	< 0.0010	8.3	0.0061	1.2	0.034	0.037	< 0.000010	< 0.000010
2016	Q3	LC_LCDSSLCC	0.0009	0.0018	< 0.0000050	< 0.0000050	0.0016	0.0015	0.0044	0.0046	8.6	< 0.0050	< 0.0050	0.0021	8.4	0.0027	1.4	0.027	0.027	< 0.000010	< 0.000010
2016	Q4	CM_MC2	0.0062	0.014	< 0.0000050	0.0000012	0.00097	0.00098	0.0073	0.0083	1.8	0.01	0.0076	0.0016	8.3	0.0063	1.3	0.0041	0.0044	< 0.000010	< 0.000010
2016	Q4	EV_HC1	0.0021	0.0033	< 0.0000005	0.00000085	0.00091	0.00093	0.00073	0.00087	1.0	< 0.0050	< 0.0050	0.0061	8.4	0.0079	1.0	0.032	0.032	< 0.000010	< 0.000010
2016	Q4	EV_MC2	0.001	0.0044	0.0000016	0.0000025	0.0006	0.00065	0.00078	0.0012	1.2	0.001	< 0.0050	0.0081	8.2	0.014	0.75	0.0054	0.006	< 0.000010	< 0.000010
2016	Q4	GH_ERC	0.00044	0.0027	< 0.0000050	< 0.0000050	0.0011	0.001	< 0.00050	0.00086	0.28	< 0.0010	< 0.0050	< 0.0010	8.3	< 0.0020	0.41	0.0014	0.0014	< 0.000010	< 0.000010
2016	Q4	GH_FR1	0.00072	0.0017	<0.000005	<0.000005	0.001	0.0011	0.0019	0.002	8.8	<0.005	<0.005	<0.001	8.3	0.0023	1.3	0.041	0.039	<0.00001	<0.00001
2016	Q4	LC_DCDS	0.00047	0.0089	<0.0000050	0.0000057	0.0014	0.0014	0.00077	0.0017	0.47	0.0077	0.02	0.021	8.2	0.05	1.3	0.0024	0.0023	<0.000010	0.000015
2016	Q4	LC_LC5	0.00028	0.00083	<0.0000050	<0.00000050	0.0011	0.0011	0.0013	0.0015	7.9	<0.0050	<0.0050	<0.0010	8.4	<0.0020	1.1	0.029	0.029	<0.000010	<0.000010
2016	Q4	LC_LCDSSLCC	0.002	0.0032	< 0.0000050	< 0.0000005	0.0014	0.0015	0.004	0.0038	7.3	< 0.0050	< 0.0050	0.0013	8.3	< 0.0020	1.1	0.024	0.023	< 0.000010	< 0.000010
2017	Q1	CM_MC2	0.011	0.013	<0.000005	<0.0000005	0.0014	0.0015	0.023	0.025	4.2	0.018	0.012	0.0022	8.3	0.0043	1.9	0.0079	0.0072	<0.00001	<0.00001
2017	Q1	EV_HC1	0.0024	0.0027	<0.000005	<0.0000005	0.00091	0.00093	0.00074	0.00078	1.2	<0.001	0.0052	0.0068	8.3	0.0077	0.92	0.036	0.038	<0.00001	<0.00001
2017	Q1	EV_MC2	0.00068	0.002	<0.000005	<0.0000005	0.0015	0.0015	0.0021	0.0025	3.5	<0.001	0.0075	0.0044	8.2	0.0056	1.2	0.016	0.016	<0.00001	<0.00001
2017	Q1	FR_FRCP1	0.008	0.01	<0.000005	<0.0000005	0.0017	0.0017	0.0097	0.01	20	0.02	0.0066	<0.001	8.3	0.0054	2.4	0.17	0.15	<0.00001	<0.00001
2017	Q1	GH_ERC	0.00012	0.00032	<0.000005	<0.0000005	0.00099	0.00099	<0.0005	<0.0005	0.45	<0.001	<0.005	0.001	8.2	<0.002	0.4	0.0018	0.0017	<0.00001	<0.00001
2017	Q1	GH_FR1	0.0012	0.0015	<0.000005	<0.0000005	0.00081

Table D-2: *P. subcapitata* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	SODIUM-T-mg/l	STRONTIUM-D-mg/l	STRONTIUM-T-mg/l	SULFATE (AS SO4)-D-mg/l	THALLIUM-D-mg/l	THALLIUM-T-mg/l	TIN-D-mg/l	TIN-T-mg/l	TITANIUM-D-mg/l	TITANIUM-T-mg/l	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	TOTAL KJELDAHL NITROGEN-N-mg/l	TOTAL ORGANIC CARBON-T-mg/l	TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	TURBIDITY, LAB-N-ntu	URANIUM-D-mg/l	URANIUM-T-mg/l	VANADIUM-D-mg/l	VANADIUM-T-mg/l
Reference																					
2015	Q1	Reference (FR_UFR1)	0.77	0.088	0.091	47	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	229	<0.050	0.69	<1.0	0.13	0.00047	0.00047	<0.0010	<0.0010
2015	Q1	Reference (FR_UFR1)	0.77	0.088	0.091	47	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	229	<0.050	0.69	<1.0	0.13	0.00047	0.00047	<0.0010	<0.0010
2015	Q1	Reference (FR_UFR1)	0.72	0.089	0.092	46	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	222	<0.050	<0.50	<1.0	0.33	0.00047	0.00047	<0.0010	<0.0010
2015	Q2	Reference (FR_UFR1)	0.56	0.061	0.066	15	<0.000010	0.00001	<0.00010	<0.00010	<0.010	<0.010	147	0.1	2.1	2.4	1.5	0.00031	0.00033	<0.00050	<0.00050
2015	Q2	Reference (GH_ER2)	0.73	0.2	0.21	18	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	191	0.067	1.8	4.4	3.9	0.00079	0.00078	<0.00050	0.00051
2015	Q3	Reference (FR_UFR1)	0.69	0.093	0.093	32	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	211	0.08	1.0	1.1	0.2	0.00042	0.00042	<0.00050	<0.00050
2015	Q4	Reference (FR_UFR1)	0.69	0.095	0.091	48	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	215	0.095	0.6	<1.0	0.26	0.00047	0.00044	<0.00050	<0.00050
2015	Q4	Reference (GH_ER2)	0.67	0.21	0.22	22	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	171	<0.050	<0.50	<1.0	0.26	0.00071	0.00072	<0.00050	<0.00050
2016	Q1	Reference (FR_UFR1)	0.68	0.089	0.09	50	< 0.000010	< 0.000010	< 0.00010	< 0.00010	0.011	0.011	244	< 0.050	< 0.50	< 1.0	0.17	0.0005	0.00049	< 0.00050	< 0.00050
2016	Q2	Reference (FR_UFR1)	0.63	0.063	0.065	13	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	135	0.086	2.8	1.9	1.6	0.00032	0.00033	< 0.00050	0.00051
2016	Q2	Reference (GH_ER2)	0.75	0.2	0.2	17	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	174	0.077	2.2	15	4.7	0.00076	0.00079	< 0.00050	0.001
2016	Q3	Reference (FR_UFR1)	0.68	0.095	0.098	35	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	222	0.077	0.92	1.2	0.22	0.00042	0.00044	< 0.00050	< 0.00050
2016	Q4	Reference (FR_UFR1)	0.7	0.093	0.095	40	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	204	0.069	1.1	< 1.0	0.85	0.00044	0.00046	< 0.00050	< 0.00050
2016	Q4	Reference (GH_ER2)	0.61	0.24	0.24	23	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	167	< 0.050	0.62	< 1.0	0.38	0.00076	0.00079	< 0.00050	< 0.00050
2017	Q1	Reference (FR_UFR1)	0.77	0.097	0.097	45	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	194	<0.05	1.0	<1	0.25	0.00046	0.00048	<0.0005	<0.0005
2017	Q2	Reference (CM_MC1)	2.7	0.14	0.14	11	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	148	0.098	1.9	<1	0.41	0.00018	0.0002	<0.0005	<0.0005
2017	Q2	Reference (FR_UFR1)	0.62	0.064	0.062	22	<0.00001	<0.00001	0.00011	<0.0001	<0.01	<0.01	143	0.18	3.7	4.4	4.7	0.00035	0.00034	0.00053	0.001
2017	Q2	Reference (GH_ER2)	0.73	0.21	0.21	21	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	180	0.068	1.1	6.2	3.8	0.00079	0.00079	<0.0005	0.00061
2017	Q3	Reference (CM_MC1)	2.0	0.14	0.13	13	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	162	0.1	1.2	<1	0.37	0.0002	0.00019	<0.0005	<0.0005
2017	Q3	Reference (FR_UFR1)	0.69	0.088	0.09	32	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	164	0.078	2.7	1.1	0.36	0.00037	0.00038	<0.0005	<0.0005
2017	Q3	Reference (GH_ER2)	0.6	0.19	0.19	15	<0.00001	<0.00001	0.00011	<0.0001	<0.01	<0.01	148	0.12	0.91	1.4	0.81	0.00053	0.00058	<0.0005	<0.0005
2017	Q4	Reference (CM_MC1)	2.9	0.16	0.16	13	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	166	<0.2	1.4	2.4	1.3	0.00023	0.00023	<0.0005	<0.0005
2017	Q4	Reference (FR_UFR1)	0.72	0.1	0.095	44	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	221	<0.05	1.0	1.2	0.45	0.00051	0.00045	<0.0005	<0.0005
2017	Q4	Reference (GH_ER2)	0.7	0.21	0.21	18	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	174	<0.05	0.91	<1	0.38	0.00077	0.00072	<0.0005	<0.0005
2018	Q1	Reference (CM_MC1)	3.5	0.16	0.17	17	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	182	<0.2	0.81	<1	0.22	0.00024	0.00024	<0.0005	<0.0005
2018	Q1	Reference (FR_UFR1)	0.67	0.099	0.093	49	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	216	0.064	0.59	<1	0.14	0.00054	0.00049	<0.0005	<0.0005
2018	Q1	Reference (GH_ER2)	0.72	0.2	0.22	23	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	186	<0.05	<0.5	<1	0.13	0.00077	0.00079	<0.0005	<0.0005
2018	Q2	Reference (CM_MC1)	2.4	0.13	0.12	10	<0.00001	0.000011	<0.0001	<0.0001	<0.01	<0.01	134	0.092	3.4	4.5	2.4	0.00018	0.0002	<0.0005	<0.0005
2018	Q2	Reference (FR_UFR1)	0.56	0.072	0.066	16	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	114	0.13	3.0	7.4	3.8	0.00033	0.00035	<0.0005	0.00065
2018	Q2	Reference (GH_ER2)	0.76	0.2	0.2	19	<0.00001	0.00001	<0.0001	<0.0001	<0.01	<0.01	186	0.2	1.9	17	14	0.00072	0.00075	<0.0005	0.0013
2018	Q2	Reference (LC_SLC)	0.81	0.13	0.12	25	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	176	0.13	2.1	1.6	0.63	0.001	0.0011	<0.0005	<0.0005
2018	Q3	Reference (CM_MC1)	2.6	0.15	0.14	13	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	174	0.052	1.5	<1	0.24	0.00023	0.00023	<0.0005	<0.0005
2018	Q3	Reference (FR_UFR1)	0.67	0.1	0.095	35	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	222	0.24	2.4	<1	0.22	0.00045	0.00043	<0.0005	<0.0005
2018	Q3	Reference (GH_ER2)	0.64	0.21	0.21	16	<0.00001	0.000028	<0.0001	<0.0001	<0.01	<0.01	179	0.057	1.6	6.9	0.61	0.00064	0.00081	<0.0005	0.0031
2018	Q3	Reference (LC_SLC)	0.8	0.16	0.14	48	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	233	<0.05	1.9	<1	0.13	0.0016	0.0016	<0.0005	<0.0005
2018	Q4	Reference (CM_MC1)	3.2	0.13	0.13	14	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	127	0.091	2.2	<1	0.29	0.00025	0.00023	<0.0005	<0.0005
2018	Q4	Reference (FR_UFR1)	0.69	0.097	0.097	44	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	195	0.079	0.66	<1	0.19	0.00053	0.0005	<0.0005	<0.0005
2018	Q4	Reference (GH_ER2)	0.72	0.21	0.21	21	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	168	0.24	<0.5	<1	0.28	0.00077	0.00077	<0.0005	<0.0005
2018	Q4	Reference (LC_SLC)	0.89	0.16	0.16	57	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	214	<0.05	0.65	<1	0.27	0.0018	0.0019	<0.0005	<0.0005
2019	Q1	Reference (CM_MC1)	3.3	0.16	0.15	17	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	209	<0.05	0.62	<1	0.26	0.00023	0.00023	<0.0005	<0.0005
2019	Q1	Reference (FR_UFR1)	0.69	0.11	0.11	49	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	249	<0.05	0.63	<1	0.51	0.00049	0.00047	<0.0005	<0.0005
2019	Q1	Reference (GH_ER2)	0.64	0.22	0.22	24	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	181	<0.05	<0.5	<1	0.45	0.00078	0.00075	<0.0005	<0.0005
2019	Q1	Reference (LC_SLC)	1.2	0.19	0.2	82	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	277	<0.05	0.71	<1	0.45	0.0017	0.002	<0.0005	<0.0005
2019	Q2	Reference (CM_MC1)	2.8	0.13	0.13	13	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	167	<0.05	7.4	1.3	0.77	0.00022	0.00021	<0.0005	<0.0005
2019	Q2	Reference (FR_UFR1)	0.66	0.065	0.072	23	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	164	0.058	1.8	<1	1.4	0.00038	0.00041	<0.0005	<0.0005
2019	Q2	Reference (GH_ER2)	0.7	0.22	0.21	23	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	174	0.064	0.86	5.0	3.2	0.00072	0.00077	<0.0005	<0.0005
2019	Q2	Reference (LC_SLC)	0.8	0.14	0.15	46	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	197	<0.05	0.77	<1	0.68	0.0013	0.0013	<0.0005	<0.0005
2019	Q3	Reference (CM_MC1)	3.0	0.15	0.16	13	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	135	<0.05	0.95	<1	0.25	0.00027	0.00024	<0.0005	<0.0005
2019	Q3	Reference (FR_UFR1)	0.69	0.095	0.1	28	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	190	0.057	1.2	1.1	0.55	0.00051	0.00047	<0.0005	<0.0005
2019	Q3	Reference (GH_ER2)	0.64	0.21	0.21	16	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	154	0.079	0.79	1.1	0.51	0.00065	0.0007	<0.0005	<0.0005
2019	Q3	Reference (LC_SLC)	0.72	0.13	0.14	41	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	205	<0.05	0.84	<1	0.24	0.0013	0.0013	<0.0005	<0.0005
2019	Q4	Reference (CM_MC1)	3.1	0.14	0.13	14	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	171	<0.05	0.76	<1	0.16	0.00023	0.00025	<0.0005	<0.0005
2019	Q4	Reference (FR_UFR1)	0.66	0.085	0.092	43	<0.00001	<0.00001	<0.0001	0.00014	<0.01	<0.01	188	0.064	0.67	1.4	0.17	0.0005	0.00049	<0.0005	<0.0005
2019	Q4	Reference (GH_ER2)	0.7	0.21	0.21	23	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	178	0.054	<0.5	1.4	0.64	0.00073	0.00073	<0.0005	<0.0005
2019	Q4	Reference (LC_SLC)	0.94	0.16	0.16	61	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	230	0.054	1.0	<1	0.14	0.0017	0.0017	<0.0005	<0.0005
Tests categorized as no adverse response																					
2015	Q1	CM_MC2	10	0.29	0.3	249	0.000014	<0.000010	<0.00010	<0.00010	<0.010	<0.010	551	<0.050	0.82	1.7	0.53	0.0022	0.0023	<0.0010	<0.0010
2015	Q1	EV_MC2	5.7	0.19	0.2	147	<0.000010	<0.000010	0.00018	<0.00010	0.014	0.013	438	0.13	1.2	1.2	0.31	0.0013	0.0012	<0.0010	<0.0010
2015	Q1	GH_ERC	0.95	0.2	0.21	30	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	203	<0.050	0.5	2.6	0.41	0.00081	0.00084	<0.0010	<0.0010
2015	Q1	GH_FR1	2.4	0.16	0.16	233	<0.000010	<0.000010	<0.00010	<0.00010	0.011	0.011	621	<0.050	1.1	<1.0	0.18	0.0022	0.0022	<0.0010	<0.0010
2015	Q1	LC_LCDSSLCC	5.9	0.23	0.23	283	<0.000010	<0.000010	<0.00010	<0.00010	0.014	0.013	690	<0.050	0.9	<1.0	0.29	0.0039	0.004	<0.0010	<0.0010
2015	Q2	EV_HC1	0.82	0.062	0.061	79	0.00001	0.00001	0.0001	0.0001	0.01	0.01	233	0.13	1.4	2.6	1.2	0.0012	0.0012	0.0005	0.0005
2015	Q2	FR_FRCP1	1.2	0.11	0.11	126	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	372	<0.050	2.2	7.7	2.0	0.0015	0.0016	<0.00050	0.00054
2015	Q2	GH_ERC	0.97	0.21	0.21	25	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	203	0.12	1.3	7.0	1.6	0.00083	0.00084	<0.00050	0.0007
2015	Q2	GH_FR1	1.7	0.12	0.12	136	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	398	<0.050	1.6	3.6	2.2	0.0016	0.0016	<0.00050	<0.00050
2015	Q2	LC_DCDS	0.58	0.032	0.033	8.7	<0.000010	0.000012	<0.00010	<0.00010	<0.010	<0.010	114	0.14	2.9	3.9	11	0.00018	0.0002	0.0013	0.0021
2015	Q3	EV_HC1	1.5	0.11	0.11	165	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	479	0.073	1.6	2.3	0.77	0.0023	0.0023	<0.00050	<0.00050
2015	Q3	FR_FRCP1	1.6	0.13	0.13	234	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	566	0.14	0.93	2.6	0.47	0.0027	0.0028	<0.00050	<0.00050
2015	Q3	GH_ERC	0.74	0.19	0.2	20	<0.000010	<0.000010	<0.00010	0.00016	<0.010	<0.010	179	<0.050	0.79	5.1	1.3	0.00065	0.00071	<0.00050	0.00058
2015	Q4	EV_HC1	1.7	0.13	0.13	218	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	529	0.096	0.74	<1.0	0.29	0.0026	0.0027	<0.00050	<0.00050
2015	Q4	EV_MC2	4.8	0.23	0.23	183	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	492	0.14	0.7	1.0	0.36	0.0019	0.0019	<0.00050	<0.00050
2015	Q4	GH_ERC	0.94	0.22	0.23	37	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	214	<0.050	0.52	<1.0	0.26	0.00077	0.00081	<0.00050	<0.00050
2015	Q4	GH_FR1	2.2	0.14	0.15	189	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	520	0.091	0.57	<1.0	0.3	0.0019	0.0019	<0.00050	<0.00050
2015	Q4	LC_DCDS	0.73	0.047	0.049	13	<0.000050	<0.000050	<0.00050	<0.00050	<0.010	<0.010	140	<0.050	2.7	4.2	1.9	0.00031	0.00033	<0.0025	<0.0025
2015	Q4	LC_LC5	3.1	0.17	0.17	178	<0.000050	<0.000050	<0.00050	<0.00050	<0.010	<0.010	440	<0.050	1.2	<1.0	0.35	0.0021	0.0021	<0.0025	<0.0025
2016	Q1	EV_MC2	4.9	0.2	0.21	174	< 0.000010	0.00001	< 0.00010	< 0.00010	0.015	0.016	482	0.11	0.77	< 1.0	0.77	0.0017	0.0017	< 0.00050	< 0.00050
2016	Q1	GH_ERC	1.0	0.24	0.24	61	< 0.000010	< 0.000010	< 0.00010	< 0.00010	0.012	0.012	256	< 0.050	< 0.50	< 1.0	0.24	0.00099	0.00095	< 0.00050	< 0.00050
2016	Q1	LC_LCDSSLCC	6.9	0.23	0.24	303	< 0.000010	< 0.000010	< 0.00010	< 0.00010	0.017	0.018	713	0.07	< 0.50	< 1.0	0.35	0.0039	0.0039	< 0.00050	< 0.00050
2016	Q2	EV_HC1	1.3	0.096	0.099	120	< 0.000010	0.000014	< 0.00010	< 0.00010	0.013	0.015	378	0.19	2.5	5.9	3.1	0.002	0.0021	< 0.00050	0.00077
2016	Q2	EV_MC2	1.7	0.088	0.092	36	< 0.000010	0.000023	< 0.00010	< 0.00010	< 0.010	0.015	165	0.2	3.3	25	11	0.00052	0.00058	< 0.00050	0.0019
2016	Q2	GH_ERC	0.94	0.21	0.2	33	< 0.000010	0.000014	< 0.00010	< 0.00010	< 0.010	< 0.010	191	0.19	2.2	23	5.7	0.00085	0.00085	< 0.00050	0.0014
2016	Q2	LC_DCDS	0.46	0.033	0.033	8.0	<0.000010	0.000015	<0.00010	<0.00010	<0.010	0.01	114	0.13	3.1	6.5	9.3	0.00019	0.0002	0.0014	0.0024
2016	Q2	LC_LC5	2.0	0.11	0.12	105	<0.000010	<0.000010	<0.00010	<0.00010	0.013	0.014	359	0.22	2.2	16	4.2	0.0016	0.0016	<0.00050	0.00063
2016	Q3	EV_HC1	1.6	0.12	0.12	176	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	496	0.096	1.5	2.7	2.6	0.0023	0.0023	< 0.00050	< 0.00050
2016	Q3	EV_MC2	6.6	0.23	0.24	214	0.000011	0.000012	< 0.00010	< 0.00010	< 0.010	< 0.010	570	0.14	0.96	< 1.0	0.3	0.0015	0.0015	< 0.00050	< 0.00050
2016	Q3	FR_FRCP1	1.6	0.14	0.14	249	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	611	0.17	1.3	1.4	0.36	0.003	0.003	< 0.00050	< 0.00050
2016	Q3	GH_ERC	0.7	0.21	0.2	26	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	195	0.055	0.65	< 1.0	1.1	0.0007	0.00067	< 0.00050	< 0.00050
2016	Q3	GH_FR1	1.9	0.13	0.14	168	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	477	0.15	1.3	< 1.0	0.43	0.002	0.002	< 0.00050	< 0.00050
2016	Q3	LC_LCDSSLCC	5.1	0.2	0.19	187	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	508	< 0.050	0.52	< 1.0	0.28	0.0029	0.0024	< 0.00050	< 0.00050
2016	Q4	CM_MC2	6.7	0.22	0.22	178	0.00001	0.000017	< 0.00010	< 0.00010	< 0.010	< 0.010	451	0.15	2.4	9.1	3.8	0.0017	0.0017	< 0.00050	< 0.00050
2016	Q4	EV_HC1	1.9	0.13	0.13	193	< 0.000010	0.00001	< 0.00010	< 0.00010	< 0.010	< 0.010	480	0.1	1.7	1.8	2.3	0.0026	0.0026	< 0.00050	< 0.00050
2016	Q4	EV_MC2	2.7	0.11	0.12	63	< 0.000010	0.000015	< 0.00010	< 0.00010	< 0.010	< 0.010	228	0.2	3.4	6.8	5.5	0.00062	0.00066	< 0.00050	0.0011
2016	Q4	GH_ERC	0.85	0.25	0.24	32	< 0.000010	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	203	< 0.050	0.8	3.4	1.2	0.00089	0.00084	< 0.00050	< 0.00050
2016	Q4	GH_FR1	2.0	0.14	0.14	196	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	517	0.13	1.1	<2	0.49	0.0021	0.0022	<0.0005	<0.0005
2016	Q4	LC_DCDS	0.94	0.047	0.05	19	<0.000010	0.000027	<0.00010	<0.00010	<0.010	<0.010	171	0.25	3.3	10	22	0.00045	0.00048	0.0011	0.0022
2016	Q4	LC_LC5	2.8	0.16	0.15	154	<0.000010	<0.000010	<0.00010	<0.00010	<0.010	<0.010	441	<0.050	0.95	<1.0	0.46	0.002	0.0021	<0.00050	<0.00050
2016	Q4	LC_LCDSSLCC	4.2	0.18	0.17	176	0.00001	< 0.000010	< 0.00010	< 0.00010	< 0.010	< 0.010	487	0.13	0.91	< 1.0	0.39	0.0032	0.0031	< 0.00050	< 0.00050
2017	Q1	CM_MC2	15	0.39	0.41	319	0.000014	0.000016	<0.0001	<0.0001	<0.01	<0.01	733	0.08	1.0	1.1	0.55	0.0031	0.0033	<0.0005	<0.0005
2017	Q1	EV_HC1	1.7	0.13	0.13	204	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	492	0.081	0.89	<1	0.4	0.0027	0.0027	<0.0005	<0.0005
2017	Q1	EV_MC2	5.9	0.2	0.2	148	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	429	0.11	0.73	<1	0.7	0.0016	0.0016	<0.0005	<0.0005
2017	Q1	FR_FRCP1	2.3	0.19	0.2	531	0.000013	0.000012	<0.0001	<0.0001	<0.01	<0.01	1140	<0.05	1.5	1.2	0.44	0.0059	0.006	<0.0005	<0.0005
2017	Q1	GH_ERC	1.0	0.21	0.22	38	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	223	<0.05	<0.5	<1	0.13	0.00085	0.00083	<0.0005	<0.0005
2017	Q1	GH_FR1	2.2	0.16	0.16	232	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	618	0.1	0.63	<1	0.47	0.0024	0.0023	<0.0005	<0.0005
2017	Q1	LC_LCDSSLCC	7.4	0.23	0.22	295	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	707	0.12	0.71	1.4	0.36	0.0039	0.0041	<0.0005	<0.0005
2017	Q2	CM_MC2	11	0.35	0.33	236	0.000014	0.000022	<0.0001	<0.0001	<0.01	<0.01	541	0.3	2.3	9.0	6.9	0.0022	0.0021	<0.0005	0.00077
2017	Q2	CM_MC2	18	0.36	0.44	237	0.000015	0.00004	<0.0001	<0.0001	<0.01	<0.01	544	0.24	1.6	4.4	2.3	0.0022	0.0027	<0.0005	<0.0005
2017	Q2	EV_HC1	1.5	0.11	0.11	147	<0.00001	0.000017	<0.0001	<0.0001	<0.01	<0.01	398	0.22	3.1	4.2	3.4	0.0022	0.0023	<0.0005	0.00079
2017	Q2	EV_MC2	3.4	0.15	0.14	68	<0.00001	0.000011	<0.0001	<0.0001	<0.01	<0.01	222	0.31	3.3	20	11	0.00078	0.00073	<0.0005	0.00096
2017	Q2	FR_FRCP1	1.3	0.13	0.13	205	0.000011	0.00003	<0.0001	<0.0001	<0.01	<0.01	496	0.67	3.2	17	23	0.0024	0.0025	<0.0005	0.0032
2017	Q2	GH_ERC	1.1	0.22	0.23	36	<0.00001	<0.00001	<0.0001	<0.0001	<0.01	<0.01	210	0.074	1.1	6.8	2.5	0.00094	0.00098	<0.0005	0.0007
2017	Q2	GH_FR1	2.2	0.13	0.14	170	<0.00001	0.000025	<0.0001	<0.0001	<0.01	<0.015

Table D-2: *P. subcapitata* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	ZINC-D-mg/l	ZINC-T-mg/l	∑TU-WQGs	∑TU-WQGs/Benchmarks	PCA Factor 1 (2015 to 2019)	PCA Factor 2 (2015 to 2019)	PCA Factor 3 (2015 to 2019)	PCA Factor 4 (2015 to 2019)	PCA Factor 5 (2015 to 2019)	PCA Factor 1 (2019)	PCA Factor 2 (2019)	PCA Factor 3 (2019)	PCA Factor 4 (2019)
Reference															
2015	Q1	Reference (FR_UFR1)	<0.0030	<0.0030	2.8	2.8	-5.4	-0.27	-5.0	2.3	-0.9	-	-	-	-
2015	Q1	Reference (FR_UFR1)	<0.0030	<0.0030	2.8	2.8	-5.4	-0.27	-5.0	2.3	-0.9	-	-	-	-
2015	Q1	Reference (FR_UFR1)	<0.0030	<0.0030	2.7	2.7	-5.2	-0.4	-4.8	2.3	-0.58	-	-	-	-
2015	Q2	Reference (FR_UFR1)	<0.0030	<0.0030	2.7	2.7	4.0	-0.87	-1.3	1.7	1.5	-	-	-	-
2015	Q2	Reference (GH_ER2)	<0.0030	<0.0030	2.5	2.5	0.072	-0.38	0.39	2.0	1.1	-	-	-	-
2015	Q3	Reference (FR_UFR1)	<0.0030	<0.0030	2.2	2.2	-5.0	0.95	-1.3	-0.46	2.9	-	-	-	-
2015	Q4	Reference (FR_UFR1)	<0.0030	<0.0030	2.4	2.4	-4.5	-2.1	-2.7	-0.5	1.5	-	-	-	-
2015	Q4	Reference (GH_ER2)	<0.0030	<0.0030	2.4	2.4	1.5	-3.2	-1.0	2.1	0.019	-	-	-	-
2016	Q1	Reference (FR_UFR1)	< 0.0030	< 0.0030	1.9	1.8	-5.6	-2.0	-2.7	1.1	-0.1	-	-	-	-
2016	Q2	Reference (FR_UFR1)	< 0.0030	< 0.0030	2.3	2.3	0.31	1.8	1.9	2.9	2.8	-	-	-	-
2016	Q2	Reference (GH_ER2)	< 0.0030	< 0.0030	2.6	2.6	2.1	-0.14	0.33	2.0	1.9	-	-	-	-
2016	Q3	Reference (FR_UFR1)	< 0.0030	< 0.0030	1.2	1.2	1.2	-2.8	0.51	1.6	-0.52	-	-	-	-
2016	Q4	Reference (FR_UFR1)	< 0.0030	< 0.0030	1.4	1.4	1.8	-2.4	0.58	1.5	-0.33	-	-	-	-
2016	Q4	Reference (GH_ER2)	< 0.0030	< 0.0030	1.7	1.7	-2.0	9.3	4.1	2.4	-3.6	-	-	-	-
2017	Q1	Reference (FR_UFR1)	<0.001	<0.003	1.1	1.1	-5.6	-2.0	-0.88	-0.086	-2.2	-	-	-	-
2017	Q2	Reference (CM_MC1)	<0.001	<0.003	1.2	1.2	1.4	1.2	4.1	1.3	0.17	-	-	-	-
2017	Q2	Reference (FR_UFR1)	0.0013	<0.003	3.7	3.7	5.4	-1.8	1.9	0.41	-0.15	-	-	-	-
2017	Q2	Reference (GH_ER2)	<0.003	<0.003	1.5	1.5	-6.6	0.86	-0.087	-2.4	-2.2	-	-	-	-
2017	Q3	Reference (CM_MC1)	<0.001	<0.003	1.2	1.2	1.6	-2.6	1.5	0.76	-1.7	-	-	-	-
2017	Q3	Reference (FR_UFR1)	<0.001	<0.003	1.3	1.3	4.4	-1.8	0.86	0.76	-0.91	-	-	-	-
2017	Q3	Reference (GH_ER2)	<0.001	<0.003	1.3	1.3	-6.5	1.2	0.21	-2.7	-2.2	-	-	-	-
2017	Q4	Reference (CM_MC1)	<0.003	<0.003	1.1	1.1	1.7	-2.6	1.0	1.3	-1.5	-	-	-	-
2017	Q4	Reference (FR_UFR1)	<0.003	<0.003	1.1	1.1	0.11	3.7	3.1	1.6	-7.0	-	-	-	-
2017	Q4	Reference (GH_ER2)	<0.003	<0.003	1.2	1.2	0.9	-2.8	0.11	1.0	-1.4	-	-	-	-
2018	Q1	Reference (CM_MC1)	<0.003	<0.003	1.1	1.1	-5.7	-1.1	-1.7	-2.4	-2.3	-	-	-	-
2018	Q1	Reference (FR_UFR1)	<0.003	<0.003	1.1	1.1	-5.8	-2.4	-1.7	0.054	-1.9	-	-	-	-
2018	Q1	Reference (GH_ER2)	<0.003	<0.003	1.3	1.3	-5.5	-2.5	-2.3	-1.7	0.9	-	-	-	-
2018	Q2	Reference (CM_MC1)	<0.001	<0.003	1.9	1.9	1.5	5.9	5.5	1.4	2.3	-	-	-	-
2018	Q2	Reference (FR_UFR1)	<0.001	<0.003	2.1	2.1	3.3	0.53	2.4	1.3	1.5	-	-	-	-
2018	Q2	Reference (GH_ER2)	<0.001	0.0036	2.5	2.5	-7.0	4.5	1.4	-1.5	-1.0	-	-	-	-
2018	Q2	Reference (LC_SLC)	0.0015	<0.003	1.3	1.3	-7.4	4.1	2.5	0.65	0.023	-	-	-	-
2018	Q3	Reference (CM_MC1)	<0.001	0.0047	1.3	1.3	2.5	-2.1	1.7	0.9	-1.8	-	-	-	-
2018	Q3	Reference (FR_UFR1)	<0.001	<0.003	1.2	1.2	4.6	-1.4	0.25	1.1	0.35	-	-	-	-
2018	Q3	Reference (GH_ER2)	<0.001	0.0073	4.9	4.9	-5.9	0.55	-0.84	-2.7	-2.2	-	-	-	-
2018	Q3	Reference (LC_SLC)	0.0025	0.0036	1.4	1.4	-5.7	-1.2	-0.15	-0.63	-2.2	-	-	-	-
2018	Q4	Reference (CM_MC1)	<0.001	<0.003	1.2	1.2	2.4	-3.6	0.68	1.3	-1.3	-	-	-	-
2018	Q4	Reference (FR_UFR1)	<0.001	<0.003	1.2	1.2	4.0	2.0	3.1	1.1	-6.9	-	-	-	-
2018	Q4	Reference (GH_ER2)	<0.001	<0.003	1.4	1.4	1.1	-3.4	0.23	1.2	-1.4	-	-	-	-
2018	Q4	Reference (LC_SLC)	0.0015	<0.003	1.6	1.6	4.6	-2.9	-0.4	1.0	-0.23	-	-	-	-
2019	Q1	Reference (CM_MC1)	<0.001	<0.003	2.4	2.4	-0.32	-1.7	0.86	0.36	-2.4	-0.7	0.91	0.92	1.2
2019	Q1	Reference (FR_UFR1)	<0.001	0.014	2.0	2.0	5.7	-1.7	-0.015	-4.5	-0.74	5.2	1.1	-0.39	-4.6
2019	Q1	Reference (GH_ER2)	<0.001	<0.003	3.7	3.8	-0.31	-1.8	0.6	1.0	-0.39	-0.56	0.29	0.13	1.0
2019	Q1	Reference (LC_SLC)	0.0016	<0.003	2.5	2.5	3.0	-3.3	0.71	1.1	0.15	2.6	1.7	-1.9	0.46
2019	Q2	Reference (CM_MC1)	<0.001	<0.003	1.3	1.3	-3.6	1.4	0.96	-0.23	-0.5	-3.6	-0.33	4.1	-2.8
2019	Q2	Reference (FR_UFR1)	<0.001	<0.003	1.9	1.9	2.0	0.22	1.9	-3.8	0.87	2.1	0.78	1.6	-6.2
2019	Q2	Reference (GH_ER2)	<0.001	<0.003	3.8	3.9	-0.86	-0.77	0.61	0.59	1.6	-0.9	-0.0042	0.8	-1.4
2019	Q2	Reference (LC_SLC)	0.0011	0.0065	2.4	2.4	5.0	1.3	-0.02	1.4	2.4	5.4	0.67	-1.9	-3.1
2019	Q3	Reference (CM_MC1)	<0.001	<0.003	1.8	1.8	-0.6	-1.3	0.79	-0.16	-2.1	-1.0	1.1	1.3	0.13
2019	Q3	Reference (FR_UFR1)	<0.001	<0.003	1.8	1.8	4.7	-1.4	-0.44	-5.0	-0.21	4.4	-0.047	-0.22	-5.2
2019	Q3	Reference (GH_ER2)	<0.001	<0.003	2.3	2.3	-0.86	-1.6	0.87	0.67	-0.27	-1.1	0.24	0.49	0.53
2019	Q3	Reference (LC_SLC)	0.0016	<0.003	2.6	2.6	2.9	-2.6	0.73	1.0	-0.078	2.3	1.5	-1.5	0.97
2019	Q4	Reference (CM_MC1)	<0.001	<0.003	1.6	1.7	0.14	-2.6	0.78	-0.066	-2.2	-0.43	1.2	-0.13	1.0
2019	Q4	Reference (FR_UFR1)	<0.001	<0.003	1.8	1.9	5.6	2.2	2.6	-5.8	2.8	6.3	0.86	1.7	-11
2019	Q4	Reference (GH_ER2)	<0.001	<0.003	2.3	2.3	-0.4	-2.8	0.58	0.66	0.073	-0.7	0.51	-1.4	1.0
2019	Q4	Reference (LC_SLC)	0.0018	<0.003	1.9	1.9	2.4	-0.52	3.0	1.2	1.6	2.8	1.9	1.9	-2.6
Tests categorized as no adverse response															
2015	Q1	CM_MC2	<0.0030	0.0032	6.7	6.1	4.2	1.3	-3.0	-2.1	1.2	-	-	-	-
2015	Q1	EV_MC2	0.0041	<0.0030	4.3	3.8	1.9	0.99	-4.0	3.7	0.83	-	-	-	-
2015	Q1	GH_ERC	<0.0030	0.0041	3.1	3.1	-4.0	1.0	-4.2	0.98	2.4	-	-	-	-
2015	Q1	GH_FR1	<0.0030	<0.0030	8.1	4.7	2.6	-1.3	-3.4	3.5	0.22	-	-	-	-
2015	Q1	LC_LCDSSLCC	0.0038	0.0039	9.6	5.6	4.6	-1.5	-3.9	3.9	0.97	-	-	-	-
2015	Q2	EV_HC1	0.003	0.003	2.7	2.7	-4.1	1.0	-0.59	1.9	1.8	-	-	-	-
2015	Q2	FR_FRCP1	<0.0030	<0.0030	5.9	4.2	0.69	1.2	2.2	2.1	1.6	-	-	-	-
2015	Q2	GH_ERC	<0.0030	<0.0030	2.9	2.9	-4.3	1.5	0.32	-0.25	3.3	-	-	-	-
2015	Q2	GH_FR1	<0.0030	<0.0030	5.6	3.8	0.41	-0.16	1.1	2.2	1.1	-	-	-	-
2015	Q2	LC_DCDS	<0.0030	0.0034	4.2	4.3	2.4	18	-15	0.097	-4.2	-	-	-	-
2015	Q3	EV_HC1	<0.0030	<0.0030	3.2	3.0	-7.5	2.4	0.099	0.71	0.92	-	-	-	-
2015	Q3	FR_FRCP1	<0.0030	<0.0030	6.7	4.6	3.8	-0.37	-1.4	-3.4	1.0	-	-	-	-
2015	Q3	GH_ERC	<0.0030	<0.0030	2.6	2.6	-0.59	-0.12	0.29	1.9	1.4	-	-	-	-
2015	Q4	EV_HC1	<0.0030	<0.0030	3.1	2.8	2.8	-1.7	-0.61	2.1	1.0	-	-	-	-
2015	Q4	EV_MC2	<0.0030	<0.0030	5.1	4.0	-5.6	-0.97	-1.9	0.58	-0.47	-	-	-	-
2015	Q4	GH_ERC	<0.0030	<0.0030	2.5	2.5	0.31	-2.4	-0.73	1.9	0.92	-	-	-	-
2015	Q4	GH_FR1	<0.0030	<0.0030	6.4	3.8	3.9	-2.0	-0.46	0.6	-1.1	-	-	-	-
2015	Q4	LC_DCDS	0.011	<0.015	7.3	7.4	-5.9	-1.5	-2.4	0.59	0.01	-	-	-	-
2015	Q4	LC_LC5	<0.0050	<0.015	12	10	-5.3	-1.7	-2.7	-0.97	1.9	-	-	-	-
2016	Q1	EV_MC2	< 0.0030	< 0.0030	4.5	3.6	3.1	-1.7	-0.71	2.2	1.2	-	-	-	-
2016	Q1	GH_ERC	< 0.0030	< 0.0030	2.7	2.6	-3.7	-2.6	-3.4	0.25	1.9	-	-	-	-
2016	Q1	LC_LCDSSLCC	< 0.0030	0.0034	7.4	4.4	5.6	-3.5	-1.0	2.9	2.5	-	-	-	-
2016	Q2	EV_HC1	< 0.0030	< 0.0030	2.9	2.8	-1.0	1.9	1.4	3.1	3.5	-	-	-	-
2016	Q2	EV_MC2	< 0.0030	0.0047	4.3	4.4	-3.4	8.7	2.9	2.2	2.3	-	-	-	-
2016	Q2	GH_ERC	< 0.0030	0.0035	3.2	3.3	-3.7	4.3	1.8	-0.08	4.1	-	-	-	-
2016	Q2	LC_DCDS	<0.0030	0.0037	3.7	3.8	1.0	-3.5	-0.22	1.4	-0.28	-	-	-	-
2016	Q2	LC_LC5	<0.0030	0.004	5.1	4.5	3.3	-2.4	0.75	1.2	0.32	-	-	-	-
2016	Q3	EV_HC1	< 0.0030	< 0.0030	2.5	2.4	-5.0	3.0	0.94	-0.44	3.6	-	-	-	-
2016	Q3	EV_MC2	< 0.0030	0.0031	4.4	3.3	4.3	-1.8	-0.94	-4.0	-0.66	-	-	-	-
2016	Q3	FR_FRCP1	< 0.0030	< 0.0030	7.0	3.9	-0.47	0.31	2.1	1.4	1.2	-	-	-	-
2016	Q3	GH_ERC	< 0.0030	< 0.0030	1.3	1.4	3.7	-2.0	0.19	0.057	-1.6	-	-	-	-
2016	Q3	GH_FR1	< 0.0030	< 0.0030	5.3	2.9	3.3	-2.7	1.3	1.5	0.17	-	-	-	-
2016	Q3	LC_LCDSSLCC	0.0089	0.0075	5.9	3.9	-5.4	-1.6	-1.4	-1.4	1.3	-	-	-	-
2016	Q4	CM_MC2	< 0.0030	< 0.0030	4.7	4.3	3.7	-3.0	-0.091	1.1	0.31	-	-	-	-
2016	Q4	EV_HC1	< 0.0030	< 0.0030	2.6	2.4	-6.0	-1.5	-1.1	0.06	-0.81	-	-	-	-
2016	Q4	EV_MC2	< 0.0030	< 0.0030	3.0	3.0	1.8	2.6	2.6	-3.9	1.5	-	-	-	-
2016	Q4	GH_ERC	< 0.0030	< 0.0030	2.0	2.0	-3.0	5.0	2.9	1.2	-0.2	-	-	-	-
2016	Q4	GH_FR1	<0.003	<0.003	5.6	3.4	3.0	-2.3	1.5	1.5	0.28	-	-	-	-
2016	Q4	LC_DCDS	<0.0030	0.005	3.6	3.6	-6.4	-0.43	-0.44	-0.0012	-0.4	-	-	-	-
2016	Q4	LC_LC5	<0.0030	<0.0030	5.4	4.2	-5.6	-2.1	-2.0	-1.8	1.7	-	-	-	-
2016	Q4	LC_LCDSSLCC	0.0061	0.0078	5.2	3.5	-4.7	-1.4	-1.2	-1.5	2.0	-	-	-	-
2017	Q1	CM_MC2	0.0041	0.004	9.5	8.3	6.9	-0.84	0.64	-6.2	-0.51	-	-	-	-
2017	Q1	EV_HC1	<0.003	<0.003	2.3	2.1	-0.39	-2.1	0.24	1.2	0.6	-	-	-	-
2017	Q1	EV_MC2	<0.003	<0.003	3.2	2.8	1.4	-1.5	0.8	0.35	-1.2	-	-	-	-
2017	Q1	FR_FRCP1	0.0023	<0.003	13	7.3	6.9	-2.6	1.9	0.67	0.56	-	-	-	-
2017	Q1	GH_ERC	<0.003	<0.003	1.4	1.4	-4.6	-2.9	-2.6	-1.1	0.39	-	-	-	-
2017	Q1	GH_FR1	<0.003	<0.003	6.5	3.0	1.7	-3.7	0.027	1.5	-0.5	-	-	-	-
2017	Q1	LC_LCDSSLCC	0.0034	0.0042	7.1	3.9	5.0	-3.2	0.69	0.9	-0.0076	-	-	-	-
2017	Q2	CM_MC2	0.005	0.0071	9.3	8.8	5.8	4.0	3.6	-6.6	0.89	-	-	-	-
2017	Q2	CM_MC2	0.0041	0.0059	10	9.6	6.8	3.0	2.7	-7.6	0.63	-	-	-	-
2017	Q2	EV_HC1	<0.001	0.0044	2.4	2.3	-0.73	1.9	3.1	1.0	0.81	-	-	-	-
2017	Q2	EV_MC2	0.0011	<0.003	2.8	2.9	-1.7	5.1	4.1	0.28	-0.9	-	-	-	-
2017	Q2	FR_FRCP1	0.002	0.0098	9.1	6.1	3.5	7.9	4.9	1.7	1.5	-	-	-	-
2017	Q2	GH_ERC	<0.003	<0.003	1.8	1.8	-3.9	0.46	0.69	-0.9	2.4	-	-	-	-
2017	Q2	GH_FR1	<0.003	0.0072	7.5	5.8	3.6	7.5	4.6	2.5	2.8	-	-	-	-
2017	Q2	LC_DCDS	0.0017	0.0056	3.2	3.3	4.5	-2.0	0.79	0.62	-0.78	-	-	-	-
2017	Q2	LC_LC5	<0.0010	0.016	5.4	3.9	-6.2	0.33	-0.82	-2.5	-1.8	-	-	-	-
2017	Q2	LC_LCDSSLCC	0.0084	0.012	8.3	4.5	-4.4	9.4	4.1	1.9	-5.4	-	-	-	-
2017	Q3	CM_MC2	<0.001	<0.003	11	10	-7.1	6.9	1.3	0.89	-0.96	-	-	-	-
2017	Q3	EV_HC1	<0.003	<0.003	2.1	1.9	-5.1	0.18	0.28	-1.3	2.3	-	-	-	-
2017	Q3	EV_MC2	<0.003	<0.003	2.6	2.2	5.4	0.62	1.2	-7.6	-0.24	-	-	-	-
2017	Q3	FR_FRCP1	<0.001	<0.003	5.9	3.6	-0.71	-1.6	0.55	1.2	0.35	-	-	-	-
2017	Q3	GH_ERC	<0.001	<0.003	1.4	1.4	1.1	-1.4	1.2	0.05	-1.6	-	-	-	-
2017	Q3	GH_FR1	<0.001	<0.003	5.6	3.2	3.0	-2.0	2.7	1.1	-1.1	-	-	-	-
2017	Q3	LC_LCDSSLCC	0.014	0.0098	6.8	4.5	-5.3	-0.26	0.63	-1.7	0.94	-	-	-	-
2017	Q4	CM_MC2	<0.003	<0.003	7.0	6.0	-6.3	-0.67	0.22	-0.67	-1.7	-	-	-	-
2017	Q4	EV_HC1	<0.003	<0.003	2.1	1.9	-5.9	-0.94	-0.43	-2.2	0.32	-	-	-	-
2017	Q4	EV_MC2	<0.003	<0.003	2.5	2.2	5.9	-0.6	0.38	-5.4	-0.36	-	-	-	-
2017	Q4	FR_FRCP1	<0.003	<0.003	9.6	5.4	-0.86	-1.9	0.63	0.95	-0.93	-	-	-	-
2017	Q4	GH_ERC	<0.003	<0.003	1.4	1.4	-0.094	-1.2	0.13	-0.27	-1.8	-	-	-	-
2017	Q4	GH_FR1	<0.003	<0.003	5.8	3.0	5.3	-3.0	1.2	0.98	-0.36	-	-	-	-
2017	Q4	LC_DCDS	<0.0030	<0.0030	4.5	4.5	-6.1	-1.8	-1.3	-0.21	-1.4	-	-	-	-
2017	Q4	LC_LC5	<0.0030	<0.0030	5.5	4.0	-5.5	-2.0	-1.6	-1.9	0.51	-	-	-	-
2017	Q4	LC_LCDSSLCC	0.0056	0.0076	6.6	4.2	-4.9	-2.0	-1.4	-1.5	0.22	-	-	-	-
2018	Q1	CM_MC2	<0.003	<0.003	6.9	6.0	6.0	-1.4	0.14	-5.2	-0.55	-	-	-	-
2018	Q1	CM_MC3	<0.003	<0.003	2.0	1.9	-1.7	-2.5	-1.3	-1.1	0.37	-	-	-	-
2018	Q1	EV_HC1	<0.003	<0.003	2.2	2.0	0.092	-2.6	0.29	1.0	-0.9	-	-	-	-
2018	Q1	EV_MC2	<0.003	<0.003	3.4	2.9	3.9	0.34	-4.0	-0.62	-3.5	-	-	-	-
2018	Q1	GH_ERC	<0.003	<0.003	1.5	1.5	-5.0	-1.5	-1.6	-0.69	1.9	-	-	-	-
2018	Q1	GH_FR1	<0.003	<0.003	6.1	3.7	2.1	-3.7	0.099	1.6	-1.2	-	-	-	-
2018	Q1	LC_LCDSSLCC	0.0035	0.0034	7.1	4.7	6.0	-0.93	-4.8	0.22	-2.5	-	-	-	-
2018	Q2	CM_MC2	0.0075	0.012	8.9	8.6	5.5	4.4	3.4	-6.1	1.7	-	-	-	-
2018	Q2	EV_HC1	<0.001	<0.003	2.1	2.0	-2.3	1.7	2.9	1.1	1.1	-	-	-	-
2018	Q2	EV_MC2	<0.0015	0.0056	4.7	4.7	-0.53	9.8	4.5	1.2	2.0	-	-	-	-
2018	Q2	GH_ERC	<0.001	0.0059	4.3	4.4	-2.8	7.7	3.9	-0.0031	4.9	-	-	-	-
2018	Q2	GH_FR1	0.0013	0.012	8.7	8.1	3.0	12	5.4	1.9	2.0	-	-	-	-
2018	Q2	LC_DCDS	0.0013	0.0082	10.0	10	-6.6	0.4	-1.1	-2.6	-2.0	-	-	-	-
2018	Q2	LC_LC5	<0.0010	0.0065	6.0	5.0	-6.1	-2.3	-1.4	-0.48	-1.7	-	-	-	-
2018	Q2	LC_LCDSSLCC	0.0074	0.009	6.6	5.1	2.9	12	6.3	0.64	-4.1	-	-	-	-
2018	Q3	CM_MC2	<0.001	<0.003	18	17	-4.8	3.8	2.6	-0.96	2.7	-	-	-	-
2018	Q3	CM_MC3	0.0023	<0.003	7.1	6.8	-5.5	-0.68	-0.23	-0.61	0.066	-	-	-	-
2018	Q3	EV_HC1	<0.001	<0.003	2.2	2.0	9.4	0.36	-0.037	-9.4	-0.86	-	-	-	-
2018	Q3	EV_MC2	0.0013	<0.003	4.2	3.6	4.5	0.64	-0.64	-6.7	-0.7	-	-	-	-
2018	Q3	FR_FRCP1	0.0013	<0.003	7.5	4.5	-0.18	-1.5	1.2	0.44	0.093	-	-	-	-
2018	Q3	GH_ERC	<0.001	<0.003	1.5	1.5	4.4	-0.35	1.1	-1.6	-2.0	-	-	-	-
2018	Q3	GH_FR1	<0.001	<0.003	5.8	4.0	4.2	-1.9	2.5	1.0	-0.52	-	-	-	-
2018	Q3	LC_LCDSSLCC	0.011	0.012	7.4	5.8	-5.3	-0.14	-0.31	-0.91	2.1	-	-	-	-
2018	Q4	CM_MC2	0.0044	0.0052	15	14	-4.1	6.8	1.6	-1.5	4.3	-	-	-	-
2018	Q4	EV_HC1	<0.001	<0.003	2.3	2.1	-4.3	-2.3	-1.4	-0.42	-0.29	-	-	-	-
2018	Q4	EV_MC2	<0.001	<0.003	3.3	3.1	9.5	1.2	0.74	-8.7	-1.1	-	-	-	-
2018	Q4	FR_FRABCH	<0.001	<0.003	8.9	3.5	0.12	-1.5	0.98	1.1	0.065	-	-	-	-
2018	Q4	GH_ERC	<0.001	<0.003	2.0	2.0	3.3	-3.7	0.94	1.5	-0.46	-	-	-	-
2018	Q4	GH_FR1	<0.001	<0.003	6.0	3.8	13	5.0	-4.2	-0.72	2.1	-	-	-	-
2018	Q4	LC_DCDS	<0.0010	<0.0030	9.7	7.4	-5.5	-1.5	-0.95	-1.9	0.76	-	-	-	-
2018	Q4	LC_LC5	<0.0010	<0.0030	6.0	4.5	-4.2	-2.8	-1.7	-0.41	-0.01	-	-	-	-
2018	Q4	LC_LCDSSLCC	0.0059	0.0066	6.3	4.8	-4.8	0.36	0.076	-0.93	3.2	-	-	-	-
2019	Q1	CM_MC2	0.0014	<0.003	7.2	6.2	8.0	-2.6	2.3	-0.77	1.2	7.3	3.7	-2.5	-1.8
2019	Q1	EV_HC1	<0.001	<0.003	3.0	2.8	4.9	-4.1	0.43	0.93	-0.29	3.9	2.5	-2.7	1.8
2019	Q1	EV_MC2	<0.001	<0.003	2.7	2.5	1.6	-4.3	-0.093	1.1	-1.3	0.4	1.3	-2.0	2.3
2019	Q1	FR_FRABCH	<0.001	<0.003	10	4.7	-4.8	-2.9	-2.5	-1.3	-0.21	-5.1	-2.0	-2.1	0.65
2019	Q1	GH_ERC	<0.001	<0.003	3.9	4.0	3.1	1.9	2.5	2.3	-6.9	2.9	2.4	8.0	3.3
2019	Q1	GH_FR1	<0.001	<0.003	7.0	4.0	2.6	-3.9	0.14	1.4	-1.1	1.8	1.3	-1.4	2.2
2019	Q1	LC_DCDS	0.0025	0.0031	8.2	6.5	-5.4	-1.8	-1.4	0.32	-1.4	-5.3	-1.7	-0.34	1.9
2019	Q1	LC_LC3	0.0026	0.0042	8.4	6.3	-5.6	-2.3	-2.0	-1.6	0.5	-5.7	-2.3	-1.8	-0.22
2019	Q1	LC_LC5	<0.001	<0.003	6.2	3.7	-3.5	-2.9	-1.8	-0.051	0.3	-3.7	-1.5	-2.2	1.3
2019	Q1	LC_LCDSSLCC	0.0027	<0.003	6.7	4.6	-5.8	-1.3	-1.9	-2.3	-1.6	-5.8	-2.1	-0.12	-0.65
2019	Q2	CM_MC2	<0.001	<0.003	4.7	4.1	5.7	-3.0	0.32	0.58	1.5	5.1	2.4	-3.1	0.43
2019	Q2	EV_HC1	<0.001	<0.003	3.0	2.8	2.6	-3.1	0.037	0.55	0.54	1.8	1.6	-2.4	1.0
2019	Q2	EV_MC2	<0.001	<0.003	2.3	2.3	1.8	-2.8	1.1	1.3	-0.25	0.87	1.5	-1.1	0.67
2019	Q2	FR_FRABCH	0.0035	0.011	11	5.6	-4.6	-1.6	-0.95	-1.3	1.0	-4.5	-1.4	-1.2	-1.2
2019	Q2	FR_FRCP1	<0.001	<0.003	8.7	5.5	4.1	-1.9	2.3	0.34	-1.1	3.4	2.3	0.7	0.57
2019	Q2	GH_ERC	<0.001	<0.003	4.0	4.0	1.5	3.1	2.7	0.87	-5.5	1.2	2.1	11	0.65
2019	Q2	GH_FR1	<0.001	<0.003	6.2	3.6	3.0	-2.3	1.8	0.76	-2.0	2.2	1.9	0.75	1.4
2019	Q2	LC_DCDS	<0.001

Table D-3: *H. azteca* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	Mean Survival (Control Normalized)	Mean Dry Weight (Control Normalized)	ALKALINITY TOTAL (As CaCO3) lab measured.-N-mg/l	ALUMINUM-D-mg/l	ALUMINUM-T-mg/l	ANTIMONY-D-mg/l	ANTIMONY-T-mg/l	ARSENIC-D-mg/l	ARSENIC-T-mg/l	BARIUM-D-mg/l	BARIUM-T-mg/l
Reference													
2015	Q1	Reference (FR_UFR1)	72	82	139	0.0033	0.024	0.0001	0.0001	0.0001	0.00012	0.07	0.072
2015	Q2	Reference (FR_UFR1)	104	92	116	0.0048	0.049	0.0001	0.0001	0.00011	0.00013	0.043	0.043
2015	Q3	Reference (FR_UFR1)	96	70	160	0.003	0.0086	0.0001	0.00011	0.00011	0.00016	0.081	0.082
2015	Q4	Reference (FR_UFR1)	94	104	146	0.003	0.0056	0.0001	0.0001	0.0001	0.00011	0.073	0.074
2016	Q1	Reference (FR_UFR1)	100	95	141	0.0039	0.0055	<0.0001	<0.0001	<0.0001	<0.0001	0.076	0.075
2016	Q2	Reference (FR_UFR1)	98	105	114	0.0059	0.054	<0.0001	<0.0001	0.00011	0.00012	0.042	0.043
2016	Q3	Reference (FR_UFR1)	102	110	158	<0.003	0.0071	<0.0001	<0.0001	<0.0001	0.00011	0.075	0.077
2016	Q4	Reference (FR_UFR1)	96	113	141	0.0082	0.042	<0.0001	<0.0001	<0.0001	0.00012	0.064	0.063
2017	Q1	Reference (FR_UFR1)	100	85	141	0.001	0.005	<0.0001	0.00014	<0.0001	0.00011	0.076	0.081
2017	Q2	Reference (FR_UFR1)	100	101	119	0.032	0.09	<0.0001	0.00011	0.00014	0.00016	0.049	0.047
2017	Q2	Reference (GH_ER2)	109	92	151	0.0032	0.14	<0.0001	<0.0001	0.00011	0.00019	0.048	0.048
2017	Q3	Reference (CM_MC1)	80	65	142	0.0029	0.013	<0.0001	0.00011	0.00021	0.00023	0.052	0.05
2017	Q3	Reference (FR_UFR1)	88	101	147	0.0026	0.0058	<0.0001	0.0001	<0.0001	0.00013	0.074	0.073
2017	Q3	Reference (GH_ER2)	83	94	136	0.0029	0.014	<0.0001	0.00012	0.00011	0.00012	0.047	0.046
2017	Q4	Reference (CM_MC1)	98	71	136	<0.003	0.0054	<0.0001	<0.0001	0.00015	0.00019	0.051	0.051
2017	Q4	Reference (FR_UFR1)	102	89	144	<0.003	0.0033	<0.0001	<0.0001	<0.0001	0.00011	0.073	0.074
2017	Q4	Reference (GH_ER2)	98	75	147	<0.003	0.0067	<0.0001	<0.0001	<0.0001	0.00012	0.048	0.048
2018	Q1	Reference (CM_MC1)	100	71	160	<0.003	0.0039	<0.0001	<0.0001	0.00016	0.00016	0.055	0.052
2018	Q1	Reference (FR_UFR1)	98	79	143	0.0071	0.013	<0.000125	<0.0001	0.00013	0.00012	0.079	0.071
2018	Q1	Reference (GH_ER2)	96	79	155	<0.003	<0.003	<0.0001	0.00011	<0.0001	0.00023	0.051	0.05
2018	Q2	Reference (CM_MC1)	102	126	98	0.029	0.37	<0.000125	<0.0001	0.00023	0.00037	0.033	0.033
2018	Q2	Reference (FR_UFR1)	102	121	99	0.012	0.21	<0.0001	<0.0001	0.00013	0.00023	0.039	0.041
2018	Q2	Reference (GH_ER2)	104	118	139	0.0053	0.87	<0.0001	0.00014	0.00015	0.00075	0.043	0.057
2018	Q2	Reference (LC_SLC)	104	126	117	0.0043	0.07	<0.0001	<0.0001	0.00012	0.00019	0.029	0.029
2018	Q3	Reference (CM_MC1)	95	137	146	0.003	0.016	<0.0001	<0.0001	0.00018	0.00021	0.059	0.054
2018	Q3	Reference (FR_UFR1)	107	180	153	<0.003	0.0046	<0.0001	<0.0001	0.0001	0.00012	0.076	0.07
2018	Q3	Reference (GH_ER2)	107	143	135	<0.003	0.24	<0.0001	<0.0001	0.00011	0.00029	0.043	0.045
2018	Q3	Reference (LC_SLC)	70	117	141	<0.003	0.0053	<0.0001	<0.0001	0.00011	0.00012	0.044	0.042
2018	Q4	Reference (CM_MC1)	94	135	145	<0.003	0.0031	<0.0001	<0.0001	0.00015	0.00016	0.055	0.055
2018	Q4	Reference (FR_UFR1)	94	56	150	<0.003	0.0035	<0.0001	<0.0001	<0.0001	0.00011	0.077	0.072
2018	Q4	Reference (GH_ER2)	96	71	149	<0.003	0.0078	<0.0001	<0.0001	<0.0001	0.0002	0.048	0.046
2018	Q4	Reference (LC_SLC)	98	68	145	<0.003	<0.003	<0.0001	<0.0001	0.00011	0.00012	0.05	0.048
2019	Q1	Reference (CM_MC1)	98	100	161	<0.003	0.0026	<0.0001	<0.0001	0.00014	0.00017	0.055	0.055
2019	Q1	Reference (FR_UFR1)	78	64	156	0.029	0.17	<0.0001	<0.0001	0.000073	0.00011	0.073	0.072
2019	Q1	Reference (GH_ER2)	67	64	150	<0.003	0.0074	<0.0001	<0.0001	<0.0001	0.00011	0.049	0.047
2019	Q3	Reference (CM_MC1)	90	107	147	<0.003	0.008	<0.0001	<0.0001	0.00021	0.00021	0.053	0.054
2019	Q3	Reference (FR_UFR1)	96	78	147	0.0019	0.0057	<0.0001	<0.0001	0.00008	0.00009	0.067	0.064
2019	Q3	Reference (GH_ER2)	93	87	138	<0.003	0.012	<0.0001	<0.0001	0.000093	0.00012	0.042	0.04
2019	Q3	Reference (LC_SLC)	102	109	140	<0.003	0.0024	<0.0001	<0.0001	0.00011	0.00011	0.04	0.04
2019	Q4	Reference (CM_MC1)	96	95	145	<0.003	0.007	<0.0001	<0.0001	0.00019	0.00019	0.046	0.048
2019	Q4	Reference (FR_UFR1)	98	144	143	<0.003	0.067	<0.0001	<0.0001	0.000065	0.00013	0.069	0.067
2019	Q4	Reference (GH_ER2)	100	59	146	0.0024	0.013	<0.0001	<0.0001	<0.0001	0.00012	0.046	0.045
2019	Q4	Reference (LC_SLC)	88	82	143	<0.003	0.0087	<0.0001	<0.0001	0.000083	0.0001	0.042	0.042
Tests categorized as no adverse response													
2015	Q1	CM_MC2	94	73	176	0.0063	0.2	0.00013	0.00015	0.00016	0.00026	0.059	0.061
2015	Q1	FR_FRCP1	94	82	226	0.003	0.024	0.00036	0.00037	0.0001	0.00013	0.087	0.089
2015	Q1	GH_FR1	98	90	204	0.003	0.069	0.0002	0.00021	0.0001	0.00015	0.11	0.11
2015	Q2	CM_MC2	100	87	136	0.012	0.66	0.00011	0.00013	0.00016	0.00049	0.042	0.048
2015	Q2	GH_FR1	100	78	158	0.003	0.054	0.00015	0.00016	0.0001	0.00016	0.083	0.084
2015	Q3	FR_FRCP1	88	77	207	0.003	0.0082	0.00026	0.00029	0.0001	0.00017	0.078	0.079
2015	Q3	GH_FR1	69	61	185	0.003	0.032	0.00017	0.00021	0.00011	0.00016	0.099	0.1
2015	Q4	CM_MC2	102	79	195	0.0031	0.05	0.00015	0.00017	0.00017	0.00023	0.074	0.074
2015	Q4	FR_FRCP1	102	92	213	0.0032	0.0046	0.00025	0.00028	0.0001	0.00011	0.08	0.08
2015	Q4	GH_FR1	96	96	193	0.003	0.0037	0.00012	0.00015	0.0001	0.00012	0.11	0.11
2016	Q1	GH_FR1	94	87	198	<0.003	0.0098	0.00014	0.00016	<0.0001	0.00013	0.12	0.12
2016	Q3	CM_MC2	100	113	204	<0.003	0.0075	0.0002	0.00023	0.00019	0.0002	0.077	0.076
2016	Q4	CM_MC2	100	113	179	0.0055	0.088	0.00014	0.00016	0.00017	0.00023	0.054	0.056
2016	Q4	GH_FR1	88	92	192	<0.003	0.01	0.00016	0.00024	0.00011	0.00014	0.1	0.1
2017	Q1	GH_FR1	104	81	204	<0.003	0.0066	0.00011	0.00013	<0.0001	0.00011	0.12	0.12
2017	Q2	FR_FRCP1	100	89	181	0.0069	0.19	0.00021	0.00024	0.00012	0.00025	0.07	0.071
2017	Q2	GH_FR1	100	99	179	0.0049	0.33	0.00019	0.00022	0.00013	0.00029	0.081	0.086
2017	Q3	FR_FRCP1	83	108	204	0.0025	0.0062	0.00024	0.00027	<0.0001	0.00012	0.074	0.072
2017	Q3	GH_FR1	78	107	191	0.0027	0.0068	0.00016	0.00019	<0.0001	0.00012	0.11	0.1
2017	Q4	FR_FRCP1	96	76	179	<0.003	0.019	0.00024	0.00027	<0.0001	0.00014	0.072	0.075
2017	Q4	GH_FR1	102	76	177	<0.003	0.0051	0.00018	0.0002	0.0001	0.00013	0.11	0.11
2018	Q1	CM_MC3	98	82	188	<0.003	0.0034	0.0001	0.00014	0.00016	0.00017	0.055	0.052
2018	Q1	GH_FR1	96	79	208	0.007	0.0069	0.00019	0.0002	0.00011	0.00015	0.13	0.12
2018	Q2	CM_MC3	102	129	125	0.0093	0.74	0.00011	0.00013	0.00027	0.00057	0.038	0.04
2018	Q2	FR_FRCP1	104	129	145	0.0049	0.52	0.00018	0.00022	0.00012	0.00042	0.05	0.064
2018	Q2	GH_FR1	98	147	149	0.006	0.53	0.00023	0.00029	0.00016	0.00046	0.064	0.075
2018	Q2	LC_LCDSSLCC	96	109	148	<0.003	0.043	0.00018	0.00023	0.00012	0.0002	0.035	0.035
2018	Q3	FR_FRCP1	111	143	210	<0.003	0.014	0.00029	0.00032	0.00011	0.00014	0.088	0.08
2018	Q3	GH_FR1	109	130	194	<0.003	0.018	0.00016	0.00017	0.00012	0.00013	0.11	0.1
2018	Q3	LC_LCDSSLCC	109	150	201	<0.003	0.0034	0.00023	0.00025	0.00011	0.00015	0.072	0.073
2018	Q4	CM_MC3	81	65	168	<0.003	0.0063	0.00013	0.00013	0.00018	0.0002	0.06	0.06
2018	Q4	EV_HC1	94	88	199	<0.003	0.0052	<0.0001	<0.0001	0.00015	0.00018	0.07	0.068
2018	Q4	EV_MC2	98	50	193	<0.003	<0.003	0.00018	0.00018	0.00015	0.00018	0.12	0.11
2018	Q4	GH_ERC	85	47	154	<0.003	<0.003	<0.0001	<0.0001	<0.0001	0.00013	0.059	0.058
2018	Q4	GH_FR1	91	47	212	<0.003	0.0039	0.00012	0.00013	0.0001	0.00012	0.12	0.11
2019	Q1	CM_MC2	107	64	225	<0.003	0.0069	0.00029	0.0003	0.00021	0.00024	0.079	0.082
2019	Q1	FR_FRABCH	87	64	241	<0.003	0.0028	<0.0001	<0.0001	<0.0001	0.000063	0.11	0.11
2019	Q1	FR_FRCP1	78	73	364	<0.003	0.02	0.00042	0.00043	0.00012	0.00015	0.035	0.036
2019	Q1	GH_FR1	91	82	212	0.0022	0.013	0.00013	0.00014	0.000065	0.00012	0.12	0.12
2019	Q1	RG_MIDAG	87	45	187	<0.003	0.025	0.00014	0.00015	0.00021	0.00023	0.085	0.084
2019	Q3	EV_MC2	104	141	170	<0.003	0.019	0.00011	0.00012	0.00019	0.0002	0.11	0.11
2019	Q3	FR_FRABCH	102	102	228	<0.003	0.0044	0.00015	0.00018	<0.0001	0.00009	0.091	0.088
2019	Q3	FR_FRCP1	96	74	197	<0.003	0.0053	0.00026	0.00029	0.00011	0.00012	0.078	0.075
2019	Q3	GH_ERC	94	85	148	<0.003	0.0071	<0.0001	<0.0001	0.000075	0.000098	0.051	0.049
2019	Q3	GH_FR1	100	111	197	<0.003	0.0062	0.00014	0.00015	0.00012	0.000093	0.094	0.09
2019	Q3	LC_LC5	81	76	187	<0.003	0.013	0.00012	0.00013	0.000065	0.000083	0.089	0.088
2019	Q3	RG_MIDAG	98	107	156	<0.003	0.014	0.00011	0.00014	0.00032	0.00034	0.056	0.058
2019	Q4	EV_MC2	98	85	173	<0.003	0.0051	0.000078	0.00009	0.00016	0.00016	0.11	0.11
2019	Q4	FR_FRABCH	88	113	237	<0.003	0.016	<0.0001	0.00011	<0.0001	0.00008	0.097	0.094
2019	Q4	GH_FR1	96	105	203	0.003	0.0034	0.00011	0.00012	<0.0001	0.00012	0.1	0.1
2019	Q4	RG_MIDAG	98	82	180	<0.003	0.03	0.00011	0.00012	0.00022	0.00024	0.068	0.069
Tests categorized as possible or likely adverse response for dry weight (2015 to 2018)													
2015	Q2	FR_FRCP1	100	72	142	0.003	0.045	0.00021	0.00022	0.0001	0.00013	0.06	0.061
2015	Q3	CM_MC2	67	35	210	0.003	0.01	0.0002	0.00021	0.00019	0.00023	0.077	0.078
2016	Q1	CM_MC2	80	58	209	<0.003	0.02	0.00021	0.00022	0.00016	0.00019	0.077	0.076
2016	Q1	FR_FRCP1	100	58	236	0.0032	0.0038	0.00026	0.00029	<0.0001	0.00011	0.083	0.084
2016	Q2	CM_MC2	94	30	146	0.0068	0.37	0.00015	0.00017	0.00017	0.0003	0.045	0.045
2016	Q2	FR_FRCP1	98	51	154	<0.003	0.07	0.00017	0.00022	<0.0001	0.00014	0.058	0.059
2016	Q2	GH_FR1	98	60	166	<0.003	0.058	0.00015	0.00018	0.0001	0.00014	0.08	0.08
2016	Q3	FR_FRCP1	100	94	202	<0.003	0.014	0.00022	0.00024	<0.0001	0.00011	0.077	0.076
2016	Q3	GH_FR1	98	97	198	<0.003	0.007	0.00013	0.00015	0.0001	0.00013	0.11	0.11
2016	Q4	FR_FRCP1	96	95	198	0.0038	0.024	0.00019	0.0002	<0.0001	0.00014	0.075	0.074
2017	Q1	FR_FRCP1	100	56	259	<0.001	0.0035	0.00027	0.0004	<0.0001	0.00013	0.076	0.073
2017	Q4	CM_MC2	90	43	200	<0.003	0.0079	0.00025	0.00028	0.00017	0.00019	0.08	0.076
2018	Q1	FR_FRCP1	86	38	227	0.0034	0.0063	0.00025	0.00026	<0.000125	0.00015	0.085	0.08
2018	Q4	FR_FRABCH	94	50	239	<0.003	0.0038	<0.0001	<0.0001	<0.0001	<0.0001	0.12	0.11
2018	Q4	LC_LCDSSLCC	74	35	195	<0.003	<0.003	0.00017	0.00019	<0.0001	0.00011	0.086	0.081
Tests categorized as possible or likely adverse response for dry weight and survival (2015 to 2018)													
2017	Q1	CM_MC2	67	23	208	0.0026	0.016	0.00033	0.00045	0.00015	0.0002	0.07	0.071
2017	Q2	CM_MC2	58	16	178	0.0048	0.2	0.00024	0.00026	0.00017	0.0003	0.058	0.06
2017	Q3	CM_MC2	0	0	188	0.003	0.034	0.00031	0.00036	0.0002	0.00025	0.064	0.065
2018	Q1	CM_MC2	36	15	236	<0.003	0.013	0.00024	0.00027	0.00017	0.00019	0.078	0.075
2018	Q2	CM_MC2	55	97	147	0.01	1.2	0.00017	0.00019	0.00017	0.00068	0.057	0.062
2018	Q3	CM_MC2	30	10	194	<0.004	0.006	0.00052	0.00053	0.00022	0.00022	0.069	0.067
2018	Q3	CM_MC3	77	23	174	<0.003	0.0048	0.00024	0.00025	0.00027	0.00028	0.064	0.061
2018	Q4	CM_MC2	70	21	211	<0.003	0.0059	0.00024	0.00027	0.00021	0.00024	0.077	0.075
2018	Q4	FR_FRCP1	17	18	397	<0.003	0.0053	0.00049	0.0005	0.00017	0.00021	0.019	0.019
Tests categorized as possible or likely adverse response for dry weight (2019)													
2019	Q3	CM_MC2	90	59	210	<0.003	0.013	0.00021	0.00021	0.00018	0.0002	0.068	0.069
2019	Q3	EV_HC1	88	67	192	<0.003	0.015	<0.0001	0.000063	0.00018	0.00019	0.06	0.059
2019	Q3	LC_DCDS	94	65	134	<0.003	0.022	0.00049	0.00052	0.0003	0.00034	0.2	0.21
2019	Q3	LC_LCDSSLCC	90	50	187	<0.003	0.0043	0.00019	0.0002	0.000083	0.000078	0.06	0.059
2019	Q4	EV_HC1	85	72	202	<0.003	0.021	<0.0001	0.000083	0.00016	0.00017	0.064	0.061
2019	Q4	FR_FRCP1	96	36	244	<0.003	0.0065	0.00033	0.00035	0.000083	0.00012	0.072	0.073
2019	Q4	GH_ERC	88	74	151	<0.003	0.004	<0.0001	<0.0001	0.000075	0.00012	0.061	0.063
Tests categorized as possible or likely adverse response for survival (2019)													
2019	Q4	LC_LC3	67	154	222	<0.003	0.0032	0.00033	0.00034	0.0001	0.00013	0.068	0.067
2019	Q4	LC_LC5	75	67	195	<0.003	0.0072	0.000065	0.00011	<0.0001	0.000065	0.094	0.09
2019	Q4	LC_LCDSSLCC	73	85	196	<0.003	0.0034	0.0002	0.00021	0.000063	0.00024	0.074	0.072
Tests categorized as possible or likely adverse response for dry weight and survival (2019)													
2019	Q3	LC_LC3	75	65	212	<0.003	0.0033	0.00028	0.0003	<0.0001	0.00008	0.052	0.052
2019	Q4	CM_MC2	79	54	221	<0.003	0.076	0.0002	0.0002	0.00019	0.00022	0.062	0.065
2019	Q4	LC_DCDS	35	51	150	<0.003	0.0034	0.00049	0.00051	0.00033	0.00035	0.25	0.26

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-3: *H. azteca* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	BERYLLIUM-D-mg/l	BERYLLIUM-T-mg/l	BISMUTH-D-mg/l	BISMUTH-T-mg/l	BORON-D-mg/l	BORON-T-mg/l	BROMIDE-D-mg/l	CADMIUM-D-mg/l	CADMIUM-T-mg/l	CALCIUM-T-mg/l	CARBON DISSOLVED ORGANIC-D-mg/l
Reference													
2015	Q1	Reference (FR_UFR1)	0.0001	0.0001	0.00032	0.00032	0.01	0.01	0.05	0.0000097	0.000011	52	1.3
2015	Q2	Reference (FR_UFR1)	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.0000057	0.0000086	37	1.8
2015	Q3	Reference (FR_UFR1)	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.0000081	0.000012	58	1.0
2015	Q4	Reference (FR_UFR1)	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.0000065	0.0000085	56	0.55
2016	Q1	Reference (FR_UFR1)	<0.0001	<0.0001	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000055	0.0000082	57	0.52
2016	Q2	Reference (FR_UFR1)	<0.00004	<0.00004	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000006	0.000012	38	1.7
2016	Q3	Reference (FR_UFR1)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000078	0.0000098	52	0.84
2016	Q4	Reference (FR_UFR1)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000064	0.0000092	47	1.2
2017	Q1	Reference (FR_UFR1)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000085	0.000011	49	0.72
2017	Q2	Reference (FR_UFR1)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000012	0.000018	33	3.0
2017	Q2	Reference (GH_ER2)	<0.00002	0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000081	0.000025	49	1.2
2017	Q3	Reference (CM_MC1)	<0.00002	<0.00002	<0.00005	<0.00005	0.016	0.015	<0.05	0.0000093	0.000012	39	1.3
2017	Q3	Reference (FR_UFR1)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000082	0.000012	50	1.1
2017	Q3	Reference (GH_ER2)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000073	0.0000088	45	0.78
2017	Q4	Reference (CM_MC1)	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.05	0.0000073	0.0000088	42	1.3
2017	Q4	Reference (FR_UFR1)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	0.052	0.0000068	0.00001	51	0.73
2017	Q4	Reference (GH_ER2)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000053	0.000008	43	0.67
2018	Q1	Reference (CM_MC1)	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.05	0.0000071	0.0000079	42	0.89
2018	Q1	Reference (FR_UFR1)	<0.00003	<0.00002	<0.0000625	<0.00005	<0.0125	<0.01	<0.05	0.0000083	0.00001	52	0.78
2018	Q1	Reference (GH_ER2)	<0.00002	<0.00002	<0.0000625	<0.00005	<0.01	<0.01	<0.05	0.0000058	0.000011	50	0.58
2018	Q2	Reference (CM_MC1)	<0.000025	0.000024	<0.0000625	<0.00005	0.013	0.011	<0.05	0.000011	0.000033	28	3.7
2018	Q2	Reference (FR_UFR1)	<0.00002	0.000022	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000096	0.000034	31	2.6
2018	Q2	Reference (GH_ER2)	<0.00002	0.000072	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000089	0.00015	51	1.9
2018	Q2	Reference (LC_SLC)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.0625	0.0000065	0.000025	36	2.5
2018	Q3	Reference (CM_MC1)	<0.00002	<0.00002	<0.00005	<0.00005	0.016	0.017	<0.05	0.000011	0.000011	41	1.2
2018	Q3	Reference (FR_UFR1)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000075	0.000011	48	1.1
2018	Q3	Reference (GH_ER2)	<0.00002	0.000032	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000064	0.000047	44	0.97
2018	Q3	Reference (LC_SLC)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.000015	49	0.98
2018	Q4	Reference (CM_MC1)	<0.00002	<0.00002	<0.00005	<0.00005	0.014	0.014	<0.05	0.0000072	0.0000087	41	0.72
2018	Q4	Reference (FR_UFR1)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000085	0.000012	52	0.59
2018	Q4	Reference (GH_ER2)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000065	0.0000082	45	0.56
2018	Q4	Reference (LC_SLC)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000094	0.00001	55	<0.5
2019	Q1	Reference (CM_MC1)	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.013	<0.05	0.0000084	0.0000081	43	0.41
2019	Q1	Reference (FR_UFR1)	<0.00002	0.000013	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.000019	50	1.1
2019	Q1	Reference (GH_ER2)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000051	0.0000069	49	0.5
2019	Q3	Reference (CM_MC1)	<0.00002	<0.00002	<0.00005	<0.00005	0.016	0.016	<0.05	0.000011	0.000013	42	0.89
2019	Q3	Reference (FR_UFR1)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000076	0.000011	50	0.94
2019	Q3	Reference (GH_ER2)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000006	0.000013	43	0.62
2019	Q3	Reference (LC_SLC)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000012	0.000017	48	0.67
2019	Q4	Reference (CM_MC1)	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.013	<0.05	0.0000089	0.000011	40	0.95
2019	Q4	Reference (FR_UFR1)	<0.00002	0.000014	<0.00005	<0.00005	<0.01	0.0088	<0.05	0.000014	0.000036	52	0.72
2019	Q4	Reference (GH_ER2)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000007	0.0000085	49	0.32
2019	Q4	Reference (LC_SLC)	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.00001	0.000014	55	0.69
Tests categorized as no adverse response													
2015	Q1	CM_MC2	0.0001	0.0001	0.00032	0.00032	0.019	0.021	0.06	0.00002	0.000034	82	1.6
2015	Q1	FR_FRCP1	0.0001	0.0001	0.00032	0.00032	0.013	0.013	0.27	0.000037	0.000074	148	1.2
2015	Q1	GH_FR1	0.0001	0.0001	0.00032	0.00032	0.01	0.01	0.1	0.000021	0.000027	113	1.5
2015	Q2	CM_MC2	0.0001	0.00011	0.00005	0.00005	0.014	0.017	0.05	0.000035	0.000088	60	1.5
2015	Q2	GH_FR1	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.075	0.00002	0.000028	80	1.4
2015	Q3	FR_FRCP1	0.0001	0.0001	0.00005	0.00005	0.013	0.014	0.25	0.000043	0.000052	123	0.92
2015	Q3	GH_FR1	0.0001	0.0001	0.00005	0.00005	0.01	0.011	0.067	0.000018	0.000023	92	0.89
2015	Q4	CM_MC2	0.0001	0.0001	0.00005	0.00005	0.024	0.027	0.25	0.000012	0.000019	107	1.2
2015	Q4	FR_FRCP1	0.0001	0.0001	0.00005	0.00005	0.011	0.012	0.25	0.000043	0.000058	141	0.78
2015	Q4	GH_FR1	0.0001	0.0001	0.00005	0.00005	0.01	0.012	0.25	0.000017	0.000019	107	0.66
2016	Q1	GH_FR1	<0.0001	<0.0001	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000016	0.000017	120	0.65
2016	Q3	CM_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.028	0.03	<0.25	0.0000066	0.0000092	116	1.0
2016	Q4	CM_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.019	0.021	<0.1	0.000027	0.000035	85	1.6
2016	Q4	GH_FR1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000016	0.00002	100	0.84
2017	Q1	GH_FR1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000015	0.000018	117	0.86
2017	Q2	FR_FRCP1	<0.00002	0.000023	<0.00005	<0.00005	<0.01	0.01	<0.05	0.000064	0.00011	87	2.2
2017	Q2	GH_FR1	<0.00002	0.000026	<0.00005	<0.00005	<0.01	<0.01	<0.15	0.00003	0.000065	80	2.6
2017	Q3	FR_FRCP1	<0.00002	<0.00002	<0.00005	<0.00005	0.011	0.011	<0.2	0.000022	0.00005	127	1.2
2017	Q3	GH_FR1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.15	0.00002	0.000019	98	0.95
2017	Q4	FR_FRCP1	<0.00002	<0.00002	<0.00005	<0.00005	0.011	0.011	0.3	0.000012	0.000056	150	1.0
2017	Q4	GH_FR1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	0.05	0.000017	0.000019	107	1.2
2018	Q1	CM_MC3	<0.00002	<0.00002	<0.00005	<0.00005	0.01	0.01	<0.05	0.000015	0.000015	70	0.7
2018	Q1	GH_FR1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.00002	0.000022	120	0.98
2018	Q2	CM_MC3	<0.000025	0.000058	<0.00005	<0.00005	0.011	0.012	<0.05	0.000041	0.000074	49	1.7
2018	Q2	FR_FRCP1	<0.00002	0.000045	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000064	0.00018	73	2.0
2018	Q2	GH_FR1	<0.00002	0.000041	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000032	0.00013	65	3.2
2018	Q2	LC_LCDSSLCC	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	0.01	<0.0625	0.00019	0.00024	66	2.0
2018	Q3	FR_FRCP1	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.012	0.2	0.000037	0.000056	121	1.3
2018	Q3	GH_FR1	<0.00002	<0.00002	<0.00005	<0.00005	0.01	<0.01	<0.1	0.000023	0.000026	97	1.0
2018	Q3	LC_LCDSSLCC	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.15	0.00026	0.00029	103	1.0
2018	Q4	CM_MC3	<0.00002	<0.00002	<0.00005	<0.00005	0.014	0.014	<0.05	0.000014	0.000015	76	0.73
2018	Q4	EV_HC1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000017	0.000019	88	0.65
2018	Q4	EV_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.014	0.015	0.6	0.000023	0.000028	88	0.73
2018	Q4	GH_ERC	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000006	0.0000079	51	0.53
2018	Q4	GH_FR1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.2	0.000019	0.00002	118	0.67
2019	Q1	CM_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.029	0.031	<0.1	0.000025	0.000026	145	0.5
2019	Q1	FR_FRABCH	<0.00002	<0.00002	<0.00005	<0.00005	0.0093	0.011	<0.1	0.000033	0.000036	150	0.6
2019	Q1	FR_FRCP1	<0.000015	<0.000015	<0.00038	<0.000038	0.0088	0.01	<0.13	0.000014	0.000027	352	1.6
2019	Q1	GH_FR1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.075	0.000019	0.000023	122	0.81
2019	Q1	RG_MIDAG	<0.00002	<0.00002	<0.00005	<0.00005	0.016	0.017	<0.05	0.000018	0.000023	96	0.52
2019	Q3	EV_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.01	0.012	0.034	0.000019	0.000034	69	1.0
2019	Q3	FR_FRABCH	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.013	<0.075	0.000033	0.000036	122	0.55
2019	Q3	FR_FRCP1	<0.00002	<0.00002	<0.00005	<0.00005	0.0095	0.011	<0.05	0.000041	0.000046	105	0.87
2019	Q3	GH_ERC	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000006	0.00001	47	0.53
2019	Q3	GH_FR1	<0.00002	<0.00002	<0.00005	<0.00005	0.0068	0.0063	<0.05	0.000017	0.000022	92	0.98
2019	Q3	LC_LC5	<0.00002	<0.00002	<0.00005	<0.00005	0.0068	0.008	<0.05	0.000017	0.000031	86	0.71
2019	Q3	RG_MIDAG	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.013	<0.05	0.000014	0.000018	71	0.67
2019	Q4	EV_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.009	0.01	0.042	0.000022	0.000025	72	0.67
2019	Q4	FR_FRABCH	<0.00002	<0.00002	<0.00005	<0.00005	0.0095	0.012	<0.1	0.000022	0.000041	137	0.5
2019	Q4	GH_FR1	<0.00002	<0.00002	<0.00005	<0.00005	0.0063	<0.01	<0.05	0.000015	0.000021	110	0.71
2019	Q4	RG_MIDAG	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.013	<0.05	0.000017	0.000022	94	0.53
Tests categorized as possible or likely adverse response for dry weight (2015 to 2018)													
2015	Q2	FR_FRCP1	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.000025	0.000039	73	1.4
2015	Q3	CM_MC2	0.0001	0.0001	0.00005	0.00005	0.027	0.027	0.21	0.0000091	0.000017	121	0.99
2016	Q1	CM_MC2	<0.0001	<0.0001	<0.00005	<0.00005	0.025	0.027	<0.25	0.000017	0.000016	118	0.7
2016	Q1	FR_FRCP1	<0.0001	<0.0001	<0.00005	<0.00005	0.011	0.012	<0.3125	0.000025	0.000055	187	0.76
2016	Q2	CM_MC2	<0.00004	0.000044	<0.00005	<0.00005	0.017	0.017	<0.05	0.000064	0.0001	68	1.5
2016	Q2	FR_FRCP1	<0.00004	<0.00004	<0.00005	0.000051	<0.01	<0.01	<0.05	0.000027	0.000045	75	1.5
2016	Q2	GH_FR1	<0.00004	<0.00004	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000022	0.000032	79	1.4
2016	Q3	FR_FRCP1	<0.00002	<0.00002	<0.00005	<0.00005	0.011	0.011	<0.25	0.000021	0.000049	114	0.96
2016	Q3	GH_FR1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	0.01	<0.25	0.000015	0.000019	95	0.82
2016	Q4	FR_FRCP1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000042	0.000051	106	1.0
2017	Q1	FR_FRCP1	<0.00002	<0.00002	<0.00005	<0.00005	0.01	0.011	<0.25	0.000043	0.000057	197	1.2
2017	Q4	CM_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.032	0.035	0.062	0.000012	0.000014	120	1.1
2018	Q1	FR_FRCP1	<0.00003	<0.000025	<0.0000625	<0.0000625	0.013	0.014	<0.05	0.000025	0.000087	193	1.3
2018	Q4	FR_FRABCH	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.012	<0.2	0.000041	0.000042	145	0.58
2018	Q4	LC_LCDSSLCC	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.012	<0.25	0.000094	0.000094	121	<0.5
Tests categorized as possible or likely adverse response for dry weight and survival (2015 to 2018)													
2017	Q1	CM_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.032	0.033	<0.2	0.000039	0.000044	132	0.68
2017	Q2	CM_MC2	<0.00002	0.000023	<0.00005	<0.00005	0.025	0.027	<0.05	0.000068	0.0001	88	1.8
2017	Q3	CM_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.032	0.032	<0.05	0.0000055	0.000021	110	1.2
2018	Q1	CM_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.032	0.036	<0.05	0.000023	0.000023	137	1.1
2018	Q2	CM_MC2	<0.000025	0.000069	<0.0000625	<0.00005	0.019	0.02	<0.05	0.000064	0.00014	66	2.0
2018	Q3	CM_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.052	0.058	<0.25	0.000009	0.000014	140	1.1
2018	Q3	CM_MC3	<0.00002	<0.00002	<0.00005	<0.00005	0.028	0.028	<0.1	0.000018	0.000019	89	0.98
2018	Q4	CM_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.029	0.028	<0.2	0.000019	0.000021	121	0.77
2018	Q4	FR_FRCP1	<0.000025	<0.000035	<0.0000625	<0.0000875	0.014	0.018	<0.375	0.0000086	0.000014	421	1.4
Tests categorized as possible or likely adverse response for dry weight (2019)													
2019	Q3	CM_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.029	0.029	<0.05	0.000012	0.000022	124	0.81
2019	Q3	EV_HC1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000012	0.000019	78	0.87
2019	Q3	LC_DCDS	<0.00002	<0.00002	<0.00005	<0.00005	0.0063	0.0095	<0.05	0.000029	0.000058	73	2.1
2019	Q3	LC_LCDSSLCC	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.013	<0.05	0.00015	0.00017	93	0.6
2019	Q4	EV_HC1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000014	0.000019	88	0.59
2019	Q4	FR_FRCP1	<0.00002	<0.00002	<0.00005	<0.00005	0.0093	0.012	<0.1	0.000032	0.000073	173	0.87
2019	Q4	GH_ERC	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000007	0.0000089	55	<0.5
Tests categorized as possible or likely adverse response for survival (2019)													
2019	Q4	LC_LC3	<0.00002	<0.00002	<0.00005	<0.00005	0.015	0.017	<0.1	0.00024	0.00025	151	0.46
2019	Q4	LC_LC5	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	0.0063	<0.05	0.000016	0.000021	97	0.62
2019	Q4	LC_LCDSSLCC	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.013	<0.05	0.0001	0.00012	116	0.4
Tests categorized as possible or likely adverse response for dry weight and survival (2019)													
2019	Q3	LC_LC3	<0.00002	<0.00002	<0.00005	<0.00005	0.017	0.016	<0.075	0.00031	0.00035	117	0.42
2019	Q4	CM_MC2	<0.00002	<0.00002	<0.00005	<0.00005	0.028	0.028	<0.1	0.000024	0.000031	132	0.78
2019	Q4	LC_DCDS	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.00012	0.00013	100	1.8

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-3: *H. azteca* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	CHLORIDE-D-mg/l	CHROMIUM-D-mg/l	CHROMIUM-T-mg/l	COBALT-D-mg/l	COBALT-T-mg/l	CONDUCTIVITY LAB-N-us/cm	COPPER-D-mg/l	COPPER-T-mg/l	FLUORIDE-D-mg/l	Hardness Total or Dissolved CaCO3-N-mg/l	IRON-D-mg/l
Reference													
2015	Q1	Reference (FR_UFR1)	1.0	0.00013	0.00019	0.0001	0.0001	328	0.0005	0.0005	0.14	180	0.01
2015	Q2	Reference (FR_UFR1)	1.0	0.00011	0.00026	0.0001	0.0001	234	0.0005	0.0005	0.15	131	0.01
2015	Q3	Reference (FR_UFR1)	1.0	0.0001	0.00014	0.0001	0.0001	348	0.0005	0.0005	0.15	199	0.01
2015	Q4	Reference (FR_UFR1)	1.0	0.00012	0.00018	0.0001	0.0001	356	0.0005	0.0005	0.15	193	0.01
2016	Q1	Reference (FR_UFR1)	0.92	0.00011	0.00018	<0.0001	<0.0001	356	<0.0005	<0.0005	0.15	195	<0.01
2016	Q2	Reference (FR_UFR1)	0.1	0.00013	0.0002	<0.0001	<0.0001	243	<0.0005	<0.0005	0.16	133	<0.01
2016	Q3	Reference (FR_UFR1)	0.13	0.0001	0.00017	<0.0001	<0.0001	341	<0.0005	<0.0005	0.17	181	<0.01
2016	Q4	Reference (FR_UFR1)	0.19	0.00011	0.0002	<0.0001	<0.0001	319	<0.0005	<0.0005	0.16	171	<0.01
2017	Q1	Reference (FR_UFR1)	<0.5	0.0001	0.00013	<0.0001	<0.0001	338	<0.0002	<0.0005	0.14	182	<0.01
2017	Q2	Reference (FR_UFR1)	<0.5	0.00013	0.00046	<0.0001	<0.0001	247	0.00031	0.00055	0.11	126	0.023
2017	Q2	Reference (GH_ER2)	0.42	0.0002	0.00055	<0.0001	0.00011	307	<0.0005	0.00051	0.15	175	<0.01
2017	Q3	Reference (CM_MC1)	<0.5	0.00013	0.00025	<0.0001	<0.0001	269	<0.000425	<0.0005	0.055	146	<0.01
2017	Q3	Reference (FR_UFR1)	0.21	0.00011	0.00021	<0.0001	<0.0001	333	<0.000425	<0.0005	0.15	178	<0.01
2017	Q3	Reference (GH_ER2)	0.32	0.00022	0.00024	<0.0001	<0.0001	282	<0.000425	<0.0005	0.16	155	<0.01
2017	Q4	Reference (CM_MC1)	0.51	0.00017	0.00019	<0.0001	<0.0001	273	<0.0005	<0.0005	0.052	143	<0.01
2017	Q4	Reference (FR_UFR1)	<0.5	0.0001	0.00014	<0.0001	<0.0001	333	<0.0005	<0.0005	0.11	183	<0.01
2017	Q4	Reference (GH_ER2)	<0.5	0.00025	0.00029	<0.0001	<0.0001	280	<0.0005	<0.0005	0.13	156	<0.01
2018	Q1	Reference (CM_MC1)	0.56	0.00015	0.0002	<0.0001	<0.0001	307	<0.0005	<0.0005	0.057	153	<0.01
2018	Q1	Reference (FR_UFR1)	<0.5	<0.000125	0.00014	<0.000125	<0.0001	357	0.00053	<0.0005	0.12	192	<0.0125
2018	Q1	Reference (GH_ER2)	0.27	0.00021	0.00027	<0.0001	<0.0001	329	<0.0005	<0.0005	0.16	170	<0.01
2018	Q2	Reference (CM_MC1)	<0.5	0.00017	0.00057	<0.000125	0.00015	193	<0.0005	0.00083	0.059	101	0.025
2018	Q2	Reference (FR_UFR1)	<0.5	0.00011	0.00048	<0.0001	0.00015	207	<0.0005	0.0013	0.12	112	0.011
2018	Q2	Reference (GH_ER2)	0.51	0.00016	0.0022	<0.0001	0.00053	279	<0.0005	0.0017	0.15	150	<0.01
2018	Q2	Reference (LC_SLC)	<0.5	0.00012	0.0003	<0.0001	<0.0001	243	<0.0005	<0.0005	0.21	134	<0.01
2018	Q3	Reference (CM_MC1)	0.43	0.00018	0.00024	<0.0001	<0.0001	277	<0.0005	0.00051	0.079	154	<0.01
2018	Q3	Reference (FR_UFR1)	0.31	0.00011	0.00011	<0.0001	<0.0001	324	<0.0005	<0.0005	0.17	184	<0.01
2018	Q3	Reference (GH_ER2)	0.4	0.0002	0.00073	<0.0001	0.0002	262	<0.0005	0.00069	0.17	151	<0.01
2018	Q3	Reference (LC_SLC)	0.44	0.00013	0.00024	<0.0001	<0.0001	347	<0.0005	<0.0005	0.34	197	<0.01
2018	Q4	Reference (CM_MC1)	0.58	0.00019	0.00019	<0.0001	<0.0001	287	<0.0005	<0.0005	0.072	153	<0.01
2018	Q4	Reference (FR_UFR1)	<0.5	0.00012	0.00038	<0.0001	<0.0001	349	<0.0005	<0.0005	0.14	194	<0.01
2018	Q4	Reference (GH_ER2)	<0.5	0.00025	0.00036	<0.0001	<0.0001	304	<0.0005	0.0005	0.16	169	<0.01
2018	Q4	Reference (LC_SLC)	0.64	0.00014	0.00029	<0.0001	<0.0001	399	<0.0005	<0.0005	0.37	224	<0.01
2019	Q1	Reference (CM_MC1)	0.68	0.00017	0.00024	<0.0001	<0.0001	305	<0.0005	<0.0005	0.061	154	<0.01
2019	Q1	Reference (FR_UFR1)	<0.5	0.00014	0.00042	<0.0001	0.000085	364	<0.0005	0.00039	0.11	184	0.02
2019	Q1	Reference (GH_ER2)	<0.5	0.00024	0.0003	<0.0001	<0.0001	305	<0.0005	<0.0005	0.14	169	<0.01
2019	Q3	Reference (CM_MC1)	<0.5	0.0002	0.00023	<0.0001	<0.0001	285	<0.0005	<0.0005	0.077	150	<0.01
2019	Q3	Reference (FR_UFR1)	<0.5	0.00013	0.00013	<0.0001	<0.0001	318	<0.0005	<0.0005	0.16	180	<0.01
2019	Q3	Reference (GH_ER2)	<0.5	0.0002	0.00026	<0.0001	<0.0001	277	<0.0005	<0.0005	0.16	152	<0.01
2019	Q3	Reference (LC_SLC)	<0.5	0.00015	0.00021	<0.0001	<0.0001	338	<0.0005	<0.0005	0.31	178	<0.01
2019	Q4	Reference (CM_MC1)	<0.5	0.00021	0.00024	<0.0001	<0.0001	263	0.00033	<0.0005	0.063	149	<0.01
2019	Q4	Reference (FR_UFR1)	<0.5	0.00011	0.00025	<0.0001	0.000083	325	0.0002	0.00049	0.14	186	<0.01
2019	Q4	Reference (GH_ER2)	<0.5	0.00026	0.00028	<0.0001	<0.0001	292	0.00035	<0.0005	0.14	160	<0.01
2019	Q4	Reference (LC_SLC)	0.41	0.00015	0.00019	<0.0001	<0.0001	359	0.00027	<0.0005	0.32	197	<0.01
Tests categorized as no adverse response													
2015	Q1	CM_MC2	2.4	0.00015	0.00046	0.00047	0.00072	599	0.0005	0.00062	0.11	333	0.01
2015	Q1	FR_FRCP1	2.4	0.00011	0.00017	0.00012	0.00014	1113	0.0005	0.0005	0.18	679	0.01
2015	Q1	GH_FR1	2.7	0.00011	0.00022	0.00011	0.00017	823	0.0005	0.00051	0.15	479	0.01
2015	Q2	CM_MC2	1.4	0.00023	0.001	0.0003	0.00083	457	0.0005	0.0013	0.099	240	0.015
2015	Q2	GH_FR1	1.6	0.00013	0.00024	0.0001	0.0001	581	0.0005	0.0005	0.17	329	0.01
2015	Q3	FR_FRCP1	1.6	0.0001	0.00014	0.0001	0.0001	925	0.0005	0.0005	0.2	541	0.01
2015	Q3	GH_FR1	1.5	0.00011	0.0002	0.0001	0.0001	686	0.0005	0.0005	0.18	385	0.01
2015	Q4	CM_MC2	3.4	0.00016	0.00026	0.00051	0.0006	821	0.0005	0.00059	0.11	456	0.01
2015	Q4	FR_FRCP1	2.4	0.00012	0.00016	0.0001	0.0001	1100	0.0005	0.0005	0.18	650	0.01
2015	Q4	GH_FR1	2.0	0.00012	0.00017	0.0001	0.0001	783	0.0005	0.0005	0.16	445	0.01
2016	Q1	GH_FR1	2.6	0.00012	0.00015	<0.0001	<0.0001	891	<0.0005	<0.0005	0.17	505	<0.01
2016	Q3	CM_MC2	3.4	0.00014	0.00017	0.00034	0.00043	915	<0.0005	<0.0005	0.12	504	<0.01
2016	Q4	CM_MC2	2.0	0.00016	0.00033	0.00076	0.00099	669	<0.0005	<0.0005	0.11	358	<0.01
2016	Q4	GH_FR1	1.6	0.00012	0.00016	<0.0001	<0.0001	758	<0.0005	<0.0005	0.17	431	<0.01
2017	Q1	GH_FR1	1.9	0.0001	0.00013	<0.0001	<0.0001	869	<0.0005	<0.0005	0.14	499	<0.01
2017	Q2	FR_FRCP1	0.67	0.0001	0.00059	<0.0001	0.00019	724	0.00028	0.00076	0.15	390	0.012
2017	Q2	GH_FR1	1.5	<0.0001	0.00072	<0.0001	0.00025	630	<0.0005	0.00089	0.15	366	0.011
2017	Q3	FR_FRCP1	1.4	0.00011	0.00017	<0.0001	<0.0001	993	<0.000425	<0.0005	0.19	584	<0.01
2017	Q3	GH_FR1	1.4	0.00011	0.00015	<0.0001	<0.0001	767	<0.000425	<0.0005	0.17	434	<0.01
2017	Q4	FR_FRCP1	<2.5	<0.0001	0.00015	<0.0001	0.00011	1153	<0.0005	<0.0005	0.11	734	0.01
2017	Q4	GH_FR1	1.3	0.00012	0.00015	<0.0001	<0.0001	830	<0.0005	<0.0005	0.13	505	<0.01
2018	Q1	CM_MC3	1.9	0.00018	0.00027	<0.0001	<0.0001	512	<0.0005	<0.0005	0.19	260	<0.01
2018	Q1	GH_FR1	2.5	<0.0001	0.00027	<0.0001	<0.0001	938	0.00051	<0.0005	0.16	526	<0.01
2018	Q2	CM_MC3	1.0	0.00014	0.00095	0.00066	0.0014	364	0.00098	0.0026	0.16	194	0.011
2018	Q2	FR_FRCP1	0.54	0.00011	0.00093	<0.0001	0.0005	531	<0.0005	0.0014	0.18	287	<0.01
2018	Q2	GH_FR1	1.0	<0.0001	0.00094	<0.0001	0.00049	522	0.00056	0.0015	0.17	279	0.013
2018	Q2	LC_LCDSSLCC	2.2	0.00012	0.0003	<0.0001	0.00014	541	<0.0005	0.00059	0.23	300	<0.01
2018	Q3	FR_FRCP1	1.7	<0.0001	0.00014	0.00011	0.00012	964	<0.0005	<0.0005	0.21	601	<0.01
2018	Q3	GH_FR1	1.5	0.0001	0.00017	<0.0001	<0.0001	768	<0.0005	<0.0005	0.18	464	<0.01
2018	Q3	LC_LCDSSLCC	3.4	0.00012	0.00018	<0.0001	<0.0001	811	<0.0005	<0.0005	0.25	444	<0.01
2018	Q4	CM_MC3	1.9	0.00023	0.00025	0.0001	0.00013	556	<0.0005	<0.0005	0.21	295	<0.01
2018	Q4	EV_HC1	1.3	0.00017	0.00021	<0.0001	<0.0001	745	<0.0005	<0.0005	0.22	431	<0.01
2018	Q4	EV_MC2	5.2	0.00015	0.00015	<0.0001	<0.0001	698	<0.0005	<0.0005	0.15	400	<0.01
2018	Q4	GH_ERC	<0.5	0.00024	0.00026	<0.0001	<0.0001	330	<0.0005	0.0005	0.16	184	<0.01
2018	Q4	GH_FR1	2.3	0.00016	0.00028	<0.0001	<0.0001	909	<0.0005	0.00051	0.17	542	<0.01
2019	Q1	CM_MC2	6.1	0.00015	0.00019	0.0009	0.001	1120	<0.0005	<0.0005	0.088	616	<0.01
2019	Q1	FR_FRABCH	1.5	0.00011	0.00019	0.00025	0.00024	1170	<0.0005	<0.0005	0.083	650	<0.01
2019	Q1	FR_FRCP1	5.5	<0.000075	0.00029	0.00010	0.00011	2863	<0.0005	<0.00038	0.078	2107	<0.0075
2019	Q1	GH_FR1	1.7	0.000083	0.00013	0.000075	0.000085	947	<0.0005	<0.0005	0.14	536	<0.01
2019	Q1	RG_MIDAG	3.1	0.00018	0.00021	<0.0001	0.0002	655	<0.0005	<0.0005	0.14	394	<0.01
2019	Q3	EV_MC2	2.7	0.00014	0.00022	<0.0001	0.00007	516	<0.0005	<0.0005	0.16	283	<0.01
2019	Q3	FR_FRABCH	1.2	0.00012	0.00017	0.00013	0.00014	909	<0.0005	0.00054	0.19	527	-
2019	Q3	FR_FRCP1	0.85	0.000065	0.00013	<0.0001	<0.0001	774	<0.0005	<0.0005	0.21	448	<0.01
2019	Q3	GH_ERC	<0.5	0.00021	0.00026	<0.0001	<0.0001	304	<0.0005	<0.0005	0.16	164	<0.01
2019	Q3	GH_FR1	1.3	0.000098	0.00025	0.000063	<0.0001	736	<0.0005	<0.0005	0.17	417	<0.01
2019	Q3	LC_LC5	2.8	0.00012	0.00022	<0.0001	<0.0001	660	<0.0005	<0.0005	0.21	354	<0.01
2019	Q3	RG_MIDAG	1.0	0.00019	0.00025	0.000065	0.00017	529	<0.0005	<0.0005	0.21	282	<0.01
2019	Q4	EV_MC2	3.7	0.00018	0.00016	<0.0001	<0.0001	524	0.00016	<0.0005	0.14	299	<0.01
2019	Q4	FR_FRABCH	1.3	0.00012	0.00014	0.00015	0.00018	968	0.00027	0.00051	0.11	587	-
2019	Q4	GH_FR1	1.6	0.00014	0.00015	<0.0001	0.0001	789	0.00019	0.00047	0.13	465	0.01
2019	Q4	RG_MIDAG	2.0	0.00019	0.00025	0.00015	0.00025	648	0.00031	<0.0005	0.18	371	<0.01
Tests categorized as possible or likely adverse response for dry weight (2015 to 2018)													
2015	Q2	FR_FRCP1	1.1	0.00011	0.00019	0.0001	0.00011	568	0.0005	0.0005	0.2	308	0.01
2015	Q3	CM_MC2	2.8	0.00014	0.00017	0.00018	0.00021	939	0.0005	0.0005	0.12	534	0.01
2016	Q1	CM_MC2	5.0	0.00016	0.00026	0.00091	0.00098	916	0.00052	<0.0005	0.13	493	<0.01
2016	Q1	FR_FRCP1	3.0	0.0001	0.0011	<0.0001	<0.0001	1450	<0.0005	0.00052	0.18	889	<0.01
2016	Q2	CM_MC2	1.2	0.00017	0.0006	0.0021	0.0029	537	<0.0005	0.0007	0.1	282	<0.01
2016	Q2	FR_FRCP1	0.51	0.00011	0.00024	<0.0001	0.0001	569	<0.0005	0.00051	0.21	311	<0.01
2016	Q2	GH_FR1	0.96	0.00011	0.00022	<0.0001	<0.0001	598	<0.0005	<0.0005	0.18	332	<0.01
2016	Q3	FR_FRCP1	1.6	<0.0001	0.00013	0.0001	0.00011	907	<0.0005	<0.0005	0.21	501	<0.01
2016	Q3	GH_FR1	1.6	0.00011	0.00018	<0.0001	<0.0001	740	<0.0005	<0.0005	0.19	399	<0.01
2016	Q4	FR_FRCP1	1.4	<0.0001	0.00015	<0.0001	<0.0001	850	<0.0005	<0.0005	0.21	478	<0.01
2017	Q1	FR_FRCP1	2.8	<0.0001	0.00027	<0.0001	<0.0001	1585	<0.0002	<0.0005	0.14	1008	<0.01
2017	Q4	CM_MC2	4.5	0.00012	0.00018	0.00098	0.0011	900	<0.0005	<0.0005	0.088	526	<0.01
2018	Q1	FR_FRCP1	2.5	<0.000125	0.00029	0.00015	0.00015	1465	0.0005	<0.000625	0.14	868	<0.0125
2018	Q4	FR_FRABCH	2.3	0.00012	0.00027	0.00014	0.00015	1100	<0.0005	0.00051	0.15	667	<0.01
2018	Q4	LC_LCDSSLCC	15	0.00012	0.00025	<0.0001	<0.0001	944	<0.0005	<0.0005	0.24	556	<0.01
Tests categorized as possible or likely adverse response for dry weight and survival (2015 to 2018)													
2017	Q1	CM_MC2	3.7	0.00013	0.00022	0.0041	0.0042	1016	<0.000425	<0.0005	0.13	553	<0.01
2017	Q2	CM_MC2	1.8	0.00013	0.00052	0.0032	0.004	696	0.00022	0.00068	0.1	348	<0.01
2017	Q3	CM_MC2	1.4	0.00015	0.00025	0.0016	0.003	873	<0.000425	0.00053	0.11	487	<0.01
2018	Q1	CM_MC2	5.9	0.00011	0.00023	0.001	0.0012	1081	<0.0005	<0.0005	0.11	586	<0.01
2018	Q2	CM_MC2	2.8	0.00014	0.0015	0.0014	0.0033	539	<0.0005	0.0017	0.11	287	0.013
2018	Q3	CM_MC2	3.2	0.00013	0.00016	0.0057	0.0064	1060	<0.0005	<0.0005	0.17	607	<0.01
2018	Q3	CM_MC3	1.6	0.00019	0.00023	0.0015	0.0016	696	<0.0005	<0.0005	0.22	366	<0.01
2018	Q4	CM_MC2	3.7	0.00021	0.00019	0.00055	0.00064	968	<0.0005	<0.0005	0.14	545	<0.01
2018	Q4	FR_FRCP1	6.7	<0.000125	0.00038	<0.000125	<0.000175	3348	0.00051	<0.000875	0.17	2580	<0.0125
Tests categorized as possible or likely adverse response for dry weight (2019)													
2019	Q3	CM_MC2	2.2	0.00016	0.00019	0.00056	0.001	954	<0.0005	<0.0005	0.12	549	<0.01
2019	Q3	EV_HC1	1.1	0.00016	0.00019	<0.0001	<0.0001	662	<0.0005	<0.0005	0.22	385	<0.01
2019	Q3	LC_DCDS	7.5	<0.0001	0.00015	0.00012	0.00015	582	<0.0005	0.00032	0.098	296	<0.01
2019	Q3	LC_LCDSSLCC	8.9	0.00013	0.0002	<0.0001	<0.0001	727	<0.0005	<0.0005	0.24	392	<0.01
2019	Q4	EV_HC1	1.4	0.00016	0.0002	<0.0001	<0.0001	701	0.00013	<0.0005	0.2	416	<0.01
2019	Q4	FR_FRCP1	1.5	0.000068	0.00013	0.0001	0.00014	1258	0.00018	<0.0005	0.18	815	<0.01
2019	Q4	GH_ERC	<0.5	0.00023	0.00026	<0.0001	<0.0001	336	0.00023	<0.0005	0.14	182	<0.01
Tests categorized as possible or likely adverse response for survival (2019)													
2019	Q4	LC_LC3	14	0.00013	0.00015	0.000085	0.000093	1093	0.00051	0.00035	0.17	659	<0.01
2019	Q4	LC_LC5	3.8	0.00013	0.00016	<0.0001	<0.0001	712	0.00024	<0.0005	0.17	407	<0.01
2019	Q4	LC_LCDSSLCC	9.3	0.00015	0.0002	<0.0001	<0.0001	846	0.00042	0.00045	0.19	489	<0.01
Tests categorized as possible or likely adverse response for dry weight and survival (2019)													
2019	Q3	LC_LC3	17	0.00008	0.00022	0.000088	0.00015	953	<0.0005	<0.0005	0.21	525	<0.01
2019	Q4	CM_MC2	3.2	0.00017	0.00033	0.0015	0.0022	969	0.00027	<0.0005	0.11	598	<0.01
2019	Q4	LC_DCDS	12	0.000095	0.000065	0.000093	0.00011	729	0.0003	<0.0005	0.085	403	<0.01

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-3: *H. azteca* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	IRON-T-mg/l	LEAD-D-mg/l	LEAD-T-mg/l	LITHIUM-D-mg/l	LITHIUM-T-mg/l	MAGNESIUM-T-mg/l	MANGANESE-D-mg/l	MANGANESE-T-mg/l	MERCURY-D-mg/l	MERCURY-T-mg/l	MOLYBDENUM-D-mg/l
Reference													
2015	Q1	Reference (FR_UFR1)	0.017	0.00005	0.00005	0.0013	0.0013	13	0.00062	0.001	0.000009	0.000009	0.00057
2015	Q2	Reference (FR_UFR1)	0.036	0.00005	0.00005	0.0011	0.0012	9.2	0.00069	0.0022	0.000005	0.000005	0.00056
2015	Q3	Reference (FR_UFR1)	0.011	0.00005	0.00005	0.0018	0.0021	14	0.00068	0.0013	0.000005	0.000005	0.00064
2015	Q4	Reference (FR_UFR1)	0.01	0.00005	0.00005	0.0014	0.0013	14	0.00016	0.00031	0.000005	0.000005	0.00061
2016	Q1	Reference (FR_UFR1)	<0.01	<0.00005	<0.00005	0.0016	0.0017	14	0.0002	0.00036	<0.000005	<0.0000005	0.00057
2016	Q2	Reference (FR_UFR1)	0.043	<0.00005	0.000053	0.0012	0.0013	10.0	0.00032	0.0016	<0.000005	0.00000095	0.00063
2016	Q3	Reference (FR_UFR1)	0.011	<0.00005	<0.00005	0.0018	0.0016	14	0.00019	0.00071	<0.000005	<0.0000005	0.00063
2016	Q4	Reference (FR_UFR1)	0.019	<0.00005	<0.00005	0.0013	0.0016	12	0.00017	0.00056	<0.000005	0.00000058	0.00057
2017	Q1	Reference (FR_UFR1)	<0.01	<0.00005	<0.00005	0.0016	0.0015	15	<0.0001	0.00027	<0.000005	<0.0000005	0.0006
2017	Q2	Reference (FR_UFR1)	0.082	<0.00005	0.000065	0.0011	0.0012	9.4	0.00063	0.0026	<0.000005	0.0000022	0.00049
2017	Q2	Reference (GH_ER2)	0.15	<0.00005	0.00011	0.0017	0.0019	12	0.00078	0.0088	<0.000005	0.0000011	0.00092
2017	Q3	Reference (CM_MC1)	0.016	<0.00005	<0.00005	0.0048	0.0045	11	0.00011	0.00054	<0.000005	0.00000055	0.00089
2017	Q3	Reference (FR_UFR1)	0.01	<0.00005	<0.00005	0.0018	0.0017	13	0.00021	0.00075	<0.000005	<0.0000005	0.00063
2017	Q3	Reference (GH_ER2)	0.02	<0.00005	<0.00005	0.0016	0.0018	10	0.0021	0.0037	<0.000005	0.00000053	0.00099
2017	Q4	Reference (CM_MC1)	<0.01	<0.00005	<0.00005	0.0046	0.0048	11	0.00013	0.00024	<0.000005	0.00000054	0.00085
2017	Q4	Reference (FR_UFR1)	<0.01	<0.00005	<0.00005	0.0017	0.0017	14	0.00013	0.0005	<0.000005	<0.0000005	0.00057
2017	Q4	Reference (GH_ER2)	0.011	<0.00005	<0.00005	0.0018	0.0017	11	0.00045	0.0016	<0.000005	<0.0000005	0.001
2018	Q1	Reference (CM_MC1)	<0.01	<0.00005	<0.00005	0.0045	0.0048	11	<0.0001	0.00017	<0.000005	<0.0000005	0.00088
2018	Q1	Reference (FR_UFR1)	0.02	<0.0000625	<0.00005	0.0016	0.0015	14	0.00016	0.00053	<0.000005	0.00000052	0.00057
2018	Q1	Reference (GH_ER2)	<0.01	<0.00005	<0.00005	0.0015	0.0016	12	0.0014	0.0015	<0.000005	<0.0000005	0.00094
2018	Q2	Reference (CM_MC1)	0.34	<0.0000625	0.00025	0.0027	0.0031	7.6	0.00098	0.0087	0.0000052	0.0000027	0.00057
2018	Q2	Reference (FR_UFR1)	0.25	<0.00005	0.00018	0.0011	0.0014	8.6	0.00057	0.011	<0.000005	0.0000025	0.00055
2018	Q2	Reference (GH_ER2)	1.3	<0.00005	0.00085	0.0016	0.0026	12	0.00069	0.067	<0.000005	0.0000043	0.00091
2018	Q2	Reference (LC_SLC)	0.07	<0.00005	0.000066	0.0017	0.0019	9.6	0.00016	0.0026	<0.000005	0.0000012	0.00057
2018	Q3	Reference (CM_MC1)	0.013	<0.00005	<0.00005	0.0049	0.0051	11	0.00019	0.0007	<0.000005	<0.0000005	0.00095
2018	Q3	Reference (FR_UFR1)	<0.01	<0.00005	<0.00005	0.0018	0.0018	13	0.00025	0.00061	<0.000005	<0.0000005	0.00064
2018	Q3	Reference (GH_ER2)	0.35	<0.00005	0.00029	0.0018	0.002	10	0.00052	0.022	<0.000005	0.00000079	0.001
2018	Q3	Reference (LC_SLC)	0.01	<0.00005	<0.00005	0.0032	0.0033	15	<0.0001	0.00034	<0.000005	<0.0000005	0.0013
2018	Q4	Reference (CM_MC1)	<0.01	<0.00005	<0.00005	0.0044	0.0043	11	0.00034	0.00042	<0.000005	<0.0000005	0.00087
2018	Q4	Reference (FR_UFR1)	0.011	<0.00005	<0.00005	0.0016	0.0017	14	<0.0001	0.00037	<0.000005	<0.0000005	0.0006
2018	Q4	Reference (GH_ER2)	0.013	<0.00005	<0.00005	0.0017	0.0018	12	0.00035	0.0014	<0.000005	<0.0000005	0.0011
2018	Q4	Reference (LC_SLC)	<0.01	<0.00005	<0.00005	0.0042	0.004	19	<0.0001	0.0001	<0.000005	<0.0000005	0.0014
2019	Q1	Reference (CM_MC1)	<0.01	<0.00005	<0.00005	0.0044	0.0045	12	0.00015	0.00022	<0.000005	<0.0000005	0.00088
2019	Q1	Reference (FR_UFR1)	0.079	<0.00005	0.000075	0.0016	0.0018	13	0.00016	0.0019	<0.000005	0.0000012	0.00051
2019	Q1	Reference (GH_ER2)	0.0065	<0.00005	<0.00005	0.0017	0.0018	12	0.00041	0.00088	<0.000005	0.00000032	0.0011
2019	Q3	Reference (CM_MC1)	<0.01	<0.00005	<0.00005	0.0048	0.0048	12	0.00019	0.00053	<0.000005	0.00000032	0.00097
2019	Q3	Reference (FR_UFR1)	<0.01	<0.00005	<0.00005	0.0017	0.0017	14	0.00023	0.0006	<0.000005	0.00000036	0.00064
2019	Q3	Reference (GH_ER2)	0.026	<0.00005	<0.00005	0.0017	0.0017	10	0.00063	0.0035	<0.000005	<0.0000005	0.00095
2019	Q3	Reference (LC_SLC)	<0.01	<0.00005	<0.00005	0.0028	0.003	15	<0.0001	0.00016	<0.000005	<0.0000005	0.0012
2019	Q4	Reference (CM_MC1)	<0.01	<0.00005	<0.00005	0.0044	0.0045	11	0.000075	0.0002	<0.000005	<0.0000005	0.00085
2019	Q4	Reference (FR_UFR1)	0.084	<0.00005	0.00012	0.0016	0.0017	14	0.000068	0.0052	<0.000005	0.0000007	0.00056
2019	Q4	Reference (GH_ER2)	0.018	<0.00005	<0.00005	0.0017	0.0019	12	0.00069	0.0016	<0.000005	<0.0000005	0.0010
2019	Q4	Reference (LC_SLC)	0.01	<0.00005	<0.00005	0.0036	0.0039	17	<0.0001	0.00063	<0.000005	<0.0000005	0.0013
Tests categorized as no adverse response													
2015	Q1	CM_MC2	0.21	0.00005	0.00014	0.0081	0.0084	33	0.0038	0.011	0.000009	0.000009	0.00092
2015	Q1	FR_FRCP1	0.035	0.00005	0.000053	0.043	0.043	78	0.0069	0.01	0.000009	0.000009	0.002
2015	Q1	GH_FR1	0.065	0.00005	0.000063	0.014	0.014	49	0.0023	0.0043	0.000009	0.000009	0.0012
2015	Q2	CM_MC2	0.85	0.00005	0.00058	0.0062	0.0069	23	0.0027	0.028	0.000005	0.000007	0.00077
2015	Q2	GH_FR1	0.077	0.00005	0.000071	0.015	0.015	32	0.00099	0.0047	0.000005	0.000005	0.00099
2015	Q3	FR_FRCP1	0.019	0.00005	0.00005	0.035	0.036	59	0.0052	0.0071	0.000005	0.000005	0.0015
2015	Q3	GH_FR1	0.052	0.00005	0.000062	0.015	0.015	38	0.002	0.0057	0.000005	0.000005	0.00099
2015	Q4	CM_MC2	0.053	0.00005	0.000063	0.012	0.012	46	0.0039	0.0065	0.000005	0.0000051	0.0011
2015	Q4	FR_FRCP1	0.021	0.00005	0.00005	0.04	0.041	74	0.0076	0.0089	0.000005	0.000005	0.0015
2015	Q4	GH_FR1	0.011	0.00005	0.00005	0.016	0.016	45	0.0012	0.0016	0.000005	0.000005	0.00094
2016	Q1	GH_FR1	0.013	<0.00005	<0.00005	0.015	0.015	52	0.0012	0.0016	<0.000005	<0.000001625	0.00089
2016	Q3	CM_MC2	0.012	<0.00005	<0.00005	0.017	0.018	55	0.00064	0.0015	<0.000005	<0.0000005	0.0012
2016	Q4	CM_MC2	0.077	<0.00005	0.000066	0.011	0.011	37	0.0073	0.011	<0.000005	0.00000078	0.00089
2016	Q4	GH_FR1	0.018	<0.00005	<0.00005	0.017	0.018	46	0.00096	0.0017	<0.000005	<0.000001625	0.0011
2017	Q1	GH_FR1	0.011	<0.00005	<0.00005	0.017	0.017	49	0.0012	0.0015	<0.000005	<0.0000005	0.00081
2017	Q2	FR_FRCP1	0.25	<0.00005	0.00019	0.03	0.029	40	0.0044	0.014	<0.000005	0.0000021	0.0013
2017	Q2	GH_FR1	0.34	<0.00005	0.00026	0.015	0.014	37	0.0018	0.011	<0.000005	0.0000053	0.0011
2017	Q3	FR_FRCP1	0.021	<0.00005	<0.00005	0.037	0.034	68	0.0051	0.0088	<0.000005	<0.0000005	0.0013
2017	Q3	GH_FR1	0.012	<0.00005	<0.00005	0.019	0.019	45	0.001	0.0022	<0.000005	0.0000005	0.00097
2017	Q4	FR_FRCP1	0.055	<0.00005	0.000059	0.041	0.041	91	0.0072	0.013	<0.000005	<0.0000005	0.0013
2017	Q4	GH_FR1	0.012	<0.00005	<0.00005	0.017	0.017	60	0.0011	0.0019	<0.000005	<0.0000005	0.0011
2018	Q1	CM_MC3	0.01	<0.00005	<0.00005	0.0051	0.0053	21	0.00059	0.00095	<0.000005	<0.0000005	0.00073
2018	Q1	GH_FR1	0.015	<0.00005	<0.00005	0.017	0.017	54	0.00083	0.0017	<0.00001	<0.0000005	0.0017
2018	Q2	CM_MC3	0.74	<0.00005	0.00048	0.0049	0.0056	16	0.0083	0.026	<0.000005	0.0000019	0.00067
2018	Q2	FR_FRCP1	0.82	<0.00005	0.00059	0.018	0.019	30	0.0014	0.045	<0.000005	0.0000039	0.0012
2018	Q2	GH_FR1	0.74	<0.00005	0.00059	0.012	0.012	29	0.0008	0.03	<0.000005	0.0000053	0.0013
2018	Q2	LC_LCDSSLCC	0.054	<0.00005	0.000064	0.026	0.025	28	0.0003	0.0032	<0.000005	0.0000012	0.0014
2018	Q3	FR_FRCP1	0.036	<0.00005	<0.00005	0.034	0.033	68	0.0057	0.008	<0.000005	<0.0000005	0.0016
2018	Q3	GH_FR1	0.029	0.00011	0.00018	0.02	0.02	47	0.0012	0.0029	<0.000005	<0.0000005	0.0013
2018	Q3	LC_LCDSSLCC	<0.01	<0.00005	<0.00005	0.036	0.038	46	0.00017	0.0004	<0.000005	<0.0000005	0.0015
2018	Q4	CM_MC3	0.013	<0.00005	<0.00005	0.0068	0.0068	26	0.00062	0.001	<0.000005	<0.0000005	0.0011
2018	Q4	EV_HC1	0.015	<0.00005	<0.00005	0.0067	0.0067	48	0.0036	0.0041	<0.000005	<0.0000005	0.00096
2018	Q4	EV_MC2	<0.01	<0.00005	<0.00005	0.021	0.021	38	0.0013	0.0013	<0.000005	<0.0000005	0.0012
2018	Q4	GH_ERC	<0.01	<0.00005	<0.00005	0.003	0.003	13	0.00015	0.00023	<0.000005	<0.0000005	0.0011
2018	Q4	GH_FR1	0.011	<0.00005	<0.00005	0.017	0.017	57	0.00092	0.0013	<0.000005	<0.0000005	0.0013
2019	Q1	CM_MC2	<0.01	<0.00005	<0.00005	0.018	0.019	67	0.0056	0.0067	<0.000005	<0.0000005	0.0027
2019	Q1	FR_FRABCH	0.016	<0.00005	<0.00005	0.031	0.033	66	0.0048	0.0054	<0.000005	<0.0000005	0.0006
2019	Q1	FR_FRCP1	0.033	<0.00038	0.000059	0.068	0.072	275	0.0038	0.0053	<0.000005	0.00000057	0.0027
2019	Q1	GH_FR1	0.011	<0.00005	<0.00005	0.017	0.017	58	0.001	0.0016	<0.000005	0.00000032	0.0014
2019	Q1	RG_MIDAG	0.029	<0.00005	0.00004	0.0098	0.010	36	0.0002	0.0019	<0.000005	0.00000034	0.0013
2019	Q3	EV_MC2	0.027	<0.00005	0.000034	0.011	0.010	26	0.00068	0.0029	<0.000005	0.00000033	0.00091
2019	Q3	FR_FRABCH	0.015	-	0.00004	0.032	0.033	56	0.0037	0.0045	<0.000005	0.00000068	0.00097
2019	Q3	FR_FRCP1	0.017	<0.00005	<0.00005	0.028	0.028	47	0.0029	0.0046	<0.000005	<0.0000005	0.0015
2019	Q3	GH_ERC	0.012	<0.00005	<0.00005	0.0026	0.0026	12	0.00063	0.0017	<0.000005	<0.0000005	0.001
2019	Q3	GH_FR1	0.019	<0.00005	<0.00005	0.02	0.019	44	0.0012	0.0026	<0.000005	<0.0000005	0.0011
2019	Q3	LC_LC5	0.021	<0.00005	0.000045	0.02	0.02	38	0.00019	0.0027	<0.000005	<0.0000005	0.0012
2019	Q3	RG_MIDAG	0.015	<0.00005	<0.00005	0.0074	0.0072	25	0.00081	0.0024	<0.000005	<0.0000005	0.00085
2019	Q4	EV_MC2	0.0093	<0.00005	0.000039	0.012	0.012	28	0.0011	0.0014	<0.000005	<0.0000005	0.00088
2019	Q4	FR_FRABCH	0.044	-	0.000065	0.03	0.033	65	0.0033	0.0083	<0.000005	0.0000008	0.00071
2019	Q4	GH_FR1	0.0068	<0.00005	0.00005	0.018	0.019	52	0.0012	0.0015	<0.000005	0.0000005	0.00092
2019	Q4	RG_MIDAG	0.035	<0.00005	0.000033	0.0083	0.0088	34	0.00087	0.0025	<0.000005	0.00000033	0.00085
Tests categorized as possible or likely adverse response for dry weight (2015 to 2018)													
2015	Q2	FR_FRCP1	0.064	0.00005	0.000082	0.018	0.019	30	0.0027	0.0079	0.000005	0.000005	0.0012
2015	Q3	CM_MC2	0.012	0.00005	0.00005	0.014	0.015	58	0.00076	0.0017	0.000005	0.000005	0.0011
2016	Q1	CM_MC2	0.018	<0.00005	<0.00005	0.013	0.014	50	0.006	0.0071	<0.000005	<0.00000275	0.0011
2016	Q1	FR_FRCP1	0.022	<0.00005	<0.00005	0.059	0.06	108	0.0073	0.0092	<0.000005	<0.0000005	0.0017
2016	Q2	CM_MC2	0.4	<0.00005	0.00024	0.009	0.0093	26	0.011	0.025	<0.000005	0.000001	0.00087
2016	Q2	FR_FRCP1	0.09	<0.00005	0.000078	0.018	0.019	31	0.0022	0.0076	<0.000005	0.00000091	0.0011
2016	Q2	GH_FR1	0.086	<0.00005	0.000072	0.014	0.014	33	0.00088	0.0043	<0.000005	0.0000011	0.00099
2016	Q3	FR_FRCP1	0.029	<0.00005	<0.00005	0.037	0.037	56	0.0043	0.0075	<0.000005	<0.0000005	0.0013
2016	Q3	GH_FR1	0.015	<0.00005	<0.00005	0.018	0.019	42	0.0009	0.0018	<0.000005	<0.0000010625	0.00094
2016	Q4	FR_FRCP1	0.034	<0.00005	<0.00005	0.032	0.033	50	0.0068	0.0087	<0.000005	<0.0000005	0.0013
2017	Q1	FR_FRCP1	0.023	<0.00005	<0.00005	0.062	0.06	122	0.0064	0.0076	<0.000005	<0.0000005	0.0018
2017	Q4	CM_MC2	0.012	<0.00005	<0.00005	0.018	0.019	57	0.004	0.005	<0.000005	<0.0000005	0.0013
2018	Q1	FR_FRCP1	0.033	<0.0000625	<0.0000625	0.054	0.057	104	0.01	0.016	<0.000005	<0.0000005	0.0017
2018	Q4	FR_FRABCH	0.021	<0.00005	<0.00005	0.033	0.033	67	0.0051	0.0052	<0.000005	<0.0000005	0.00067
2018	Q4	LC_LCDSSLCC	0.012	<0.00005	<0.00005	0.034	0.035	55	0.0021	0.0028	<0.000005	<0.0000005	0.0025
Tests categorized as possible or likely adverse response for dry weight and survival (2015 to 2018)													
2017	Q1	CM_MC2	0.02	<0.00005	<0.00005	0.02	0.021	56	0.018	0.02	<0.000005	<0.0000005	0.0016
2017	Q2	CM_MC2	0.24	<0.00005	0.00017	0.014	0.014	36	0.017	0.028	<0.000005	0.0000014	0.0011
2017	Q3	CM_MC2	0.052	<0.00005	0.000075	0.018	0.017	53	0.0021	0.012	<0.000005	0.00000073	0.0015
2018	Q1	CM_MC2	0.019	<0.00005	<0.00005	0.017	0.019	61	0.0056	0.0078	<0.000005	<0.0000005	0.0013
2018	Q2	CM_MC2	1.4	<0.0000625	0.00088	0.0095	0.011	27	0.0095	0.055	<0.000005	0.0000025	0.00093
2018	Q3	CM_MC2	<0.01	<0.00005	<0.00005	0.029	0.031	65	0.012	0.016	<0.000005	<0.0000005	0.0025
2018	Q3	CM_MC3	<0.01	<0.00005	<0.00005	0.014	0.014	33	0.0032	0.0042	<0.000005	<0.0000005	0.0014
2018	Q4	CM_MC2	<0.01	<0.00005	<0.00005	0.015	0.015	57	0.0031	0.0041	<0.000005	<0.0000005	0.0021
2018	Q4	FR_FRCP1	<0.0175	<0.0000625	<0.0000875	0.076	0.079	363	0.00019	0.00049	<0.000005	<0.0000005	0.0029
Tests categorized as possible or likely adverse response for dry weight (2019)													
2019	Q3	CM_MC2	0.019	<0.00005	0.000038	0.016	0.017	61	0.0019	0.0068	<0.000005	<0.0000005	0.0011
2019	Q3	EV_HC1	0.027	<0.00005	<0.00005	0.0071	0.0066	43	0.0033	0.0063	<0.000005	<0.0000005	0.00096
2019	Q3	LC_DCDS	0.026	<0.00005	0.000032	0.016	0.015	30	0.00026	0.0019	<0.000005	0.0000014	0.0037
2019	Q3	LC_LCDSSLCC	0.019	<0.00005	<0.00005	0.028	0.028	41	0.002	0.0068	<0.000005	<0.0000005	0.0022
2019	Q4	EV_HC1	0.035	<0.00005	0.000053	0.0069	0.0069	48	0.0048	0.0057	<0.000005	0.00000042	0.00096
2019	Q4	FR_FRCP1	0.031	<0.00005	<0.00005	0.046	0.048	100	0.0048	0.008	<0.000005	<0.0000005	0.002
2019	Q4	GH_ERC	<0.01	<0.00005	<0.00005	0.003	0.0032	14	0.0003	0.00051	<0.000005	<0.0000005	0.0011
Tests categorized as possible or likely adverse response for survival (2019)													
2019	Q4	LC_LC3	0.038	<0.00005	<0.00005	0.05	0.053	75	0.011	0.013	<0.000005	<0.0000005	0.003
2019	Q4	LC_LC5	0.0065	<0.00005	<0.00005	0.019	0.02	44	0.0003	0.0011	<0.000005	<0.0000005	0.0012
2019	Q4	LC_LCDSSLCC	0.024	<0.00005	<0.00005	0.033	0.035	51	0.0014	0.0043	<0.000005	<0.0000005	0.002
Tests categorized as possible or likely adverse response for dry weight and survival (2019)													
2019	Q3	LC_LC3	0.073	<0.00005	<0.00005	0.04	0.04	59	0.013	0.027	<0.000005	<0.0000005	0.0037
2019	Q4	CM_MC2	0.074	<0.00005	0.000063	0.018	0.018	63	0.0065	0.014	<0.000005	0.00000047	0.0011
2019	Q4	LC_DCDS	<0.01	<0.00005	<0.00005	0.016	0.016	37	0.00075	0.0011	<0.000005	0.00000065	0.004

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-3: *H. azteca* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	MOLYBDENUM-T-mg/l	NICKEL-D-mg/l	NICKEL-T-mg/l	NITRATE NITROGEN (NO3) AS N-N-mg/l	NITRITE NITROGEN (NO2) AS N-N-mg/l	NITROGEN AMMONIA (AS N)-N-mg/l	ORTHO-PHOSPHATE-N-mg/l	pH LAB-N-ph units	PHOSPHORUS-N-mg/l	POTASSIUM-T-mg/l	SELENIUM-D-mg/l
Reference													
2015	Q1	Reference (FR_UFR1)	0.00057	0.0005	0.0005	0.12	0.001	0.005	0.003	8.3	0.005	0.42	0.00072
2015	Q2	Reference (FR_UFR1)	0.0006	0.0005	0.0005	0.03	0.001	0.005	0.003	8.3	0.007	0.36	0.00045
2015	Q3	Reference (FR_UFR1)	0.00065	0.0005	0.0005	0.048	0.001	0.005	0.0036	8.4	0.0033	0.54	0.00049
2015	Q4	Reference (FR_UFR1)	0.00059	0.0005	0.0005	0.074	0.001	0.005	0.0015	8.4	0.0024	0.39	0.00065
2016	Q1	Reference (FR_UFR1)	0.00059	<0.0005	<0.0005	0.16	<0.001	<0.005	0.0031	8.3	0.0041	0.39	0.00083
2016	Q2	Reference (FR_UFR1)	0.00065	<0.0005	<0.0005	0.018	<0.001	<0.005	0.0025	8.3	0.0047	0.34	0.00051
2016	Q3	Reference (FR_UFR1)	0.00064	<0.0005	<0.0005	0.043	<0.001	<0.005	0.0027	8.3	0.0051	0.46	0.0006
2016	Q4	Reference (FR_UFR1)	0.00058	<0.0005	<0.0005	0.097	<0.001	<0.005	0.0024	8.3	0.0045	0.37	0.00066
2017	Q1	Reference (FR_UFR1)	0.00059	<0.0005	<0.0005	0.21	0.0012	<0.005	0.007	8.2	0.012	0.43	0.001
2017	Q2	Reference (FR_UFR1)	0.00052	0.00051	0.00055	0.079	0.0022	0.007	0.0074	8.3	0.018	0.36	0.00068
2017	Q2	Reference (GH_ER2)	0.00093	<0.0005	0.00059	0.12	<0.001	<0.005	0.0011	8.3	0.009	0.43	0.00089
2017	Q3	Reference (CM_MC1)	0.0009	<0.0005	<0.0005	0.015	<0.001	0.0063	0.0049	8.3	0.021	0.49	0.00018
2017	Q3	Reference (FR_UFR1)	0.00067	<0.0005	<0.0005	0.012	<0.001	0.0063	0.0025	8.4	0.0042	0.46	0.00055
2017	Q3	Reference (GH_ER2)	0.001	<0.0005	<0.0005	0.04	<0.001	0.0055	0.0011	8.2	0.004	0.38	0.00065
2017	Q4	Reference (CM_MC1)	0.00087	<0.0005	<0.0005	0.015	0.001	0.0075	0.0035	8.2	0.0028	0.51	0.0002
2017	Q4	Reference (FR_UFR1)	0.00058	<0.0005	<0.0005	0.024	0.001	0.0052	0.0014	8.4	0.0028	0.4	0.00059
2017	Q4	Reference (GH_ER2)	0.001	<0.0005	<0.0005	0.047	<0.001	0.0074	<0.001	8.4	0.0015	0.37	0.00083
2018	Q1	Reference (CM_MC1)	0.00093	<0.0005	<0.0005	0.041	<0.001	0.0089	0.0027	8.3	0.004	0.45	0.00028
2018	Q1	Reference (FR_UFR1)	0.00062	<0.000625	<0.0005	0.19	<0.001	0.0077	0.003	8.3	0.0045	0.37	0.0009
2018	Q1	Reference (GH_ER2)	0.001	<0.0005	0.00064	0.1	<0.001	<0.005	0.0011	8.3	0.002	0.31	0.001
2018	Q2	Reference (CM_MC1)	0.00064	<0.000625	0.00079	0.0093	<0.001	0.0082	0.0044	8.2	0.02	0.5	0.0002
2018	Q2	Reference (FR_UFR1)	0.00055	<0.0005	0.00074	0.089	<0.001	0.0079	0.007	8.3	0.031	0.44	0.00059
2018	Q2	Reference (GH_ER2)	0.00097	<0.0005	0.0026	0.13	<0.001	0.0093	0.0029	8.4	0.14	0.78	0.00078
2018	Q2	Reference (LC_SLC)	0.00058	<0.0005	0.00057	0.11	<0.001	0.0086	0.0023	8.3	0.016	0.33	0.00058
2018	Q3	Reference (CM_MC1)	0.00091	<0.0005	0.00055	0.017	<0.001	0.016	0.0044	8.3	0.0056	0.5	0.00018
2018	Q3	Reference (FR_UFR1)	0.00065	<0.0005	<0.0005	0.01	<0.001	0.027	0.002	8.4	0.0045	0.44	0.00057
2018	Q3	Reference (GH_ER2)	0.00095	<0.0005	0.00094	0.036	0.0025	0.018	0.0022	8.3	0.01	0.43	0.00067
2018	Q3	Reference (LC_SLC)	0.0012	<0.0005	0.00055	0.086	<0.001	0.029	0.0017	8.4	0.0029	0.35	0.0013
2018	Q4	Reference (CM_MC1)	0.00089	<0.0005	<0.0005	0.046	<0.001	0.0074	0.0035	8.2	0.0044	0.44	0.00025
2018	Q4	Reference (FR_UFR1)	0.00057	<0.0005	0.0005	0.21	<0.001	0.027	0.0053	8.3	0.0058	0.38	0.00093
2018	Q4	Reference (GH_ER2)	0.0011	<0.0005	<0.0005	0.095	<0.001	0.032	0.0017	8.3	0.0063	0.33	0.0011
2018	Q4	Reference (LC_SLC)	0.0013	<0.0005	<0.0005	0.14	<0.001	0.016	0.0025	8.2	0.003	0.38	0.0019
2019	Q1	Reference (CM_MC1)	0.00087	<0.0005	<0.0005	0.058	0.00065	0.0094	0.0032	8.2	0.0037	0.44	0.00028
2019	Q1	Reference (FR_UFR1)	0.00049	<0.0005	0.00049	0.24	0.0012	0.02	0.0072	8.2	0.013	0.4	0.00097
2019	Q1	Reference (GH_ER2)	0.0011	<0.0005	<0.0005	0.11	0.00075	0.0035	0.0011	8.2	0.0049	0.34	0.0011
2019	Q3	Reference (CM_MC1)	0.00093	<0.0005	<0.0005	0.015	<0.001	0.0032	0.0043	8.4	0.0037	0.5	0.00021
2019	Q3	Reference (FR_UFR1)	0.00068	<0.0005	<0.0005	0.012	<0.001	0.0095	0.0014	8.4	0.002	0.4	0.00071
2019	Q3	Reference (GH_ER2)	0.00096	<0.0005	0.00035	0.032	<0.001	0.014	<0.001	8.3	0.002	0.33	0.00079
2019	Q3	Reference (LC_SLC)	0.0012	<0.0005	<0.0005	0.1	0.00075	0.0052	0.0016	8.3	0.0017	0.35	0.0015
2019	Q4	Reference (CM_MC1)	0.00088	<0.0005	<0.0005	0.026	0.00068	0.0058	0.0043	8.3	0.004	0.42	0.00025
2019	Q4	Reference (FR_UFR1)	0.00056	<0.0005	0.00041	0.16	0.00065	0.024	0.0028	8.3	0.015	0.41	0.00091
2019	Q4	Reference (GH_ER2)	0.001	<0.0005	<0.0005	0.082	0.00068	0.013	0.00078	8.3	0.0019	0.36	0.001
2019	Q4	Reference (LC_SLC)	0.0016	<0.0005	<0.0005	0.14	<0.001	0.0078	0.002	8.2	0.002	0.38	0.0015
Tests categorized as no adverse response													
2015	Q1	CM_MC2	0.00096	0.0061	0.0067	1.6	0.01	0.0079	0.0015	8.3	0.014	1.2	0.0043
2015	Q1	FR_FRCP1	0.002	0.0073	0.0077	15	0.014	0.019	0.001	8.4	0.004	2.2	0.11
2015	Q1	GH_FR1	0.0012	0.0037	0.0039	11	0.0038	0.005	0.0014	8.3	0.0061	1.3	0.05
2015	Q2	CM_MC2	0.00097	0.006	0.0081	1.1	0.0029	0.0068	0.0017	8.4	0.062	1.1	0.0039
2015	Q2	GH_FR1	0.00099	0.0016	0.0018	7.8	0.003	0.0054	0.001	8.4	0.009	1.1	0.03
2015	Q3	FR_FRCP1	0.0015	0.0056	0.0058	10	0.0071	0.0064	0.001	8.4	0.0022	1.9	0.072
2015	Q3	GH_FR1	0.001	0.0015	0.0016	9.6	0.006	0.0062	0.001	8.3	0.0031	1.2	0.037
2015	Q4	CM_MC2	0.0011	0.0087	0.009	2.4	0.034	0.016	0.0012	8.4	0.0081	1.4	0.0052
2015	Q4	FR_FRCP1	0.0015	0.007	0.0072	16	0.0053	0.005	0.001	8.3	0.002	2.0	0.091
2015	Q4	GH_FR1	0.00098	0.0015	0.0015	10	0.005	0.005	0.0011	8.4	0.0022	1.2	0.042
2016	Q1	GH_FR1	0.00089	0.0016	0.0016	13	0.0052	<0.005	<0.001	8.2	0.0032	1.2	0.051
2016	Q3	CM_MC2	0.0012	0.014	0.015	3.1	0.0062	<0.005	0.001	8.3	0.0022	1.8	0.0067
2016	Q4	CM_MC2	0.00093	0.0098	0.011	2.2	0.008	0.0057	0.0013	8.3	0.0053	1.3	0.0057
2016	Q4	GH_FR1	0.0011	0.0024	0.0025	9.5	<0.005	0.0054	0.0011	8.3	0.011	1.3	0.043
2017	Q1	GH_FR1	0.00086	0.0014	0.0014	13	<0.005	0.0057	0.0016	8.3	0.003	1.2	0.053
2017	Q2	FR_FRCP1	0.0014	0.0042	0.005	11	0.0045	0.015	0.0022	8.3	0.024	1.5	0.056
2017	Q2	GH_FR1	0.0012	0.0024	0.0034	6.7	0.0037	<0.005	0.0034	8.3	0.018	1.3	0.035
2017	Q3	FR_FRCP1	0.0014	0.0065	0.0067	11	0.0059	0.0059	0.0013	8.3	0.0041	2.0	0.086
2017	Q3	GH_FR1	0.001	0.0025	0.0027	10	0.0069	0.0056	<0.001	8.3	0.0029	1.3	0.051
2017	Q4	FR_FRCP1	0.0014	0.0085	0.0093	15	0.0072	0.0067	<0.001	8.2	0.0025	2.1	0.14
2017	Q4	GH_FR1	0.0011	0.0029	0.0031	10	0.0055	0.0073	<0.001	8.4	0.0017	1.4	0.067
2018	Q1	CM_MC3	0.00076	0.0013	0.0014	1.1	<0.001	0.0066	0.0011	8.3	0.0023	0.57	0.0033
2018	Q1	GH_FR1	0.0019	0.0016	0.0016	12	<0.005	0.0056	0.0015	8.4	0.0055	1.2	0.067
2018	Q2	CM_MC3	0.00075	0.0056	0.0071	0.78	0.0029	0.016	0.0028	8.3	0.046	0.88	0.0025
2018	Q2	FR_FRCP1	0.0011	0.0031	0.0054	7.9	0.0028	0.0086	0.0019	8.3	0.066	1.3	0.037
2018	Q2	GH_FR1	0.0013	0.0026	0.005	5.0	0.0032	0.009	0.0061	8.4	0.062	1.3	0.027
2018	Q2	LC_LCDSSLCC	0.0014	0.0046	0.0051	6.6	0.0011	0.0073	0.0017	8.3	0.008	0.98	0.028
2018	Q3	FR_FRCP1	0.0015	0.0074	0.0075	11	0.0096	0.025	0.0013	8.3	0.0039	2.0	0.086
2018	Q3	GH_FR1	0.0013	0.0019	0.0021	9.9	0.0083	0.028	0.0014	8.3	0.0046	1.3	0.051
2018	Q3	LC_LCDSSLCC	0.0015	0.0069	0.0072	11	0.0039	0.015	0.0017	8.4	0.0029	1.4	0.055
2018	Q4	CM_MC3	0.0011	0.0024	0.0025	1.2	0.0017	0.0078	0.0022	8.2	0.0036	0.71	0.0041
2018	Q4	EV_HC1	0.00097	0.00052	0.0006	1.1	0.001	0.077	0.0081	8.3	0.0095	0.87	0.045
2018	Q4	EV_MC2	0.0012	0.0037	0.0035	2.8	0.0018	0.054	0.0021	8.3	0.0037	1.2	0.023
2018	Q4	GH_ERC	0.0011	<0.0005	<0.0005	0.49	<0.001	0.067	0.0013	8.2	0.002	0.37	0.0022
2018	Q4	GH_FR1	0.0013	0.0018	0.0017	11	0.0055	0.057	0.0015	8.3	0.004	1.2	0.071
2019	Q1	CM_MC2	0.0027	0.015	0.015	3.9	0.012	0.016	0.0021	8.2	0.0049	1.9	0.0091
2019	Q1	FR_FRABCH	0.0006	0.00041	0.00048	22	0.0068	0.08	0.0017	8.1	0.0058	1.6	0.12
2019	Q1	FR_FRCP1	0.0027	0.03	0.028	27	0.013	0.013	0.0018	8.1	0.0054	4.0	0.55
2019	Q1	GH_FR1	0.0014	0.0016	0.0018	11	0.0051	0.012	0.0022	8.2	0.004	1.3	0.075
2019	Q1	RG_MIDAG	0.0013	0.0026	0.0028	1.9	0.0017	0.01	0.0034	8.1	0.0067	0.94	0.0058
2019	Q3	EV_MC2	0.00086	0.0010	0.0012	1.4	0.0018	0.013	0.002	8.4	0.0049	0.88	0.013
2019	Q3	FR_FRABCH	0.001	0.0013	0.0014	16(Mn, E)	0.0063	0.011	0.00068	8.3	0.0014	1.8	0.076
2019	Q3	FR_FRCP1	0.0015	0.0037	0.0037	9.0	0.013	0.043	0.00085	8.4	0.0027	1.7	0.058
2019	Q3	GH_ERC	0.0011	<0.0005	0.00035	0.28	0.00095	0.0042	<0.001	8.3	0.0022	0.39	0.0016
2019	Q3	GH_FR1	0.0011	0.0011	0.0013	8.8	0.0061	0.014	<0.001	8.4	0.0019	1.3	0.049
2019	Q3	LC_LC5	0.033	0.00086	0.00099	7.6	0.0039	0.0061	0.00063	8.4	0.0015	1.2	0.037
2019	Q3	RG_MIDAG	0.00082	0.0035	0.0038	0.89	0.0015	0.0098	0.0013	8.4	0.0022	0.82	0.0039
2019	Q4	EV_MC2	0.00089	0.0011	0.0011	1.7	0.0047	0.01	0.0029	8.2	0.003	0.89	0.014
2019	Q4	FR_FRABCH	0.00071	0.00072	0.00087	19(Mn, E)	0.0028	0.017	0.0011	8.3	0.021	1.7	0.087
2019	Q4	GH_FR1	0.00091	0.00094	0.0011	10	0.0026	0.0075	0.00098	8.3	0.002	1.3	0.057
2019	Q4	RG_MIDAG	0.00087	0.0047	0.0051(Mn)	1.5	0.00068	0.0081	0.0024	8.3	0.0032	0.94	0.0059
Tests categorized as possible or likely adverse response for dry weight (2015 to 2018)													
2015	Q2	FR_FRCP1	0.0012	0.0018	0.0021	8.1	0.0046	0.011	0.0012	8.4	0.01	1.2	0.03
2015	Q3	CM_MC2	0.0011	0.012	0.013	3.2	0.0068	0.0062	0.001	8.3	0.0029	1.8	0.0079
2016	Q1	CM_MC2	0.0011	0.01	0.01	3.0	0.026	0.01	0.0012	8.3	0.0023	1.6	0.0055
2016	Q1	FR_FRCP1	0.0017	0.0092	0.0098	26	0.0066	<0.005	<0.001	8.3	0.0025	2.4	0.15
2016	Q2	CM_MC2	0.00088	0.015	0.017	2.0	0.0088	0.024	0.0023	8.3	0.02	1.1	0.0046
2016	Q2	FR_FRCP1	0.0011	0.0019	0.0024	8.4	0.0027	0.0059	0.0017	8.3	0.0094	1.1	0.03
2016	Q2	GH_FR1	0.00099	0.0016	0.0017	7.6	0.0027	0.005	0.0013	8.4	0.0096	1.1	0.029
2016	Q3	FR_FRCP1	0.0013	0.0054	0.0057	13	0.0068	0.0057	0.0014	8.3	0.0046	1.7	0.066
2016	Q3	GH_FR1	0.00098	0.0015	0.0016	10	0.0057	<0.005	0.001	8.3	0.0043	1.2	0.039
2016	Q4	FR_FRCP1	0.0013	0.0049	0.0052	12	<0.005	<0.005	<0.001	8.3	0.0031	1.6	0.059
2017	Q1	FR_FRCP1	0.0018	0.013	0.012	23	0.011	0.0062	0.0052	8.2	0.014	2.6	0.2
2017	Q4	CM_MC2	0.0013	0.015	0.016	3.7	0.012	0.017	<0.001	8.3	0.003	1.9	0.0084
2018	Q1	FR_FRCP1	0.0018	0.0084	0.0089	20	0.0045	0.010	<0.001	8.2	0.0026	2.4	0.16
2018	Q4	FR_FRABCH	0.00063	0.00054	0.00059	20	0.0057	0.024	0.0016	8.3	0.0027	1.7	0.1
2018	Q4	LC_LCDSSLCC	0.0025	0.0033	0.0032	8.2	0.0051	0.022	0.0014	8.3	0.0029	1.3	0.038
Tests categorized as possible or likely adverse response for dry weight and survival (2015 to 2018)													
2017	Q1	CM_MC2	0.0016	0.032	0.033	4.6	0.021	0.038	0.0023	8.3	0.0036	2.0	0.0074
2017	Q2	CM_MC2	0.0013	0.018	0.02	2.3	0.0095	0.047	0.0016	8.2	0.029	1.5	0.0069
2017	Q3	CM_MC2	0.0015	0.026	0.027	3.3	0.019	0.015	0.0012	8.4	0.013	1.8	0.0084
2018	Q1	CM_MC2	0.0014	0.015	0.015	4.3	0.017	0.015	0.0012	8.3	0.0033	1.8	0.0093
2018	Q2	CM_MC2	0.0011	0.012	0.015	1.4	0.0055	0.027	0.0027	8.4	0.063	1.5	0.0049
2018	Q3	CM_MC2	0.0025	0.053	0.053	4.3	0.034	0.047	0.0012	8.2	0.0035	2.4	0.0087
2018	Q3	CM_MC3	0.0014	0.017	0.017	2.1	0.0091	0.021	0.002	8.4	0.0044	1.2	0.0043
2018	Q4	CM_MC2	0.0022	0.012	0.012	3.1	0.012	0.012	0.0019	8.2	0.0029	1.6	0.0088
2018	Q4	FR_FRCP1	0.0029	0.04	0.039	29	0.013	0.027	0.0019	8.0	0.0034	4.8	0.68
Tests categorized as possible or likely adverse response for dry weight (2019)													
2019	Q3	CM_MC2	0.0011	0.018	0.019	2.6	0.0057	0.0061	0.00065	8.4	0.0019	1.9	0.0094
2019	Q3	EV_HC1	0.00091	0.00054	0.0007	0.63	0.0012	0.0062	0.0018	8.4	0.01	0.92	0.038
2019	Q3	LC_DCDS	0.0038	0.0063	0.007	17	0.058	0.053	0.0007	8.4	0.047	2.1	0.038
2019	Q3	LC_LCDSSLCC	0.0022	0.0041	0.0043	6.4	0.0011	0.0079	0.0012	8.3	0.005	1.2	0.029
2019	Q4	EV_HC1	0.001	0.00045	0.00051	0.99	0.00063	0.012	0.0067	8.3	0.0074	0.89	0.044
2019	Q4	FR_FRCP1	0.002	0.01	0.011	17	0.012	0.032	<0.001	8.3	0.0016	2.4	0.16
2019	Q4	GH_ERC	0.0011	<0.0005	<0.0005	0.72	0.00098	0.011	0.0011	8.2	<0.002	0.42	0.0028
Tests categorized as possible or likely adverse response for survival (2019)													
2019	Q4	LC_LC3	0.003	0.0092	0.0094	16	0.0022	0.032	0.0024	8.2	0.0037	1.8	0.096
2019	Q4	LC_LC5	0.041	0.00075	0.00089	8.9	0.0013	0.011	0.00065	8.3	0.0018	1.1	0.044
2019	Q4	LC_LCDSSLCC	0.0021	0.004	0.0043	10	0.0019	0.014	0.0012	8.3	0.0022	1.3	0.059
Tests categorized as possible or likely adverse response for dry weight and survival (2019)													
2019	Q3	LC_LC3	0.0037	0.0086	0.0091	9.1	<0.0015	0.0079	0.0017	8.2	0.0023	1.6	0.038
2019	Q4	CM_MC2	0.0011	0.02	0.022	3.0	0.0028	0.0094	0.00075	8.4	0.0073	2.0	0.01
2019	Q4	LC_DCDS	0.0042	0.0058	0.0059	28	0.013	0.046	0.028	8.2	0.028	2.4	0.051

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-3: *H. azteca* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	SELENIUM-T-mg/l	SILVER-D-mg/l	SILVER-T-mg/l	SODIUM-T-mg/l	STRONTIUM-D-mg/l	STRONTIUM-T-mg/l	SULFATE (AS SO4)-D-mg/l	THALLIUM-D-mg/l	THALLIUM-T-mg/l	TIN-D-mg/l	TIN-T-mg/l
Reference													
2015	Q1	Reference (FR_UFR1)	0.00077	0.00001	0.00001	0.71	0.084	0.085	38	0.00001	0.00001	0.0001	0.0001
2015	Q2	Reference (FR_UFR1)	0.0005	0.00001	0.00001	0.58	0.063	0.066	14	0.00001	0.00001	0.0001	0.0001
2015	Q3	Reference (FR_UFR1)	0.00049	0.00001	0.00001	0.74	0.095	0.097	36	0.00001	0.000016	0.0001	0.0001
2015	Q4	Reference (FR_UFR1)	0.00067	0.00001	0.00001	0.68	0.092	0.091	47	0.00001	0.00001	0.0001	0.0001
2016	Q1	Reference (FR_UFR1)	0.00081	<0.00001	<0.00001	0.71	0.089	0.092	49	<0.00001	<0.00001	<0.0001	<0.0001
2016	Q2	Reference (FR_UFR1)	0.00055	<0.00001	<0.00001	0.63	0.065	0.067	15	<0.00001	<0.00001	<0.0001	<0.0001
2016	Q3	Reference (FR_UFR1)	0.00064	<0.00001	<0.00001	0.74	0.098	0.1	38	<0.00001	<0.00001	<0.0001	<0.0001
2016	Q4	Reference (FR_UFR1)	0.00066	<0.00001	<0.00001	0.68	0.089	0.089	38	<0.00001	<0.00001	<0.0001	<0.0001
2017	Q1	Reference (FR_UFR1)	0.00094	<0.00001	<0.00001	0.84	0.094	0.092	46	<0.00001	<0.00001	<0.0001	<0.0001
2017	Q2	Reference (FR_UFR1)	0.00068	<0.00001	0.000013	0.6	0.066	0.064	18	<0.00001	0.000011	0.0001	<0.0001
2017	Q2	Reference (GH_ER2)	0.00088	<0.00001	<0.00001	0.79	0.21	0.21	18	<0.00001	0.00001	<0.0001	<0.0001
2017	Q3	Reference (CM_MC1)	0.00023	<0.00001	<0.00001	2.4	0.15	0.15	13	<0.00001	<0.00001	<0.0001	<0.0001
2017	Q3	Reference (FR_UFR1)	0.00059	<0.00001	<0.00001	0.69	0.096	0.096	36	<0.00001	<0.00001	<0.0001	<0.0001
2017	Q3	Reference (GH_ER2)	0.00064	<0.00001	<0.00001	0.6	0.21	0.21	16	<0.00001	<0.00001	0.0001	<0.0001
2017	Q4	Reference (CM_MC1)	0.00021	<0.00001	<0.00001	3.0	0.16	0.16	14	<0.00001	<0.00001	<0.0001	<0.0001
2017	Q4	Reference (FR_UFR1)	0.00061	<0.00001	<0.00001	0.7	0.098	0.099	46	<0.00001	<0.00001	<0.0001	<0.0001
2017	Q4	Reference (GH_ER2)	0.00081	<0.00001	<0.00001	0.7	0.2	0.2	19	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q1	Reference (CM_MC1)	0.00028	<0.00001	<0.00001	3.4	0.16	0.17	18	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q1	Reference (FR_UFR1)	0.00089	<0.0000125	<0.00001	0.79	0.096	0.091	48	<0.0000125	<0.00001	<0.000125	<0.0001
2018	Q1	Reference (GH_ER2)	0.0011	<0.00001	<0.00001	0.74	0.2	0.22	23	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q2	Reference (CM_MC1)	0.00022	<0.0000125	<0.00001	1.5	0.095	0.093	6.7	<0.0000125	0.000025	<0.000125	<0.0001
2018	Q2	Reference (FR_UFR1)	0.00053	<0.00001	0.000016	0.53	0.063	0.06	11	<0.00001	0.000012	<0.0001	<0.0001
2018	Q2	Reference (GH_ER2)	0.00082	<0.00001	0.000027	0.72	0.19	0.2	15	<0.00001	0.000043	<0.0001	<0.0001
2018	Q2	Reference (LC_SLC)	0.00056	<0.0000125	<0.00001	0.57	0.083	0.081	14	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q3	Reference (CM_MC1)	0.0002	<0.00001	<0.00001	2.9	0.16	0.15	13	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q3	Reference (FR_UFR1)	0.00059	<0.00001	<0.0000125	0.67	0.1	0.096	36	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q3	Reference (GH_ER2)	0.00066	<0.00001	0.000011	0.61	0.21	0.2	17	<0.00001	0.000015	<0.0001	<0.0001
2018	Q3	Reference (LC_SLC)	0.0014	<0.00001	<0.00001	0.85	0.15	0.15	51	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q4	Reference (CM_MC1)	0.00029	<0.00001	<0.00001	3.4	0.15	0.15	16	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q4	Reference (FR_UFR1)	0.00084	<0.00001	<0.00001	0.74	0.11	0.097	48	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q4	Reference (GH_ER2)	0.0011	<0.00001	<0.00001	0.72	0.22	0.22	23	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q4	Reference (LC_SLC)	0.0017	<0.00001	<0.00001	1.2	0.19	0.18	74	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q1	Reference (CM_MC1)	0.0003	<0.00001	<0.00001	3.4	0.16	0.16	17	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q1	Reference (FR_UFR1)	0.00082	0.0000078	0.000016	0.7	0.096	0.097	48	<0.00001	0.0000088	<0.0001	<0.0001
2019	Q1	Reference (GH_ER2)	0.0011	<0.00001	<0.00001	0.72	0.21	0.21	24	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q3	Reference (CM_MC1)	0.00019	<0.00001	<0.00001	3.1	0.15	0.15	14	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q3	Reference (FR_UFR1)	0.00064	<0.00001	<0.00001	0.69	0.098	0.10	31	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q3	Reference (GH_ER2)	0.00077	<0.00001	<0.00001	0.61	0.21	0.21	17	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q3	Reference (LC_SLC)	0.0013	<0.00001	<0.00001	0.8	0.14	0.14	46	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q4	Reference (CM_MC1)	0.00026	<0.00001	<0.00001	3.1	0.14	0.14	14	<0.00001	<0.00001	0.00007	<0.0001
2019	Q4	Reference (FR_UFR1)	0.0009	<0.00001	<0.00001	0.7	0.093	0.096	44	<0.00001	0.0000068	<0.0001	0.000073
2019	Q4	Reference (GH_ER2)	0.00099	<0.00001	<0.00001	0.74	0.21	0.22	23	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q4	Reference (LC_SLC)	0.0016	<0.00001	<0.00001	1.0	0.16	0.17	63	<0.00001	<0.00001	<0.0001	<0.0001
Tests categorized as no adverse response													
2015	Q1	CM_MC2	0.0043	0.00001	0.00001	6.9	0.22	0.23	159	0.00001	0.000017	0.0001	0.0001
2015	Q1	FR_FRCP1	0.11	0.00001	0.00001	2.5	0.17	0.17	407	0.000013	0.000013	0.0001	0.0001
2015	Q1	GH_FR1	0.049	0.00001	0.00001	2.4	0.15	0.15	230	0.00001	0.00001	0.0001	0.0001
2015	Q2	CM_MC2	0.0039	0.00001	0.000013	3.9	0.15	0.16	103	0.00001	0.000034	0.0001	0.0001
2015	Q2	GH_FR1	0.03	0.00001	0.00001	1.6	0.11	0.11	129	0.00001	0.00001	0.0001	0.0001
2015	Q3	FR_FRCP1	0.073	0.00001	0.00001	1.8	0.15	0.15	291	0.000011	0.00001	0.0001	0.0001
2015	Q3	GH_FR1	0.037	0.00001	0.00001	1.9	0.13	0.13	160	0.00001	0.00001	0.0001	0.00012
2015	Q4	CM_MC2	0.0052	0.00001	0.00001	9.5	0.29	0.29	252	0.000011	0.000012	0.0001	0.0001
2015	Q4	FR_FRCP1	0.091	0.00001	0.00001	2.1	0.17	0.17	364	0.00001	0.00001	0.0001	0.0001
2015	Q4	GH_FR1	0.042	0.00001	0.00001	2.1	0.15	0.15	202	0.00001	0.00001	0.0001	0.0001
2016	Q1	GH_FR1	0.05	<0.00001	<0.00001	2.4	0.16	0.16	251	<0.00001	<0.00001	<0.0001	<0.0001
2016	Q3	CM_MC2	0.0069	<0.00001	<0.00001	12	0.36	0.36	310	0.000016	0.000015	<0.0001	<0.0001
2016	Q4	CM_MC2	0.0058	<0.00001	<0.00001	7.7	0.23	0.24	195	0.000011	0.000015	<0.0001	<0.0001
2016	Q4	GH_FR1	0.042	<0.00001	<0.00001	2.1	0.14	0.15	212	<0.00001	<0.00001	<0.0001	<0.0001
2017	Q1	GH_FR1	0.053	<0.00001	<0.00001	2.3	0.17	0.17	239	<0.00001	<0.00001	<0.0001	<0.0001
2017	Q2	FR_FRCP1	0.049	<0.00001	0.000014	1.4	0.13	0.13	190	0.00001	0.000018	<0.0001	<0.0001
2017	Q2	GH_FR1	0.033	<0.00001	0.000015	1.9	0.12	0.12	143	<0.00001	0.000016	<0.0001	<0.0001
2017	Q3	FR_FRCP1	0.086	<0.00001	<0.00001	1.6	0.15	0.15	341	0.000011	0.000011	<0.0001	<0.0001
2017	Q3	GH_FR1	0.048	<0.00001	<0.00001	1.9	0.14	0.14	206	<0.00001	<0.00001	0.0001	<0.0001
2017	Q4	FR_FRCP1	0.13	<0.00001	<0.00001	2.0	0.17	0.17	513	0.000012	0.000013	<0.0001	<0.0001
2017	Q4	GH_FR1	0.065	<0.00001	<0.00001	2.3	0.16	0.16	274	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q1	CM_MC3	0.0033	<0.00001	<0.00001	5.0	0.21	0.22	105	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q1	GH_FR1	0.063	<0.00001	<0.00001	2.5	0.17	0.19	285	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q2	CM_MC3	0.0026	<0.00001	<0.00001	3.3	0.16	0.16	64	0.000021	0.000048	<0.0001	<0.0001
2018	Q2	FR_FRCP1	0.035	<0.00001	0.000018	1.1	0.1	0.1	114	<0.00001	0.000027	<0.0001	<0.0001
2018	Q2	GH_FR1	0.028	<0.00001	0.000021	1.5	0.1	0.1	115	<0.00001	0.000026	<0.0001	<0.0001
2018	Q2	LC_LCDSSLCC	0.027	<0.00001	<0.00001	3.8	0.14	0.13	115	0.00001	0.000011	<0.0001	<0.0001
2018	Q3	FR_FRCP1	0.086	<0.00001	<0.00001	1.6	0.16	0.15	342	0.000011	0.000012	<0.0001	<0.0001
2018	Q3	GH_FR1	0.05	<0.00001	<0.00001	2.1	0.15	0.14	218	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q3	LC_LCDSSLCC	0.052	<0.00001	<0.00001	6.0	0.2	0.2	229	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q4	CM_MC3	0.004	<0.00001	<0.00001	5.4	0.25	0.25	135	0.00001	0.00001	<0.0001	<0.0001
2018	Q4	EV_HC1	0.041	<0.00001	<0.00001	1.8	0.14	0.14	225	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q4	EV_MC2	0.022	<0.00001	<0.00001	4.4	0.22	0.21	183	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q4	GH_ERC	0.002	<0.00001	<0.00001	0.92	0.21	0.21	31	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q4	GH_FR1	0.065	<0.00001	<0.00001	2.5	0.18	0.17	272	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q1	CM_MC2	0.0087	<0.00001	<0.00001	16	0.46	0.46	404	0.000012	0.000013	<0.0001	<0.0001
2019	Q1	FR_FRABCH	0.093	<0.00001	<0.00001	2.6	0.19	0.19	354	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q1	FR_FRCP1	0.45	<0.0000075	<0.0000075	2.1	0.24	0.24	1580	0.000028	0.000032	<0.000075	<0.000075
2019	Q1	GH_FR1	0.064	<0.00001	<0.00001	2.6	0.17	0.18	285	<0.00001	0.0000068	<0.0001	<0.0001
2019	Q1	RG_MIDAG	0.0053	<0.00001	<0.00001	8.1	0.32	0.32	211	<0.00001	0.0000075	<0.0001	<0.0001
2019	Q3	EV_MC2	0.012	<0.00001	<0.00001	3.1	0.16	0.16	105	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q3	FR_FRABCH	0.0640	<0.00001	<0.00001	2.1	0.15	0.16	234	<0.00001	<0.00001	<0.0001	0.00019
2019	Q3	FR_FRCP1	0.051	<0.00001	<0.00001	1.4	0.14	0.15	210	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q3	GH_ERC	0.0015	<0.00001	<0.00001	0.78	0.21	0.21	24	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q3	GH_FR1	0.043	<0.00001	<0.00001	2.0	0.14	0.14	184	<0.00001	<0.00001	<0.0001	0.000068
2019	Q3	LC_LC5	0.033	<0.00001	<0.00001	2.8	0.15	0.15	150	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q3	RG_MIDAG	0.0039	<0.00001	<0.00001	4.4	0.22	0.22	128	0.000023	0.000025	<0.0001	<0.0001
2019	Q4	EV_MC2	0.013	<0.00001	<0.00001	3.8	0.18	0.18	121	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q4	FR_FRABCH	0.08200	<0.00001	<0.00001	2.4	0.16	0.16	294	<0.00001	<0.00001	<0.0001	0.000075
2019	Q4	GH_FR1	0.054	<0.00001	<0.00001	2.3	0.15	0.16	229	<0.00001	<0.00001	<0.000065	0.000088
2019	Q4	RG_MIDAG	0.0055	<0.00001	<0.00001	6.4	0.27	0.27	193	0.000012	0.000015	<0.0001	0.00014
Tests categorized as possible or likely adverse response for dry weight (2015 to 2018)													
2015	Q2	FR_FRCP1	0.03	0.00001	0.00001	1.2	0.10	0.1	119	0.00001	0.00001	0.0001	0.0001
2015	Q3	CM_MC2	0.0081	0.00001	0.00001	10	0.31	0.32	325	0.000019	0.000018	0.0001	0.0001
2016	Q1	CM_MC2	0.0055	<0.00001	<0.00001	13	0.33	0.33	291	0.000011	0.000016	<0.0001	<0.0001
2016	Q1	FR_FRCP1	0.15	<0.00001	<0.00001	2.5	0.2	0.2	561	0.000013	0.000015	<0.0001	<0.0001
2016	Q2	CM_MC2	0.0045	<0.00001	<0.00001	6.0	0.2	0.19	134	0.000012	0.000022	<0.0001	<0.0001
2016	Q2	FR_FRCP1	0.031	<0.00001	<0.00001	1.1	0.099	0.1	119	<0.00001	0.000011	<0.0001	<0.0001
2016	Q2	GH_FR1	0.03	<0.00001	<0.00001	1.5	0.11	0.11	128	<0.00001	<0.00001	<0.0001	<0.0001
2016	Q3	FR_FRCP1	0.066	<0.00001	<0.00001	1.8	0.15	0.16	280	<0.00001	0.00001	<0.0001	<0.0001
2016	Q3	GH_FR1	0.04	<0.00001	<0.00001	2.0	0.14	0.14	188	<0.00001	<0.00001	<0.0001	<0.0001
2016	Q4	FR_FRCP1	0.058	<0.00001	<0.00001	1.6	0.15	0.15	253	0.000011	<0.00001	<0.0001	<0.0001
2017	Q1	FR_FRCP1	0.19	<0.00001	<0.00001	2.3	0.2	0.2	680	0.000015	0.000016	<0.0001	<0.0001
2017	Q4	CM_MC2	0.0078	<0.00001	<0.00001	13	0.41	0.41	325	0.000014	0.000015	<0.0001	<0.0001
2018	Q1	FR_FRCP1	0.15	<0.0000125	<0.0000125	2.6	0.2	0.21	552	0.000015	0.000014	<0.000125	<0.000125
2018	Q4	FR_FRABCH	0.092	<0.00001	<0.00001	2.6	0.2	0.19	330	<0.00001	<0.00001	<0.0001	<0.0001
2018	Q4	LC_LCDSSLCC	0.036	<0.00001	<0.00001	8.3	0.24	0.23	293	<0.00001	<0.00001	<0.0001	<0.0001
Tests categorized as possible or likely adverse response for dry weight and survival (2015 to 2018)													
2017	Q1	CM_MC2	0.0069	<0.00001	<0.00001	16	0.44	0.45	356	0.000018	0.000021	<0.0001	<0.0001
2017	Q2	CM_MC2	0.0062	<0.00001	<0.00001	11	0.3	0.31	204	0.000014	0.000028	<0.0001	0.00013
2017	Q3	CM_MC2	0.0081	<0.00001	<0.00001	12	0.38	0.38	305	0.00002	0.000021	<0.0001	<0.0001
2018	Q1	CM_MC2	0.009	<0.00001	<0.00001	16	0.44	0.45	380	0.000014	0.000012	<0.0001	<0.0001
2018	Q2	CM_MC2	0.005	<0.0000125	0.000011	7.1	0.24	0.23	136	0.000014	0.000044	<0.000125	<0.0001
2018	Q3	CM_MC2	0.0087	0.000011	<0.00001	19	0.6	0.6	437	0.000029	0.000027	<0.0001	<0.0001
2018	Q3	CM_MC3	0.0044	<0.00001	<0.00001	9.1	0.35	0.34	210	0.000024	0.000023	<0.0001	<0.0001
2018	Q4	CM_MC2	0.0082	<0.00001	<0.00001	12	0.4	0.41	335	0.000011	0.000011	<0.0001	<0.0001
2018	Q4	FR_FRCP1	0.62	<0.0000125	<0.0000175	2.1	0.25	0.24	1940	0.000041	0.000041	<0.000125	<0.000175
Tests categorized as possible or likely adverse response for dry weight (2019)													
2019	Q3	CM_MC2	0.0084	<0.00001	<0.00001	11	0.38	0.39	336	0.000016	0.000016	<0.0001	<0.0001
2019	Q3	EV_HC1	0.032	<0.00001	<0.00001	1.5	0.12	0.12	179	<0.00001	<0.00001	<0.0001	0.000065
2019	Q3	LC_DCDS	0.035	<0.00001	<0.00001	2.6	0.11	0.11	98	0.000015	0.000014	<0.0001	<0.0001
2019	Q3	LC_LCDSSLCC	0.026	<0.00001	<0.00001	5.9	0.19	0.18	182	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q4	EV_HC1	0.042	<0.00001	0.0000075	1.7	0.13	0.14	214	<0.00001	0.0000083	0.00008	<0.0001
2019	Q4	FR_FRCP1	0.14	<0.00001	<0.00001	2.4	0.18	0.19	512	0.000014	0.000015	<0.0001	<0.0001
2019	Q4	GH_ERC	0.0025	<0.00001	<0.00001	1.1	0.22	0.22	39	<0.00001	<0.00001	<0.0001	0.000083
Tests categorized as possible or likely adverse response for survival (2019)													
2019	Q4	LC_LC3	0.087	<0.00001	<0.00001	9.0	0.23	0.24	392	0.000010	0.000012	<0.0001	<0.0001
2019	Q4	LC_LC5	0.041	<0.00001	<0.00001	3.4	0.18	0.18	189	<0.00001	<0.00001	<0.0001	<0.0001
2019	Q4	LC_LCDSSLCC	0.055	<0.00001	<0.00001	6.6	0.22	0.22	263	<0.00001	<0.00001	0.00007	<0.0001
Tests categorized as possible or likely adverse response for dry weight and survival (2019)													
2019	Q3	LC_LC3	0.036	<0.00001	<0.00001	8.8	0.2	0.2	274	0.000012	0.000013	<0.0001	0.000088
2019	Q4	CM_MC2	0.0095	<0.00001	<0.00001	12	0.4	0.39	369	0.000014	0.000018	0.00021	0.000093
2019	Q4	LC_DCDS	0.05	<0.00001	<0.00001	2.7	0.14	0.14	142	0.0000088	0.00001	0.000075	0.000068

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-3: *H. azteca* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	TITANIUM-D-mg/l	TITANIUM-T-mg/l	TOTAL DISSOLVED SOLIDS (RESIDUE FILTERABLE)-N-mg/l	TOTAL KJELDAHL NITROGEN-N-mg/l	TOTAL ORGANIC CARBON-T-mg/l	TOTAL SUSPENDED SOLIDS LAB-N-mg/l	TURBIDITY LAB-N-ntu	URANIUM-D-mg/l	URANIUM-T-mg/l	VANADIUM-D-mg/l	VANADIUM-T-mg/l
Reference													
2015	Q1	Reference (FR_UFR1)	0.01	0.01	203	0.075	1.1	1.1	0.69	0.00044	0.00044	0.0008	0.0008
2015	Q2	Reference (FR_UFR1)	0.01	0.01	141	0.094	2.0	2.0	1.4	0.00031	0.00031	0.0005	0.0005
2015	Q3	Reference (FR_UFR1)	0.01	0.01	221	0.06	0.84	1.0	0.24	0.00043	0.00044	0.0005	0.00053
2015	Q4	Reference (FR_UFR1)	0.01	0.01	217	0.065	0.6	1.0	0.22	0.00045	0.00045	0.0005	0.0005
2016	Q1	Reference (FR_UFR1)	0.01	0.01	237	0.055	0.53	<1	0.2	0.00045	0.0005	<0.0005	<0.0005
2016	Q2	Reference (FR_UFR1)	<0.01	<0.01	147	0.077	2.0	1.5	0.82	0.00032	0.00033	<0.0005	0.0005
2016	Q3	Reference (FR_UFR1)	<0.01	<0.01	218	0.07	0.97	1.7	0.27	0.00045	0.00045	<0.0005	<0.0005
2016	Q4	Reference (FR_UFR1)	<0.01	<0.01	197	0.065	1.3	<1	0.69	0.00043	0.00045	<0.0005	0.0005
2017	Q1	Reference (FR_UFR1)	<0.01	<0.01	195	0.074	0.77	<1	0.27	0.00046	0.00046	<0.0005	<0.0005
2017	Q2	Reference (FR_UFR1)	<0.01	<0.01	146	0.12	3.3	3.0	2.6	0.00031	0.00034	0.00051	0.00066
2017	Q2	Reference (GH_ER2)	<0.01	<0.01	182	0.1	1.8	11	5.2	0.00079	0.00082	<0.0005	0.0009
2017	Q3	Reference (CM_MC1)	<0.01	<0.01	162	0.064	1.1	<1	0.37	0.00022	0.00022	<0.0005	<0.0005
2017	Q3	Reference (FR_UFR1)	<0.01	<0.01	201	0.063	1.5	1.1	0.24	0.00043	0.00041	<0.0005	<0.0005
2017	Q3	Reference (GH_ER2)	<0.01	<0.01	162	0.067	0.79	1.3	0.62	0.00063	0.00063	<0.0005	<0.0005
2017	Q4	Reference (CM_MC1)	<0.01	<0.01	173	0.12	1.2	1.4	0.52	0.00022	0.00023	<0.0005	<0.0005
2017	Q4	Reference (FR_UFR1)	<0.01	<0.01	235	0.071	0.78	1.1	0.36	0.00052	0.00051	<0.0005	<0.0005
2017	Q4	Reference (GH_ER2)	<0.01	<0.01	194	0.19	0.69	1.6	0.7	0.00078	0.00076	<0.0005	<0.0005
2018	Q1	Reference (CM_MC1)	<0.01	<0.01	174	<0.2	0.96	<1	0.16	0.00025	0.00025	<0.0005	<0.0005
2018	Q1	Reference (FR_UFR1)	<0.01	<0.01	206	0.068	0.88	<1	0.31	0.00052	0.00049	<0.000625	0.0005
2018	Q1	Reference (GH_ER2)	<0.01	<0.01	193	<0.05	0.51	<1	0.12	0.00068	0.00075	<0.0005	<0.0005
2018	Q2	Reference (CM_MC1)	<0.01	<0.01	113	0.12	3.9	12	6.3	0.00014	0.00015	<0.000625	0.00092
2018	Q2	Reference (FR_UFR1)	<0.01	<0.01	116	0.1	2.9	13	5.5	0.00029	0.00031	<0.0005	0.00099
2018	Q2	Reference (GH_ER2)	<0.01	<0.01	169	0.26	4.2	75	54	0.0007	0.00085	<0.0005	0.0043
2018	Q2	Reference (LC_SLC)	<0.01	<0.01	146	0.12	2.9	5.6	2.2	0.00072	0.00074	<0.0005	0.00054
2018	Q3	Reference (CM_MC1)	<0.01	<0.01	175	0.056	1.2	1.2	0.6	0.00025	0.00024	<0.0005	<0.0005
2018	Q3	Reference (FR_UFR1)	<0.01	<0.01	221	0.11	1.3	<1	0.75	0.00049	0.00045	<0.0005	<0.0005
2018	Q3	Reference (GH_ER2)	<0.01	<0.01	169	0.074	1.1	4.3	0.73	0.00068	0.0007	<0.0005	0.0013
2018	Q3	Reference (LC_SLC)	<0.01	<0.01	227	0.068	1.2	1.1	0.25	0.0016	0.0016	<0.0005	<0.0005
2018	Q4	Reference (CM_MC1)	<0.01	<0.01	172	<0.05	0.79	<1	0.28	0.00024	0.00025	<0.0005	<0.0005
2018	Q4	Reference (FR_UFR1)	<0.01	<0.01	228	0.057	0.73	<1	0.51	0.00053	0.0005	<0.0005	<0.0005
2018	Q4	Reference (GH_ER2)	<0.01	<0.01	174	0.18	0.61	1.0	0.38	0.00081	0.00083	<0.0005	<0.0005
2018	Q4	Reference (LC_SLC)	<0.01	<0.01	264	0.11	0.56	<1	0.39	0.0017	0.0017	<0.0005	<0.0005
2019	Q1	Reference (CM_MC1)	<0.01	<0.01	181	<0.05	0.42	<1	0.26	0.00023	0.00024	<0.0005	<0.0005
2019	Q1	Reference (FR_UFR1)	<0.01	0.008	224	0.11	1.3	2.8	2.5	0.00049	0.00047	0.00033	0.0008
2019	Q1	Reference (GH_ER2)	<0.01	<0.01	185	0.13	0.33	1.2	0.51	0.00081	0.00078	<0.0005	<0.0005
2019	Q3	Reference (CM_MC1)	<0.01	<0.01	157	0.06	0.9	0.85	0.25	0.00024	0.00024	<0.0005	<0.0005
2019	Q3	Reference (FR_UFR1)	<0.01	<0.01	236	0.14	0.98	1.0	0.33	0.00049	0.00047	<0.0005	<0.0005
2019	Q3	Reference (GH_ER2)	<0.01	<0.01	165	0.068	0.63	1.3	0.55	0.00068	0.00068	<0.0005	<0.0005
2019	Q3	Reference (LC_SLC)	<0.01	<0.01	214	0.058	0.69	<1	0.22	0.0016	0.0015	<0.0005	<0.0005
2019	Q4	Reference (CM_MC1)	<0.01	<0.01	164	<0.05	0.88	<1	0.25	0.00023	0.00025	<0.0005	<0.0005
2019	Q4	Reference (FR_UFR1)	<0.01	<0.01	191	0.38	1.4	8.2	0.85	0.00051	0.0005	<0.0005	0.00048
2019	Q4	Reference (GH_ER2)	<0.01	<0.01	172	0.045	0.36	1.6	0.77	0.00074	0.00076	<0.0005	<0.0005
2019	Q4	Reference (LC_SLC)	<0.01	<0.01	233	0.041	0.84	<1	0.27	0.0017	0.0017	<0.0005	<0.0005
Tests categorized as no adverse response													
2015	Q1	CM_MC2	0.01	0.014	408	0.12	1.9	10	6.1	0.0015	0.0015	0.0008	0.00092
2015	Q1	FR_FRCP1	0.013	0.014	866	0.05	1.3	1.9	1.3	0.0041	0.0042	0.0008	0.0008
2015	Q1	GH_FR1	0.012	0.014	574	0.12	1.9	2.5	3.6	0.0022	0.0023	0.0008	0.00083
2015	Q2	CM_MC2	0.01	0.018	308	0.18	2.2	32	16	0.0011	0.0011	0.0005	0.0016
2015	Q2	GH_FR1	0.01	0.01	386	0.073	1.6	4.4	1.8	0.0015	0.0015	0.0005	0.00056
2015	Q3	FR_FRCP1	0.01	0.01	703	0.13	0.96	1.0	0.23	0.0032	0.0033	0.0005	0.0005
2015	Q3	GH_FR1	0.01	0.01	508	0.12	0.89	8.3	1.9	0.0018	0.0019	0.0005	0.00051
2015	Q4	CM_MC2	0.011	0.012	571	0.14	1.4	4.1	2.0	0.0024	0.0023	0.0005	0.00053
2015	Q4	FR_FRCP1	0.011	0.011	836	0.1	0.88	1.1	0.37	0.0042	0.0043	0.0005	0.0005
2015	Q4	GH_FR1	0.01	0.011	545	0.11	0.7	1.0	0.27	0.002	0.0021	0.0005	0.0005
2016	Q1	GH_FR1	0.013	0.013	618	0.084	0.88	<1	0.56	0.0022	0.0022	<0.0005	<0.0005
2016	Q3	CM_MC2	<0.01	<0.01	704	0.14	1.2	1.1	0.43	0.0029	0.0029	<0.0005	<0.0005
2016	Q4	CM_MC2	<0.01	<0.01	482	0.13	1.9	4.2	2.2	0.0018	0.0019	<0.0005	<0.0005
2016	Q4	GH_FR1	<0.01	<0.01	553	0.21	1.8	2.2	0.79	0.0023	0.0023	<0.0005	<0.0005
2017	Q1	GH_FR1	<0.01	<0.01	623	0.092	0.78	<1	0.38	0.0024	0.0024	<0.0005	<0.0005
2017	Q2	FR_FRCP1	<0.01	<0.01	495	0.5	2.8	8.9	9.4	0.0022	0.0023	<0.0005	0.0016
2017	Q2	GH_FR1	<0.01	<0.01125	423	0.31	4.3	12	14	0.0019	0.0019	<0.0005	0.0016
2017	Q3	FR_FRCP1	<0.01	<0.01	792	0.42	1.8	1.5	0.57	0.0039	0.0038	<0.0005	<0.0005
2017	Q3	GH_FR1	<0.01	<0.01	568	0.37	1.2	1.6	0.38	0.0023	0.0023	<0.0005	<0.0005
2017	Q4	FR_FRCP1	<0.01	<0.01	1053	0.45	1.0	1.3	0.69	0.0058	0.0058	<0.0005	0.00052
2017	Q4	GH_FR1	<0.01	<0.01	685	0.43	1.5	1.3	0.8	0.003	0.003	<0.0005	<0.0005
2018	Q1	CM_MC3	<0.01	<0.01	322	<0.2	0.71	<1	0.21	0.0013	0.0013	<0.0005	<0.0005
2018	Q1	GH_FR1	<0.01	<0.01	680	0.24	1.0	2.0	0.46	0.0024	0.0026	<0.0005	<0.0005
2018	Q2	CM_MC3	<0.01	0.011	220	0.27	2.3	23	16	0.00072	0.00087	<0.0005	0.0018
2018	Q2	FR_FRCP1	<0.01	<0.01	352	0.45	3.6	49	18	0.0018	0.0019	<0.0005	0.0023
2018	Q2	GH_FR1	<0.01	<0.01	348	0.52	5.0	45	46	0.0015	0.0016	<0.0005	0.0024
2018	Q2	LC_LCDSSLCC	<0.01	<0.01	356	0.47	1.9	5.6	3.3	0.0022	0.0022	<0.0005	0.00054
2018	Q3	FR_FRCP1	<0.01	<0.01	785	0.45	1.4	1.1	1.2	0.0043	0.0041	<0.0005	<0.0005
2018	Q3	GH_FR1	<0.01	<0.01	572	0.41	1.2	2.7	0.36	0.0026	0.0025	<0.0005	<0.0005
2018	Q3	LC_LCDSSLCC	<0.01	<0.01	590	0.23	1.2	1.1	0.33	0.0035	0.0036	<0.0005	<0.0005
2018	Q4	CM_MC3	<0.01	<0.01	397	0.12	0.73	<1	0.38	0.0016	0.0016	<0.0005	<0.0005
2018	Q4	EV_HC1	<0.01	<0.01	539	0.32	0.68	1.1	0.58	0.0029	0.0028	<0.0005	<0.0005
2018	Q4	EV_MC2	<0.01	<0.01	490	1.2	0.81	1.1	0.66	0.0021	0.0021	<0.0005	<0.0005
2018	Q4	GH_ERC	<0.01	<0.01	201	0.2	0.57	<1	0.22	0.00087	0.00084	<0.0005	<0.0005
2018	Q4	GH_FR1	<0.01	<0.01	686	0.27	0.83	<1	0.4	0.0028	0.0028	<0.0005	<0.0005
2019	Q1	CM_MC2	<0.01	<0.01	847	0.26	0.54	0.85	0.61	0.0037	0.0039	<0.0005	<0.0005
2019	Q1	FR_FRABCH	<0.01	<0.01	884	0.093	0.58	0.85	0.32	0.0031	0.0031	<0.0005	<0.0005
2019	Q1	FR_FRCP1	<0.01	<0.005	2832	0.16	1.5	5.1	2.9	0.016	0.016	<0.00038	<0.00038
2019	Q1	GH_FR1	<0.01	<0.01	720	0.15	0.82	1.6	0.89	0.0028	0.0028	<0.0005	<0.0005
2019	Q1	RG_MIDAG	<0.01	<0.01	522	0.21	0.5	2.0	0.7	0.0021	0.0021	<0.0005	<0.0005
2019	Q3	EV_MC2	<0.01	<0.01	334	0.63	1.0	2.5	0.78	0.0012	0.0012	<0.0005	<0.0005
2019	Q3	FR_FRABCH	<0.01	<0.01	663	0.11	0.54	1.7	0.43	0.0031	0.0031	<0.0005	<0.0005
2019	Q3	FR_FRCP1	<0.01	<0.01	561	0.36	0.9	1.0	0.39	0.0029	0.0029	<0.0005	<0.0005
2019	Q3	GH_ERC	<0.01	<0.01	183	0.13	1.5	0.93	0.63	0.00075	0.00076	<0.0005	<0.0005
2019	Q3	GH_FR1	<0.01	<0.01	524	<0.1	1.1	2.8	0.77	0.0023	0.0023	<0.0005	<0.0005
2019	Q3	LC_LC5	<0.01	<0.01	462	0.14	0.83	1.2	0.42	0.002	0.002	<0.0005	<0.0005
2019	Q3	RG_MIDAG	<0.01	<0.01	351	0.27	1.4	1.3	0.62	0.0014	0.0014	<0.0005	<0.0005
2019	Q4	EV_MC2	<0.01	<0.01	365	0.33	0.7	0.93	0.34	0.0014	0.0013	<0.0005	<0.0005
2019	Q4	FR_FRABCH	<0.01	<0.01	765	<0.05	0.87	9.4	1.3	0.0031	0.0031	<0.0005	<0.0005
2019	Q4	GH_FR1	<0.01	<0.01	598	<0.05	0.73	0.7	0.43	0.0025	0.0025	<0.0005	<0.0005
2019	Q4	RG_MIDAG	<0.01	<0.01	460	0.3	0.6	<1	0.36	0.0018	0.0019	<0.0005	<0.0005
Tests categorized as possible or likely adverse response for dry weight (2015 to 2018)													
2015	Q2	FR_FRCP1	0.01	0.01	374	0.05	1.7	5.4	1.4	0.0016	0.0016	0.0005	0.00051
2015	Q3	CM_MC2	0.01	0.01	725	0.14	1.1	1.3	0.48	0.0029	0.003	0.0005	0.0005
2016	Q1	CM_MC2	0.011	0.011	642	0.12	0.8	1.1	0.74	0.0026	0.0026	<0.0005	<0.0005
2016	Q1	FR_FRCP1	0.015	0.015	1205	0.12	0.87	1.0	0.31	0.0062	0.0063	<0.0005	<0.0005
2016	Q2	CM_MC2	0.012	0.017	366	0.2	1.8	14	6.6	0.0014	0.0014	<0.0005	0.00088
2016	Q2	FR_FRCP1	0.011	0.011	377	0.16	2.0	6.0	0.98	0.0017	0.0017	<0.0005	0.00053
2016	Q2	GH_FR1	0.011	0.011	394	0.17	1.8	4.4	1.4	0.0016	0.0016	<0.0005	0.00053
2016	Q3	FR_FRCP1	<0.01	<0.01	692	0.14	1.1	1.7	0.74	0.0034	0.0035	<0.0005	<0.0005
2016	Q3	GH_FR1	<0.01	<0.01	514	0.13	1.1	<1	0.36	0.0021	0.0021	<0.0005	0.00051
2016	Q4	FR_FRCP1	<0.01	<0.01	626	0.073	1.4	1.4	1.2	0.0031	0.0032	<0.0005	<0.0005
2017	Q1	FR_FRCP1	<0.01	<0.01	1330	0.22	1.3	1.1	0.35	0.0073	0.0073	<0.0005	<0.0005
2017	Q4	CM_MC2	<0.01	<0.01	744	0.44	1.0	3.2	1.4	0.003	0.0031	<0.0005	<0.0005
2018	Q1	FR_FRCP1	<0.01	<0.01	1164	0.29	1.3	1.1	0.84	0.0063	0.0062	<0.000625	<0.000625
2018	Q4	FR_FRABCH	<0.01	<0.01	851	0.17	0.58	<1	0.44	0.0033	0.0031	<0.0005	<0.0005
2018	Q4	LC_LCDSSLCC	<0.01	<0.01	702	0.077	0.6	<1	0.59	0.0037	0.0038	<0.0005	<0.0005
Tests categorized as possible or likely adverse response for dry weight and survival (2015 to 2018)													
2017	Q1	CM_MC2	<0.01	<0.01	750	0.13	0.78	1.1	0.63	0.0037	0.0037	<0.0005	<0.0005
2017	Q2	CM_MC2	<0.01	<0.01	479	0.21	2.3	11	9.3	0.0019	0.002	<0.0005	0.00081
2017	Q3	CM_MC2	<0.01	<0.01	627	0.24	1.2	3.2	1.2	0.0029	0.0029	<0.0005	<0.0005
2018	Q1	CM_MC2	<0.01	<0.01	794	0.27	0.99	1.2	0.71	0.0039	0.0039	<0.0005	<0.0005
2018	Q2	CM_MC2	<0.01	0.016	335	0.24	3.0	30	30	0.0014	0.0014	<0.000625	0.0025
2018	Q3	CM_MC2	<0.01	<0.01	859	0.25	1.2	1.2	0.55	0.0045	0.0045	0.00051	<0.0005
2018	Q3	CM_MC3	<0.01	<0.01	491	0.14	1.0	<1	0.33	0.0024	0.0022	<0.0005	<0.0005
2018	Q4	CM_MC2	<0.01	<0.01	722	0.25	0.86	<1	0.58	0.0032	0.0033	<0.0005	<0.0005
2018	Q4	FR_FRCP1	<0.01	<0.01	3508	0.22	1.5	2.2	0.55	0.021	0.021	<0.000625	<0.000875
Tests categorized as possible or likely adverse response for dry weight (2019)													
2019	Q3	CM_MC2	<0.01	<0.01	709	0.42	0.82	1.1	0.54	0.003	0.0029	<0.0005	<0.0005
2019	Q3	EV_HC1	<0.01	<0.01	458	0.33	0.89	0.93	0.96	0.0023	0.0022	<0.0005	<0.0005
2019	Q3	LC_DCDS	<0.01	<0.01	383	0.68	3.5	1.7	0.97	0.0014	0.0014	0.0011	0.0014
2019	Q3	LC_LCDSSLCC	<0.01	<0.01	515	0.11	0.69	0.75	0.22	0.0028	0.0028	<0.0005	<0.0005
2019	Q4	EV_HC1	<0.01	<0.01	517	0.27	0.72	2.0	0.78	0.0027	0.0028	<0.0005	<0.0005
2019	Q4	FR_FRCP1	<0.01	<0.01	1095	<0.05	1.2	1.3	0.41	0.0059	0.006	<0.0005	<0.0005
2019	Q4	GH_ERC	<0.01	<0.01	206	0.22	0.32	5.4	0.45	0.00084	0.00085	<0.0005	<0.0005
Tests categorized as possible or likely adverse response for survival (2019)													
2019	Q4	LC_LC3	<0.01	<0.01	886	<0.05	0.71	0.98	0.43	0.0057	0.0059	<0.0005	<0.0005
2019	Q4	LC_LC5	<0.01	<0.01	517	<0.025	0.62	1.3	0.35	0.0023	0.0023	<0.0005	<0.0005
2019	Q4	LC_LCDSSLCC	<0.01	<0.01	655	0.043	0.39	0.7	0.32	0.0038	0.004	<0.0005	<0.0005
Tests categorized as possible or likely adverse response for dry weight and survival (2019)													
2019	Q3	LC_LC3	<0.01	<0.01	709	0.1	0.55	1.1	0.4	0.0039	0.0039	<0.0005	<0.0005
2019	Q4	CM_MC2	<0.01	<0.01	775	0.35	0.82	5.4	2.1	0.0032	0.0034	<0.0005	0.00036
2019	Q4	LC_DCDS	<0.01	<0.01	554	<0.025	1.9	0.88	0.5	0.002	0.0021	0.0011	0.0012

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-3: *H. azteca* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	ZINC-D-mg/l	ZINC-T-mg/l	∑TU-WQGs	∑TU-WQGs/Benchmarks	PC1 (all years)	PC2 (all years)	PC3 (all years)	PC4 (all years)	PC1 (2019)	PC2 (2019)	PC3 (2019)
Reference													
2015	Q1	Reference (FR_UFR1)	0.003	0.0032	2.7	2.7	-5.4	0.9	3.9	-7.9	-	-	-
2015	Q2	Reference (FR_UFR1)	0.003	0.003	2.4	2.4	-7.5	1.8	1.8	-2.3	-	-	-
2015	Q3	Reference (FR_UFR1)	0.003	0.003	2.2	2.2	-5.2	-0.8	1.5	-2.8	-	-	-
2015	Q4	Reference (FR_UFR1)	0.003	0.003	2.3	2.3	-5.9	-2.0	1.4	-3.1	-	-	-
2016	Q1	Reference (FR_UFR1)	<0.003	<0.003	1.8	1.8	-5.8	-2.3	1.1	-2.3	-	-	-
2016	Q2	Reference (FR_UFR1)	<0.003	<0.003	1.5	1.5	-7.9	1.0	1.1	-0.9	-	-	-
2016	Q3	Reference (FR_UFR1)	<0.003	<0.003	1.2	1.2	-6.1	-1.9	0.6	-0.2	-	-	-
2016	Q4	Reference (FR_UFR1)	<0.003	<0.00375	1.4	1.4	-6.6	-0.5	0.7	0.0	-	-	-
2017	Q1	Reference (FR_UFR1)	<0.001	0.0037	1.2	1.2	-5.8	-2.7	0.4	0.7	-	-	-
2017	Q2	Reference (FR_UFR1)	0.0011	<0.003	2.4	2.4	-7.7	4.8	1.4	1.3	-	-	-
2017	Q2	Reference (GH_ER2)	<0.003	<0.003	1.8	1.8	-4.9	2.8	-0.3	0.5	-	-	-
2017	Q3	Reference (CM_MC1)	<0.0025	<0.003	1.2	1.2	-6.2	0.1	-2.5	-0.5	-	-	-
2017	Q3	Reference (FR_UFR1)	<0.0025	<0.003	1.2	1.2	-6.2	-1.6	0.6	-0.2	-	-	-
2017	Q3	Reference (GH_ER2)	<0.0025	<0.003	1.2	1.3	-5.7	-1.2	-1.6	-0.1	-	-	-
2017	Q4	Reference (CM_MC1)	<0.003	<0.003	1.1	1.1	-6.3	-0.9	-2.7	-0.7	-	-	-
2017	Q4	Reference (FR_UFR1)	<0.003	<0.003	1.1	1.1	-6.0	-2.4	0.4	-0.7	-	-	-
2017	Q4	Reference (GH_ER2)	<0.003	<0.003	1.3	1.3	-5.6	-1.7	-1.6	-0.4	-	-	-
2018	Q1	Reference (CM_MC1)	<0.003	<0.003	1.1	1.1	-5.8	-1.6	-2.6	-0.7	-	-	-
2018	Q1	Reference (FR_UFR1)	<0.003	<0.003	1.3	1.3	-5.6	-0.7	-0.1	-1.3	-	-	-
2018	Q1	Reference (GH_ER2)	<0.003	<0.003	1.3	1.3	-5.3	-2.3	-1.8	-0.6	-	-	-
2018	Q2	Reference (CM_MC1)	<0.00125	0.0033	3.0	3.0	-7.5	9.4	-1.3	0.4	-	-	-
2018	Q2	Reference (FR_UFR1)	<0.001	0.0031	2.8	2.8	-7.8	7.2	1.6	2.0	-	-	-
2018	Q2	Reference (GH_ER2)	<0.001	0.011	6.6	6.6	-3.7	13.5	1.1	3.1	-	-	-
2018	Q2	Reference (LC_SLC)	0.0018	0.0038	1.6	1.6	-6.9	2.9	0.6	0.8	-	-	-
2018	Q3	Reference (CM_MC1)	0.001	0.0034	1.2	1.2	-5.9	-0.2	-2.8	-0.3	-	-	-
2018	Q3	Reference (FR_UFR1)	<0.001	<0.003	1.1	1.1	-6.0	-1.5	0.5	0.2	-	-	-
2018	Q3	Reference (GH_ER2)	<0.001	0.0041	2.5	2.5	-5.1	4.1	-0.9	1.2	-	-	-
2018	Q3	Reference (LC_SLC)	0.0022	0.0033	1.6	1.6	-4.5	-2.0	-0.1	0.6	-	-	-
2018	Q4	Reference (CM_MC1)	<0.001	<0.003	1.1	1.1	-6.0	-1.8	-2.9	-0.4	-	-	-
2018	Q4	Reference (FR_UFR1)	<0.001	<0.003	1.5	1.5	-5.9	-2.1	0.0	0.5	-	-	-
2018	Q4	Reference (GH_ER2)	<0.001	0.0039	1.5	1.5	-5.3	-1.4	-2.1	0.7	-	-	-
2018	Q4	Reference (LC_SLC)	0.0016	<0.003	1.6	1.6	-3.9	-3.1	-0.8	0.9	-	-	-
2019	Q1	Reference (CM_MC1)	<0.001	<0.003	2.7	2.7	-6.0	-2.5	-2.9	-0.4	-6.3	0.3	-1.0
2019	Q1	Reference (FR_UFR1)	0.00078	0.0053	2.8	2.8	-6.3	2.2	1.2	3.6	-5.3	-8.3	5.0
2019	Q1	Reference (GH_ER2)	<0.0005	<0.003	2.9	2.9	-5.7	-2.7	-2.1	0.4	-6.3	-0.5	-2.3
2019	Q3	Reference (CM_MC1)	<0.001	<0.003	1.9	1.9	-6.1	-1.1	-3.0	-0.7	-6.4	0.3	-0.9
2019	Q3	Reference (FR_UFR1)	0.0008	0.0019	1.7	1.7	-6.1	-2.9	0.1	-0.2	-6.3	-0.1	0.6
2019	Q3	Reference (GH_ER2)	<0.001	<0.003	2.4	2.4	-5.9	-1.6	-1.6	0.1	-6.1	-0.8	-1.3
2019	Q3	Reference (LC_SLC)	0.0019	0.0026	2.6	2.7	-5.0	-3.0	-0.4	0.3	-5.4	0.5	-0.6
2019	Q4	Reference (CM_MC1)	<0.001	<0.003	1.7	1.7	-6.7	-1.5	-2.6	-0.2	-6.8	-0.3	0.0
2019	Q4	Reference (FR_UFR1)	0.00083	0.0036	1.7	1.7	-5.8	0.3	1.5	2.3	-5.3	-4.5	3.1
2019	Q4	Reference (GH_ER2)	0.00065	0.0021	2.9	2.9	-5.6	-2.6	-2.2	0.1	-6.1	-0.6	-2.1
2019	Q4	Reference (LC_SLC)	0.0019	<0.003	1.9	1.9	-4.3	-2.9	-0.3	1.0	-4.6	0.2	-0.5
Tests categorized as no adverse response													
2015	Q1	CM_MC2	0.003	0.0036	5.7	5.3	2.1	6.4	1.1	-8.2	-	-	-
2015	Q1	FR_FRCP1	0.003	0.0031	11	6.7	7.0	1.2	5.4	-8.7	-	-	-
2015	Q1	GH_FR1	0.003	0.003	7.7	4.8	3.2	2.1	5.6	-8.2	-	-	-
2015	Q2	CM_MC2	0.0035	0.0091	7.0	6.8	-0.2	11.5	0.1	-1.2	-	-	-
2015	Q2	GH_FR1	0.003	0.003	5.6	3.8	0.2	1.0	3.4	-1.5	-	-	-
2015	Q3	FR_FRCP1	0.003	0.003	8.0	5.2	4.4	-1.4	2.7	-1.8	-	-	-
2015	Q3	GH_FR1	0.003	0.003	6.4	4.0	1.4	0.1	3.0	-1.7	-	-	-
2015	Q4	CM_MC2	0.003	0.003	6.5	5.8	3.8	2.2	-1.9	-3.8	-	-	-
2015	Q4	FR_FRCP1	0.003	0.003	10	5.9	5.1	-1.7	2.9	-2.1	-	-	-
2015	Q4	GH_FR1	0.003	0.003	6.5	3.8	1.6	-2.5	2.6	-2.7	-	-	-
2016	Q1	GH_FR1	<0.003	<0.003	7.2	3.7	2.3	-2.3	3.1	-3.3	-	-	-
2016	Q3	CM_MC2	<0.003	<0.003	6.1	5.2	4.3	-1.2	-4.2	-1.5	-	-	-
2016	Q4	CM_MC2	0.0032	0.004	5.3	4.7	2.4	2.8	-2.8	-0.4	-	-	-
2016	Q4	GH_FR1	<0.003	<0.003	5.7	3.2	2.0	-1.4	2.0	0.4	-	-	-
2017	Q1	GH_FR1	<0.003	<0.003	6.4	3.0	1.7	-3.3	1.8	0.2	-	-	-
2017	Q2	FR_FRCP1	0.0028	0.0066	7.7	4.9	2.6	6.1	3.1	3.2	-	-	-
2017	Q2	GH_FR1	<0.003	0.0049	6.1	4.5	1.7	6.9	3.3	1.9	-	-	-
2017	Q3	FR_FRCP1	<0.0025	<0.003	7.3	4.4	4.3	-1.5	1.9	1.3	-	-	-
2017	Q3	GH_FR1	<0.0025	<0.003	5.9	3.2	1.9	-2.5	1.9	0.6	-	-	-
2017	Q4	FR_FRCP1	<0.003	0.0032	9.8	5.6	5.5	-1.3	1.4	1.3	-	-	-
2017	Q4	GH_FR1	<0.003	<0.003	6.1	3.3	2.3	-2.2	1.6	0.6	-	-	-
2018	Q1	CM_MC3	<0.003	<0.003	2.0	1.9	-1.9	-2.2	-1.4	0.1	-	-	-
2018	Q1	GH_FR1	<0.003	<0.003	6.5	4.0	3.0	-1.8	2.6	-1.0	-	-	-
2018	Q2	CM_MC3	0.0039	0.011	6.0	6.0	-0.6	11.7	-1.6	1.1	-	-	-
2018	Q2	FR_FRCP1	0.0025	0.011	7.8	6.1	1.3	10.3	3.4	3.6	-	-	-
2018	Q2	GH_FR1	0.0013	0.0092	6.8	6.3	0.9	11.3	3.5	3.6	-	-	-
2018	Q2	LC_LCDSSLCC	0.0087	0.01	5.3	4.7	1.5	2.7	1.8	2.2	-	-	-
2018	Q3	FR_FRCP1	0.0013	0.003	7.9	4.9	5.0	-1.1	1.7	1.5	-	-	-
2018	Q3	GH_FR1	0.0011	<0.003	5.9	3.9	2.4	-1.3	1.9	2.0	-	-	-
2018	Q3	LC_LCDSSLCC	0.011	0.013	7.7	5.8	4.2	-1.3	1.3	1.3	-	-	-
2018	Q4	CM_MC3	<0.001	<0.003	2.5	2.3	-0.8	-1.8	-2.5	0.3	-	-	-
2018	Q4	EV_HC1	<0.001	<0.003	2.4	2.2	-0.3	-1.8	0.3	2.0	-	-	-
2018	Q4	EV_MC2	<0.001	<0.003	3.3	2.8	2.7	-2.4	-0.6	0.8	-	-	-
2018	Q4	GH_ERC	<0.001	<0.003	1.5	1.5	-4.7	-3.0	-1.9	0.6	-	-	-
2018	Q4	GH_FR1	0.0011	<0.003	6.2	3.9	2.4	-3.1	1.0	1.3	-	-	-
2019	Q1	CM_MC2	0.0017	<0.003	8.2	7.1	6.5	-1.1	-5.2	-0.5	5.8	2.5	-4.1
2019	Q1	FR_FRABCH	<0.001	<0.003	11	5.2	2.8	-3.4	0.9	1.5	3.0	1.2	0.4
2019	Q1	FR_FRCP1	0.00093	0.0035	22	14	10.5	-2.1	0.5	5.2	13.7	-13.9	-2.7
2019	Q1	GH_FR1	<0.001	<0.003	7.0	4.0	2.2	-3.5	2.0	1.6	2.0	0.9	1.2
2019	Q1	RG_MIDAG	<0.001	<0.003	4.1	3.6	1.0	-1.6	-2.7	0.8	0.5	1.0	-2.0
2019	Q3	EV_MC2	0.0013	<0.003	2.8	2.7	-0.8	-0.9	0.2	0.9	-1.0	0.5	0.7
2019	Q3	FR_FRABCH	0.0008	0.0022	9.0	4.6	2.9	-3.3	1.0	0.5	2.3	1.8	-0.6
2019	Q3	FR_FRCP1	0.001	0.0019	7.0	4.6	3.2	-2.5	1.9	1.4	2.8	1.2	1.5
2019	Q3	GH_ERC	<0.001	<0.003	2.9	2.9	-5.1	-2.0	-0.9	0.2	-5.5	-0.5	-1.2
2019	Q3	GH_FR1	0.00093	<0.003	5.8	3.5	0.8	-2.4	2.8	1.5	0.8	-0.3	1.9
2019	Q3	LC_LC5	0.00078	<0.003	5.1	3.3	0.9	-3.4	2.3	1.4	0.2	0.9	0.8
2019	Q3	RG_MIDAG	0.0007	<0.003	3.5	3.3	-0.5	0.0	-3.0	0.3	-0.7	-0.6	-2.0
2019	Q4	EV_MC2	0.0011	<0.003	2.5	2.3	-0.7	-2.8	-0.2	1.1	-1.0	1.6	0.6
2019	Q4	FR_FRABCH	0.00068	<0.003	9.4	4.3	2.1	-1.2	2.1	1.9	2.6	-1.1	1.6
2019	Q4	GH_FR1	0.001	0.003	5.7	3.1	0.8	-4.2	1.9	1.3	0.6	1.1	1.2
2019	Q4	RG_MIDAG	0.0011	<0.003	3.9	3.5	0.5	-1.2	-2.8	0.5	0.0	1.1	-3.1
Tests categorized as possible or likely adverse response for dry weight (2015 to 2018)													
2015	Q2	FR_FRCP1	0.003	0.003	5.8	4.0	0.4	1.3	3.6	-1.2	-	-	-
2015	Q3	CM_MC2	0.003	0.003	6.9	5.9	4.3	-0.2	-2.5	-3.4	-	-	-
2016	Q1	CM_MC2	<0.003	<0.003	6.5	5.6	4.8	0.3	-3.0	-3.9	-	-	-
2016	Q1	FR_FRCP1	<0.003	<0.003	15	8.2	7.0	-1.1	3.0	-3.2	-	-	-
2016	Q2	CM_MC2	0.0059	0.011	7.8	7.4	2.3	8.1	-2.0	-1.4	-	-	-
2016	Q2	FR_FRCP1	<0.003	0.0031	5.1	3.2	0.3	1.3	3.1	0.1	-	-	-
2016	Q2	GH_FR1	<0.003	<0.003	4.7	2.9	0.1	0.7	3.0	-0.2	-	-	-
2016	Q3	FR_FRCP1	<0.003	<0.003	7.7	4.2	3.8	-1.7	2.1	1.0	-	-	-
2016	Q3	GH_FR1	<0.003	<0.003	5.7	3.1	1.4	-2.5	2.0	0.1	-	-	-
2016	Q4	FR_FRCP1	<0.003	<0.0045	7.2	4.0	3.3	-1.1	2.4	1.0	-	-	-
2017	Q1	FR_FRCP1	0.0019	<0.003	14	7.6	7.2	-2.0	1.5	2.3	-	-	-
2017	Q4	CM_MC2	<0.003	<0.003	6.8	5.7	5.5	0.1	-4.9	-1.0	-	-	-
2018	Q1	FR_FRCP1	<0.003	0.0045	12	6.2	6.6	0.5	0.7	0.6	-	-	-
2018	Q4	FR_FRABCH	0.0022	0.0035	9.1	3.7	3.2	-3.0	1.3	1.0	-	-	-
2018	Q4	LC_LCDSSLCC	0.0033	0.0036	5.8	4.1	4.7	-2.9	0.6	1.0	-	-	-
Tests categorized as possible or likely adverse response for dry weight and survival (2015 to 2018)													
2017	Q1	CM_MC2	0.0043	0.0049	12	11	7.6	0.8	-5.7	-0.8	-	-	-
2017	Q2	CM_MC2	0.0063	0.0096	8.8	8.3	4.9	7.0	-3.9	0.9	-	-	-
2017	Q3	CM_MC2	<0.0025	0.0039	10	9.3	5.4	2.5	-5.5	-0.8	-	-	-
2018	Q1	CM_MC2	<0.003	0.003	7.3	6.4	6.2	-0.1	-4.7	-0.9	-	-	-
2018	Q2	CM_MC2	0.0046	0.016	9.7	9.6	3.1	13.7	-1.8	-0.3	-	-	-
2018	Q3	CM_MC2	0.001	<0.003	17	16	9.0	0.9	-8.2	-1.4	-	-	-
2018	Q3	CM_MC3	0.0014	<0.003	6.7	6.4	3.9	0.5	-6.0	-1.0	-	-	-
2018	Q4	CM_MC2	0.0011	<0.003	5.9	5.3	5.2	-1.2	-4.6	-0.6	-	-	-
2018	Q4	FR_FRCP1	<0.00125	<0.00525	26	18	11.0	1.7	-2.1	1.8	-	-	-
Tests categorized as possible or likely adverse response for dry weight (2019)													
2019	Q3	CM_MC2	<0.001	<0.003	7.7	6.9	4.6	-0.6	-4.7	-1.0	3.9	1.4	-4.7
2019	Q3	EV_HC1	<0.001	<0.003	2.7	2.6	-1.1	-1.2	1.0	1.3	-0.9	-0.7	0.5
2019	Q3	LC_DCDS	<0.001	<0.003	9.7	7.8	3.9	1.5	2.3	-0.3	4.1	0.5	9.0
2019	Q3	LC_LCDSSLCC	0.0055	0.007	6.2	4.7	3.2	-2.0	0.9	1.5	2.8	2.7	-0.4
2019	Q4	EV_HC1	0.001	<0.003	2.4	2.2	-0.6	-2.1	0.7	2.2	-0.4	-0.5	0.0
2019	Q4	FR_FRCP1	0.0016	0.005	12	6.9	6.5	-2.3	1.8	2.1	6.5	1.2	0.8
2019	Q4	GH_ERC	0.00073	<0.003	2.6	2.6	-4.4	-2.9	-1.3	1.0	-4.9	-0.5	-1.2
Tests categorized as possible or likely adverse response for survival (2019)													
2019	Q4	LC_LC3	0.0087	0.0087	12	8.0	7.1	-2.0	0.4	1.7	7.2	2.8	0.1
2019	Q4	LC_LC5	0.0009	<0.003	5.4	3.1	0.8	-4.5	1.5	1.4	0.1	1.6	0.4
2019	Q4	LC_LCDSSLCC	0.0042	0.0049	7.8	5.2	3.9	-3.1	0.8	1.4	3.5	2.7	-0.5
Tests categorized as possible or likely adverse response for dry weight and survival (2019)													
2019	Q3	LC_LC3	0.012	0.015	10	8.0	6.4	-1.1	0.5	2.1	6.2	2.7	-1.3
2019	Q4	CM_MC2	0.0022	0.0027	8.7	7.9	5.5	1.9	-5.3	-0.7	5.1	-0.5	-5.9
2019	Q4	LC_DCDS	0.0043	0.0045	13	8.0	4.7	-0.4	3.0	0.4	5.4	3.4	8.9

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-3: *H. azteca* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	PC4 (2019)	PC5 (2019)	PC6 (2019)
Reference					
2015	Q1	Reference (FR_UFR1)	-	-	-
2015	Q2	Reference (FR_UFR1)	-	-	-
2015	Q3	Reference (FR_UFR1)	-	-	-
2015	Q4	Reference (FR_UFR1)	-	-	-
2016	Q1	Reference (FR_UFR1)	-	-	-
2016	Q2	Reference (FR_UFR1)	-	-	-
2016	Q3	Reference (FR_UFR1)	-	-	-
2016	Q4	Reference (FR_UFR1)	-	-	-
2017	Q1	Reference (FR_UFR1)	-	-	-
2017	Q2	Reference (FR_UFR1)	-	-	-
2017	Q2	Reference (GH_ER2)	-	-	-
2017	Q3	Reference (CM_MC1)	-	-	-
2017	Q3	Reference (FR_UFR1)	-	-	-
2017	Q3	Reference (GH_ER2)	-	-	-
2017	Q4	Reference (CM_MC1)	-	-	-
2017	Q4	Reference (FR_UFR1)	-	-	-
2017	Q4	Reference (GH_ER2)	-	-	-
2018	Q1	Reference (CM_MC1)	-	-	-
2018	Q1	Reference (FR_UFR1)	-	-	-
2018	Q1	Reference (GH_ER2)	-	-	-
2018	Q2	Reference (CM_MC1)	-	-	-
2018	Q2	Reference (FR_UFR1)	-	-	-
2018	Q2	Reference (GH_ER2)	-	-	-
2018	Q2	Reference (LC_SLC)	-	-	-
2018	Q3	Reference (CM_MC1)	-	-	-
2018	Q3	Reference (FR_UFR1)	-	-	-
2018	Q3	Reference (GH_ER2)	-	-	-
2018	Q3	Reference (LC_SLC)	-	-	-
2018	Q4	Reference (CM_MC1)	-	-	-
2018	Q4	Reference (FR_UFR1)	-	-	-
2018	Q4	Reference (GH_ER2)	-	-	-
2018	Q4	Reference (LC_SLC)	-	-	-
2019	Q1	Reference (CM_MC1)	0.5	-1.8	-2.2
2019	Q1	Reference (FR_UFR1)	3.8	6.8	-2.8
2019	Q1	Reference (GH_ER2)	-0.6	-1.2	-0.4
2019	Q3	Reference (CM_MC1)	1.9	-2.6	-1.7
2019	Q3	Reference (FR_UFR1)	-1.1	-1.8	1.1
2019	Q3	Reference (GH_ER2)	0.0	-0.3	-0.6
2019	Q3	Reference (LC_SLC)	-1.9	-1.4	-1.3
2019	Q4	Reference (CM_MC1)	1.2	-2.9	-2.0
2019	Q4	Reference (FR_UFR1)	1.0	3.7	0.1
2019	Q4	Reference (GH_ER2)	-0.5	-0.2	-0.1
2019	Q4	Reference (LC_SLC)	-2.0	-0.6	-1.3
Tests categorized as no adverse response					
2015	Q1	CM_MC2	-	-	-
2015	Q1	FR_FRCP1	-	-	-
2015	Q1	GH_FR1	-	-	-
2015	Q2	CM_MC2	-	-	-
2015	Q2	GH_FR1	-	-	-
2015	Q3	FR_FRCP1	-	-	-
2015	Q3	GH_FR1	-	-	-
2015	Q4	CM_MC2	-	-	-
2015	Q4	FR_FRCP1	-	-	-
2015	Q4	GH_FR1	-	-	-
2016	Q1	GH_FR1	-	-	-
2016	Q3	CM_MC2	-	-	-
2016	Q4	CM_MC2	-	-	-
2016	Q4	GH_FR1	-	-	-
2017	Q1	GH_FR1	-	-	-
2017	Q2	FR_FRCP1	-	-	-
2017	Q2	GH_FR1	-	-	-
2017	Q3	FR_FRCP1	-	-	-
2017	Q3	GH_FR1	-	-	-
2017	Q4	FR_FRCP1	-	-	-
2017	Q4	GH_FR1	-	-	-
2018	Q1	CM_MC3	-	-	-
2018	Q1	GH_FR1	-	-	-
2018	Q2	CM_MC3	-	-	-
2018	Q2	FR_FRCP1	-	-	-
2018	Q2	GH_FR1	-	-	-
2018	Q2	LC_LCDSSLCC	-	-	-
2018	Q3	FR_FRCP1	-	-	-
2018	Q3	GH_FR1	-	-	-
2018	Q3	LC_LCDSSLCC	-	-	-
2018	Q4	CM_MC3	-	-	-
2018	Q4	EV_HC1	-	-	-
2018	Q4	EV_MC2	-	-	-
2018	Q4	GH_ERC	-	-	-
2018	Q4	GH_FR1	-	-	-
2019	Q1	CM_MC2	4.5	-0.3	-0.5
2019	Q1	FR_FRABCH	-2.0	1.9	1.8
2019	Q1	FR_FRCP1	-3.2	-5.2	-1.2
2019	Q1	GH_FR1	-2.1	0.4	1.6
2019	Q1	RG_MIDAG	2.0	0.1	-0.3
2019	Q3	EV_MC2	1.1	-0.4	1.8
2019	Q3	FR_FRABCH	-2.0	0.9	2.3
2019	Q3	FR_FRCP1	-1.4	0.1	2.0
2019	Q3	GH_ERC	-0.5	-0.7	-0.2
2019	Q3	GH_FR1	-2.1	0.5	2.4
2019	Q3	LC_LC5	-2.6	0.2	1.7
2019	Q3	RG_MIDAG	2.6	-2.1	0.9
2019	Q4	EV_MC2	-0.5	-0.7	1.2
2019	Q4	FR_FRABCH	-0.5	4.6	3.0
2019	Q4	GH_FR1	-3.1	-0.6	1.5
2019	Q4	RG_MIDAG	2.0	-0.5	0.6
Tests categorized as possible or likely adverse response for dry weight (2015 to 2018)					
2015	Q2	FR_FRCP1	-	-	-
2015	Q3	CM_MC2	-	-	-
2016	Q1	CM_MC2	-	-	-
2016	Q1	FR_FRCP1	-	-	-
2016	Q2	CM_MC2	-	-	-
2016	Q2	FR_FRCP1	-	-	-
2016	Q2	GH_FR1	-	-	-
2016	Q3	FR_FRCP1	-	-	-
2016	Q3	GH_FR1	-	-	-
2016	Q4	FR_FRCP1	-	-	-
2017	Q1	FR_FRCP1	-	-	-
2017	Q4	CM_MC2	-	-	-
2018	Q1	FR_FRCP1	-	-	-
2018	Q4	FR_FRABCH	-	-	-
2018	Q4	LC_LCDSSLCC	-	-	-
Tests categorized as possible or likely adverse response for dry weight and survival (2015 to 2018)					
2017	Q1	CM_MC2	-	-	-
2017	Q2	CM_MC2	-	-	-
2017	Q3	CM_MC2	-	-	-
2018	Q1	CM_MC2	-	-	-
2018	Q2	CM_MC2	-	-	-
2018	Q3	CM_MC2	-	-	-
2018	Q3	CM_MC3	-	-	-
2018	Q4	CM_MC2	-	-	-
2018	Q4	FR_FRCP1	-	-	-
Tests categorized as possible or likely adverse response for dry weight (2019)					
2019	Q3	CM_MC2	4.4	-0.8	1.6
2019	Q3	EV_HC1	-0.4	0.7	1.9
2019	Q3	LC_DCDS	5.7	-4.0	1.8
2019	Q3	LC_LCDSSLCC	-1.7	1.4	-3.1
2019	Q4	EV_HC1	-1.5	0.9	1.6
2019	Q4	FR_FRCP1	-1.9	1.0	0.5
2019	Q4	GH_ERC	-0.9	-0.2	0.3
Tests categorized as possible or likely adverse response for survival (2019)					
2019	Q4	LC_LC3	-0.8	1.9	-4.6
2019	Q4	LC_LC5	-3.6	0.0	1.3
2019	Q4	LC_LCDSSLCC	-2.0	0.8	-2.8
Tests categorized as possible or likely adverse response for dry weight and survival (2019)					
2019	Q3	LC_LC3	-1.2	2.8	-5.5
2019	Q4	CM_MC2	6.8	2.9	2.1
2019	Q4	LC_DCDS	2.6	-3.4	-2.6

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-4: *O. mykiss* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	Mean Survival (Control Normalized)	Mean Viability (Control Normalized)	Mean Length (Control Normalized)	Mean Wet Weight (Control Normalized)	ALKALINITY TOTAL (As CaCO3) lab measured.-N-mg/l	ALUMINUM-D-mg/l	ALUMINUM-T-mg/l	ANTIMONY-D-mg/l	ANTIMONY-T-mg/l	ARSENIC-D-mg/l	ARSENIC-T-mg/l
Tests not included in statistical analysis													
2017	Q4	CM_MC2	23	23	113	128	202	<0.003	0.0081	0.00025	0.00028	0.00017	0.0002
2017	Q4	EV_HC1	34	34	90	92	185	<0.003	0.0055	<0.0001	0.00011	0.00015	0.00018
2017	Q4	EV_MC2	24	23	91	102	175	<0.003	0.0086	<0.0001	0.00012	0.00015	0.00018
2017	Q4	FR_FRCP1	27	29	96	105	190	<0.003	0.016	0.00024	0.00026	<0.0001	0.00013
2017	Q4	GH_ERC	23	22	91	96	148	<0.003	0.0044	<0.0001	<0.0001	<0.0001	0.00011
2017	Q4	GH_FR1	23	23	92	108	181	<0.003	0.0055	0.00017	0.00019	0.0001	0.00012
2017	Q4	LC_LCDSSLCC	41	41	108	119	186	<0.003	0.0043	0.00026	0.00028	0.00011	0.00013
2017	Q4	Reference (CM_MC1)	35	36	98	103	136	<0.003	0.0067	<0.0001	<0.0001	0.00015	0.00018
2017	Q4	Reference (FR_UFR1)	70	74	100	99	144	<0.003	0.0033	<0.0001	<0.0001	<0.0001	0.00011
2017	Q4	Reference (GH_ER2)	57	59	99	98	147	<0.003	0.0068	<0.0001	<0.0001	<0.0001	0.00011
Reference													
2015	Q2	Reference (FR_UFR1)	91	89	98	100	118	0.0075	0.059	0.0001	0.0001	0.0001	0.00013
2015	Q2	Reference (GH_ER2)	61	62	102	106	150	0.003	0.082	0.0001	0.0001	0.00011	0.00016
2015	Q4	Reference (FR_UFR1)	90	90	100	102	146	0.003	0.0056	0.0001	0.0001	0.0001	0.00011
2015	Q4	Reference (GH_ER2)	94	94	97	99	147	0.003	0.014	0.0001	0.0001	0.0001	0.00012
2016	Q2	Reference (FR_UFR1)	84	81	103	103	114	0.0059	0.054	<0.0001	<0.0001	0.00011	0.00012
2016	Q2	Reference (GH_ER2)	103	101	104	103	141	0.0032	0.14	<0.0001	<0.0001	0.0001	0.00019
2016	Q4	Reference (FR_UFR1)	91	91	101	103	141	0.0082	0.042	<0.0001	<0.0001	<0.0001	0.00012
2016	Q4	Reference (GH_ER2)	96	97	101	103	146	<0.003	0.0076	<0.0001	<0.0001	0.0001	0.00014
2017	Q2	Reference (FR_UFR1)	79	87	110	111	113	0.0056	0.16	<0.0001	0.00011	0.00012	0.0002
2017	Q2	Reference (GH_ER2)	100	106	103	108	143	0.0047	0.71	<0.0001	0.00011	0.00013	0.00063
2018	Q2	Reference (CM_MC1)	104	107	105	105	92	0.025	0.33	<0.00012	<0.0001	0.00023	0.00037
2018	Q2	Reference (FR_UFR1)	96	99	101	100	102	0.0071	0.16	<0.0001	<0.0001	0.00013	0.00021
2018	Q2	Reference (GH_ER2)	97	101	105	105	137	0.005	0.71	<0.0001	0.00013	0.00015	0.00066
2018	Q2	Reference (LC_SLC)	101	103	105	108	109	0.0041	0.059	<0.0001	<0.0001	0.00011	0.00017
2018	Q4	Reference (CM_MC1)	87	91	104	103	137	0.0033	0.008	<0.0001	<0.0001	0.00017	0.00019
2018	Q4	Reference (FR_UFR1)	94	95	102	102	151	<0.003	0.0031	<0.0001	<0.0001	<0.0001	0.00011
2018	Q4	Reference (GH_ER2)	95	100	102	102	147	<0.003	0.01	<0.0001	<0.0001	<0.0001	0.00012
2018	Q4	Reference (LC_SLC)	97	101	103	102	145	<0.003	0.0071	<0.0001	<0.0001	0.0001	0.00014
2019	Q2	Reference (CM_MC1)	92	90	102	109	101	0.021	0.19	<0.0001	<0.0001	0.00024	0.0003
2019	Q2	Reference (FR_UFR1)	106	107	101	101	118	0.0055	0.052	<0.0001	<0.0001	0.000086	0.00013
2019	Q2	Reference (GH_ER2)	94	93	104	110	137	0.0024	0.21	<0.0001	<0.0001	0.00011	0.00027
2019	Q2	Reference (LC_SLC)	94	99	98	100	121	0.0023	0.018	<0.0001	<0.0001	0.00012	0.00014
2019	Q4	Reference (CM_MC1)	96	89	99	100	145	<0.003	0.0059	<0.0001	<0.0001	0.00018	0.00019
2019	Q4	Reference (FR_UFR1)	101	98	98	100	146	<0.003	0.054	<0.0001	<0.0001	0.000062	0.00012
2019	Q4	Reference (GH_ER2)	101	98	92	94	149	0.0022	0.012	<0.0001	<0.0001	<0.0001	0.0001
2019	Q4	Reference (LC_SLC)	97	92	99	104	146	<0.003	0.0073	<0.0001	<0.0001	0.000076	0.0001
Tests categorized as no adverse response													
2015	Q2	CM_MC2	80	82	103	101	138	0.012	0.58	0.00019	0.00016	0.00023	0.00049
2015	Q2	EV_MC2	103	102	104	104	104	0.0065	0.66	0.00014	0.00017	0.00018	0.00054
2015	Q2	FR_FRCP1	83	83	105	110	145	0.003	0.047	0.00022	0.00022	0.0001	0.00013
2015	Q2	GH_ERC	69	68	101	106	153	0.0032	0.21	0.0001	0.0001	0.0001	0.00024
2015	Q2	GH_FR1	89	92	102	98	156	0.003	0.051	0.00016	0.00017	0.0001	0.00015
2015	Q2	LC_LCDSSLCC	102	101	101	101	121	0.003	0.041	0.00014	0.00016	0.00012	0.00016
2015	Q4	EV_MC2	87	86	98	98	167	0.0068	0.081	0.00026	0.00029	0.00016	0.00022
2015	Q4	LC_LCDSSLCC	88	87	98	103	199	0.003	0.0052	0.00028	0.00032	0.0001	0.00013
2016	Q4	EV_MC2	87	88	102	110	132	0.012	0.1	0.00012	0.00013	0.00018	0.00024
2017	Q2	CM_MC2	97	93	106	117	142	0.0067	0.6	0.00018	0.00023	0.00018	0.00049
2017	Q2	EV_HC1	103	104	106	115	166	0.0064	0.38	0.00011	0.00011	0.00017	0.00033
2017	Q2	EV_MC2	102	108	110	119	105	0.022	1.0	0.0001	0.00018	0.00021	0.0007
2017	Q2	FR_FRCP1	81	87	108	113	164	0.0033	0.24	0.00018	0.00019	0.00011	0.00027
2017	Q2	GH_FR1	91	100	117	127	159	0.0041	0.35	0.00016	0.00019	0.00013	0.00034
2017	Q2	LC_LCDSSLCC	99	93	107	126	151	0.0017	0.027	0.00021	0.00021	0.00013	0.00017
2018	Q2	CM_MC2	94	94	106	113	141	0.0094	1.1	0.00016	0.00018	0.00017	0.00064
2018	Q2	EV_HC1	94	96	107	113	168	0.018	0.23	<0.0001	0.0001	0.00016	0.00029
2018	Q2	EV_MC2	106	109	105	111	97	0.085	0.85	0.0001	0.00015	0.00024	0.00069
2018	Q2	FR_FRCP1	92	93	103	108	158	0.0038	0.37	0.00019	0.00022	0.00011	0.00033
2018	Q2	GH_ERC	98	102	105	107	141	0.0054	1.2	<0.0001	0.00016	0.00014	0.001
2018	Q2	GH_FR1	95	95	106	115	160	0.0041	0.24	0.00019	0.00023	0.00014	0.00029
2018	Q2	LC_LCDSSLCC	102	103	104	109	156	<0.003	0.031	0.00019	0.00022	0.00012	0.00018
2018	Q4	CM_MC2	84	87	103	109	209	<0.003	0.013	0.00039	0.00041	0.00018	0.0002
2018	Q4	EV_HC1	84	88	103	103	180	<0.003	0.023	<0.0001	<0.0001	0.00016	0.00019
2018	Q4	EV_MC2	91	96	105	106	178	<0.003	0.010	0.00017	0.00019	0.00015	0.00018
2018	Q4	GH_ERC	97	99	100	96	154	<0.003	0.04	<0.0001	<0.0001	<0.0001	0.00013
2018	Q4	LC_LCDSSLCC	100	103	105	110	200	<0.003	0.0033	0.00025	0.00026	0.0001	0.00015
2019	Q2	CM_MC2	86	85	103	111	139	0.0069	0.3	0.000098	0.00013	0.00016	0.00032
2019	Q2	EV_HC1	95	91	101	112	168	0.002	0.041	0.00006	0.00006	0.00016	0.00019
2019	Q2	EV_MC2	91	94	105	109	101	0.017	0.24	<0.0001	0.000072	0.0002	0.00031
2019	Q2	FR_FRCP1	88	87	104	119	162	0.0019	0.077	0.00019	0.00021	0.000074	0.00017
2019	Q2	GH_ERC	94	96	103	111	142	0.0023	0.35	<0.0001	0.000072	0.0001	0.00037
2019	Q2	LC_DCDS	95	98	105	112	118	0.0037	0.029	0.0004	0.00039	0.00029	0.00034
2019	Q2	LC_LC3	92	95	104	118	173	<0.003	0.0092	0.00029	0.00031	0.000096	0.00015
2019	Q2	LC_LC5	91	89	102	113	164	0.0023	0.065	0.00011	0.00026	0.000088	0.00018
2019	Q2	LC_LCDSSLCC	101	101	104	115	150	<0.003	0.012	0.00017	0.00019	0.0001	0.00014
2019	Q4	EV_HC1	89	86	100	105	205	<0.003	0.018	<0.0001	0.000076	0.00016	0.00016
2019	Q4	FR_FRABCH	84	81	99	100	238	<0.003	0.013	<0.0001	0.0001	<0.0001	0.000074
2019	Q4	FR_FRCP1	90	86	92	96	243	<0.003	0.0061	0.00033	0.00035	0.00009	0.00012
2019	Q4	GH_ERC	100	96	99	104	155	<0.003	0.0039	<0.0001	<0.0001	0.00007	0.00011
2019	Q4	LC_LC3	90	83	100	104	223	0.0018	0.0028	0.00032	0.00033	0.000092	0.00011
2019	Q4	LC_LCDSSLCC	90	86	103	107	198	<0.003	0.003	0.00019	0.00021	0.00006	0.00011
Tests categorized as possible or likely response for length (2015 to 2018)													
2016	Q4	GH_ERC	98	102	97	103	151	<0.003	0.013	<0.0001	<0.0001	<0.0001	0.00014
Tests categorized as possible or likely response for weight (2015 to 2018)													
2015	Q2	EV_HC1	75	75	100	98	113	0.0031	0.055	0.0001	0.0001	0.00013	0.00017
Tests categorized as possible or likely response for viability (2015 to 2018)													
2016	Q4	CM_MC2	87	84	102	110	179	0.0055	0.088	0.00014	0.00016	0.00017	0.00023
Tests categorized as possible or likely response for survival and viability (2015 to 2018)													
2015	Q4	CM_MC2	82	81	100	103	195	0.0031	0.05	0.00015	0.00017	0.00017	0.00023
2015	Q4	EV_HC1	82	81	98	100	197	0.0032	0.023	0.0001	0.00011	0.00015	0.00018
2016	Q2	CM_MC2	73	73	102	101	146	0.0068	0.37	0.00015	0.00017	0.00017	0.0003
2016	Q2	EV_HC1	86	81	102	111	176	0.0034	0.074	<0.0001	0.00011	0.00015	0.0002
2016	Q2	EV_MC2	68	66	105	113	100	0.014	0.41	0.00012	0.00016	0.00018	0.00037
2016	Q2	GH_ERC	81	77	102	108	145	0.0045	0.23	<0.0001	0.0001	0.0001	0.00025
2016	Q2	GH_FR1	76	77	104	101	166	<0.003	0.058	0.00015	0.00018	0.0001	0.00014
2016	Q2	LC_LCDSSLCC	84	80	104	103	157	0.0026	0.017	0.00023	0.00026	0.00012	0.00015
2016	Q4	EV_HC1	60	59	97	104	195	0.0036	0.037	<0.0001	0.0001	0.00015	0.00018
2016	Q4	FR_FRCP1	54	55	98	100	198	0.0038	0.024	0.00019	0.0002	<0.0001	0.00014
2016	Q4	GH_FR1	44	46	98	105	192	<0.003	0.01	0.00016	0.00024	0.00011	0.00014
2016	Q4	LC_LCDSSLCC	69	70	104	116	184	<0.003	0.03	0.00022	0.00027	<0.0001	0.00019
2017	Q2	GH_ERC	63	69	115	123	149	0.005	0.87	<0.0001	0.00013	0.00012	0.00078
2018	Q4	FR_FRABCH	77	80	99	99	247	<0.003	0.0039	<0.0001	0.00011	<0.0001	0.00011
2018	Q4	GH_FR1	66	68	96	97	206	<0.003	0.0043	0.00013	0.00014	<0.0001	0.00013
Tests categorized as possible or likely response for survival, viability, and length (2015 to 2018)													
2015	Q4	FR_FRCP1	73	72	96	100	213	0.0032	0.0046	0.00025	0.00028	0.0001	0.00011
2015	Q4	GH_FR1	80	79	94	98	193	0.003	0.0037	0.00012	0.00015	0.0001	0.00012
2016	Q2	FR_FRCP1	81	79	99	102	154	<0.003	0.07	0.00017	0.00022	<0.0001	0.00014
Tests categorized as possible or likely response for survival, viability, length, weight (2015 to 2018)													
2015	Q4	GH_ERC	77	74	97	95	152	0.0031	0.0089	0.0001	0.0001	0.0001	0.00012
2018	Q4	FR_FRCP1	23	19	83	87	336	<0.003	0.0064	0.00049	0.0005	<0.0002	0.00021
Tests categorized as possible or likely response for viability (2019)													
2019	Q4	CM_MC2	81	75	99	105	220	<0.003	0.063	0.0002	0.00021	0.00018	0.00021
2019	Q4	EV_MC2	80	75	100	101	177	<0.003	0.0049	0.000082	0.000094	0.00016	0.00016
2019	Q4	LC_LC5	82	72	100	101	195	<0.003	0.0083	0.000062	0.00011	<0.0001	0.000062
Tests categorized as possible or likely response for survival and viability (2019)													
2019	Q2	FR_FRABCH	73	75	96	96	184	<0.003	0.1	0.00013	0.00016	0.000062	0.00018
2019	Q2	GH_FR1	69	71	102	106	171	<0.003	0.1	0.00016	0.00017	0.00011	0.0002
2019	Q4	GH_FR1	69	65	99	109	204	0.0021	0.019	0.00011	0.00012	<0.0001	0.00013
2019	Q4	LC_DCDS	73	66	100	105	151	<0.003	0.0041	0.00049	0.00051	0.00033	0.00035

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-4: *O. mykiss* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	BARIUM-D-mg/l	BARIUM-T-mg/l	BERYLLIUM-D-mg/l	BERYLLIUM-T-mg/l	BISMUTH-D-mg/l	BISMUTH-T-mg/l	BORON-D-mg/l	BORON-T-mg/l	BROMIDE-D-mg/l	CADMIUM-D-mg/l	CADMIUM-T-mg/l
Tests not included in statistical analysis													
2017	Q4	CM_MC2	0.079	0.077	<0.00002	<0.00002	<0.00005	<0.00005	0.033	0.035	0.099	0.000012	0.000014
2017	Q4	EV_HC1	0.065	0.062	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.09	0.000016	0.000019
2017	Q4	EV_MC2	0.11	0.11	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.013	<0.09	0.000026	0.000035
2017	Q4	FR_FRCP1	0.074	0.075	<0.00002	<0.00002	<0.00005	<0.00005	0.011	0.011	0.29	0.000012	0.000056
2017	Q4	GH_ERC	0.057	0.055	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000063	0.000007
2017	Q4	GH_FR1	0.11	0.11	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	0.05	0.000017	0.00002
2017	Q4	LC_LCDSSLCC	0.079	0.077	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	0.053	0.00016	0.00017
2017	Q4	Reference (CM_MC1)	0.051	0.051	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.09	0.0000077	0.0000086
2017	Q4	Reference (FR_UFR1)	0.074	0.073	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	0.052	0.0000068	0.0000098
2017	Q4	Reference (GH_ER2)	0.048	0.047	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000052	0.0000075
Reference													
2015	Q2	Reference (FR_UFR1)	0.043	0.043	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.0000066	0.0000099
2015	Q2	Reference (GH_ER2)	0.044	0.046	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.0000056	0.000017
2015	Q4	Reference (FR_UFR1)	0.073	0.074	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.0000065	0.0000085
2015	Q4	Reference (GH_ER2)	0.047	0.048	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.0000051	0.0000074
2016	Q2	Reference (FR_UFR1)	0.042	0.043	<0.00004	<0.00004	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000006	0.000012
2016	Q2	Reference (GH_ER2)	0.041	0.042	<0.00004	<0.00004	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000059	0.00002
2016	Q4	Reference (FR_UFR1)	0.064	0.063	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000064	0.0000092
2016	Q4	Reference (GH_ER2)	0.045	0.045	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000055	0.0000077
2017	Q2	Reference (FR_UFR1)	0.039	0.04	<0.00002	0.000021	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000094	0.000025
2017	Q2	Reference (GH_ER2)	0.043	0.053	<0.00002	0.000059	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000008	0.00012
2018	Q2	Reference (CM_MC1)	0.028	0.029	<0.000024	0.000023	<0.00006	<0.00005	<0.012	0.01	<0.05	0.000012	0.000033
2018	Q2	Reference (FR_UFR1)	0.039	0.038	<0.00002	0.000021	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000082	0.000024
2018	Q2	Reference (GH_ER2)	0.041	0.054	<0.00002	0.000064	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000085	0.00014
2018	Q2	Reference (LC_SLC)	0.025	0.026	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.06	0.0000081	0.000026
2018	Q4	Reference (CM_MC1)	0.047	0.046	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.05	0.0000081	0.0000091
2018	Q4	Reference (FR_UFR1)	0.071	0.068	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000069	0.0000085
2018	Q4	Reference (GH_ER2)	0.048	0.045	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000055	0.0000073
2018	Q4	Reference (LC_SLC)	0.043	0.043	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.000014
2019	Q2	Reference (CM_MC1)	0.031	0.033	<0.00002	<0.00002	<0.00005	<0.00005	0.0066	0.0068	<0.05	0.000013	0.000026
2019	Q2	Reference (FR_UFR1)	0.042	0.042	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000052	0.000012
2019	Q2	Reference (GH_ER2)	0.041	0.043	<0.00002	0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000065	0.000042
2019	Q2	Reference (LC_SLC)	0.028	0.027	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.000018
2019	Q4	Reference (CM_MC1)	0.046	0.048	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.013	<0.05	0.0000088	0.000011
2019	Q4	Reference (FR_UFR1)	0.069	0.067	<0.00002	0.000013	<0.00005	<0.00005	<0.01	0.008	<0.05	0.000013	0.000031
2019	Q4	Reference (GH_ER2)	0.046	0.045	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000067	0.0000082
2019	Q4	Reference (LC_SLC)	0.042	0.042	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.000014
Tests categorized as no adverse response													
2015	Q2	CM_MC2	0.043	0.049	0.00018	0.00014	0.00054	0.00054	0.021	0.018	0.05	0.000038	0.000081
2015	Q2	EV_MC2	0.064	0.076	0.0001	0.00012	0.00005	0.00005	0.01	0.01	0.05	0.000024	0.00013
2015	Q2	FR_FRCP1	0.063	0.064	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.000028	0.000042
2015	Q2	GH_ERC	0.049	0.051	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.0000073	0.000033
2015	Q2	GH_FR1	0.085	0.086	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.07	0.000021	0.000028
2015	Q2	LC_LCDSSLCC	0.035	0.035	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.06	0.00011	0.00013
2015	Q4	EV_MC2	0.11	0.11	0.0001	0.0001	0.00005	0.00005	0.013	0.013	0.10	0.000029	0.000045
2015	Q4	LC_LCDSSLCC	0.083	0.087	0.0001	0.0001	0.00005	0.00005	0.015	0.016	0.25	0.0002	0.00024
2016	Q4	EV_MC2	0.079	0.083	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	0.01	<0.05	0.000025	0.000036
2017	Q2	CM_MC2	0.043	0.048	<0.00002	0.000042	<0.00005	<0.00005	0.016	0.017	<0.05	0.000092	0.00017
2017	Q2	EV_HC1	0.04	0.043	<0.00002	0.000028	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000025	0.000057
2017	Q2	EV_MC2	0.059	0.077	<0.00002	0.000065	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000029	0.00016
2017	Q2	FR_FRCP1	0.054	0.057	<0.00002	0.000027	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.00005	0.00011
2017	Q2	GH_FR1	0.07	0.077	<0.00002	0.00003	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000025	0.000088
2017	Q2	LC_LCDSSLCC	0.035	0.034	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.00022	0.00023
2018	Q2	CM_MC2	0.05	0.055	<0.000024	0.000067	<0.00006	<0.00005	0.016	0.017	<0.05	0.000077	0.00015
2018	Q2	EV_HC1	0.041	0.041	<0.00002	0.000025	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000021	0.000041
2018	Q2	EV_MC2	0.057	0.071	0.000021	0.00006	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000042	0.00016
2018	Q2	FR_FRCP1	0.048	0.057	<0.00002	0.00004	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000055	0.00014
2018	Q2	GH_ERC	0.048	0.067	<0.00002	0.000097	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.0002
2018	Q2	GH_FR1	0.065	0.068	<0.00002	0.000041	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.00003	0.000086
2018	Q2	LC_LCDSSLCC	0.033	0.034	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.06	0.00022	0.00026
2018	Q4	CM_MC2	0.071	0.072	<0.00002	<0.00002	<0.00005	<0.00005	0.048	0.049	<0.21	0.000023	0.000029
2018	Q4	EV_HC1	0.067	0.068	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.17	0.000015	0.000022
2018	Q4	EV_MC2	0.11	0.11	<0.00002	<0.00002	<0.00005	<0.00005	0.014	0.014	0.2	0.000025	0.000031
2018	Q4	GH_ERC	0.059	0.056	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000065	0.000013
2018	Q4	LC_LCDSSLCC	0.072	0.07	<0.00002	<0.00002	<0.00005	<0.00005	0.016	0.017	<0.17	0.00016	0.00016
2019	Q2	CM_MC2	0.042	0.044	<0.00002	0.000021	<0.00005	<0.00005	0.012	0.015	<0.05	0.000055	0.00009
2019	Q2	EV_HC1	0.041	0.042	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000014	0.00002
2019	Q2	EV_MC2	0.06	0.067	<0.00002	0.000017	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000021	0.000063
2019	Q2	FR_FRCP1	0.052	0.053	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000031	0.000053
2019	Q2	GH_ERC	0.048	0.052	<0.00002	0.00003	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000016	0.000056
2019	Q2	LC_DCDS	0.15	0.15	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000041	0.000072
2019	Q2	LC_LC3	0.032	0.032	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.013	<0.045	0.00027	0.00028
2019	Q2	LC_LC5	0.072	0.073	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000023	0.000066
2019	Q2	LC_LCDSSLCC	0.039	0.037	<0.00002	<0.00002	<0.00005	<0.00005	0.006	0.0062	<0.05	0.00012	0.00014
2019	Q4	EV_HC1	0.064	0.062	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000014	0.000019
2019	Q4	FR_FRABCH	0.097	0.095	<0.00002	<0.00002	<0.00005	<0.00005	0.0096	0.012	<0.11	0.000023	0.000039
2019	Q4	FR_FRCP1	0.073	0.075	<0.00002	<0.00002	<0.00005	<0.00005	0.0096	0.012	<0.11	0.000036	0.000071
2019	Q4	GH_ERC	0.062	0.063	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000008	0.0000085
2019	Q4	LC_LC3	0.066	0.066	<0.00002	<0.00002	<0.00005	<0.00005	0.015	0.017	<0.11	0.00023	0.00023
2019	Q4	LC_LCDSSLCC	0.074	0.073	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.013	<0.065	0.00011	0.00012
Tests categorized as possible or likely response for length (2015 to 2018)													
2016	Q4	GH_ERC	0.055	0.054	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000057	0.0000068
Tests categorized as possible or likely response for weight (2015 to 2018)													
2015	Q2	EV_HC1	0.027	0.028	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.057	0.000014	0.00002
Tests categorized as possible or likely response for viability (2015 to 2018)													
2016	Q4	CM_MC2	0.054	0.056	<0.00002	<0.00002	<0.00005	<0.00005	0.019	0.021	<0.1	0.000027	0.000035
Tests categorized as possible or likely response for survival and viability (2015 to 2018)													
2015	Q4	CM_MC2	0.074	0.074	0.0001	0.0001	0.00005	0.00005	0.024	0.027	0.25	0.000012	0.000019
2015	Q4	EV_HC1	0.063	0.064	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.2	0.000015	0.000022
2016	Q2	CM_MC2	0.045	0.045	<0.00004	0.000044	<0.00005	<0.00005	0.017	0.017	<0.05	0.000064	0.0001
2016	Q2	EV_HC1	0.041	0.042	<0.00004	<0.00004	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.00002	0.000031
2016	Q2	EV_MC2	0.057	0.062	<0.00004	0.000047	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000028	0.000082
2016	Q2	GH_ERC	0.048	0.05	<0.00004	<0.00004	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000082	0.000029
2016	Q2	GH_FR1	0.08	0.08	<0.00004	<0.00004	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000022	0.000032
2016	Q2	LC_LCDSSLCC	0.039	0.04	<0.00004	<0.00004	<0.00005	<0.00005	0.01	0.011	<0.1	0.0002	0.00022
2016	Q4	EV_HC1	0.057	0.056	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.2	0.000016	0.00002
2016	Q4	FR_FRCP1	0.075	0.074	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000042	0.000051
2016	Q4	GH_FR1	0.1	0.1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000016	0.00002
2016	Q4	LC_LCDSSLCC	0.061	0.062	<0.00002	<0.00002	<0.00005	<0.00005	0.01	0.011	<0.25	0.00015	0.00016
2017	Q2	GH_ERC	0.049	0.062	<0.00002	0.000072	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011	0.00014
2018	Q4	FR_FRABCH	0.11	0.11	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.012	<0.25	0.000033	0.000037
2018	Q4	GH_FR1	0.12	0.11	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000017	0.00002
Tests categorized as possible or likely response for survival, viability, and length (2015 to 2018)													
2015	Q4	FR_FRCP1	0.08	0.08	0.0001	0.0001	0.00005	0.00005	0.011	0.012	0.25	0.000043	0.000058
2015	Q4	GH_FR1	0.11	0.11	0.0001	0.0001	0.00005	0.00005	0.01	0.012	0.25	0.000017	0.000019
2016	Q2	FR_FRCP1	0.058	0.059	<0.00004	<0.00004	<0.00005	0.000051	<0.01	<0.01	<0.05	0.000027	0.000045
Tests categorized as possible or likely response for survival, viability, length, weight (2015 to 2018)													
2015	Q4	GH_ERC	0.06	0.06	0.0001	0.0001	0.00005	0.00005	0.01	0.01	0.05	0.0000056	0.0000063
2018	Q4	FR_FRCP1	0.015	0.018	<0.00004	<0.000028	<0.0001	<0.00007	<0.02	0.014	<0.25	<0.00001	0.000015
Tests categorized as possible or likely response for viability (2019)													
2019	Q4	CM_MC2	0.063	0.064	<0.00002	<0.00002	<0.00005	<0.00005	0.028	0.028	<0.085	0.000023	0.00003
2019	Q4	EV_MC2	0.11	0.11	<0.00002	<0.00002	<0.00005	<0.00005	0.0092	0.01	0.038	0.000022	0.000025
2019	Q4	LC_LC5	0.093	0.091	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	0.006	<0.05	0.000016	0.000022
Tests categorized as possible or likely response for survival and viability (2019)													
2019	Q2	FR_FRABCH	0.069	0.07	<0.00002	<0.00002	<0.00005	<0.00005	0.006	0.007	<0.045	0.000031	0.00006
2019	Q2	GH_FR1	0.079	0.078	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000018	0.000039
2019	Q4	GH_FR1	0.1	0.1	<0.00002	<0.00002	<0.00005	<0.00005	0.006	<0.01	<0.05	0.000016	0.000025
2019	Q4	LC_DCDS	0.26	0.26	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.11	0.00012	0.00013

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-4: *O. mykiss* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	CALCIUM-T-mg/l	CARBON DISSOLVED ORGANIC-D-mg/l	CHLORIDE-D-mg/l	CHROMIUM-D-mg/l	CHROMIUM-T-mg/l	COBALT-D-mg/l	COBALT-T-mg/l	CONDUCTIVITY LAB-N-us/cm	COPPER-D-mg/l	COPPER-T-mg/l	FLUORIDE-D-mg/l
Tests not included in statistical analysis													
2017	Q4	CM_MC2	121	1.1	4.4	0.00012	0.00019	0.0011	0.0012	919	<0.0005	<0.0005	0.09
2017	Q4	EV_HC1	84	1.1	1.1	0.00013	0.00019	<0.0001	<0.0001	698	<0.0005	<0.0005	0.22
2017	Q4	EV_MC2	81	0.93	7.1	0.00011	0.00015	<0.0001	<0.0001	588	<0.0005	<0.0005	0.14
2017	Q4	FR_FRCP1	151	0.97	<2.5	<0.0001	0.00018	<0.0001	0.00011	1174	<0.0005	<0.0005	0.11
2017	Q4	GH_ERC	47	0.68	<0.5	0.00022	0.00029	<0.0001	<0.0001	300	<0.0005	<0.0005	0.13
2017	Q4	GH_FR1	106	1.1	1.3	0.00012	0.00015	<0.0001	<0.0001	826	<0.0005	<0.0005	0.13
2017	Q4	LC_LCDSSLCC	114	0.87	6.7	0.00011	0.00019	<0.0001	<0.0001	853	<0.0005	<0.0005	0.18
2017	Q4	Reference (CM_MC1)	41	1.2	1.1	0.00018	0.00019	<0.0001	<0.0001	275	<0.0005	<0.0005	0.093
2017	Q4	Reference (FR_UFR1)	51	0.71	<0.5	0.0001	0.00018	<0.0001	<0.0001	334	<0.0005	<0.0005	0.11
2017	Q4	Reference (GH_ER2)	43	0.63	<0.5	0.00025	0.00028	<0.0001	<0.0001	280	<0.0005	<0.0005	0.13
Reference													
2015	Q2	Reference (FR_UFR1)	38	1.9	1.0	0.00012	0.00026	0.0001	0.0001	239	0.0005	0.0005	0.15
2015	Q2	Reference (GH_ER2)	49	1.1	1.2	0.0002	0.00075	0.0001	0.0001	297	0.0005	0.00052	0.16
2015	Q4	Reference (FR_UFR1)	56	0.55	1.0	0.00012	0.00018	0.0001	0.0001	356	0.0005	0.0005	0.15
2015	Q4	Reference (GH_ER2)	52	0.68	1.1	0.00022	0.0003	0.0001	0.0001	314	0.0005	0.0005	0.16
2016	Q2	Reference (FR_UFR1)	38	1.7	0.1	0.00013	0.0002	<0.0001	<0.0001	243	<0.0005	<0.0005	0.16
2016	Q2	Reference (GH_ER2)	48	1.1	0.57	0.00019	0.00049	<0.0001	0.0001	287	<0.0005	<0.0005	0.16
2016	Q4	Reference (FR_UFR1)	47	1.2	0.19	0.00011	0.0002	<0.0001	<0.0001	319	<0.0005	<0.0005	0.16
2016	Q4	Reference (GH_ER2)	48	0.64	0.37	0.00024	0.00026	<0.0001	<0.0001	297	<0.0005	<0.0005	0.17
2017	Q2	Reference (FR_UFR1)	31	2.5	<0.5	0.0001	0.00058	<0.0001	0.00014	218	0.00025	0.0006	0.11
2017	Q2	Reference (GH_ER2)	53	1.8	0.45	0.00017	0.0019	<0.0001	0.00047	276	<0.00044	0.0013	0.14
2018	Q2	Reference (CM_MC1)	25	3.3	<0.5	0.00022	0.00057	<0.00012	0.00014	176	<0.0005	0.00077	0.046
2018	Q2	Reference (FR_UFR1)	30	2.2	<0.5	0.00011	0.00041	<0.0001	0.00014	206	<0.0005	0.0011	0.12
2018	Q2	Reference (GH_ER2)	49	1.8	0.51	0.00015	0.0019	<0.0001	0.00047	265	<0.0005	0.0015	0.15
2018	Q2	Reference (LC_SLC)	33	2.1	<0.5	0.00011	0.00028	<0.0001	<0.0001	220	<0.0005	<0.0005	0.2
2018	Q4	Reference (CM_MC1)	39	1.6	0.5	0.00018	0.00021	<0.0001	<0.0001	278	<0.0005	<0.0005	0.069
2018	Q4	Reference (FR_UFR1)	50	0.72	<0.5	0.0001	0.00018	<0.0001	<0.0001	343	<0.0005	<0.0005	0.15
2018	Q4	Reference (GH_ER2)	47	0.5	<0.5	0.00024	0.00028	<0.0001	<0.0001	297	<0.0005	<0.0005	0.17
2018	Q4	Reference (LC_SLC)	52	0.71	0.5	0.00013	0.0002	<0.0001	<0.0001	368	<0.0005	<0.0005	0.36
2019	Q2	Reference (CM_MC1)	29	3.5	<0.5	0.0002	0.00043	<0.0001	0.000086	206	<0.0005	0.00053	0.059
2019	Q2	Reference (FR_UFR1)	35	1.4	<0.5	0.00011	0.00029	<0.0001	<0.0001	235	<0.0005	<0.0005	0.15
2019	Q2	Reference (GH_ER2)	46	0.88	0.48	0.00023	0.00067	<0.0001	0.00014	291	<0.0005	0.0005	0.15
2019	Q2	Reference (LC_SLC)	38	1.8	<0.5	0.00015	0.00019	<0.0001	<0.0001	266	<0.0005	<0.0005	0.24
2019	Q4	Reference (CM_MC1)	40	0.88	<0.5	0.00022	0.00024	<0.0001	<0.0001	266	0.00028	<0.0005	0.065
2019	Q4	Reference (FR_UFR1)	51	1.0	<0.5	0.00011	0.00023	<0.0001	0.000076	329	0.00018	0.00044	0.14
2019	Q4	Reference (GH_ER2)	49	0.31	<0.5	0.00026	0.00027	<0.0001	<0.0001	298	0.0003	<0.0005	0.14
2019	Q4	Reference (LC_SLC)	55	0.6	0.38	0.00015	0.00018	<0.0001	<0.0001	365	0.00027	<0.0005	0.32
Tests categorized as no adverse response													
2015	Q2	CM_MC2	60	1.3	1.4	0.00028	0.00091	0.00034	0.00082	466	0.0005	0.0011	0.097
2015	Q2	EV_MC2	46	2.0	3.2	0.00018	0.0012	0.0001	0.00048	321	0.00061	0.0014	0.12
2015	Q2	FR_FRCP1	75	1.5	1.1	0.0001	0.00018	0.0001	0.0001	580	0.0005	0.0005	0.2
2015	Q2	GH_ERC	53	1.1	1.3	0.00024	0.00069	0.0001	0.00014	323	0.0005	0.0007	0.15
2015	Q2	GH_FR1	81	1.4	1.6	0.00012	0.00024	0.0001	0.0001	595	0.0005	0.0005	0.17
2015	Q2	LC_LCDSSLCC	58	1.2	1.5	0.00012	0.00032	0.0001	0.00012	436	0.0005	0.00056	0.15
2015	Q4	EV_MC2	81	1.5	5.6	0.00014	0.00027	0.0001	0.00011	588	0.0005	0.00056	0.15
2015	Q4	LC_LCDSSLCC	125	0.67	3.8	0.00014	0.00017	0.0001	0.0001	901	0.0005	0.0005	0.22
2016	Q4	EV_MC2	55	2.1	3.5	0.00012	0.00029	<0.0001	0.00011	410	<0.0005	0.00054	0.13
2017	Q2	CM_MC2	62	2.1	0.72	0.00015	0.00096	0.0018	0.0029	517	0.00023	0.0011	0.085
2017	Q2	EV_HC1	59	2.4	0.5	0.00012	0.00061	<0.0001	0.00018	458	<0.0005	0.00082	0.16
2017	Q2	EV_MC2	38	2.9	2.0	0.00013	0.0016	<0.0001	0.00069	277	<0.0005	0.0018	0.11
2017	Q2	FR_FRCP1	68	2.0	0.5	<0.0001	0.00059	<0.0001	0.00027	540	0.00025	0.00087	0.16
2017	Q2	GH_FR1	68	2.1	0.84	0.0001	0.00078	<0.0001	0.00029	506	<0.00044	0.00097	0.16
2017	Q2	LC_LCDSSLCC	59	1.8	2.0	0.00011	0.00023	0.0001	0.00012	489	0.00033	0.00057	0.18
2018	Q2	CM_MC2	58	2.0	1.7	0.00016	0.0014	0.0013	0.0027	486	<0.0005	0.0015	0.085
2018	Q2	EV_HC1	60	2.3	0.57	0.00012	0.00043	<0.0001	0.00017	485	<0.0005	0.0007	0.17
2018	Q2	EV_MC2	35	3.0	1.5	0.00022	0.0014	0.00014	0.00072	262	0.00053	0.0017	0.1
2018	Q2	FR_FRCP1	70	1.7	0.51	0.00011	0.0007	<0.0001	0.00036	527	<0.0005	0.0011	0.17
2018	Q2	GH_ERC	56	1.8	0.55	0.00018	0.0027	<0.0001	0.00078	292	<0.0005	0.0023	0.15
2018	Q2	GH_FR1	66	2.3	0.86	0.0001	0.00085	<0.0001	0.00025	521	0.00053	0.00088	0.18
2018	Q2	LC_LCDSSLCC	60	1.7	1.8	0.00011	0.00025	<0.0001	0.00011	490	<0.0005	0.00052	0.22
2018	Q4	CM_MC2	126	1.0	3.9	0.00015	0.00018	0.0051	0.0055	993	<0.0005	<0.0005	0.14
2018	Q4	EV_HC1	87	1.0	1.4	0.00016	0.00023	<0.0001	<0.0001	727	<0.0005	<0.0005	0.22
2018	Q4	EV_MC2	82	1.2	5.7	0.00012	0.00018	<0.0001	<0.0001	625	<0.0005	<0.0005	0.15
2018	Q4	GH_ERC	49	<0.5	<0.5	0.00023	0.00034	<0.0001	<0.0001	322	<0.0005	<0.0005	0.16
2018	Q4	LC_LCDSSLCC	106	0.66	7.0	0.00011	0.00015	<0.0001	<0.0001	842	<0.0005	<0.0005	0.24
2019	Q2	CM_MC2	63	2.1	1.2	0.00017	0.00062	0.00065	0.0015	535	<0.0005	0.0006	0.10
2019	Q2	EV_HC1	64	1.6	0.57	0.00015	0.00021	<0.0001	<0.0001	522	<0.0005	<0.0005	0.19
2019	Q2	EV_MC2	37	2.4	1.4	0.00019	0.00049	<0.0001	0.00024	276	0.00031	0.00054	0.11
2019	Q2	FR_FRCP1	78	1.1	0.53	0.000098	0.00024	0.000074	0.00016	624	<0.0005	0.00034	0.2
2019	Q2	GH_ERC	51	0.58	0.61	0.00023	0.00099	<0.0001	0.00022	322	<0.0005	0.00073	0.15
2019	Q2	LC_DCDS	47	2.3	3.2	0.00011	0.00012	0.000074	0.00017	384	<0.0005	<0.0005	0.11
2019	Q2	LC_LC3	95	0.37	7.8	0.00015	0.00016	0.00009	0.00016	782	<0.0005	0.00045	0.23
2019	Q2	LC_LC5	79	0.99	2.1	0.00013	0.00026	<0.0001	0.00013	610	<0.0005	0.00031	0.21
2019	Q2	LC_LCDSSLCC	71	1.0	4.6	0.00015	0.0002	<0.0001	0.000072	579	<0.0005	<0.0005	0.24
2019	Q4	EV_HC1	88	0.52	1.5	0.00016	0.00019	<0.0001	<0.0001	714	0.00012	<0.0005	0.21
2019	Q4	FR_FRABCH	137	1.0	1.3	0.0001	0.00014	0.00015	0.00017	982	0.00023	0.00046	0.1
2019	Q4	FR_FRCP1	171	0.96	1.4	0.000064	0.00012	0.00011	0.00014	1268	0.0002	<0.0005	0.17
2019	Q4	GH_ERC	56	<0.5	<0.5	0.00024	0.00026	<0.0001	<0.0001	345	0.00042	<0.0005	0.15
2019	Q4	LC_LC3	153	0.5	18	0.00013	0.00014	0.00012	0.00013	1128	0.00052	0.00033	0.16
2019	Q4	LC_LCDSSLCC	118	0.42	11	0.00014	0.0002	<0.0001	<0.0001	869	0.0004	0.00041	0.16
Tests categorized as possible or likely response for length (2015 to 2018)													
2016	Q4	GH_ERC	52	0.54	0.45	0.00023	0.0003	<0.0001	<0.0001	324	<0.0005	0.00051	0.16
Tests categorized as possible or likely response for weight (2015 to 2018)													
2015	Q2	EV_HC1	47	1.1	1.3	0.00014	0.00023	0.0001	0.0001	364	0.0005	0.00051	0.13
Tests categorized as possible or likely response for viability (2015 to 2018)													
2016	Q4	CM_MC2	85	1.6	2.0	0.00016	0.00033	0.00076	0.00099	669	<0.0005	<0.0005	0.11
Tests categorized as possible or likely response for survival and viability (2015 to 2018)													
2015	Q4	CM_MC2	107	1.2	3.4	0.00016	0.00026	0.00051	0.0006	821	0.0005	0.00059	0.11
2015	Q4	EV_HC1	93	1.3	1.9	0.00014	0.00028	0.0001	0.0001	750	0.0005	0.00053	0.2
2016	Q2	CM_MC2	68	1.5	1.2	0.00017	0.0006	0.0021	0.0029	537	<0.0005	0.0007	0.1
2016	Q2	EV_HC1	71	1.3	0.74	0.00012	0.00024	<0.0001	<0.0001	545	<0.0005	<0.0005	0.19
2016	Q2	EV_MC2	40	2.3	1.7	0.00013	0.00073	<0.0001	0.00031	286	0.00051	0.00098	0.12
2016	Q2	GH_ERC	53	1.1	0.67	0.00022	0.00067	<0.0001	0.00014	327	<0.0005	0.00055	0.16
2016	Q2	GH_FR1	79	1.4	0.96	0.00011	0.00022	<0.0001	<0.0001	598	<0.0005	<0.0005	0.18
2016	Q2	LC_LCDSSLCC	75	1.3	3.2	0.00015	0.00019	0.000092	0.000095	562	0.00044	0.00051	0.23
2016	Q4	EV_HC1	82	1.2	1.2	0.00015	0.00018	<0.0001	<0.0001	661	<0.0005	<0.0005	0.21
2016	Q4	FR_FRCP1	106	1.0	1.4	<0.0001	0.00015	<0.0001	<0.0001	850	<0.0005	<0.0005	0.21
2016	Q4	GH_FR1	100	0.84	1.6	0.00012	0.00016	<0.0001	<0.0001	758	<0.0005	<0.0005	0.17
2016	Q4	LC_LCDSSLCC	95	0.8	6.5	0.00012	0.00021	<0.0001	<0.0001	742	<0.0005	<0.0005	0.25
2017	Q2	GH_ERC	56	1.8	0.55	0.00021	0.0023	<0.0001	0.00058	302	<0.00044	0.0016	0.14
2018	Q4	FR_FRABCH	139	0.69	<2.5	0.00011	0.00014	0.0001	0.0001	1066	<0.0005	<0.0005	0.15
2018	Q4	GH_FR1	110	0.69	<2.5	0.00011	0.00015	<0.0001	<0.0001	869	<0.0005	<0.0005	0.16
Tests categorized as possible or likely response for survival, viability, and length (2015 to 2018)													
2015	Q4	FR_FRCP1	141	0.78	2.4	0.00012	0.00016	0.0001	0.0001	1100	0.0005	0.0005	0.18
2015	Q4	GH_FR1	107	0.66	2.0	0.00012	0.00017	0.0001	0.0001	783	0.0005	0.0005	0.16
2016	Q2	FR_FRCP1	75	1.5	0.51	0.00011	0.00024	<0.0001	0.0001	569	<0.0005	0.00051	0.21
Tests categorized as possible or likely response for survival, viability, length, weight (2015 to 2018)													
2015	Q4	GH_ERC	58	0.58	1.2	0.00023	0.0003	0.0001	0.0001	357	0.0005	0.00052	0.16
2018	Q4	FR_FRCP1	414	1.7	6.4	<0.0002	0.00015	<0.0002	<0.00014	3314	<0.0005	<0.0007	0.12
Tests categorized as possible or likely response for viability (2019)													
2019	Q4	CM_MC2	132	0.76	3.1	0.00019	0.0003	0.0015	0.0021	974	0.00023	<0.0005	0.12
2019	Q4	EV_MC2	72	0.59	3.7	0.00017	0.00015	<0.0001	<0.0001	537	0.00015	<0.0005	0.14
2019	Q4	LC_LC5	98	0.62	3.9	0.00013	0.00015	<0.0001	<0.0001	724	0.00028	<0.0005	0.17
Tests categorized as possible or likely response for survival and viability (2019)													
2019	Q2	FR_FRABCH	100	1.1	0.88	0.000098	0.0003	0.00012	0.00022	803	<0.0005	0.00047	0.17
2019	Q2	GH_FR1	85	1.1	1.2	0.00013	0.00037	0.000062	0.00013	682	<0.0005	0.00045	0.17
2019	Q4	GH_FR1	112	0.71	1.7	0.00014	0.00016	<0.0001	0.000068	806	0.0002	0.00042	0.14
2019	Q4	LC_DCDS	101	1.7	12	0.000086	0.000062	0.000084	0.00011	739	0.00034	0.00035	0.087

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-4: *O. mykiss* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	Hardness Total or Dissolved CaCO3-N-mg/l	IRON-D-mg/l	IRON-T-mg/l	LEAD-D-mg/l	LEAD-T-mg/l	LITHIUM-D-mg/l	LITHIUM-T-mg/l	MAGNESIUM-T-mg/l	MANGANESE-D-mg/l	MANGANESE-T-mg/l	MERCURY-D-mg/l
Tests not included in statistical analysis													
2017	Q4	CM_MC2	532	<0.01	0.012	<0.00005	<0.00005	0.018	0.019	59	0.0043	0.0054	<0.000005
2017	Q4	EV_HC1	399	<0.01	0.011	<0.00005	<0.00005	0.007	0.0074	47	0.0025	0.0044	0.0000015
2017	Q4	EV_MC2	314	<0.01	0.016	<0.00005	<0.00005	0.015	0.016	31	0.00073	0.0017	0.0000031
2017	Q4	FR_FRCP1	745	0.01	0.049	<0.00005	0.000057	0.041	0.04	94	0.0075	0.013	<0.000005
2017	Q4	GH_ERC	167	<0.01	<0.01	<0.00005	0.000055	0.0027	0.0026	12	0.00034	0.00097	<0.000005
2017	Q4	GH_FR1	497	<0.01	0.013	<0.00005	<0.00005	0.017	0.017	57	0.0013	0.002	<0.000005
2017	Q4	LC_LCDSSLCC	494	<0.01	<0.01	<0.00005	<0.00005	0.041	0.041	51	0.00059	0.0013	<0.000005
2017	Q4	Reference (CM_MC1)	144	<0.01	<0.01	<0.00005	<0.00005	0.0046	0.0047	11	0.00013	0.00026	<0.000005
2017	Q4	Reference (FR_UFR1)	184	<0.01	<0.01	<0.00005	<0.00005	0.0017	0.0017	14	0.00012	0.00047	<0.000005
2017	Q4	Reference (GH_ER2)	155	<0.01	0.011	<0.00005	<0.00005	0.0019	0.0017	11	0.00044	0.0015	<0.000005
Reference													
2015	Q2	Reference (FR_UFR1)	132	0.01	0.04	0.00005	0.00005	0.0012	0.0012	9.4	0.00067	0.0022	0.000005
2015	Q2	Reference (GH_ER2)	162	0.01	0.093	0.00005	0.000072	0.0016	0.0017	11	0.0029	0.0074	0.0000055
2015	Q4	Reference (FR_UFR1)	193	0.01	0.01	0.00005	0.00005	0.0014	0.0013	14	0.00016	0.00031	0.000005
2015	Q4	Reference (GH_ER2)	173	0.01	0.022	0.00005	0.00005	0.0016	0.0016	11	0.0023	0.0035	0.000005
2016	Q2	Reference (FR_UFR1)	133	<0.01	0.043	<0.00005	0.000053	0.0012	0.0013	10.0	0.00032	0.0016	<0.000005
2016	Q2	Reference (GH_ER2)	162	<0.01	0.17	<0.00005	0.00011	0.0016	0.0017	11	0.0014	0.013	<0.000005
2016	Q4	Reference (FR_UFR1)	171	<0.01	0.019	<0.00005	<0.00005	0.0013	0.0016	12	0.00017	0.00056	<0.000005
2016	Q4	Reference (GH_ER2)	163	<0.01	0.012	<0.00005	<0.00005	0.0019	0.0018	11	0.0011	0.0019	<0.000005
2017	Q2	Reference (FR_UFR1)	112	<0.01	0.2	<0.00005	0.00014	0.001	0.0012	8.6	0.00054	0.0087	<0.000005
2017	Q2	Reference (GH_ER2)	155	<0.01	1.1	<0.00005	0.00069	0.0013	0.0026	12	0.0014	0.069	<0.000005
2018	Q2	Reference (CM_MC1)	93	0.02	0.31	<0.00006	0.00025	0.0021	0.0025	7.1	0.00099	0.0092	0.0000052
2018	Q2	Reference (FR_UFR1)	112	<0.01	0.19	<0.00005	0.00014	0.0011	0.0013	8.4	0.00059	0.0083	<0.000005
2018	Q2	Reference (GH_ER2)	142	<0.01	1.0	<0.00005	0.00075	0.0014	0.0022	11	0.00077	0.065	<0.000005
2018	Q2	Reference (LC_SLC)	123	<0.01	0.059	<0.00005	0.000063	0.0013	0.0015	8.5	0.00015	0.0021	<0.000005
2018	Q4	Reference (CM_MC1)	142	<0.01	<0.01	<0.00005	<0.00005	0.0043	0.0043	11	0.00011	0.00029	<0.000005
2018	Q4	Reference (FR_UFR1)	187	<0.01	<0.01	<0.00005	<0.00005	0.0015	0.0016	14	0.00013	0.00032	<0.000005
2018	Q4	Reference (GH_ER2)	167	<0.01	0.015	<0.00005	<0.00005	0.0018	0.0019	11	0.00039	0.0013	<0.000005
2018	Q4	Reference (LC_SLC)	201	<0.01	0.013	<0.00005	<0.00005	0.0035	0.0037	17	0.00013	0.00033	<0.000005
2019	Q2	Reference (CM_MC1)	103	0.015	0.17	<0.00005	0.00014	0.0025	0.0028	8.0	0.00048	0.0053	<0.000005
2019	Q2	Reference (FR_UFR1)	128	<0.01	0.047	<0.00005	0.000039	0.0012	0.0012	10	0.00026	0.0028	<0.000005
2019	Q2	Reference (GH_ER2)	156	<0.01	0.29	<0.00005	0.00019	0.0015	0.0019	11	0.00024	0.016	<0.000005
2019	Q2	Reference (LC_SLC)	137	<0.01	0.015	<0.00005	<0.00005	0.0017	0.0018	10	0.00008	0.00076	<0.000005
2019	Q4	Reference (CM_MC1)	148	<0.01	<0.01	<0.00005	<0.00005	0.0044	0.0045	11	0.00007	0.00019	<0.000005
2019	Q4	Reference (FR_UFR1)	186	<0.01	0.068	<0.00005	0.00010	0.0016	0.0017	14	0.000064	0.0042	<0.000005
2019	Q4	Reference (GH_ER2)	162	<0.01	0.016	<0.00005	<0.00005	0.0018	0.0019	12	0.00065	0.0014	<0.000005
2019	Q4	Reference (LC_SLC)	199	<0.01	0.0092	<0.00005	<0.00005	0.0037	0.0039	17	<0.0001	0.00052	<0.000005
Tests categorized as no adverse response													
2015	Q2	CM_MC2	245	0.022	0.74	0.00009	0.0005	0.0063	0.0068	24	0.0029	0.025	0.000006
2015	Q2	EV_MC2	170	0.01	0.82	0.00005	0.00067	0.0066	0.007	14	0.00073	0.024	0.000005
2015	Q2	FR_FRCP1	315	0.01	0.066	0.00005	0.000076	0.02	0.02	31	0.0031	0.0083	0.000005
2015	Q2	GH_ERC	177	0.01	0.26	0.000051	0.00018	0.0021	0.0023	12	0.00054	0.014	0.000005
2015	Q2	GH_FR1	335	0.01	0.071	0.00005	0.000071	0.015	0.015	32	0.001	0.0045	0.000005
2015	Q2	LC_LCDSSLCC	232	0.01	0.048	0.00005	0.000081	0.014	0.012	22	0.00015	0.0023	0.000005
2015	Q4	EV_MC2	320	0.013	0.083	0.00005	0.000077	0.016	0.015	29	0.0013	0.003	<0.0000005
2015	Q4	LC_LCDSSLCC	497	0.01	0.01	0.00005	0.00005	0.036	0.036	52	0.00037	0.0005	0.000005
2016	Q4	EV_MC2	211	0.014	0.081	<0.00005	0.000078	0.0092	0.0092	19	0.00062	0.0026	0.000001
2017	Q2	CM_MC2	252	0.01	0.83	<0.00005	0.0005	0.009	0.0095	26	0.011	0.039	<0.000005
2017	Q2	EV_HC1	260	<0.01	0.4	<0.00005	0.00023	0.0046	0.0047	26	0.0013	0.0089	0.00000082
2017	Q2	EV_MC2	142	0.024	1.2	<0.00005	0.0008	0.005	0.0055	13	0.0018	0.033	0.0000016
2017	Q2	FR_FRCP1	279	<0.01	0.39	<0.00005	0.00028	0.019	0.019	28	0.0023	0.023	<0.000005
2017	Q2	GH_FR1	281	<0.01	0.51	<0.00005	0.00038	0.013	0.013	28	0.0013	0.022	<0.000005
2017	Q2	LC_LCDSSLCC	248	<0.01	0.043	<0.00005	0.000055	0.021	0.02	24	0.00054	0.0034	<0.000005
2018	Q2	CM_MC2	252	0.012	1.3	<0.00006	0.00082	0.0081	0.0091	24	0.01	0.05	<0.000005
2018	Q2	EV_HC1	270	0.018	0.27	0.000051	0.00018	0.0049	0.0049	26	0.0015	0.0078	<0.000005
2018	Q2	EV_MC2	134	0.073	1.1	0.000098	0.00077	0.0047	0.0054	11	0.0042	0.035	<0.000005
2018	Q2	FR_FRCP1	288	<0.01	0.6	<0.00005	0.00044	0.019	0.018	28	0.0015	0.033	<0.000005
2018	Q2	GH_ERC	159	<0.01	1.8	<0.00005	0.0013	0.0025	0.0039	13	0.00071	0.098	<0.000005
2018	Q2	GH_FR1	285	0.01	0.37	<0.00005	0.0003	0.013	0.013	28	0.00074	0.018	<0.000005
2018	Q2	LC_LCDSSLCC	270	<0.01	0.039	<0.00005	0.000056	0.024	0.023	25	0.00026	0.0022	<0.000005
2018	Q4	CM_MC2	556	<0.01	0.016	<0.00005	0.000055	0.024	0.025	57	0.018	0.021	<0.000005
2018	Q4	EV_HC1	422	<0.01	0.034	<0.00005	0.000056	0.0067	0.007	50	0.0022	0.0034	<0.000005
2018	Q4	EV_MC2	331	<0.01	0.018	<0.00005	0.00013	0.018	0.018	33	0.00089	0.0015	<0.000005
2018	Q4	GH_ERC	179	<0.01	0.053	<0.00005	0.000068	0.0026	0.0027	12	0.00028	0.0043	<0.000005
2018	Q4	LC_LCDSSLCC	470	<0.01	<0.01	<0.00005	<0.00005	0.042	0.042	49	0.00038	0.00086	<0.000005
2019	Q2	CM_MC2	269	<0.01	0.4	<0.00005	0.00028	0.0068	0.0074	28	0.0042	0.022	<0.000005
2019	Q2	EV_HC1	272	<0.01	0.042	<0.00005	0.000042	0.0047	0.005	30	0.00078	0.0026	<0.000005
2019	Q2	EV_MC2	140	0.011	0.26	<0.00005	0.00022	0.0044	0.0047	12	0.00084	0.0096	<0.000005
2019	Q2	FR_FRCP1	334	<0.01	0.12	<0.00005	0.00012	0.019	0.021	36	0.0026	0.012	<0.000005
2019	Q2	GH_ERC	172	<0.01	0.52	<0.00005	0.00033	0.0022	0.0027	13	0.00022	0.028	<0.000005
2019	Q2	LC_DCDS	191	<0.01	0.036	<0.00005	0.000034	0.0099	0.0098	18	0.00053	0.0045	<0.000005
2019	Q2	LC_LC3	412	<0.01	0.043	<0.00005	0.000031	0.031	0.033	45	0.0034	0.01	<0.000005
2019	Q2	LC_LC5	320	<0.01	0.13	<0.00005	0.00011	0.015	0.016	33	0.00024	0.01	<0.000005
2019	Q2	LC_LCDSSLCC	297	<0.01	0.033	<0.00005	0.00003	0.019	0.019	30	0.00045	0.0046	<0.000005
2019	Q4	EV_HC1	420	<0.01	0.031	<0.00005	0.000047	0.0068	0.0069	49	0.0046	0.0054	<0.000005
2019	Q4	FR_FRABCH	589	0.015	0.038	<0.00005	0.000057	0.03	0.034	65	0.0036	0.0077	<0.000005
2019	Q4	FR_FRCP1	814	<0.01	0.03	<0.00005	<0.00005	0.048	0.049	100	0.0056	0.0084	<0.000005
2019	Q4	GH_ERC	187	0.0066	<0.01	0.000031	<0.00005	0.0032	0.0033	14	0.00028	0.00045	<0.000005
2019	Q4	LC_LC3	673	0.03	0.033	<0.00005	<0.00005	0.05	0.053	78	0.022	0.024	<0.000005
2019	Q4	LC_LCDSSLCC	495	<0.01	0.022	<0.00005	<0.00005	0.034	0.036	53	0.0021	0.0048	<0.000005
Tests categorized as possible or likely response for length (2015 to 2018)													
2016	Q4	GH_ERC	178	<0.01	0.018	<0.00005	<0.00005	0.0026	0.0027	12	0.00035	0.0016	<0.000005
Tests categorized as possible or likely response for weight (2015 to 2018)													
2015	Q2	EV_HC1	206	0.01	0.058	0.00005	0.00007	0.0042	0.0042	22	0.00064	0.0021	0.000005
Tests categorized as possible or likely response for viability (2015 to 2018)													
2016	Q4	CM_MC2	358	<0.01	0.077	<0.00005	0.000066	0.011	0.011	37	0.0073	0.011	<0.000005
Tests categorized as possible or likely response for survival and viability (2015 to 2018)													
2015	Q4	CM_MC2	456	0.01	0.053	0.00005	0.000063	0.012	0.012	46	0.0039	0.0065	0.000005
2015	Q4	EV_HC1	434	0.01	0.028	0.00005	0.00005	0.0071	0.0072	49	0.0019	0.0024	<0.0000005
2016	Q2	CM_MC2	282	<0.01	0.4	<0.00005	0.00024	0.009	0.0093	26	0.011	0.025	<0.000005
2016	Q2	EV_HC1	311	<0.01	0.072	<0.00005	0.000063	0.006	0.0061	33	0.00046	0.0027	0.00000054
2016	Q2	EV_MC2	152	0.012	0.43	<0.00005	0.00033	0.0057	0.0058	12	0.00039	0.012	0.0000013
2016	Q2	GH_ERC	180	<0.01	0.28	<0.00005	0.00016	0.0021	0.0024	12	0.00095	0.017	<0.000005
2016	Q2	GH_FR1	332	<0.01	0.086	<0.00005	0.000072	0.014	0.014	33	0.00088	0.0043	<0.000005
2016	Q2	LC_LCDSSLCC	304	<0.01	0.02	<0.000045	<0.000045	0.025	0.026	29	0.0025	0.0037	<0.000005
2016	Q4	EV_HC1	381	<0.01	0.036	<0.00005	<0.00005	0.0075	0.0075	43	0.0015	0.0025	<0.0000005
2016	Q4	FR_FRCP1	478	<0.01	0.034	<0.00005	<0.00005	0.032	0.033	50	0.0068	0.0087	<0.000005
2016	Q4	GH_FR1	431	<0.01	0.018	<0.00005	<0.00005	0.017	0.018	46	0.00096	0.0017	<0.000005
2016	Q4	LC_LCDSSLCC	395	<0.01	0.029	<0.00005	0.000052	0.033	0.032	39	0.0018	0.0033	<0.000005
2017	Q2	GH_ERC	168	<0.01	1.3	<0.00005	0.0049	0.0024	0.0038	14	0.0011	0.081	<0.000005
2018	Q4	FR_FRABCH	626	<0.01	0.017	<0.00005	<0.00005	0.034	0.034	67	0.0045	0.0051	<0.000005
2018	Q4	GH_FR1	513	<0.01	0.011	<0.00005	<0.00005	0.019	0.019	56	0.00085	0.0014	<0.000005
Tests categorized as possible or likely response for survival, viability, and length (2015 to 2018)													
2015	Q4	FR_FRCP1	650	0.01	0.021	0.00005	0.00005	0.04	0.041	74	0.0076	0.0089	0.000005
2015	Q4	GH_FR1	445	0.01	0.011	0.00005	0.00005	0.016	0.016	45	0.0012	0.0016	0.000005
2016	Q2	FR_FRCP1	311	<0.01	0.09	<0.00005	0.000078	0.018	0.019	31	0.0022	0.0076	<0.000005
Tests categorized as possible or likely response for survival, viability, length, weight (2015 to 2018)													
2015	Q4	GH_ERC	195	0.01	0.015	0.00005	0.00005	0.0019	0.0019	13	0.00057	0.0014	0.000005
2018	Q4	FR_FRCP1	2492	<0.02	0.016	<0.0001	<0.00007	0.079	0.081	369	0.00024	0.00066	<0.000005
Tests categorized as possible or likely response for viability (2019)													
2019	Q4	CM_MC2	594	<0.01	0.061	<0.00005	0.000056	0.017	0.018	63	0.0066	0.013	<0.000005
2019	Q4	EV_MC2	303	0.0062	0.0094	<0.00005	0.000036	0.012	0.012	29	0.0011	0.0013	<0.000005
2019	Q4	LC_LC5	411	<0.01	0.009	<0.00005	<0.00005	0.019	0.02	44	0.00027	0.0012	<0.000005
Tests categorized as possible or likely response for survival and viability (2019)													
2019	Q2	FR_FRABCH	430	<0.01	0.18	0.000094	0.0005	0.023	0.024	46	0.0024	0.013	<0.000005
2019	Q2	GH_FR1	378	<0.01	0.16	<0.00005	0.00012	0.015	0.015	40	0.00062	0.0091	<0.000005
2019	Q4	GH_FR1	468	0.0066	0.034	<0.00005	0.000043	0.018	0.019	52	0.0012	0.002	<0.000005
2019	Q4	LC_DCDS	402	<0.01	<0.01	<0.00005	0.000032	0.016	0.016	38	0.00078	0.0012	<0.000005

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-4: *O. mykiss* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	MERCURY-T-mg/l	MOLYBDENUM-D-mg/l	MOLYBDENUM-T-mg/l	NICKEL-D-mg/l	NICKEL-T-mg/l	NITRATE NITROGEN (NO3) AS N-N-mg/l	NITRITE NITROGEN (NO2) AS N-N-mg/l	NITROGEN AMMONIA (AS N)-N-mg/l	ORTHO-PHOSPHATE-N-mg/l	pH LAB-N-ph units	PHOSPHORUS-N-mg/l
Tests not included in statistical analysis													
2017	Q4	CM_MC2	<0.0000005	0.0013	0.0014	0.016	0.017	3.9	0.014	0.02	<0.001	8.3	0.0029
2017	Q4	EV_HC1	0.0000013	0.00089	0.00089	0.00058	0.00067	0.94	0.002	0.0088	0.0043	8.4	0.0063
2017	Q4	EV_MC2	0.0000032	0.00078	0.0008	0.00052	0.00062	2.8	0.0019	0.0091	0.0014	8.2	0.0029
2017	Q4	FR_FRCP1	<0.0000005	0.0013	0.0014	0.0086	0.0092	15	0.0067	0.0063	<0.001	8.2	0.0022
2017	Q4	GH_ERC	<0.0000005	0.001	0.0011	<0.0005	<0.0005	0.25	0.0013	0.0085	<0.001	8.4	0.002
2017	Q4	GH_FR1	0.0000011	0.0011	0.0011	0.0026	0.0028	10	0.0056	0.0068	<0.001	8.4	0.0019
2017	Q4	LC_LCDSSLCC	0.0000005	0.0016	0.0017	0.0056	0.0058	11	0.0015	0.008	0.0011	8.3	0.0024
2017	Q4	Reference (CM_MC1)	0.00000053	0.00085	0.00088	<0.0005	<0.0005	0.068	0.0018	0.007	0.0035	8.2	0.0033
2017	Q4	Reference (FR_UFR1)	<0.0000005	0.00057	0.00059	<0.0005	<0.0005	0.031	0.001	0.0052	0.0015	8.4	0.0028
2017	Q4	Reference (GH_ER2)	<0.0000005	0.0011	0.001	<0.0005	<0.0005	0.05	<0.001	0.0069	<0.001	8.4	0.0017
Reference													
2015	Q2	Reference (FR_UFR1)	0.000005	0.00055	0.00059	0.0005	0.0005	0.038	0.001	0.005	0.0035	8.3	0.0077
2015	Q2	Reference (GH_ER2)	0.000005	0.00095	0.00096	0.0005	0.00051	0.082	0.001	0.0068	0.0011	8.3	0.009
2015	Q4	Reference (FR_UFR1)	0.000005	0.00061	0.00059	0.0005	0.0005	0.074	0.001	0.005	0.0015	8.4	0.0024
2015	Q4	Reference (GH_ER2)	0.000005	0.001	0.001	0.0005	0.0005	0.081	0.001	0.005	0.0012	8.3	0.003
2016	Q2	Reference (FR_UFR1)	0.00000095	0.00063	0.00065	<0.0005	<0.0005	0.018	<0.001	<0.005	0.0025	8.3	0.0047
2016	Q2	Reference (GH_ER2)	0.00000073	0.00095	0.00095	<0.0005	0.00053	0.089	<0.001	<0.005	0.0011	8.3	0.013
2016	Q4	Reference (FR_UFR1)	0.00000058	0.00057	0.00058	<0.0005	<0.0005	0.097	<0.001	<0.005	0.0024	8.3	0.0045
2016	Q4	Reference (GH_ER2)	<0.000001625	0.00098	0.001	<0.0005	<0.0005	0.075	<0.001	0.0056	0.0012	8.3	0.0023
2017	Q2	Reference (FR_UFR1)	0.0000022	0.0005	0.00054	<0.0005	0.00064	0.07	0.0019	0.0056	0.0061	8.3	0.023
2017	Q2	Reference (GH_ER2)	0.0000043	0.00085	0.00097	<0.0005	0.0022	0.11	<0.001	0.005	0.0019	8.4	0.1
2018	Q2	Reference (CM_MC1)	0.0000025	0.00051	0.00057	<0.0006	0.00075	0.007	<0.001	0.008	0.0038	8.0	0.021
2018	Q2	Reference (FR_UFR1)	0.000002	0.00059	0.00056	<0.0005	0.00066	0.052	<0.001	0.0082	0.0052	8.2	0.023
2018	Q2	Reference (GH_ER2)	0.0000039	0.00089	0.00089	<0.0005	0.0022	0.1	0.0011	0.009	0.003	8.3	0.13
2018	Q2	Reference (LC_SLC)	0.0000011	0.00052	0.00053	<0.0005	0.00055	0.091	<0.001	0.013	0.0021	8.1	0.014
2018	Q4	Reference (CM_MC1)	0.00000058	0.00086	0.00088	<0.0005	<0.0005	0.017	<0.001	0.015	0.0046	8.3	0.0045
2018	Q4	Reference (FR_UFR1)	<0.0000005	0.00058	0.00058	<0.0005	<0.0005	0.078	<0.001	0.047	0.0021	8.4	0.0024
2018	Q4	Reference (GH_ER2)	<0.0000005	0.001	0.001	<0.0005	<0.0005	0.081	<0.001	0.015	0.0021	8.3	0.0028
2018	Q4	Reference (LC_SLC)	<0.0000005	0.0013	0.0013	0.00052	<0.0005	0.13	<0.001	0.012	0.0024	8.3	0.011
2019	Q2	Reference (CM_MC1)	0.000002	0.00061	0.00064	<0.0005	0.0005	0.01	<0.001	0.014	0.0041	8.1	0.011
2019	Q2	Reference (FR_UFR1)	0.0000013	0.00058	0.00057	<0.0005	0.00033	0.036	<0.001	0.03	0.0031	8.1	0.0082
2019	Q2	Reference (GH_ER2)	0.0000017	0.00098	0.00091	<0.0005	0.00069	0.092	<0.001	0.014	<0.001	8.2	0.035
2019	Q2	Reference (LC_SLC)	0.00000076	0.00067	0.00068	<0.0005	<0.0005	0.1	<0.001	0.0077	0.002	8.3	0.0046
2019	Q4	Reference (CM_MC1)	<0.0000005	0.00086	0.00088	<0.0005	<0.0005	0.029	0.00064	0.0057	0.0043	8.2	0.0039
2019	Q4	Reference (FR_UFR1)	0.00000061	0.00056	0.00056	<0.0005	0.00037	0.17	0.00062	0.021	0.0031	8.3	0.013
2019	Q4	Reference (GH_ER2)	<0.0000005	0.001	0.0011	<0.0005	<0.0005	0.084	0.00064	0.011	0.00094	8.3	0.0017
2019	Q4	Reference (LC_SLC)	<0.0000005	0.0013	0.0015	<0.0005	<0.0005	0.14	<0.001	0.0079	0.0019	8.2	0.0021
Tests categorized as no adverse response													
2015	Q2	CM_MC2	0.0000076	0.00078	0.00095	0.0062	0.008	1.1	0.0047	0.0064	0.0016	8.3	0.052
2015	Q2	EV_MC2	0.000005	0.00078	0.00087	0.0012	0.0029	1.1	0.0013	0.006	0.0029	8.3	0.081
2015	Q2	FR_FRCP1	0.000005	0.0013	0.0013	0.0021	0.0023	7.9	0.0052	0.012	0.0013	8.4	0.0097
2015	Q2	GH_ERC	0.000005	0.00096	0.00094	0.0005	0.00069	0.26	0.001	0.0052	0.001	8.4	0.025
2015	Q2	GH_FR1	0.000005	0.001	0.001	0.0018	0.002	7.8	0.0034	0.0053	0.001	8.4	0.0084
2015	Q2	LC_LCDSSLCC	0.000005	0.00095	0.00096	0.0029	0.0032	4.8	0.0015	0.005	0.0014	8.0	0.0088
2015	Q4	EV_MC2	<0.0000005	0.0016	0.0016	0.0029	0.0031	3.8	0.0023	0.0054	0.0052	8.2	0.0088
2015	Q4	LC_LCDSSLCC	0.000005	0.0018	0.0019	0.0066	0.0069	15	0.005	0.005	0.001	8.3	0.002
2016	Q4	EV_MC2	0.0000015	0.00079	0.00083	0.0013	0.0016	1.8	0.0011	<0.005	0.0065	8.2	0.011
2017	Q2	CM_MC2	0.0000022	0.00088	0.001	0.013	0.016	2.0	0.0064	0.03	0.0034	8.3	0.066
2017	Q2	EV_HC1	0.0000025	0.00062	0.00066	0.00076	0.0014	0.56	<0.001	<0.005	0.0067	8.3	0.023
2017	Q2	EV_MC2	0.0000061	0.00061	0.00067	0.0013	0.0037	0.76	0.0011	0.0058	0.015	8.1	0.11
2017	Q2	FR_FRCP1	0.0000028	0.0011	0.0012	0.0025	0.0037	8.7	0.0031	0.0076	0.0025	8.3	0.048
2017	Q2	GH_FR1	<0.000008	0.001	0.0011	0.0018	0.0032	5.8	0.0024	0.0063	0.0033	8.4	0.037
2017	Q2	LC_LCDSSLCC	0.0000011	0.0012	0.0012	0.0048	0.0048	5.6	0.0011	0.0056	0.0014	8.3	0.0058
2018	Q2	CM_MC2	0.0000023	0.00084	0.00093	0.011	0.014	1.3	0.0036	0.024	0.0037	8.3	0.061
2018	Q2	EV_HC1	0.0000019	0.00068	0.00075	0.00075	0.0012	0.59	<0.001	0.017	0.0067	8.4	0.024
2018	Q2	EV_MC2	0.0000056	0.00057	0.00066	0.0015	0.0037	0.69	0.0011	0.011	0.016	8.1	0.096
2018	Q2	FR_FRCP1	0.0000029	0.0011	0.0011	0.0024	0.004	8.1	0.0021	0.010	0.0017	8.3	0.051
2018	Q2	GH_ERC	0.0000053	0.001	0.0011	<0.0005	0.0035	0.41	0.0011	0.0093	0.0029	8.4	0.2
2018	Q2	GH_FR1	0.0000029	0.0012	0.0012	0.0022	0.0035	5.6	0.0029	0.0088	0.004	8.4	0.042
2018	Q2	LC_LCDSSLCC	0.0000009	0.0012	0.0012	0.0047	0.0051	5.6	0.001	0.0074	0.0018	8.2	0.0068
2018	Q4	CM_MC2	<0.0000005	0.0025	0.0025	0.038	0.038	3.3	0.025	0.075	0.0027	8.4	0.0033
2018	Q4	EV_HC1	0.0000005	0.00093	0.00095	0.00054	0.00066	0.98	0.0034	0.015	0.006	8.4	0.0095
2018	Q4	EV_MC2	<0.0000005	0.0013	0.0012	0.0036	0.0038	2.7	0.0011	0.014	0.0024	8.3	0.0038
2018	Q4	GH_ERC	0.00000056	0.0011	0.0011	<0.0005	<0.0005	0.37	<0.001	0.017	0.0017	8.3	0.002
2018	Q4	LC_LCDSSLCC	<0.0000005	0.002	0.002	0.0047	0.005	8.0	0.0034	0.015	0.0017	8.4	0.0021
2019	Q2	CM_MC2	0.0000015	0.00078	0.00083	0.008	0.01	1.3	0.0016	0.034	0.0023	8.3	0.021
2019	Q2	EV_HC1	0.00000073	0.00073	0.00075	0.00063	0.00064	0.54	<0.001	0.019	0.0044	8.4	0.0079
2019	Q2	EV_MC2	0.0000029	0.00054	0.00056	0.00099	0.0015	0.48	<0.001	0.0086	0.0092	8.2	0.03
2019	Q2	FR_FRCP1	0.0000011	0.0012	0.0012	0.0034	0.004	7.7	0.003	0.018	<0.0005	8.3	0.014
2019	Q2	GH_ERC	0.0000023	0.001	0.00099	<0.0005	0.001	0.46	0.00062	0.0098	0.00062	8.3	0.055
2019	Q2	LC_DCDS	0.0000016	0.0028	0.0026	0.004	0.0046	8.1	0.010	0.013	0.01	8.3	0.025
2019	Q2	LC_LC3	0.00000054	0.0025	0.0027	0.0068	0.0069	9.6	<0.0009	0.015	0.0017	8.1	0.0039
2019	Q2	LC_LC5	0.000001	0.0011	0.03	0.00099	0.0014	6.3	0.0018	0.012	0.00086	8.1	0.017
2019	Q2	LC_LCDSSLCC	0.00000062	0.0016	0.0016	0.0031	0.0033	5.2	0.0006	0.0076	0.0011	8.0	0.0045
2019	Q4	EV_HC1	0.00000039	0.00095	0.001	0.00047	0.00052	1.0	0.0006	0.012	0.0069	8.3	0.0076
2019	Q4	FR_FRABCH	0.00000069	0.0007	0.00071	0.00068	0.00081	19	0.0027	0.016	0.0013	8.3	0.018
2019	Q4	FR_FRCP1	<0.0000005	0.002	0.002	0.01	0.011	18	0.013	0.052	0.00062	8.3	0.0018
2019	Q4	GH_ERC	<0.0000005	0.0011	0.0011	<0.0005	<0.0005	0.76	0.00088	0.0099	0.0012	8.2	<0.002
2019	Q4	LC_LC3	<0.0000005	0.0037	0.0038	0.0089	0.009	15	0.0023	0.027	0.0022	8.2	0.0035
2019	Q4	LC_LCDSSLCC	<0.0000005	0.0023	0.0023	0.0039	0.0042	10	0.002	0.012	0.0013	8.3	0.0019
Tests categorized as possible or likely response for length (2015 to 2018)													
2016	Q4	GH_ERC	<0.000001625	0.001	0.001	<0.0005	0.00059	0.29	<0.001	<0.005	0.0012	8.2	0.003
Tests categorized as possible or likely response for weight (2015 to 2018)													
2015	Q2	EV_HC1	0.000005	0.00051	0.00052	0.00073	0.00085	0.56	0.0011	0.0064	0.003	7.7	0.0082
Tests categorized as possible or likely response for viability (2015 to 2018)													
2016	Q4	CM_MC2	0.00000078	0.00089	0.00093	0.0098	0.011	2.2	0.008	0.0057	0.0013	8.3	0.0053
Tests categorized as possible or likely response for survival and viability (2015 to 2018)													
2015	Q4	CM_MC2	0.0000051	0.0011	0.0011	0.0087	0.009	2.4	0.034	0.016	0.0012	8.4	0.0081
2015	Q4	EV_HC1	<0.0000005	0.0010	0.001	0.00076	0.00079	1.2	0.004	0.005	0.0057	8.4	0.0069
2016	Q2	CM_MC2	0.000001	0.00087	0.00088	0.015	0.017	2.0	0.0088	0.024	0.0023	8.3	0.02
2016	Q2	EV_HC1	0.00000067	0.00076	0.00078	0.00086	0.001	0.76	<0.001	<0.005	0.0048	8.4	0.0084
2016	Q2	EV_MC2	0.0000024	0.00073	0.00074	0.0017	0.0026	1.0	0.0012	<0.005	0.011	8.2	0.042
2016	Q2	GH_ERC	0.0000012	0.00096	0.00094	<0.0005	0.00059	0.31	<0.001	<0.005	0.0011	8.3	0.021
2016	Q2	GH_FR1	0.0000011	0.00099	0.00099	0.0016	0.0017	7.6	0.0027	0.005	0.0013	8.4	0.0096
2016	Q2	LC_LCDSSLCC	0.00000056	0.0014	0.0014	0.0046	0.0049	6.3	0.002	<0.005	0.001	8.3	0.0027
2016	Q4	EV_HC1	0.00000062	0.00091	0.00093	0.00075	0.00082	1.0	<0.004	<0.005	0.0045	8.4	0.0064
2016	Q4	FR_FRCP1	<0.0000005	0.0013	0.0013	0.0049	0.0052	12	<0.005	<0.005	<0.001	8.3	0.0031
2016	Q4	GH_FR1	<0.000001625	0.0011	0.0011	0.0024	0.0025	9.5	<0.005	0.0054	0.0011	8.3	0.011
2016	Q4	LC_LCDSSLCC	0.00000054	0.0016	0.0016	0.0044	0.0045	9.9	<0.005	<0.005	0.0015	8.3	0.0049
2017	Q2	GH_ERC	0.0000053	0.00094	0.0011	<0.0005	0.0027	0.38	<0.001	0.0052	0.0018	8.4	0.13
2018	Q4	FR_FRABCH	<0.0000005	0.0007	0.0007	0.00052	0.00056	19	0.0053	0.017	0.0021	8.3	0.0026
2018	Q4	GH_FR1	<0.0000005	0.0012	0.0012	0.0017	0.0018	10	0.005	0.012	0.0018	8.4	<0.002
Tests categorized as possible or likely response for survival, viability, and length (2015 to 2018)													
2015	Q4	FR_FRCP1	0.000005	0.0015	0.0015	0.007	0.0072	16	0.0053	0.005	0.001	8.3	0.002
2015	Q4	GH_FR1	0.000005	0.00094	0.00098	0.0015	0.0015	10	0.005	0.005	0.0011	8.4	0.0022
2016	Q2	FR_FRCP1	0.00000091	0.0011	0.0011	0.0019	0.0024	8.4	0.0027	0.0059	0.0017	8.3	0.0094
Tests categorized as possible or likely response for survival, viability, length, weight (2015 to 2018)													
2015	Q4	GH_ERC	0.000005	0.0010	0.001	0.0005	0.0005	0.49	0.001	0.005	0.0012	8.3	0.0035
2018	Q4	FR_FRCP1	<0.0000005	0.0026	0.0025	0.042	0.043	29	0.0056	0.042	0.0011	7.9	0.003
Tests categorized as possible or likely response for viability (2019)													
2019	Q4	CM_MC2	0.00000043	0.0011	0.0011	0.021	0.022	3.0	0.0027	0.011	0.00096	8.3	0.0063
2019	Q4	EV_MC2	<0.0000005	0.0009	0.00091	0.0011	0.0011	1.8	0.0038	0.011	0.003	8.3	0.0034
2019	Q4	LC_LC5	<0.0000005	0.0012	0.041	0.00074	0.00088	8.9	0.0014	0.012	0.00062	8.3	0.0016
Tests categorized as possible or likely response for survival and viability (2019)													
2019	Q2	FR_FRABCH	0.0000013	0.00088	0.00088	0.0015	0.0021	12	0.0018	0.012	<0.001	8.3	0.015
2019	Q2	GH_FR1	0.00000094	0.0014	0.0013	0.0015	0.002	6.9	0.0035	0.017	<0.001	8.4	0.014
2019	Q4	GH_FR1	0.00000033	0.00091	0.00091	0.00096	0.0011	10	0.0026	0.0072	0.001	8.3	0.0024
2019	Q4	LC_DCDS	0.00000065	0.0041	0.0042	0.0057	0.0058	28	0.013	0.042	0.028	8.2	0.039

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-4: *O. mykiss* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	POTASSIUM-T-mg/l	SELENIUM-D-mg/l	SELENIUM-T-mg/l	SILVER-D-mg/l	SILVER-T-mg/l	SODIUM-T-mg/l	STRONTIUM-D-mg/l	STRONTIUM-T-mg/l	SULFATE (AS SO4)-D-mg/l	THALLIUM-D-mg/l	THALLIUM-T-mg/l
Tests not included in statistical analysis													
2017	Q4	CM_MC2	1.9	0.0084	0.0079	<0.00001	<0.00001	14	0.41	0.41	334	0.000014	0.000015
2017	Q4	EV_HC1	0.88	0.04	0.04	<0.00001	0.000011	1.6	0.13	0.13	203	<0.00001	<0.00001
2017	Q4	EV_MC2	1.0	0.018	0.018	<0.00001	<0.00001	5.0	0.2	0.19	136	<0.00001	<0.00001
2017	Q4	FR_FRCP1	2.2	0.14	0.13	<0.00001	<0.00001	2.0	0.18	0.18	515	0.000011	0.000012
2017	Q4	GH_ERC	0.4	0.0012	0.0012	<0.00001	<0.00001	0.85	0.21	0.21	24	<0.00001	<0.00001
2017	Q4	GH_FR1	1.3	0.065	0.063	<0.00001	<0.00001	2.2	0.16	0.16	267	<0.00001	<0.00001
2017	Q4	LC_LCDSSLCC	1.5	0.054	0.051	<0.00001	<0.00001	6.7	0.21	0.21	257	0.00001	<0.00001
2017	Q4	Reference (CM_MC1)	0.5	0.0002	0.00022	<0.00001	<0.00001	3.0	0.16	0.16	28	<0.00001	<0.00001
2017	Q4	Reference (FR_UFR1)	0.39	0.00059	0.00061	<0.00001	<0.00001	0.69	0.099	0.099	46	<0.00001	<0.00001
2017	Q4	Reference (GH_ER2)	0.36	0.00084	0.00081	<0.00001	<0.00001	0.7	0.21	0.2	19	<0.00001	<0.00001
Reference													
2015	Q2	Reference (FR_UFR1)	0.36	0.00046	0.0005	0.00001	0.00001	0.58	0.064	0.066	14	0.00001	0.00001
2015	Q2	Reference (GH_ER2)	0.37	0.00075	0.00079	0.00001	0.00001	0.74	0.2	0.21	17	0.00001	0.00001
2015	Q4	Reference (FR_UFR1)	0.39	0.00065	0.00067	0.00001	0.00001	0.68	0.092	0.091	47	0.00001	0.00001
2015	Q4	Reference (GH_ER2)	0.36	0.00079	0.00084	0.00001	0.00001	0.67	0.21	0.22	22	0.00001	0.00001
2016	Q2	Reference (FR_UFR1)	0.34	0.00051	0.00055	<0.00001	<0.00001	0.63	0.065	0.067	15	<0.00001	<0.00001
2016	Q2	Reference (GH_ER2)	0.41	0.00075	0.00077	<0.00001	<0.00001	0.72	0.2	0.21	17	<0.00001	<0.00001
2016	Q4	Reference (FR_UFR1)	0.37	0.00066	0.00066	<0.00001	<0.00001	0.68	0.089	0.089	38	<0.00001	<0.00001
2016	Q4	Reference (GH_ER2)	0.37	0.00085	0.00089	<0.00001	<0.00001	0.69	0.23	0.24	23	<0.00001	<0.00001
2017	Q2	Reference (FR_UFR1)	0.42	0.00056	0.00049	<0.00001	<0.00001	0.53	0.061	0.06	10	<0.00001	0.000012
2017	Q2	Reference (GH_ER2)	0.67	0.00072	0.00077	<0.00001	0.00002	0.69	0.19	0.21	14	<0.00001	0.000035
2018	Q2	Reference (CM_MC1)	0.44	0.00018	0.00018	<0.000012	<0.00001	1.2	0.078	0.074	5.1	<0.000012	0.000024
2018	Q2	Reference (FR_UFR1)	0.41	0.00049	0.00047	<0.00001	0.000015	0.52	0.063	0.06	9.9	<0.00001	0.000012
2018	Q2	Reference (GH_ER2)	0.68	0.00068	0.00074	<0.00001	0.000023	0.66	0.19	0.19	13	<0.00001	0.000036
2018	Q2	Reference (LC_SLC)	0.29	0.00051	0.00055	<0.000012	<0.00001	0.46	0.068	0.066	11	<0.00001	<0.00001
2018	Q4	Reference (CM_MC1)	0.42	0.00023	0.00023	<0.00001	<0.00001	3.1	0.14	0.14	14	<0.00001	<0.00001
2018	Q4	Reference (FR_UFR1)	0.35	0.00076	0.00077	<0.00001	<0.00001	0.7	0.097	0.096	44	<0.00001	<0.00001
2018	Q4	Reference (GH_ER2)	0.34	0.00092	0.00089	<0.00001	<0.00001	0.71	0.22	0.21	22	<0.00001	<0.00001
2018	Q4	Reference (LC_SLC)	0.37	0.0016	0.0015	<0.00001	<0.00001	0.98	0.17	0.17	61	<0.00001	<0.00001
2019	Q2	Reference (CM_MC1)	0.41	0.00021	0.00021	<0.00001	<0.00001	1.6	0.089	0.091	7.5	<0.00001	0.000016
2019	Q2	Reference (FR_UFR1)	0.33	0.00058	0.00058	<0.00001	<0.00001	0.6	0.067	0.069	15	<0.00001	<0.00001
2019	Q2	Reference (GH_ER2)	0.42	0.00091	0.00095	<0.00001	0.0000072	0.73	0.22	0.21	19	<0.00001	0.000011
2019	Q2	Reference (LC_SLC)	0.28	0.00079	0.00075	<0.00001	<0.00001	0.55	0.091	0.093	20	<0.00001	<0.00001
2019	Q4	Reference (CM_MC1)	0.42	0.00026	0.00026	<0.00001	<0.00001	3.2	0.14	0.14	14	<0.00001	<0.00001
2019	Q4	Reference (FR_UFR1)	0.4	0.0009	0.00088	<0.00001	<0.00001	0.71	0.093	0.097	44	<0.00001	0.0000064
2019	Q4	Reference (GH_ER2)	0.36	0.001	0.00098	<0.00001	<0.00001	0.73	0.21	0.22	23	<0.00001	<0.00001
2019	Q4	Reference (LC_SLC)	0.38	0.0016	0.0016	<0.00001	<0.00001	1.0	0.16	0.17	63	<0.00001	<0.00001
Tests categorized as no adverse response													
2015	Q2	CM_MC2	1.0	0.004	0.004	0.000018	0.00002	4.1	0.16	0.17	107	0.000018	0.000037
2015	Q2	EV_MC2	0.82	0.0064	0.0063	0.00001	0.000025	2.2	0.1	0.1	49	0.000011	0.000036
2015	Q2	FR_FRCP1	1.2	0.033	0.032	0.00001	0.00001	1.2	0.1	0.11	125	0.00001	0.00001
2015	Q2	GH_ERC	0.44	0.0015	0.0015	0.00001	0.000011	0.94	0.2	0.2	23	0.00001	0.000014
2015	Q2	GH_FR1	1.1	0.031	0.032	0.00001	0.00001	1.6	0.11	0.12	134	0.00001	0.00001
2015	Q2	LC_LCDSSLCC	0.68	0.022	0.022	0.00001	0.00001	2.4	0.11	0.11	90	0.000011	0.000012
2015	Q4	EV_MC2	1.1	0.016	0.016	0.00001	0.00001	3.9	0.19	0.19	129	0.00001	0.000011
2015	Q4	LC_LCDSSLCC	1.5	0.05	0.054	0.00001	0.00001	7.2	0.22	0.22	248	0.00001	0.00001
2016	Q4	EV_MC2	0.79	0.0077	0.0081	<0.00001	<0.00001	3.0	0.13	0.13	79	<0.00001	0.000012
2017	Q2	CM_MC2	1.3	0.0063	0.0057	<0.00001	0.00001	6.2	0.2	0.21	135	0.000013	0.000035
2017	Q2	EV_HC1	0.85	0.022	0.022	<0.00001	0.000011	1.1	0.087	0.086	85	<0.00001	0.00002
2017	Q2	EV_MC2	0.92	0.0042	0.0043	<0.00001	0.000026	2.0	0.09	0.093	40	<0.00001	0.000044
2017	Q2	FR_FRCP1	1.3	0.035	0.031	<0.00001	0.000012	1.1	0.096	0.097	111	0.00001	0.000017
2017	Q2	GH_FR1	1.1	0.026	0.025	<0.00001	0.000015	1.4	0.10	0.1	99	<0.00001	0.000018
2017	Q2	LC_LCDSSLCC	0.94	0.022	0.02	<0.00001	<0.00001	3.0	0.12	0.12	98	<0.00001	0.00001
2018	Q2	CM_MC2	1.3	0.0046	0.0046	<0.000012	0.00001	5.9	0.19	0.19	118	0.000013	0.00004
2018	Q2	EV_HC1	0.8	0.024	0.024	<0.00001	0.00001	1.1	0.091	0.087	101	0.00001	0.000017
2018	Q2	EV_MC2	0.83	0.004	0.004	<0.000012	0.000026	1.7	0.083	0.084	38	0.000011	0.000041
2018	Q2	FR_FRCP1	1.3	0.035	0.033	<0.00001	0.000016	1.1	0.098	0.095	104	<0.00001	0.000021
2018	Q2	GH_ERC	0.9	0.0019	0.002	<0.00001	0.000032	0.84	0.19	0.2	23	<0.00001	0.000057
2018	Q2	GH_FR1	1.1	0.029	0.027	<0.00001	0.000013	1.4	0.1	0.098	110	<0.00001	0.000016
2018	Q2	LC_LCDSSLCC	0.94	0.023	0.022	<0.00001	<0.00001	3.6	0.13	0.12	99	0.000011	0.00001
2018	Q4	CM_MC2	2.0	0.0071	0.0068	<0.00001	<0.00001	16	0.55	0.54	350	0.00002	0.000021
2018	Q4	EV_HC1	0.9	0.044	0.041	<0.00001	<0.00001	1.7	0.13	0.14	216	<0.00001	<0.00001
2018	Q4	EV_MC2	1.1	0.017	0.016	<0.00001	<0.00001	4.6	0.2	0.2	155	<0.00001	<0.00001
2018	Q4	GH_ERC	0.4	0.0017	0.0016	<0.00001	<0.00001	0.88	0.21	0.2	28	<0.00001	<0.00001
2018	Q4	LC_LCDSSLCC	1.6	0.042	0.039	<0.00001	<0.00001	9.5	0.21	0.21	242	<0.00001	0.00001
2019	Q2	CM_MC2	1.1	0.0061	0.0054	<0.00001	<0.00001	4.7	0.19	0.19	138	0.0000072	0.000019
2019	Q2	EV_HC1	0.71	0.025	0.023	<0.00001	0.0000078	1.2	0.094	0.099	113	<0.00001	<0.00001
2019	Q2	EV_MC2	0.58	0.0039	0.0035	<0.00001	0.000011	1.8	0.09	0.092	40	<0.00001	0.000016
2019	Q2	FR_FRCP1	1.2	0.038	0.037	<0.00001	<0.00001	1.1	0.11	0.11	152	<0.00001	0.000008
2019	Q2	GH_ERC	0.5	0.0022	0.0022	<0.00001	0.000012	0.93	0.21	0.21	28	<0.00001	0.000017
2019	Q2	LC_DCDS	1.4	0.015	0.014	<0.00001	<0.00001	1.2	0.069	0.068	46	0.0000062	0.0000084
2019	Q2	LC_LC3	1.4	0.036	0.034	<0.00001	<0.00001	6.1	0.16	0.16	216	0.00001	0.000012
2019	Q2	LC_LC5	0.98	0.031	0.029	<0.00001	0.0000062	2.3	0.13	0.14	140	<0.00001	0.000007
2019	Q2	LC_LCDSSLCC	0.9	0.022	0.02	<0.00001	<0.00001	3.8	0.14	0.14	132	<0.00001	<0.00001
2019	Q4	EV_HC1	0.89	0.044	0.042	<0.00001	0.000007	1.7	0.13	0.14	216	<0.00001	0.0000076
2019	Q4	FR_FRABCH	1.7	0.089	0.082	<0.00001	<0.00001	2.4	0.16	0.17	292	<0.00001	<0.00001
2019	Q4	FR_FRCP1	2.5	0.15	0.14	<0.00001	<0.00001	2.3	0.18	0.19	501	0.000014	0.000015
2019	Q4	GH_ERC	0.42	0.0029	0.0027	<0.00001	<0.00001	1.1	0.22	0.22	40	<0.00001	<0.00001
2019	Q4	LC_LC3	1.9	0.086	0.078	<0.00001	<0.00001	10.0	0.24	0.24	399	0.000009	0.00001
2019	Q4	LC_LCDSSLCC	1.3	0.056	0.052	<0.00001	<0.00001	7.0	0.22	0.22	266	<0.00001	<0.00001
Tests categorized as possible or likely response for length (2015 to 2018)													
2016	Q4	GH_ERC	0.41	0.0014	0.0014	<0.00001	<0.00001	0.88	0.23	0.24	32	<0.00001	<0.00001
Tests categorized as possible or likely response for weight (2015 to 2018)													
2015	Q2	EV_HC1	0.56	0.019	0.019	0.00001	0.00001	0.86	0.064	0.064	82	0.00001	0.000012
Tests categorized as possible or likely response for viability (2015 to 2018)													
2016	Q4	CM_MC2	1.3	0.0057	0.0058	<0.00001	<0.00001	7.7	0.23	0.24	195	0.000011	0.000015
Tests categorized as possible or likely response for survival and viability (2015 to 2018)													
2015	Q4	CM_MC2	1.4	0.0052	0.0052	0.00001	0.00001	9.5	0.29	0.29	252	0.000011	0.000012
2015	Q4	EV_HC1	0.97	0.036	0.037	0.00001	0.00001	1.9	0.13	0.14	217	0.00001	0.00001
2016	Q2	CM_MC2	1.1	0.0046	0.0045	<0.00001	<0.00001	6.0	0.2	0.19	134	0.000012	0.000022
2016	Q2	EV_HC1	0.85	0.03	0.03	<0.00001	<0.00001	1.3	0.096	0.099	120	<0.00001	0.000012
2016	Q2	EV_MC2	0.68	0.0042	0.0041	<0.00001	0.000015	1.8	0.091	0.092	44	<0.00001	0.000022
2016	Q2	GH_ERC	0.47	0.0016	0.0016	<0.00001	<0.00001	0.89	0.21	0.2	29	<0.00001	0.000012
2016	Q2	GH_FR1	1.1	0.029	0.03	<0.00001	<0.00001	1.5	0.11	0.11	128	<0.00001	<0.00001
2016	Q2	LC_LCDSSLCC	1.0	0.021	0.021	<0.00001	<0.00001	3.9	0.13	0.14	120	0.00001	0.00001
2016	Q4	EV_HC1	0.93	0.033	0.032	<0.00001	<0.00001	1.7	0.13	0.13	182	<0.00001	0.00001
2016	Q4	FR_FRCP1	1.6	0.059	0.058	<0.00001	<0.00001	1.6	0.15	0.15	253	0.000011	<0.00001
2016	Q4	GH_FR1	1.3	0.043	0.042	<0.00001	<0.00001	2.1	0.14	0.15	212	<0.00001	<0.00001
2016	Q4	LC_LCDSSLCC	1.2	0.028	0.028	<0.00001	<0.00001	5.3	0.19	0.19	194	0.00001	0.000012
2017	Q2	GH_ERC	0.79	0.0018	0.0018	<0.00001	0.000022	0.9	0.19	0.21	23	<0.00001	0.000043
2018	Q4	FR_FRABCH	1.8	0.093	0.089	<0.00001	<0.00001	2.6	0.18	0.18	314	<0.00001	<0.00001
2018	Q4	GH_FR1	1.3	0.064	0.06	<0.00001	<0.00001	2.4	0.16	0.16	259	<0.00001	<0.00001
Tests categorized as possible or likely response for survival, viability, and length (2015 to 2018)													
2015	Q4	FR_FRCP1	2.0	0.091	0.091	0.00001	0.00001	2.1	0.17	0.17	364	0.00001	0.00001
2015	Q4	GH_FR1	1.2	0.042	0.042	0.00001	0.00001	2.1	0.15	0.15	202	0.00001	0.00001
2016	Q2	FR_FRCP1	1.1	0.03	0.031	<0.00001	<0.00001	1.1	0.099	0.1	119	<0.00001	0.000011
Tests categorized as possible or likely response for survival, viability, length, weight (2015 to 2018)													
2015	Q4	GH_ERC	0.4	0.0016	0.0016	0.00001	0.00001	0.93	0.22	0.23	39	0.00001	0.00001
2018	Q4	FR_FRCP1	4.9	0.6	0.61	<0.00002	<0.000014	2.2	0.22	0.24	1906	0.000043	0.000044
Tests categorized as possible or likely response for viability (2019)													
2019	Q4	CM_MC2	1.9	0.01	0.0095	<0.00001	<0.00001	12	0.4	0.39	366	0.000014	0.000017
2019	Q4	EV_MC2	0.9	0.014	0.014	<0.00001	<0.00001	3.9	0.18	0.18	123	<0.00001	<0.00001
2019	Q4	LC_LC5	1.1	0.044	0.041	<0.00001	<0.00001	3.4	0.18	0.18	189	<0.00001	<0.00001
Tests categorized as possible or likely response for survival and viability (2019)													
2019	Q2	FR_FRABCH	1.4	0.057	0.052	<0.00001	<0.00001	1.8	0.12	0.13	210	<0.00001	0.0000072
2019	Q2	GH_FR1	1.1	0.041	0.038	<0.00001	<0.00001	1.8	0.13	0.13	172	<0.00001	0.000006
2019	Q4	GH_FR1	1.3	0.057	0.054	<0.00001	<0.00001	2.3	0.15	0.16	231	<0.00001	<0.00001
2019	Q4	LC_DCDS	2.4	0.052	0.05	<0.00001	<0.00001	2.7	0.14	0.14	141	0.0000094	0.000011

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-4: *O. mykiss* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	TIN-D-mg/l	TIN-T-mg/l	TITANIUM-D-mg/l	TITANIUM-T-mg/l	TOTAL DISSOLVED SOLIDS (RESIDUE FILTERABLE)-N-mg/l	TOTAL KJELDAHL NITROGEN-N-mg/l	TOTAL ORGANIC CARBON-T-mg/l	TOTAL SUSPENDED SOLIDS LAB-N-mg/l	TURBIDITY LAB-N-ntu	URANIUM-D-mg/l	URANIUM-T-mg/l
Tests not included in statistical analysis													
2017	Q4	CM_MC2	<0.0001	<0.0001	<0.01	<0.01	748	0.38	0.99	2.8	1.3	0.003	0.0032
2017	Q4	EV_HC1	<0.0001	<0.0001	<0.01	<0.01	494	0.099	1.0	1.2	0.3	0.0027	0.0027
2017	Q4	EV_MC2	<0.0001	0.00011	<0.01	<0.01	413	0.2	0.99	1.3	0.47	0.0011	0.0012
2017	Q4	FR_FRCP1	<0.0001	<0.0001	<0.01	<0.01	1058	0.38	0.98	1.3	0.63	0.0058	0.0057
2017	Q4	GH_ERC	<0.0001	0.00011	<0.01	<0.01	202	0.066	0.72	1.3	0.55	0.00083	0.00081
2017	Q4	GH_FR1	<0.0001	<0.0001	<0.01	<0.01	672	0.36	1.3	8.3	9.3	0.0029	0.0029
2017	Q4	LC_LCDSSLCC	<0.0001	<0.0001	<0.01	<0.01	677	0.41	0.94	1.0	0.44	0.0041	0.004
2017	Q4	Reference (CM_MC1)	<0.0001	<0.0001	<0.01	<0.01	171	0.11	1.2	1.3	0.48	0.00022	0.00023
2017	Q4	Reference (FR_UFR1)	<0.0001	<0.0001	<0.01	<0.01	235	0.075	0.8	1.0	0.37	0.00052	0.00049
2017	Q4	Reference (GH_ER2)	<0.0001	<0.0001	<0.01	<0.01	192	0.16	0.66	1.5	0.73	0.00077	0.00075
Reference													
2015	Q2	Reference (FR_UFR1)	0.0001	0.0001	0.01	0.01	143	0.092	2.0	1.9	1.4	0.00031	0.00032
2015	Q2	Reference (GH_ER2)	0.0001	0.0001	0.01	0.01	181	0.086	1.4	5.9	4.1	0.00077	0.00079
2015	Q4	Reference (FR_UFR1)	0.0001	0.0001	0.01	0.01	217	0.065	0.6	1.0	0.22	0.00045	0.00045
2015	Q4	Reference (GH_ER2)	0.0001	0.0001	0.01	0.01	176	0.05	0.62	1.3	0.37	0.00074	0.00075
2016	Q2	Reference (FR_UFR1)	<0.0001	<0.0001	<0.01	<0.01	147	0.077	2.0	1.5	0.82	0.00032	0.00033
2016	Q2	Reference (GH_ER2)	<0.0001	<0.0001	<0.01	0.01	180	0.075	1.6	10	2.8	0.00075	0.00077
2016	Q4	Reference (FR_UFR1)	<0.0001	<0.0001	<0.01	<0.01	197	0.065	1.3	<1	0.69	0.00043	0.00045
2016	Q4	Reference (GH_ER2)	<0.0001	<0.0001	<0.01	<0.01	181	0.055	0.67	<1	0.36	0.00077	0.00078
2017	Q2	Reference (FR_UFR1)	<0.0001	<0.0001	<0.01	<0.01	131	0.096	2.9	10	6.0	0.00027	0.0003
2017	Q2	Reference (GH_ER2)	<0.0001	<0.0001	<0.01	0.01	166	0.23	4.1	79	42	0.00069	0.00083
2018	Q2	Reference (CM_MC1)	<0.00012	<0.0001	<0.01	<0.01	104	0.1	3.5	12	5.9	0.00013	0.00013
2018	Q2	Reference (FR_UFR1)	<0.0001	<0.0001	<0.01	<0.01	123	0.11	2.7	9.6	3.9	0.0003	0.00031
2018	Q2	Reference (GH_ER2)	<0.0001	<0.0001	<0.01	<0.01	161	0.3	3.7	72	48	0.00066	0.00079
2018	Q2	Reference (LC_SLC)	<0.0001	<0.0001	<0.01	<0.01	135	0.09	2.5	4.8	1.8	0.00065	0.00067
2018	Q4	Reference (CM_MC1)	<0.0001	<0.0001	<0.01	<0.01	153	0.16	1.7	<1	0.31	0.00023	0.00023
2018	Q4	Reference (FR_UFR1)	<0.0001	<0.0001	<0.01	<0.01	209	0.1	0.68	<1	0.23	0.0005	0.0005
2018	Q4	Reference (GH_ER2)	<0.0001	<0.0001	<0.01	<0.01	171	0.096	<0.5	1.2	0.38	0.00075	0.00077
2018	Q4	Reference (LC_SLC)	<0.0001	<0.0001	<0.01	<0.01	224	0.077	0.91	1.6	0.22	0.0018	0.0018
2019	Q2	Reference (CM_MC1)	<0.0001	<0.0001	<0.01	<0.01	122	0.11	4.6	5.7	4.0	0.00015	0.00016
2019	Q2	Reference (FR_UFR1)	<0.0001	<0.0001	<0.01	<0.01	137	0.11	1.5	3.3	1.7	0.00034	0.00035
2019	Q2	Reference (GH_ER2)	<0.0001	<0.0001	<0.01	<0.01	162	0.16	1.2	30	14	0.00074	0.00076
2019	Q2	Reference (LC_SLC)	<0.0001	<0.0001	<0.01	<0.01	149	0.08	2.0	2.0	1.0	0.00087	0.00088
2019	Q4	Reference (CM_MC1)	0.000066	<0.0001	<0.01	<0.01	157	<0.05	0.84	<1	0.23	0.00023	0.00025
2019	Q4	Reference (FR_UFR1)	<0.0001	0.000068	<0.01	<0.01	198	0.31	1.2	6.6	0.7	0.00051	0.0005
2019	Q4	Reference (GH_ER2)	<0.0001	<0.0001	<0.01	<0.01	170	0.041	0.34	1.5	0.64	0.00075	0.00076
2019	Q4	Reference (LC_SLC)	<0.0001	<0.0001	<0.01	<0.01	225	0.038	0.72	<1	0.23	0.0017	0.0017
Tests categorized as no adverse response													
2015	Q2	CM_MC2	0.0001	0.00013	0.01	0.016	316	0.16	1.9	29	15	0.0011	0.0011
2015	Q2	EV_MC2	0.0001	0.0001	0.01	0.017	208	0.29	3.6	57	15	0.00062	0.00067
2015	Q2	FR_FRCP1	0.0001	0.0001	0.01	0.01	382	0.05	1.8	5.2	1.4	0.0016	0.0017
2015	Q2	GH_ERC	0.0001	0.0001	0.01	0.01	192	0.12	1.7	17	6.9	0.0008	0.00081
2015	Q2	GH_FR1	0.0001	0.0001	0.01	0.01	399	0.068	1.6	4.1	1.8	0.0016	0.0016
2015	Q2	LC_LCDSSLCC	0.0001	0.0001	0.01	0.01	280	0.075	1.3	5.3	1.7	0.0016	0.0017
2015	Q4	EV_MC2	0.0001	0.0001	0.01	0.01	387	0.17	1.6	3.1	2.5	0.0014	0.0014
2015	Q4	LC_LCDSSLCC	0.0001	0.0001	0.01	0.01	651	0.13	0.77	1.0	0.45	0.004	0.0042
2016	Q4	EV_MC2	<0.0001	<0.0001	<0.01	<0.01	261	0.17	2.4	3.6	2.9	0.00083	0.00084
2017	Q2	CM_MC2	<0.0001	0.00012	<0.01	<0.01	348	0.21	2.6	37	23	0.0013	0.0013
2017	Q2	EV_HC1	<0.0001	<0.0001	<0.01	<0.01	290	0.19	3.4	13	12	0.0014	0.0014
2017	Q2	EV_MC2	<0.0001	<0.0001	<0.01	0.015	178	0.27	5.1	66	38	0.00049	0.00057
2017	Q2	FR_FRCP1	<0.0001	<0.0001	<0.01	<0.01	362	0.56	2.7	27	13	0.0015	0.0016
2017	Q2	GH_FR1	<0.0001	<0.0001	<0.01	<0.01	331	0.38	4.2	34	17	0.0015	0.0015
2017	Q2	LC_LCDSSLCC	<0.0001	<0.0001	<0.01	<0.01	327	0.56	1.9	3.5	1.9	0.0017	0.0019
2018	Q2	CM_MC2	<0.00012	<0.0001	<0.01	0.015	302	0.19	2.9	29	27	0.0012	0.0012
2018	Q2	EV_HC1	<0.0001	<0.0001	<0.01	<0.01	302	0.07	3.0	13	7.4	0.0016	0.0016
2018	Q2	EV_MC2	<0.0001	<0.0001	<0.01	0.011	156	0.2	4.9	55	29	0.00048	0.00054
2018	Q2	FR_FRCP1	<0.0001	<0.0001	<0.01	<0.01	344	0.49	2.8	36	12	0.0018	0.0018
2018	Q2	GH_ERC	<0.0001	<0.0001	<0.01	0.01	175	0.33	3.3	132	56	0.00077	0.00094
2018	Q2	GH_FR1	<0.0001	<0.0001	<0.01	0.0086	347	0.43	3.4	28	28	0.0016	0.0016
2018	Q2	LC_LCDSSLCC	<0.0001	<0.0001	<0.01	<0.01	334	0.43	1.6	4.3	1.5	0.002	0.002
2018	Q4	CM_MC2	<0.0001	<0.0001	<0.01	<0.01	715	0.22	1.1	1.3	0.67	0.0039	0.0039
2018	Q4	EV_HC1	<0.0001	<0.0001	<0.01	<0.01	525	0.15	0.95	1.6	0.51	0.0027	0.0028
2018	Q4	EV_MC2	<0.0001	<0.0001	<0.01	<0.01	433	0.2	1.1	1.8	0.46	0.0016	0.0017
2018	Q4	GH_ERC	<0.0001	<0.0001	<0.01	<0.01	190	0.068	0.74	1.4	0.46	0.0008	0.00082
2018	Q4	LC_LCDSSLCC	<0.0001	<0.0001	<0.01	<0.01	577	0.17	0.74	1.1	0.27	0.0036	0.0037
2019	Q2	CM_MC2	<0.0001	<0.0001	<0.01	<0.01	339	0.27	2.2	18	10	0.0013	0.0013
2019	Q2	EV_HC1	<0.0001	<0.0001	<0.01	<0.01	314	0.14	1.7	3.7	1.9	0.0017	0.0018
2019	Q2	EV_MC2	<0.0001	<0.0001	<0.01	<0.01	166	0.21	2.8	18	9.8	0.00048	0.0005
2019	Q2	FR_FRCP1	<0.0001	<0.0001	<0.01	<0.01	418	0.23	1.2	12	4.2	0.002	0.0021
2019	Q2	GH_ERC	<0.0001	<0.0001	<0.01	<0.01	181	0.22	1.1	45	17	0.00082	0.00085
2019	Q2	LC_DCDS	<0.0001	<0.0001	<0.01	<0.01	234	0.51	3.1	4.4	2.8	0.00089	0.00082
2019	Q2	LC_LC3	<0.0001	<0.0001	<0.01	<0.01	518	0.25	0.64	1.4	0.86	0.0031	0.0033
2019	Q2	LC_LC5	<0.0001	0.000066	<0.01	<0.01	394	0.41	1.7	15	4.3	0.0017	0.0018
2019	Q2	LC_LCDSSLCC	<0.0001	<0.0001	<0.01	<0.01	366	0.3	1.1	2.2	1.1	0.0021	0.0021
2019	Q4	EV_HC1	0.000074	<0.0001	<0.01	<0.01	526	0.26	0.62	1.7	0.67	0.0028	0.0028
2019	Q4	FR_FRABCH	<0.0001	0.00007	<0.01	<0.01	766	<0.05	0.75	7.6	1.1	0.0031	0.0031
2019	Q4	FR_FRCP1	<0.0001	0.000074	<0.01	<0.01	1086	<0.05	1.0	1.1	0.39	0.0059	0.0059
2019	Q4	GH_ERC	0.000064	0.000076	<0.01	<0.01	202	0.2	0.31	4.4	0.38	0.00085	0.00085
2019	Q4	LC_LC3	<0.0001	0.00011	<0.01	<0.01	903	<0.05	0.73	1.0	0.4	0.0056	0.0059
2019	Q4	LC_LCDSSLCC	0.000066	<0.0001	<0.01	<0.01	652	0.039	0.44	0.66	0.27	0.0038	0.004
Tests categorized as possible or likely response for length (2015 to 2018)													
2016	Q4	GH_ERC	<0.0001	<0.0001	<0.01	<0.01	202	<0.05	0.69	1.7	0.55	0.00084	0.00084
Tests categorized as possible or likely response for weight (2015 to 2018)													
2015	Q2	EV_HC1	0.0001	0.0001	0.01	0.01	241	0.11	1.3	2.2	1.3	0.0013	0.0013
Tests categorized as possible or likely response for viability (2015 to 2018)													
2016	Q4	CM_MC2	<0.0001	<0.0001	<0.01	<0.01	482	0.13	1.9	4.2	2.2	0.0018	0.0019
Tests categorized as possible or likely response for survival and viability (2015 to 2018)													
2015	Q4	CM_MC2	0.0001	0.0001	0.011	0.012	571	0.14	1.4	4.1	2.0	0.0024	0.0023
2015	Q4	EV_HC1	0.0001	0.0001	0.01	0.011	519	0.1	1.2	1.1	0.69	0.0027	0.0028
2016	Q2	CM_MC2	<0.0001	<0.0001	0.012	0.017	366	0.2	1.8	14	6.6	0.0014	0.0014
2016	Q2	EV_HC1	<0.0001	<0.0001	0.011	0.012	351	0.11	1.7	3.1	1.7	0.0019	0.002
2016	Q2	EV_MC2	<0.0001	<0.0001	<0.01	0.014	173	0.18	3.0	23	8.2	0.00058	0.0006
2016	Q2	GH_ERC	<0.0001	<0.0001	<0.01	0.011	189	0.12	1.6	16	3.4	0.00083	0.00082
2016	Q2	GH_FR1	<0.0001	<0.0001	0.011	0.011	394	0.17	1.8	4.4	1.4	0.0016	0.0016
2016	Q2	LC_LCDSSLCC	<0.0000875	<0.0000875	0.008	0.0083	362	0.17	1.5	1.1	0.55	0.0022	0.0023
2016	Q4	EV_HC1	<0.0001	<0.0001	<0.01	<0.01	478	0.11	1.4	1.4	1.2	0.0026	0.0026
2016	Q4	FR_FRCP1	<0.0001	<0.0001	<0.01	<0.01	626	0.073	1.4	1.4	1.2	0.0031	0.0032
2016	Q4	GH_FR1	<0.0001	<0.0001	<0.01	<0.01	553	0.21	1.8	2.2	0.79	0.0023	0.0023
2016	Q4	LC_LCDSSLCC	<0.0001	<0.0001	<0.01	<0.01	525	0.11	0.89	1.3	1.1	0.0033	0.0033
2017	Q2	GH_ERC	<0.0001	<0.0001	<0.01	0.011	184	0.29	4.4	104	55	0.00077	0.00093
2018	Q4	FR_FRABCH	<0.0001	<0.0001	<0.01	<0.01	800	0.21	0.74	1.0	0.35	0.0034	0.0034
2018	Q4	GH_FR1	<0.0001	<0.0001	<0.01	<0.01	622	0.17	0.66	1.2	0.39	0.0027	0.0027
Tests categorized as possible or likely response for survival, viability, and length (2015 to 2018)													
2015	Q4	FR_FRCP1	0.0001	0.0001	0.011	0.011	836	0.1	0.88	1.1	0.37	0.0042	0.0043
2015	Q4	GH_FR1	0.0001	0.0001	0.01	0.011	545	0.11	0.7	1.0	0.27	0.002	0.0021
2016	Q2	FR_FRCP1	<0.0001	<0.0001	0.011	0.011	377	0.16	2.0	6.0	0.98	0.0017	0.0017
Tests categorized as possible or likely response for survival, viability, length, weight (2015 to 2018)													
2015	Q4	GH_ERC	0.0001	0.0001	0.01	0.01	211	0.051	0.58	3.2	0.5	0.00082	0.00084
2018	Q4	FR_FRCP1	<0.0002	<0.00014	<0.01	<0.01	3220	0.41	1.8	27	9.6	0.02	0.022
Tests categorized as possible or likely response for viability (2019)													
2019	Q4	CM_MC2	0.00017	0.000084	<0.01	<0.01	770	0.29	0.78	4.6	1.7	0.0032	0.0034
2019	Q4	EV_MC2	<0.0001	<0.0001	<0.01	<0.01	368	0.31	0.61	0.84	0.31	0.0014	0.0014
2019	Q4	LC_LC5	<0.0001	<0.0001	<0.01	<0.01	512	<0.025	0.62	1.2	0.3	0.0023	0.0023
Tests categorized as possible or likely response for survival and viability (2019)													
2019	Q2	FR_FRABCH	<0.0001	0.000064	<0.01	<0.01	547	0.17	1.3	11	4.6	0.0023	0.0024
2019	Q2	GH_FR1	<0.0001	<0.0001	<0.01	<0.01	439	0.32	1.3	12	3.4	0.002	0.002
2019	Q4	GH_FR1	0.000062	0.00008	<0.01	<0.01	596	<0.05	0.78	2.1	0.39	0.0025	0.0025
2019	Q4	LC_DCDS	0.00007	0.000076	<0.01	<0.01	557	<0.025	1.9	0.8	0.44	0.002	0.0021

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-4: *O. mykiss* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	VANADIUM-D-mg/l	VANADIUM-T-mg/l	ZINC-D-mg/l	ZINC-T-mg/l	∑TU-WQGs	∑TU-WQGs/Benchmarks	PCA Factor 1 (2015 to 2019)	PCA Factor 2 (2015 to 2019)	PCA Factor 3 (2015 to 2019)
Tests not included in statistical analysis											
2017	Q4	CM_MC2	<0.0005	<0.0005	<0.003	<0.003	7.3	6.2	-	-	-
2017	Q4	EV_HC1	<0.0005	<0.0005	<0.003	<0.003	2.3	2.1	-	-	-
2017	Q4	EV_MC2	<0.0005	<0.0005	<0.003	<0.003	2.7	2.4	-	-	-
2017	Q4	FR_FRCP1	<0.0005	0.00052	<0.003	0.0032	9.8	5.6	-	-	-
2017	Q4	GH_ERC	<0.0005	<0.0005	<0.003	0.0031	1.4	1.4	-	-	-
2017	Q4	GH_FR1	<0.0005	<0.0005	<0.003	<0.003	6.1	3.3	-	-	-
2017	Q4	LC_LCDSSLCC	<0.0005	<0.0005	0.0061	0.0081	7.1	4.3	-	-	-
2017	Q4	Reference (CM_MC1)	<0.0005	<0.0005	<0.003	<0.003	1.2	1.2	-	-	-
2017	Q4	Reference (FR_UFR1)	<0.0005	<0.0005	<0.003	<0.003	1.2	1.2	-	-	-
2017	Q4	Reference (GH_ER2)	<0.0005	<0.0005	<0.003	<0.003	1.3	1.3	-	-	-
Reference											
2015	Q2	Reference (FR_UFR1)	0.0005	0.0005	0.003	0.003	2.4	2.4	-6.0	-3.0	-0.7
2015	Q2	Reference (GH_ER2)	0.0005	0.00061	0.003	0.003	2.9	2.9	-4.0	-1.8	-1.8
2015	Q4	Reference (FR_UFR1)	0.0005	0.0005	0.003	0.003	2.3	2.3	-2.9	-5.3	-1.7
2015	Q4	Reference (GH_ER2)	0.0005	0.0005	0.003	0.003	2.4	2.4	-2.9	-4.1	-2.9
2016	Q2	Reference (FR_UFR1)	<0.0005	0.0005	<0.003	<0.003	1.5	1.5	-5.9	-4.0	-0.9
2016	Q2	Reference (GH_ER2)	<0.0005	0.00079	<0.003	<0.003	1.9	1.9	-4.2	-1.9	-1.3
2016	Q4	Reference (FR_UFR1)	<0.0005	0.0005	<0.003	<0.00375	1.4	1.4	-4.1	-4.5	-0.8
2016	Q4	Reference (GH_ER2)	<0.0005	<0.0005	0.0034	0.0035	1.4	1.4	-2.8	-4.8	-2.8
2017	Q2	Reference (FR_UFR1)	<0.0005	0.00083	0.001	0.0031	2.2	2.2	-7.3	-1.0	0.9
2017	Q2	Reference (GH_ER2)	<0.0005	0.0033	<0.0026	0.0094	5.0	5.6	-6.4	5.1	1.2
2018	Q2	Reference (CM_MC1)	<0.0006	0.00088	<0.0012	0.0032	3.1	3.2	-9.3	2.3	-2.9
2018	Q2	Reference (FR_UFR1)	<0.0005	0.0009	<0.001	0.0031	2.1	2.1	-7.7	-0.6	0.6
2018	Q2	Reference (GH_ER2)	<0.0005	0.0036	<0.001	0.0093	5.7	5.7	-6.8	5.4	1.4
2018	Q2	Reference (LC_SLC)	<0.0005	0.00063	0.002	0.0061	1.6	1.6	-6.1	-2.5	-0.8
2018	Q4	Reference (CM_MC1)	<0.0005	<0.0005	0.001	<0.003	1.1	1.2	-4.2	-3.9	-2.7
2018	Q4	Reference (FR_UFR1)	<0.0005	<0.0005	<0.001	<0.003	1.3	1.3	-2.7	-5.7	-1.4
2018	Q4	Reference (GH_ER2)	<0.0005	<0.0005	<0.001	<0.003	1.3	1.3	-2.7	-5.2	-2.8
2018	Q4	Reference (LC_SLC)	<0.0005	<0.0005	0.0014	0.0035	1.5	1.5	-1.1	-4.8	-1.1
2019	Q2	Reference (CM_MC1)	<0.0005	0.00056	<0.001	<0.003	2.3	2.3	-8.4	-0.4	-0.5
2019	Q2	Reference (FR_UFR1)	<0.0005	0.00034	<0.001	<0.003	2.0	2.0	-5.8	-3.9	-0.7
2019	Q2	Reference (GH_ER2)	<0.0005	0.0011	<0.001	0.0031	3.1	3.1	-4.7	-1.0	-0.8
2019	Q2	Reference (LC_SLC)	<0.0005	0.00031	0.0019	0.005	1.8	1.8	-4.4	-4.3	-1.1
2019	Q4	Reference (CM_MC1)	<0.0005	<0.0005	<0.001	<0.003	1.6	1.6	-3.9	-4.9	-2.8
2019	Q4	Reference (FR_UFR1)	<0.0005	0.00044	0.00076	0.0031	1.5	1.5	-3.6	-4.3	1.3
2019	Q4	Reference (GH_ER2)	<0.0005	<0.0005	0.00062	0.002	2.7	2.7	-2.5	-5.8	-3.1
2019	Q4	Reference (LC_SLC)	<0.0005	<0.0005	0.0019	<0.003	2.1	2.1	-0.8	-5.7	-1.6
Tests categorized as no adverse response											
2015	Q2	CM_MC2	0.0014	0.0023	0.0058	0.01	7.2	7.0	-1.4	12.0	-10.4
2015	Q2	EV_MC2	0.0005	0.0029	0.003	0.0087	5.8	5.8	-4.6	6.9	1.6
2015	Q2	FR_FRCP1	0.0005	0.00051	0.003	0.003	5.9	4.1	2.3	-0.2	1.5
2015	Q2	GH_ERC	0.0005	0.0011	0.003	0.0038	3.2	3.2	-4.1	0.2	-0.8
2015	Q2	GH_FR1	0.0005	0.00054	0.003	0.003	5.7	3.9	1.9	-0.6	1.3
2015	Q2	LC_LCDSSLCC	0.0005	0.00056	0.0052	0.007	5.1	4.2	0.2	0.1	0.6
2015	Q4	EV_MC2	0.0005	0.00071	0.003	0.003	4.2	3.7	2.9	1.2	0.9
2015	Q4	LC_LCDSSLCC	0.0005	0.0005	0.0085	0.0092	9.8	6.0	7.7	0.1	0.0
2016	Q4	EV_MC2	<0.0005	0.00076	<0.003	<0.003	2.6	2.6	-1.2	0.3	1.5
2017	Q2	CM_MC2	<0.0005	0.0016	0.0071	0.015	8.7	8.3	0.2	8.3	-0.9
2017	Q2	EV_HC1	<0.0005	0.0014	<0.003	0.004	3.0	2.9	-2.8	2.3	2.4
2017	Q2	EV_MC2	<0.0005	0.0043	<0.003	0.010	7.0	7.0	-6.3	8.5	2.9
2017	Q2	FR_FRCP1	<0.0005	0.0013	0.0023	0.0062	6.4	4.5	0.2	3.7	3.5
2017	Q2	GH_FR1	<0.0005	0.0018	0.0027	0.0064	6.1	4.9	-0.8	4.4	3.6
2017	Q2	LC_LCDSSLCC	<0.0005	<0.0005	0.011	0.011	4.9	3.9	2.2	0.7	1.9
2018	Q2	CM_MC2	<0.0006	0.0024	0.0047	0.015	9.1	9.0	-0.9	9.9	-1.9
2018	Q2	EV_HC1	<0.0005	0.0011	<0.001	0.0036	2.8	2.8	-2.4	1.6	1.6
2018	Q2	EV_MC2	0.00065	0.0039	0.0014	0.01	7.9	8.1	-6.8	9.6	0.4
2018	Q2	FR_FRCP1	<0.0005	0.0018	0.0018	0.0079	6.8	5.0	-0.3	4.8	3.6
2018	Q2	GH_ERC	<0.0005	0.0053	<0.001	0.014	8.5	8.6	-6.1	7.6	2.1
2018	Q2	GH_FR1	<0.0005	0.0013	0.0013	0.0057	5.7	5.1	-0.2	3.7	3.6
2018	Q2	LC_LCDSSLCC	<0.0005	0.00062	0.011	0.011	4.9	4.6	2.3	0.7	1.8
2018	Q4	CM_MC2	<0.0005	<0.0005	0.003	0.0043	13	12	9.5	4.6	-5.9
2018	Q4	EV_HC1	<0.0005	0.00051	<0.001	<0.003	2.4	2.2	2.3	-2.0	0.5
2018	Q4	EV_MC2	<0.0005	<0.0005	0.0012	0.0048	3.2	2.8	4.0	-0.9	0.1
2018	Q4	GH_ERC	<0.0005	0.0006	<0.001	<0.003	1.5	1.6	-2.3	-4.2	-1.8
2018	Q4	LC_LCDSSLCC	<0.0005	<0.0005	0.0054	0.0058	5.9	4.5	7.7	-0.7	0.2
2019	Q2	CM_MC2	<0.0005	0.0008	0.0031	0.0077	5.7	5.4	-0.4	4.3	0.0
2019	Q2	EV_HC1	<0.0005	0.00033	<0.001	<0.003	2.2	2.1	-0.8	-2.7	0.3
2019	Q2	EV_MC2	<0.0005	0.0012	<0.001	0.0029	2.9	3.0	-5.2	1.6	1.3
2019	Q2	FR_FRCP1	<0.0005	0.00055	0.00062	0.0023	5.8	4.0	2.5	-0.4	2.1
2019	Q2	GH_ERC	<0.0005	0.0016	<0.001	0.0049	4.4	4.4	-4.3	1.0	0.0
2019	Q2	LC_DCDS	0.0011	0.0014	0.00098	0.0024	5.5	5.6	1.1	1.5	3.4
2019	Q2	LC_LC3	<0.0005	<0.0005	0.01	0.012	9.5	7.2	6.2	0.5	0.6
2019	Q2	LC_LC5	<0.0005	0.0005	<0.001	0.0033	4.8	3.3	2.7	-1.2	2.7
2019	Q2	LC_LCDSSLCC	<0.0005	0.00031	0.0047	0.0061	4.8	3.7	2.7	-1.4	1.6
2019	Q4	EV_HC1	<0.0005	<0.0005	0.001	<0.003	2.4	2.2	2.2	-3.3	0.8
2019	Q4	FR_FRABCH	<0.0005	<0.0005	0.00064	0.0018	8.9	3.7	4.9	-1.8	1.6
2019	Q4	FR_FRCP1	<0.0005	<0.0005	0.0018	0.0043	12	7.1	9.4	-0.2	1.5
2019	Q4	GH_ERC	<0.0005	<0.0005	0.00086	<0.003	2.9	2.9	-1.2	-6.2	-0.7
2019	Q4	LC_LC3	<0.0005	<0.0005	0.0083	0.0084	12	7.7	9.9	1.1	0.1
2019	Q4	LC_LCDSSLCC	<0.0005	<0.0005	0.0042	0.0049	7.7	5.1	7.3	-2.1	0.6
Tests categorized as possible or likely response for length (2015 to 2018)											
2016	Q4	GH_ERC	<0.0005	<0.0005	<0.003	<0.003	1.6	1.6	-2.2	-4.5	-2.4
Tests categorized as possible or likely response for weight (2015 to 2018)											
2015	Q2	EV_HC1	0.0005	0.00058	0.003	0.0031	2.7	2.7	-2.6	-1.6	-0.4
Tests categorized as possible or likely response for viability (2015 to 2018)											
2016	Q4	CM_MC2	<0.0005	<0.0005	0.0032	0.004	5.3	4.7	3.2	2.5	-2.2
Tests categorized as possible or likely response for survival and viability (2015 to 2018)											
2015	Q4	CM_MC2	0.0005	0.00053	0.003	0.003	6.5	5.8	4.9	2.7	-3.4
2015	Q4	EV_HC1	0.0005	0.00052	0.003	0.003	3.2	2.9	2.6	-1.5	0.4
2016	Q2	CM_MC2	<0.0005	0.00088	0.0059	0.011	7.8	7.4	1.0	6.4	-2.2
2016	Q2	EV_HC1	<0.0005	0.00057	<0.003	<0.003	2.2	2.1	-0.2	-1.1	0.9
2016	Q2	EV_MC2	<0.0005	0.0018	<0.003	0.0046	3.9	4.0	-4.8	4.1	2.0
2016	Q2	GH_ERC	<0.0005	0.001	<0.003	0.0032	2.4	2.4	-3.8	-0.5	-0.6
2016	Q2	GH_FR1	<0.0005	0.00053	<0.003	<0.003	4.7	2.9	1.8	-0.7	1.6
2016	Q2	LC_LCDSSLCC	<0.0005	<0.0005	0.0088	0.0097	5.2	3.9	4.0	-0.6	1.7
2016	Q4	EV_HC1	<0.0005	<0.0005	<0.003	<0.003	2.3	2.1	2.0	-1.9	0.8
2016	Q4	FR_FRCP1	<0.0005	<0.0005	<0.003	<0.0045	7.2	4.0	5.7	-0.6	1.5
2016	Q4	GH_FR1	<0.0005	<0.0005	<0.003	<0.003	5.7	3.2	4.4	-1.3	1.2
2016	Q4	LC_LCDSSLCC	<0.0005	0.00056	0.006	0.008	6.4	4.0	5.9	0.1	1.3
2017	Q2	GH_ERC	<0.0005	0.0039	<0.0026	0.011	7.3	7.3	-5.9	6.7	1.8
2018	Q4	FR_FRABCH	<0.0005	<0.0005	<0.001	<0.003	8.6	3.5	6.2	-2.1	0.8
2018	Q4	GH_FR1	<0.0005	<0.0005	<0.001	<0.003	5.6	3.5	5.5	-2.7	0.7
Tests categorized as possible or likely response for survival, viability, and length (2015 to 2018)											
2015	Q4	FR_FRCP1	0.0005	0.0005	0.003	0.003	10	5.9	7.4	-0.1	0.4
2015	Q4	GH_FR1	0.0005	0.0005	0.003	0.003	6.5	3.8	4.5	-2.3	-0.1
2016	Q2	FR_FRCP1	<0.0005	0.00053	<0.003	0.0031	5.1	3.2	1.7	-0.2	1.8
Tests categorized as possible or likely response for survival, viability, length, weight (2015 to 2018)											
2015	Q4	GH_ERC	0.0005	0.0005	0.003	0.003	2.5	2.5	-2.0	-4.1	-2.6
2018	Q4	FR_FRCP1	<0.001	<0.0007	<0.002	<0.0042	26	18	12.2	8.0	-9.3
Tests categorized as possible or likely response for viability (2019)											
2019	Q4	CM_MC2	<0.0005	0.00033	0.0021	0.0025	8.6	7.7	6.7	3.1	-4.3
2019	Q4	EV_MC2	<0.0005	<0.0005	0.0011	<0.003	2.5	2.3	2.4	-3.4	0.1
2019	Q4	LC_LC5	<0.0005	<0.0005	0.00094	<0.003	5.5	3.2	4.5	-4.5	0.5
Tests categorized as possible or likely response for survival and viability (2019)											
2019	Q2	FR_FRABCH	<0.0005	0.00059	0.0011	0.0051	7.2	4.1	2.5	0.5	3.4
2019	Q2	GH_FR1	<0.0005	0.0007	0.0012	0.0023	5.4	3.6	2.3	-0.3	2.1
2019	Q4	GH_FR1	<0.0005	<0.0005	0.0011	0.0019	5.8	3.1	4.1	-4.1	2.1
2019	Q4	LC_DCDS	0.0011	0.0012	0.0042	0.0047	13	8.0	6.9	0.9	3.1

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-4: *O. mykiss* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	PCA Factor 1 (2019)	PCA Factor 2 (2019)	PCA Factor 3 (2019)	PCA Factor 4 (2019)	PCA Factor 5 (2019)
Tests not included in statistical analysis							
2017	Q4	CM_MC2	-	-	-	-	-
2017	Q4	EV_HC1	-	-	-	-	-
2017	Q4	EV_MC2	-	-	-	-	-
2017	Q4	FR_FRCP1	-	-	-	-	-
2017	Q4	GH_ERC	-	-	-	-	-
2017	Q4	GH_FR1	-	-	-	-	-
2017	Q4	LC_LCDSSLCC	-	-	-	-	-
2017	Q4	Reference (CM_MC1)	-	-	-	-	-
2017	Q4	Reference (FR_UFR1)	-	-	-	-	-
2017	Q4	Reference (GH_ER2)	-	-	-	-	-
Reference							
2015	Q2	Reference (FR_UFR1)	-	-	-	-	-
2015	Q2	Reference (GH_ER2)	-	-	-	-	-
2015	Q4	Reference (FR_UFR1)	-	-	-	-	-
2015	Q4	Reference (GH_ER2)	-	-	-	-	-
2016	Q2	Reference (FR_UFR1)	-	-	-	-	-
2016	Q2	Reference (GH_ER2)	-	-	-	-	-
2016	Q4	Reference (FR_UFR1)	-	-	-	-	-
2016	Q4	Reference (GH_ER2)	-	-	-	-	-
2017	Q2	Reference (FR_UFR1)	-	-	-	-	-
2017	Q2	Reference (GH_ER2)	-	-	-	-	-
2018	Q2	Reference (CM_MC1)	-	-	-	-	-
2018	Q2	Reference (FR_UFR1)	-	-	-	-	-
2018	Q2	Reference (GH_ER2)	-	-	-	-	-
2018	Q2	Reference (LC_SLC)	-	-	-	-	-
2018	Q4	Reference (CM_MC1)	-	-	-	-	-
2018	Q4	Reference (FR_UFR1)	-	-	-	-	-
2018	Q4	Reference (GH_ER2)	-	-	-	-	-
2018	Q4	Reference (LC_SLC)	-	-	-	-	-
2019	Q2	Reference (CM_MC1)	-8.9	3.3	-1.5	-1.9	-0.6
2019	Q2	Reference (FR_UFR1)	-7.0	-0.8	-1.3	-0.3	-1.2
2019	Q2	Reference (GH_ER2)	-5.8	2.4	2.2	1.0	-0.2
2019	Q2	Reference (LC_SLC)	-5.6	-2.3	-0.5	-1.0	-2.0
2019	Q4	Reference (CM_MC1)	-5.3	-3.8	-1.0	-3.8	1.4
2019	Q4	Reference (FR_UFR1)	-4.6	-1.7	-1.3	2.3	0.7
2019	Q4	Reference (GH_ER2)	-4.1	-4.6	1.7	-1.3	0.8
2019	Q4	Reference (LC_SLC)	-2.4	-4.7	0.5	-1.1	-1.1
Tests categorized as no adverse response							
2015	Q2	CM_MC2	-	-	-	-	-
2015	Q2	EV_MC2	-	-	-	-	-
2015	Q2	FR_FRCP1	-	-	-	-	-
2015	Q2	GH_ERC	-	-	-	-	-
2015	Q2	GH_FR1	-	-	-	-	-
2015	Q2	LC_LCDSSLCC	-	-	-	-	-
2015	Q4	EV_MC2	-	-	-	-	-
2015	Q4	LC_LCDSSLCC	-	-	-	-	-
2016	Q4	EV_MC2	-	-	-	-	-
2017	Q2	CM_MC2	-	-	-	-	-
2017	Q2	EV_HC1	-	-	-	-	-
2017	Q2	EV_MC2	-	-	-	-	-
2017	Q2	FR_FRCP1	-	-	-	-	-
2017	Q2	GH_FR1	-	-	-	-	-
2017	Q2	LC_LCDSSLCC	-	-	-	-	-
2018	Q2	CM_MC2	-	-	-	-	-
2018	Q2	EV_HC1	-	-	-	-	-
2018	Q2	EV_MC2	-	-	-	-	-
2018	Q2	FR_FRCP1	-	-	-	-	-
2018	Q2	GH_ERC	-	-	-	-	-
2018	Q2	GH_FR1	-	-	-	-	-
2018	Q2	LC_LCDSSLCC	-	-	-	-	-
2018	Q4	CM_MC2	-	-	-	-	-
2018	Q4	EV_HC1	-	-	-	-	-
2018	Q4	EV_MC2	-	-	-	-	-
2018	Q4	GH_ERC	-	-	-	-	-
2018	Q4	LC_LCDSSLCC	-	-	-	-	-
2019	Q2	CM_MC2	-0.6	7.1	3.3	-2.2	0.6
2019	Q2	EV_HC1	-1.9	-0.8	0.1	1.5	0.3
2019	Q2	EV_MC2	-5.8	5.0	-0.7	-0.5	0.9
2019	Q2	FR_FRCP1	1.4	1.8	0.2	3.3	-0.8
2019	Q2	GH_ERC	-5.2	4.2	3.9	0.2	-0.2
2019	Q2	LC_DCDS	0.0	4.6	-7.4	-0.9	1.2
2019	Q2	LC_LC3	5.3	0.6	1.2	-2.5	-5.2
2019	Q2	LC_LC5	1.2	1.2	-0.2	3.8	-1.6
2019	Q2	LC_LCDSSLCC	1.5	-0.5	0.0	-0.4	-5.0
2019	Q4	EV_HC1	1.0	-2.7	0.4	1.5	1.2
2019	Q4	FR_FRABCH	4.1	-0.7	0.6	2.6	3.1
2019	Q4	FR_FRCP1	8.5	-0.2	0.3	0.7	1.1
2019	Q4	GH_ERC	-3.0	-4.9	0.7	-1.0	0.9
2019	Q4	LC_LC3	9.5	0.8	0.8	-2.8	-3.0
2019	Q4	LC_LCDSSLCC	6.2	-2.1	0.5	-1.4	-1.6
Tests categorized as possible or likely response for length (2015 to 2018)							
2016	Q4	GH_ERC	-	-	-	-	-
Tests categorized as possible or likely response for weight (2015 to 2018)							
2015	Q2	EV_HC1	-	-	-	-	-
Tests categorized as possible or likely response for viability (2015 to 2018)							
2016	Q4	CM_MC2	-	-	-	-	-
Tests categorized as possible or likely response for survival and viability (2015 to 2018)							
2015	Q4	CM_MC2	-	-	-	-	-
2015	Q4	EV_HC1	-	-	-	-	-
2016	Q2	CM_MC2	-	-	-	-	-
2016	Q2	EV_HC1	-	-	-	-	-
2016	Q2	EV_MC2	-	-	-	-	-
2016	Q2	GH_ERC	-	-	-	-	-
2016	Q2	GH_FR1	-	-	-	-	-
2016	Q2	LC_LCDSSLCC	-	-	-	-	-
2016	Q4	EV_HC1	-	-	-	-	-
2016	Q4	FR_FRCP1	-	-	-	-	-
2016	Q4	GH_FR1	-	-	-	-	-
2016	Q4	LC_LCDSSLCC	-	-	-	-	-
2017	Q2	GH_ERC	-	-	-	-	-
2018	Q4	FR_FRABCH	-	-	-	-	-
2018	Q4	GH_FR1	-	-	-	-	-
Tests categorized as possible or likely response for survival, viability, and length (2015 to 2018)							
2015	Q4	FR_FRCP1	-	-	-	-	-
2015	Q4	GH_FR1	-	-	-	-	-
2016	Q2	FR_FRCP1	-	-	-	-	-
Tests categorized as possible or likely response for survival, viability, length, weight (2015 to 2018)							
2015	Q4	GH_ERC	-	-	-	-	-
2018	Q4	FR_FRCP1	-	-	-	-	-
Tests categorized as possible or likely response for viability (2019)							
2019	Q4	CM_MC2	5.6	2.5	6.6	-3.8	4.7
2019	Q4	EV_MC2	1.0	-3.0	-0.6	-0.6	2.0
2019	Q4	LC_LC5	2.7	-4.2	-0.1	1.1	0.3
Tests categorized as possible or likely response for survival and viability (2019)							
2019	Q2	FR_FRABCH	1.8	2.8	0.8	5.4	-0.8
2019	Q2	GH_FR1	1.0	1.8	-0.1	3.0	0.3
2019	Q4	GH_FR1	2.8	-3.4	-0.6	2.2	1.9
2019	Q4	LC_DCDS	6.4	2.3	-8.2	-2.7	1.9

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-5: *P. promelas* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	Mean Hatch (control normalized)	Mean Survival (Control Normalized)	Mean Biomass (Control Normalized)	Mean Length (Control Normalized)	Mean Normal Development (Control Normalized)	ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	ALUMINUM-D-mg/l	ALUMINUM-T-mg/l	ANTIMONY-D-mg/l	ANTIMONY-T-mg/l	ARSENIC-D-mg/l
Tests not included in statistical analysis													
2016	Q1	CM_MC2	-	-	-	-	-	210	<0.003	0.018	0.00021	0.00022	0.00016
2016	Q1	FR_FRCP1	-	-	-	-	-	234	0.0032	0.0048	0.00026	0.00028	<0.0001
2016	Q1	GH_FR1	-	-	-	-	-	200	<0.003	0.0094	0.00014	0.00016	<0.0001
2016	Q1	Reference (FR_UFR1)	-	-	-	-	-	139	0.0072	0.024	<0.0001	<0.0001	<0.0001
2016	Q4	Reference (FR_UFR1)	100	58	58	97	102	141	0.0073	0.038	<0.0001	<0.0001	<0.0001
2018	Q2	Reference (FR_UFR1)	100	6.1	19	150	107	102	0.0071	0.16	<0.0001	<0.0001	0.00013
2018	Q2	Reference (GH_ER2)	97	39	59	120	96	137	0.005	0.71	<0.0001	0.00013	0.00015
2019	Q1	FR_FRABCH	103	78	94	98	100	237	<0.003	0.012	0.000064	0.000066	<0.0001
2019	Q3	CM_MC2	98	28	56	127	100	210	<0.003	0.012	0.00021	0.00021	0.00019
2019	Q3	FR_FRABCH	98	74	93	107	100	230	<0.003	0.0038	0.00015	0.00017	<0.0001
2019	Q3	FR_FRCP1	100	64	85	109	100	197	<0.003	0.0046	0.00026	0.00028	0.000098
2019	Q3	LC_LCDSSLCC	100	64	74	104	100	188	<0.003	0.0038	0.00019	0.00019	0.000076
2019	Q3	Reference (FR_UFR1)	100	88	98	101	100	148	0.0018	0.006	<0.0001	<0.0001	0.000074
Reference													
2016	Q2	Reference (FR_UFR1)	100	104	95	95	98	116	0.0056	0.059	<0.0001	<0.0001	0.0001
2016	Q3	Reference (FR_UFR1)	107	96	100	102	100	156	<0.003	0.0063	<0.0001	<0.0001	<0.0001
2017	Q1	Reference (FR_UFR1)	97	100	91	107	100	139	0.0014	0.0076	<0.0001	0.00013	<0.0001
2017	Q2	Reference (FR_UFR1)	100	98	111	98	100	116	0.026	0.13	<0.0001	0.00011	0.00013
2017	Q2	Reference (GH_ER2)	100	98	105	100	98	150	0.0035	0.27	<0.0001	<0.0001	0.00012
2017	Q3	Reference (CM_MC1)	100	92	128	82	100	142	0.0029	0.012	<0.0001	0.0001	0.00021
2017	Q3	Reference (FR_UFR1)	98	98	130	84	100	147	0.0027	0.0057	<0.0001	0.0001	<0.0001
2017	Q3	Reference (GH_ER2)	100	83	130	85	100	140	0.0029	0.014	<0.0001	0.00012	0.00011
2017	Q4	Reference (CM_MC1)	100	78	91	97	100	136	<0.003	0.0067	<0.0001	<0.0001	0.00015
2017	Q4	Reference (FR_UFR1)	105	98	98	93	100	144	<0.003	0.0033	<0.0001	<0.0001	<0.0001
2017	Q4	Reference (GH_ER2)	103	96	85	92	100	147	<0.003	0.0068	<0.0001	<0.0001	<0.0001
2018	Q1	Reference (CM_MC1)	100	100	86	88	102	157	<0.003	0.0038	<0.0001	<0.0001	0.00015
2018	Q1	Reference (FR_UFR1)	102	89	98	96	100	148	0.0063	0.011	<0.00012	<0.0001	0.00012
2018	Q1	Reference (GH_ER2)	100	77	86	109	102	156	<0.003	0.0045	<0.0001	0.0001	<0.0001
2018	Q2	Reference (CM_MC1)	98	116	97	100	107	92	0.025	0.33	<0.00012	<0.0001	0.00023
2018	Q3	Reference (CM_MC1)	98	106	93	93	100	146	0.003	0.014	<0.0001	<0.0001	0.00018
2018	Q3	Reference (FR_UFR1)	102	102	87	98	100	152	<0.003	0.0045	<0.0001	<0.0001	0.0001
2018	Q3	Reference (GH_ER2)	98	69	54	94	100	137	<0.003	0.19	<0.0001	<0.0001	0.0001
2018	Q4	Reference (CM_MC1)	98	93	79	99	100	139	0.0033	0.0071	<0.0001	<0.0001	0.00017
2018	Q4	Reference (FR_UFR1)	100	109	97	104	100	150	<0.003	0.0031	<0.0001	<0.0001	<0.0001
2018	Q4	Reference (GH_ER2)	100	104	100	106	100	147	<0.003	0.0055	<0.0001	<0.0001	<0.0001
2019	Q1	Reference (CM_MC1)	100	60	64	102	100	159	<0.003	0.0052	<0.0001	<0.0001	0.00014
2019	Q1	Reference (FR_UFR1)	100	86	82	96	100	147	0.032	0.17	<0.0001	<0.0001	0.00009
2019	Q1	Reference (GH_ER2)	100	82	86	103	100	148	0.0023	0.014	<0.0001	<0.0001	<0.0001
2019	Q1	Reference (LC_SLC)	100	89	82	93	100	146	<0.003	<0.003	<0.0001	<0.0001	0.00012
2019	Q3	Reference (CM_MC1)	98	76	96	104	100	147	<0.003	0.0076	<0.0001	<0.0001	0.0002
2019	Q3	Reference (GH_ER2)	98	69	89	104	100	138	<0.003	0.012	<0.0001	<0.0001	0.000084
2019	Q3	Reference (LC_SLC)	100	63	68	95	100	139	<0.003	0.0022	<0.0001	<0.0001	0.00011
Tests categorized as no adverse response													
2016	Q2	CM_MC2	100	107	100	97	100	144	0.0062	0.34	0.00015	0.00016	0.00017
2016	Q2	FR_FRCP1	98	104	86	96	100	155	<0.003	0.064	0.00017	0.00022	<0.0001
2016	Q2	GH_FR1	97	100	91	99	100	168	<0.003	0.065	0.00016	0.00019	0.0001
2016	Q3	FR_FRCP1	105	92	111	105	100	201	<0.003	0.015	0.00021	0.00024	<0.0001
2016	Q3	GH_FR1	107	102	89	101	100	199	<0.003	0.0072	0.00013	0.00015	0.0001
2016	Q4	CM_MC2	100	105	92	103	102	174	0.0065	0.1	0.00021	0.00022	0.00024
2016	Q4	FR_FRCP1	97	87	95	103	102	197	0.0036	0.023	0.00019	0.0002	<0.0001
2016	Q4	GH_FR1	98	89	92	101	102	194	<0.003	0.01	0.00016	0.00022	0.0001
2017	Q1	CM_MC2	98	113	103	94	100	196	0.0032	0.036	0.00031	0.00041	0.00015
2017	Q1	FR_FRCP1	102	81	72	115	100	250	0.0011	0.011	0.00026	0.00037	<0.0001
2017	Q1	GH_FR1	102	115	106	99	100	204	<0.003	0.012	0.00012	0.00013	<0.0001
2017	Q2	CM_MC2	100	95	111	100	100	170	0.005	0.31	0.00023	0.00026	0.00017
2017	Q2	FR_FRCP1	100	98	97	99	98	175	0.006	0.22	0.00019	0.00023	0.00012
2017	Q3	CM_MC2	102	96	119	96	100	190	0.003	0.029	0.00031	0.00036	0.00019
2017	Q3	FR_FRCP1	102	83	98	103	100	204	0.0026	0.0056	0.00024	0.00027	<0.00012
2017	Q3	GH_FR1	100	92	117	90	100	194	0.0027	0.0067	0.00016	0.00018	<0.0001
2017	Q4	CM_MC2	98	82	95	97	100	202	<0.003	0.0081	0.00025	0.00028	0.00017
2017	Q4	FR_FRCP1	100	96	109	101	100	190	<0.003	0.016	0.00024	0.00026	<0.0001
2017	Q4	GH_FR1	97	94	101	98	100	181	<0.003	0.0055	0.00017	0.00019	0.0001
2018	Q1	CM_MC2	93	98	121	96	100	232	<0.003	0.012	0.00023	0.00025	0.00017
2018	Q1	FR_FRCP1	93	84	107	100	100	250	0.0033	0.0062	0.00024	0.00026	<0.00012
2018	Q1	GH_FR1	93	91	102	99	100	208	0.0062	0.0061	0.00017	0.00018	0.0001
2018	Q2	CM_MC2	100	113	105	100	103	141	0.0094	1.1	0.00016	0.00018	0.00017
2018	Q2	FR_FRCP1	93	104	93	97	101	158	0.0038	0.37	0.00019	0.00022	0.00011
2018	Q2	GH_FR1	97	94	98	105	103	160	0.0041	0.24	0.00019	0.00023	0.00014
2018	Q3	GH_FR1	95	92	89	103	100	195	<0.003	0.015	0.00015	0.00016	0.00011
2018	Q4	CM_MC2	100	91	91	96	100	215	<0.003	0.012	0.00036	0.00037	0.00017
2018	Q4	GH_FR1	100	96	81	95	100	206	<0.003	0.0066	0.00013	0.00013	<0.0001
2019	Q1	CM_MC2	103	98	119	96	100	223	<0.003	0.0096	0.00029	0.00029	0.0002
2019	Q1	EV_HC1	100	95	86	91	100	191	<0.003	0.013	0.000064	0.000062	0.00016
2019	Q1	EV_MC2	100	98	91	88	100	186	<0.003	0.025	0.000082	0.000082	0.00014
2019	Q1	GH_FR1	103	106	125	98	100	209	0.0021	0.03	0.00015	0.00016	0.000082
2019	Q1	LC_DCDS	100	100	91	89	100	171	0.0022	0.034	0.00051	0.00052	0.00038
2019	Q1	LC_LC3	100	86	95	96	100	210	<0.003	0.099	0.00026	0.00029	0.00008
2019	Q1	LC_LC5	100	72	68	89	100	197	<0.003	0.023	0.000066	0.000076	0.0001
2019	Q1	LC_LCDSSLCC	100	89	91	90	100	200	<0.003	0.0063	0.00017	0.00017	0.000084
2019	Q3	EV_HC1	100	83	85	101	100	193	<0.003	0.014	<0.0001	0.000072	0.00017
2019	Q3	EV_MC2	98	78	89	104	100	171	<0.003	0.016	0.000096	0.00011	0.00019
2019	Q3	GH_ERC	98	80	105	105	100	148	<0.003	0.0066	<0.0001	<0.0001	0.00007
2019	Q3	GH_FR1	98	86	95	102	100	197	<0.003	0.0068	0.00014	0.00015	0.00011
2019	Q3	LC_DCDS	98	76	77	98	100	134	<0.003	0.019	0.00049	0.00051	0.0003
2019	Q3	LC_LC3	100	95	95	105	100	213	<0.003	0.0034	0.00027	0.00029	<0.0001
2019	Q3	LC_LC5	100	90	84	97	100	188	<0.003	0.011	0.00012	0.00013	0.000062
Tests categorized as possible or likely for hatch (2015 to 2018)													
2016	Q3	CM_MC2	95	73	89	106	100	200	0.0034	0.012	0.00026	0.00029	0.00025
Tests categorized as possible or likely for survival and biomass (2015 to 2018)													
2017	Q2	GH_FR1	100	64	84	106	100	175	0.0046	0.36	0.00018	0.00022	0.00013
2018	Q3	FR_FRCP1	100	1.8	5.8	140	100	213	<0.003	0.012	0.00028	0.0003	0.0001
2018	Q4	FR_FRABCH	100	62	59	99	100	246	<0.003	0.0036	<0.0001	0.00011	<0.0001
Tests categorized as possible or likely for survival (2015 to 2018)													
2018	Q3	CM_MC2	100	45	62	114	100	195	<0.0038	0.029	0.00053	0.00055	0.00021
Tests categorized as possible or likely for survival, biomass, and length (2015 to 2018)													
2018	Q4	FR_FRCP1	98	1.8	3.1	31	100	353	<0.003	0.0043	0.00049	0.0005	<0.0002
Tests categorized as possible or likely for survival and biomass (2019)													
2019	Q1	FR_FRCP1	95	18	50	129	100	327	0.0019	0.037	0.00039	0.0004	0.00012
Tests categorized as possible or likely for survival (2019)													
2019	Q1	GH_ERC	98	51	36	94	100	154	<0.003	0.0026	<0.0001	<0.0001	<0.0001

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-5: *P. promelas* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	ARSENIC-T-mg/l	BARIUM-D-mg/l	BARIUM-T-mg/l	BERYLLIUM-D-mg/l	BERYLLIUM-T-mg/l	BISMUTH-D-mg/l	BISMUTH-T-mg/l	BORON-D-mg/l	BORON-T-mg/l	BROMIDE-D-mg/l	CADMIUM-D-mg/l
Tests not included in statistical analysis													
2016	Q1	CM_MC2	0.00019	0.077	0.076	<0.0001	<0.0001	<0.00005	<0.00005	0.025	0.027	<0.25	0.000015
2016	Q1	FR_FRCP1	0.0001	0.084	0.085	<0.0001	<0.0001	<0.00005	<0.00005	0.011	0.012	<0.3	0.000022
2016	Q1	GH_FR1	0.00012	0.12	0.12	<0.0001	<0.0001	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000015
2016	Q1	Reference (FR_UFR1)	0.0001	0.075	0.075	<0.0001	<0.0001	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000065
2016	Q4	Reference (FR_UFR1)	0.00012	0.063	0.063	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000063
2018	Q2	Reference (FR_UFR1)	0.00021	0.039	0.038	<0.00002	0.000021	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000082
2018	Q2	Reference (GH_ER2)	0.00066	0.041	0.054	<0.00002	0.000064	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000085
2019	Q1	FR_FRABCH	0.000074	0.11	0.1	<0.00002	<0.00002	<0.00005	<0.00005	0.0096	0.011	<0.11	0.000034
2019	Q3	CM_MC2	0.0002	0.069	0.069	<0.00002	<0.00002	<0.00005	<0.00005	0.029	0.029	<0.065	0.000012
2019	Q3	FR_FRABCH	0.000096	0.092	0.089	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.012	<0.085	0.000033
2019	Q3	FR_FRCP1	0.00012	0.078	0.075	<0.00002	<0.00002	<0.00005	<0.00005	0.0086	0.010	<0.05	0.00004
2019	Q3	LC_LCDSSLCC	0.000072	0.06	0.06	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.013	<0.05	0.00015
2019	Q3	Reference (FR_UFR1)	0.000094	0.067	0.065	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000079
Reference													
2016	Q2	Reference (FR_UFR1)	0.00012	0.042	0.044	<0.000036	<0.000036	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000006
2016	Q3	Reference (FR_UFR1)	0.00011	0.076	0.077	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000079
2017	Q1	Reference (FR_UFR1)	0.00011	0.074	0.082	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000084
2017	Q2	Reference (FR_UFR1)	0.00018	0.046	0.046	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011
2017	Q2	Reference (GH_ER2)	0.00027	0.047	0.049	<0.00002	0.000028	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000078
2017	Q3	Reference (CM_MC1)	0.00022	0.052	0.052	<0.00002	<0.00002	<0.00005	<0.00005	0.016	0.015	<0.05	0.0000099
2017	Q3	Reference (FR_UFR1)	0.00012	0.075	0.073	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000083
2017	Q3	Reference (GH_ER2)	0.00012	0.048	0.047	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000068
2017	Q4	Reference (CM_MC1)	0.00018	0.051	0.051	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.09	0.0000077
2017	Q4	Reference (FR_UFR1)	0.00011	0.074	0.073	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	0.052	0.0000068
2017	Q4	Reference (GH_ER2)	0.00011	0.048	0.047	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000052
2018	Q1	Reference (CM_MC1)	0.00016	0.054	0.053	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.014	<0.05	0.0000067
2018	Q1	Reference (FR_UFR1)	0.00012	0.08	0.071	<0.000028	<0.00002	<0.00006	<0.00005	<0.012	<0.01	<0.05	0.0000077
2018	Q1	Reference (GH_ER2)	0.00021	0.051	0.05	<0.00002	<0.00002	<0.00006	<0.00005	<0.01	<0.01	<0.05	0.0000056
2018	Q2	Reference (CM_MC1)	0.00037	0.028	0.029	<0.000024	0.000023	<0.00006	<0.00005	<0.012	0.01	<0.05	0.000012
2018	Q3	Reference (CM_MC1)	0.00021	0.059	0.054	<0.00002	<0.00002	<0.00005	<0.00005	0.015	0.016	<0.05	0.00001
2018	Q3	Reference (FR_UFR1)	0.00012	0.075	0.072	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.09	0.0000073
2018	Q3	Reference (GH_ER2)	0.00026	0.043	0.045	<0.00002	0.000029	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000065
2018	Q4	Reference (CM_MC1)	0.00018	0.048	0.047	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.013	<0.05	0.000008
2018	Q4	Reference (FR_UFR1)	0.00011	0.071	0.071	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000076
2018	Q4	Reference (GH_ER2)	0.00011	0.047	0.047	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000055
2019	Q1	Reference (CM_MC1)	0.00016	0.056	0.056	<0.00002	<0.00002	<0.00005	<0.00005	0.013	0.013	<0.05	0.0000095
2019	Q1	Reference (FR_UFR1)	0.00012	0.068	0.067	<0.00002	0.000013	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000011
2019	Q1	Reference (GH_ER2)	0.000094	0.049	0.048	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000055
2019	Q1	Reference (LC_SLC)	0.000074	0.049	0.048	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.00001
2019	Q3	Reference (CM_MC1)	0.00021	0.053	0.053	<0.00002	0.000013	<0.00005	<0.00005	0.016	0.016	<0.05	0.00001
2019	Q3	Reference (GH_ER2)	0.00013	0.043	0.041	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000062
2019	Q3	Reference (LC_SLC)	0.00011	0.04	0.04	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000012
Tests categorized as no adverse response													
2016	Q2	CM_MC2	0.00028	0.044	0.045	<0.000036	0.000039	<0.00005	<0.00005	0.016	0.017	<0.05	0.000059
2016	Q2	FR_FRCP1	0.00013	0.058	0.059	<0.000036	<0.000036	<0.00005	0.000051	<0.01	<0.01	<0.05	0.000027
2016	Q2	GH_FR1	0.00015	0.079	0.08	<0.000036	<0.000036	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.00002
2016	Q3	FR_FRCP1	0.00011	0.077	0.077	<0.00002	<0.00002	<0.00005	<0.00005	0.011	0.011	<0.25	0.00002
2016	Q3	GH_FR1	0.00013	0.11	0.11	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	0.01	<0.25	0.000015
2016	Q4	CM_MC2	0.00028	0.053	0.056	<0.000036	<0.000036	<0.00009	<0.00009	0.025	0.026	<0.09	0.000029
2016	Q4	FR_FRCP1	0.00013	0.075	0.075	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000044
2016	Q4	GH_FR1	0.00014	0.10	0.099	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000016
2017	Q1	CM_MC2	0.0002	0.068	0.07	<0.00002	<0.00002	<0.00005	<0.00005	0.03	0.031	<0.17	0.000037
2017	Q1	FR_FRCP1	0.00013	0.077	0.077	<0.00002	<0.00002	<0.00005	<0.00005	0.01	0.011	<0.25	0.000045
2017	Q1	GH_FR1	0.00011	0.12	0.12	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000017
2017	Q2	CM_MC2	0.00036	0.055	0.058	<0.00002	0.00003	<0.00005	<0.00005	0.023	0.025	<0.05	0.000071
2017	Q2	FR_FRCP1	0.00027	0.067	0.069	<0.00002	0.000025	<0.00005	<0.00005	<0.01	0.01	<0.05	0.000057
2017	Q3	CM_MC2	0.00024	0.067	0.066	<0.00002	<0.00002	<0.00005	<0.00005	0.032	0.033	<0.09	0.0000061
2017	Q3	FR_FRCP1	0.00012	0.074	0.073	<0.000024	<0.00002	<0.00006	<0.00005	0.013	0.011	<0.21	0.000019
2017	Q3	GH_FR1	0.00011	0.11	0.1	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.13	0.000019
2017	Q4	CM_MC2	0.0002	0.079	0.077	<0.00002	<0.00002	<0.00005	<0.00005	0.033	0.035	0.099	0.000012
2017	Q4	FR_FRCP1	0.00013	0.074	0.075	<0.00002	<0.00002	<0.00005	<0.00005	0.011	0.011	0.29	0.000012
2017	Q4	GH_FR1	0.00012	0.11	0.11	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	0.05	0.000017
2018	Q1	CM_MC2	0.00019	0.077	0.075	<0.00002	<0.00002	<0.00005	<0.00005	0.031	0.035	<0.05	0.000023
2018	Q1	FR_FRCP1	0.00016	0.084	0.08	<0.000028	<0.000028	<0.00006	<0.00007	0.013	0.015	<0.09	0.000034
2018	Q1	GH_FR1	0.00014	0.12	0.12	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000017
2018	Q2	CM_MC2	0.00064	0.05	0.055	<0.000024	0.000067	<0.00006	<0.00005	0.016	0.017	<0.05	0.000077
2018	Q2	FR_FRCP1	0.00033	0.048	0.057	<0.00002	0.00004	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000055
2018	Q2	GH_FR1	0.00029	0.065	0.068	<0.00002	0.000041	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.00003
2018	Q3	GH_FR1	0.00013	0.11	0.1	<0.00002	<0.00002	<0.00005	<0.00005	0.01	<0.01	<0.09	0.000023
2018	Q4	CM_MC2	0.00019	0.073	0.073	<0.00002	<0.00002	<0.00005	<0.00005	0.046	0.047	<0.21	0.000018
2018	Q4	GH_FR1	0.00013	0.12	0.11	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.25	0.000016
2019	Q1	CM_MC2	0.00023	0.079	0.082	<0.00002	<0.00002	<0.00005	<0.00005	0.029	0.031	<0.105	0.000026
2019	Q1	EV_HC1	0.00019	0.078	0.075	<0.00002	<0.00002	<0.00005	<0.00005	0.006	0.0062	0.043	0.000019
2019	Q1	EV_MC2	0.00017	0.11	0.1	<0.00002	<0.00002	<0.00005	<0.00005	0.01	0.01	0.093	0.000021
2019	Q1	GH_FR1	0.00013	0.11	0.11	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.085	0.000021
2019	Q1	LC_DCDS	0.00035	0.22	0.22	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000085
2019	Q1	LC_LC3	0.000092	0.062	0.064	<0.00002	0.000012	<0.00005	<0.00005	0.015	0.015	<0.25	0.00013
2019	Q1	LC_LC5	0.00006	0.1	0.099	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000013
2019	Q1	LC_LCDSSLCC	0.000078	0.085	0.079	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.012	<0.25	0.000082
2019	Q3	EV_HC1	0.00019	0.06	0.059	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.000012
2019	Q3	EV_MC2	0.0002	0.11	0.11	<0.00002	<0.00002	<0.00005	<0.00005	0.01	0.011	0.032	0.000019
2019	Q3	GH_ERC	0.00011	0.051	0.05	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.01	<0.05	0.0000064
2019	Q3	GH_FR1	0.000096	0.096	0.091	<0.00002	<0.00002	<0.00005	<0.00005	0.0064	0.0072	<0.05	0.000017
2019	Q3	LC_DCDS	0.00034	0.21	0.22	<0.00002	<0.00002	<0.00005	<0.00005	0.006	0.0086	<0.05	0.000029
2019	Q3	LC_LC3	0.000074	0.052	0.052	<0.00002	<0.00002	<0.00005	<0.00005	0.016	0.016	<0.085	0.0003
2019	Q3	LC_LC5	0.000076	0.089	0.091	<0.00002	<0.00002	<0.00005	<0.00005	0.0064	0.0074	<0.05	0.000016
Tests categorized as possible or likely for hatch (2015 to 2018)													
2016	Q3	CM_MC2	0.00026	0.077	0.076	<0.000036	<0.000036	<0.00009	<0.00009	0.033	0.034	<0.21	0.00001
Tests categorized as possible or likely for survival and biomass (2015 to 2018)													
2017	Q2	GH_FR1	0.00031	0.078	0.085	<0.00002	0.000028	<0.00005	<0.00005	<0.01	<0.01	<0.13	0.000028
2018	Q3	FR_FRCP1	0.00014	0.086	0.08	<0.00002	<0.00002	<0.00005	<0.00005	0.011	0.012	0.17	0.000031
2018	Q4	FR_FRABCH	0.00011	0.11	0.11	<0.00002	<0.00002	<0.00005	<0.00005	0.012	0.012	<0.25	0.000034
Tests categorized as possible or likely for survival (2015 to 2018)													
2018	Q3	CM_MC2	0.00023	0.071	0.069	<0.00002	<0.00002	<0.00005	<0.00005	0.053	0.059	<0.25	0.0000082
Tests categorized as possible or likely for survival, biomass, and length (2015 to 2018)													
2018	Q4	FR_FRCP1	0.00021	0.016	0.018	<0.00004	<0.000024	<0.0001	<0.00006	<0.02	0.012	<0.25	0.000011
Tests categorized as possible or likely for survival and biomass (2019)													
2019	Q1	FR_FRCP1	0.00016	0.043	0.043	<0.000014	<0.000014	<0.000035	<0.000035	0.008	0.0092	<0.11	0.000023
Tests categorized as possible or likely for survival (2019)													
2019	Q1	GH_ERC	0.000066	0.057	0.058	<0.00002	<0.00002	<0.00005	<0.00005	<0.01	<0.002	<0.05	0.000005

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-5: *P. promelas* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	CADMIUM-T-mg/l	CALCIUM-T-mg/l	CARBON, DISSOLVED ORGANIC-D-mg/l	CHLORIDE-D-mg/l	CHROMIUM-D-mg/l	CHROMIUM-T-mg/l	COBALT-D-mg/l	COBALT-T-mg/l	CONDUCTIVITY, LAB-N-us/cm	COPPER-D-mg/l	COPPER-T-mg/l
Tests not included in statistical analysis													
2016	Q1	CM_MC2	0.000016	121	0.68	4.9	0.00016	0.00025	0.00093	0.001	922	0.00052	0.021
2016	Q1	FR_FRCP1	0.000055	183	0.76	2.8	0.0001	0.0009	<0.0001	<0.0001	1412	<0.0005	0.021
2016	Q1	GH_FR1	0.000018	120	0.62	2.7	0.00011	0.00014	<0.0001	<0.0001	897	<0.0005	0.021
2016	Q1	Reference (FR_UFR1)	0.0000094	56	0.6	0.77	0.00011	0.0002	<0.0001	<0.0001	353	<0.0005	0.021
2016	Q4	Reference (FR_UFR1)	0.0000089	48	1.1	0.19	0.00011	0.00018	<0.0001	<0.0001	318	<0.0005	0.011
2018	Q2	Reference (FR_UFR1)	0.000024	30	2.2	<0.5	0.00011	0.00041	<0.0001	0.00014	206	<0.0005	0.0011
2018	Q2	Reference (GH_ER2)	0.00014	49	1.8	0.51	0.00015	0.0019	<0.0001	0.00047	265	<0.0005	0.0015
2019	Q1	FR_FRABCH	0.000039	149	0.8	1.4	0.00011	0.00018	0.00026	0.00025	1140	<0.0005	<0.0005
2019	Q3	CM_MC2	0.000021	125	0.77	2.4	0.00015	0.00017	0.00055	0.00092	967	<0.0005	<0.0005
2019	Q3	FR_FRABCH	0.000036	123	0.58	1.2	0.00012	0.00021	0.00014	0.00014	913	<0.0005	0.00048
2019	Q3	FR_FRCP1	0.000045	105	0.84	0.86	0.000062	0.00014	<0.0001	<0.0001	777	<0.0005	<0.0005
2019	Q3	LC_LCDSSLCC	0.00017	94	0.59	9.1	0.00013	0.00022	<0.0001	<0.0001	733	<0.0005	<0.0005
2019	Q3	Reference (FR_UFR1)	0.00001	51	0.88	<0.5	0.00012	0.00016	<0.0001	<0.0001	319	<0.0005	<0.0005
Reference													
2016	Q2	Reference (FR_UFR1)	0.000012	39	1.7	0.1	0.00012	0.00021	<0.0001	<0.0001	245	0.00061	0.011
2016	Q3	Reference (FR_UFR1)	0.00001	51	0.8	0.14	0.0001	0.00016	<0.0001	<0.0001	341	<0.0005	0.011
2017	Q1	Reference (FR_UFR1)	0.000011	50	0.68	<0.5	0.0001	0.00014	<0.0001	<0.0001	333	<0.0002	<0.0005
2017	Q2	Reference (FR_UFR1)	0.000022	32	2.9	<0.5	0.00012	0.00049	<0.0001	0.00012	238	0.0003	0.00059
2017	Q2	Reference (GH_ER2)	0.000043	50	1.3	0.4	0.0002	0.00082	<0.0001	0.00018	301	<0.0005	0.00068
2017	Q3	Reference (CM_MC1)	0.000012	40	1.4	<0.5	0.00012	0.00025	<0.0001	<0.0001	270	<0.00044	<0.0005
2017	Q3	Reference (FR_UFR1)	0.000012	50	1.3	0.27	0.0001	0.0002	<0.0001	<0.0001	333	<0.00044	<0.0005
2017	Q3	Reference (GH_ER2)	0.0000085	45	0.83	0.35	0.00021	0.00024	<0.0001	<0.0001	282	<0.00044	<0.0005
2017	Q4	Reference (CM_MC1)	0.0000086	41	1.2	1.1	0.00018	0.00019	<0.0001	<0.0001	275	<0.0005	<0.0005
2017	Q4	Reference (FR_UFR1)	0.0000098	51	0.71	<0.5	0.0001	0.00018	<0.0001	<0.0001	334	<0.0005	<0.0005
2017	Q4	Reference (GH_ER2)	0.0000075	43	0.63	<0.5	0.00025	0.00028	<0.0001	<0.0001	280	<0.0005	<0.0005
2018	Q1	Reference (CM_MC1)	0.0000081	43	0.89	0.55	0.00015	0.0002	<0.0001	<0.0001	305	<0.0005	<0.0005
2018	Q1	Reference (FR_UFR1)	0.000011	52	0.75	<0.5	<0.00012	0.0002	<0.00012	<0.0001	359	0.00052	<0.0005
2018	Q1	Reference (GH_ER2)	0.00001	50	0.56	0.27	0.00021	0.00026	<0.0001	<0.0001	324	<0.0005	<0.0005
2018	Q2	Reference (CM_MC1)	0.000033	25	3.3	<0.5	0.00022	0.00057	<0.00012	0.00014	176	<0.0005	0.00077
2018	Q3	Reference (CM_MC1)	0.00001	41	1.1	0.44	0.00018	0.00024	<0.0001	<0.0001	274	<0.0005	0.0005
2018	Q3	Reference (FR_UFR1)	0.000011	48	0.99	0.75	0.00011	0.00011	<0.0001	<0.0001	329	<0.0005	<0.0005
2018	Q3	Reference (GH_ER2)	0.000039	44	0.89	0.42	0.0002	0.00063	<0.0001	0.00018	268	<0.0005	0.00065
2018	Q4	Reference (CM_MC1)	0.0000092	39	1.5	0.5	0.00017	0.00021	<0.0001	<0.0001	279	<0.0005	<0.0005
2018	Q4	Reference (FR_UFR1)	0.0000089	51	0.76	<0.5	0.0001	0.00017	<0.0001	<0.0001	340	<0.0005	<0.0005
2018	Q4	Reference (GH_ER2)	0.0000064	47	0.5	<0.5	0.00024	0.00026	<0.0001	<0.0001	293	<0.0005	<0.0005
2019	Q1	Reference (CM_MC1)	0.0000083	43	0.38	0.7	0.00017	0.00023	<0.0001	<0.0001	304	<0.0005	<0.0005
2019	Q1	Reference (FR_UFR1)	0.00002	48	1.5	<0.5	0.00015	0.00041	<0.0001	0.000078	340	<0.0005	0.00036
2019	Q1	Reference (GH_ER2)	0.0000077	50	0.63	<0.5	0.00025	0.0003	<0.0001	<0.0001	301	<0.0005	<0.0005
2019	Q1	Reference (LC_SLC)	0.000013	58	0.63	0.69	0.00015	0.00016	<0.0001	<0.0001	407	<0.0005	<0.0005
2019	Q3	Reference (CM_MC1)	0.000013	41	0.86	<0.5	0.00019	0.00024	<0.0001	<0.0001	285	<0.0005	<0.0005
2019	Q3	Reference (GH_ER2)	0.000012	44	0.62	<0.5	0.00022	0.00026	<0.0001	<0.0001	279	<0.0005	<0.0005
2019	Q3	Reference (LC_SLC)	0.000017	48	0.59	<0.5	0.00016	0.0002	<0.0001	<0.0001	339	<0.0005	<0.0005
Tests categorized as no adverse response													
2016	Q2	CM_MC2	0.000096	68	1.4	1.3	0.00018	0.00058	0.002	0.0027	532	<0.0005	0.011
2016	Q2	FR_FRCP1	0.000044	76	1.5	0.51	0.0001	0.00023	<0.0001	0.0001	570	0.00061	0.011
2016	Q2	GH_FR1	0.000033	80	1.4	0.98	0.00012	0.00023	<0.0001	<0.0001	603	<0.0005	0.011
2016	Q3	FR_FRCP1	0.000051	113	0.94	1.7	<0.0001	0.00013	0.0001	0.00011	909	<0.0005	0.011
2016	Q3	GH_FR1	0.000018	95	0.85	1.6	0.00011	0.00017	<0.0001	<0.0001	744	<0.00052	0.011
2016	Q4	CM_MC2	0.000037	83	1.6	1.8	0.00023	0.00037	0.0011	0.0013	648	<0.0006	0.011
2016	Q4	FR_FRCP1	0.000052	110	1.0	1.4	<0.0001	0.00015	<0.0001	<0.0001	855	<0.0005	0.011
2016	Q4	GH_FR1	0.000019	100	0.85	1.6	0.00011	0.00015	<0.0001	<0.0001	763	<0.0005	0.011
2017	Q1	CM_MC2	0.000044	120	1.0	3.5	0.00014	0.00027	0.0039	0.0041	923	<0.00044	<0.0005
2017	Q1	FR_FRCP1	0.000061	186	1.2	2.8	<0.0001	0.00025	<0.0001	0.0001	1482	<0.0002	<0.0005
2017	Q1	GH_FR1	0.000019	118	0.87	2.1	0.0001	0.00014	<0.0001	<0.0001	876	<0.0005	<0.0005
2017	Q2	CM_MC2	0.00012	82	1.9	1.6	0.00013	0.00062	0.0029	0.0039	652	0.00022	0.00082
2017	Q2	FR_FRCP1	0.00011	82	2.1	0.64	0.0001	0.0006	<0.0001	0.00022	678	0.00026	0.0008
2017	Q3	CM_MC2	0.000019	113	1.4	1.6	0.00014	0.00024	0.0016	0.0027	893	<0.00044	0.00052
2017	Q3	FR_FRCP1	0.000049	130	1.4	1.6	0.00012	0.00026	<0.00012	<0.0001	1015	<0.00044	<0.0005
2017	Q3	GH_FR1	0.000019	99	1.0	1.3	0.00011	0.00014	<0.0001	<0.0001	766	<0.00044	<0.0005
2017	Q4	CM_MC2	0.000014	121	1.1	4.4	0.00012	0.00019	0.0011	0.0012	919	<0.0005	<0.0005
2017	Q4	FR_FRCP1	0.000056	151	0.97	<2.5	<0.0001	0.00018	<0.0001	0.00011	1174	<0.0005	<0.0005
2017	Q4	GH_FR1	0.00002	106	1.1	1.3	0.00012	0.00015	<0.0001	<0.0001	826	<0.0005	<0.0005
2018	Q1	CM_MC2	0.000023	136	1.0	5.3	0.00011	0.00021	0.00098	0.0011	1067	<0.0005	<0.0005
2018	Q1	FR_FRCP1	0.000083	194	1.3	2.5	<0.00012	0.00027	0.00014	0.00016	1502	0.0005	<0.0007
2018	Q1	GH_FR1	0.000021	116	0.97	2.4	<0.0001	0.00023	<0.0001	<0.0001	924	0.0005	<0.0005
2018	Q2	CM_MC2	0.00015	58	2.0	1.7	0.00016	0.0014	0.0013	0.0027	486	<0.0005	0.0015
2018	Q2	FR_FRCP1	0.00014	70	1.7	0.51	0.00011	0.0007	<0.0001	0.00036	527	<0.0005	0.0011
2018	Q2	GH_FR1	0.000086	66	2.3	0.86	0.0001	0.00085	<0.0001	0.00025	521	0.00053	0.00088
2018	Q3	GH_FR1	0.000025	96	0.94	1.5	0.0001	0.00017	<0.0001	<0.0001	773	<0.0005	0.00062
2018	Q4	CM_MC2	0.000027	129	0.97	4.0	0.00015	0.00019	0.0042	0.0045	1011	<0.0005	<0.0005
2018	Q4	GH_FR1	0.000021	112	0.66	<2.5	0.00012	0.00023	<0.0001	<0.0001	867	<0.0005	<0.0005
2019	Q1	CM_MC2	0.000028	144	0.56	7.2	0.00014	0.00018	0.00095	0.0011	1106	<0.0005	<0.0005
2019	Q1	EV_HC1	0.00002	85	0.85	2.1	0.00014	0.00019	<0.0001	<0.0001	712	<0.0005	<0.0005
2019	Q1	EV_MC2	0.000024	79	1.1	3.8	0.00011	0.00017	<0.0001	<0.0001	631	<0.0005	<0.0005
2019	Q1	GH_FR1	0.000026	121	1.1	1.6	0.000076	0.00015	0.000092	0.00011	931	<0.0005	<0.0005
2019	Q1	LC_DCDS	0.000091	72	1.8	7.4	0.000064	0.00011	0.00011	0.00016	557	<0.0005	<0.0005
2019	Q1	LC_LC3	0.00015	150	0.8	33	0.00013	0.00031	0.00022	0.00027	1212	<0.0005	0.00046
2019	Q1	LC_LC5	0.00002	105	0.71	4.5	0.00013	0.00017	<0.0001	0.000076	778	<0.0005	<0.0005
2019	Q1	LC_LCDSSLCC	0.000088	124	0.62	17	0.00014	0.00016	<0.0001	<0.0001	946	<0.0005	<0.0005
2019	Q3	EV_HC1	0.00002	79	0.91	1.1	0.00015	0.00019	<0.0001	<0.0001	660	<0.0005	<0.0005
2019	Q3	EV_MC2	0.000032	69	0.99	2.6	0.00014	0.0002	<0.0001	0.000066	512	<0.0005	<0.0005
2019	Q3	GH_ERC	0.000010	47	0.47	0.3	0.00021	0.00027	<0.0001	<0.0001	307	<0.0005	<0.0005
2019	Q3	GH_FR1	0.000022	93	0.92	1.3	0.00011	0.00023	0.00006	<0.0001	740	<0.0005	<0.0005
2019	Q3	LC_DCDS	0.000055	74	2.1	7.8	0.000072	0.00014	0.00012	0.00015	595	<0.0005	0.0003
2019	Q3	LC_LC3	0.00034	118	0.44	18	0.000088	0.00019	0.000098	0.00015	967	<0.0005	<0.0005
2019	Q3	LC_LC5	0.00003	86	0.68	2.8	0.00012	0.0002	<0.0001	<0.0001	665	<0.0005	<0.0005
Tests categorized as possible or likely for hatch (2015 to 2018)													
2016	Q3	CM_MC2	0.000012	113	1.0	3.2	0.00021	0.00024	0.00037	0.00047	896	0.00062	0.011
Tests categorized as possible or likely for survival and biomass (2015 to 2018)													
2017	Q2	GH_FR1	0.000075	78	2.5	1.3	<0.0001	0.00077	<0.0001	0.00027	601	<0.0005	0.00096
2018	Q3	FR_FRCP1	0.000053	125	1.2	1.7	<0.0001	0.00013	0.00011	0.00011	1009	<0.0005	<0.0005
2018	Q4	FR_FRABCH	0.000037	141	0.66	<2.5	0.00011	0.00015	0.0001	0.0001	1056	<0.0005	<0.0005
Tests categorized as possible or likely for survival (2015 to 2018)													
2018	Q3	CM_MC2	0.000019	143	1.0	3.2	0.00012	0.00018	0.0057	0.0072	1072	<0.0005	<0.0005
Tests categorized as possible or likely for survival, biomass, and length (2015 to 2018)													
2018	Q4	FR_FRCP1	0.000013	417	1.7	6.4	<0.0002	0.00015	<0.0002	<0.00012	3280	<0.0005	<0.0006
Tests categorized as possible or likely for survival and biomass (2019)													
2019	Q1	FR_FRCP1	0.000036	305	1.7	4.6	<0.00007	0.00029	0.00012	0.00014	2456	<0.00025	0.0004
Tests categorized as possible or likely for survival (2019)													
2019	Q1	GH_ERC	0.000007	52	0.47	0.31	0.00024	0.00027	<0.0001	<0.0001	338	<0.0005	<0.0005

Notes:

"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening

Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-5: *P. promelas* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	FLUORIDE-D-mg/l	Hardness, Total or Dissolved CaCO3-N-mg/l	IRON-D-mg/l	IRON-T-mg/l	LEAD-D-mg/l	LEAD-T-mg/l	LITHIUM-D-mg/l	LITHIUM-T-mg/l	MAGNESIUM-T-mg/l	MANGANESE-D-mg/l	MANGANESE-T-mg/l
Tests not included in statistical analysis													
2016	Q1	CM_MC2	0.12	499	<0.01	0.016	<0.00005	<0.00005	0.014	0.014	51	0.0059	0.0071
2016	Q1	FR_FRCP1	0.18	863	<0.01	0.023	<0.00005	<0.00005	0.058	0.06	103	0.0073	0.0093
2016	Q1	GH_FR1	0.18	504	<0.01	0.013	<0.00005	<0.00005	0.015	0.015	52	0.0012	0.0017
2016	Q1	Reference (FR_UFR1)	0.15	193	<0.01	0.017	<0.00005	<0.00005	0.0015	0.0016	14	0.00021	0.00045
2016	Q4	Reference (FR_UFR1)	0.16	172	<0.01	0.017	<0.00005	<0.00005	0.0013	0.0015	13	0.00016	0.00052
2018	Q2	Reference (FR_UFR1)	0.12	112	<0.01	0.19	<0.00005	0.00014	0.0011	0.0013	8.4	0.00059	0.0083
2018	Q2	Reference (GH_ER2)	0.15	142	<0.01	1.0	<0.00005	0.00075	0.0014	0.0022	11	0.00077	0.065
2019	Q1	FR_FRABCH	0.094	663	<0.01	0.027	<0.00005	0.00003	0.033	0.033	66	0.0051	0.0061
2019	Q3	CM_MC2	0.13	557	<0.01	0.016	<0.00005	0.000036	0.017	0.017	62	0.0019	0.006
2019	Q3	FR_FRABCH	0.19	529	<0.01	0.013	<0.00005	0.000037	0.032	0.033	56	0.0036	0.0044
2019	Q3	FR_FRCP1	0.21	451	<0.01	0.016	<0.00005	<0.00005	0.028	0.028	47	0.003	0.0047
2019	Q3	LC_LCDSSLCC	0.24	395	<0.01	0.018	<0.00005	<0.00005	0.028	0.028	41	0.0023	0.0064
2019	Q3	Reference (FR_UFR1)	0.16	180	<0.01	<0.01	<0.00005	<0.00005	0.0017	0.0017	14	0.00023	0.00058
Reference													
2016	Q2	Reference (FR_UFR1)	0.16	134	<0.01	0.043	<0.00005	0.000052	0.0011	0.0013	10	0.00031	0.0016
2016	Q3	Reference (FR_UFR1)	0.17	178	<0.01	0.011	<0.00005	<0.00005	0.0018	0.0015	14	0.00019	0.00066
2017	Q1	Reference (FR_UFR1)	0.14	177	<0.01	0.011	<0.00005	<0.00005	0.0016	0.0016	15	<0.0001	0.00034
2017	Q2	Reference (FR_UFR1)	0.11	122	0.02	0.14	<0.00005	0.00011	0.0011	0.0012	9.1	0.00064	0.0054
2017	Q2	Reference (GH_ER2)	0.15	171	<0.01	0.34	<0.00005	0.00023	0.0016	0.0021	12	0.00078	0.021
2017	Q3	Reference (CM_MC1)	0.053	146	<0.01	0.015	<0.00005	<0.00005	0.0049	0.0045	11	0.00012	0.00052
2017	Q3	Reference (FR_UFR1)	0.15	180	<0.01	0.01	<0.00005	<0.00005	0.0018	0.0017	13	0.00023	0.00071
2017	Q3	Reference (GH_ER2)	0.13	155	<0.01	0.019	<0.00005	<0.00005	0.0017	0.0018	10	0.0022	0.0038
2017	Q4	Reference (CM_MC1)	0.093	144	<0.01	<0.01	<0.00005	<0.00005	0.0046	0.0047	11	0.00013	0.00026
2017	Q4	Reference (FR_UFR1)	0.11	184	<0.01	<0.01	<0.00005	<0.00005	0.0017	0.0017	14	0.00012	0.00047
2017	Q4	Reference (GH_ER2)	0.13	155	<0.01	0.011	<0.00005	<0.00005	0.0019	0.0017	11	0.00044	0.0015
2018	Q1	Reference (CM_MC1)	0.054	152	<0.01	<0.01	<0.00005	<0.00005	0.0046	0.0049	11	<0.0001	0.00017
2018	Q1	Reference (FR_UFR1)	0.12	190	<0.012	0.018	<0.00006	<0.00005	0.0015	0.0015	14	0.00015	0.0005
2018	Q1	Reference (GH_ER2)	0.16	171	<0.01	0.012	<0.00005	<0.00005	0.0016	0.0016	11	0.0011	0.0016
2018	Q2	Reference (CM_MC1)	0.046	93	0.02	0.31	<0.00006	0.00025	0.0021	0.0025	7.1	0.00099	0.0092
2018	Q3	Reference (CM_MC1)	0.078	152	<0.01	0.012	<0.00005	<0.00005	0.0049	0.005	11	0.00018	0.00063
2018	Q3	Reference (FR_UFR1)	0.16	183	<0.01	<0.01	<0.00005	<0.00005	0.0018	0.0018	13	0.00023	0.00059
2018	Q3	Reference (GH_ER2)	0.17	150	<0.01	0.28	<0.00005	0.00024	0.0017	0.0019	10	0.00058	0.018
2018	Q4	Reference (CM_MC1)	0.069	145	<0.01	<0.01	<0.00005	<0.00005	0.0042	0.0042	11	0.00011	0.00028
2018	Q4	Reference (FR_UFR1)	0.15	187	<0.01	<0.01	<0.00005	<0.00005	0.0015	0.0016	14	0.00013	0.00031
2018	Q4	Reference (GH_ER2)	0.17	165	<0.01	0.013	<0.00005	<0.00005	0.0018	0.0019	11	0.00037	0.00099
2019	Q1	Reference (CM_MC1)	0.065	155	<0.01	0.0074	<0.00005	<0.00005	0.0045	0.0045	12	0.00013	0.00028
2019	Q1	Reference (FR_UFR1)	0.11	178	0.021	0.082	<0.00005	0.000073	0.0015	0.0017	13	0.0002	0.0019
2019	Q1	Reference (GH_ER2)	0.14	167	<0.01	0.011	<0.00005	<0.00005	0.0017	0.0018	12	0.00045	0.0011
2019	Q1	Reference (LC_SLC)	0.39	217	<0.01	<0.01	<0.00005	<0.00005	0.0046	0.0046	18	<0.0001	0.000076
2019	Q3	Reference (CM_MC1)	0.078	151	<0.01	<0.01	<0.00005	<0.00005	0.0049	0.0048	12	0.00017	0.00049
2019	Q3	Reference (GH_ER2)	0.17	153	<0.01	0.025	<0.00005	<0.00005	0.0017	0.0017	10	0.00059	0.0034
2019	Q3	Reference (LC_SLC)	0.32	180	<0.01	<0.01	<0.00005	<0.00005	0.0028	0.0029	15	<0.0001	0.00016
Tests categorized as no adverse response													
2016	Q2	CM_MC2	0.1	278	<0.01	0.36	0.000053	0.00023	0.0088	0.0092	26	0.011	0.023
2016	Q2	FR_FRCP1	0.21	312	<0.01	0.082	<0.00005	0.000072	0.018	0.019	31	0.0022	0.0074
2016	Q2	GH_FR1	0.19	336	<0.01	0.091	<0.00005	0.000073	0.014	0.014	33	0.00082	0.0047
2016	Q3	FR_FRCP1	0.2	497	<0.01	0.029	<0.00005	<0.00005	0.037	0.037	57	0.0044	0.0077
2016	Q3	GH_FR1	0.19	406	<0.01	0.015	<0.00005	<0.00005	0.018	0.018	42	0.00087	0.0018
2016	Q4	CM_MC2	0.11	349	<0.018	0.1	<0.00009	0.0001	0.011	0.011	36	0.009	0.014
2016	Q4	FR_FRCP1	0.2	489	<0.01	0.032	<0.00005	<0.00005	0.033	0.034	52	0.0069	0.0087
2016	Q4	GH_FR1	0.17	429	<0.01	0.018	<0.00005	<0.00005	0.018	0.018	46	0.00096	0.0017
2017	Q1	CM_MC2	0.13	504	<0.01	0.036	<0.00005	0.000054	0.019	0.019	51	0.019	0.021
2017	Q1	FR_FRCP1	0.15	926	<0.01	0.032	<0.00005	0.00005	0.059	0.059	113	0.0071	0.0089
2017	Q1	GH_FR1	0.14	507	<0.01	0.015	<0.00005	<0.00005	0.017	0.017	50	0.0014	0.0019
2017	Q2	CM_MC2	0.098	327	<0.01	0.42	<0.00005	0.00027	0.013	0.013	34	0.017	0.033
2017	Q2	FR_FRCP1	0.15	362	0.012	0.31	<0.00005	0.00023	0.027	0.027	37	0.0038	0.018
2017	Q3	CM_MC2	0.11	502	<0.01	0.044	<0.00005	0.00007	0.018	0.018	55	0.0017	0.01
2017	Q3	FR_FRCP1	0.19	601	<0.012	0.023	<0.00006	<0.00005	0.037	0.035	70	0.0051	0.0088
2017	Q3	GH_FR1	0.16	436	<0.01	0.011	<0.00005	<0.00005	0.019	0.019	45	0.001	0.0021
2017	Q4	CM_MC2	0.09	532	<0.01	0.012	<0.00005	<0.00005	0.018	0.019	59	0.0043	0.0054
2017	Q4	FR_FRCP1	0.11	745	0.01	0.049	<0.00005	0.000057	0.041	0.04	94	0.0075	0.013
2017	Q4	GH_FR1	0.13	497	<0.01	0.013	<0.00005	<0.00005	0.017	0.017	57	0.0013	0.002
2018	Q1	CM_MC2	0.11	577	<0.01	0.017	<0.00005	<0.00005	0.017	0.018	61	0.0053	0.0072
2018	Q1	FR_FRCP1	0.14	891	0.014	0.031	<0.00006	<0.00007	0.054	0.056	107	0.01	0.015
2018	Q1	GH_FR1	0.16	463	<0.01	0.014	<0.00005	<0.00005	0.015	0.017	51	0.00068	0.0016
2018	Q2	CM_MC2	0.085	252	0.012	1.3	<0.00006	0.00082	0.0081	0.0091	24	0.01	0.05
2018	Q2	FR_FRCP1	0.17	288	<0.01	0.6	<0.00005	0.00044	0.019	0.018	28	0.0015	0.033
2018	Q2	GH_FR1	0.18	285	0.01	0.37	<0.00005	0.0003	0.013	0.013	28	0.00074	0.018
2018	Q3	GH_FR1	0.18	457	<0.01	0.025	0.0001	0.00015	0.02	0.02	47	0.0011	0.0027
2018	Q4	CM_MC2	0.14	581	<0.01	0.015	<0.00005	0.000055	0.024	0.024	59	0.014	0.018
2018	Q4	GH_FR1	0.17	521	<0.01	0.016	<0.00005	<0.00005	0.019	0.019	57	0.00084	0.0016
2019	Q1	CM_MC2	0.093	608	<0.01	0.009	<0.00005	<0.00005	0.018	0.019	66	0.0062	0.0077
2019	Q1	EV_HC1	0.17	404	<0.01	0.016	<0.00005	<0.00005	0.0071	0.0075	43	0.0026	0.0033
2019	Q1	EV_MC2	0.13	346	<0.01	0.022	<0.00005	0.000034	0.012	0.013	33	0.0037	0.0043
2019	Q1	GH_FR1	0.13	527	<0.01	0.02	<0.00005	0.000031	0.017	0.017	58	0.0018	0.0027
2019	Q1	LC_DCDS	0.084	289	<0.01	0.021	<0.00005	0.000034	0.012	0.012	25	0.0025	0.0047
2019	Q1	LC_LC3	0.14	688	<0.01	0.2	<0.00005	0.000081	0.049	0.048	75	0.042	0.045
2019	Q1	LC_LC5	0.2	436	<0.01	0.023	<0.00005	0.000031	0.019	0.018	43	0.0004	0.0016
2019	Q1	LC_LCDSSLCC	0.16	536	<0.01	0.013	<0.00005	<0.00005	0.036	0.035	54	0.0029	0.0036
2019	Q3	EV_HC1	0.22	383	<0.01	0.025	<0.00005	<0.00005	0.007	0.0068	43	0.0034	0.0063
2019	Q3	EV_MC2	0.15	279	<0.01	0.023	<0.00005	0.000032	0.01	0.01	26	0.00068	0.0027
2019	Q3	GH_ERC	0.17	165	<0.01	0.011	<0.00005	<0.00005	0.0026	0.0027	12	0.00062	0.0016
2019	Q3	GH_FR1	0.18	419	<0.01	0.018	<0.00005	<0.00005	0.02	0.019	45	0.0012	0.0025
2019	Q3	LC_DCDS	0.098	304	<0.01	0.022	<0.00005	0.000031	0.016	0.016	30	0.0003	0.0019
2019	Q3	LC_LC3	0.21	534	<0.01	0.072	<0.00005	<0.00005	0.041	0.041	60	0.016	0.029
2019	Q3	LC_LC5	0.21	361	<0.01	0.017	<0.00005	0.000041	0.02	0.02	38	0.0002	0.0023
Tests categorized as possible or likely for hatch (2015 to 2018)													
2016	Q3	CM_MC2	0.11	489	<0.018	0.019	<0.00009	<0.00009	0.016	0.017	54	0.00069	0.002
Tests categorized as possible or likely for survival and biomass (2015 to 2018)													
2017	Q2	GH_FR1	0.15	344	0.011	0.41	<0.00005	0.00033	0.014	0.014	35	0.0015	0.016
2018	Q3	FR_FRCP1	0.2	614	<0.01	0.033	<0.00005	<0.00005	0.035	0.035	71	0.0053	0.0077
2018	Q4	FR_FRABCH	0.16	628	<0.01	0.015	<0.00005	<0.00005	0.034	0.034	67	0.0043	0.0049
Tests categorized as possible or likely for survival (2015 to 2018)													
2018	Q3	CM_MC2	0.17	628	<0.01	0.028	<0.00005	0.000052	0.03	0.031	66	0.011	0.021
Tests categorized as possible or likely for survival, biomass, and length (2015 to 2018)													
2018	Q4	FR_FRCP1	0.12	2494	<0.02	<0.012	<0.0001	<0.00006	0.076	0.079	372	0.00023	0.00027
Tests categorized as possible or likely for survival and biomass (2019)													
2019	Q1	FR_FRCP1	0.095	1795	<0.007	0.049	<0.000035	0.000067	0.061	0.063	231	0.0051	0.0071
Tests categorized as possible or likely for survival (2019)													
2019	Q1	GH_ERC	0.14	180	<0.01	<0.01	<0.00005	<0.00005	0.003	0.0031	13	0.00017	0.0003

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-5: *P. promelas* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	MERCURY-D-mg/l	MERCURY-T-mg/l	MOLYBDENUM-D-mg/l	MOLYBDENUM-T-mg/l	NICKEL-D-mg/l	NICKEL-T-mg/l	NITRATE NITROGEN (NO3), AS N-N-mg/l	NITRITE NITROGEN (NO2), AS N-N-mg/l	NITROGEN, AMMONIA (AS N)-N-mg/l	ORTHO-PHOSPHATE-N-mg/l	pH, LAB-N-ph units
Tests not included in statistical analysis													
2016	Q1	CM_MC2	<0.000005	<0.0000023	0.0011	0.0011	0.01	0.01	3.0	0.026	0.01	0.0012	8.3
2016	Q1	FR_FRCP1	<0.000005	<0.0000005	0.0016	0.0017	0.0089	0.0093	25	0.0063	<0.005	<0.001	8.3
2016	Q1	GH_FR1	<0.000005	<0.0000014	0.00091	0.00091	0.0017	0.0017	13	0.0054	<0.005	<0.001	8.3
2016	Q1	Reference (FR_UFR1)	<0.000005	0.00000062	0.00057	0.00059	<0.0005	<0.0005	0.15	<0.001	<0.005	0.0031	8.3
2016	Q4	Reference (FR_UFR1)	<0.000005	0.00000056	0.00057	0.00058	<0.0005	<0.0005	0.1	<0.001	<0.005	0.0023	8.3
2018	Q2	Reference (FR_UFR1)	<0.000005	0.000002	0.00059	0.00056	<0.0005	0.00066	0.052	<0.001	0.0082	0.0052	8.2
2018	Q2	Reference (GH_ER2)	<0.000005	0.0000039	0.00089	0.00089	<0.0005	0.0022	0.1	0.0011	0.009	0.003	8.3
2019	Q1	FR_FRABCH	<0.000005	0.00000035	0.00065	0.00065	0.00056	0.00065	21	0.0059	0.066	0.0019	8.1
2019	Q3	CM_MC2	<0.000005	<0.0000005	0.0011	0.0011	0.018	0.019	2.7	0.0051	0.0059	0.00062	8.4
2019	Q3	FR_FRABCH	<0.000005	0.00000072	0.00096	0.001	0.0013	0.0014	16	0.0063	0.02	0.00078	8.3
2019	Q3	FR_FRCP1	<0.000005	<0.0000005	0.0015	0.0016	0.0037	0.0038	9.1	0.014	0.041	0.0009	8.3
2019	Q3	LC_LCDSSLCC	<0.000005	<0.0000005	0.0022	0.0022	0.004	0.0043	6.4	0.001	0.01	0.0012	8.3
2019	Q3	Reference (FR_UFR1)	0.000003	0.00000034	0.00064	0.00067	<0.0005	<0.0005	0.01	<0.001	0.012	0.0012	8.4
Reference													
2016	Q2	Reference (FR_UFR1)	<0.000005	0.00000096	0.00063	0.00065	<0.0005	<0.0005	0.016	<0.001	<0.005	0.0026	8.3
2016	Q3	Reference (FR_UFR1)	<0.000005	<0.0000005	0.00061	0.00062	<0.0005	<0.0005	0.041	<0.001	<0.005	0.0026	8.3
2017	Q1	Reference (FR_UFR1)	<0.000005	<0.0000005	0.00058	0.00062	<0.0005	<0.0005	0.21	0.0012	<0.005	0.0064	8.2
2017	Q2	Reference (FR_UFR1)	<0.000005	0.0000024	0.00049	0.00052	0.0005	0.0006	0.078	0.0019	0.0066	0.0072	8.3
2017	Q2	Reference (GH_ER2)	<0.000005	0.0000018	0.00091	0.00094	<0.0005	0.0009	0.12	<0.001	<0.005	0.0012	8.3
2017	Q3	Reference (CM_MC1)	<0.000005	0.00000054	0.00089	0.0009	<0.0005	<0.0005	0.018	<0.001	0.0063	0.005	8.3
2017	Q3	Reference (FR_UFR1)	<0.000005	<0.0000005	0.00063	0.00067	<0.0005	<0.0005	0.014	<0.001	0.0061	0.0026	8.4
2017	Q3	Reference (GH_ER2)	<0.000005	0.00000052	0.00099	0.001	<0.0005	<0.0005	0.043	<0.001	0.0061	0.0014	8.2
2017	Q4	Reference (CM_MC1)	<0.000005	0.00000053	0.00085	0.00088	<0.0005	<0.0005	0.068	0.0018	0.007	0.0035	8.2
2017	Q4	Reference (FR_UFR1)	<0.000005	<0.0000005	0.00057	0.00059	<0.0005	<0.0005	0.031	0.001	0.0052	0.0015	8.4
2017	Q4	Reference (GH_ER2)	<0.000005	<0.0000005	0.0011	0.001	<0.0005	<0.0005	0.05	<0.001	0.0069	<0.001	8.4
2018	Q1	Reference (CM_MC1)	<0.000005	<0.0000005	0.00087	0.00092	<0.0005	<0.0005	0.048	<0.001	0.0081	0.003	8.2
2018	Q1	Reference (FR_UFR1)	<0.000005	0.00000052	0.00057	0.00061	<0.0006	<0.0005	0.19	<0.001	0.0084	0.0033	8.3
2018	Q1	Reference (GH_ER2)	<0.000005	<0.0000005	0.00094	0.001	<0.0005	0.00061	0.1	<0.001	<0.005	0.0011	8.2
2018	Q2	Reference (CM_MC1)	0.0000052	0.0000025	0.00051	0.00057	<0.0006	0.00075	0.007	<0.001	0.008	0.0038	8.0
2018	Q3	Reference (CM_MC1)	<0.000005	<0.0000005	0.00094	0.00092	<0.0005	0.00054	0.018	<0.001	0.014	0.0047	8.3
2018	Q3	Reference (FR_UFR1)	<0.000005	<0.0000005	0.00064	0.00065	<0.0005	<0.0005	0.014	<0.0018	0.023	0.0022	8.4
2018	Q3	Reference (GH_ER2)	<0.000005	0.00000074	0.001	0.00096	<0.0005	0.00085	0.035	0.0022	0.018	0.002	8.3
2018	Q4	Reference (CM_MC1)	<0.000005	0.00000056	0.00086	0.00087	<0.0005	<0.0005	0.021	<0.001	0.026	0.0046	8.3
2018	Q4	Reference (FR_UFR1)	<0.000005	<0.0000005	0.00058	0.00057	<0.0005	<0.0005	0.1	<0.001	0.047	0.0024	8.4
2018	Q4	Reference (GH_ER2)	<0.000005	<0.0000005	0.001	0.001	<0.0005	<0.0005	0.086	<0.001	0.017	0.002	8.3
2019	Q1	Reference (CM_MC1)	<0.000005	<0.0000005	0.00087	0.00086	<0.0005	<0.0005	0.061	0.00062	0.008	0.0032	8.2
2019	Q1	Reference (FR_UFR1)	<0.000005	0.0000014	0.00052	0.0005	<0.0005	0.00044	0.22	0.0011	0.017	0.0076	8.2
2019	Q1	Reference (GH_ER2)	<0.000005	0.00000031	0.001	0.001	<0.0005	<0.0005	0.11	0.0007	0.004	0.00098	8.2
2019	Q1	Reference (LC_SLC)	<0.000005	<0.0000005	0.0013	0.0013	<0.0005	<0.0005	0.14	0.00062	0.024	0.0035	8.1
2019	Q3	Reference (CM_MC1)	<0.000005	0.0000003	0.00097	0.00094	<0.0005	<0.0005	0.02	0.0021	0.0031	0.0043	8.4
2019	Q3	Reference (GH_ER2)	<0.000005	<0.0000005	0.00096	0.00097	<0.0005	0.00033	0.037	<0.001	0.014	<0.001	8.3
2019	Q3	Reference (LC_SLC)	<0.000005	<0.0000005	0.0012	0.0012	<0.0005	<0.0005	0.1	0.0007	0.0056	0.0016	8.3
Tests categorized as no adverse response													
2016	Q2	CM_MC2	<0.000005	0.00000096	0.00086	0.00089	0.015	0.016	1.9	0.008	0.02	0.002	8.3
2016	Q2	FR_FRCP1	<0.000005	0.00000086	0.0011	0.0011	0.0019	0.0024	8.3	0.0026	0.0057	0.0015	8.3
2016	Q2	GH_FR1	<0.000005	0.0000012	0.001	0.001	0.0018	0.002	7.6	0.0027	0.0052	0.0012	8.3
2016	Q3	FR_FRCP1	<0.000005	<0.0000005	0.0013	0.0013	0.0055	0.0058	13	0.0065	0.0056	0.0013	8.3
2016	Q3	GH_FR1	<0.000005	<0.00000095	0.00095	0.00097	0.0016	0.0017	10	0.0056	<0.005	0.001	8.3
2016	Q4	CM_MC2	<0.000005	0.00000086	0.00092	0.00095	0.011	0.012	2.1	0.0096	0.012	0.0015	8.3
2016	Q4	FR_FRCP1	<0.000005	<0.0000005	0.0013	0.0013	0.0051	0.0054	13	<0.005	<0.005	<0.001	8.3
2016	Q4	GH_FR1	<0.000005	<0.0000014	0.0011	0.0011	0.0024	0.0025	9.6	<0.005	0.0053	0.0011	8.3
2017	Q1	CM_MC2	0.00000057	0.000005	0.0016	0.0016	0.029	0.03	4.1	0.019	0.042	0.0026	8.3
2017	Q1	FR_FRCP1	<0.000005	0.00000055	0.0018	0.0018	0.011	0.011	22	0.011	0.0059	0.0043	8.2
2017	Q1	GH_FR1	<0.000005	0.00000052	0.00084	0.00087	0.0015	0.0015	13	<0.005	0.0056	0.002	8.3
2017	Q2	CM_MC2	<0.000005	0.0000017	0.0011	0.0012	0.017	0.02	2.3	0.0092	0.045	0.0021	8.3
2017	Q2	FR_FRCP1	<0.000005	0.0000025	0.0012	0.0013	0.0037	0.0047	11	0.0038	0.013	0.0023	8.3
2017	Q3	CM_MC2	<0.000005	0.00000069	0.0015	0.0015	0.026	0.027	3.5	0.018	0.015	0.0011	8.4
2017	Q3	FR_FRCP1	<0.000005	<0.0000005	0.0013	0.0014	0.0068	0.007	11	0.0062	0.0063	0.0013	8.3
2017	Q3	GH_FR1	<0.000005	0.0000005	0.00097	0.00099	0.0025	0.0026	10	0.0067	0.0058	0.001	8.3
2017	Q4	CM_MC2	<0.000005	<0.0000005	0.0013	0.0014	0.016	0.017	3.9	0.014	0.02	<0.001	8.3
2017	Q4	FR_FRCP1	<0.000005	<0.0000005	0.0013	0.0014	0.0086	0.0092	15	0.0067	0.0063	<0.001	8.2
2017	Q4	GH_FR1	<0.000005	0.0000011	0.0011	0.0011	0.0026	0.0028	10	0.0056	0.0068	<0.001	8.4
2018	Q1	CM_MC2	<0.000005	<0.0000005	0.0013	0.0014	0.015	0.015	4.1	0.017	0.014	0.0014	8.2
2018	Q1	FR_FRCP1	<0.000005	<0.0000005	0.0017	0.0018	0.009	0.0094	20	0.0051	0.0099	<0.001	8.2
2018	Q1	GH_FR1	<0.000009	<0.0000005	0.0015	0.0017	0.0014	0.0017	12	<0.005	0.0055	0.0014	8.3
2018	Q2	CM_MC2	<0.000005	0.0000023	0.00084	0.00093	0.011	0.014	1.3	0.0036	0.024	0.0037	8.3
2018	Q2	FR_FRCP1	<0.000005	0.0000029	0.0011	0.0011	0.0024	0.004	8.1	0.0021	0.010	0.0017	8.3
2018	Q2	GH_FR1	<0.000005	0.0000029	0.0012	0.0012	0.0022	0.0035	5.6	0.0029	0.0088	0.004	8.4
2018	Q3	GH_FR1	<0.000005	<0.0000005	0.0013	0.0013	0.0018	0.002	9.9	0.0076	0.024	0.0017	8.3
2018	Q4	CM_MC2	<0.000005	<0.0000005	0.0024	0.0024	0.035	0.034	3.3	0.023	0.083	0.0028	8.3
2018	Q4	GH_FR1	<0.000005	<0.0000005	0.0012	0.0012	0.0015	0.0018	10	0.005	0.015	0.0019	8.4
2019	Q1	CM_MC2	<0.000005	<0.0000005	0.0026	0.0025	0.014	0.015	3.8	0.011	0.016	0.002	8.2
2019	Q1	EV_HC1	<0.000005	0.0000003	0.00092	0.00094	0.00053	0.00065	1.2	0.0012	0.016	0.0069	8.2
2019	Q1	EV_MC2	<0.000005	0.00000039	0.00093	0.00097	0.0013	0.0013	2.1	0.0029	0.025	0.0053	8.2
2019	Q1	GH_FR1	<0.000005	0.00000051	0.0017	0.0016	0.002	0.0022	11	0.0046	0.013	0.0025	8.2
2019	Q1	LC_DCDS	<0.000005	0.000001	0.0036	0.0035	0.0037	0.0038	15	0.015	0.029	0.031	8.2
2019	Q1	LC_LC3	<0.000005	0.00000067	0.0055	0.0055	0.0064	0.0068	11	0.0062	0.014	0.0013	8.1
2019	Q1	LC_LC5	<0.000005	0.00000031	0.0013	0.043	0.0007	0.00075	9.5	0.0032	0.02	0.0012	8.2
2019	Q1	LC_LCDSSLCC	<0.000005	<0.0000005	0.0029	0.0029	0.0032	0.0031	9.1	0.0062	0.02	0.0016	8.2
2019	Q3	EV_HC1	<0.000005	0.00000031	0.00096	0.00093	0.00057	0.00069	0.63	0.0011	0.0086	0.002	8.4
2019	Q3	EV_MC2	<0.000005	0.00000031	0.00088	0.00086	0.00094	0.0011	1.3	0.0018	0.015	0.0021	8.3
2019	Q3	GH_ERC	<0.000005	<0.0000005	0.0011	0.0011	<0.0005	0.00033	0.32	0.00086	0.0092	0.00064	8.3
2019	Q3	GH_FR1	<0.000005	0.0000003	0.0011	0.0011	0.001	0.0013	8.9	0.0058	0.014	0.0007	8.4
2019	Q3	LC_DCDS	<0.000005	0.0000013	0.0037	0.0038	0.0064	0.007	18	0.058	0.05	0.0011	8.4
2019	Q3	LC_LC3	<0.000005	<0.0000005	0.0038	0.0038	0.0085	0.009	9.1	<0.0017	0.0091	0.0017	8.2
2019	Q3	LC_LC5	<0.000005	<0.0000005	0.0012	0.033	0.00084	0.00097	7.7	0.0037	0.0081	0.0006	8.4
Tests categorized as possible or likely for hatch (2015 to 2018)													
2016	Q3	CM_MC2	<0.000005	<0.0000005	0.0012	0.0012	0.014	0.014	3.0	0.0064	<0.005	0.001	8.2
Tests categorized as possible or likely for survival and biomass (2015 to 2018)													
2017	Q2	GH_FR1	<0.000005	0.0000063	0.0011	0.0011	0.0022	0.0034	6.5	0.0033	<0.005	0.0033	8.3
2018	Q3	FR_FRCP1	<0.000005	<0.0000005	0.0015	0.0015	0.0075	0.0077	12	0.0085	0.022	0.0013	8.3
2018	Q4	FR_FRABCH	<0.000005	<0.0000005	0.0007	0.0007	0.00051	0.00055	19	0.0053	0.018	0.0021	8.3
Tests categorized as possible or likely for survival (2015 to 2018)													
2018	Q3	CM_MC2	<0.000005	<0.0000005	0.0027	0.0027	0.055	0.056	4.5	0.036	0.045	0.0016	8.2
Tests categorized as possible or likely for survival, biomass, and length (2015 to 2018)													
2018	Q4	FR_FRCP1	<0.000005	<0.0000005	0.0027	0.0027	0.041	0.042	29	0.0056	0.043	0.0012	7.9
Tests categorized as possible or likely for survival and biomass (2019)													
2019	Q1	FR_FRCP1	<0.0000025	0.00000083	0.0025	0.0024	0.025	0.024	23	0.012	0.013	0.0021	8.1
Tests categorized as possible or likely for survival (2019)													
2019	Q1	GH_ERC	<0.000005	<0.0000005	0.001	0.001	<0.0005	<0.0005	0.55	0.00078	0.023	0.0011	8.1

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-5: *P. promelas* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	PHOSPHORUS-N-mg/l	POTASSIUM-T-mg/l	SELENIUM-D-ug/l	SELENIUM-T-ug/l	SILVER-D-mg/l	SILVER-T-mg/l	SODIUM-T-mg/l	STRONTIUM-D-mg/l	STRONTIUM-T-mg/l	SULFATE (AS SO4)-D-mg/l	THALLIUM-D-mg/l
Tests not included in statistical analysis													
2016	Q1	CM_MC2	0.0022	1.6	0.0055	0.0055	<0.00001	<0.00001	13	0.33	0.34	292	0.000011
2016	Q1	FR_FRCP1	0.0027	2.4	0.14	0.14	<0.00001	<0.00001	2.5	0.2	0.2	533	0.000012
2016	Q1	GH_FR1	0.0031	1.2	0.051	0.05	<0.00001	<0.00001	2.4	0.16	0.16	250	<0.00001
2016	Q1	Reference (FR_UFR1)	0.0047	0.39	0.00081	0.0008	<0.00001	<0.00001	0.7	0.088	0.09	48	<0.00001
2016	Q4	Reference (FR_UFR1)	0.0044	0.37	0.00067	0.00067	<0.00001	<0.00001	0.68	0.089	0.09	38	<0.00001
2018	Q2	Reference (FR_UFR1)	0.023	0.41	0.00049	0.00047	<0.00001	0.000015	0.52	0.063	0.06	9.9	<0.00001
2018	Q2	Reference (GH_ER2)	0.13	0.68	0.00068	0.00074	<0.00001	0.000023	0.66	0.19	0.19	13	<0.00001
2019	Q1	FR_FRABCH	0.0051	1.6	0.11	0.091	<0.00001	<0.00001	2.6	0.19	0.19	349	<0.00001
2019	Q3	CM_MC2	0.0017	1.9	0.0096	0.0086	<0.00001	<0.00001	11	0.38	0.39	346	0.000016
2019	Q3	FR_FRABCH	0.0013	1.8	0.077	0.065	<0.00001	<0.00001	2.1	0.15	0.16	239	<0.00001
2019	Q3	FR_FRCP1	0.0023	1.7	0.059	0.051	<0.00001	<0.00001	1.4	0.14	0.15	214	<0.00001
2019	Q3	LC_LCDSSLCC	0.0044	1.2	0.029	0.026	<0.00001	<0.00001	6.0	0.19	0.19	185	<0.00001
2019	Q3	Reference (FR_UFR1)	0.0018	0.4	0.00071	0.00067	<0.00001	<0.00001	0.69	0.099	0.1	32	<0.00001
Reference													
2016	Q2	Reference (FR_UFR1)	0.0047	0.36	0.00051	0.00055	<0.00001	<0.00001	0.65	0.066	0.068	15	<0.00001
2016	Q3	Reference (FR_UFR1)	0.0048	0.45	0.0006	0.00065	<0.00001	<0.00001	0.74	0.096	0.098	39	<0.00001
2017	Q1	Reference (FR_UFR1)	0.015	0.43	0.001	0.00095	<0.00001	<0.00001	0.85	0.093	0.096	46	<0.00001
2017	Q2	Reference (FR_UFR1)	0.022	0.39	0.00068	0.00064	<0.00001	0.000012	0.58	0.064	0.063	16	<0.00001
2017	Q2	Reference (GH_ER2)	0.026	0.48	0.00084	0.00087	<0.00001	0.000012	0.77	0.2	0.21	18	<0.00001
2017	Q3	Reference (CM_MC1)	0.018	0.5	0.00018	0.00022	<0.00001	<0.00001	2.4	0.15	0.15	13	<0.00001
2017	Q3	Reference (FR_UFR1)	0.0043	0.46	0.00054	0.00058	<0.00001	<0.00001	0.68	0.097	0.096	37	<0.00001
2017	Q3	Reference (GH_ER2)	0.0037	0.38	0.00065	0.00066	<0.00001	<0.00001	0.61	0.21	0.21	16	<0.00001
2017	Q4	Reference (CM_MC1)	0.0033	0.5	0.0002	0.00022	<0.00001	<0.00001	3.0	0.16	0.16	28	<0.00001
2017	Q4	Reference (FR_UFR1)	0.0028	0.39	0.00059	0.00061	<0.00001	<0.00001	0.69	0.099	0.099	46	<0.00001
2017	Q4	Reference (GH_ER2)	0.0017	0.36	0.00084	0.00081	<0.00001	<0.00001	0.7	0.21	0.2	19	<0.00001
2018	Q1	Reference (CM_MC1)	0.004	0.45	0.00028	0.00028	<0.00001	<0.00001	3.4	0.16	0.17	18	<0.00001
2018	Q1	Reference (FR_UFR1)	0.0043	0.37	0.00088	0.00087	<0.000012	<0.00001	0.77	0.097	0.092	48	<0.000012
2018	Q1	Reference (GH_ER2)	0.0039	0.32	0.001	0.0011	<0.00001	<0.00001	0.73	0.21	0.22	23	<0.00001
2018	Q2	Reference (CM_MC1)	0.021	0.44	0.00018	0.00018	<0.000012	<0.00001	1.2	0.078	0.074	5.1	<0.000012
2018	Q3	Reference (CM_MC1)	0.0063	0.49	0.00018	0.00019	<0.00001	<0.00001	2.9	0.16	0.16	13	<0.00001
2018	Q3	Reference (FR_UFR1)	0.005	0.44	0.00059	0.00058	<0.00001	<0.000012	0.68	0.1	0.097	37	<0.00001
2018	Q3	Reference (GH_ER2)	0.0085	0.42	0.0007	0.00067	<0.00001	0.000011	0.62	0.21	0.2	17	<0.00001
2018	Q4	Reference (CM_MC1)	0.0042	0.42	0.00023	0.00023	<0.00001	<0.00001	3.1	0.14	0.14	14	<0.00001
2018	Q4	Reference (FR_UFR1)	0.0026	0.36	0.00076	0.00081	<0.00001	<0.00001	0.72	0.096	0.098	44	<0.00001
2018	Q4	Reference (GH_ER2)	0.0028	0.34	0.00091	0.00093	<0.00001	<0.00001	0.72	0.22	0.21	22	<0.00001
2019	Q1	Reference (CM_MC1)	0.0037	0.44	0.00029	0.0003	<0.00001	<0.00001	3.4	0.16	0.16	17	<0.00001
2019	Q1	Reference (FR_UFR1)	0.012	0.4	0.00092	0.00079	0.0000072	0.000016	0.67	0.092	0.092	44	<0.00001
2019	Q1	Reference (GH_ER2)	0.0046	0.34	0.0012	0.0011	<0.00001	<0.00001	0.74	0.21	0.21	24	<0.00001
2019	Q1	Reference (LC_SLC)	0.0038	0.41	0.0018	0.0017	<0.00001	<0.00001	1.2	0.19	0.19	79	<0.00001
2019	Q3	Reference (CM_MC1)	0.0042	0.5	0.00021	0.00018	<0.00001	<0.00001	3.1	0.15	0.15	14	<0.00001
2019	Q3	Reference (GH_ER2)	0.0029	0.34	0.0008	0.00077	<0.00001	<0.00001	0.62	0.21	0.22	18	<0.00001
2019	Q3	Reference (LC_SLC)	0.0015	0.35	0.0015	0.0013	<0.00001	<0.00001	0.78	0.14	0.14	47	<0.00001
Tests categorized as no adverse response													
2016	Q2	CM_MC2	0.018	1.1	0.0043	0.0042	<0.00001	<0.00001	6.0	0.19	0.19	132	0.000012
2016	Q2	FR_FRCP1	0.0086	1.2	0.03	0.031	<0.00001	<0.00001	1.1	0.099	0.1	119	<0.00001
2016	Q2	GH_FR1	0.0089	1.1	0.029	0.03	<0.00001	<0.00001	1.5	0.11	0.11	130	<0.00001
2016	Q3	FR_FRCP1	0.0051	1.7	0.068	0.067	<0.00001	<0.00001	1.8	0.15	0.15	284	<0.00001
2016	Q3	GH_FR1	0.0041	1.2	0.039	0.04	<0.00001	<0.00001	2.0	0.14	0.14	190	<0.00001
2016	Q4	CM_MC2	0.0071	1.3	0.0054	0.0055	<0.000018	<0.000018	7.6	0.24	0.24	187	0.000019
2016	Q4	FR_FRCP1	0.0036	1.6	0.06	0.059	<0.00001	<0.00001	1.6	0.15	0.15	256	0.000011
2016	Q4	GH_FR1	0.01	1.3	0.043	0.043	<0.00001	<0.00001	2.1	0.14	0.15	214	<0.00001
2017	Q1	CM_MC2	0.0057	1.9	0.0066	0.0062	<0.00001	<0.00001	15	0.41	0.42	320	0.000016
2017	Q1	FR_FRCP1	0.015	2.5	0.17	0.17	<0.00001	<0.00001	2.4	0.2	0.2	620	0.000014
2017	Q1	GH_FR1	0.0036	1.2	0.053	0.053	<0.00001	<0.00001	2.4	0.17	0.17	238	<0.00001
2017	Q2	CM_MC2	0.042	1.5	0.0066	0.006	<0.00001	<0.00001	10	0.28	0.29	188	0.000013
2017	Q2	FR_FRCP1	0.033	1.5	0.051	0.044	<0.00001	0.000014	1.4	0.12	0.12	172	0.00001
2017	Q3	CM_MC2	0.011	1.8	0.0086	0.0084	<0.00001	<0.00001	12	0.38	0.39	319	0.00002
2017	Q3	FR_FRCP1	0.0037	2.0	0.091	0.091	<0.000012	<0.00001	1.6	0.15	0.15	359	0.000013
2017	Q3	GH_FR1	0.0035	1.3	0.052	0.049	<0.00001	<0.00001	1.9	0.14	0.14	208	<0.00001
2017	Q4	CM_MC2	0.0029	1.9	0.0084	0.0079	<0.00001	<0.00001	14	0.41	0.41	334	0.000014
2017	Q4	FR_FRCP1	0.0022	2.2	0.14	0.13	<0.00001	<0.00001	2.0	0.18	0.18	515	0.000011
2017	Q4	GH_FR1	0.0019	1.3	0.065	0.063	<0.00001	<0.00001	2.2	0.16	0.16	267	<0.00001
2018	Q1	CM_MC2	0.0032	1.8	0.0092	0.0089	<0.00001	<0.00001	16	0.43	0.44	370	0.000014
2018	Q1	FR_FRCP1	0.0022	2.4	0.16	0.16	<0.000012	<0.000014	2.6	0.21	0.21	583	0.000015
2018	Q1	GH_FR1	0.0049	1.2	0.058	0.061	<0.00001	<0.00001	2.4	0.16	0.19	278	<0.00001
2018	Q2	CM_MC2	0.061	1.3	0.0046	0.0046	<0.000012	0.00001	5.9	0.19	0.19	118	0.000013
2018	Q2	FR_FRCP1	0.051	1.3	0.035	0.033	<0.00001	0.000016	1.1	0.098	0.095	104	<0.00001
2018	Q2	GH_FR1	0.042	1.1	0.029	0.027	<0.00001	0.000013	1.4	0.1	0.098	110	<0.00001
2018	Q3	GH_FR1	0.0043	1.3	0.053	0.05	<0.00001	<0.00001	2.1	0.15	0.14	216	<0.00001
2018	Q4	CM_MC2	0.0029	2.0	0.0078	0.0075	<0.00001	<0.00001	16	0.55	0.54	356	0.000019
2018	Q4	GH_FR1	0.0025	1.4	0.065	0.062	<0.00001	<0.00001	2.5	0.17	0.16	256	<0.00001
2019	Q1	CM_MC2	0.0048	1.9	0.0091	0.0087	<0.00001	<0.00001	16	0.46	0.45	404	0.000012
2019	Q1	EV_HC1	0.0081	0.85	0.038	0.034	<0.00001	<0.00001	2.1	0.15	0.15	200	<0.00001
2019	Q1	EV_MC2	0.0073	0.95	0.023	0.021	<0.00001	<0.00001	3.5	0.18	0.18	151	<0.00001
2019	Q1	GH_FR1	0.0051	1.3	0.073	0.064	<0.00001	<0.00001	2.6	0.17	0.17	286	<0.00001
2019	Q1	LC_DCDS	0.031	2.1	0.023	0.02	<0.00001	<0.00001	1.6	0.1	0.1	80	0.0000098
2019	Q1	LC_LC3	0.0082	2.0	0.043	0.037	<0.00001	<0.00001	14	0.25	0.25	443	<0.00001
2019	Q1	LC_LC5	0.004	1.1	0.051	0.043	<0.00001	<0.00001	3.5	0.19	0.18	215	<0.00001
2019	Q1	LC_LCDSSLCC	0.0028	1.3	0.043	0.037	<0.00001	<0.00001	8.9	0.24	0.23	314	<0.00001
2019	Q3	EV_HC1	0.009	0.92	0.038	0.032	<0.00001	<0.00001	1.5	0.12	0.12	179	<0.00001
2019	Q3	EV_MC2	0.0045	0.86	0.013	0.012	<0.00001	<0.00001	3.1	0.16	0.17	104	<0.00001
2019	Q3	GH_ERC	0.0019	0.39	0.0017	0.0016	<0.00001	<0.00001	0.79	0.21	0.22	25	<0.00001
2019	Q3	GH_FR1	0.0021	1.3	0.049	0.043	<0.00001	<0.00001	2.1	0.14	0.14	186	<0.00001
2019	Q3	LC_DCDS	0.039	2.2	0.039	0.036	<0.00001	<0.00001	2.6	0.11	0.11	101	0.000015
2019	Q3	LC_LC3	0.0023	1.6	0.038	0.035	<0.00001	<0.00001	9.1	0.21	0.2	283	0.000012
2019	Q3	LC_LC5	0.0014	1.2	0.037	0.033	<0.00001	<0.00001	2.8	0.15	0.15	152	<0.00001
Tests categorized as possible or likely for hatch (2015 to 2018)													
2016	Q3	CM_MC2	0.0056	1.8	0.0063	0.0065	<0.000018	<0.000018	11	0.35	0.35	295	0.000023
Tests categorized as possible or likely for survival and biomass (2015 to 2018)													
2017	Q2	GH_FR1	0.024	1.3	0.033	0.032	<0.00001	0.000015	1.8	0.12	0.12	133	<0.00001
2018	Q3	FR_FRCP1	0.0041	2.0	0.095	0.092	<0.00001	<0.00001	1.6	0.16	0.15	358	0.000011
2018	Q4	FR_FRABCH	0.003	1.8	0.093	0.09	<0.00001	<0.00001	2.6	0.18	0.18	312	<0.00001
Tests categorized as possible or likely for survival (2015 to 2018)													
2018	Q3	CM_MC2	0.0043	2.5	0.0087	0.0088	0.000011	<0.00001	20	0.61	0.63	452	0.00003
Tests categorized as possible or likely for survival, biomass, and length (2015 to 2018)													
2018	Q4	FR_FRCP1	0.0023	5.0	0.59	0.62	<0.00002	<0.000012	2.2	0.23	0.25	1896	0.000042
Tests categorized as possible or likely for survival and biomass (2019)													
2019	Q1	FR_FRCP1	0.0058	3.5	0.45	0.37	<0.000007	<0.000007	2.0	0.22	0.22	1314	0.000024
Tests categorized as possible or likely for survival (2019)													
2019	Q1	GH_ERC	0.00098	0.37	0.0024	0.0022	<0.00001	<0.00001	0.97	0.2	0.21	33	<0.00001

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-5: *P. promelas* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	THALLIUM-T-mg/l	TIN-D-mg/l	TIN-T-mg/l	TITANIUM-D-mg/l	TITANIUM-T-mg/l	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	TOTAL KJELDAHL NITROGEN-N-mg/l	TOTAL ORGANIC CARBON-T-mg/l	TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	TURBIDITY, LAB-N-ntu	URANIUM-D-mg/l
Tests not included in statistical analysis													
2016	Q1	CM_MC2	0.000015	<0.0001	<0.0001	0.011	0.011	650	0.12	0.8	1.1	0.65	0.0026
2016	Q1	FR_FRCP1	0.000014	<0.0001	<0.0001	0.014	0.015	1159	0.13	0.9	1.0	0.33	0.006
2016	Q1	GH_FR1	<0.00001	<0.0001	<0.0001	0.012	0.012	625	0.098	0.89	<1	0.53	0.0023
2016	Q1	Reference (FR_UFR1)	<0.00001	<0.0001	<0.0001	0.01	0.01	231	0.058	0.64	<1	0.48	0.00045
2016	Q4	Reference (FR_UFR1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	198	0.063	1.3	<1	0.65	0.00043
2018	Q2	Reference (FR_UFR1)	0.000012	<0.0001	<0.0001	<0.01	<0.01	123	0.11	2.7	9.6	3.9	0.0003
2018	Q2	Reference (GH_ER2)	0.000036	<0.0001	<0.0001	<0.01	<0.01	161	0.3	3.7	72	48	0.00066
2019	Q1	FR_FRABCH	<0.00001	<0.0001	<0.0001	<0.01	<0.01	862	0.17	0.8	1.5	0.99	0.0031
2019	Q3	CM_MC2	0.000016	<0.0001	<0.0001	<0.01	<0.01	718	0.4	0.78	1.0	0.53	0.003
2019	Q3	FR_FRABCH	<0.00001	<0.0001	0.00016	<0.01	<0.01	682	0.12	0.58	3.9	0.95	0.0031
2019	Q3	FR_FRCP1	<0.00001	<0.0001	<0.0001	<0.01	<0.01	574	0.3	0.87	0.92	0.35	0.0029
2019	Q3	LC_LCDSSLCC	<0.00001	<0.0001	<0.0001	<0.01	<0.01	519	0.094	0.66	0.7	0.21	0.0029
2019	Q3	Reference (FR_UFR1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	232	0.12	0.92	0.9	0.31	0.00049
Reference													
2016	Q2	Reference (FR_UFR1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	147	0.081	2.0	1.7	0.89	0.00033
2016	Q3	Reference (FR_UFR1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	221	0.068	0.92	1.6	0.29	0.00044
2017	Q1	Reference (FR_UFR1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	196	0.069	0.71	<1	0.33	0.00045
2017	Q2	Reference (FR_UFR1)	0.000011	0.0001	<0.0001	<0.01	<0.01	143	0.12	3.1	6.5	4.2	0.0003
2017	Q2	Reference (GH_ER2)	0.000016	<0.0001	<0.0001	<0.01	<0.01	180	0.13	2.5	24	11	0.00078
2017	Q3	Reference (CM_MC1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	163	0.061	1.1	1.0	0.38	0.00022
2017	Q3	Reference (FR_UFR1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	204	0.06	1.4	1.1	0.28	0.00044
2017	Q3	Reference (GH_ER2)	<0.00001	0.0001	<0.0001	<0.01	<0.01	164	0.063	0.86	1.2	0.6	0.00064
2017	Q4	Reference (CM_MC1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	171	0.11	1.2	1.3	0.48	0.00022
2017	Q4	Reference (FR_UFR1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	235	0.075	0.8	1.0	0.37	0.00052
2017	Q4	Reference (GH_ER2)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	192	0.16	0.66	1.5	0.73	0.00077
2018	Q1	Reference (CM_MC1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	190	0.18	0.93	<1	0.15	0.00025
2018	Q1	Reference (FR_UFR1)	<0.00001	<0.00012	<0.0001	<0.01	<0.01	212	0.086	0.87	<1	0.28	0.00052
2018	Q1	Reference (GH_ER2)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	191	<0.05	0.51	1.0	0.15	0.0007
2018	Q2	Reference (CM_MC1)	0.000024	<0.00012	<0.0001	<0.01	<0.01	104	0.1	3.5	12	5.9	0.00013
2018	Q3	Reference (CM_MC1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	175	0.054	1.1	1.2	0.51	0.00024
2018	Q3	Reference (FR_UFR1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	222	0.096	1.2	<1	0.64	0.00048
2018	Q3	Reference (GH_ER2)	0.000014	<0.0001	<0.0001	<0.01	<0.01	170	0.069	0.94	3.6	0.71	0.00067
2018	Q4	Reference (CM_MC1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	158	0.17	1.5	<1	0.3	0.00023
2018	Q4	Reference (FR_UFR1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	212	0.11	0.71	<1	0.24	0.0005
2018	Q4	Reference (GH_ER2)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	172	0.062	<0.5	1.2	0.44	0.00075
2019	Q1	Reference (CM_MC1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	182	0.03	0.38	1.4	0.56	0.00024
2019	Q1	Reference (FR_UFR1)	0.000008	<0.0001	<0.0001	<0.01	0.0074	211	0.12	1.6	2.3	2.6	0.00047
2019	Q1	Reference (GH_ER2)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	185	0.12	0.51	1.6	0.81	0.00081
2019	Q1	Reference (LC_SLC)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	260	0.073	0.63	<1	0.53	0.0017
2019	Q3	Reference (CM_MC1)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	160	0.062	0.87	0.78	0.24	0.00024
2019	Q3	Reference (GH_ER2)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	165	0.066	0.63	2.8	0.87	0.00069
2019	Q3	Reference (LC_SLC)	<0.00001	<0.0001	<0.0001	<0.01	<0.01	214	0.051	0.6	<1	0.2	0.0016
Tests categorized as no adverse response													
2016	Q2	CM_MC2	0.000021	<0.0001	<0.0001	0.011	0.015	365	0.19	1.8	12	5.9	0.0014
2016	Q2	FR_FRCP1	0.000011	<0.0001	<0.0001	0.011	0.011	377	0.15	1.9	6.3	1.0	0.0017
2016	Q2	GH_FR1	0.00001	<0.0001	<0.0001	0.01	0.011	401	0.18	1.8	15	2.6	0.0017
2016	Q3	FR_FRCP1	0.00001	<0.0001	<0.0001	<0.01	<0.01	700	0.14	1.1	2.1	1.8	0.0033
2016	Q3	GH_FR1	<0.00001	<0.0001	<0.0001	<0.01	<0.01	522	0.13	1.1	<1	0.36	0.0021
2016	Q4	CM_MC2	0.000022	<0.00018	<0.00018	<0.01	<0.01	462	0.14	1.9	4.6	2.9	0.0017
2016	Q4	FR_FRCP1	<0.00001	<0.0001	<0.0001	<0.01	<0.01	636	0.095	1.3	1.3	1.1	0.0031
2016	Q4	GH_FR1	<0.00001	<0.0001	<0.0001	<0.01	<0.01	562	0.2	1.6	2.0	0.71	0.0023
2017	Q1	CM_MC2	0.00002	<0.0001	<0.0001	<0.01	<0.01	668	0.14	1.1	1.9	1.2	0.0034
2017	Q1	FR_FRCP1	0.000015	<0.0001	<0.0001	<0.01	<0.01	1231	0.29	1.3	1.3	1.1	0.0067
2017	Q1	GH_FR1	<0.00001	<0.0001	<0.0001	<0.01	<0.01	623	0.095	1.1	1.1	0.77	0.0024
2017	Q2	CM_MC2	0.000031	<0.0001	0.00012	<0.01	<0.01	448	0.22	2.5	19	12	0.0018
2017	Q2	FR_FRCP1	0.000018	<0.0001	<0.0001	<0.01	<0.01	462	0.6	2.7	17	10	0.002
2017	Q3	CM_MC2	0.000021	<0.0001	<0.0001	<0.01	<0.01	653	0.26	1.2	3.2	1.2	0.003
2017	Q3	FR_FRCP1	0.000011	<0.00012	<0.0001	<0.01	<0.01	817	0.48	1.6	1.4	0.55	0.0041
2017	Q3	GH_FR1	<0.00001	0.0001	<0.0001	<0.01	<0.01	571	0.36	1.2	1.5	0.38	0.0023
2017	Q4	CM_MC2	0.000015	<0.0001	<0.0001	<0.01	<0.01	748	0.38	0.99	2.8	1.3	0.003
2017	Q4	FR_FRCP1	0.000012	<0.0001	<0.0001	<0.01	<0.01	1058	0.38	0.98	1.3	0.63	0.0058
2017	Q4	GH_FR1	<0.00001	<0.0001	<0.0001	<0.01	<0.01	672	0.36	1.3	8.3	9.3	0.0029
2018	Q1	CM_MC2	0.000012	<0.0001	<0.0001	<0.01	<0.01	799	0.29	0.94	1.1	0.62	0.0039
2018	Q1	FR_FRCP1	0.000015	<0.00012	<0.00014	<0.01	<0.01	1211	0.24	1.2	1.1	0.7	0.0067
2018	Q1	GH_FR1	<0.00001	<0.0001	<0.0001	<0.01	<0.01	666	0.23	0.99	1.9	0.42	0.0022
2018	Q2	CM_MC2	0.00004	<0.00012	<0.0001	<0.01	0.015	302	0.19	2.9	29	27	0.0012
2018	Q2	FR_FRCP1	0.000021	<0.0001	<0.0001	<0.01	<0.01	344	0.49	2.8	36	12	0.0018
2018	Q2	GH_FR1	0.000016	<0.0001	<0.0001	<0.01	0.0086	347	0.43	3.4	28	28	0.0016
2018	Q3	GH_FR1	<0.00001	<0.0001	<0.0001	<0.01	<0.01	572	0.52	1.1	2.5	0.37	0.0025
2018	Q4	CM_MC2	0.00002	<0.0001	<0.0001	<0.01	<0.01	739	0.22	1.1	1.3	0.59	0.0039
2018	Q4	GH_FR1	<0.00001	<0.0001	<0.0001	<0.01	<0.01	637	0.18	0.65	2.1	0.63	0.0026
2019	Q1	CM_MC2	0.000013	<0.0001	<0.0001	<0.01	<0.01	828	0.29	0.59	1.1	0.75	0.0037
2019	Q1	EV_HC1	<0.00001	<0.0001	<0.0001	<0.01	<0.01	493	0.22	0.82	1.4	0.91	0.0024
2019	Q1	EV_MC2	<0.00001	<0.0001	<0.0001	<0.01	<0.01	428	0.25	1.1	1.2	1.0	0.0017
2019	Q1	GH_FR1	0.0000064	<0.0001	<0.0001	<0.01	<0.01	699	0.2	1.2	2.2	1.5	0.0029
2019	Q1	LC_DCDS	0.000012	<0.0001	<0.0001	<0.01	<0.01	368	0.34	1.8	1.4	2.3	0.0016
2019	Q1	LC_LC3	0.00001	<0.0001	<0.0001	<0.01	0.0076	925	0.29	1.5	4.3	11	0.0049
2019	Q1	LC_LC5	<0.00001	<0.0001	<0.0001	<0.01	<0.01	567	0.3	0.63	2.2	1.4	0.0024
2019	Q1	LC_LCDSSLCC	<0.00001	<0.0001	<0.0001	<0.01	<0.01	706	0.21	0.55	2.1	0.71	0.0037
2019	Q3	EV_HC1	<0.00001	<0.0001	0.000062	<0.01	<0.01	460	0.33	0.96	0.84	0.92	0.0023
2019	Q3	EV_MC2	<0.00001	<0.0001	<0.0001	<0.01	<0.01	337	0.59	0.97	2.2	0.72	0.0012
2019	Q3	GH_ERC	<0.00001	<0.0001	<0.0001	<0.01	<0.01	183	0.12	1.3	0.84	0.76	0.00075
2019	Q3	GH_FR1	<0.00001	<0.0001	0.000064	<0.01	<0.01	520	0.18	1.1	2.4	0.7	0.0023
2019	Q3	LC_DCDS	0.000015	<0.0001	<0.0001	<0.01	<0.01	397	0.55	3.2	1.5	0.97	0.0014
2019	Q3	LC_LC3	0.000012	<0.0001	0.00008	<0.01	<0.01	726	0.085	0.54	0.98	0.4	0.004
2019	Q3	LC_LC5	<0.00001	<0.0001	<0.0001	<0.01	<0.01	465	0.12	0.77	1.2	0.36	0.002
Tests categorized as possible or likely for hatch (2015 to 2018)													
2016	Q3	CM_MC2	0.000022	<0.00018	<0.00018	<0.01	<0.01	674	0.2	1.1	1.5	0.51	0.0027
Tests categorized as possible or likely for survival and biomass (2015 to 2018)													
2017	Q2	GH_FR1	0.000018	<0.0001	<0.0001	<0.01	<0.011	404	0.31	4.4	22	16	0.0018
2018	Q3	FR_FRCP1	0.000011	<0.0001	<0.0001	<0.01	<0.01	815	0.44	1.3	1.2	1.1	0.0044
2018	Q4	FR_FRABCH	<0.00001	<0.0001	<0.0001	<0.01	<0.01	807	0.19	0.76	1.1	0.4	0.0033
Tests categorized as possible or likely for survival (2015 to 2018)													
2018	Q3	CM_MC2	0.000028	<0.0001	<0.0001	<0.01	<0.01	879	0.31	1.2	1.7	0.53	0.0046
Tests categorized as possible or likely for survival, biomass, and length (2015 to 2018)													
2018	Q4	FR_FRCP1	0.000044	<0.0002	<0.00012	<0.01	<0.01	3272	0.31	1.7	20	5.5	0.02
Tests categorized as possible or likely for survival and biomass (2019)													
2019	Q1	FR_FRCP1	0.000028	<0.00007	<0.00007	<0.005	<0.005	2389	0.2	1.7	4.8	3.9	0.014
Tests categorized as possible or likely for survival (2019)													
2019	Q1	GH_ERC	<0.00001	<0.0001	<0.0001	<0.01	<0.01	217	0.095	0.25	0.64	0.26	0.00085

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-5: *P. promelas* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	URANIUM-T-mg/l	VANADIUM-D-mg/l	VANADIUM-T-mg/l	ZINC-D-mg/l	ZINC-T-mg/l	∑TU-WQGs	∑TU-WQGs/Benchmarks	PCA Factor 1 (2015 to 2019)	PCA Factor 2 (2015 to 2019)	PCA Factor 3 (2015 to 2019)	PCA Factor 4 (2015 to 2019)
Tests not included in statistical analysis													
2016	Q1	CM_MC2	0.0026	<0.0005	<0.0005	<0.003	<0.003	8.5	7.8	-	-	-	-
2016	Q1	FR_FRCP1	0.0061	<0.0005	<0.0005	<0.003	<0.003	17	9.8	-	-	-	-
2016	Q1	GH_FR1	0.0023	<0.0005	<0.0005	<0.003	<0.003	9.2	5.7	-	-	-	-
2016	Q1	Reference (FR_UFR1)	0.0005	<0.0005	0.00051	<0.003	<0.003	4.5	4.5	-	-	-	-
2016	Q4	Reference (FR_UFR1)	0.00044	<0.0005	0.0005	<0.003	<0.0036	2.8	2.8	-	-	-	-
2018	Q2	Reference (FR_UFR1)	0.00031	<0.0005	0.0009	<0.001	0.0031	2.1	2.1	-	-	-	-
2018	Q2	Reference (GH_ER2)	0.00079	<0.0005	0.0036	<0.001	0.0093	5.7	5.7	-	-	-	-
2019	Q1	FR_FRABCH	0.0031	<0.0005	<0.0005	<0.001	<0.003	11	4.8	-	-	-	-
2019	Q3	CM_MC2	0.003	<0.0005	<0.0005	<0.001	<0.003	7.8	7.0	-	-	-	-
2019	Q3	FR_FRABCH	0.0031	<0.0005	<0.0005	0.00092	0.0021	9.0	4.7	-	-	-	-
2019	Q3	FR_FRCP1	0.0028	<0.0005	<0.0005	0.001	0.0018	7.1	4.7	-	-	-	-
2019	Q3	LC_LCDSSLCC	0.0028	<0.0005	<0.0005	0.0055	0.0069	6.2	4.7	-	-	-	-
2019	Q3	Reference (FR_UFR1)	0.00047	<0.0005	<0.0005	0.00086	0.0018	1.9	1.9	-	-	-	-
Reference													
2016	Q2	Reference (FR_UFR1)	0.00034	<0.0005	0.0005	<0.003	<0.003	3.3	3.4	-7.0	3.0	-0.21	1.6
2016	Q3	Reference (FR_UFR1)	0.00044	<0.0005	<0.0005	<0.003	<0.003	2.6	2.6	-6.1	-0.86	0.28	0.92
2017	Q1	Reference (FR_UFR1)	0.00049	<0.0005	<0.0005	<0.001	0.0035	1.2	1.2	-5.8	-1.3	-0.49	-0.08
2017	Q2	Reference (FR_UFR1)	0.00033	0.00051	0.00079	0.0011	<0.003	2.4	2.4	-5.9	6.4	-2.9	0.71
2017	Q2	Reference (GH_ER2)	0.00082	<0.0005	0.0014	<0.003	0.0046	2.6	2.6	-3.2	6.0	-2.7	-0.5
2017	Q3	Reference (CM_MC1)	0.00022	<0.0005	<0.0005	<0.0026	<0.003	1.2	1.2	-5.8	1.2	0.86	-2.3
2017	Q3	Reference (FR_UFR1)	0.00042	<0.0005	<0.0005	<0.0026	<0.003	1.2	1.2	-6.1	-0.68	-0.12	0.27
2017	Q3	Reference (GH_ER2)	0.00065	<0.0005	<0.0005	<0.0026	<0.003	1.2	1.2	-5.6	-0.18	1.0	-1.3
2017	Q4	Reference (CM_MC1)	0.00023	<0.0005	<0.0005	<0.003	<0.003	1.2	1.2	-5.5	0.092	1.6	-1.7
2017	Q4	Reference (FR_UFR1)	0.00049	<0.0005	<0.0005	<0.003	<0.003	1.2	1.2	-6.2	-1.4	0.53	0.31
2017	Q4	Reference (GH_ER2)	0.00075	<0.0005	<0.0005	<0.003	<0.003	1.3	1.3	-5.7	-0.94	1.4	-1.0
2018	Q1	Reference (CM_MC1)	0.00025	<0.0005	<0.0005	<0.003	<0.003	1.1	1.1	-5.7	-0.42	1.9	-1.9
2018	Q1	Reference (FR_UFR1)	0.00049	<0.0006	0.00053	<0.003	<0.003	1.3	1.3	-5.3	0.51	2.4	1.5
2018	Q1	Reference (GH_ER2)	0.00077	<0.0005	<0.0005	<0.003	<0.003	1.3	1.3	-5.5	-0.96	2.0	-0.9
2018	Q2	Reference (CM_MC1)	0.00013	<0.0006	0.00088	<0.0012	0.0032	3.1	3.2	-5.8	10	0.058	-0.36
2018	Q3	Reference (CM_MC1)	0.00024	<0.0005	<0.0005	0.001	0.0033	1.2	1.2	-5.8	0.68	1.2	-2.4
2018	Q3	Reference (FR_UFR1)	0.00046	<0.0005	<0.0005	<0.001	<0.003	1.2	1.2	-5.6	-1.1	0.22	0.36
2018	Q3	Reference (GH_ER2)	0.0007	<0.0005	0.0011	<0.001	0.0039	2.3	2.3	-4.4	3.7	-1.2	-1.3
2018	Q4	Reference (CM_MC1)	0.00023	<0.0005	<0.0005	0.001	<0.003	1.1	1.2	-6.1	0.56	1.3	-2.1
2018	Q4	Reference (FR_UFR1)	0.0005	<0.0005	<0.0005	<0.001	<0.003	1.3	1.3	-6.1	-1.7	0.57	0.024
2018	Q4	Reference (GH_ER2)	0.00077	<0.0005	<0.0005	<0.001	<0.003	1.3	1.3	-5.9	-1.4	1.7	-1.3
2019	Q1	Reference (CM_MC1)	0.00024	<0.0005	<0.0005	<0.001	<0.003	2.7	2.7	-6.2	-0.96	2.2	-2.1
2019	Q1	Reference (FR_UFR1)	0.00045	0.00031	0.0008	0.00072	0.0045	2.6	2.7	-5.6	3.2	-2.6	0.45
2019	Q1	Reference (GH_ER2)	0.00078	<0.0005	<0.0005	<0.001	<0.003	2.4	2.4	-5.6	-1.3	1.5	-0.79
2019	Q1	Reference (LC_SLC)	0.0018	<0.0005	<0.0005	0.0015	<0.003	2.7	2.7	-4.3	-2.6	1.4	-0.074
2019	Q3	Reference (CM_MC1)	0.00024	<0.0005	<0.0005	<0.001	<0.003	1.9	1.9	-6.1	-0.38	1.8	-2.4
2019	Q3	Reference (GH_ER2)	0.00068	<0.0005	<0.0005	<0.001	<0.003	2.4	2.4	-5.9	-0.44	1.0	-1.2
2019	Q3	Reference (LC_SLC)	0.0015	<0.0005	<0.0005	0.0019	0.0024	2.6	2.6	-5.5	-2.3	1.4	0.18
Tests categorized as no adverse response													
2016	Q2	CM_MC2	0.0014	<0.0005	0.00082	0.0054	0.0099	8.5	8.1	3.0	7.3	-0.68	-1.8
2016	Q2	FR_FRCP1	0.0018	<0.0005	0.00052	<0.003	0.0031	6.0	4.2	0.46	1.4	-1.7	3.1
2016	Q2	GH_FR1	0.0017	<0.0005	0.00052	<0.003	0.003	5.8	4.0	0.53	1.4	-1.9	3.0
2016	Q3	FR_FRCP1	0.0034	<0.0005	<0.0005	<0.003	<0.003	8.7	5.2	3.2	-2.5	-1.1	2.1
2016	Q3	GH_FR1	0.0021	<0.0005	0.00051	<0.003	<0.003	6.7	4.0	0.75	-2.8	-0.53	2.2
2016	Q4	CM_MC2	0.0018	<0.0009	<0.0009	0.0035	0.0062	6.9	6.4	5.3	8.8	8.6	3.3
2016	Q4	FR_FRCP1	0.0032	<0.0005	<0.0005	<0.003	<0.0042	8.4	5.0	2.8	-2.1	-1.4	2.1
2016	Q4	GH_FR1	0.0023	<0.0005	<0.0005	<0.003	<0.003	6.7	4.2	1.5	-2.0	-1.0	2.1
2017	Q1	CM_MC2	0.0033	<0.0005	<0.0005	0.0041	0.0048	12	10	6.9	1.1	0.66	-6.4
2017	Q1	FR_FRCP1	0.0069	<0.0005	0.00052	0.002	0.0031	13	7.1	6.4	-2.9	-2.0	0.76
2017	Q1	GH_FR1	0.0024	<0.0005	<0.0005	<0.003	<0.003	6.3	2.9	1.1	-3.4	-0.62	1.6
2017	Q2	CM_MC2	0.0018	<0.0005	0.001	0.0063	0.011	9.0	8.5	5.7	7.0	-2.4	-4.5
2017	Q2	FR_FRCP1	0.0021	<0.0005	0.0016	0.0024	0.0066	7.5	4.9	3.4	5.2	-5.2	1.5
2017	Q3	CM_MC2	0.003	<0.0005	<0.0005	<0.0026	0.0037	10	9.2	5.4	0.77	1.6	-4.6
2017	Q3	FR_FRCP1	0.004	<0.0006	<0.0005	<0.0026	<0.003	7.7	4.6	4.3	-1.6	0.75	2.6
2017	Q3	GH_FR1	0.0023	<0.0005	<0.0005	<0.0026	<0.003	5.9	3.2	1.3	-3.2	-0.8	1.7
2017	Q4	CM_MC2	0.0032	<0.0005	<0.0005	<0.003	<0.003	7.3	6.2	5.1	-1.2	2.1	-3.9
2017	Q4	FR_FRCP1	0.0057	<0.0005	0.00052	<0.003	0.0032	9.8	5.6	4.7	-2.9	-0.82	1.3
2017	Q4	GH_FR1	0.0029	<0.0005	<0.0005	<0.003	<0.003	6.1	3.3	1.8	-2.2	-1.4	1.7
2018	Q1	CM_MC2	0.0038	<0.0005	<0.0005	<0.003	0.003	7.1	6.2	5.2	-1.6	1.8	-3.7
2018	Q1	FR_FRCP1	0.0066	<0.0006	<0.0007	<0.003	0.0048	12	6.5	6.8	0.072	2.7	3.5
2018	Q1	GH_FR1	0.0025	<0.0005	<0.0005	<0.003	<0.003	6.4	4.1	1.6	-3.1	-0.77	2.0
2018	Q2	CM_MC2	0.0012	<0.0006	0.0024	0.0047	0.015	9.1	9.0	4.1	12	-2.0	-1.4
2018	Q2	FR_FRCP1	0.0018	<0.0005	0.0018	0.0018	0.0079	6.8	5.0	2.4	7.0	-5.3	2.0
2018	Q2	GH_FR1	0.0016	<0.0005	0.0013	0.0013	0.0057	5.7	5.1	1.8	6.0	-5.3	1.7
2018	Q3	GH_FR1	0.0025	<0.0005	<0.0005	0.0011	<0.003	5.8	3.9	1.9	-2.0	-0.44	2.3
2018	Q4	CM_MC2	0.0039	<0.0005	<0.0005	0.0023	0.0038	12	11	7.2	-0.89	2.8	-5.9
2018	Q4	GH_FR1	0.0028	<0.0005	<0.0005	<0.001	<0.003	5.7	3.6	1.4	-3.7	-0.54	1.4
2019	Q1	CM_MC2	0.0038	<0.0005	<0.0005	0.0018	0.0018	8.2	7.1	5.6	-2.3	2.3	-4.0
2019	Q1	EV_HC1	0.0025	<0.0005	<0.0005	<0.001	0.0079	3.0	2.8	-1.0	-1.7	-1.1	1.2
2019	Q1	EV_MC2	0.0017	<0.0005	<0.0005	<0.001	<0.003	3.1	2.8	0.09	-1.9	-0.82	0.34
2019	Q1	GH_FR1	0.0029	<0.0005	<0.0005	<0.0006	<0.003	6.8	3.8	1.9	-3.4	-1.5	1.6
2019	Q1	LC_DCDS	0.0016	0.0011	0.0013	0.0028	0.0031	7.9	6.4	3.7	0.84	-2.6	0.72
2019	Q1	LC_LC3	0.0051	<0.0005	0.00053	0.0042	0.0062	9.3	6.3	7.3	-1.4	-2.2	-0.84
2019	Q1	LC_LC5	0.0023	<0.0005	<0.0005	<0.001	0.0018	6.0	3.5	0.6	-4.4	-0.37	1.5
2019	Q1	LC_LCDSSLCC	0.0038	<0.0005	<0.0005	0.003	0.0028	7.1	4.7	3.9	-4.0	-0.048	0.36
2019	Q3	EV_HC1	0.0022	<0.0005	<0.0005	<0.001	<0.003	2.6	2.5	-1.2	-2.1	-1.4	0.71
2019	Q3	EV_MC2	0.0011	<0.0005	<0.0005	0.0011	<0.003	2.8	2.7	-1.1	-1.5	-0.61	0.38
2019	Q3	GH_ERC	0.00075	<0.0005	<0.0005	<0.001	<0.003	2.9	2.9	-5.3	-1.5	1.1	-0.46
2019	Q3	GH_FR1	0.0023	<0.0005	<0.0005	0.00084	<0.003	5.8	3.5	0.19	-3.6	-1.8	1.8
2019	Q3	LC_DCDS	0.0014	0.0011	0.0014	0.0022	0.0019	10	7.9	4.0	0.35	-2.2	1.1
2019	Q3	LC_LC3	0.004	<0.0005	<0.0005	0.012	0.014	9.3	7.1	5.4	-2.7	-0.86	-0.53
2019	Q3	LC_LC5	0.002	<0.0005	<0.0005	0.00072	<0.003	5.3	3.4	-0.12	-4.4	-0.78	2.0
Tests categorized as possible or likely for hatch (2015 to 2018)													
2016	Q3	CM_MC2	0.0028	<0.0009	<0.0009	<0.0034	<0.0054	7.3	6.4	6.0	5.3	11	3.6
Tests categorized as possible or likely for survival and biomass (2015 to 2018)													
2017	Q2	GH_FR1	0.0018	<0.0005	0.0017	<0.003	0.0059	6.2	4.7	2.7	6.2	-5.1	2.0
2018	Q3	FR_FRCP1	0.0043	<0.0005	<0.0005	0.0012	0.003	8.2	5.0	4.3	-2.9	-1.3	1.3
2018	Q4	FR_FRABCH	0.0034	<0.0005	<0.0005	<0.001	<0.003	8.6	3.5	2.2	-4.2	-0.53	1.6
Tests categorized as possible or likely for survival (2015 to 2018)													
2018	Q3	CM_MC2	0.0045	0.0005	0.00052	0.001	0.0032	18	17	8.6	-0.34	3.4	-6.4
Tests categorized as possible or likely for survival, biomass, and length (2015 to 2018)													
2018	Q4	FR_FRCP1	0.022	<0.001	<0.0006	<0.002	<0.0036	26	18	12	2.1	10.0	5.1
Tests categorized as possible or likely for survival and biomass (2019)													
2019	Q1	FR_FRCP1	0.013	<0.00035	0.00046	0.0011	0.0035	19	12	8.4	-6.0	-8.1	-5.2
Tests categorized as possible or likely for survival (2019)													
2019	Q1	GH_ERC	0.00086	<0.0005	<0.0005	<0.001	<0.003	2.2	2.2	-5.7	-3.1	2.1	-0.073

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

Table D-5: *P. promelas* Endpoints Paired with Water Quality

Year	Quarter	Sample ID	PCA Factor 1 (2019)	PCA Factor 2 (2019)	PCA Factor 3 (2019)	PCA Factor 4 (2019)	PCA Factor 5 (2019)
Tests not included in statistical analysis							
2016	Q1	CM_MC2	-	-	-	-	-
2016	Q1	FR_FRCP1	-	-	-	-	-
2016	Q1	GH_FR1	-	-	-	-	-
2016	Q1	Reference (FR_UFR1)	-	-	-	-	-
2016	Q4	Reference (FR_UFR1)	-	-	-	-	-
2018	Q2	Reference (FR_UFR1)	-	-	-	-	-
2018	Q2	Reference (GH_ER2)	-	-	-	-	-
2019	Q1	FR_FRABCH	-	-	-	-	-
2019	Q3	CM_MC2	-	-	-	-	-
2019	Q3	FR_FRABCH	-	-	-	-	-
2019	Q3	FR_FRCP1	-	-	-	-	-
2019	Q3	LC_LCDSSLCC	-	-	-	-	-
2019	Q3	Reference (FR_UFR1)	-	-	-	-	-
Reference							
2016	Q2	Reference (FR_UFR1)	-	-	-	-	-
2016	Q3	Reference (FR_UFR1)	-	-	-	-	-
2017	Q1	Reference (FR_UFR1)	-	-	-	-	-
2017	Q2	Reference (FR_UFR1)	-	-	-	-	-
2017	Q2	Reference (GH_ER2)	-	-	-	-	-
2017	Q3	Reference (CM_MC1)	-	-	-	-	-
2017	Q3	Reference (FR_UFR1)	-	-	-	-	-
2017	Q3	Reference (GH_ER2)	-	-	-	-	-
2017	Q4	Reference (CM_MC1)	-	-	-	-	-
2017	Q4	Reference (FR_UFR1)	-	-	-	-	-
2017	Q4	Reference (GH_ER2)	-	-	-	-	-
2018	Q1	Reference (CM_MC1)	-	-	-	-	-
2018	Q1	Reference (FR_UFR1)	-	-	-	-	-
2018	Q1	Reference (GH_ER2)	-	-	-	-	-
2018	Q2	Reference (CM_MC1)	-	-	-	-	-
2018	Q3	Reference (CM_MC1)	-	-	-	-	-
2018	Q3	Reference (FR_UFR1)	-	-	-	-	-
2018	Q3	Reference (GH_ER2)	-	-	-	-	-
2018	Q4	Reference (CM_MC1)	-	-	-	-	-
2018	Q4	Reference (FR_UFR1)	-	-	-	-	-
2018	Q4	Reference (GH_ER2)	-	-	-	-	-
2019	Q1	Reference (CM_MC1)	-5.9	-1.4	-0.11	0.34	-3.0
2019	Q1	Reference (FR_UFR1)	-4.3	-1.0	-8.2	7.3	2.8
2019	Q1	Reference (GH_ER2)	-5.4	-2.3	0.42	0.07	-1.0
2019	Q1	Reference (LC_SLC)	-4.1	-1.2	1.0	-1.0	-0.42
2019	Q3	Reference (CM_MC1)	-5.8	-0.97	-1.1	0.66	-3.4
2019	Q3	Reference (GH_ER2)	-5.5	-2.1	-0.23	0.64	-0.81
2019	Q3	Reference (LC_SLC)	-5.4	-1.8	0.83	-1.2	-0.83
Tests categorized as no adverse response							
2016	Q2	CM_MC2	-	-	-	-	-
2016	Q2	FR_FRCP1	-	-	-	-	-
2016	Q2	GH_FR1	-	-	-	-	-
2016	Q3	FR_FRCP1	-	-	-	-	-
2016	Q3	GH_FR1	-	-	-	-	-
2016	Q4	CM_MC2	-	-	-	-	-
2016	Q4	FR_FRCP1	-	-	-	-	-
2016	Q4	GH_FR1	-	-	-	-	-
2017	Q1	CM_MC2	-	-	-	-	-
2017	Q1	FR_FRCP1	-	-	-	-	-
2017	Q1	GH_FR1	-	-	-	-	-
2017	Q2	CM_MC2	-	-	-	-	-
2017	Q2	FR_FRCP1	-	-	-	-	-
2017	Q3	CM_MC2	-	-	-	-	-
2017	Q3	FR_FRCP1	-	-	-	-	-
2017	Q3	GH_FR1	-	-	-	-	-
2017	Q4	CM_MC2	-	-	-	-	-
2017	Q4	FR_FRCP1	-	-	-	-	-
2017	Q4	GH_FR1	-	-	-	-	-
2018	Q1	CM_MC2	-	-	-	-	-
2018	Q1	FR_FRCP1	-	-	-	-	-
2018	Q1	GH_FR1	-	-	-	-	-
2018	Q2	CM_MC2	-	-	-	-	-
2018	Q2	FR_FRCP1	-	-	-	-	-
2018	Q2	GH_FR1	-	-	-	-	-
2018	Q3	GH_FR1	-	-	-	-	-
2018	Q4	CM_MC2	-	-	-	-	-
2018	Q4	GH_FR1	-	-	-	-	-
2019	Q1	CM_MC2	5.0	1.7	4.8	2.2	-5.6
2019	Q1	EV_HC1	-0.54	0.3	-0.0029	-0.93	2.4
2019	Q1	EV_MC2	0.53	1.7	0.08	-0.53	1.1
2019	Q1	GH_FR1	2.4	1.8	0.54	-1.1	2.2
2019	Q1	LC_DCDS	3.9	7.4	-4.1	-1.0	-2.3
2019	Q1	LC_LC3	7.7	0.86	2.5	6.5	1.1
2019	Q1	LC_LC5	0.74	0.95	1.7	-1.9	2.9
2019	Q1	LC_LCDSSLCC	3.6	1.3	3.9	0.73	0.78
2019	Q3	EV_HC1	-0.63	-0.069	-0.039	-1.3	2.0
2019	Q3	EV_MC2	-0.91	1.5	-0.48	-1.4	0.9
2019	Q3	GH_ERC	-5.2	-1.9	0.45	-0.22	-0.67
2019	Q3	GH_FR1	0.74	0.076	0.4	-2.2	3.1
2019	Q3	LC_DCDS	4.4	7.2	-5.7	-2.6	-2.3
2019	Q3	LC_LC3	5.0	0.9	5.0	2.6	0.41
2019	Q3	LC_LC5	-0.15	0.27	1.5	-2.1	2.6
Tests categorized as possible or likely for hatch (2015 to 2018)							
2016	Q3	CM_MC2	-	-	-	-	-
Tests categorized as possible or likely for survival and biomass (2015 to 2018)							
2017	Q2	GH_FR1	-	-	-	-	-
2018	Q3	FR_FRCP1	-	-	-	-	-
2018	Q4	FR_FRABCH	-	-	-	-	-
Tests categorized as possible or likely for survival (2015 to 2018)							
2018	Q3	CM_MC2	-	-	-	-	-
Tests categorized as possible or likely for survival, biomass, and length (2015 to 2018)							
2018	Q4	FR_FRCP1	-	-	-	-	-
Tests categorized as possible or likely for survival and biomass (2019)							
2019	Q1	FR_FRCP1	16	-11	-4.3	-2.3	-1.4
Tests categorized as possible or likely for survival (2019)							-
2019	Q1	GH_ERC	-5.6	-2.4	1.2	-1.3	-0.53

Notes:
"-D-" = dissolved concentration; "-T-" = total concentration; "-N-" = normal concentration; $CaCO_3$ = calcium carbonate; TU = toxic unit; WQG = water quality guideline; ∑ = sum of; mg/l = milligrams per litre; ug/l = micrograms per litre; % = percent.

Screening
Concentrations of parameters in 2019 tests categorized as possible or likely response are shaded if the concentration is greater than the maximum concentration measured in references or tests categorized as no adverse response.

APPENDIX E

Principal Components Analyses

Table E-1: PCA Results for *C. dubia* Tests

	2015 to 2019 Dataset					2019 Dataset			
	PC1	**PC2**	**PC3**	**PC4**	**PC5**	**PC1**	**PC2**	**PC3**	**PC4**
Percent of Total Variance Explained									
	28.2	16.9	9.9	7.0	5.1	32.6	14.1	11.0	8.5
Component Loadings by Water Quality Parameter									
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	0.743	-0.399	-0.133	-0.003	0.14	0.811	-0.086	-0.32	0.041
ALUMINUM-D-mg/l	-0.208	0.634	0.253	0.142	-0.059	-0.227	-0.09	0.256	-0.124
ALUMINUM-T-mg/l	-0.169	0.713	0.439	0.002	0.379	-0.086	-0.074	0.368	-0.653
ANTIMONY-D-mg/l	0.782	0.262	-0.036	-0.05	-0.304	0.719	0.115	0.431	0.177
ANTIMONY-T-mg/l	0.769	0.279	0.042	-0.007	-0.268	0.748	0.159	0.399	0.142
ARSENIC-D-mg/l	0.211	0.606	-0.085	-0.245	-0.47	0.124	-0.086	0.77	-0.144
ARSENIC-T-mg/l	0.168	0.812	0.213	-0.146	-0.09	0.192	-0.043	0.774	-0.28
BARIUM-D-mg/l	0.285	-0.013	0.125	0.283	-0.61	0.146	0.63	0.466	0.279
BARIUM-T-mg/l	0.302	0.051	0.13	0.294	-0.579	0.182	0.608	0.494	0.257
BERYLLIUM-D-mg/l	0.069	0.304	-0.517	0.321	0.279	0.526	-0.828	0.048	0.138
BERYLLIUM-T-mg/l	0.062	0.372	-0.465	0.335	0.325	0.526	-0.828	0.048	0.138
BISMUTH-D-mg/l	0.138	0.208	-0.618	0.212	0.043	0.526	-0.828	0.048	0.138
BISMUTH-T-mg/l	0.127	0.21	-0.603	0.214	0.061	0.526	-0.828	0.048	0.138
BORON-D-mg/l	0.528	0.263	-0.34	-0.639	-0.069	0.436	-0.169	-0.015	-0.69
BORON-T-mg/l	0.551	0.247	-0.304	-0.635	-0.042	0.491	-0.129	-0.018	-0.719
BROMIDE-D-mg/l	0.539	-0.233	-0.074	0.17	0.111	0.641	-0.071	-0.106	0.072
CADMIUM-D-mg/l	0.622	0.135	0.187	0.314	-0.09	0.579	0.503	-0.021	0.149
CADMIUM-T-mg/l	0.591	0.327	0.319	0.331	-0.004	0.624	0.593	0.058	0.132
CALCIUM-T-mg/l	0.901	-0.294	-0.063	0.07	0.144	0.943	0.038	-0.2	0.015
CARBON, DISSOLVED ORGANIC-D-mg/l	-0.006	0.659	0.406	0.089	-0.158	0.111	-0.143	0.759	0.061
CHLORIDE-D-mg/l	0.763	-0.117	0.108	0.102	-0.127	0.775	0.386	0.012	0.102
CHROMIUM-D-mg/l	-0.154	0.2	-0.511	-0.268	0.166	-0.204	-0.231	0.236	-0.348
CHROMIUM-T-mg/l	-0.189	0.657	0.157	-0.15	0.454	-0.248	-0.266	-0.159	-0.625
COBALT-D-mg/l	0.453	0.252	-0.017	-0.723	0.026	0.478	0.022	0.029	-0.734
COBALT-T-mg/l	0.435	0.422	0.144	-0.658	0.094	0.473	0.06	0.115	-0.772
CONDUCTIVITY, LAB-N-us/cm	0.919	-0.267	0.01	0.093	0.106	0.945	0.078	-0.15	0.039
COPPER-D-mg/l	0.028	0.162	-0.326	0.2	0.09	0.006	-0.051	0.011	0.08
COPPER-T-mg/l	0.225	0.782	-0.174	0.131	0.103	0.448	-0.316	-0.148	0.092
FLUORIDE-D-mg/l	0.254	-0.36	-0.078	0.278	0.401	0.184	0.053	-0.62	0.271
Hardness, Total or Dissolved CaCO3-N-mg/l	0.912	-0.262	-0.033	0.1	0.117	0.948	0.026	-0.183	0.023
IRON-D-mg/l	0.129	0.658	-0.393	0.107	-0.132	0.526	-0.828	0.048	0.138
IRON-T-mg/l	0.004	0.695	0.451	0.063	0.423	0.368	0.18	-0.078	-0.52
LEAD-D-mg/l	0.298	0.407	-0.594	0.048	-0.043	0.31	-0.25	-0.064	-0.069
LEAD-T-mg/l	0.052	0.787	0.2	0.118	0.296	0.289	-0.086	-0.022	-0.261
LITHIUM-D-mg/l	0.918	-0.096	0.127	0.159	-0.07	0.888	0.295	-0.102	0.088
LITHIUM-T-mg/l	0.92	-0.087	0.133	0.158	-0.056	0.888	0.294	-0.11	0.076
MAGNESIUM-T-mg/l	0.914	-0.223	0.008	0.142	0.085	0.937	0.086	-0.154	0.041
MANGANESE-D-mg/l	0.539	0.057	0.303	-0.151	0.173	0.594	0.359	-0.255	-0.21
MANGANESE-T-mg/l	0.369	0.33	0.58	-0.098	0.33	0.566	0.503	-0.086	-0.325
MERCURY-D-mg/l	0.101	-0.044	-0.113	-0.02	-0.195	n/a	n/a	n/a	n/a
MERCURY-T-mg/l	-0.08	0.395	-0.052	0.2	0.285	-0.006	0.091	0.642	-0.203
MOLYBDENUM-D-mg/l	0.695	-0.049	0.102	-0.035	-0.194	0.642	0.236	0.087	0.241
MOLYBDENUM-T-mg/l	0.527	-0.119	0.094	0.03	-0.17	0.399	0.242	-0.086	0.311
NICKEL-D-mg/l	0.868	0.102	0.088	-0.288	-0.009	0.838	0.066	0.165	-0.245
NICKEL-T-mg/l	0.867	0.173	0.151	-0.261	0.015	0.848	0.097	0.168	-0.244
NITRATE NITROGEN (NO3), AS N-N-mg/l	0.853	-0.119	0.194	0.304	0.005	0.827	0.364	0.002	0.195
NITRITE NITROGEN (NO2), AS N-N-mg/l	0.733	0.01	0.237	-0.104	-0.239	0.677	0.195	0.401	0.179
NITROGEN, AMMONIA (AS N)-N-mg/l	0.207	0.14	0.289	-0.286	-0.4	0.143	0.219	0.349	0.299
ORTHO-PHOSPHATE-N-mg/l	-0.25	0.348	0.247	0.218	-0.357	-0.057	-0.094	0.312	0.275
pH, LAB-N-ph units	-0.021	-0.151	0.28	-0.105	-0.017	-0.142	0.309	0.425	-0.203
PHOSPHORUS-N-mg/l	-0.091	0.748	0.397	0.114	-0.046	0.16	0.203	0.631	-0.131
POTASSIUM-T-mg/l	0.935	0.078	0.2	0.108	-0.127	0.927	0.252	0.183	0.026
SELENIUM-D-mg/l	0.824	-0.143	0.131	0.432	0.051	0.834	0.248	-0.043	0.257
SELENIUM-T-mg/l	0.801	-0.149	0.124	0.426	0.048	0.741	0.248	-0.081	0.291
SILVER-D-mg/l	0.301	0.477	-0.711	0.023	-0.094	0.526	-0.828	0.048	0.138
SILVER-T-mg/l	0.225	0.731	-0.367	0.111	0.031	0.526	-0.828	0.048	0.138
SODIUM-T-mg/l	0.723	-0.1	0.09	-0.372	-0.031	0.606	0.371	-0.126	-0.402
STRONTIUM-D-mg/l	0.465	-0.312	-0.087	-0.621	0.317	0.37	-0.074	-0.442	-0.543
STRONTIUM-T-mg/l	0.472	-0.315	-0.096	-0.617	0.318	0.399	-0.057	-0.47	-0.534
SULFATE (AS SO4)-D-mg/l	0.9	-0.267	0.043	0.099	0.113	0.902	0.168	-0.192	0.005
THALLIUM-D-mg/l	0.518	0.416	-0.497	-0.337	-0.098	0.546	-0.663	0.16	-0.019
THALLIUM-T-mg/l	0.416	0.735	-0.089	-0.28	0.087	0.529	-0.548	0.21	-0.311
TIN-D-mg/l	0.296	0.475	-0.716	0.042	-0.09	0.526	-0.828	0.048	0.138
TIN-T-mg/l	0.262	0.483	-0.688	0.033	-0.047	0.434	-0.764	0.022	0.144
TITANIUM-D-mg/l	0.199	-0.079	-0.2	0.321	0.26	n/a	n/a	n/a	n/a
TITANIUM-T-mg/l	0.182	0.022	-0.114	0.326	0.315	n/a	n/a	n/a	n/a
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	0.915	-0.269	0.005	0.094	0.099	0.948	0.073	-0.169	0.028
TOTAL KJELDAHL NITROGEN-N-mg/l	0.322	0.226	0.507	-0.066	-0.233	0.255	0.31	0.369	-0.278
TOTAL ORGANIC CARBON-T-mg/l	0.006	0.694	0.444	0.085	-0.099	0.106	-0.076	0.755	-0.043
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	-0.014	0.65	0.459	0.036	0.313	0.157	-0.009	0.283	-0.312
TURBIDITY, LAB-N-ntu	-0.01	0.685	0.54	0.031	0.181	0.116	0.045	0.481	-0.348
URANIUM-D-mg/l	0.878	-0.281	0.016	0.102	0.218	0.882	0.105	-0.266	0.082
URANIUM-T-mg/l	0.881	-0.267	0.024	0.103	0.225	0.879	0.118	-0.271	0.072
VANADIUM-D-mg/l	0.205	0.553	-0.497	0.239	-0.383	0.355	-0.14	0.767	0.326
VANADIUM-T-mg/l	0.065	0.845	0.019	0.259	-0.025	0.348	-0.088	0.795	0.235
ZINC-D-mg/l	0.329	0.103	-0.212	0.161	0.187	0.495	0.236	-0.216	0.096
ZINC-T-mg/l	0.371	0.462	-0.044	0.072	0.153	0.399	-0.076	-0.233	0.083

Notes:

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; ntu = nephelometric turbidity units; PC = principle component; "-T-" = total concentration; µg/l = micrograms per litre.

n/a = parameter not included in analysis because concentrations were the same in all samples.

PCA scores for each test are provided in Appendix D.

Shaded value = component loading not between -0.6 and 0.6.

Table E-2: PCA Results for *P. subcapitata* Tests

	2015 to 2019 Dataset					2019 Dataset			
	PC1	**PC2**	**PC3**	**PC4**	**PC5**	**PC1**	**PC2**	**PC3**	**PC4**
Percent of Total Variance Explained									
	28.4	17.1	10.0	6.7	5.2	33.2	14.4	11.5	8.19
Component Loadings by Water Quality Parameter									
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	0.743	-0.4	-0.133	-0.012	0.139	0.811	-0.084	-0.32	0.032
ALUMINUM-D-mg/l	-0.207	0.632	0.258	0.139	-0.06	-0.226	-0.095	0.254	-0.18
ALUMINUM-T-mg/l	-0.167	0.712	0.441	-0.001	0.382	-0.083	-0.071	0.371	-0.682
ANTIMONY-D-mg/l	0.787	0.259	-0.032	-0.068	-0.301	0.725	0.111	0.43	0.167
ANTIMONY-T-mg/l	0.773	0.277	0.048	-0.022	-0.263	0.752	0.158	0.4	0.138
ARSENIC-D-mg/l	0.214	0.63	-0.092	-0.19	-0.489	0.146	-0.078	0.832	-0.035
ARSENIC-T-mg/l	0.168	0.823	0.218	-0.114	-0.087	0.214	-0.033	0.821	-0.202
BARIUM-D-mg/l	0.29	-0.008	0.138	0.256	-0.612	0.142	0.625	0.484	0.282
BARIUM-T-mg/l	0.308	0.058	0.145	0.264	-0.58	0.179	0.602	0.507	0.263
BERYLLIUM-D-mg/l	0.075	0.308	-0.51	0.324	0.275	0.53	-0.828	0.04	0.122
BERYLLIUM-T-mg/l	0.068	0.376	-0.457	0.335	0.322	0.53	-0.828	0.04	0.122
BISMUTH-D-mg/l	0.141	0.21	-0.612	0.223	0.037	0.53	-0.828	0.04	0.122
BISMUTH-T-mg/l	0.13	0.212	-0.597	0.226	0.055	0.53	-0.828	0.04	0.122
BORON-D-mg/l	0.53	0.264	-0.355	-0.635	-0.063	0.455	-0.161	-0.025	-0.656
BORON-T-mg/l	0.554	0.248	-0.319	-0.63	-0.036	0.511	-0.118	-0.032	-0.693
BROMIDE-D-mg/l	0.543	-0.237	-0.071	0.153	0.107	0.645	-0.071	-0.112	0.034
CADMIUM-D-mg/l	0.625	0.131	0.197	0.299	-0.089	0.576	0.507	-0.019	0.151
CADMIUM-T-mg/l	0.596	0.322	0.329	0.314	-0.003	0.624	0.595	0.062	0.114
CALCIUM-T-mg/l	0.901	-0.296	-0.061	0.07	0.142	0.942	0.045	-0.205	0.026
CARBON, DISSOLVED ORGANIC-D-mg/l	0	0.658	0.414	0.068	-0.16	0.123	-0.152	0.763	0.03
CHLORIDE-D-mg/l	0.763	-0.121	0.11	0.097	-0.127	0.774	0.387	0.014	0.113
CHROMIUM-D-mg/l	-0.156	0.214	-0.518	-0.243	0.174	-0.203	-0.23	0.239	-0.331
CHROMIUM-T-mg/l	-0.194	0.659	0.157	-0.131	0.465	-0.252	-0.263	-0.174	-0.621
COBALT-D-mg/l	0.459	0.244	-0.042	-0.723	0.029	0.483	0.026	0.019	-0.756
COBALT-T-mg/l	0.442	0.421	0.128	-0.655	0.099	0.485	0.07	0.102	-0.767
CONDUCTIVITY, LAB-N-us/cm	0.92	-0.273	0.011	0.089	0.102	0.946	0.085	-0.159	0.04
COPPER-D-mg/l	0.03	0.164	-0.325	0.223	0.095	0.015	-0.048	0.003	0.043
COPPER-T-mg/l	0.231	0.786	-0.164	0.117	0.108	0.449	-0.315	-0.152	0.055
FLUORIDE-D-mg/l	0.248	-0.368	-0.079	0.324	0.397	0.178	0.055	-0.619	0.292
Hardness, Total or Dissolved CaCO3-N-mg/l	0.912	-0.265	-0.03	0.099	0.115	0.947	0.032	-0.186	0.031
IRON-D-mg/l	0.134	0.662	-0.385	0.104	-0.132	0.53	-0.828	0.04	0.122
IRON-T-mg/l	0.008	0.694	0.454	0.052	0.427	0.383	0.193	-0.096	-0.548
LEAD-D-mg/l	0.302	0.409	-0.59	0.052	-0.044	0.31	-0.247	-0.068	-0.116
LEAD-T-mg/l	0.056	0.786	0.207	0.103	0.301	0.289	-0.083	-0.025	-0.32
LITHIUM-D-mg/l	0.918	-0.101	0.132	0.153	-0.07	0.885	0.301	-0.105	0.092
LITHIUM-T-mg/l	0.919	-0.092	0.138	0.151	-0.056	0.885	0.299	-0.113	0.08
MAGNESIUM-T-mg/l	0.914	-0.226	0.012	0.139	0.082	0.935	0.092	-0.157	0.044
MANGANESE-D-mg/l	0.54	0.043	0.299	-0.148	0.173	0.594	0.37	-0.264	-0.207
MANGANESE-T-mg/l	0.37	0.319	0.58	-0.109	0.334	0.571	0.519	-0.1	-0.342
MERCURY-D-mg/l	0.1	-0.045	-0.114	-0.012	-0.196	n/a	n/a	n/a	n/a
MERCURY-T-mg/l	-0.076	0.396	-0.045	0.185	0.288	-0.001	0.083	0.642	-0.282
MOLYBDENUM-D-mg/l	0.696	-0.052	0.104	-0.05	-0.189	0.647	0.233	0.09	0.231
MOLYBDENUM-T-mg/l	0.524	-0.121	0.096	0.009	-0.167	0.394	0.236	-0.082	0.295
NICKEL-D-mg/l	0.875	0.093	0.081	-0.27	-0.008	0.853	0.079	0.153	-0.188
NICKEL-T-mg/l	0.873	0.164	0.146	-0.247	0.018	0.861	0.11	0.159	-0.198
NITRATE NITROGEN (NO3), AS N-N-mg/l	0.853	-0.123	0.202	0.299	0.005	0.824	0.367	0.001	0.207
NITRITE NITROGEN (NO2), AS N-N-mg/l	0.737	-0.002	0.236	-0.118	-0.241	0.688	0.192	0.404	0.145
NITROGEN, AMMONIA (AS N)-N-mg/l	0.204	0.132	0.286	-0.285	-0.403	0.144	0.217	0.35	0.267
ORTHO-PHOSPHATE-N-mg/l	-0.251	0.354	0.258	0.216	-0.359	-0.061	-0.107	0.341	0.291
pH, LAB-N-ph units	-0.026	-0.161	0.275	-0.09	-0.018	-0.142	0.32	0.422	-0.2
PHOSPHORUS-N-mg/l	-0.085	0.751	0.404	0.089	-0.046	0.167	0.197	0.642	-0.151
POTASSIUM-T-mg/l	0.936	0.075	0.206	0.094	-0.126	0.927	0.256	0.18	0.031
SELENIUM-D-mg/l	0.827	-0.146	0.143	0.423	0.047	0.834	0.25	-0.042	0.244
SELENIUM-T-mg/l	0.829	-0.139	0.139	0.425	0.052	0.83	0.252	-0.039	0.254
SILVER-D-mg/l	0.306	0.481	-0.707	0.031	-0.096	0.53	-0.828	0.04	0.122
SILVER-T-mg/l	0.231	0.734	-0.358	0.108	0.034	0.53	-0.828	0.04	0.122
SODIUM-T-mg/l	0.73	-0.106	0.081	-0.359	-0.028	0.629	0.4	-0.137	-0.332
STRONTIUM-D-mg/l	0.465	-0.32	-0.105	-0.611	0.328	0.389	-0.061	-0.47	-0.481
STRONTIUM-T-mg/l	0.473	-0.322	-0.114	-0.606	0.33	0.419	-0.043	-0.5	-0.472
SULFATE (AS SO4)-D-mg/l	0.9	-0.27	0.046	0.109	0.111	0.903	0.178	-0.196	0.036
THALLIUM-D-mg/l	0.533	0.422	-0.532	-0.284	-0.103	0.599	-0.696	0.146	0.027
THALLIUM-T-mg/l	0.425	0.749	-0.1	-0.241	0.091	0.616	-0.608	0.215	-0.227
TIN-D-mg/l	0.301	0.479	-0.712	0.05	-0.092	0.53	-0.828	0.04	0.122
TIN-T-mg/l	0.266	0.487	-0.684	0.04	-0.048	0.437	-0.766	0.016	0.117
TITANIUM-D-mg/l	0.2	-0.08	-0.195	0.332	0.251	n/a	n/a	n/a	n/a
TITANIUM-T-mg/l	0.183	0.022	-0.107	0.334	0.308	n/a	n/a	n/a	n/a
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	0.916	-0.271	0.008	0.091	0.098	0.948	0.079	-0.171	0.035
TOTAL KJELDAHL NITROGEN-N-mg/l	0.322	0.219	0.512	-0.042	-0.236	0.263	0.329	0.372	-0.221
TOTAL ORGANIC CARBON-T-mg/l	0.012	0.692	0.451	0.067	-0.099	0.118	-0.079	0.752	-0.073
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	-0.008	0.653	0.464	0.017	0.319	0.184	-0.012	0.282	-0.376
TURBIDITY, LAB-N-ntu	-0.006	0.683	0.545	0.01	0.187	0.129	0.043	0.478	-0.447
URANIUM-D-mg/l	0.877	-0.285	0.018	0.11	0.216	0.88	0.111	-0.269	0.098
URANIUM-T-mg/l	0.88	-0.271	0.026	0.11	0.223	0.877	0.124	-0.274	0.088
VANADIUM-D-mg/l	0.21	0.558	-0.487	0.239	-0.387	0.36	-0.151	0.772	0.313
VANADIUM-T-mg/l	0.072	0.851	0.034	0.241	-0.021	0.354	-0.1	0.799	0.216
ZINC-D-mg/l	0.334	0.094	-0.216	0.153	0.186	0.496	0.237	-0.219	0.07
ZINC-T-mg/l	0.376	0.456	-0.043	0.061	0.156	0.399	-0.077	-0.238	0.045

Notes:

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; ntu = nephelometric turbidity units; PC = principle component; "-T-" = total concentration; µg/l = micrograms per litre.

n/a = parameter not included in analysis because concentrations were the same in all samples.

PCA scores for each test are provided in Appendix D.

Shaded value = component loading not between -0.6 and 0.6.

Table E-3: PCA Results for *H. azteca* Tests

	2015 to 2019 Dataset				2019 Dataset					
	PC1	**PC2**	**PC3**	**PC4**	**PC1**	**PC2**	**PC3**	**PC4**	**PC5**	**PC6**
Percent of Total Variance Explained										
	30.3	17.7	8.6	6.0	32.2	12.1	11.2	8.4	6.8	5.54
Component Loadings by Water Quality Parameter										
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	0.824	-0.349	0.014	0.051	0.817	-0.18	-0.295	-0.265	0.178	0.154
ALUMINUM-D-mg/l	-0.218	0.64	0.049	0.059	-0.119	-0.432	0.266	0.268	0.494	-0.244
ALUMINUM-T-mg/l	-0.071	0.9	0.11	0.019	-0.054	-0.56	0.015	0.52	0.335	0.253
ANTIMONY-D-mg/l	0.838	0.108	-0.019	-0.032	0.783	0.031	0.214	0.249	-0.211	-0.276
ANTIMONY-T-mg/l	0.856	0.132	0.012	-0.013	0.8	0.071	0.215	0.217	-0.215	-0.249
ARSENIC-D-mg/l	0.168	0.369	-0.545	-0.107	0.163	0.157	0.041	0.639	-0.468	0.105
ARSENIC-T-mg/l	0.101	0.779	-0.313	0.011	0.131	0.043	0.059	0.693	-0.432	-0.048
BARIUM-D-mg/l	0.36	-0.372	0.341	-0.144	0.329	0.372	0.675	0.187	0.021	0.337
BARIUM-T-mg/l	0.371	-0.283	0.366	-0.145	0.348	0.366	0.663	0.226	-0.002	0.329
BERYLLIUM-D-mg/l	0.064	0.143	0.331	-0.745	-0.452	0.748	0.151	0.207	0.372	0.096
BERYLLIUM-T-mg/l	0.082	0.359	0.327	-0.656	0.013	0.803	-0.226	-0.108	-0.318	0.188
BISMUTH-D-mg/l	0.15	0.117	0.24	-0.498	0.452	-0.748	-0.151	-0.207	-0.372	-0.096
BISMUTH-T-mg/l	0.086	0.137	0.263	-0.68	-0.452	0.748	0.151	0.207	0.372	0.096
BORON-D-mg/l	0.404	0.183	-0.755	-0.295	0.171	0.21	-0.627	0.561	0.125	-0.262
BORON-T-mg/l	0.478	0.174	-0.734	-0.29	0.309	0.218	-0.552	0.606	0.069	-0.199
BROMIDE-D-mg/l	0.632	-0.17	0.12	-0.157	0.649	-0.043	0.142	0.074	-0.006	-0.17
CADMIUM-D-mg/l	0.629	0.175	0.28	0.185	0.68	0.409	0.223	-0.059	0.233	-0.423
CADMIUM-T-mg/l	0.569	0.445	0.332	0.265	0.709	0.308	0.283	-0.042	0.281	-0.37
CALCIUM-T-mg/l	0.937	-0.212	0.088	0.02	0.951	-0.062	-0.123	-0.147	0.094	0.132
CARBON, DISSOLVED ORGANIC-D-mg/l	0.02	0.731	0.222	0.004	0.234	-0.344	0.582	0.267	-0.369	0.183
CHLORIDE-D-mg/l	0.825	-0.086	-0.021	-0.058	0.805	0.283	0.115	0.09	-0.024	-0.272
CHROMIUM-D-mg/l	-0.372	0.035	-0.572	-0.105	-0.663	0.074	-0.428	0.269	-0.104	-0.055
CHROMIUM-T-mg/l	-0.102	0.789	-0.074	0.142	-0.361	-0.519	-0.485	0.192	0.207	-0.126
COBALT-D-mg/l	0.412	0.35	-0.649	-0.23	0.292	0.099	-0.461	0.575	0.16	0.22
COBALT-T-mg/l	0.424	0.547	-0.583	-0.154	0.387	0.143	-0.498	0.625	0.101	0.208
CONDUCTIVITY, LAB-N-us/cm	0.953	-0.18	0.09	0.038	0.959	-0.05	-0.09	-0.132	0.092	0.137
COPPER-D-mg/l	-0.009	0.173	-0.023	-0.228	0.039	-0.031	-0.09	0.129	-0.151	-0.225
COPPER-T-mg/l	-0.028	0.825	0.034	0.156	-0.34	0.362	-0.394	-0.204	0.101	0.271
FLUORIDE-D-mg/l	0.125	-0.191	0.35	0.134	-0.048	0.267	-0.104	-0.414	0.242	0.057
Hardness, Total or Dissolved CaCO3-N-mg/l	0.941	-0.193	0.103	0.049	0.951	-0.085	-0.114	-0.152	0.082	0.145
IRON-D-mg/l	-0.175	0.402	0.059	0.12	-0.211	-0.126	0.306	0.219	0.674	0.025
IRON-T-mg/l	0.071	0.908	0.187	0.135	0.319	-0.344	0.03	0.295	0.598	-0.109
LEAD-D-mg/l	0.204	0.002	0.024	0.229	0.452	-0.748	-0.151	-0.207	-0.372	-0.096
LEAD-T-mg/l	-0.025	0.898	0.102	0.18	-0.134	-0.48	0.078	-0.062	0.486	-0.172
LITHIUM-D-mg/l	0.925	-0.108	0.153	0.102	0.906	0.207	0.008	-0.191	0.036	0.057
LITHIUM-T-mg/l	0.928	-0.086	0.151	0.111	0.908	0.199	0.005	-0.195	0.05	0.05
MAGNESIUM-T-mg/l	0.948	-0.162	0.123	0.061	0.948	-0.041	-0.095	-0.167	0.086	0.164
MANGANESE-D-mg/l	0.732	0.233	-0.009	-0.079	0.745	0.163	-0.257	-0.078	0.255	0.071
MANGANESE-T-mg/l	0.538	0.607	0.081	0.09	0.692	0.015	-0.146	0.078	0.504	0.07
MERCURY-D-mg/l	0.079	0.095	0.284	-0.614	n/a	n/a	n/a	n/a	n/a	n/a
MERCURY-T-mg/l	0.016	0.584	0.408	-0.488	0.169	-0.291	0.586	0.254	0.225	-0.028
MOLYBDENUM-D-mg/l	0.737	-0.13	-0.052	0.119	0.666	0.234	0.159	0.033	-0.317	-0.448
MOLYBDENUM-T-mg/l	0.54	-0.162	0.025	0.136	0.384	0.222	0.133	-0.225	-0.176	-0.11
NICKEL-D-mg/l	0.887	0.221	-0.252	-0.094	0.845	0.034	-0.187	0.343	-0.126	-0.16
NICKEL-T-mg/l	0.883	0.304	-0.228	-0.06	0.865	0.058	-0.175	0.331	-0.114	-0.124
NITRATE NITROGEN (NO3), AS N-N-mg/l	0.892	-0.063	0.312	0.09	0.876	0.16	0.21	-0.15	0.152	0.183
NITRITE NITROGEN (NO2), AS N-N-mg/l	0.83	0.105	-0.026	-0.158	0.724	0.044	0.351	0.15	-0.205	0.289
NITROGEN, AMMONIA (AS N)-N-mg/l	0.296	0.032	-0.194	0.253	0.448	0.009	0.549	0.092	0.183	0.088
ORTHO-PHOSPHATE-N-mg/l	-0.366	0.26	-0.003	0.189	-0.094	-0.108	0.358	0.209	-0.051	-0.432
pH, LAB-N-ph units	-0.093	0.173	0.227	-0.307	-0.143	0.199	0.053	0.221	-0.116	0.487
PHOSPHORUS-N-mg/l	-0.068	0.811	0.138	0.172	0.177	-0.231	0.554	0.506	0.108	0.007
POTASSIUM-T-mg/l	0.968	0.067	0.093	0.035	0.963	0.091	0.094	0.038	-0.018	0.164
SELENIUM-D-mg/l	0.851	-0.144	0.419	0.175	0.865	0.07	0.179	-0.332	0.111	0.245
SELENIUM-T-mg/l	0.852	-0.138	0.423	0.165	0.867	0.078	0.18	-0.331	0.107	0.241
SILVER-D-mg/l	-0.017	0.222	-0.1	-0.129	-0.225	0.868	-0.074	-0.007	-0.048	0.221
SILVER-T-mg/l	-0.061	0.592	0.161	0.27	-0.333	0.031	0.277	0.323	0.505	-0.178
SODIUM-T-mg/l	0.694	0.047	-0.511	-0.144	0.613	0.405	-0.327	0.347	0.011	-0.143
STRONTIUM-D-mg/l	0.59	-0.088	-0.69	-0.072	0.383	0.183	-0.752	0.284	-0.054	-0.063
STRONTIUM-T-mg/l	0.592	-0.091	-0.681	-0.085	0.388	0.192	-0.743	0.282	-0.059	-0.06
SULFATE (AS SO4)-D-mg/l	0.943	-0.15	0.099	0.025	0.924	-0.001	-0.093	-0.114	0.172	0.194
THALLIUM-D-mg/l	0.502	0.183	-0.458	-0.006	0.499	-0.487	-0.295	0.228	-0.332	0.056
THALLIUM-T-mg/l	0.362	0.723	-0.29	0.05	0.528	-0.314	-0.337	0.248	-0.371	-0.013
TIN-D-mg/l	0.027	0.229	-0.175	-0.113	-0.025	0.074	-0.33	0.422	0.355	0.245
TIN-T-mg/l	0.094	0.065	-0.136	-0.097	-0.111	0.28	-0.286	0.017	-0.013	0.047
TITANIUM-D-mg/l	0.217	0.049	0.259	-0.499	n/a	n/a	n/a	n/a	n/a	n/a
TITANIUM-T-mg/l	0.067	0.395	0.1	-0.507	-0.38	0.856	0.058	0.123	0.205	0.16
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	0.948	-0.191	0.087	0.049	0.956	-0.05	-0.091	-0.143	0.082	0.134
TOTAL KJELDAHL NITROGEN-N-mg/l	0.366	0.267	-0.093	0.254	0.112	-0.146	-0.113	0.456	0.001	0.437
TOTAL ORGANIC CARBON-T-mg/l	0.044	0.771	0.273	0.066	0.225	-0.313	0.597	0.302	-0.19	0.152
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	0.008	0.866	0.15	0.161	0.079	-0.575	0.03	0.153	0.341	0.306
TURBIDITY, LAB-N-ntu	0.102	0.896	0.142	0.11	0.303	-0.674	0.073	0.339	0.258	0.263
URANIUM-D-mg/l	0.924	-0.158	0.107	0.128	0.896	0.023	-0.136	-0.255	0.11	0.115
URANIUM-T-mg/l	0.927	-0.139	0.107	0.129	0.9	0.031	-0.142	-0.247	0.11	0.106
VANADIUM-D-mg/l	0.131	0.167	0.212	-0.469	0.159	0.449	0.574	0.309	-0.432	0.068
VANADIUM-T-mg/l	0	0.85	0.204	0.094	0.029	0.132	0.827	0.367	-0.18	-0.113
ZINC-D-mg/l	0.284	0.208	0.153	-0.288	0.461	0.4	0.028	-0.015	0.144	-0.682
ZINC-T-mg/l	0.224	0.639	0.052	0.269	0.39	0.098	0.118	-0.046	0.342	-0.73

Notes:

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; ntu = nephelometric turbidity units; PC = principle component; "-T-" = total concentration; µg/l = micrograms per litre.

n/a = parameter not included in analysis because concentrations were the same in all samples.

PCA scores for each test are provided in Appendix D.

Shaded value = component loading not between -0.6 and 0.6.

Table E-4: PCA Results for *O. mykiss* Tests

	2015 to 2019 Dataset			2019 Dataset				
	PC1	**PC2**	**PC3**	**PC1**	**PC2**	**PC3**	**PC4**	**PC5**
Percent of Total Variance Explained								
	29.2	20.6	7.4	33.7	14.9	10.4	7.6	6.25
Component Loadings by Water Quality Parameter								
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	0.851	-0.096	-0.084	0.818	-0.304	0.322	0.215	0.196
ALUMINUM-D-mg/l	-0.498	0.509	-0.023	-0.422	0.422	-0.133	-0.247	0.066
ALUMINUM-T-mg/l	-0.583	0.691	0.185	-0.516	0.703	0.276	0.33	0.084
ANTIMONY-D-mg/l	0.679	0.365	0.006	0.631	0.339	-0.374	-0.274	-0.137
ANTIMONY-T-mg/l	0.677	0.439	0.134	0.71	0.288	-0.358	-0.154	-0.198
ARSENIC-D-mg/l	-0.141	0.554	-0.161	-0.116	0.402	-0.413	-0.469	0.39
ARSENIC-T-mg/l	-0.406	0.83	0.117	-0.295	0.785	-0.171	-0.174	0.142
BARIUM-D-mg/l	0.437	-0.135	0.354	0.517	0.022	-0.553	0.149	0.51
BARIUM-T-mg/l	0.385	-0.003	0.379	0.497	0.067	-0.541	0.14	0.53
BERYLLIUM-D-mg/l	0.015	0.058	-0.276	n/a	n/a	n/a	n/a	n/a
BERYLLIUM-T-mg/l	-0.164	0.359	-0.108	0.071	0.161	0.26	-0.12	-0.073
BISMUTH-D-mg/l	0.03	0.376	-0.552	n/a	n/a	n/a	n/a	n/a
BISMUTH-T-mg/l	0.008	0.335	-0.495	n/a	n/a	n/a	n/a	n/a
BORON-D-mg/l	0.363	0.389	-0.606	0.244	0.102	0.374	-0.532	0.295
BORON-T-mg/l	0.418	0.361	-0.501	0.374	0.175	0.41	-0.502	0.317
BROMIDE-D-mg/l	0.671	0.016	-0.105	0.629	0.108	-0.069	-0.222	0.261
CADMIUM-D-mg/l	0.575	0.393	0.341	0.742	0.339	-0.141	-0.231	-0.421
CADMIUM-T-mg/l	0.231	0.685	0.462	0.598	0.582	-0.098	-0.053	-0.44
CALCIUM-T-mg/l	0.937	0.094	-0.031	0.952	-0.068	0.178	0.173	0.11
CARBON, DISSOLVED ORGANIC-D-mg/l	-0.421	0.58	0.246	-0.352	0.589	-0.429	0.063	0.123
CHLORIDE-D-mg/l	0.723	0.217	0.043	0.786	0.129	-0.21	-0.292	-0.184
CHROMIUM-D-mg/l	-0.362	0.062	-0.604	-0.57	-0.116	0.453	-0.399	0.037
CHROMIUM-T-mg/l	-0.629	0.646	0.053	-0.608	0.426	0.587	0.092	-0.027
COBALT-D-mg/l	0.216	0.469	-0.463	0.184	0.302	0.583	-0.347	0.389
COBALT-T-mg/l	-0.029	0.781	-0.194	0.175	0.612	0.502	-0.246	0.35
CONDUCTIVITY, LAB-N-us/cm	0.956	0.129	0.01	0.96	0.017	0.138	0.192	0.064
COPPER-D-mg/l	-0.138	0.168	-0.074	-0.174	0.47	-0.026	-0.03	-0.582
COPPER-T-mg/l	-0.456	0.745	0.065	-0.525	0.119	0.335	-0.195	0.187
FLUORIDE-D-mg/l	0.319	-0.369	0.264	0.194	-0.334	0.245	0.357	-0.535
Hardness, Total or Dissolved CaCO3-N-mg/l	0.947	0.107	-0.015	0.954	-0.029	0.158	0.184	0.104
IRON-D-mg/l	-0.094	0.469	-0.17	0.213	0.281	0.034	-0.165	-0.26
IRON-T-mg/l	-0.48	0.762	0.24	-0.253	0.802	0.342	0.335	-0.072
LEAD-D-mg/l	0.044	0.455	-0.333	0.122	0.3	0.014	0.396	-0.106
LEAD-T-mg/l	-0.463	0.752	0.174	-0.338	0.6	0.356	0.393	0.04
LITHIUM-D-mg/l	0.891	0.24	0.218	0.925	0.091	-0.019	0.112	-0.068
LITHIUM-T-mg/l	0.882	0.279	0.23	0.924	0.104	-0.002	0.118	-0.078
MAGNESIUM-T-mg/l	0.932	0.156	0.04	0.945	0.005	0.138	0.205	0.079
MANGANESE-D-mg/l	0.414	0.484	0.019	0.726	0.305	0.257	-0.045	0.081
MANGANESE-T-mg/l	-0.151	0.753	0.245	0.269	0.75	0.368	0.272	-0.15
MERCURY-D-mg/l	0.012	-0.051	-0.176	n/a	n/a	n/a	n/a	n/a
MERCURY-T-mg/l	-0.438	0.46	0.066	-0.529	0.767	-0.072	0.157	-0.101
MOLYBDENUM-D-mg/l	0.746	0.07	0.035	0.721	0.071	-0.321	-0.303	-0.257
MOLYBDENUM-T-mg/l	0.556	0.002	0.079	0.479	-0.086	-0.175	0.063	-0.215
NICKEL-D-mg/l	0.71	0.534	-0.136	0.756	0.446	0.057	-0.317	-0.049
NICKEL-T-mg/l	0.592	0.723	-0.037	0.749	0.519	0.102	-0.261	-0.033
NITRATE NITROGEN (NO3), AS N-N-mg/l	0.844	0.27	0.346	0.895	0.16	-0.121	0.268	0.001
NITRITE NITROGEN (NO2), AS N-N-mg/l	0.671	0.325	-0.053	0.618	0.281	-0.44	0.037	0.353
NITROGEN, AMMONIA (AS N)-N-mg/l	0.315	0.116	-0.179	0.363	0.358	-0.183	0.007	0.042
ORTHO-PHOSPHATE-N-mg/l	-0.331	0.251	0.211	-0.159	0.173	-0.675	-0.381	0.17
pH, LAB-N-ph units	0.104	-0.084	0.143	0.185	-0.029	0.052	0.163	0.615
PHOSPHORUS-N-mg/l	-0.497	0.719	0.303	-0.263	0.793	-0.176	0.232	0.147
POTASSIUM-T-mg/l	0.82	0.492	0.179	0.916	0.302	-0.103	0.086	0.154
SELENIUM-D-mg/l	0.834	0.182	0.35	0.887	0.076	-0.066	0.354	-0.006
SELENIUM-T-mg/l	0.834	0.184	0.347	0.887	0.071	-0.068	0.357	-0.005
SILVER-D-mg/l	0.078	0.43	-0.598	n/a	n/a	n/a	n/a	n/a
SILVER-T-mg/l	-0.35	0.651	0.072	-0.001	0.082	-0.006	-0.335	0.047
SODIUM-T-mg/l	0.696	0.345	-0.123	0.727	0.135	0.23	-0.383	-0.012
STRONTIUM-D-mg/l	0.469	0.072	-0.432	0.459	-0.137	0.646	-0.292	0.198
STRONTIUM-T-mg/l	0.47	0.081	-0.428	0.475	-0.157	0.642	-0.292	0.188
SULFATE (AS SO4)-D-mg/l	0.925	0.176	0.073	0.926	0.02	0.168	0.226	0.057
THALLIUM-D-mg/l	0.286	0.398	-0.633	0.179	-0.296	0.488	0.04	0.159
THALLIUM-T-mg/l	-0.255	0.853	-0.161	-0.064	0.397	0.367	-0.595	0.14
TIN-D-mg/l	0.061	0.334	-0.344	0.004	0.406	0.419	-0.001	0.028
TIN-T-mg/l	-0.104	0.284	-0.426	-0.25	0.022	0.085	-0.469	-0.301
TITANIUM-D-mg/l	0.035	0.08	-0.086	n/a	n/a	n/a	n/a	n/a
TITANIUM-T-mg/l	-0.148	0.518	-0.185	n/a	n/a	n/a	n/a	n/a
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	0.952	0.143	0.007	0.962	0.007	0.119	0.164	0.099
TOTAL KJELDAHL NITROGEN-N-mg/l	0.002	0.533	0.242	-0.206	0.468	0.147	0.234	-0.078
TOTAL ORGANIC CARBON-T-mg/l	-0.457	0.679	0.297	-0.337	0.709	-0.395	0.073	-0.043
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	-0.448	0.745	0.167	-0.414	0.654	0.302	0.439	0.097
TURBIDITY, LAB-N-ntu	-0.432	0.801	0.181	-0.391	0.815	0.228	0.288	-0.04
URANIUM-D-mg/l	0.916	0.117	0.059	0.914	-0.068	0.196	0.193	-0.071
URANIUM-T-mg/l	0.908	0.141	0.064	0.916	-0.065	0.208	0.183	-0.075
VANADIUM-D-mg/l	0.124	0.381	-0.335	0.179	0.293	-0.785	-0.211	0.205
VANADIUM-T-mg/l	-0.427	0.766	0.2	-0.112	0.59	-0.277	-0.015	0.201
ZINC-D-mg/l	0.302	0.293	-0.068	0.554	0.156	0.023	-0.525	-0.532
ZINC-T-mg/l	-0.014	0.69	0.11	0.295	0.28	0.108	-0.326	-0.671

Notes:

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; ntu = nephelometric turbidity units; PC = principle component; "-T-" = total concentration; µg/l = micrograms per litre.

n/a = parameter not included in analysis because concentrations were the same in all samples.

PCA scores for each test are provided in Appendix D.

Shaded value = component loading not between -0.6 and 0.6.

Table E-5: PCA Results for *P. promelas* Tests

	2015 to 2019 Dataset				2019 Dataset				
	PC1	**PC2**	**PC3**	**PC4**	**PC1**	**PC2**	**PC3**	**PC4**	**PC5**
Percent of Total Variance Explained									
	32.1	17.3	10.7	7.4	37.3	15.1	12.3	8.2	6.72
Component Loadings by Water Quality Parameter									
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	0.78	-0.459	0.07	0.091	0.835	-0.298	0.239	-0.027	0.165
ALUMINUM-D-mg/l	-0.149	0.63	-0.074	0.055	-0.276	0	-0.461	0.643	0.273
ALUMINUM-T-mg/l	0.211	0.784	-0.444	-0.047	0.407	0.118	-0.538	0.436	0.277
ANTIMONY-D-mg/l	0.85	0.067	0.047	-0.137	0.739	0.271	-0.17	0.07	-0.425
ANTIMONY-T-mg/l	0.863	0.068	0.006	-0.111	0.744	0.283	-0.152	0.073	-0.403
ARSENIC-D-mg/l	0.253	0.436	0.306	-0.281	0.151	0.495	-0.355	-0.238	-0.512
ARSENIC-T-mg/l	0.259	0.757	-0.054	-0.226	0.188	0.386	-0.505	-0.125	-0.472
BARIUM-D-mg/l	0.231	-0.41	-0.255	0.212	0.299	0.818	-0.27	-0.249	0.11
BARIUM-T-mg/l	0.27	-0.364	-0.277	0.229	0.312	0.819	-0.273	-0.237	0.085
BERYLLIUM-D-mg/l	0.151	0.445	0.485	0.427	-0.621	0.676	0.301	0.196	0.133
BERYLLIUM-T-mg/l	0.157	0.697	0.011	0.242	-0.227	0.322	0.376	-0.622	0.028
BISMUTH-D-mg/l	0.218	0.405	0.741	0.413	-0.621	0.676	0.301	0.196	0.133
BISMUTH-T-mg/l	0.188	0.346	0.693	0.394	-0.621	0.676	0.301	0.196	0.133
BORON-D-mg/l	0.456	0.233	0.533	-0.555	0.04	0.019	0.478	0.547	-0.534
BORON-T-mg/l	0.472	0.218	0.394	-0.549	0.252	0.154	0.234	0.417	-0.383
BROMIDE-D-mg/l	0.618	-0.299	0.142	0.123	0.613	-0.052	0.376	0.426	-0.035
CADMIUM-D-mg/l	0.667	0.136	-0.377	0.104	0.697	0.411	0.244	0.296	0.047
CADMIUM-T-mg/l	0.654	0.31	-0.478	0.116	0.717	0.401	0.164	0.281	0.11
CALCIUM-T-mg/l	0.897	-0.353	0.039	0.111	0.942	-0.127	0.214	-0.016	0.139
CARBON, DISSOLVED ORGANIC-D-mg/l	0.265	0.666	-0.313	0.116	0.47	0.254	-0.765	-0.101	0.126
CHLORIDE-D-mg/l	0.807	-0.249	0.02	-0.052	0.813	0.404	0.256	0.169	0.043
CHROMIUM-D-mg/l	-0.375	0.283	0.552	-0.199	-0.769	-0.348	0.267	0.186	-0.099
CHROMIUM-T-mg/l	-0.007	0.783	-0.294	-0.132	-0.215	-0.667	-0.17	0.521	0.097
COBALT-D-mg/l	0.525	0.323	0.299	-0.607	0.328	0.107	0.295	0.359	-0.549
COBALT-T-mg/l	0.545	0.437	0.166	-0.583	0.469	0.172	0.313	0.308	-0.561
CONDUCTIVITY, LAB-N-us/cm	0.918	-0.317	0.006	0.125	0.946	-0.061	0.194	-0.025	0.171
COPPER-D-mg/l	-0.112	-0.003	0.367	0.23	-0.621	0.676	0.301	0.196	0.133
COPPER-T-mg/l	0.103	0.307	0.098	0.358	-0.315	-0.099	0.714	-0.149	0.071
FLUORIDE-D-mg/l	0.084	-0.359	-0.162	0.39	-0.202	-0.097	0.408	-0.182	0.52
Hardness, Total or Dissolved CaCO3-N-mg/l	0.903	-0.328	0.008	0.131	0.943	-0.128	0.179	-0.041	0.174
IRON-D-mg/l	0.04	0.537	0.41	0.344	-0.411	0.225	-0.383	0.636	0.287
IRON-T-mg/l	0.284	0.759	-0.468	0.039	0.538	-0.009	-0.205	0.566	0.406
LEAD-D-mg/l	0.233	0.337	0.631	0.42	-0.621	0.676	0.301	0.196	0.133
LEAD-T-mg/l	0.144	0.814	-0.3	0.003	0.054	-0.595	-0.006	0.632	-0.048
LITHIUM-D-mg/l	0.9	-0.237	-0.096	0.14	0.884	0.147	0.287	-0.078	0.128
LITHIUM-T-mg/l	0.906	-0.222	-0.095	0.139	0.89	0.136	0.285	-0.07	0.128
MAGNESIUM-T-mg/l	0.912	-0.301	-0.011	0.157	0.931	-0.083	0.191	-0.072	0.2
MANGANESE-D-mg/l	0.77	0.094	-0.176	-0.17	0.735	0.101	0.318	0.309	0.092
MANGANESE-T-mg/l	0.639	0.386	-0.363	-0.118	0.698	0.172	0.145	0.36	0.195
MERCURY-D-mg/l	-0.195	0.005	0.063	0.377	-0.621	0.676	0.301	0.196	0.133
MERCURY-T-mg/l	0.172	0.694	-0.435	-0.017	0.331	0.163	-0.599	0.341	-0.203
MOLYBDENUM-D-mg/l	0.719	-0.26	-0.013	-0.147	0.747	0.327	0.229	0.112	-0.276
MOLYBDENUM-T-mg/l	0.486	-0.303	-0.032	-0.008	0.426	0.233	0.277	-0.157	0.179
NICKEL-D-mg/l	0.929	0.117	0.115	-0.216	0.919	0.094	0.072	0.119	-0.3
NICKEL-T-mg/l	0.937	0.164	0.072	-0.195	0.931	0.129	0.085	0.085	-0.257
NITRATE NITROGEN (NO3), AS N-N-mg/l	0.866	-0.221	-0.204	0.29	0.844	0.324	0.075	-0.149	0.273
NITRITE NITROGEN (NO2), AS N-N-mg/l	0.865	-0.053	-0.027	-0.14	0.767	0.435	-0.192	-0.133	-0.168
NITROGEN, AMMONIA (AS N)-N-mg/l	0.358	0.04	0.093	-0.364	0.353	0.46	-0.233	-0.097	0.113
ORTHO-PHOSPHATE-N-mg/l	-0.226	0.269	-0.209	-0.168	0.057	0.28	-0.41	0.188	-0.145
pH, LAB-N-ph units	-0.225	-0.053	-0.288	0.002	-0.221	0.185	-0.113	-0.358	0.084
PHOSPHORUS-N-mg/l	0.136	0.704	-0.47	-0.028	0.361	0.501	-0.614	0.133	-0.126
POTASSIUM-T-mg/l	0.97	-0.094	-0.068	0.088	0.943	0.266	0.019	-0.09	0.011
SELENIUM-D-mg/l	0.806	-0.299	-0.256	0.396	0.845	0.127	0.087	-0.267	0.415
SELENIUM-T-mg/l	0.808	-0.296	-0.246	0.403	0.845	0.132	0.095	-0.272	0.408
SILVER-D-mg/l	0.272	0.368	0.737	0.384	-0.349	0.553	0.622	-0.283	-0.08
SILVER-T-mg/l	0.11	0.578	0.211	0.397	-0.491	0.336	-0.281	0.607	0.283
SODIUM-T-mg/l	0.695	0.004	0.257	-0.43	0.577	0.306	0.531	0.252	-0.129
STRONTIUM-D-mg/l	0.531	-0.151	0.425	-0.574	0.246	-0.294	0.709	0.148	-0.365
STRONTIUM-T-mg/l	0.533	-0.156	0.434	-0.561	0.223	-0.298	0.709	0.144	-0.367
SULFATE (AS SO4)-D-mg/l	0.912	-0.287	-0.025	0.144	0.89	-0.007	0.22	-0.031	0.285
THALLIUM-D-mg/l	0.643	0.163	0.47	-0.214	0.711	-0.409	-0.302	-0.19	-0.289
THALLIUM-T-mg/l	0.587	0.597	0.123	-0.238	0.652	-0.352	-0.182	-0.238	-0.427
TIN-D-mg/l	0.235	0.415	0.734	0.424	-0.621	0.676	0.301	0.196	0.133
TIN-T-mg/l	0.157	0.39	0.595	0.241	-0.366	0.313	0.025	0.212	-0.25
TITANIUM-D-mg/l	-0.175	0.226	0.301	0.249	-0.621	0.676	0.301	0.196	0.133
TITANIUM-T-mg/l	-0.071	0.351	0.23	0.131	-0.595	0.609	0.428	-0.26	-0.019
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	0.912	-0.323	0.012	0.125	0.945	-0.088	0.187	-0.034	0.176
TOTAL KJELDAHL NITROGEN-N-mg/l	0.692	0.039	-0.238	0.161	0.57	0.467	-0.147	-0.132	0.214
TOTAL ORGANIC CARBON-T-mg/l	0.29	0.676	-0.387	0.175	0.469	0.295	-0.652	0.043	0.101
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	0.312	0.704	-0.346	0.125	0.547	-0.203	-0.235	0.224	0.276
TURBIDITY, LAB-N-ntu	0.403	0.634	-0.427	0.074	0.603	0.015	-0.333	0.406	0.199
URANIUM-D-mg/l	0.889	-0.303	-0.038	0.146	0.853	-0.091	0.287	-0.115	0.242
URANIUM-T-mg/l	0.891	-0.295	-0.035	0.15	0.852	-0.089	0.301	-0.108	0.233
VANADIUM-D-mg/l	0.288	0.28	0.454	0.331	0.096	0.774	-0.131	-0.366	-0.321
VANADIUM-T-mg/l	0.187	0.792	-0.302	0.134	0.154	0.651	-0.644	0.025	-0.196
ZINC-D-mg/l	0.358	0.268	0.072	-0.007	0.408	0.312	0.356	0.324	-0.225
ZINC-T-mg/l	0.32	0.592	-0.164	-0.049	0.171	-0.107	0.142	0.453	0.306

Notes:

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; ntu = nephelometric turbidity units; PC = principle component; "-T-" = total concentration; µg/l = micrograms per litre.

n/a = parameter not included in analysis because concentrations were the same in all samples.

PCA scores for each test are provided in Appendix D.

Shaded value = component loading not between -0.6 and 0.6.

APPENDIX F

Spearman Rank Correlation Analyses

Table F-1: Spearman Rank Order Correlation for *C. dubia* Survival and Reproduction

Parameter	Survival Rs[1]		Reproduction Rs[1]		Is parameter greater than the chronic BC WQG or lowest L1 benchmark from EVWQP in at least one test categorized as possible or likely?[2]	Retain Parameter for Concentration-Response Analysis?[3]	
	2015 to 2019 Dataset	2019 Dataset	2015 to 2019 Dataset	2019 Dataset		Survival	Reproduction
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	-0.007	0.061	**-0.218**	-0.164	No WQG	-	No - parameter included in TDS
ALUMINUM-D-mg/l	0.053	-0.017	**-0.197**	-0.236	No	-	-
ANTIMONY-T-mg/l	-0.011	-0.099	**-0.314**	0.023	No	-	-
ARSENIC-T-mg/l	0.032	-0.190	**-0.229**	-0.061	No	-	-
BARIUM-T-mg/l	0.166	0.156	0.032	0.055	-	-	-
BERYLLIUM-T-mg/l	0.288	-0.247	0.106	-0.215	-	-	-
BISMUTH-T-mg/l	0.147	-0.247	0.011	-0.215	-	-	-
BORON-T-mg/l	-0.034	-0.124	**-0.220**	-0.154	No	-	-
BROMIDE-D-mg/l	0.106	-0.082	-0.093	-0.230	-	-	-
CADMIUM-D-mg/l	0.066	0.128	**-0.213**	0.060	No	Yes	Yes
CALCIUM-T-mg/l	0.002	0.042	**-0.233**	-0.165	No WQG	-	No - parameter included in TDS
CARBON, DISSOLVED ORGANIC-D-mg/l	-0.040	-0.062	**-0.193**	-0.248	No WQG	-	Yes
CHLORIDE-D-mg/l	0.064	-0.006	-0.148	0.079	-	-	-
CHROMIUM-T-mg/l	0.003	-0.111	-0.108	-0.077	-	-	-
COBALT-T-mg/l	-0.145	-0.131	**-0.471**	-0.146	No	-	-
CONDUCTIVITY, LAB-N-us/cm	-0.003	0.053	**-0.286**	-0.214	No WQG	-	No - parameter included in TDS
COPPER-D-mg/l	0.141	0.156	-0.051	**-0.346**	No	-	-
FLUORIDE-D-mg/l	0.060	0.059	0.051	0.061	-	-	-
Hardness, Total or Dissolved CaCO3-N-mg/l	-0.012	0.037	**-0.245**	-0.165	No WQG	-	No - parameter included in TDS
IRON-D-mg/l	0.016	-0.247	-0.162	-0.215	-	-	-
IRON-T-mg/l	-0.055	-0.058	**-0.245**	-0.158	No	-	-
LEAD-T-mg/l	-0.035	-0.047	**-0.271**	-0.154	No	-	-
LITHIUM-T-mg/l	-0.014	0.001	**-0.308**	-0.102	No WQG	-	Yes
MAGNESIUM-T-mg/l	-0.002	0.027	**-0.259**	-0.171	No WQG	-	No - parameter included in TDS
MANGANESE-T-mg/l	-0.128	-0.117	**-0.336**	-0.018	No	-	-
MERCURY-T-mg/l	0.184	-0.125	0.043	-0.009	-	-	-
MOLYBDENUM-T-mg/l	-0.044	-0.092	**-0.260**	0.105	No	-	-
NICKEL-T-mg/l	-0.065	-0.172	**-0.421**	0.046	Yes	-	Yes
NITRATE NITROGEN (NO3), AS N-N-mg/l	-0.017	-0.015	**-0.273**	-0.072	Yes	Yes	Yes
NITRITE NITROGEN (NO2), AS N-N-mg/l	-0.001	-0.123	**-0.302**	-0.149	No	-	-
NITROGEN, AMMONIA (AS N)-N-mg/l	**-0.271**	-0.124	**-0.175**	0.118	No	-	-
ORTHO-PHOSPHATE-N-mg/l	0.109	0.112	0.067	-0.049	-	-	-
pH, LAB-N-ph units	0.062	-0.102	0.016	0.057	-	-	-
PHOSPHORUS-N-mg/l	-0.083	-0.102	-0.149	**-0.322**	No WQG	-	Yes
POTASSIUM-T-mg/l	-0.044	-0.115	**-0.339**	-0.055	No WQG	-	No - parameter included in TDS
SELENIUM-T-mg/l	0.003	0.008	**-0.213**	-0.080	Yes	Yes	Yes
SILVER-T-mg/l	0.008	-0.247	**-0.183**	-0.215	No	-	-
SODIUM-T-mg/l	-0.021	0.042	**-0.247**	-0.004	No WQG	-	No - parameter included in TDS
STRONTIUM-T-mg/l	-0.119	-0.090	**-0.227**	-0.028	No WQG	-	Yes
SULFATE (AS SO4)-D-mg/l	-0.017	0.046	**-0.293**	-0.187	Yes	Yes	Yes
THALLIUM-T-mg/l	-0.130	-0.301	**-0.429**	0.093	No	-	-
TIN-T-mg/l	0.088	-0.036	-0.043	-0.187	-	-	-
TITANIUM-T-mg/l	0.140	-	0.017	-	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-	-0.023	0.037	**-0.265**	-0.166	No WQG	-	Yes
TOTAL KJELDAHL NITROGEN-N-mg/l	-0.106	-0.037	**-0.234**	0.099	No WQG	-	Yes
TOTAL ORGANIC CARBON-T-mg/l	-0.106	-0.220	**-0.224**	-0.208	No WQG	-	Yes
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	-0.113	-0.165	**-0.252**	-0.084	No WQG	-	Yes
TURBIDITY, LAB-N-ntu	-0.104	-0.093	**-0.306**	-0.255	No WQG	-	Yes
URANIUM-T-mg/l	-0.033	0.032	**-0.290**	-0.120	Yes	-	Yes
VANADIUM-T-mg/l	0.009	-0.217	**-0.184**	0.112	No WQG	-	Yes
ZINC-T-mg/l	0.006	0.004	**-0.240**	-0.033	No	-	-
∑TU-WQGs	-0.060	-0.090	**-0.397**	-0.092	No WQG	-	Yes
∑TU-WQGs/Benchmarks	-0.049	-0.158	**-0.437**	-0.047	No WQG	-	Yes
PC1 (all years)	-0.025	-	**-0.353**	-	No WQG	-	Yes
PC2 (all years)	-0.015	-	**-0.178**	-	No WQG	-	Yes
PC3 (all years)	**-0.188**	-	**-0.273**	-	No WQG	Yes	Yes
PC4 (all years)	**0.211**	-	0.094	-	No WQG	Yes	-
PC5 (all years)	0.012	-	-0.113	-	-	-	-
PC1 (2019)	-	-0.064	-	-0.057	-	-	-
PC2 (2019)	-	0.053	-	0.116	-	-	-
PC3 (2019)	-	-0.216	-	-0.111	-	-	-
PC4 (2019)	-	0.053	-	0.141	-	-	-

Notes:

(1) Statistical significance is based on one-tailed comparisons. Significant negative correlations for combined dataset ($\alpha < 0.005$; $rs < -0.167$) and 2019 dataset ($\alpha < 0.005$; $rs < -0.321$) are bolded. Strong negative correlations ($rs < -0.4$) are shaded. - = rs could not be calculated because parameter concentration was the same in all tests or parameter was not applicable to the dataset. Principle components with significant positive correlations are bolded ($\alpha < 0.005$; combined dataset: $rs > 0.167$; 2019 dataset: $rs > 0.321$); principle components with strong positive correlations are shaded ($\alpha < 0.005$; $rs > 0.4$).

(2) Parameters are screeened against BC WQGs in Appendix C.

(3) Parameters were retained for graphical analysis if they met one of the following conditions: 1) order constituent, 2) significant negative correlation and concentration was greater than the chronic BC WQG, or 3) significant negative correlation and there is no chronic BC WQG.

Abbreviations

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; "-T-" = total concentration; µg/l = micrograms per litre; WQG = water quality guideline.

Table F-2: Spearman Rank Order Correlation for *P. subcapitata* Cell Yield

Constituent	Rs[1]		Is parameter greater than the chronic BC WQG or lowest L1 benchmark from EVWQP in at least one test categorized as possible or likely?[2]	Retain Constituent for Graphical Analysis?[3]
	2015 to 2019 Dataset	2019 Dataset		
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	-0.075	-0.122	-	-
ALUMINUM-D-mg/l	0.080	0.260	-	-
ANTIMONY-T-mg/l	-0.020	-0.015	-	-
ARSENIC-T-mg/l	0.071	0.249	-	-
BARIUM-T-mg/l	0.073	0.107	-	-
BERYLLIUM-T-mg/l	-0.055	-0.222	-	-
BISMUTH-T-mg/l	-0.168	-0.222	-	-
BORON-T-mg/l	-0.018	-0.040	-	-
BROMIDE-D-mg/l	-0.051	0.056	-	-
CADMIUM-D-mg/l	-0.034	-0.011	-	Yes
CALCIUM-T-mg/l	-0.078	-0.005	-	-
CARBON, DISSOLVED ORGANIC-D-mg/l	0.018	-0.144	-	-
CHLORIDE-D-mg/l	-0.046	0.054	-	-
CHROMIUM-T-mg/l	0.074	-0.070	-	-
COBALT-T-mg/l	-0.072	0.080	-	-
CONDUCTIVITY, LAB-N-us/cm	-0.056	-0.043	-	-
COPPER-D-mg/l	**-0.214**	**-0.419**	No	-
FLUORIDE-D-mg/l	**-0.202**	-0.094	No	-
Hardness, Total or Dissolved CaCO3-N-mg/l	-0.082	-0.017	-	-
IRON-D-mg/l	0.066	-0.222	-	-
IRON-T-mg/l	0.108	0.339	-	-
LEAD-T-mg/l	0.058	0.084	-	-
LITHIUM-T-mg/l	-0.082	-0.016	-	-
MAGNESIUM-T-mg/l	-0.077	0.009	-	-
MANGANESE-T-mg/l	0.023	0.115	-	-
MERCURY-T-mg/l	0.113	0.260	-	-
MOLYBDENUM-T-mg/l	-0.142	-0.137	-	-
NICKEL-T-mg/l	-0.054	-0.025	-	-
NITRATE NITROGEN (NO3), AS N-N-mg/l	-0.081	0.036	-	Yes
NITRITE NITROGEN (NO2), AS N-N-mg/l	-0.046	-0.086	-	-
NITROGEN, AMMONIA (AS N)-N-mg/l	-0.146	0.070	-	-
ORTHO-PHOSPHATE-N-mg/l	0.128	-0.056	-	-
pH, LAB-N-ph units	0.034	0.036	-	-
PHOSPHORUS-N-mg/l	0.111	0.242	-	-
POTASSIUM-T-mg/l	-0.043	-0.006	-	-
SELENIUM-T-mg/l	-0.093	0.001	-	Yes
SILVER-T-mg/l	-0.018	-0.222	-	-
SODIUM-T-mg/l	0.021	0.117	-	-
STRONTIUM-T-mg/l	-0.037	-0.033	-	-
SULFATE (AS SO4)-D-mg/l	-0.055	0.045	-	Yes
THALLIUM-T-mg/l	-0.024	0.018	-	-
TIN-T-mg/l	-0.076	0.078	-	-
TITANIUM-T-mg/l	-0.044	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N	-0.066	0.015	-	-
TOTAL KJELDAHL NITROGEN-N-mg/l	0.083	-0.045	-	-
TOTAL ORGANIC CARBON-T-mg/l	0.022	-0.185	-	-
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	0.097	0.246	-	-
TURBIDITY, LAB-N-ntu	0.057	0.072	-	-
URANIUM-T-mg/l	-0.119	-0.021	-	-
VANADIUM-T-mg/l	-0.049	0.108	-	-
ZINC-T-mg/l	-0.059	0.057	-	-
∑TU-WQGs	**-0.240**	-0.072	No WQG	Yes
∑TU-WQGs/Benchmarks	**-0.249**	-0.086	No WQG	Yes
PC1 (all years)	-0.081	-	-	-
PC2 (all years)	0.060	-	-	-
PC3 (all years)	0.069	-	-	-
PC4 (all years)	-0.023	-	-	-
PC5 (all years)	0.005	-	-	-
PC1 (2019)	-	0.005	-	-
PC2 (2019)	-	0.043	-	-
PC3 (2019)	-	0.071	-	-
PC4 (2019)	-	-0.188	-	-

Notes:

(1) Statistical significance is based on one-tailed comparisons. Significant negative correlations for combined dataset ($\alpha < 0.005$; $rs < -0.169$) and 2019 dataset ($\alpha < 0.005$; $rs < -0.331$) are bolded. Strong negative correlations ($rs < -0.4$) are shaded. - = rs could not be calculated because parameter concentration was the same in all tests or parameter was not applicable to the dataset. Principle components with significant positive correlations are bolded ($\alpha < 0.005$; combined dataset: $rs > 0.169$; 2019 dataset: $rs > 0.331$); principle components with strong positive correlations are shaded ($\alpha < 0.005$; $rs > 0.4$).

(2) Parameters are screeened against BC WQGs in Appendix C.

(3) Parameters were retained for graphical analysis if they met one of the following conditions: 1) order constituent, 2) significant negative correlation and concentration was greater than the chronic BC WQG, or 3) significant negative correlation and there is no chronic BC WQG.

Abbreviations

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; "-T-" = total concentration; µg/l = micrograms per litre; WQG = water quality guideli

Table F-3: Spearman Rank Order Correlation for *H.azteca* Survival and Dry Weight

Parameter	Survival Rs[1]		Dry Weight Rs[1]		Is parameter greater than the chronic BC WQG or lowest L1 benchmark from EVWQP in at least one test categorized as possible or likely?[2]	Retain Parameter for Concentration-Response Analysis?[3]	
	2015 to 2019 Dataset	2019 Dataset	2015 to 2019 Dataset	2019 Dataset		Survival	Dry Weight
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	**-0.262**	-0.198	**-0.340**	-0.188	No WQG	No - parameter included in TDS	
ALUMINUM-D-mg/l	0.258	-0.239	0.204	0.002	-	-	-
ANTIMONY-T-mg/l	-0.191	-0.153	**-0.284**	-0.267	No	-	-
ARSENIC-T-mg/l	0.002	0.087	-0.016	-0.024	-	-	-
BARIUM-T-mg/l	-0.018	0.036	-0.112	-0.055	-	-	-
BERYLLIUM-T-mg/l	0.178	0.115	0.022	-0.030	-	-	-
BISMUTH-T-mg/l	-0.062	0.181	-0.116	0.049	-	-	-
BORON-T-mg/l	**-0.268**	0.002	**-0.309**	-0.113	No	-	-
BROMIDE-D-mg/l	-0.083	-0.339	-0.155	-0.262	-	-	-
CADMIUM-D-mg/l	-0.075	-0.146	-0.096	-0.155	-	Yes	Yes
CALCIUM-T-mg/l	**-0.282**	-0.266	**-0.379**	-0.292	No WQG	No - parameter included in TDS	
CARBON, DISSOLVED ORGANIC-D-mg/l	0.231	0.077	0.177	-0.035	-	-	-
CHLORIDE-D-mg/l	**-0.303**	-0.319	**-0.383**	-0.295	No	-	-
CHROMIUM-T-mg/l	0.042	-0.006	-0.042	0.039	-	-	-
COBALT-T-mg/l	-0.093	-0.029	**-0.252**	**-0.437**	No	-	-
CONDUCTIVITY, LAB-N-us/cm	**-0.282**	-0.258	**-0.371**	-0.274	No WQG	No - parameter included in TDS	
COPPER-D-mg/l	0.159	-0.001	0.084	0.072	-	-	-
FLUORIDE-D-mg/l	0.065	0.036	0.125	0.106	-	-	-
Hardness, Total or Dissolved CaCO3-N-mg/l	**-0.273**	-0.250	**-0.362**	-0.251	No WQG	No - parameter included in TDS	
IRON-D-mg/l	0.075	-0.044	0.135	0.066	-	-	-
IRON-T-mg/l	0.160	-0.199	0.143	-0.067	-	-	-
LEAD-T-mg/l	0.170	-0.309	0.152	0.030	-	-	-
LITHIUM-T-mg/l	-0.192	-0.244	**-0.242**	-0.126	No WQG	-	Yes
MAGNESIUM-T-mg/l	**-0.258**	-0.235	**-0.338**	-0.231	No WQG	No - parameter included in TDS	
MANGANESE-T-mg/l	0.002	-0.180	-0.052	-0.208	-	-	-
MERCURY-T-mg/l	0.169	-0.023	0.157	0.042	-	-	-
MOLYBDENUM-T-mg/l	**-0.329**	-0.394	**-0.379**	-0.393	No	-	-
NICKEL-T-mg/l	-0.180	-0.115	**-0.300**	-0.318	Yes	-	Yes
NITRATE NITROGEN (NO3), AS N-N-mg/l	-0.149	-0.294	**-0.229**	-0.205	Yes	Yes	Yes
NITRITE NITROGEN (NO2), AS N-N-mg/l	-0.174	-0.081	**-0.339**	-0.246	No	-	-
NITROGEN, AMMONIA (AS N)-N-mg/l	**-0.237**	-0.011	**-0.248**	-0.078	No	-	-
ORTHO-PHOSPHATE-N-mg/l	0.110	-0.077	0.191	0.116	-	-	-
pH, LAB-N-ph units	0.231	0.347	0.252	0.243	-	-	-
PHOSPHORUS-N-mg/l	0.129	-0.301	0.142	-0.180	-	-	-
POTASSIUM-T-mg/l	-0.208	-0.200	**-0.274**	-0.290	No WQG	-	No - parameter included in TDS
SELENIUM-T-mg/l	-0.144	-0.263	-0.198	-0.104	-	Yes	Yes
SILVER-T-mg/l	0.188	0.079	0.203	-0.022	-	-	-
SODIUM-T-mg/l	**-0.340**	-0.120	**-0.363**	-0.147	No WQG	No - parameter included in TDS	
STRONTIUM-T-mg/l	**-0.360**	-0.144	**-0.470**	-0.264	No WQG	Yes	Yes
SULFATE (AS SO4)-D-mg/l	**-0.282**	-0.236	**-0.374**	-0.267	Yes	Yes	Yes
THALLIUM-T-mg/l	-0.033	-0.023	-0.139	-0.191	-	-	-
TIN-T-mg/l	0.054	0.265	-0.110	-0.017	-	-	-
TITANIUM-T-mg/l	0.165	0.259	0.004	0.142	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	**-0.280**	-0.265	**-0.370**	-0.272	No WQG	Yes	Yes
TOTAL KJELDAHL NITROGEN-N-mg/l	0.049	0.256	-0.122	-0.077	-	-	-
TOTAL ORGANIC CARBON-T-mg/l	0.243	0.057	0.274	0.153	-	-	-
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	0.192	0.013	0.168	0.024	-	-	-
TURBIDITY, LAB-N-ntu	0.123	-0.085	0.074	-0.091	-	-	-
URANIUM-T-mg/l	**-0.253**	-0.291	**-0.334**	-0.263	No	-	-
VANADIUM-T-mg/l	0.202	-0.083	0.097	-0.184	-	-	-
ZINC-T-mg/l	-0.093	**-0.475**	0.092	-0.109	No	-	-
∑TU-WQGs	**-0.224**	-0.304	**-0.285**	-0.342	No WQG	Yes	Yes
∑TU-WQGs/Benchmarks	**-0.234**	-0.304	**-0.305**	**-0.404**	No WQG	Yes	Yes
PC1 (all years)	**-0.301**	-	**-0.412**	-	No WQG	Yes	Yes
PC2 (all years)	0.117	-	0.089	-	-	-	-
PC3 (all years)	**0.240**	-	**0.257**	-	No WQG	Yes	Yes
PC4 (all years)	0.030	-	0.198	-	-	-	-
PC1 (2019)	-	-0.294	-	-0.349	-	-	-
PC2 (2019)	-	-0.084	-	-0.200	-	-	-
PC3 (2019)		-0.003		0.207	-	-	-
PC4 (2019)	-	0.116	-	-0.150	-	-	-
PC5 (2019)		-0.220		-0.097	-	-	-
PC6 (2019)	-	0.284	-	0.077	-	-	-

Notes:

(1) Statistical significance is based on one-tailed comparisons. Significant negative correlations for combined dataset ($\alpha < 0.005$; $rs < -0.224$) and 2019 dataset ($\alpha < 0.005$; $rs < -0.405$) are bolded. Strong negative correlations ($rs < -0.4$) are shaded. - = rs could not be calculated because parameter concentration was the same in all tests or parameter was not applicable to the dataset. Principle components with significant positive correlations are bolded ($\alpha < 0.005$; combined dataset: $rs > 0.224$; 2019 dataset: $rs > 0.405$); principle components with strong positive correlations are shaded ($\alpha < 0.005$; $rs > 0.4$).

(2) Parameters are screeened against chronic BC WQGs in Appendix C.

(3) Parameters were retained for graphical analysis if they met one of the following conditions: 1) order constituent, 2) significant negative correlation and concentration was greater than the chronic BC WQG, or 3) significant negative correlation and there is no chronic BC WQG.

Abbreviations

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; "-T-" = total concentration; ug/l = micrograms per litre.

Table F-4: Spearman Rank Order Correlation for *O. mykiss* Survival and Reproduction

Parameter	Survival Rs[1]		Viability Rs[1]		Is parameter greater than the chronic BC WQG or lowest L1 benchmark from EVWQP in at least one test categorized as possible or likely?[2]	Retain Parameter for Concentration-Response Analysis?[3]	
	2015 to 2019 Dataset	2019 Dataset	2015 to 2019 Dataset	2019 Dataset		Survival	Viability
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	**-0.454**	**-0.568**	**-0.486**	**-0.650**	No WQG	No - parameter included in TDS	
ALUMINUM-D-mg/l	0.078	0.034	0.152	0.089	-	-	-
ANTIMONY-T-mg/l	-0.224	-0.321	-0.209	-0.284	-	-	-
ARSENIC-T-mg/l	0.091	-0.154	0.172	-0.011	-	-	-
BARIUM-T-mg/l	**-0.340**	**-0.601**	**-0.313**	**-0.614**	No	-	-
BERYLLIUM-T-mg/l	-0.120	-0.175	-0.082	-0.173	-	-	-
BISMUTH-T-mg/l	-0.205	-	-0.187	-	-	-	-
BORON-T-mg/l	-0.188	-0.196	-0.196	-0.247	-	-	-
BROMIDE-D-mg/l	**-0.339**	-0.143	**-0.333**	-0.245	No WQG	Low detection frequency[4]	
CADMIUM-D-mg/l	-0.113	-0.467	-0.130	-0.362	No	Yes	Yes
CALCIUM-T-mg/l	**-0.519**	**-0.664**	**-0.548**	**-0.713**	No WQG	No - parameter included in TDS	
CARBON, DISSOLVED ORGANIC-D-mg/l	0.139	-0.055	0.217	0.081	-	-	-
CHLORIDE-D-mg/l	**-0.356**	**-0.507**	**-0.376**	-0.436	No	-	-
CHROMIUM-T-mg/l	0.290	0.170	0.342	0.221	-	-	-
COBALT-T-mg/l	0.010	-0.323	0.070	-0.187	-	-	-
CONDUCTIVITY, LAB-N-us/cm	**-0.508**	**-0.664**	**-0.536**	**-0.684**	No WQG	No - parameter included in TDS	
COPPER-T-mg/l	0.170	0.314	0.240	0.356	-	-	-
FLUORIDE-D-mg/l	-0.025	0.116	-0.017	0.186	-	-	-
Hardness, Total or Dissolved CaCO3-N-mg/l	**-0.507**	**-0.660**	**-0.534**	**-0.691**	No WQG	No - parameter included in TDS	
IRON-D-mg/l	0.115	0.057	0.126	0.050	-	-	-
IRON-T-mg/l	0.123	-0.074	0.186	0.080	-	-	-
LEAD-T-mg/l	0.099	-0.176	0.177	-0.143	-	-	-
LITHIUM-T-mg/l	**-0.363**	**-0.617**	**-0.385**	**-0.611**	No WQG	Yes	Yes
MAGNESIUM-T-mg/l	**-0.489**	**-0.649**	**-0.515**	**-0.673**	No WQG	No - parameter included in TDS	
MANGANESE-T-mg/l	0.029	-0.284	0.075	-0.145	-	-	-
MERCURY-T-mg/l	0.086	0.147	0.179	0.328	-	-	-
MOLYBDENUM-T-mg/l	-0.174	-0.217	-0.213	-0.253	-	-	-
NICKEL-T-mg/l	-0.217	**-0.548**	-0.200	-0.444	Yes	Yes	Yes
NITRATE NITROGEN (NO3), AS N-N-mg/l	**-0.435**	**-0.658**	**-0.444**	**-0.613**	Yes	Yes	Yes
NITRITE NITROGEN (NO2), AS N-N-mg/l	**-0.523**	**-0.680**	**-0.480**	**-0.627**	No	-	-
NITROGEN, AMMONIA (AS N)-N-mg/l	0.116	-0.153	0.113	-0.180	-	-	-
ORTHO-PHOSPHATE-N-mg/l	0.226	0.188	0.279	0.168	-	-	-
pH, LAB-N-ph units	**-0.262**	-0.450	-0.201	-0.438	No	-	-
PHOSPHORUS-N-mg/l	0.117	-0.109	0.200	0.057	-	-	-
POTASSIUM-T-mg/l	**-0.431**	**-0.686**	**-0.427**	**-0.652**	No WQG	No - parameter included in TDS	
SELENIUM-T-mg/l	**-0.446**	**-0.672**	**-0.462**	**-0.660**	Yes	Yes	Yes
SILVER-T-mg/l	0.140	0.012	0.221	0.068	-	-	-
SODIUM-T-mg/l	-0.253	**-0.552**	**-0.309**	**-0.607**	No WQG	No - parameter included in TDS	
STRONTIUM-T-mg/l	-0.148	-0.172	-0.200	-0.306	-	-	-
SULFATE (AS SO4)-D-mg/l	**-0.480**	**-0.663**	**-0.509**	**-0.657**	No	Yes	Yes
THALLIUM-T-mg/l	0.045	-0.024	0.091	-0.011	-	-	-
TIN-T-mg/l	0.036	0.231	0.079	0.240	-	-	-
TITANIUM-T-mg/l	-0.111	-	-0.090	-	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	**-0.513**	**-0.684**	**-0.541**	**-0.704**	No WQG	Yes	Yes
TOTAL KJELDAHL NITROGEN-N-mg/l	0.051	0.016	0.119	0.209	-	-	-
TOTAL ORGANIC CARBON-T-mg/l	0.117	0.014	0.200	0.163	-	-	-
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	0.157	0.001	0.221	0.161	-	-	-
TURBIDITY, LAB-N-ntu	0.101	-0.042	0.171	0.176	-	-	-
URANIUM-T-mg/l	**-0.414**	**-0.573**	**-0.442**	**-0.564**	No	-	-
VANADIUM-T-mg/l	0.044	-0.319	0.133	-0.244	-	-	-
ZINC-T-mg/l	0.213	0.113	0.253	0.138	-	-	-
∑TU-WQGs	**-0.303**	**-0.622**	**-0.296**	**-0.558**	No WQG	Yes	Yes
∑TU-WQGs/Benchmarks	-0.148	**-0.480**	-0.140	-0.391	No WQG	Yes	-
PC1 (all years)	**-0.439**	-	**-0.484**	-	No WQG	Yes	Yes
PC2 (all years)	-0.051	-	0.010	-	-	-	-
PC3 (all years)	-0.077	-	-0.036	-	-	-	-
PC2 (2019)	-	**-0.603**	-	**-0.627**	No WQG	Yes	Yes
PC2 (2019)	-	-0.248	-	-0.058	-	-	-
PC3 (2019)	-	-0.064	-	-0.072	-	-	-
PC4 (2019)	-	-0.191	-	-0.105	-	-	-
PC5 (2019)	-	-0.341	-	-0.399	-	-	-

Notes:

(1) Statistical significance is based on one-tailed comparisons. Significant negative correlations for combined dataset ($\alpha < 0.005$; $rs < -0.26$) and 2019 dataset ($\alpha < 0.05$; $rs < -0.467$) are bolded. Strong correlations ($rs < -0.6$) are shaded. - = rs could not be calculated because parameter concentration was the same in all tests or parameter was not applicable to the dataset. Principle components with significant positive correlations are bolded ($\alpha < 0.005$; combined dataset: $rs > 0.26$; 2018 dataset: $rs > 0.467$); principle components with strong positive correlations are shaded ($\alpha < 0.005$; $rs > 0.6$).

(2) Parameters are screeened against BC WQGs in Appendix C.

(3) Parameters were retained for graphical analysis if they met one of the following conditions: 1) order constituent, 2) significant negative correlation and concentration was greater than the chronic BC WQG, or 3) significant negative correlation and there is no chronic BC WQG.

(4) Of 30 samples, one had detected concentrations of bromide (Table D-4).

Abbreviations

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; "-T-" = total concentration; ug/l = micrograms per litre.

Table F-5: Spearman Rank Order Correlation for *P. promelas* Survival and Biomass

Parameter	Survival Rs[1]		Biomass Rs[1]		Is parameter greater than the chronic BC WQG or lowest L1 benchmark from EVWQP in at least one test categorized as possible or likely?[2]	Retain Parameter for Concentration-Response Analysis?[3]	
	2015 to 2019 Dataset	2019 Dataset	2015 to 2019 Dataset	2019 Dataset		Survival	Biomass
ALKALINITY, TOTAL (As CaCO3), lab measured.-N-mg/l	-0.187	0.382	-0.036	0.320	-	-	-
ALUMINUM-D-mg/l	0.197	-0.097	0.049	-0.098	-	-	-
ANTIMONY-T-mg/l	-0.057	0.205	0.133	0.266	-	-	-
ARSENIC-T-mg/l	0.140	0.117	0.078	0.203	-	-	-
BARIUM-T-mg/l	0.043	0.503	0.065	0.245	-	-	-
BERYLLIUM-T-mg/l	0.290	0.200	0.096	-0.026	-	-	-
BISMUTH-T-mg/l	0.029	0.347	-0.011	0.317	-	-	-
BORON-T-mg/l	0.033	0.197	0.188	0.497	-	-	-
BROMIDE-D-mg/l	-0.147	0.259	-0.002	0.321	-	-	-
CADMIUM-D-mg/l	0.128	0.516	0.091	0.368	-	Yes	Yes
CALCIUM-T-mg/l	-0.172	0.415	0.007	0.222	-	-	-
CARBON, DISSOLVED ORGANIC-D-mg/l	0.232	0.194	0.165	0.012	-	-	-
CHLORIDE-D-mg/l	-0.133	0.412	-0.114	0.206	-	-	-
CHROMIUM-T-mg/l	0.027	-0.501	0.096	-0.146	No	-	-
COBALT-T-mg/l	0.130	0.334	0.187	0.359	-	-	-
CONDUCTIVITY, LAB-N-us/cm	-0.175	0.420	-0.002	0.223	-	-	-
COPPER-T-mg/l	0.332	0.246	0.187	0.272	-	-	-
FLUORIDE-D-mg/l	-0.157	0.070	-0.214	-0.085	-	-	-
Hardness, Total or Dissolved CaCO3-N-mg/l	-0.169	0.399	-0.014	0.204	-	-	-
IRON-D-mg/l	0.043	0.261	0.101	0.115	-	-	-
IRON-T-mg/l	0.145	0.074	0.116	0.036	-	-	-
LEAD-T-mg/l	0.151	-0.248	0.096	-0.083	-	-	-
LITHIUM-T-mg/l	-0.193	0.337	-0.072	0.241	-	-	-
MAGNESIUM-T-mg/l	-0.183	0.417	-0.010	0.245	-	-	-
MANGANESE-T-mg/l	0.131	0.461	0.235	0.452	-	-	-
MERCURY-T-mg/l	0.339	0.015	0.189	-0.131	-	-	-
MOLYBDENUM-T-mg/l	-0.285	0.219	-0.097	0.115	-	-	-
NICKEL-T-mg/l	0.020	0.385	0.112	0.244	-	-	-
NITRATE NITROGEN (NO3), AS N-N-mg/l	-0.170	0.330	-0.066	0.130	-	Yes	Yes
NITRITE NITROGEN (NO2), AS N-N-mg/l	-0.021	0.333	0.086	0.322	-	-	-
NITROGEN, AMMONIA (AS N)-N-mg/l	-0.019	0.249	-0.228	-0.115	-	-	-
ORTHO-PHOSPHATE-N-mg/l	0.292	0.312	-0.003	0.021	-	-	-
pH, LAB-N-ph units	0.161	-0.070	0.116	0.166	-	-	-
PHOSPHORUS-N-mg/l	0.284	0.265	0.110	0.071	-	-	-
POTASSIUM-T-mg/l	-0.116	0.381	0.029	0.253	-	-	-
SELENIUM-T-mg/l	-0.194	0.282	-0.081	0.100	-	Yes	Yes
SILVER-T-mg/l	0.073	0.261	0.015	0.115	-	-	-
SODIUM-T-mg/l	-0.032	0.334	0.029	0.362	-	-	-
STRONTIUM-T-mg/l	-0.263	-0.074	0.007	0.239	-	-	-
SULFATE (AS SO4)-D-mg/l	-0.164	0.406	0.010	0.230	-	Yes	Yes
THALLIUM-T-mg/l	0.045	-0.083	0.039	-0.068	-	-	-
TIN-T-mg/l	0.030	0.039	0.085	0.009	-	-	-
TITANIUM-T-mg/l	0.249	0.191	0.066	0.189	-	-	-
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)-N-mg/l	-0.177	0.405	-0.026	0.204	-	-	-
TOTAL KJELDAHL NITROGEN-N-mg/l	-0.107	0.308	-0.037	0.153	-	-	-
TOTAL ORGANIC CARBON-T-mg/l	0.226	0.164	0.189	0.190	-	-	-
TOTAL SUSPENDED SOLIDS, LAB-N-mg/l	0.105	-0.051	0.070	-0.034	-	-	-
TURBIDITY, LAB-N-ntu	0.143	0.177	0.101	0.070	-	-	-
URANIUM-T-mg/l	-0.216	0.416	-0.034	0.215	-	-	-
VANADIUM-T-mg/l	0.163	0.233	0.023	0.089	-	-	-
ZINC-T-mg/l	0.193	0.211	0.079	0.096	-	-	-
∑TU-WQGs	-0.108	0.369	0.026	0.229	-	-	-
∑TU-WQGs/Benchmarks	-0.054	0.364	0.035	0.219	-	-	-
PC1 (all years)	-0.134	-	0.020	-	-	-	-
PC2 (all years)	0.255	-	0.161	-	-	-	-
PC3 (all years)	-0.161	-	-0.042	-	-	-	-
PC4 (all years)	0.009	-	-0.065	-	-	-	-
PC1 (2019)	-	0.445	-	0.276	No WQG	Yes	-
PC2 (2019)	-	**0.665**	-	0.452	No WQG	Yes	Yes
PC3 (2019)	-	0.296	-	0.260	-	-	-
PC4 (2019)		0.275		0.458	-	-	Yes
PC5 (2019)	-	0.306	-	0.024	-	-	-

Notes:

(1) Statistical significance is based on one-tailed comparisons. Significant negative correlations for combined dataset ($\alpha < 0.005$; $rs < -0.289$) and 2019 dataset ($\alpha < 0.005$; $rs < -0.521$) are bolded. - = rs could not be calculated because parameter concentration was the same in all tests or parameter was not applicable to the dataset. Principle components with significant positive correlations are bolded ($\alpha < 0.005$; combined dataset: $rs > 0.289$; 2019 dataset: $rs > 0.521$); principle components with strong positive correlations are shaded ($\alpha < 0.005$; $rs > 0.4$).

(2) Parameters are screeened against BC WQGs in Appendix C.

(3) Parameters were retained for graphical analysis if they met one of the following conditions: 1) order constituent, 2) significant negative correlation and concentration was greater than the chronic BC WQG, or 3) significant negative correlation and there is no chronic BC WQG.

Abbreviations

% = percent; $CaCO_3$ = calcium carbonate; "-D-" = dissolved concentration; mg/l = milligrams per litre; "-T-" = total concentration; ug/l = micrograms per litre.

APPENDIX G

Line Creek Historical Data Analyses

1.0 INTRODUCTION

In 2019, the Line Creek Operation (LCO) chronic toxicity testing program was integrated into the regional chronic toxicity program according to the permit integration plan (Golder 2018a). Accordingly, the 2019 regional chronic toxicity report (the main report to which this appendix is attached) includes data from all sites at which Teck does chronic toxicity monitoring, including three at LCO that were retained from the pre-existing LCO program for integration into the regional program. Data from all sites sampled in 2019 were processed and interpreted in a consistent way to facilitate comparisons across sites and over time. The purpose of this appendix is to process and interpret previous years' data collected under the LCO program for the three stations that were carried forward in the regionally integrated program.

2.0 METHODS

2.1 Field

Field methods were similar to the regional toxicity testing program. For station descriptions and locations, see Table 2.1-1 and Figure 2.1-1 in the main report. Water collection dates are provided in Attachment 1. Test sites carried forward to the integrated regional program were LC_LC5 (Q2 and Q4 of years 2015, 2016, 2017, and 2018), LC_DCDS (Q2 and Q4 of years 2015, 2016, 2017, and 2018), and LC_LC3 (Q2 of 2015).

2.2 Laboratory

Tests carried forward to the integrated regional program were the semi-annual tests with *Ceriodaphnia dubia* and *Pseudokirchneriella subcapitata*. Test procedures used in the semi-annual testing program followed procedures described by Environment Canada protocols (Environment Canada 2007a,b). Tests in the LCO Line Creek chronic toxicity testing were conducted as a dilution series of the site water samples, where organisms were subjected to seven concentrations. Only the results for the full-strength tests (i.e., concentration of the site water was 100%[1]) were used herein because these tests align with the regional chronic toxicity testing program. A laboratory control was tested concurrently for each test site.

Laboratory reports for each round of semi-annual testing are provided in Attachment 1, including detailed methodology, raw data, laboratory notes, quality assurance overview, and statistical significance tests, per protocol requirements.

2.3 Data Analysis

2.3.1 Quality Assurance/Quality Control

Laboratory reports for each round of semi-annual testing from 2015 to 2018 include a quality assurance section (Attachment 1). Quality assurance information was reviewed and summarized to establish that organism performance in the laboratory control water met acceptability criteria for the protocol as it pertains to the health histories and sensitivity of the organisms, and that no deviations from test procedures occurred that would influence the reliability of the data.

To control for temporal variation in test organism performance (batch sensitivity) as a potential confounding factor, response data for *C. dubia* (including reference waters and test waters) were control-normalized[2] before performing data analyses. Each test site was control-normalized to its corresponded laboratory control (see Section 2.2). Algal cell yield was excluded from this step because it is largely influenced by the variability in

[1] The highest test concentration for *P. subcapitata* was 95.2% as a result of dilution associated with the addition of nutrients, as required in the test protocol.

[2] $control - normalized\ response = \left(\frac{site\ water\ response}{laboratory\ control\ response}\right) \times 100$

nutrient concentrations and ionic strength of lab water and site water. Methods are described in more detail in Section 2.3.2.1 in the main report.

2.3.2 Evaluation of Test Results

The LCO chronic toxicity data from 2015 to 2018 were evaluated using the following comparisons:

- **Batch-specific comparison**—Pairwise comparisons of test site responses to reference responses, with analysis limited to batch-specific findings (i.e., test site results for each quarter/year were compared to all references tested in that quarter/year). Analysis of variance (ANOVA) run in Systat™ was used to identify test sites with mean results statistically significantly (p <0.05; herein referred to as 'significantly') lower than the batch-specific mean response in associated Fording River, Elk River, Michel Creek, or South Line Creek reference waters.
- **Local reference comparison**—Mean test site responses were compared to local normal ranges (NRs). As described in Section 2.3.2.3 of the main report, local NRs were inclusive of findings from multiple batches at a single reference location. Each test site was paired with the best reference match a priori, based on geography and availability of data. Stations LC_LC5 (located on Fording River) and LC_DCDS (a tributary to Fording River) were compared with the Fording River reference, and station LC_LC3 (located on Line Creek) was compared with the South Line Creek reference.
- **Regional reference comparison**—Mean test site responses were compared to regional NRs. As described in Section 2.3.2.3 of the main report, regional NRs were inclusive of findings from multiple batches and multiple reference locations.

Data used in the local and regional NRs for comparisons of the historical LCO chronic toxicity data were pooled from all years available (i.e., the local and regional NRs were the same NRs used for 2019 data comparisons). The LCO data from 2015 to 2018 were categorized as no, possible, or likely adverse response according to the methods in Figure 2.3-1 of the main report. Test results were interpreted similar to methods outlined in Section 2.3.3 of the main report. Effect sizes were calculated relative to the mean of the batch-specific references (i.e., mean test results were compared to pooled references of the same quarter and year).

2.3.3 Causation Assessment

A causation assessment was conducted to identify potential contributors to adverse responses observed in the 2015, 2016, 2017, and 2018 semi-annual tests. The assessment was conducted for all endpoints for which one or more "possible" or "likely" adverse responses were identified.

To support this assessment, responses in chronic toxicity tests were paired with matching water chemistry data. Tests with *C. dubia* and *P. subcapitata* were conducted using water collected on a single day and were paired with water chemistry collected on that day.

The causation assessment for the historical data consisted of four components: comparison of water quality data against BC water quality guidelines (WQGs) and Elk Valley Water Quality Program (EVWQP) benchmarks; Spearman rank order correlations between response and explanatory variables; graphical analysis; and identification of potential contributors to adverse responses. The first three components are used as lines of evidence to support the fourth (combined identification of potential contributors). Methods for each component were performed similar to the methods described in Section 2.3.4 of the main report. The Spearman rank correlation (including principal component analysis and calculation of toxic units) and graphical analysis for the LCO chronic toxicity data were included in the 2019 Spearman rank correlations and graphical analysis, which included data from 2015, 2016, 2017, 2018, and 2019 quarterly and semi-annual test results for reference

locations and test sites. Results of these two components for LCO data are presented in Section 3.4 of the main report, and results of the water quality screening and identification of potential contributors is presented in Section 3.3 of this appendix.

3.0 RESULTS

3.1 Quality Assurance/Quality Control

Detailed laboratory quality assurance/quality control (QA/QC) information is provided in the Nautilus reports (Attachment 1). The health histories of the test organisms used in the exposures were acceptable and met requirements of the test protocols. Water quality constituents remained within ranges specified in the protocol throughout tests in all years. Tests in all test years met all control acceptability criteria, and results of the reference toxicant tests fell within the acceptable range for organism performance of mean and two standard deviations based on historical results obtained by the laboratory (i.e., sensitivity of organisms used in the tests was acceptable). There were no deviations from the test methodologies. Overall, the data were considered to be acceptable.

3.2 Results by Test Species

3.2.1 Ceriodaphnia dubia

Individual replicate results are provided in Figures 3.2-1 and 3.2-2. Mean test results are provided in the main report in Figure 3.3-3 and Figure 3.3-4.

There was no evidence of statistically significant adverse effects on mean *C. dubia* survival in any test in any year (Figure 3.2-1). The few individual replicates for which mortality was observed in all quarters and years were insufficient to cause a statistically significant response. Replicate results for survival are binomial (either 0% or 100%) because each replicate consists of a single female. Results of other testing of Elk Valley waters, conducted with additional replication of the survival endpoint, confirmed that adult survival is a relatively insensitive test endpoint (Golder 2018b); the observation of an occasional mortality to an adult female (including in reference samples) is believed to occur due to random events not associated with chemical toxicity.

Reproduction was significantly reduced relative to one or more references in 8 of 17 tests (Figure 3.2-2), including:

- three LC_LC5 tests (Q2 2015, Q2 2018, and Q4 2018)
- one LC_LC3 test (Q2 2015)
- four LC_DCDS tests (Q2 2015, Q2 2016, Q4 2016, and Q4 2018).

In three of the eight tests with significant results, mean reproduction was within the local NR and the effect size was less than 20% compared to the mean response in batch-specific references (LC_LC5 [Q2 2015 = 0%]; LC_DCDS [Q2 2015 = 6%]; LC_LC3 [Q2 2015 = 17%]), indicating no adverse response. In two of eight tests with significant results, mean reproduction was within the local NR and the effect size was between 20% and 50% compared to the mean response in batch-specific references, or mean reproduction was below the local NR and within the regional NR (LC_LC5 [Q4 2018 = 35%]; LC_DCDS [Q4 2018 = 25%]). These results indicate a “possible” adverse response. There is uncertainty whether these results represent an adverse response to the test water or variance in test organism performance related to background water quality. In the remaining three tests with significant results, mean reproduction was below the local and regional NRs (LC_LC5 [Q2 2018], LC_DCDS [Q2 and Q4 2016]). These results indicate a likely adverse response to the test site water. Compared

to the mean response in batch-specific references, the effect size in tests categorized as likely ranged from 28% (LC_DCDS in Q2 2016) to 58% (LC_DCDS in Q4 2016).

Based on the results presented above, *C. dubia* tests were categorized as follows:

- **No adverse response (12 of 17 tests):** all Q2 and Q4 2015 tests, Q2 2016 test with LC_LC5, Q4 2016 test with LC_LC5, all Q2 and Q4 2017 tests, Q2 2018 test with LC_DCDS.
- **Possible adverse response (2 of 17 tests)**: Q4 2018 tests with LC_LC5, LC_DCDS.
- **Likely adverse response (3 of 17 tests)**: Q2 2016 test with LC_DCDS, Q4 2016 test with LC_DCDS, Q2 2018 test with LC_LC5.

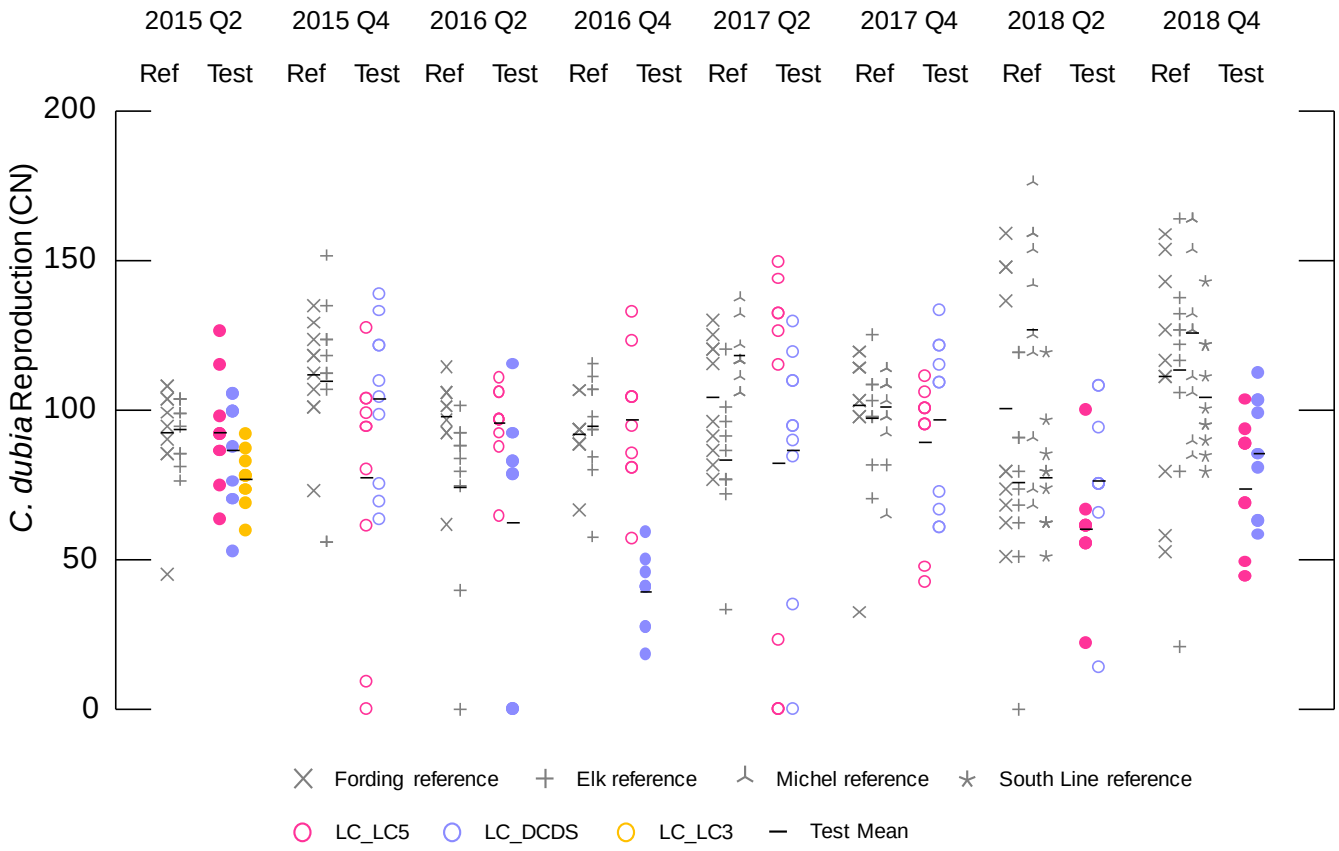
The causation assessment for *C. dubia* reproduction is presented in Section 3.4 of the main report and Section 3.3 of this appendix.

Figure 3.2-1: Individual replicate and mean results for *C. dubia* survival in reference (Ref) and test site waters.



Note: See Figure 2.3-2 of main report for description of lines and symbols. Replicate results are either 100% or 0% because there is a single adult female daphnid in each replicate. Mean results represent the combined data from ten replicates per treatment.

Figure 3.2-2: Individual replicate and mean results for *C. dubia* reproduction in reference (Ref) and test site waters.



Note: See Figure 2.3-2 of main report for description of lines and symbols.

3.2.2 *Pseudokirchneriella subcapitata*

Individual replicate results are provided in Figures 3.2-3. Mean test results are provided in the main report in Figure 3.3-7.

Cell yield was significantly reduced relative to one or more references in 6 of 17 tests, including:

- four LC_LC5 tests (Q2 2015, Q4 2015, Q2 2016, and Q2 2017)
- one LC_DCDS test (Q2 2017)
- one LC_LC3 test (Q2 2015)

In four of six tests with significant results, mean cell yield was within the local NR and the effect size was less than 20% compared to the mean response in batch-specific references, indicating no adverse response (LC_LC5 [Q4 2015, Q2 2016, Q2 2017]; LC_DCDS [Q2 2017]). Compared to the mean response in batch-specific references, the effect size in tests categorized as no adverse response ranged from 2% (LC_DCDS in Q2 2017) to 19% (LC_LC5 in Q4 2015). In the remaining tests with significant pairwise test results, mean cell yield was within the local NR and the effect size was between 20% and 50% compared to the mean response in batch-specific references (LC_LC5 [Q2 2015 = 35%]; LC_LC3 [Q2 2015 = 42%]). These results indicate a “possible” adverse

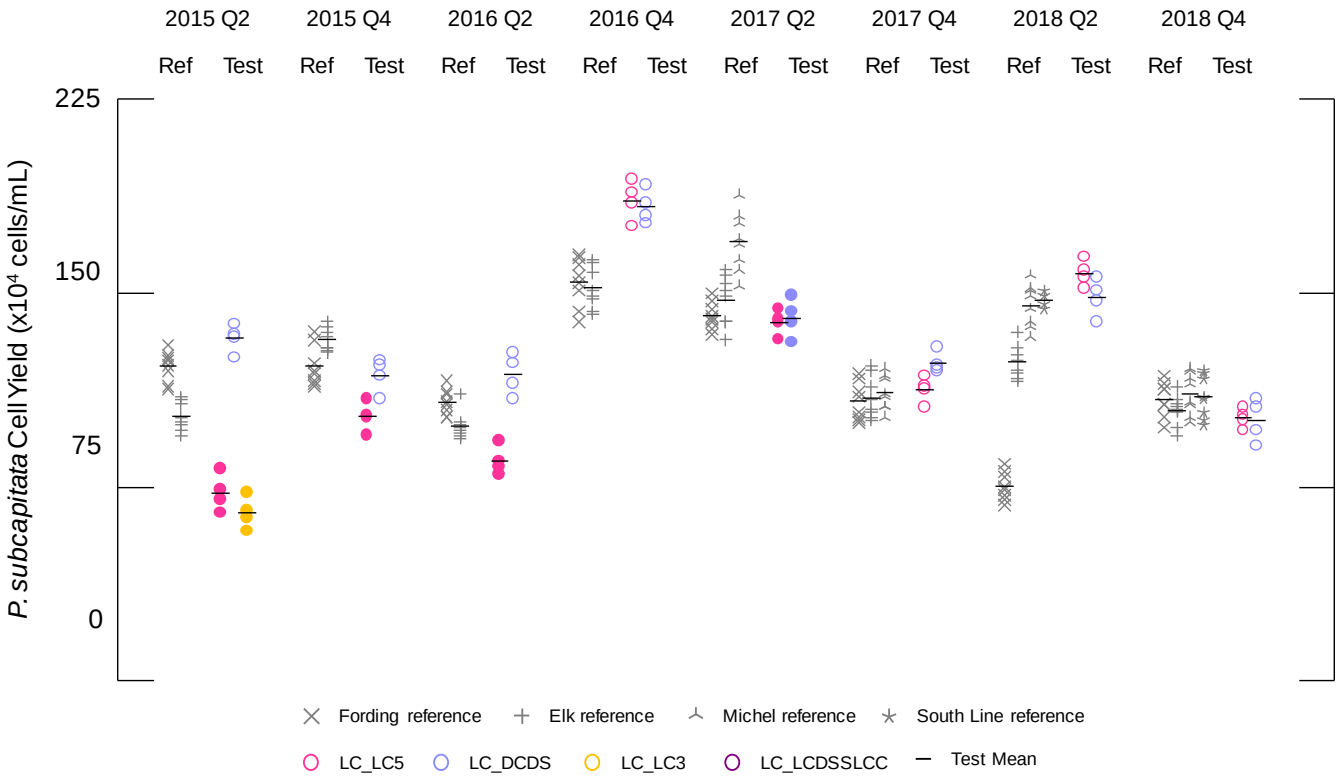
response. There is uncertainty whether these results represent an adverse response to the test water or variance in test organism performance related to background water quality.

Based on the results presented above, *P. subcapitata* tests were categorized as follows:

- **No adverse response (15 of 17 tests)**. Q2 2015 test with LC_DCDS, Q4 2015 test with LC_LC5, LC_DCDS, all Q2 and Q4 2016 tests, all Q2 and Q4 2017 tests, and all Q2 and Q4 2018 tests.
- **Possible adverse response (2 of 17 tests)**: Q2 2015 tests with LC_LC5, LC_LC3.
- **Likely adverse response (0 of 17 tests)**: No tests were in this category.

The causation assessment for *P. subcapitata* cell yield is presented in Section 3.4 of the main report and Section 3.3 of this appendix.

Figure 3.1-3: Individual replicate and mean results for *P. subcapitata* cell yield in reference (Ref) and test site waters.



Note: See Figure 2.3-2 of main report for description of lines and symbols.

3.3 Causation Assessment

3.3.1 *Ceriodaphnia dubia* Reproduction

Water Quality Screening

In two of five tests categorized as possible or likely (Q2 and Q4 2016 LC_DCDS), concentrations were below BC WQGs and lowest level 1 EVWQP benchmarks. In the remaining three tests, concentrations exceeded BC WQGs and lowest level 1 EVWQP benchmarks for at least one constituent:

- **LC_LC5 (Q2 and Q4 2018):** The concentration of selenium exceeded the lowest level 1 EVWQP benchmark.
- **LC_DCDS (Q4 2018):** Concentrations of nitrate and selenium exceeded lowest level 1 EVWQP benchmarks and the concentration of nickel exceeded the interim screening value.

Identification of Potential Contributors to Toxicity

In tests categorized as having a possible or likely adverse response, concentrations of most constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-1 of main report), and/or were lower than the chronic BC WQG (Attachment 2). Such constituents are not expected to contribute to toxicity in these tests. Published toxicity data were reviewed for constituents that were higher than reference waters and test site waters categorized as no adverse response and/or above BC WQGs and lowest level 1 EVWQP benchmarks and are discussed below.

- **LC_DCDS (Q2 2016):** Overall, no water quality constituent was identified as a likely cause of the observed response in these tests. The concentration of orthophosphate was higher than reference waters and test site waters categorized as no adverse response (Table D-1 of main report). Orthophosphate is a constituent that may result in ecological changes in the receiving environment under long-term discharge conditions but would not be expected to cause direct aquatic toxicity at the concentration observed in this sample (0.032 mg/L).
- **LC_DCDS (Q4 2018):** Overall, nitrate showed the greatest evidence of causing the observed response in this test. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-1 of main report), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks, except nitrate (Attachment 2). The concentration of nitrate in this test (19 mg/L NO_3-N) was between the level 2 and level 3 benchmarks from the EVWQP (level 2 = 8 mg/L NO_3-N and level 3 = 31 mg/L NO_3-N at hardness 300 mg/L as $CaCO_3$). The level 2 and level 3 benchmarks are associated with 20% and 50% effect on *C. dubia* reproduction, indicating that nitrate may have contributed to the observed response in this test.
- **LC_LC5 (Q2 and Q4 2018) and LC_DCDS (Q4 2016):** Overall, no water quality constituent was identified as a likely cause of the observed response in these tests. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-1 of main report), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks (Attachment 2).

3.3.2 *Pseudokirchneriella subcapitata* Cell Yield

Water Quality Screening

In the two tests categorized as possible or likely, concentrations exceeded BC WQGs and lowest level 1 EVWQP benchmarks for at least one constituent:

- **LC_LC5 (Q2 2015):** The concentration of selenium exceeded the lowest level 1 EVWQP benchmark.
- **LC_LC3 (Q2 2015):** Concentrations of selenium and dissolved cadmium exceeded the lowest level 1 EVWQP benchmarks.

Identification of Potential Contributors to Toxicity

In tests categorized as having a possible or likely adverse response, concentrations of most constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-1 of main report), and/or were lower than the chronic BC WQG (Attachment 2). Such constituents are not expected to contribute to toxicity in these tests. Published toxicity data were reviewed for constituents that were higher than reference waters and test site waters categorized as no adverse response and/or above BC WQGs and lowest level 1 EVWQP benchmarks and are discussed below.

- **LC_LC5 (Q2 2015):** Overall, no water quality constituent was identified as a likely cause of the observed response in these tests. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-2 of main report), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks (Attachment 2).
- **LC_LC3 (Q2 2015):** Overall, no water quality constituent was identified as a likely cause of the observed response in these tests. Concentrations of constituents were equal to or lower than concentrations in reference waters and/or test site waters categorized as no adverse response (Table D-2 of main report), and/or were lower than the chronic BC WQG and lowest level 1 EVWQP benchmarks, except dissolved cadmium (Attachment 2). The concentration of dissolved cadmium in this test (0.35 µg/L) was marginally higher than the lowest level 1 benchmark from the EVWQP (0.32 µg/L at hardness >285 mg/L as $CaCO_3$). The level 1 benchmark is associated with a 10% effect on *Daphnia magna* reproduction. *D. magna* was reported as one of the three most sensitive species in the cadmium toxicity database reported in the EVWQP, along with *H. azteca* and *O. mykiss* (Teck 2014), indicating that the sensitivity of *P. subcapitata* to cadmium is lower relative to these three species. The dissolved cadmium concentration in this test (0.35 µg/L) was lower than the level 1 EVWQP benchmark for fish (0.95 µg/L at hardness >285 mg/L as $CaCO_3$), indicating that dissolved cadmium did not contribute to the observed response in this test.

4.0 SUMMARY

The following bullets summarize results from the 2015 to 2018 LCO chronic toxicity data analysis.

- **Quality Assurance/Quality Control**—QA/QC information indicated that organism performance in the laboratory control water met acceptability criteria for the protocol as it pertains to the health histories and sensitivity of the organisms (Section 3.1)
- **Evaluation of Test Results**—Most of the *C. dubia* and *P. subcapitata* tests were categorized as no adverse response. Likely adverse and possible adverse responses were more common in *C. dubia* tests (5 out of 17 tests) compared to *P. subcapitata* (2 out of 17 tests). Of the seven tests with possible or likely adverse responses, three were at station LC_LC5, three were at station LC_DCDS, and one was at station LC_LC3 (Section 3.2).
- **Causation Assessment**—For most tests categorized as possible or likely, no water quality constituents were identified as causing the observed responses, except for nitrate in the Q4 2018 LC_DCDS test for *C. dubia* reproduction (Section 3.3).

5.0 REFERENCES

Environment Canada. 2007a. *Biological test method: test of reproduction and survival using the cladoceran Ceriodaphnia dubia*. EPS 1/RM/21, Second Edition, February 2007.

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Attachment G1 Toxicity testing on Line Creek Operation samples with *Ceriodaphnia dubia*, *Oncorhynchus mykiss*, *Lemna minor* and P*seudokirchneriella subcapitata*

Nautilus Environmental

Toxicity testing on Line Creek Operation samples with *Ceriodaphnia dubia*, *Oncorhynchus mykiss*, *Lemna minor* and *Pseudokirchneriella subcapitata*

2nd Quarter, 2015

Final Report

Report date: October 28, 2015

Submitted to:

Teck Coal Ltd.
Sparwood, BC

8664 Commerce Court
Burnaby, BC
V5A 4N7

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SIGNATURE PAGE



Krystal Pearcy, B.Sc.
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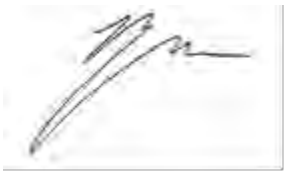


James Elphick, R.P.Bio.
Senior Reviewer

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on samples collected from the Line Creek Operation. Test types included survival and reproduction of a cladoceran (*Ceriodaphnia dubia*), embryo development of rainbow trout (*Oncorhynchus mykiss*), population growth of a unicellular green alga (*Pseudokirchneriella subcapitata*) and growth of a freshwater plant (*Lemna minor*). Table 1 outlines the toxicity tests that were conducted on each sample and Figure 1 shows the locations of sample sites. Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 6.0 to 8.0°C and were stored in the dark at 4 ± 2°C prior to testing.

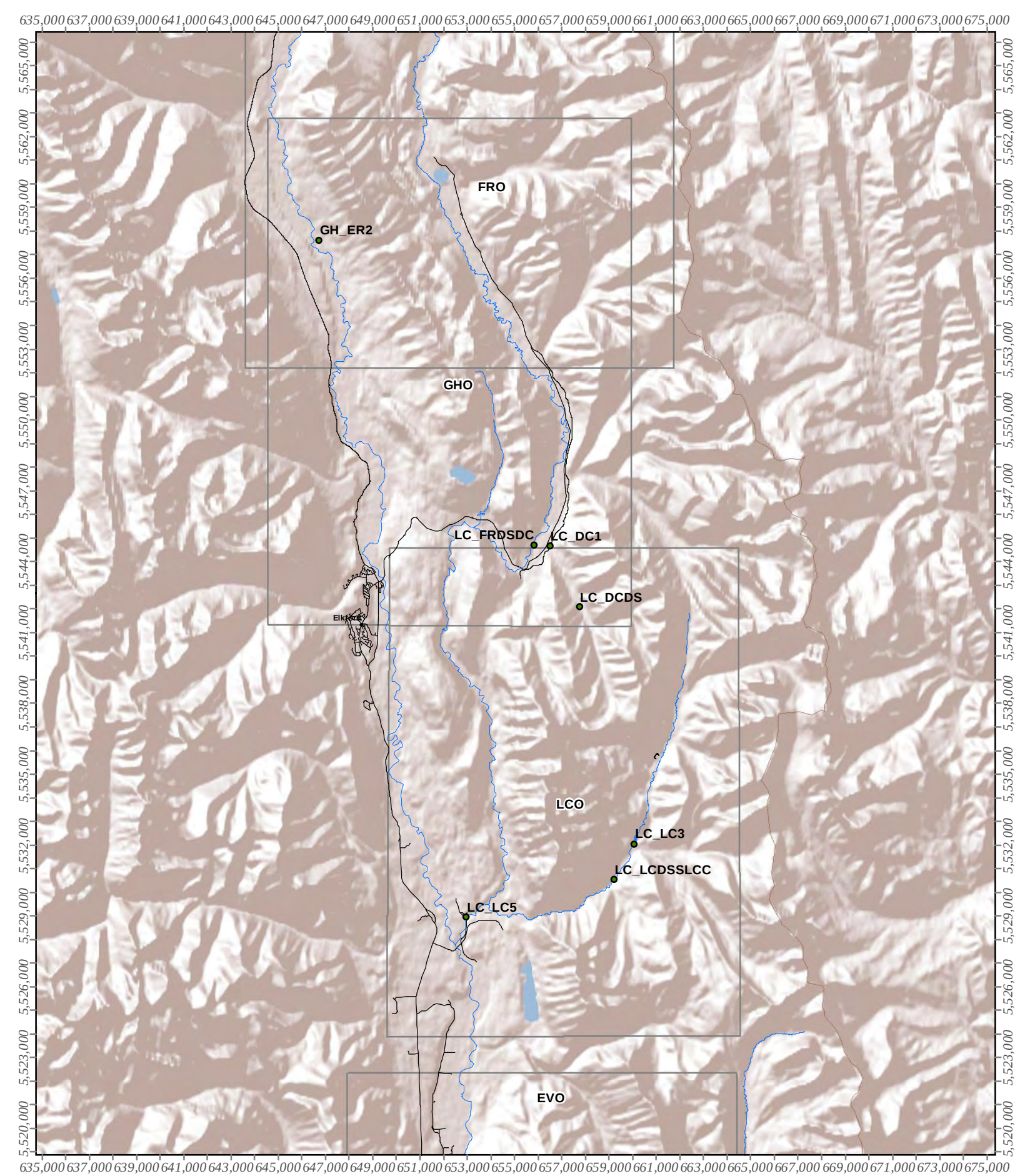
Table 1. Summary of toxicity testing program.

Sample ID	EMS #	Species Tested	Sample Collection Dates
GH_ER2*	200389	*C. dubia*, *O. mykiss*, and *P. subcapitata*	April 28 and May 5, 2015
LC_LCDSSLCC	297110	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 28 and May 5, 2015
LC_LC3	200337	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 28 and May 5, 2015
LC_DC1	E288270	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 28 and May 5, 2015
LC_FRDSDC	E288272	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 28 and May 5, 2015
LC_DCDS	E295210	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 28 and May 5, 2015
LC_LC5	200028	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 28 and May 5, 2015

*Reference site. Conducted as a single concentration toxicity test.

The Line Creek Operation samples were tested using serial dilutions of the sample with control water. Sample GH_ER2 was tested using only a single (100%) concentration with no dilution. GH_ER2 is an upstream reference location that is not required as part of the Line Creek Operation testing program, but the data for this sample were included here as a basis for comparison to Line Creek Operation mine-influenced samples.

This report describes the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. Results of analytical chemistry that was performed on the samples tested in this program are provided in Appendix E. These samples were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix F.



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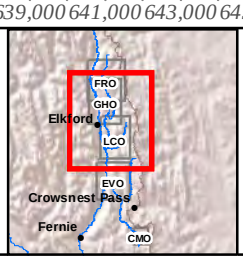

Chronic Toxicity Monitoring Locations

- Monitoring Locations
- Roads
- Rivers

N

0 1,400 2,800 5,600 Meters

DATE:	MINE OPERATION:
10/19/2015	Line Creek
SCALE:	COORDINATE SYSTEM:
1:200,000	NAD 1983 UTM Zone 11N

2.0 METHODS

Methods for the toxicity tests are summarized in Tables 2 through 5. Testing was conducted according to procedures described by Environment Canada protocols (1998, 2007a, 2007b and 2007c). Statistical analyses for the tests were performed using CETIS (Tidepool Scientific Software, 2013).

Table 2. Summary of test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test organism	*Ceriodaphnia dubia*
Test organism source	In-house culture
Test organism age	<24 h old neonates produced within 12 h
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20 mL test tube
Test volume	15 mL
Test replicates	10
Number of organisms	1 per replicate
Control water	20% Perrier water
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	*Pseudokirchneriella subcapitata* and YCT
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Environment Canada (2007a)
Statistical software	CETIS
Test endpoint	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods
Reference toxicant	Sodium chloride

Table 3. Summary of test conditions: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Test organism	*Oncorhynchus mykiss*
Test organism source	Vancouver Island Trout Hatchery, Duncan, BC
Test organism age	<30 min post fertilization, <24 h old gametes
Test type	Static renewal
Test duration	7 days
Test vessel	2 L plastic containers
Test volume	2 L
Test replicates	4
No. of organisms	30 eggs per replicate
Control water	Dechlorinated tapwater (hardness ~12 mg/L $CaCO_3$)
Test solution renewal	Daily
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark
Aeration	6.5 ± 1 mL/min/L
Test protocol	Environment Canada (1998); Canaria et al. (1999)
Statistical software	CETIS
Test endpoint	Embryo viability
Test acceptability criteria for controls	Embryo viability ≥70%
Reference toxicant	Sodium dodecyl sulphate

Table 4. Summary of test conditions: *Lemna minor* growth inhibition test.

Test organism	*Lemna minor*, strain CPCC# 490
Test organism source	In-house culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Wainfleet, Stinking Barn, Niagara Peninsula, Ontario, Canada
Test organism age	7-to 10-day old
Test type	Static
Test duration	7 days
Test vessel	250 mL glass containers
Test volume	100 mL
Test replicates	4
No. of organisms	Two 3-frond plants per replicate
Control water	Deionized water with added nutrients
Test solution renewal	None
Test temperature	25 ± 2°C
Feeding	None
Light intensity	4000 to 5600 lux full spectrum light
Photoperiod	24 hours light
Aeration	None
Test protocol	Environment Canada (2007b)
Statistical software	CETIS
Test endpoint	Number of fronds and dry weight
Test acceptability criteria for controls	≥ 8-fold increase in number of fronds
Reference toxicant	Potassium chloride

Table 5. Summary of test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test organism	*Pseudokirchneriella subcapitata*, strain UTCC #37
Test organism source	In-house culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Nitelva River, Norway.
Test organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test replicates	4 for samples; 8 for control
Number of organisms	10, 000 cells/mL
Control water	Deionized water with added nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Sample filtration	Through a preconditioned membrane filter of 0.45 µm using a vacuum pump
Aeration	None
pH adjustment	None
Test protocol	Environment Canada (2007c)
Statistical software	CETIS
Test endpoint	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc

3.0 RESULTS

The results of the toxicity tests and associated statistical analyses are provided in Appendices A through D, with the exception of data for sample GH-ER2, which are reproduced here, but the raw data are provided a separate report (Nautilus Environmental, 2015).

Results of the toxicity tests using *C. dubia* are provided in Table 6. There were no adverse effects on survival of *C. dubia* in the samples; the LC50 values were >100%. A small reduction in reproduction was observed in one of the six samples (LC_FRDSDC) tested with *C. dubia;* the IC25 was 93.4% and the IC50 was >100% for this sample. No adverse effects were observed with this species with the other samples.

Results of the toxicity tests using *O. mykiss* are provided in Table 7. There were no adverse effects on embryo viability in the samples; the EC25 and EC50 values were >100%.

Results of the toxicity tests using *L. minor* are provided in Table 8; the highest test concentraton was 97% as a result of dilution associated with addition of nutrients. There were no adverse effects on *L. minor* dry weight in the samples; the IC25 and IC50 values were >97%. An adverse effect on frond count was observed in one of the six samples (LC_LC3); the IC25 was 75.9% and the IC50 was >97%. There were no adverse effects in the remaining samples.

Results of the toxicity tests using *P. subcapitata* are provided in Tables 9; the highest test concentraton was 95.2% as a result of dilution associated with addition of nutrients. The algae exhibited growth enhancement in all samples. Consequently, the IC25 and IC50 values for cell yield were >95.2% in the samples.

For reference sample GH_ER2, which was only tested at full strength with *C. dubia*, *O. mykiss* and *P. subcapitata*, there were no significant differences in the results compared to the laboratory controls.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	GH_ER2		LC_LCDSSLCC		LC_LC3		LC_DC1	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Control	100	22.2 ± 1.5	100	19.7 ± 2.0	100	21.8 ± 1.4	90	18.9 ± 3.4
1.56	NT	NT	100	20.6 ± 2.1	100	21.0 ± 3.0	100	21.2 ± 1.3
3.12	NT	NT	100	18.6 ± 2.3	100	20.5 ± 1.1	100	19.7 ± 2.2
6.25	NT	NT	100	20.2 ± 1.0	100	20.7 ± 1.3	100	20.9 ± 2.8
12.5	NT	NT	100	21.0 ± 1.9	100	20.3 ± 2.8	100	21.4 ± 3.3
25	NT	NT	100	19.6 ± 2.8	100	19.4 ± 2.4	100	19.3 ± 2.8
50	NT	NT	100	18.5 ± 2.9	90	16.3 ± 6.3	100	20.5 ± 2.1
100	100	20.7 ± 2.3	100	18.1 ± 2.6	90	16.8 ± 2.0	100	20.5 ± 2.4
Test endpoint (% v/v)								
LC50	--	--	>100	--	>100	--	>100	--
IC25	--	--	--	>100	--	>100	--	>100
IC50	--	--	--	>100	--	>100	--	>100

NT = Not Tested, SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration.

Table 6. (continued) Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Control	100	20.9 ± 1.3	90	17.1 ± 6.3	90	17.4 ± 6.7
1.56	100	19.9 ± 3.4	100	19.0 ± 3.9	90	16.6 ± 6.4
3.12	100	19.3 ± 4.2	100	18.7 ± 4.0	100	20.2 ± 1.5
6.25	90	18.6 ± 3.6	100	20.5 ± 1.4	100	16.7 ± 5.6
12.5	100	20.1 ± 1.5	100	17.4 ± 4.9	100	18.2 ± 3.6
25	100	18.0 ± 4.5	100	16.5 ± 3.8	100	18.5 ± 3.3
50	100	20.2 ± 1.8	90	15.6 ± 5.1	90	16.7 ± 4.2
100	100	15.3 ± 5.9	100	14.8 ± 3.1	100	16.1 ± 3.1
Test endpoint (% v/v [with 95% CL])						
LC50	>100	--	>100	--	>100	--
IC25	--	93.4 (68.4 – 100)	--	>100	--	>100
IC50	--	>100	--	>100	--	>100

SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration, CL = Confidence Limits.

Table 7. Results: rainbow trout embryo (*Oncorhynchus mykiss*) viability test.

Concentration (% v/v)	Embryo Viability (Mean ± SD)						
	GH_ER2	**LC_LCDSSLCC**	**LC_LC3**	**LC_DC1**	**LC_FRDSDC**	**LC_DCDS**	**LC_LC5**
Control	91.7 ± 1.9	91.3 ± 4.5	95.7 ± 1.6	97.5 ± 3.2	95.5 ± 4.7	95.8 ± 6.3	87.4 ± 3.1
6.25	NT	84.4 ± 5.9	97.4 ± 3.3	96.7 ± 2.7	95.7 ± 1.9	89.0 ± 4.2	91.5 ± 3.5
12.5	NT	81.4 ± 7.7	92.9 ± 6.5	97.5 ± 1.7	93.2 ± 4.8	94.2 ± 5.0	86.7 ± 9.4
25	NT	89.1 ± 4.9	95.7 ± 3.3	97.5 ± 1.7	94.8 ± 4.5	90.8 ± 7.4	90.0 ± 6.7
50	NT	86.7 ± 3.5	97.4 ± 1.7	98.3 ± 1.9	96.4 ± 2.9	92.5 ± 4.2	87.4 ± 6.8
100	95.0 ± 4.3	87.2 ± 3.7	96.5 ± 4.9	98.3 ± 1.9	94.7 ± 3.5	97.5 ± 1.7	91.7 ± 3.3
Test endpoint (% v/v)							
EC25	-	>100	>100	>100	>100	>100	>100
EC50	-	>100	>100	>100	>100	>100	>100

NT = Not Tested, SD = Standard Deviation, EC = Effective Concentration.

Table 8. Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_LCDSSLCC		LC_LC3		LC_DC1	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Control	82.0 ± 14.2	5.6 ± 1.1	67.8 ± 16.6	5.2 ± 1.4	84.0 ± 5.0	6.4 ± 0.6
1.5	75.2 ± 8.4	5.4 ± 0.7	85.2 ± 9.5	6.5 ± 0.8	74.2 ± 18.4	6.0 ± 1.0
3.0	88.0 ± 9.5	6.2 ± 0.8	80.2 ± 8.7	6.4 ± 0.5	83.8 ± 13.0	6.9 ± 0.3
6.1	78.0 ± 10.4	5.7 ± 0.5	75.0 ± 11.9	6.1 ± 0.9	88.8 ± 11.5	6.5 ± 1.2
12.1	92.0 ± 11.2	6.6 ± 0.7	82.5 ± 8.3	6.8 ± 0.8	97.0 ± 14.2	7.6 ± 1.3
24.2	99.0 ± 8.0	7.2 ± 0.5	76.0 ± 7.4	6.1 ± 0.4	95.2 ± 11.5	7.4 ± 0.5
48.5	87.0 ± 16.0	6.6 ± 0.9	72.0 ± 7.0	5.6 ± 0.7	93.8 ± 9.5	6.6 ± 0.5
97	69.0 ± 4.1	6.1 ± 0.5	47.8 ± 3.2	5.6 ± 0.5	91.2 ± 16.4	7.4 ± 1.3
Test endpoint (% v/v [with 95% CL])						
IC25	>97	>97	75.9 (57.9 – 96.9)	>97	>97	>97
IC50	>97	>97	>97	>97	>97	>97

SD = Standard Deviation, IC = Inhibition Concentration, CL = Confidence Limits.

Table 8. (continued) Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Control	93.8 ± 9.9	7.6 ± 0.9	81.8 ± 15.8	5.7 ± 1.0	84.8 ± 17.4	6.3 ± 1.2
1.5	93.5 ± 7.9	7.7 ± 0.7	93.5 ± 11.1	6.8 ± 1.1	87.0 ± 6.5	6.6 ± 0.3
3.0	87.0 ± 18.2	7.0 ± 1.3	93.5 ± 8.2	6.6 ± 0.5	81.5 ± 18.1	6.4 ± 1.4
6.1	93.5 ± 8.1	7.4 ± 0.5	90.0 ± 16.8	6.5 ± 1.2	85.2 ± 17.6	6.6 ± 1.2
12.1	83.0 ± 13.8	6.5 ± 0.9	88.5 ± 15.0	6.3 ± 0.8	85.5 ± 15.5	6.5 ± 1.2
24.2	100.5 ± 11.0	7.6 ± 0.8	90.0 ± 8.0	6.7 ± 0.7	89.5 ± 5.1	6.9 ± 0.2
48.5	97.0 ± 11.2	7.4 ± 1.4	88.5 ± 13.1	6.4 ± 0.9	71.2 ± 4.1	5.6 ± 0.4
97	89.2 ± 2.5	7.4 ± 0.5	103.0 ± 4.2	7.4 ± 0.4	74.0 ± 15.1	6.2 ± 1.3
Test endpoint (% v/v)						
IC25	>97	>97	>97	>97	>97	>97
IC50	>97	>97	>97	>97	>97	>97

SD = Standard Deviation, IC = Inhibition Concentration.

Table 9. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	GH_ER2		LC_LCDSSLCC		LC_LC3		LC_DC1	
	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)
Control	35.0 ± 1.3	--	34.8 ± 2.8	--	33.4 ± 2.6	--	33.9 ± 2.7	--
1.5	NT	NT	44.5 ± 3.4*	28.1	36.0 ± 2.6	7.9	36.8 ± 2.6	8.5
3.0	NT	NT	63.5 ± 3.9*	82.7	55.0 ± 3.2*	64.8	46.8 ± 1.7*	38.0
6.0	NT	NT	87.0 ± 5.2*	150.4	86.8 ± 5.0*	159.9	71.8 ± 5.9*	111.8
11.9	NT	NT	109.8 ± 5.9*	215.8	107.3 ± 9.2*	221.3	83.5 ± 5.3*	146.5
23.8	NT	NT	114.3 ± 12.0*	228.8	103.0 ± 9.7*	208.6	106.3 ± 8.7*	213.7
47.6	NT	NT	118.8 ± 8.6*	241.7	100.5 ± 6.8*	201.1	113.8 ± 6.6*	235.8
95.2	102.4 ± 5.7*	192.5	69.2 ± 5.7*	99.3	65.0 ± 6.3*	94.8	121.8 ± 7.8*	259.4
Test endpoint (% v/v)								
IC25	--	--	>95.2	--	>95.2	--	>95.2	--
IC50	--	--	>95.2	--	>95.2	--	>95.2	--

NT = Not Tested, SD = Standard Deviation, IC = Inhibition Concentration.
*Indicates cell yield that were significantly greater than the control.

Table 9. (continued) Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5	
	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)
Control	32.0 ± 2.2	--	35.1 ± 3.1	--	33.2 ± 3.0	--
1.5	36.0 ± 3.4	12.5	39.0 ± 4.4	11.0	62.5 ± 4.5*	88.0
3.0	48.0 ± 4.2*	50.0	57.8 ± 4.3*	64.4	79.5 ± 3.3*	139.1
6.0	64.2 ± 7.1*	100.8	69.0 ± 5.9*	96.4	106.5 ± 11.1*	220.3
11.9	85.2 ± 7.6*	166.4	85.2 ± 6.2*	142.7	116.3 ± 10.2*	249.6
23.8	100.5 ± 12.6*	214.1	119.0 ± 12.4*	238.8	115.5 ± 5.6*	247.4
47.6	83.5 ± 8.9*	160.9	139.3 ± 10.9*	296.4	90.2 ± 5.7*	171.4
95.2	72.8 ± 3.0*	127.3	132.5 ± 5.4*	277.2	72.8 ± 7.2*	118.8
Test endpoint (% v/v)						
IC25	>95.2	--	>95.2	--	>95.2	--
IC50	>95.2	--	>95.2	--	>95.2	--

SD = Standard Deviation, IC = Inhibition Concentration.
*Indicates cell yield that were significantly greater than the control.

4.0 QA/QC

The health history of the test organisms used in the exposures was acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocols throughout the tests. There were no deviations from the test methodologies. Uncertainty associated with these tests is best described by the standard deviation around the mean and/or the confidence intervals around the point estimates.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was considered appropriate.

Table 10. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.1 g/L NaCl	2.0 (1.6 – 2.4)	11	April 22, 2015
	Reproduction (IC50): 1.4 g/L NaCl	1.5 (1.2 – 1.9)	14	
O.mykiss	Embryo viability (EC50): 6.7 mg/L SDS	4.1 (2.2 – 7.6)	36	April 29, 2015
L. minor	Number of fronds (IC50): 4.1 g/L KCl	4.1 (3.1 – 5.4)	15	May 20, 2015
P. subcapitata	Growth (IC50) 38.6 µg/L Zn	26.4 (13.6 – 51.1)	39	May 5, 2015

SD = Standard Deviation, CV = Coefficient of Variation, IC = Inhibition Concentration, EC= Effective Concentration, LC = Lethal Concentration.

5.0 REFERENCES

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Environment Canada. 1998. Biological test method: toxicity tests using early life stages of salmonid fish (rainbow trout). Environmental Protection Series EPS 1/RM/28. Second Edition, July 1998. Environment Canada, Method Development and Application Section, Environmental Technology Centre, Ottawa, ON. 102 pp.

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Environment Canada. 2007b. Biological test method: tests for measuring the inhibition of growth using the freshwater macrophyte, *Lemna minor*. Environmental Protection Series, Report EPS 1/RM/37. Second Edition. January 2007. Environment Canada, Method Development and Application Section, Environmental Technology Centre, Ottawa, ON. 112 pp.

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Nautilus Environmental. 2015. Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia, Pseudokirchneriella subcapitata, Hyalella azteca, Pimephales promelas* and *Oncorhynchus mykiss*: 2nd Quarter 2015 results.

Tidepool Scientific Software. 2013. CETIS comprehensive environmental toxicity information system, version 1.8.7.16 Tidepool Scientific Software, McKinleyville, CA. 222 pp.

6.0 END OF REPORT

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15376

Start Date/Time: May 6/15 @ 1300h
Set up by: MLT

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2015-05-06_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 4 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042415A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 27
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 1,2,3,4,5,6,7,8,9,10,11,14,16

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd128
Stock Solution ID: 15Na02
Date Initiated: April 22/15

7-d LC50 (95% CL): 2.1 (2.0 - 2.2) g/L NaCL
7-d IC50 (95% CL): 1.4 (0.9 - 1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCL CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 2/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_LCOSSLCC_WS_2015-05-01
Work Order #: 15376
Start Date & Time: May 6/15 @ 1300h
Stop Date & Time: May 12/15 @ 1500h
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days														
	0	1		2		3		4		5		Final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0			
DO (mg/L)	8.1	9.0	8.0	7.8	8.2	7.6	8.2	7.9	8.1	7.6	8.2	7.8			
pH	8.0	7.7	7.9	7.6	8.0	8.1	8.1	7.9	8.0	7.7	8.0	7.7			
Cond. (µS/cm)	218	209		213		218		223		220		224			
Initials	MLT	EMM		JW		EMM		MLT		EMM		MLT			

Concentration: 1.56% (v/v)

	Days														
	0	1		2		3		4		5		Final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.5	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0			
DO (mg/L)	7.9	7.8	8.1	7.8	8.4	7.7	8.2	7.5	8.1	7.6	8.2	7.8			
pH	7.9	7.8	7.9	7.7	8.3	7.8	8.1	7.7	8.0	7.7	8.0	7.7			
Cond. (µS/cm)	225	212		215		219		227		221		229			
Initials	MLT	EMM		JW		EMM		MLT		EMM		MLT			

Concentration: 12.5% (v/v)

	Days														
	0	1		2		3		4		5		Final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.5	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0			
DO (mg/L)	7.9	7.8	8.2	7.7	8.4	7.7	8.2	7.5	8.1	7.7	8.2	7.8			
pH	7.9	7.9	7.9	7.8	8.3	7.9	8.2	7.9	8.1	7.9	8.0	7.7			
Cond. (µS/cm)	260	249		252		260		269		264		261			
Initials	MLT	EMM		JW		EMM		MLT		EMM		MLT			

Concentration: 100% (v/v)

	Days														
	0	1		2		3		4		5		Final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	25.0	24.0	24.0	25.0	25.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0			
DO (mg/L)	7.9	7.8	8.2	7.9	8.2	7.5	8.2	7.6	8.1	7.7	8.2	7.8			
pH	8.0	7.9	8.0	7.9	8.3	8.2	8.2	8.1	8.1	8.0	8.1	7.9			
Cond. (µS/cm)	518	521		522		524		536		526		527			
Initials	MLT	EMM		JW		EMM		MLT		EMM		MLT			

	Control	100% (v/v)		
Hardness*	100	268		
Alkalinity*	90	166		

* mg/L as CaCO3

Analysts: EMM, MLT, AWD, EC, JW
Reviewed by:
Date reviewed: June 2/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: clear, some ppt present

Comments: **Broodboard Used:** BB042415A test tubes (1-11, 14, 16)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC_LCOSSLCC_WS_2015-05-06_N
Work Order: 15376

Start Date & Time: May 6/15 @1300h
Stop Date & Time: May 12/15 @ 1500h
Set up by: MLT

% (w/v)

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	4	3	3	4	3	3	5	3	3	A
5	6	5	7	7	7	8	7	✓	7	7	JW
6	11	9	10	11	11	10	11	10	10	9	MLT
7											
8											
Total	20	18	20	21	22	21	21	15	20	19	MLT

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	2	2	3	2	3	3	2	3	2	3	A
5	6	7	9	8	8	8	8	7	8	7	JW
6	9	9	11	11	11	12	11	10	12	9	MLT
7											
8											
Total	17	18	23	21	22	23	21	20	22	19	MLT

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	2	3	3	3	✓	2	3	2	3	A
5	✓	7	7	7	6	6	7	7	7	7	JW
6	11	9	10	10	11	9	11	9	11	10	MLT
7											
8											
Total	14	18	20	20	20	15	20	19	20	20	MLT

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	2	3	2	✓	3	M 3	2	2	A
5	8	6	8	7	8	8	7	7	8	7	JW
6	10	10	9	11	11	12	12	9	10	11	MLT
7											
8											
Total	21	19	19	21	21	20	22	19	20	20	MLT

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	2	3	3	2	2	3	3	✓	2	2	A
5	9	9	7	7	8	8	7	6	7	8	JW
6	11	11	10	10	11	12	12	11	12	12	MLT
7											
8											
Total	22	23	20	19	21	23	22	17	21	22	MLT

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	3	✓	2	3	3	2	2	5	A
5	7	9	8	5	7	8	7	9	8	✓	JW
6	9	10	10	10	9	9	12	11	12	10	MLT
7											
8											
Total	19	22	21	15	18	20	22	22	22	15	MLT

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	2	3	✓	3	3	2	3	3	A
5	7	8	7	7	5	✓	✓	8	7	8	JW
6	9	9	10	12	11	12	10	10	11	9	MLT
7											
8											
Total	19	20	19	22	16	15	13	20	21	20	MLT

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	4	3	2	3	2	3	3	3	A
5	5	6	7	7	✓	7	8	4	4	7	JW
6	10	9	9	11	10	10	10	9	10	9	MLT
7											
8											
Total	18	18	20	21	12	20	20	16	17	19	MLT

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Some clear, not present

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	02-5469-3560	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-4795-0276	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	06 May-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	22h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1908769	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

June 2/15

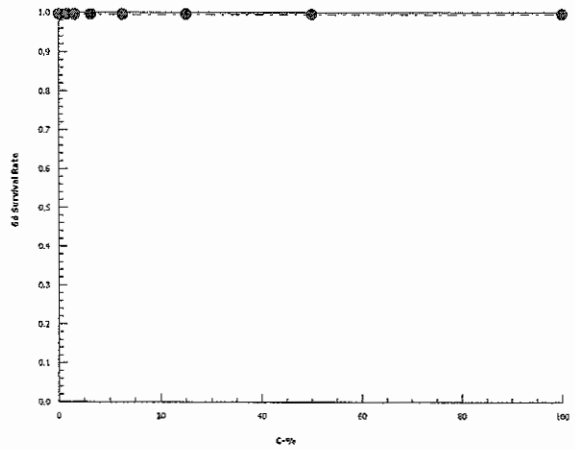
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 02-5469-3560 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 22 May-15 13:52 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-4727-2928	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-4795-0276	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	06 May-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	22h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1493458	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	33.41	2.905	78.93	2.993	1.267	34.43
IC10	94.14	22.65	N/A	1.062	NA	4.414
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	19.7	15	22	0.6333	2.003	10.17%	0.0%
1.56		10	20.6	17	23	0.6532	2.066	10.03%	-4.57%
3.12		10	18.6	14	20	0.718	2.271	12.21%	5.58%
6.25		10	20.2	19	22	0.3266	1.033	5.11%	-2.54%
12.5		10	21	17	23	0.5963	1.886	8.98%	-6.6%
25		10	19.6	15	22	0.8844	2.797	14.27%	0.51%
50		10	18.5	13	22	0.9098	2.877	15.55%	6.09%
100		10	18.1	12	21	0.836	2.644	14.61%	8.12%

Reproduction Detail

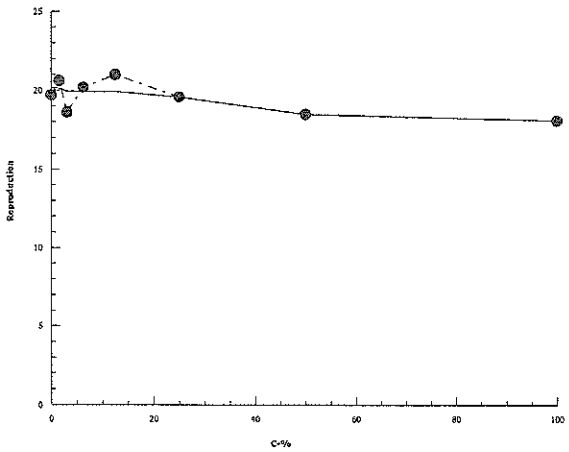
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	20	18	20	21	22	21	21	15	20	19
1.56		17	18	23	21	22	23	21	20	22	19
3.12		14	18	20	20	20	15	20	19	20	20
6.25		21	19	19	21	21	20	22	19	20	20
12.5		22	23	20	19	21	23	22	17	21	22
25		19	22	21	15	18	20	22	22	22	15
50		19	20	19	22	16	15	13	20	21	20
100		18	18	20	21	12	20	20	16	17	19

June 2/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-4727-2928	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15376

Start Date/Time: May 6/15 @ 1250h
Set up by: MLT

Sample Information:

Sample ID: LC_LC3_WS_2015-05-06_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042415B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 34
Mortality (%) in previous 7 d: 10
Individual female # used ≥8 young on test day: 21,22,23,24,25,26,28,30,31,35,36,37,38,39

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd128
Stock Solution ID: 15Na02
Date Initiated: April 22/15

7-d LC50 (95% CL): 2.1 (2.0 - 2.2) g/L NaCL
7-d IC50 (95% CL): 1.4 (0.9 - 1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCL CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 2/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_LC3_WS_2015-05-06_N
Work Order #: 153716

Start Date & Time: May 6/15 @ 1250h
Stop Date & Time: May 13/15 @ 1020h
Test Species: *Ceriodaphnia dubia*

Concentration: Control	Days													
	0	1		2		24.5 3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	~~25.5~~	24.0	25.0	25.0	25.0	24.0	24.5	24.0	25.0
DO (mg/L)	8.1	7.9	8.0	7.8	8.2	7.9	8.2	7.4	8.1	7.4	8.2	7.2	8.0	7.5
pH	8.0	7.7	7.9	7.7	8.0	7.9	8.1	7.7	8.0	7.6	8.0	7.6	~~7.8~~ 7.9	7.7
Cond. (µS/cm)	218	209		213		218		223		220		217		219
Initials	KLP	EMM		JW				MLT		EMM		JW		EMM

Concentration: 1.56% (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.5	24.5	24.0	25.0	24.5	25.0	24.0	24.5	24.0	25.0
DO (mg/L)	7.9	7.9	8.2	7.8	8.3	7.9	8.1	7.5	8.1	7.5	8.1	7.3 ④	~~7.8~~ 7.7	7.6
pH	7.9	7.7	8.0	7.8	8.3	7.9	8.1	7.9	8.0	~~7.7~~	8.0	7.7	7.7	7.7
Cond. (µS/cm)	224	213		221		229		234		229		230		230
Initials	KLP	EMM		JW		EMM		MLT		EMM		KS/MLT		EMM
												⑤ 8.1		

Concentration: 12.5% (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.5	24.5	24.0	25.0	24.5	25.0	24.0	24.5	24.0	25.0
DO (mg/L)	7.9	7.9	8.2	7.8	8.2	7.9	8.1	7.5	8.0	7.5	8.1	7.5 ④	~~7.4~~ 7.7	7.6
pH	7.9	7.8	8.0	7.8	8.3	8.0	8.2	8.0	8.0	~~7.7~~	8.0	7.7	7.7	7.7
Cond. (µS/cm)	287	277		286		292		307		298		294		290
Initials	KLP	EMM		JW		EMM		MLT		EMM		KS/MLT		EMM
												⑤ 8.1		

Concentration: 100% (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	25.0	24.5	24.0	25.0	24.5	25.0	24.0	24.5	24.0	25.0
DO (mg/L)	8.0	7.9	8.2	7.8	8.2	7.9	8.2	7.5	8.0	7.6	8.1	7.4 ④	~~8.1~~ 7.9	7.9
pH	7.9	7.9	7.9	8.0	8.1	8.2	8.1	8.2	8.0	8.1	8.0	8.0	7.7	7.9
Cond. (µS/cm)	749	751		759		760		772		760		754		728
Initials	KLP	EMM		EMM		EMM		MLT		EMM		KS/MLT		EMM
												⑤ 8.2		

	Control	100% (v/v)	
Hardness*	100	470	
Alkalinity*	90	182	

* mg/L as CaCO3

Analysts: EMM, MLT, AWD, EC, JW
Reviewed by:
Date reviewed: June 2/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: Clear

Comments: **Broodboard Used:** BB042415B (21-26, 28, 30, 31, 35-39)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC_LC3-WS_2015-05-06_N
Work Order: 15376

Start Date & Time: May 6/15 @1250h
Stop Date & Time: May 13/15 @ 1020h
Set up by: MLT

% (v/v)

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	3	3	4	3	4	3	3	3	4	4	AD
5	8	8	7	7	8	8	7	7	6	9	FMM
6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JW
7	11	10	10	11	13	12	12	11	10	9	FMM
8											
Total	22	21	21	21	25	23	22	21	20	22	FMM

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	2	3	3	✓	✓	3	2	3	3	3	AD
5	8	8	7	4	4	8	7	7	6	6	FMM
6	✓	✓	✓	9	✓	✓	✓	✓	✓	✓	JW
7	9	12	11	13	11	13	11	10	12	12	FMM
8											
Total	19	23	21	26	15	24	20	20	21	21	FMM

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	3	4	3	2	3	2	3	2	3	3	AD
5	8	7	7	6	6	7	7	6	5	6	FMM
6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JW
7	10	11	11	13	13	10	10	11	12	11	FMM
8											
Total	21	22	21	21	22	19	20	19	20	20	FMM

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	3	3	2	3	3	2	3	2	3	2	AD
5	8	7	6	7	8	7	7	6	6	5	FMM
6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JW
7	11	10	12	10	11	11	13	11	12	13	FMM
8											
Total	22	20	20	20	22	20	23	19	21	20	FMM

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	2	3	4	4	3	4	3	3	2	✓	AD
5	8	9	7	7	7	8	7	9	8	5	FMM
6	✓	✓	✓	✓	✓	✓	✓	✓	✓	8	JW
7	11	10	11	9	12	10	9	10	10	✓	FMM
8											
Total	21	22	22	20	24 or 22	22	19	22	20	13	FMM

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	2	3	3	✓	4	✓	3	2	3	3	AD
5	8	9	8	6	8	6	✓	6	8	7	FMM
6	✓	✓	✓	11	✓	✓	7	✓	✓	✓	JW
7	10	9	9	✓	12	9	10	10	9	9	FMM
8											
Total	20	21	20	17	24	15	20	18	20	19	FMM

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	✓	3	3	3	3	X	3	2	3	2	AD
5	4	6	8	7	7	|	7	8	8	6	FMM
6	3	✓	✓	✓	✓	|	✓	✓	✓	✓	JW
7	6	10	10	8	9	|	11	8	9	6	FMM
8											
Total	13	19	21	18	19	0X	21	18	20	14	FMM

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	2	✓	3	2	2	2	3	3	2	3	AD
5	7	4	8	✓	7	6	6	6	7	6	FMM
6	✓	9	✓	6	✓	✓	✓	✓	✓	✓	JW
7	8	✓	9	10	8X	7	8	10	7	7	FMM
8					↓						
Total	17	13	20	18	17X	15	17	19	16	16	FMM

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											EL — MLT
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: June 2/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-8401-8701	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-9635-6863	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	06 May-15 12:50	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 10:20	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 22h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	22h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1550163	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	35.41	29.77	N/A	2.824	NA	3.359
EC10	100	35.41	N/A	1	NA	2.824
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
100		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	0	1	1	1	1
100		1	1	1	1	0	1	1	1	1	1

June 2/15

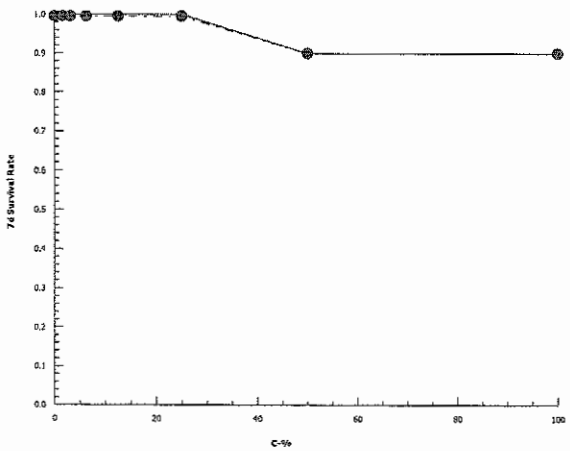
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-8401-8701	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1

Graphics



June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	01-6776-7010	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-9635-6863	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	06 May-15 12:50	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 10:20	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 22h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	22h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	154583	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.615	0.6822	25.39	38.25	3.939	146.6
IC10	21.15	6.812	35.56	4.728	2.812	14.68
IC15	30.94	18.66	60.72	3.232	1.647	5.359
IC20	40.32	27.88	N/A	2.48	NA	3.586
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	21.8	20	25	0.4422	1.398	6.42%	0.0%
1.56		10	21	15	26	0.9428	2.981	14.2%	3.67%
3.12		10	20.5	19	22	0.3416	1.08	5.27%	5.96%
6.25		10	20.7	19	23	0.3958	1.252	6.05%	5.05%
12.5		10	20.3	13	22	0.8825	2.791	13.75%	6.88%
25		10	19.4	15	24	0.763	2.413	12.44%	11.01%
50		10	16.3	0	21	2	6.325	38.81%	25.23%
100		10	16.8	13	20	0.6289	1.989	11.84%	22.94%

Reproduction Detail

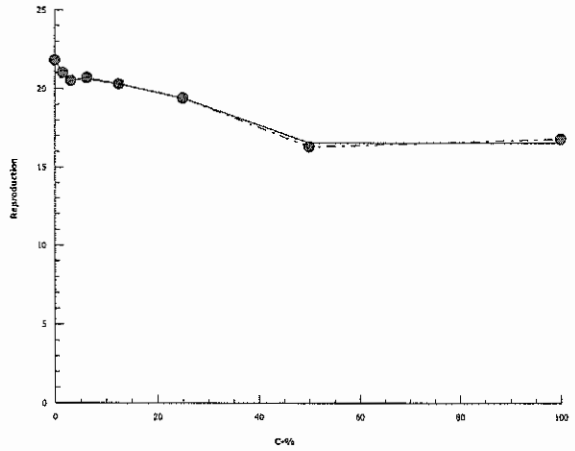
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	22	21	21	21	25	23	22	21	20	22
1.56		19	23	21	26	15	24	20	20	21	21
3.12		21	22	21	21	22	19	20	19	20	20
6.25		22	20	20	20	22	20	23	19	21	20
12.5		21	22	22	20	22	22	19	22	20	13
25		20	21	20	17	24	15	20	18	20	19
50		13	19	21	18	19	0	21	18	20	14
100		17	13	20	18	17	15	17	19	16	16

June 2/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	01-6776-7010	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 153716

Start Date/Time: May 6/15 @ 1310h
Set up by: MLT

Sample Information:

Sample ID: LC_DCI_WS_2015-05-05_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042415B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 34
Mortality (%) in previous 7 d: 10
Individual female # used ≥8 young on test day 21,22,23,24,25,26,28,30,31,35,36,37,38,39

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd128
Stock Solution ID: 15Na02
Date Initiated: April 22/15

7-d LC50 (95% CL): 2.1 (2.0 - 2.2) g/L NaCl
7-d IC50 (95% CL): 1.4 (0.9 - 1.7) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCl CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCl CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 2/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_OC1_WS_2015-05-05_N
Work Order #: 15376

Start Date & Time: May 6/15 @ 1310h
Stop Date & Time: May 13/15 @ 1100h
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.1	7.8	8.0	7.8	8.2	7.7	8.2	7.4	8.1	7.7	8.2	7.7	8.0	7.5
pH	8.0	7.8	7.9	7.6	8.0	7.7	8.1	7.7	8.0	7.7	8.0	7.6	7.8	7.7
Cond. (µS/cm)	218	209		213		218		223		220		217		221
Initials	KLP	EMM		JW		EMM		MLT		EMM		KS/MLT		EMM

Concentration: 1.56% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	7.8	7.9	8.0	7.8	8.3	7.7	8.3	7.6	8.1	7.8	8.1	7.6	7.9	7.5
pH	7.9	7.8	7.9	7.7	8.3	7.8	8.1	7.9	8.0	7.7	8.0	7.7	7.8	7.7
Cond. (µS/cm)	218	208		211		218		223		222		222		230
Initials	KLP	EMM		JW		EMM		MLT		EMM		KS/MLT		EMM

① 8.1

Concentration: 12.5% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	7.9	7.9	8.1	7.8	8.2	7.6	8.2	7.5	8.0	7.8	8.2	7.6	7.7	7.5
pH	7.9	7.8	7.9	7.7	8.3	7.8	8.2	8.0	8.0	7.7	8.0	7.7	7.8	7.7
Cond. (µS/cm)	220	210		214		219		226		224		222		220
Initials	KLP	EMM		JW		EMM		MLT		EMM		KS/MLT		EMM

② 8.2

Concentration: 100% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	25.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	7.9	7.9	8.1	7.8	8.3	7.6	8.3	7.4	8.0	7.8	8.1	7.8	7.8	7.4
pH	7.8	7.8	7.9	7.9	8.3	8.1	8.3	8.2	8.1	8.0	8.1	7.8	7.8	7.8
Cond. (µS/cm)	227	226		228		232		233		231		228		225
Initials	KLP	EMM		JW		EMM		MLT		EMM		KS/MLT		EMM

③ 8.2 ④ 7.6

	Control	100% (v/v)		
Hardness*	100	144		
Alkalinity*	90	100		

Analysts: EMM, MLT, AWD, EC

Reviewed by: [redacted]

Date reviewed: June 2/15

* mg/L as CaCO3

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: Clear

Comments: **Broodboard Used:** BB042415B test tubes (21-26, 28, 30, 31, 35-39)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LL_OC1_WS_2015-05-05_N
Work Order: 15376

Start Date & Time: May 6/15 @ 1310h
Stop Date & Time: May 13/15 @ 1100h
Set up by: MLJ

% (v/v)

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	4	3	4	3	3	4	3	3	3	Δ
5	6	6	6	8	X	7	8	6	6	7	FMM
6	✓	✓	✓	✓	|	✓	✓	✓	✓	✓	MLJ
7	10	8	10	10	|	9	10	10	11	11	FMM
8									MLJ		
Total	19	18	19	22	10	19	22	19	19	21	FMM
									20		

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	2	3	3	2	2	3	3	3	Δ
5	6	9	7	8	8	9	7	7	6	9	FMM
6	✓	✓	✓	10	✓	✓	✓	✓	10	✓	MLJ
7	12	10	12	✓	11	11	10	12	13	11	FMM
8											
Total	21	22	21	21	22	22	19	22	19	23	FMM

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	2	2	3	2	✓	3	2	3	3	Δ
5	8	7	7	✓	6	4	8	6	6	7	FMM
6	✓	✓	✓	6	✓	11	✓	✓	✓	✓	MLJ
7	9	9	10	11	12	✓	12	11	13	11	FMM
8											
Total	20	18	19	20	20	15	23	19	22	21	FMM

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	2	2	3	✓	3	2	3	3	Δ
5	6	8	6	7	8	5	8	5	8	8	FMM
6	✓	✓	✓	9	✓	✓	✓	12	✓	✓	MLJ
7	11	12	11	✓	12	11	13	✓	12	13	FMM
8											
Total	20	23	19	18	25	16	24	19	23	24	FMM

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	2	3	3	2	3	3	✓	2	3	Δ
5	8	8	✓	6	7	9	✓	6	5	7	FMM
6	✓	✓	7	✓	9	✓	8	12	✓	✓	MLJ
7	13	11	10	11	10	11	12	10	9	11	FMM
8											
Total	24	21	20	20	18	23	23	28	16	21	FMM

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	2	3	2	✓	3	3	✓	✓	Δ
5	6	6	7	✓	8	6	7	7	6	5	FMM
6	10	✓	✓	7	✓	✓	✓	✓	11	✓	MLJ
7	✓	11	14	11	12	10	11	10	✓	9	FMM
8											
Total	19	20	23	21	22	16	21	20	17	14	FMM

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	3	✓	3	2	3	3	3	✓	Δ	Δ
5	6	8	6	7	✓	8	✓	7	6	8	FMM
6	✓	✓	✓	10	8	✓	6	✓	12	✓	MLJ
7	11	11	10	✓	12	11	12	13	✓	10	FMM
8										MLJ	
Total	20	22	16	20	22	22	21	23	18	18	FMM
										21	

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	FMM
4	3	2	✓	2	3	2	✓	2	2	3	Δ
5	7	7	6	✓	7	7	5	7	8	8	FMM
6	✓	✓	12	8	✓	✓	10	—	✓	✓	MLJ
7	11	14	✓	12	10	12	✓	13	11	11	FMM
8						MLJ					
Total	21	23	18	22	20	22-15	22	21	22		FMM
						21					

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	16-2250-0354	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 12:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-2196-4899	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 13:10	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 22h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	25h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	297228	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	1	1	1	0	0	0.0%	-11.11%	10	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	0	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

June 2/15

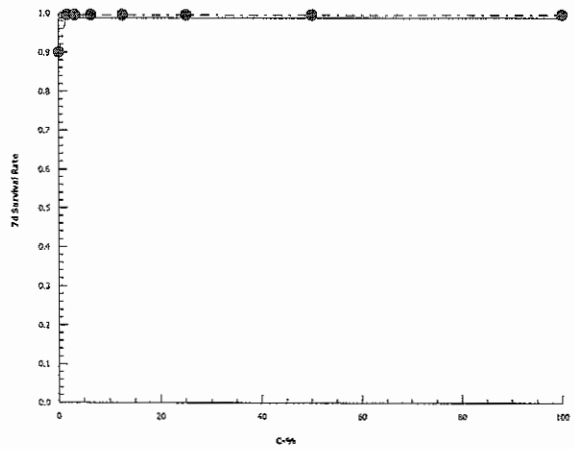
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	16-2250-0354	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 12:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-5473-8212	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 12:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-2196-4899	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 13:10	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	13 May-15 11:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 22h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	25h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1734800	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	N/A	N/A	<1	NA	NA
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	18.9	10	22	1.08	3.414	18.06%	0.0%
1.56		10	21.2	19	23	0.4163	1.317	6.21%	-12.17%
3.12		10	19.7	15	23	0.7	2.214	11.24%	-4.23%
6.25		10	20.9	16	24	0.9	2.846	13.62%	-10.58%
12.5		10	21.4	16	28	1.056	3.34	15.61%	-13.23%
25		10	19.3	14	23	0.895	2.83	14.67%	-2.12%
50		10	20.5	16	23	0.6708	2.121	10.35%	-8.47%
100		10	20.5	15	23	0.7491	2.369	11.56%	-8.47%

Reproduction Detail

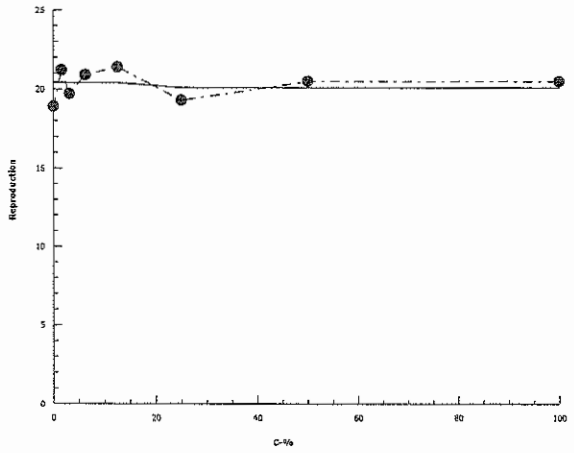
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	19	18	19	22	10	19	22	19	20	21
1.56		21	22	21	21	22	22	19	22	19	23
3.12		20	18	19	20	20	15	23	19	22	21
6.25		20	23	19	18	23	16	24	19	23	24
12.5		24	21	20	20	18	23	23	28	16	21
25		19	20	23	21	22	16	21	20	17	14
50		20	22	16	20	22	22	21	23	18	21
100		21	23	18	22	20	21	15	22	21	22

June 2/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-5473-8212	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 12:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15376

Start Date/Time: May 6/15 @ 1240h
Set up by: MLT

Sample Information:

Sample ID: LC_FRDSDC_WS_2015-05-05_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042415A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 27
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 1,2,3,4,5,6,7,8,9,10,11,14,16

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd128
Stock Solution ID: 15Na02
Date Initiated: April 22/15

7-d LC50 (95% CL): 2.1 (2.0 - 2.2) g/L NaCL
7-d IC50 (95% CL): 1.4 (0.9 - 1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCL CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		93.4 (68.4 - 100)
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 2/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_FROSK_WS_2015-05-05_N
Work Order #: 15376

Start Date & Time: May 6/15 @ 1240h
Stop Date & Time: May 12/15 @ ~~1300h~~ 1600h MLT
Test Species: *Ceriodaphnia dubia*

Concentration: Control

	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	JW old	new		final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	25.0	24.5	24.0	24.5			
DO (mg/L)	8.1	7.9	8.0	7.8	8.2	7.6	8.2	7.4	8.1	7.9	8.2	6.9			
pH	8.0	7.7	7.9	~~7.7~~	8.0	~~7.7~~	8.1	~~7.8~~	8.0	7.6	8.0	7.5			
Cond. (µS/cm)	218	209		213		218		223		220		216			
Initials	KLP	EMM		EMM		MD		MLT		EMM		JW			JW

Concentration: 1.56% (v/v)

	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	JW old	new		final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	24.5	24.0	24.5			
DO (mg/L)	7.8	8.0	7.9	7.8	8.3	7.6	8.1	7.7	8.1	7.7	8.2	7.1			
pH	8.0	7.7	8.0	7.8	8.3	8.0	8.0	7.9	8.0	7.7	8.1	7.6			
Cond. (µS/cm)	225	214		218		EMM ~~210~~ 225		230		228		223			
Initials	KLP	EMM		JW		MD		MLT		EMM		JW			JW

Concentration: 12.5% (v/v)

	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	JW old	new		final
Temperature (°C)	24.5	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	24.5	24.0	24.5			
DO (mg/L)	7.8	7.9	8.0	7.8	8.2	7.6	8.2	7.6	8.1	7.8	8.2	7.2			
pH	8.0	7.7	8.0	7.9	8.3	8.0	8.0	8.0	8.0	7.8	8.0	7.6			
Cond. (µS/cm)	261	250		255		264		270		269		261			
Initials	KLP	EMM		EMM		MD		MLT		EMM		JW			JW

Concentration: 100% (v/v)

	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	JW old	new		final
Temperature (°C)	25.0	24.0	24.0	25.0	25.0	25.0	24.0	25.0	24.5	24.5	24.0	24.5			
DO (mg/L)	7.9	8.0	8.0	7.8	~~8.2~~ 7.6	8.2	8.2	7.6	8.2	7.7	8.3	7.2			
pH	8.0	7.9	8.1	8.0	8.2	8.2	8.2	8.1	8.1	8.0	8.1	7.8			
Cond. (µS/cm)	551	550		550		552		564		554		542			
Initials	KLP	EMM		JW		MD		MLT		EMM		JW			JW

	Control	100% (v/v)		
Hardness*	100	288		
Alkalinity*	90	166		

* mg/L as CaCO3

Analysts: EMM, MLT, AWD, EC, JW

Reviewed by:

Date reviewed: June 2/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: clear

Comments: **Broodboard Used:** BB042415A (Test tubes 1-11, 14, ~~16~~ MD 14, 16)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: ~~FADSAC~~ FRDSOC_WS-2015-05-05_N
Work Order: 15376

Start Date & Time: May 6/15 @1240h
Stop Date & Time: May 12/15 @ ~~1300h~~ 1600h
Set up by: MLT MLT

% (v/v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
4	3	4	3	3	2	3	3	3	3	3	
5	8	7	8	7	7	7	7	7	7	7	JW
6	11	10	12	11	11	10	11	11	11	8	JW
7											
8											
Total	22	21	23	21	21	20	21	21	21	18	JW

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
4	3	2	✓	✓	3	3	3	2	3	2	
5	9	8	8	5	7	8	7	8	✓	7	JW
6	11	10	12	9	12	13	11	11	11	11	JW
7											
8											
Total	23	20	20	14	22	24	21	21	14	20	JW

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
4	3	3	2	3	2	3	3	2	3	3	
5	7	7	8	5	8	6	7	8	6	7	JW
6	11	12	7	✓	11	11	11	11	11	12	JW
7											
8											
Total	21	22	17	8	21	20	21	21	20	22	JW

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
4	3	3	2	3	3	3	2	2	3	✓	
5	✓	8	6	7	9X	7	8	8	6	4	JW
6	12	11	12	12	1	10	12	10	10	10	JW
7					1						
8											
Total	15	22	20	22	12X	20	22	20	19	14	JW

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
4	2	2	3	2	3	3	2	2	3	3	
5	7	8	6	7	8	6	6	8	8	8	JW
6	12	10	11	9	12	10	10	11	9	10	JW
7											
8											
Total	21	20	20	18	23	19	18	21	20	21	JW

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
4	2	2	3	3	3	3	3	3	3	3	
5	6	8	8	8	7	7	6	6	✓	8	JW
6	9	11	10	10	10	9	✓	XJW 10	8	11	JW
7											
8											
Total	17	21	21	21	20	19	9	19	11	22	JW

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
4	2	3	2	3	3	3	2	2	/	3	
5	6	8	7	6	8	7	6	9	7	7	JW
6	10	11	10	11	11	9	10	12	13	11	JW
7											
8											
Total	18	22	19	20	22	19	18	23	20	21	JW

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	TMM
4	✓	2	3	✓	3	2	3	2	2	3	
5	✓	7	6	4	6	3	5	8	8	6	JW
6	5	10	10	11	10	11	✓	11	12	✓	JW
7											
8											
Total	5	19	19	15	19	16	8	21	22	9	JW

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: EL

Date reviewed: June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-4947-4808	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:55	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-2702-3340	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 12:40	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	82165	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	0	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

June 2/15

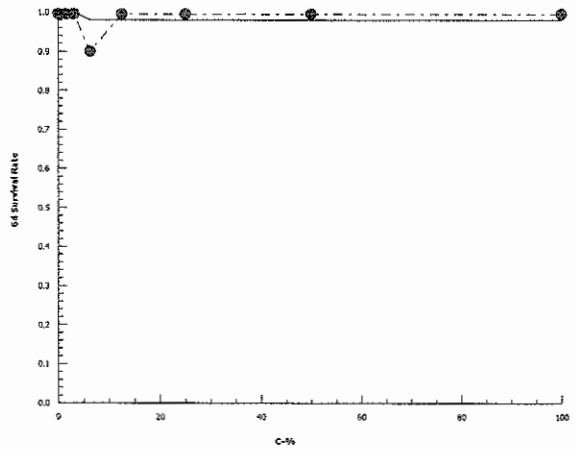
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-4947-4808	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:55	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	20-6981-3209	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-2702-3340	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 12:40	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1509842	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	1.659	0.5895	52.2	60.29	1.916	169.6
IC10	52.73	1.527	74.61	1.896	1.34	65.5
IC15	63.84	22.52	N/A	1.566	NA	4.44
IC20	77.24	57.99	N/A	1.295	NA	1.725
IC25	93.41	68.41	N/A	1.071	NA	1.462
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	20.9	18	23	0.4069	1.287	6.16%	0.0%
1.56		10	19.9	14	24	1.069	3.381	16.99%	4.79%
3.12		10	19.3	8	22	1.334	4.218	21.85%	7.66%
6.25		10	18.6	12	22	1.147	3.627	19.5%	11.0%
12.5		10	20.1	18	23	0.4819	1.524	7.58%	3.83%
25		10	18	9	22	1.414	4.472	24.85%	13.88%
50		10	20.2	18	23	0.5538	1.751	8.67%	3.35%
100		10	15.3	5	22	1.88	5.945	38.86%	26.79%

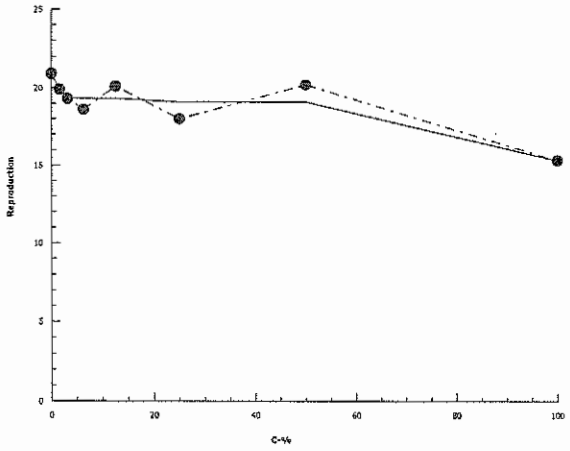
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	22	21	23	21	21	20	21	21	21	18
1.56		23	20	20	14	22	24	21	21	14	20
3.12		21	22	17	8	21	20	21	21	20	22
6.25		15	22	20	22	12	20	22	20	19	14
12.5		21	20	20	18	23	19	18	21	20	21
25		17	21	21	21	20	19	9	19	11	22
50		18	22	19	20	22	19	18	23	20	21
100		5	19	19	15	19	16	8	21	22	9

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	20-6981-3209	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15376

Start Date/Time: May 6/15 @ 1320h
Set up by: MLT

Sample Information:

Sample ID: LC_DCDS_WS_2015-05-05_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1X20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: D042815A, D042815B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 17
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day 1,3,4,6,7,10,11,12,13,14,15,16,17,18,22,23,24,31,33,34,35,36,

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd128
Stock Solution ID: 15NaCl02
Date Initiated: April 22/15

7-d LC50 (95% CL): 2.1 (2.0 - 2.2) g/L NaCl
7-d IC50 (95% CL): 1.4 (0.9 - 1.7) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCl CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCl CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 2/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC-DCDS_WS_2015-05-05_N
Work Order #: 15376
Start Date & Time: May 6/15 @ 13:20h
Stop Date & Time: May 12/15 @ 15:00h
Test Species: *Ceriodaphnia dubia*

Concentration: control	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	23.5	25.0	24.0	25.0			
DO (mg/L)	8.1	7.9	8.0	7.9	8.2	7.7	8.2	7.9	8.1	7.5	8.2	7.3			
pH	8.0	7.7	7.9	7.6	8.0	7.7	8.1	7.7	8.0	7.7	8.0	7.6			
Cond. (µS/cm)	218	209		213		218		223		220		231			
Initials	KLP	EMM		JW		EMM		MLT		EMM		JW			

Concentration: 1.56% (v/v)	Days														
	0	1		2 24.0		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0			
DO (mg/L)	7.9	7.8	8.0	8.0	8.3	7.6	8.1	7.5	8.1	7.5	8.2	7.3			
pH	7.9	7.7	7.9	7.7	8.3	7.7	7.8	7.9	8.0	7.9	8.0	7.6			
Cond. (µS/cm)	217	212		211		219		223		220		231			
Initials	KLP	EMM		JW		EMM		MLT		EMM		JW			

Concentration: 12.5% (v/v)	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0			
DO (mg/L)	7.9	7.9	7.9	7.9	8.3	7.7	8.2	7.6	8.0	7.6	8.2	7.4			
pH	7.8	7.7	7.9	7.7	8.3	7.6	7.8	7.9	8.1	7.9	8.0	7.6			
Cond. (µS/cm)	215	207		211		216		220		218		229			
Initials	KLP	EMM		JW		EMM		MLT		EMM		JW			

Concentration: 100% (v/v)	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	24.0	24.0	24.0	25.0	24.5	25.0	24.0	25.0	24.5	25.0	24.0	25.0			
DO (mg/L)	7.9	7.8	7.9	7.8	8.2	7.7	8.2	7.6	8.0	7.6	8.2	7.3			
pH	7.7	7.7	7.8	7.7	8.2	7.6	7.9	7.8	8.0	7.8	8.0	7.6			
Cond. (µS/cm)	189	187		189		189		189		191		202			
Initials	KLP	EMM		JW		EMM		MLT		EMM		JW			

	Control	100% (v/v)		
Hardness*	150	90		
Alkalinity*	90	92		

* mg/L as CaCO3

Analysts: EMM, MLT, AWD, EC, JW
Reviewed by: EC
Date reviewed: June 2/15

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: clear, some ppt present

Comments: **Broodboard Used:** BB042815 A+B (1,3,4,6,7,10,11-18,22-24,31,33-36,39)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC DCDS_WS_2015-05-05_N
Work Order: 15376

Start Date & Time: May 6/15 @ 1320h
Stop Date & Time: May 12/15 @ 1500h
Set up by: MLT

% (v/v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	mm
3	✓	X	✓	3	✓	✓	✓	✓	✓	3	mm
4	4	↓	3	✓	3	3	3	3	3	✓	A
5	8		9	6	7	7	7	8	8	6	mm
6	10		8	9	10	9	9	10	4	8	JW
7											
8											
Total	22	0	20	18	20	19	19	21	15	17	MLT

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	mm
3	✓	✓	✓	2	✓	✓	✓	✓	✓	✓	mm
4	3	3	2	✓	3	2	3✓	3	3	3	A
5	6	8	6	7	7	6	3	7	8	8	mm
6	11	12	9	12	10	10	6	10	11	9	JW
7											
8											
Total	20	23	17	21	20	18	9	20	22	20	MLT

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	mm
3	✓	✓	✓	✓	3	✓	✓	✓	✓	✓	mm
4	3	2	3	2	✓	3	2	2	3	3	A
5	6	7	7	5	8	6	6	7	8	7	mm
6	12	9	11	11	9	11	✓	10	11	10	JW
7											
8											
Total	21	18	21	18	20	20	8	19	22	20	MLT

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	mm
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	mm
4	3	2	3	3	3	3	4	3	3	2	A
5	8	6	8	9	8	7	8	7	6	6	mm
6	11	10	10	10	10	10	10	11	10	11	JW
7											
8											
Total	22	18	21	22	21	20	22	21	19	19	MLT

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	mm
3	✓	4	✓	✓	✓	✓	✓	✓	✓	✓	mm
4	✓	✓	3	2	3	3	3	3	3	3	A
5	5	8	7	6	7	8	7	6	7	7	mm
6	10	11	11	✓	10	8	✓	11	10	8	JW
7											
8	MLT 15										
Total	15	23	21	8	20	19	10	20	20	18	MLT

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	mm
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	mm
4	3	4	✓	2	3	3	3	✓	2	4	A
5	8	8	4	6	6	7	8	4	6	7	mm
6	10	✓	11	10	9	12	✓	10	6	9	JW
7											
8											
Total	21	12	15	18	18	22	11	14	14	20	MLT

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	mm
3	✓	✓	✓	3	✓	✓	✓	✓	2	✓	mm
4	3	2	✓	✓	3	3	2	2	✓	✓	A
5	6	7	4	8	9		7	7	6	9	mm
6	9	11	9	9	2		10	8	10	10	JW
7											
8		20									
Total	18	18 MLT	13	20	14	3	19	17	18	14	MLT

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	mm
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	mm
4	4	2	3	3	✓	3	2	2	2	✓	A
5	8	7	6	6	4	6	6	7	6	5	mm
6	✓	8	4	9	8	✓	9	8	10	10	JW
7											
8											
Total	12	17	13	18	12	9	17	17	18	15	MLT

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear, some ppt present

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-1122-9588	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-0889-2617	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 13:20	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	26h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2019556	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	0	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	0	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

June 2/15

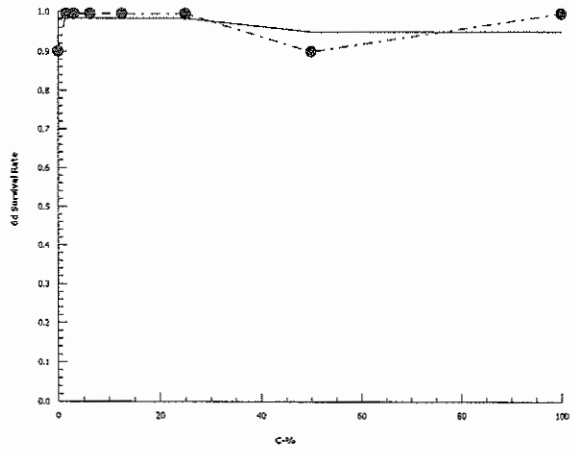
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-1122-9588	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-3209-1811	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-0889-2617	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 13:20	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	26h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1632692	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	9.931	3.023	42.54	10.07	2.351	33.08
IC10	17.84	8.482	72.8	5.606	1.374	11.79
IC15	36.77	10.48	N/A	2.72	NA	9.542
IC20	79.89	12.41	N/A	1.252	NA	8.056
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	17.1	0	22	2.002	6.332	37.03%	0.0%
1.56		10	19	9	23	1.238	3.916	20.61%	-11.11%
3.12		10	18.7	8	22	1.257	3.974	21.25%	-9.36%
6.25		10	20.5	18	22	0.4534	1.434	6.99%	-19.88%
12.5		10	17.4	8	23	1.551	4.904	28.18%	-1.75%
25		10	16.5	11	22	1.213	3.837	23.25%	3.51%
50		10	15.6	3	20	1.614	5.103	32.71%	8.77%
100		10	14.8	9	18	0.9866	3.12	21.08%	13.45%

Reproduction Detail

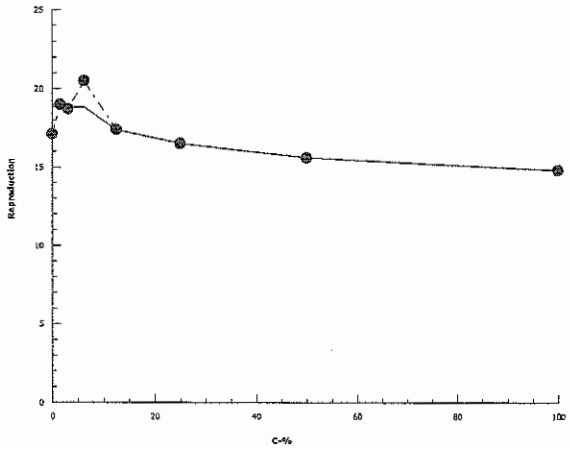
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	22	0	20	18	20	19	19	21	15	17
1.56		20	23	17	21	20	18	9	20	22	20
3.12		21	18	21	18	20	20	8	19	22	20
6.25		22	18	21	22	21	20	22	21	19	19
12.5		15	23	21	8	20	19	10	20	20	18
25		21	12	15	18	18	22	11	14	14	20
50		18	20	13	20	14	3	19	17	18	14
100		12	17	13	18	12	9	17	17	18	15

June 2/15

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	03-3209-1811	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 15376

Start Date/Time: May 6/15 @ 1230h
Set up by: MLT

Sample Information:

Sample ID: LC_LC5_WS_2015-05-06_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042815A , 042815B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 17
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day 1,3,4,6,7,10,11,12,13,14,15,16,17,18,22,23,24,31,33,34,35,36,3

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd128
Stock Solution ID: 15Na02
Date Initiated: April 22/15

7-d LC50 (95% CL): 2.1 (2.0 - 2.2) g/L NaCL
7-d IC50 (95% CL): 1.4 (0.9 - 1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.6-2.4) g/L NaCL CV (%): 11
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 2/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_LC5_WS_2015-05-06_N
Work Order #: 15376

Start Date & Time: May 6/15 @ 1230h
Stop Date & Time: May 12/15 @ ~~1300h~~ 1600h MLT
Test Species: *Ceriodaphnia dubia*

Concentration: Control

	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	24.0	24.0	24.0	24.0	24.0	25.0	24.0	~~25.0~~	~~24.5~~	25.0	24.0	25.0			
DO (mg/L)	8.1	8.0	8.0	8.0	8.2	7.6	8.2	7.4	8.1	7.7	8.2	7.8			
pH	8.0	7.5	7.9	7.2	8.0	7.9	8.1	7.7	8.0	7.7	8.0	7.7			
Cond. (µS/cm)	218	209		213		218		223		220		218			
Initials	KLP	EMM		JW		EMM		~~AMLT~~ MLT		EMM		MLT			

① 25.0

Concentration: 1.56% (v/v)

	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	24.5	24.0	24.0	24.0	24.0	25.0	24.0	~~25.0~~	~~24.5~~	25.0	24.0	25.0			
DO (mg/L)	7.8	8.1	8.1	8.0	8.2	7.6	8.2	~~7.5~~	8.1	7.6	8.1	7.8			
pH	7.9	7.5	7.9	7.7	8.2	8.0	8.1	~~7.8~~	8.0	7.8	8.0	7.7			
Cond. (µS/cm)	228	215		218		223		226		222		221			
Initials	KLP	EMM		JW		EMM		~~AMLT~~ MLT		EMM		MLT			

Concentration: 12.5% (v/v)

	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	25.0	24.0	24.0	24.0	24.5	25.0	24.0	~~25.0~~	~~24.5~~	25.0	24.0	25.0			
DO (mg/L)	7.8	8.0	8.1	~~7.8~~ 8.2	~~8.2~~ 8.2	~~7.5~~ 8.2		~~7.4~~	8.1	~~7.6~~	~~8.2~~	7.8			
pH	7.9	7.7	7.9	7.8	8.2	8.1	8.2	~~7.9~~	8.1	7.9	~~8.1~~	7.7			
Cond. (µS/cm)	267	257		238		260		270		265		262			
Initials	KLP	EMM		JW		EMM		~~AMLT~~ MLT		EMM		MLT			

Concentration: 100% (v/v)

	Days														
	0	1		2		3		4		5		Final 6			7
	init.	old	new	old	new	old	new	old	new	old	new	old	new		final
Temperature (°C)	25.0	24.0	24.0	24.0	24.5	25.0	24.0	~~25.0~~	~~24.5~~	25.0	24.0	25.0			
DO (mg/L)	8.0	8.0	8.2	~~7.8~~ 8.2	~~8.2~~ 8.3	~~7.6~~ 8.3		~~7.5~~	8.1	7.6	8.2	7.8			
pH	7.9	7.9	8.1	8.0	8.3	8.2	8.3	~~8.1~~	8.2	8.0	8.2	8.0			
Cond. (µS/cm)	564	561		564		563		574		566		556			
Initials	KLP	EMM		EC		EMM		MLT		EMM		MLT			

	Control	100% (v/v)		
Hardness*	100	282		
Alkalinity*	90	364		

Analysts: EMM, MLT, AWD, EC
Reviewed by: [signature]
Date reviewed: June 7/15

* mg/L as CaCO3

WQ Ranges: T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 (mg/L) ; pH = 6 to 8.5

Sample Description: clear

Comments: **Broodboard Used:** BB 042815 A+B (1,3,4,6,7,10,11-18,22-24,31,33-36,39)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC_165_WS_2015-05-06_N
Work Order: 15376

Start Date & Time: May 6/15 @ 1230h
Stop Date & Time: May 12/15 @ ~~1300h~~ 1600h MG
Set up by: MLT

% (v/v)

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
3	✓	4	✓	✓	✓	✓	✓	✓	3	✓	MLT
4	4	✓	3	3	3	3	3	4	✓	X	AA
5	6	6	7	✓	7	7	8	6	7	|	FMM
6	10	11	10	9	12	9	10	9	10	|	MLT
7											
8											
Total	20	21	20	12	22	19	21	19	20	3X	MLT

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
3	✓	✓	✓	✓	✓	✓	✓	X	✓	4	MLT
4	3	4	4	✓	3	2	4	|	3	✓	AA
5	6	7	✓	4	7	6	8	|	7	6	FMM
6	10	10	11	10	9	8	10	|	9	11	MLT
7											
8											
Total	19	21	15	14	19	16	22	0X	19	21	MLT

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
3	4	✓	✓	3	3	✓	3	4	✓	✓	MLT
4	✓	3	3	✓	✓	3	✓	✓	3	3	AA
5	7	6	6	7	6	6	7	7	5	8	FMM
6	9	9	11	9	12	12	11	11	10	11	MLT
7											
8											
Total	20	18	20	19	21	21	21	22	18	22	MLT

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
3	✓	4	✓	✓	✓	✓	✓	✓	3	✓	MLT
4	4	✓	3	3	2	3	2	2	✓	3	AA
5	8	7	6	6	5	✓	7	6	7	8	FMM
6	10	10	9	✓	✓	8	9	10	10	11	MLT
7											
8											
Total	22	22	18	9	7	11	18	18	20	22	MLT

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
3	✓	✓	✓	3	✓	✓	✓	✓	4	✓	MLT
4	✓	2	3	✓	2	3	2	3	✓	3	AA
5	4	6	7	6	✓	✓	7	7	8	7	FMM
6	12	10	12	11	12	8	10	9	10	11	MLT
7											
8											
Total	16	18	22	20	14	11	19	19	22	21	MLT

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
3	✓	✓	✓	✓	✓	✓	✓	3	✓	✓	MLT
4	3	3	3	✓	✓	3	2	✓	3	2	AA
5	6	✓	8	6	4	8	6	6	9	7	FMM
6	9	9	11	11	11	10	11	10	11	10	MLT
7											
8											
Total	18	12	22	17	15	21	19	19	23	19	MLT

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	✓	4	3	~~3~~	3	✓	4	2	3	✓	AA
5	4	✓	7	✓	8	4	8	7	7	4	FMM
6	11	12	9	10	10	11	12	11	0X	10	MLT
7									↓		
8											
Total	15	16	19	13	21	15	24	20	10X	14	MLT

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	LL
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
4	4	✓	2	4	3	✓	✓	3	3	✓	AA
5	✓	6	5	✓	8	6	5	8	✓	5	FMM
6	11	11	13	12	✓	10	10	11	10	11	MLT
7											
8											
Total	15	17	20	16	11	16	15	22	13	16	MLT

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-6000-7899	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 12:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-8758-6864	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 13:20	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	186908	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	0
1.56		1	1	1	1	1	1	1	0	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	0	1
100		1	1	1	1	1	1	1	1	1	1

June 7/15

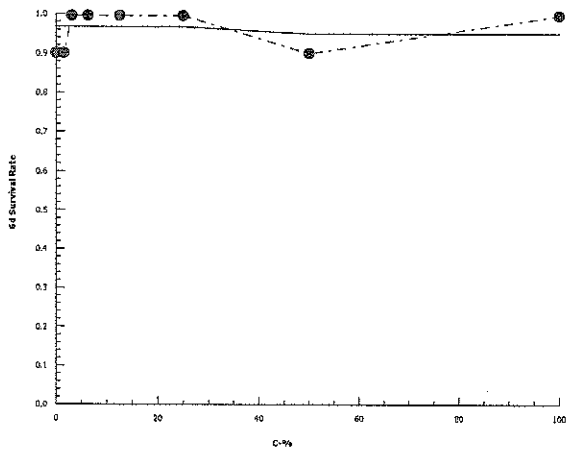
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-6000-7899	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 12:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



June 2/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	08-6980-2188	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-8758-6864	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Mimi Tran
Start Date:	06 May-15 13:20	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 May-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	873476	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	37.4	0.4757	N/A	2.674	NA	210.2
IC10	83.18	1.178	N/A	1.202	NA	84.9
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	17.4	0	22	2.12	6.703	38.52%	0.0%
1.56		10	16.6	0	22	2.029	6.415	38.65%	4.6%
3.12		10	20.2	18	22	0.4667	1.476	7.31%	-16.09%
6.25		10	16.7	7	22	1.783	5.638	33.76%	4.02%
12.5		10	18.2	11	22	1.133	3.584	19.69%	-4.6%
25		10	18.5	12	23	1.035	3.274	17.7%	-6.32%
50		10	16.7	10	24	1.334	4.218	25.26%	4.02%
100		10	16.1	11	22	0.9939	3.143	19.52%	7.47%

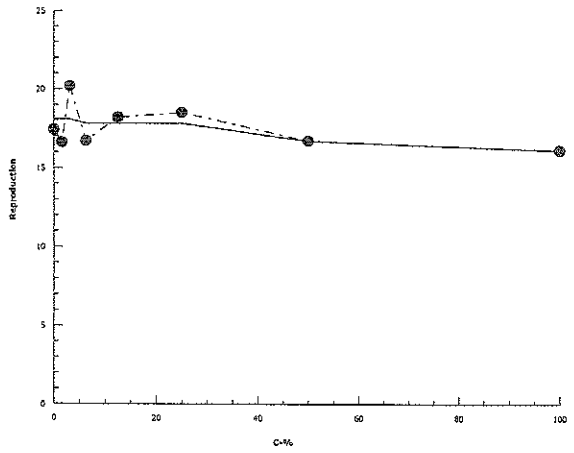
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	20	21	20	12	22	19	21	19	20	0
1.56		19	21	15	14	19	16	22	0	19	21
3.12		20	18	20	19	21	21	21	22	18	22
6.25		22	22	18	9	7	11	18	18	20	22
12.5		16	18	22	20	14	11	19	19	22	21
25		18	12	22	17	15	21	19	19	23	19
50		15	16	19	13	21	15	24	20	10	14
100		15	17	20	16	11	16	15	22	13	16

June 2/15

Analysis ID:	08-6980-2188	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	22 May-15 13:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Client: Teck Coal

W.O.#: 15376

Hardness and Alkalinity Datasheet

	Alkalinity					Hardness			
Sample ID	Sample Date May 6/15	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity (mg/L$CaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness (mg/L $CaCO_3$)	Technician
LC-FRD SDC	~~50.0~~ KS ~~May 6/15~~ MLT KS	~~8.~~ KS 50.0	8.5	8.7	166	50.0	14.4	288	KS
LC-LC3	May 6/15	50.0	9.3	9.5	182	10.0 ①	4.7	470	KS
LC-LC5	May 6/15	50.0	18.4	18.6	364	50.0	14.1	282	KS
LC-LCDSSLCC	May 6/15	50.0	~~8.9~~ KS 8.4	8.5	166	50.0	13.4	268	KS
LC-DC1	May 6/15	50.0	5.1	5.2	100	50.0	7.2	144	KS
LC-DCDS	May 6/15	50.0	4.8	5.0	92	10 ①	0.9	90	KS
20% Derrier Control	May 6/15	50	MLT ~~4.6~~ 4.6	4.7	90	50	5.0	100	MLT

Notes: ① Diluted to 100.0mL with D.I. water

Reviewed by: [signature]

Date Reviewed: June 2/15

APPENDIX B – Rainbow Trout Embryo *(Oncorhynchus mykiss)* Toxicity Test Data

Rainbow Trout Embryo Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: April 29, 2015 @ 1545

Work Order No.: 15365 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2015-28_N
Sample Date: April 28, 2015
Date Received: April 29, 2015
Sample Volume: 8 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 042915
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.44 g/L

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE74
Stock Solution ID: 14504
Date Initiated: April 29 2015
7-d EC50 (95% CL): 6.7 (6.5 - 7.0) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.2 - 7.6) mg/L SDS
Reference Toxicant CV (%): ~~37~~ 36

Test Results:

	Sample ID		
	LC_LCDSSLCC_WS-2015-28_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: Date reviewed: June 2/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC_LCDSSLLC_WS-2015-28_N **Stop Date & Time:** May 6 / 15 @ 1100 h
Work Order #: 15365 **Test Species:** *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.0	9.9	10.0	10.1	10.2	10.0	10.2	10.0	10.0	9.8	10.1	9.9	10.1
pH	6.8	7.2	7.1	7.2	7.2	7.2	7.1	7.2	7.1	6.9	7.1	7.0	7.2	7.1
Cond. (µS/cm)	28	28		28		28		28		29		28		33
Initials	A	SSD		SSD		A		A		SSD		GL		YML

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.2	9.8	10.1	10.1	10.2	10.1	10.1	10.1	10.0	9.9	10.0	10.0	10.1
pH	7.3	7.5	7.3	7.6	7.3	7.4	7.5	7.5	7.6	7.3	7.5	7.2	7.4	7.5
Cond. (µS/cm)	63	74		61		70		71		74		66		70
Initials	A	SSD		SSD		A		A		SSD		GL		YML

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	9.9	10.1	10.1	10.1	10.0	10.1	10.0	10.0	10.0	9.9	10.0	10.1
pH	7.3	7.5	7.4	7.6	7.4	7.6	7.7	7.4	7.9	7.6	7.6	7.6	7.7	7.8
Cond. (µS/cm)	189	188		175		189		185		192		181		183
Initials	A	SSD		SSD		A		A		SSD		GL		YML

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	9.9	10.1	10.1	10.1	10.0	10.2	10.1	9.9	10.0	9.9	10.0	10.1
pH	8.1	8.2	8.1	8.2	8.0	8.1	8.1	8.1	8.2	8.1	8.1	8.1	8.3	8.2
Cond. (µS/cm)	616	621		637		635		638		616		620		623
Initials	A	SSD		SSD		A		A		SSD		GL		YML

DO meter: DO - 1/3 **pH meter:** pH 1/3 **Conductivity meter:** C - 1/3

	Control	100%		
Hardness*	10	322		
Alkalinity*	0	176		

* mg/L as CaCO3

Analysts: AW, SSD, EC, YML

Reviewed by: [signature]

Date reviewed: June 2/15

Sample Description: clear

Comments:

Embryo-~~Alevin-Fry~~ Toxicity Test
Daily Mortality

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545h
Sample ID: LC-LCD SS LCC-WS-2015-28-N **Stop Date:** May 6/15 @ 1100
Work Order #: 15365 **Test Species:** O. mykiss

Treatments (%)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ ~~Embryos~~ ~~Alevins~~ Embryos	Total Undeveloped/ Unhatched Embryos	Total No. ~~Alevins~~ Embryos	Total Exposed
Control	1	0	0	0	0	0	0	1	1	2	25	28
	2							1	1	1	27	29
	3							1	1	3	25	29
	4							0	0	1	27	28
6.25	1						1	2	3	2	23	28
	2						0	1	1	1	27	29
	3							1	1	5	24	30
	4							1	1	4	23	28
12.5	1						1	2	3	1	24	28
	2						1	0	1	3	26	30
	3						0	0	0	5	25	30
	4							2	2	7	21	30
25	1							1	1	3	26	30
	2							1	1	3	27	31
	3						1	1	2	2	25	29
	4						1	0	1	0	27	29
50	1						0	0	0	4	24	28
	2						0	0	0	3	26	29
	3						1	0	1	2	25	28
	4						1	1	2	3	23	28
100	1						0	1	1	3	26	30
	2						0	0	0	3	26	29
	3						1	1	2	1	29	31
	4						1	1	2	3	23	28
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SD	EC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments: _____

Reviewed by: _____ **Date reviewed:** June 2/15

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	04-6211-7754	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-7028-9446	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	06 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	05-7061-6078	**Code:**	2202E90E	**Client:**	Teck Coal
Sample Date:	28 Apr-15 10:27	**Material:**	Water Sample	**Project:**	
Receive Date:	29 Apr-15 07:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	29h (8 °C)	**Station:**	LC_LCDSSLCC_WS_2015-28_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1813744	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	4.189	0.267	N/A	23.87	NA	374.5
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9126	0.8621	0.9643	0.02228	0.04455	4.88%	0.0%	104	114
6.25		4	0.8435	0.8	0.931	0.02962	0.05924	7.02%	7.57%	97	115
12.5		4	0.8143	0.7	0.8667	0.03873	0.07747	9.51%	10.77%	96	118
25		4	0.891	0.8621	0.9643	0.0245	0.04899	5.5%	2.36%	105	118
50		4	0.867	0.8214	0.8966	0.0176	0.03519	4.06%	4.99%	98	113
100		4	0.872	0.8214	0.9032	0.01863	0.03725	4.27%	4.45%	103	118

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8929	0.931	0.8621	0.9643
6.25		0.8214	0.931	0.8	0.8214
12.5		0.8571	0.8667	0.8333	0.7
25		0.8667	0.871	0.8621	0.9643
50		0.8571	0.8966	0.8929	0.8214
100		0.8667	0.8966	0.9032	0.8214

Proportion Normal Binomials

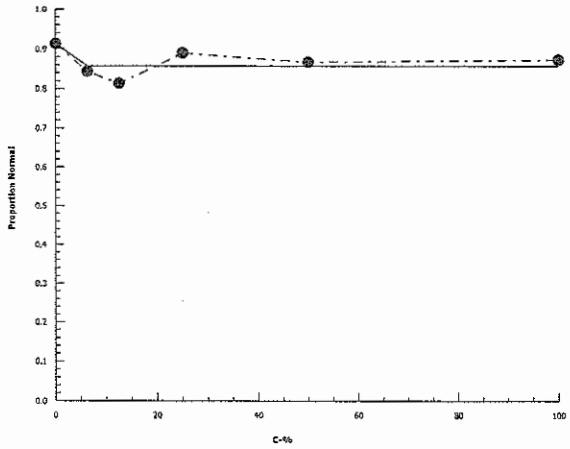
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	25/28	27/29	25/29	27/28
6.25		23/28	27/29	24/30	23/28
12.5		24/28	26/30	25/30	21/30
25		26/30	27/31	25/29	27/28
50		24/28	26/29	25/28	23/28
100		26/30	26/29	28/31	23/28

June 2/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	04-6211-7754	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Jike 2/15

Rainbow Trout Embryo Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: April 29, 2015 @ 1545h

Work Order No.: 15365 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LC3_2015-04-28_N
Sample Date: April 28, 2015
Date Received: April 29, 2015
Sample Volume: 3 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 042915
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.44 g/L

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE74
Stock Solution ID: 14504
Date Initiated: April 29 2015
7-d EC50 (95% CL): 6.7 (6.5-7.0) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.2-7.6) mg/L SDS
Reference Toxicant CV (%): ~~37~~ 36

Test Results:

	Sample ID		
	LC_LC3_2015-04-28_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: Date reviewed: June 2/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck (Line Creek) inc **Start Date & Time:** April 29/15 @ 1545
Sample ID: LC - LC3 WS-2015-04-28.N **Stop Date & Time:** May 6/15 @ 1100
Work Order #: 15365 **Test Species:** *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.0	9.8	10.0	9.9	10.2	10.0	10.2	10.1	10.0	10.0	10.1	10.0	10.0
pH	6.8	7.2	7.2	7.2	7.2	7.2	7.1	7.2	7.1	6.9	7.2	7.0	7.4	7.3
Cond. (µS/cm)	28	29		26		28		28		29		28		33
Initials	A	SSD		SSD		A		A		SSD		EC		YML

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.2	9.9	10.1	9.9	10.1	10.0	10.2	10.1	10.1	9.9	10.0	10.0	10.0
pH	6.9	7.0	7.2	7.6	7.4	7.3	7.4	7.4	7.5	7.2	7.5	7.2	7.15	7.4
Cond. (µS/cm)	67	72		78		79		80		78		79		79
Initials	A	SSD		SSD		A		A		SSD		EC		YML

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.2	9.9	10.1	10.1	10.1	9.9	10.2	10.1	10.1	10.0	10.1	10.1	10.0
pH	7.1	7.2	7.3	7.6	7.5	7.6	7.5	7.5	7.7	7.7	7.6	7.6	7.7	7.7
Cond. (µS/cm)	247	255		235		241		238		257		245		254
Initials	A	SSD		SSD		A		A		SSD		EC		YML

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.3	9.9	10.1	10.1	10.1	10.0	10.1	10.2	10.1	10.0	10.2	10.1	9.8
pH	7.6	7.7	8.0	7.9	8.0	8.0	8.0	8.1	8.2	7.9	8.1	7.9	8.2	8.2
Cond. (µS/cm)	815	819		825		824		825		822		823		852
Initials	A	SSD		SSD		A		A		SSD		EC		YML

DO meter: DO - 1/3 **pH meter:** pH 1/3 **Conductivity meter:** C - 1/3

	Control	100%		
Hardness*	10	460		
Alkalinity*	6	184		

Analysts: AM, SSD, EC, YML
Reviewed by:
Date reviewed: June 2/15

* mg/L as CaCO3

Sample Description: clear

Comments:

Embryo-~~Alevin-Fry~~ Toxicity Test
Daily Mortality

Client: Tech (Line Creek) **Start Date & Time:** April 29/15 @ 1545
Sample ID: LC LC3-~~S~~-2015_04-28-N **Stop Date:** May 6/16 @ 1100
Work Order #: 15365 **Test Species:** O. mykiss

Treatments (%(v/v))	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ ~~Embryos~~ ~~Alevins~~	Total Undeveloped/ Unhatched Embryos	Total No. ~~Alevins~~ Embryos	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	1	30	31
	2	↓	↓	↓	↓	↓	↓	0	0	1	27	28
	3							1	1	0	27	28
	4							0	0	2	28	30
6.25	1							↓	0	0	29	29
	2								0	0	28	28
	3								0	1	27	28
	4								0	2	27	29
12.5	1								0	4	~~28~~ 24	28
	2								0	0	30	30
	3								0	1	28	29
	4								1	2	~~26~~ 25	28
25	1						↓	0	0	0	29	29
	2						1	↓	1	1	27	~~28~~ 29
	3						0		0	1	27	28
	4						↓		0	2	27	29
50	1								0	0	28	28
	2								0	1	30	31
	3								0	1	27	28
	4								0	1	28	29
100	1								0	0	30	30
	2					~~5~~ 1		↓	1	0	27	28
	3					↓			0	0	28	28
	4	↓	↓	↓	↓		↓	1	1	2	26	29
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	SSD	AS	AS	SSD	CS,D	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments: _____

Reviewed by: _____ **Date reviewed:** June 7/16

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	18-8917-5162	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	01-3747-5206	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	06 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	05-8517-3447	**Code:**	22E109C7	**Client:**	Teck Coal
Sample Date:	28 Apr-15 15:06	**Material:**	Water Sample	**Project:**	
Receive Date:	29 Apr-15 07:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	25h (8 °C)	**Station:**	LC_LC3_2015-04-28_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	460580	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9574	0.9333	0.9677	0.008067	0.01613	1.69%	0.0%	112	117
6.25		4	0.9738	0.931	1	0.01656	0.03313	3.4%	-1.72%	111	114
12.5		4	0.9289	0.8571	1	0.03272	0.06543	7.04%	2.98%	107	115
25		4	0.9566	0.931	1	0.01646	0.03291	3.44%	0.09%	110	115
50		4	0.9744	0.9643	1	0.008568	0.01714	1.76%	-1.77%	113	116
100		4	0.9652	0.8966	1	0.02438	0.04877	5.05%	-0.81%	111	115

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9677	0.9643	0.9643	0.9333
6.25		1	1	0.9643	0.931
12.5		0.8571	1	0.9655	0.8929
25		1	0.931	0.9643	0.931
50		1	0.9677	0.9643	0.9655
100		1	0.9643	1	0.8966

Proportion Normal Binomials

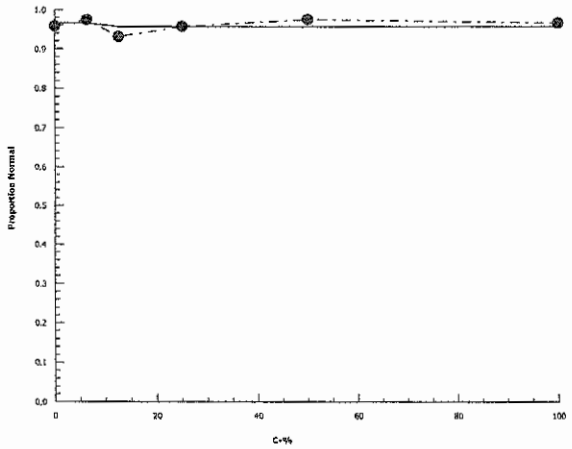
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/31	27/28	27/28	28/30
6.25		29/29	28/28	27/28	27/29
12.5		24/28	30/30	28/29	25/28
25		29/29	27/29	27/28	27/29
50		28/28	30/31	27/28	28/29
100		30/30	27/28	28/28	26/29

June 2/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	18-8917-5162	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Rainbow Trout Embryo Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: April 29, 2015 @ 1545 h

Work Order No.: 15365 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DC1_WS_2015-04-28_N
Sample Date: April 28, 2015
Date Received: April 29, 2015
Sample Volume: 3 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 042915
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.44 g/L

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE74
Stock Solution ID: 14504
Date Initiated: April 29 2015
7-d EC50 (95% CL): 6.7 (6.5 - 7.0) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.2 - 7.6) mg/L SDS
Reference Toxicant CV (%): 37 36

Test Results:

	Sample ID		
	LC_DC1_WS_2015-04-28_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: Date reviewed: June 2/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck (Line Creek)
Sample ID: LC_DC1_WS_2015-04-28-N
Work Order #: 15365

Start Date & Time: April 29/15 @ 1545 h
Stop Date & Time: May 6/15 @ 1100 h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.0	10.0	10.0	9.9	10.2	10.0	10.2	10.1	10.0	10.0	10.1	10.1	9.9
pH	6.8	7.2	7.2	7.2	7.3	7.2	7.1	7.2	7.2	6.9	7.1	7.0	7.2	7.1
Cond. (µS/cm)	28	28		28		28		28		29		28		30
Initials	AS	SSD		SSD		AS		AS		SSD		GL		[illegible]

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	10.1	10.1	10.0	10.1	10.1	10.2	10.1	10.0	10.1	10.1	10.1	9.9
pH	6.9	7.1	7.3	7.5	7.4	7.4	7.5	7.4	7.5	7.2	7.5	7.1	7.4	7.4
Cond. (µS/cm)	44	41		36		39		43		44		44		47
Initials	AS	SSD		SSD		AS		AS		SSD		GL		[illegible]

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.3	10.0	10.1	10.0	10.2	9.9	10.1	10.2	10.0	10.1	10.1	10.1	9.9
pH	7.0	7.2	7.5	7.6	7.4	7.4	7.6	7.5	7.7	7.4	7.6	7.4	7.7	7.7
Cond. (µS/cm)	80	80		~~7.6~~ 76		82		83		82		84		84
Initials	AS	SSD		SSD		AS		AS		SSD		GL		[illegible]

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.3	10.0	10.1	10.1	10.2	10.0	10.1	10.1	9.8	10.1	10.0	10.1	9.8
pH	7.8	7.5	8.0	8.2	7.9	8.0	8.1	8.1	8.2	7.9	8.0	7.9	~~8.1~~ 8.1	8.1
Cond. (µS/cm)	238	241		239		240		241		238		241		~~[illegible]~~ 241
Initials	AS	SSD		SSD		AS		AS		SSD		GL		[illegible]

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	124		
Alkalinity*	6	126		

* mg/L as CaCO3

Analysts: AWS, SSD, EC, YYC

Reviewed by: [illegible]

Date reviewed: June 2/15

Sample Description: Clear

Comments:

Embryo-~~Alevin-Fry~~ Toxicity Test
Daily Mortality

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC_DC1_WS_2015-04-28-N **Stop Date:** May 6/15 @ 1100 h
Work Order #: 15365 **Test Species:** O. mykiss

Treatments (%(v/v))	Rep	Day of Test - No. of Mortalities							Total Dead Eggs/ Embryos ~~Alevins~~	Total Undeveloped/ Unhatched Embryos	Total No. ~~Alevins~~ Embryos	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	0	30	30
	2	↓	↓	↓	↓	↓	↓	↓	0	2	28	30
	3								0	1	29	30
	4								0	0	30	30
6.25	1							↓	0	1	29	30
	2							1	1	0	29	30
	3							0	0	2	28	30
	4						↓		0	0	30	30
12.5	1						0		0	0	29	29
	2						1		1	0	29	30
	3						0		0	1	29	30
	4						1		1	0	29	30
25	1						0		0	1	29	30
	2						1		0	1	29	30
	3						↓		0	0	30	30
	4								0	1	29	30
50	1								0	0	30	30
	2								0	1	29	30
	3								0	0	30	30
	4								0	1	29	30
100	1							↓	0	0	30	30
	2							1	1	0	29	30
	3							0	0	0	30	30
	4	↓	↓	↓	↓	↓	↓	0	0	1	29	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	[illegible]	[illegible]	[illegible]	BC	BC	MMC	MMC	MMC	MMC	MMC

Comments: _____

Reviewed by: _____ **Date reviewed:** June 2/15

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	20-4603-2369	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-6011-7379	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	06 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-2035-3463	**Code:**	131834B7	**Client:**	Teck Coal
Sample Date:	28 Apr-15 09:49	**Material:**	Water Sample	**Project:**	
Receive Date:	29 Apr-15 07:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	30h (8 °C)	**Station:**	LC_DC1_WS_2015-04-28_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1705437	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.975	0.9333	1	0.01596	0.03191	3.27%	0.0%	117	120
6.25		4	0.9667	0.9333	1	0.01361	0.02722	2.82%	0.85%	116	120
12.5		4	0.975	0.9667	1	0.008333	0.01667	1.71%	0.0%	116	119
25		4	0.975	0.9667	1	0.008333	0.01667	1.71%	0.0%	117	120
50		4	0.9833	0.9667	1	0.009622	0.01924	1.96%	-0.85%	118	120
100		4	0.9833	0.9667	1	0.009622	0.01924	1.96%	-0.85%	118	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.9333	0.9667	1
6.25		0.9667	0.9667	0.9333	1
12.5		1	0.9667	0.9667	0.9667
25		0.9667	0.9667	1	0.9667
50		1	0.9667	1	0.9667
100		1	0.9667	1	0.9667

Proportion Normal Binomials

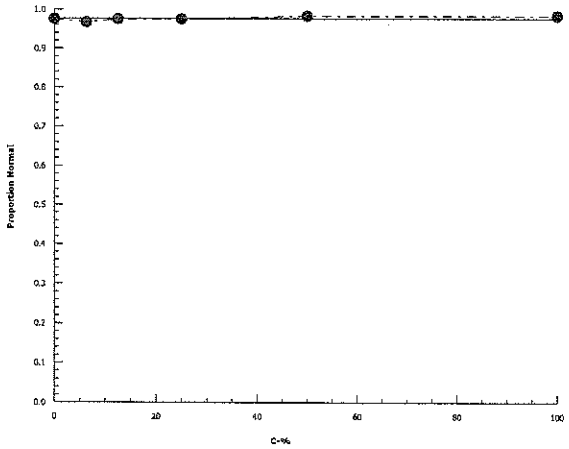
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	28/30	29/30	30/30
6.25		29/30	29/30	28/30	30/30
12.5		29/29	29/30	29/30	29/30
25		29/30	29/30	30/30	29/30
50		30/30	29/30	30/30	29/30
100		30/30	29/30	30/30	29/30

June 2/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	20-4603-2369	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Rainbow Trout Embryo Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: April 29, 2015 @ 1545h

Work Order No.: 15365 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_FRDSDC_WS_2015-04-28_N
Sample Date: April 28, 2015
Date Received: April 29, 2015
Sample Volume: 3 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 042915
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.44 g/L

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE74
Stock Solution ID: 14504
Date Initiated: April 29 2015
7-d EC50 (95% CL): 6.7 (6.5 - 7.0) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.2 - 7.6) mg/L SDS
Reference Toxicant CV (%): 37%

Test Results:

	Sample ID		
	LC_FRDSDC_WS_2015-04-28_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: Date reviewed: June 2/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC-FROSDC_WS_ **Stop Date & Time:** May 6/15 @ 1000 h
Work Order #: 15365 2015-04-28-N **Test Species:** *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.0	10.0	10.0	10.0	10.2	10.1	10.2	10.1	10.0	10.0	10.1	10.0	10.0
pH	6.8	7.2	7.2	7.2	7.2	7.2	7.0	7.2	7.1	6.9	7.1	7.0	7.2	7.2
Cond. (µS/cm)	28	28		28		28		28		29		28		32
Initials	A	SSD		SSD		A		A		SSD		EC		YML

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	10.0	10.1	10.1	10.2	10.1	10.1	10.1	10.1	10.0	10.1	10.0	9.9
pH	6.8	7.0	7.2	7.2	7.4	7.3	7.4	7.2	7.5	7.4	7.5	7.2	7.4	7.5
Cond. (µS/cm)	63	71		58		66		70		71		70		69
Initials	A	SSD		SSD		A		A		SSD		EC		YML

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	9.9	10.1	10.1	10.1	10.2	10.2	10.1	10.1	10.1	10.1	10.0	9.9
pH	7.1	7.2	7.4	7.5	7.5	7.6	7.7	7.7	8.0	7.6	7.6	7.6	7.5	7.7
Cond. (µS/cm)	193	194		193		196		198		198		194		197
Initials	A	SSD		SSD		A		A		SSD		EC		YML

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	15.0	14.0	14.0	14.0	14.5
DO (mg/L)	10.2	10.2	10.0	10.1	10.1	10.1	DV	10.2	10.1	10.0	10.0	10.0	10.0	9.8
pH	7.9	~~8.0~~	8.0	8.1	8.0	8.1	8.0	8.1	8.3	8.1	8.2	8.1	~~8.2~~ 8.2	8.2
Cond. (µS/cm)	624	626		627		627		628		628		633		630
Initials	A	SSD		SSD		A		A		SSD		EC		YML

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	290		
Alkalinity*	6	174		

* mg/L as CaCO3

Analysts: AW, SSD, EC, YML
Reviewed by: EC
Date reviewed: June 2/15

Sample Description: clear

Comments:

Embryo-~~Alevin-Fry~~ Toxicity Test
Daily Mortality

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC_FRDSDC_WS_2015-04-28-N **Stop Date:** May 6/15 @ 1000 h
Work Order #: 15365 **Test Species:** O. mykiss

Treatments (%)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos ~~Alevins~~	Total Undeveloped/ Unhatched Embryos	Total No. Alevins Embryos	Total Exposed
control	1	0	0	0	0	0	0	0	0	3	24	27
	2								0	1	28	29
	3								0	1	27	28
	4								0	0	29	29
6.25	1								0	1	28	29
	2						↓		0	1	28	29
	3						1		1	0	29	~~29~~ 30
	4						0	↓	0	2	26	28
12.5	1						0	1	1	1	27	~~28~~ 29
	2							0	0	0	29	29
	3							1	1	3	26	~~28~~ 29
	4							0	0	3	27	30
25	1								0	2	26	28
	2								0	1	29	30
	3								0	0	29	29
	4						↓		0	3	26	29
50	1						0		0	0	28	28
	2							↓	0	2	26	28
	3							1	1	0	27	28
	4						↓	0	0	1	27	28
100	1					~~0~~ 1	1		1	1	27	29
	2						1		1	1	26	28
	3						1		0	1	26	28
	4	↓	↓	↓	↓	↓	0	↓	0	0	28	28
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	SSD	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments: _____

Reviewed by: [signature] **Date reviewed:** June 2/15

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	08-7098-8922	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-7725-0504	**Test Type:**	Development	**Analyst:**	
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	06 May-15 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 18h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	08-8445-6912	**Code:**	34B7BDD0	**Client:**	Teck Coal
Sample Date:	28 Apr-15 09:19	**Material:**	Water Sample	**Project:**	
Receive Date:	29 Apr-15 07:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	30h (8 °C)	**Station:**	LC_FRDSDC_WS_2015-04-28_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	835249	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9547	0.8889	1	0.02344	0.04688	4.91%	0.0%	108	113
6.25		4	0.9566	0.9286	0.9667	0.009336	0.01867	1.95%	-0.2%	111	116
12.5		4	0.9319	0.8966	1	0.02399	0.04798	5.15%	2.39%	109	117
25		4	0.9479	0.8966	1	0.0225	0.04501	4.75%	0.7%	110	116
50		4	0.9643	0.9286	1	0.01458	0.02916	3.02%	-1.01%	108	112
100		4	0.947	0.9286	1	0.01766	0.03532	3.73%	0.8%	107	113

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8889	0.9655	0.9643	1
6.25		0.9655	0.9655	0.9667	0.9286
12.5		0.931	1	0.8966	0.9
25		0.9286	0.9667	1	0.8966
50		1	0.9286	0.9643	0.9643
100		0.931	0.9286	0.9286	1

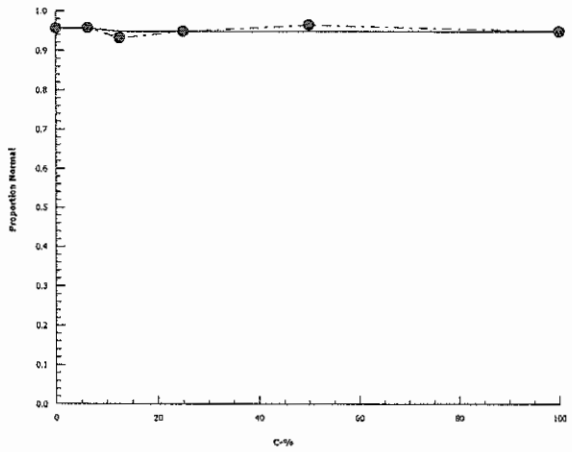
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	24/27	28/29	27/28	29/29
6.25		28/29	28/29	29/30	26/28
12.5		27/29	29/29	26/29	27/30
25		26/28	29/30	29/29	26/29
50		28/28	26/28	27/28	27/28
100		27/29	26/28	26/28	28/28

Salmonid Embryo Survival and Development Test | **Nautilus Environmental**

Analysis ID:	08-7098-8922	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Rainbow Trout Embryo Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: April 29, 2015 @ 1545h

Work Order No.: 15365 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DCDS_WS_2015-04-28_N
Sample Date: April 28, 2015
Date Received: April 29, 2015
Sample Volume: 3 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 042915
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.44 g/L

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE74
Stock Solution ID: 14504
Date Initiated: April 29 2015
7-d EC50 (95% CL): 6.7 (6.5-7.0) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.2-7.6) mg/L SDS
Reference Toxicant CV (%): 37 36

Test Results:

	Sample ID		
	LC_DCDS_WS_2015-04-28_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: Date reviewed: June 2/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC_DCDS_WS_2015-04-28_N **Stop Date & Time:** May 6/15 @ 1100 h
Work Order #: 15365 **Test Species:** *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.0	9.9	10.0	9.9	10.2	10.0	10.2	10.1	10.0	10.0	10.1	10.1	9.9
pH	6.8	7.2	7.2	7.2	7.3	7.2	7.2	7.1	7.1	6.9	7.1	7.0	7.2	7.0
Cond. (µS/cm)	28	28		28		28		28		29		28		31
Initials	A	SSD		SSD		A		A		SSD		GL		YML

6.25 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	9.8	10.1	10.0	10.2	10.1	10.1	10.1	10.0	10.1	10.0	10.1	10.0
pH	6.9	7.1	7.3	7.5	7.4	7.3	7.4	7.3	7.6	7.3	7.5	7.2	7.4	7.3
Cond. (µS/cm)	39	41		36		42		45		40		39		40
Initials	A	SSD		SSD		A		A		SSD		GL		YML

25 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.2	9.9	10.1	10.1	10.2	10.0	10.2	10.1	10.1	10.1	10.0	10.1	10.0
pH	7.0	7.1	7.4	7.5	7.4	7.5	7.6	7.5	7.7	7.7	7.5	7.5	7.4	7.6
Cond. (µS/cm)	70	74		66		66		71		70		71		71
Initials	A	SSD		SSD		A		A		SSD		GL		YML

100 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.2	9.6	10.1	10.1	10.2	10.0	10.2	10.0	10.1	10.1	9.9	10.1	10.0
pH	7.6	7.5	7.9	7.9	7.7	7.9	8.0	7.5	8.1	7.9	7.9	7.7	8.1	7.8
Cond. (µS/cm)	184	189		185		186		188		185		186		187
Initials	A	SSD		SSD		A		A		SSD		GL		YML

DO meter: DO - 1/3 **pH meter:** pH 1/3 **Conductivity meter:** C - 1/3

	Control	100%		
Hardness*	10	98		
Alkalinity*	6	92		

* mg/L as CaCO3

Analysts: AW, SSD, EC, YML

Reviewed by: [signature]

Date reviewed: June 2/15

Sample Description: clear

Comments:

Embryo-~~Alevin-Fry~~ Toxicity Test
Daily Mortality

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC_DC DS_WS_2015-04-28_N **Stop Date:** May 6/15 @ 1100 h
Work Order #: 15365 **Test Species:** O. mykiss

Treatments (%)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos/ ~~Alevins~~	Total Undeveloped/ Unhatched Embryos	Total No. ~~Alevins~~ Embryos	Total Exposed
Control	1	1	0	0	0	0	0	0	1	3	26	30
	2	0							0	0	27	27
	3	0							0	0	30	30
	4	0							0	1	29	30
6.25	1	4						2	4	1	25	30
	2	0						2	2	1	25	28
	3	2						0	2	1	27	30
	4	0				2		1	2	0	26	~~30~~ 30
12.5	1					1	1		2	1	27	30
	2					0	0		0	1	29	30
	3					0	0		0	0	30	30
	4				1	0	1	1	3	0 ~~27~~	~~27~~ 27 ~~30~~	~~30~~ 30
25	1				0	0	0	0	0	2	28	30
	2				0	0		0	0	2	28	30
	3				0	0		0	0	1	29	30
	4				2	2		2	6	0	24	30
50	1				0	0	0	0	0	2	28	30
	2							0	0	1	29	30
	3							0	0	2	28	30
	4						2	0	2	2	26	30
100	1						0	0	0	0	30	30
	2							0	0	1	29	30
	3							1	1	0	29	30
	4							0	0	1	29	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	EC	[illegible]	[illegible]	EC	EC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments: _____

Reviewed by: [signature] **Date reviewed:** June 2/15

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	21-3354-7440	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-5553-0349	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	06 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	06-4609-2256	**Code:**	268295E0	**Client:**	Teck Coal
Sample Date:	28 Apr-15 09:16	**Material:**	Water Sample	**Project:**	
Receive Date:	29 Apr-15 07:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	30h (8 °C)	**Station:**	LC_DCDS_WS_2015-04-28_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	588563	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9583	0.8667	1	0.03155	0.0631	6.58%	0.0%	112	117
6.25		4	0.8899	0.8333	0.9333	0.02081	0.04162	4.68%	7.14%	105	118
12.5		4	0.9417	0.9	1	0.025	0.05	5.31%	1.74%	113	120
25		4	0.9083	0.8	0.9667	0.03696	0.07391	8.14%	5.22%	109	120
50		4	0.925	0.8667	0.9667	0.02097	0.04194	4.53%	3.48%	111	120
100		4	0.975	0.9667	1	0.008333	0.01667	1.71%	-1.74%	117	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8667	1	1	0.9667
6.25		0.8333	0.8929	0.9	0.9333
12.5		0.9	0.9667	1	0.9
25		0.9333	0.9333	0.9667	0.8
50		0.9333	0.9667	0.9333	0.8667
100		1	0.9667	0.9667	0.9667

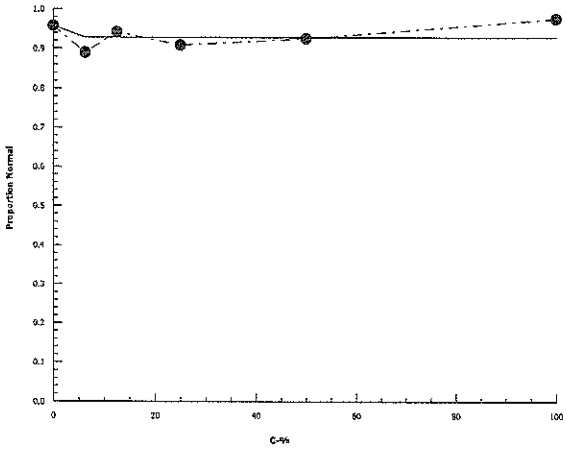
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	27/27	30/30	29/30
6.25		25/30	25/28	27/30	28/30
12.5		27/30	29/30	30/30	27/30
25		28/30	28/30	29/30	24/30
50		28/30	29/30	28/30	26/30
100		30/30	29/30	29/30	29/30

June 2/15

Analysis ID:	21-3354-7440	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Embryo Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: April 29, 2015 @ 1545h

Work Order No.: 15365 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCS_2015-04-28_N
Sample Date: April 28, 2015
Date Received: April 29, 2015
Sample Volume: 3 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 042915
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.44 g/L

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE74
Stock Solution ID: 14504
Date Initiated: April 29 2015
7-d EC50 (95% CL): 6.7 (6.5 - 7.0) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.2 - 7.~~1~~6) mg/L SDS
Reference Toxicant CV (%): ~~37~~ 36

Test Results:

	Sample ID		
	LC_LCS_2015-04-28_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: [signature] Date reviewed: June 2/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC-LC5-2015-09-28_N **Stop Date & Time:** May 6/15 @ 1100 h
Work Order #: 15305 **Test Species:** *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.0	9.7	10.0	9.8	10.2	10.0	10.2	10.0	10.0	9.9	10.1	10.1	10.0
pH	6.8	7.2	7.2	7.2	7.3	7.2	7.1	7.2	7.1	6.9	7.1	7.0	7.2	7.1
Cond. (µS/cm)	28	28		28		28		28		29		29		31
Initials	A	SSD		SSD		A		A		SSD		GL		MML

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	9.9	10.1	9.9	10.2	10.1	10.1	10.1	10.1	10.0	10.1	10.1	10.0
pH	7.8	7.7	7.5	7.0	7.3	7.4	7.5	7.4	7.6	7.3	7.4	7.2	7.4	7.3
Cond. (µS/cm)	59	61		57		60		63		65		63		70
Initials	A	SSD		SSD		A		A		SSD		GL		MML

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.1	10.2	9.8	10.1	10.0	10.2	10.0	10.1	10.1	10.1	10.1	10.1	10.1	10.0
pH	7.7	7.8	7.5	7.2	7.5	7.5	7.6	7.7	7.9	7.7	7.5	7.5	7.6	7.7
Cond. (µS/cm)	205	~~1200~~		186		190		195		202		199		204
Initials	A	SSD		SSD		A		A		SSD		GL		MML

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	15.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.2	10.2	9.8	10.0	10.0	10.1	10.0	10.2	10.1	10.2	10.1	10.0	10.1	10.1
pH	8.1	8.3	8.2	8.3	7.9	8.1	8.1	8.2	8.3	8.2	8.1	8.2	8.1	8.2
Cond. (µS/cm)	631	625		632		630		631		632		634		639
Initials	A	SSD		SSD		A		A		SSD		GL		MML

DO meter: DO-1/3 **pH meter:** pH 1/3 **Conductivity meter:** C-1/3

	Control	100%		
Hardness*	10	316		
Alkalinity*	6	182		

* mg/L as CaCO3

Analysts: AM, SSD, EC, YYL
Reviewed by: EC
Date reviewed: JMW 2/15

Sample Description: clear

Comments:

Embryo-~~Alevin Fry~~ Toxicity Test
Daily Mortality

Client: Teck (Line Creek) **Start Date & Time:** April 29/15 @ 1545 h
Sample ID: LC-LC5-2015-04-28-N **Stop Date:** May 6/15 @ 1100 h
Work Order #: 15365 **Test Species:** O. mykiss

Treatments % (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs/ Embryos Alevins	Total Undeveloped/ Unhatched Embryos	Total No. Alevins	Total Exposed
Control	1	0	0	0	0	0	0	3	3	2	25	30
	2	↓	↓	↓	↓	↓	2	1	3	0	26	29
	3	↓	↓	↓	↓	↓	0	3	3	0	27	30
	4	↓	↓	↓	↓	↓	1	0	1	3	26	30
6.25	1	↓	↓	↓	↓	↓	0	0	0	4	25	29
	2	↓	↓	↓	↓	↓	↓	1	1	1	27	29
	3	↓	↓	↓	↓	↓	↓	1	1	1	28	30
	4	↓	↓	↓	↓	↓	↓	0	0	2	28	30
12.5	1	↓	↓	↓	↓	0	1	2	3	1	26	30
	2	↓	↓	↓	↓	1	1	2	4	4	22	30
	3	↓	↓	↓	↓	0	0	0	0	2	28	30
	4	↓	↓	↓	↓	0	0	2	2	0	28	30
25	1	↓	↓	↓	↓	0	0	0	0	4	26	30
	2	↓	↓	↓	↓	↓	↓	1	1	3	26	30
	3	↓	↓	↓	↓	↓	↓	1	1	3	26	30
	4	↓	↓	↓	↓	↓	↓	0	0	0	30	30
50	1	↓	↓	↓	↓	0	0	2	2	0	28	30
	2	↓	↓	↓	↓	0	0	1	1	1	27	29
	3	↓	↓	↓	↓	0	1	2	3	2	25	30
	4	↓	↓	↓	↓	2	1	1	4	2	24	30
100	1	↓	↓	↓	↓	0	0	0	0	3	27	30
	2	↓	↓	↓	↓	↓	↓	0	0	1	29	30
	3	↓	↓	↓	↓	↓	↓	1	1	2	27	30
	4	↓	↓	↓	↓	↓	↓	1	1	2	27	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		SSD	FC	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments: _____

Reviewed by: [signature] **Date reviewed:** June 2/15

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	13-8157-2654	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:57	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-7379-7946	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	29 Apr-15 15:45	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	06 May-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	14-8027-4760	**Code:**	583B3348	**Client:**	Teck Coal
Sample Date:	28 Apr-15 10:24	**Material:**	Water Sample	**Project:**	
Receive Date:	29 Apr-15 07:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	29h (8 °C)	**Station:**	LC_LC5_2015-04-28_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	193600	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.8741	0.8333	0.9	0.01552	0.03105	3.55%	0.0%	104	119
6.25		4	0.9149	0.8621	0.9333	0.01763	0.03527	3.85%	-4.67%	108	118
12.5		4	0.8667	0.7333	0.9333	0.04714	0.09428	10.88%	0.85%	104	120
25		4	0.9	0.8667	1	0.03333	0.06667	7.41%	-2.96%	108	120
50		4	0.8744	0.8	0.9333	0.03404	0.06807	7.79%	-0.03%	104	119
100		4	0.9167	0.9	0.9667	0.01667	0.03333	3.64%	-4.87%	110	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8333	0.8966	0.9	0.8667
6.25		0.8621	0.931	0.9333	0.9333
12.5		0.8667	0.7333	0.9333	0.9333
25		0.8667	0.8667	0.8667	1
50		0.9333	0.931	0.8333	0.8
100		0.9	0.9667	0.9	0.9

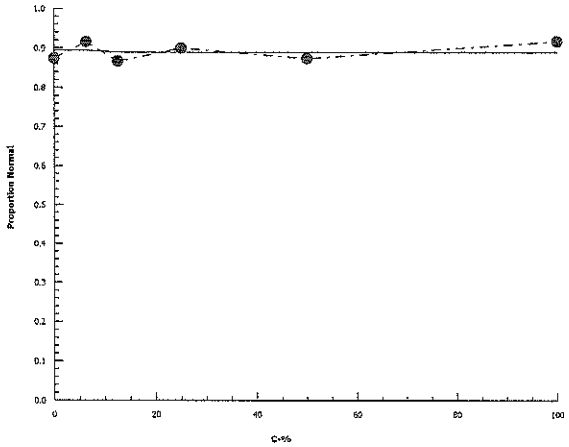
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	25/30	26/29	27/30	26/30
6.25		25/29	27/29	28/30	28/30
12.5		26/30	22/30	28/30	28/30
25		26/30	26/30	26/30	30/30
50		28/30	27/29	25/30	24/30
100		27/30	29/30	27/30	27/30

Salmonid Embryo Survival and Development Test | **Nautilus Environmental**

Analysis ID:	13-8157-2654	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	14 May-15 12:57	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

Client: Teck Coal (LCO)

W.O.#: 15364 KL S

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/L CaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L CaCO_3$)	Technician
LC_DC1_WS_2015-04-28_N	Apr 29/15	50	6.4	6.5	126		50	6.2	124	KL
LC_DCDS_WS_2015-04-28_N	↓	50	4.8	5.0	92		50	4.9	98	KL
LC_FRDSDC_WS_2015-04-28_N	↓	50	8.9	9.1	174		50	148.5	290	KL
LC_LC3_WS_2015-04-28_N	↓	50	9.4	9.6	184		10 ①	4.6	92 KL 460	KL
LC_LC5_WS_2015-04-28_N	↓	50	9.2	9.3	182		50	15.8	316	KL
Dechlor	↓	50	0.4	0.5	6		50	0.5	10	EC
LC_LCDSSLCC_WS_2015-28_N	↓	50	9.0	9.2	176		50	16.1	322	KL

Notes: ① Diluted w/ DI water up to 100mL

Reviewed by: [signature]

Date Reviewed: June 2/15

APPENDIX C – ***Lemna minor*** **Toxicity Test Data**

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 15378

Start Date: May 8, 2015
Set up by: JW

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2015-05-06_N
Sample Date: May 5, 2015
Date Received: May 6, 2015
Sample Volume: 4 x 20L

Test Organism Information:

Culture Date: 050115
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (35 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 118
Date Initiated: May 20, 2015

7-d No. of Fronds IC50 (95% CL): 4.1 (3.8 - 4.3) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.1 (3.1 - 5.4) g/L KCl CV (%): 15

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	>97	>97
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: June 8/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck
Setup by: JW
Sample ID: LC_LCDSSLCC_WS_2015-05-06_N
Test Date: May 8, 2015
Work Order No.: 15378
Test Species: *Lemna minor*
Culture Source: CPCC # 490
Test Culture Age: 7 days
> 8X Growth? (Y/N): Y (35 fronds)
Light Intensity Range: 4000 - 4600 lux
Date Measured: ~~April~~ May 7, 2015 (JW)

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Initials	JW	A	MLT	MLT	MLT	LP	MLT	MLT

Sample Characteristics: Initial Water Quality

	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	23.0
DO (mg/L)	9.3	Nutrients added?: Y →	8.4
pH	8.0		7.9
Conductivity (µS)	541		1319

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.0	8.2	9.6	882
1.5	23.0	24.0	8.0	9.9	891
3.0	23.0	24.0	8.0	9.3	900
6.1	23.0	24.0	8.0	9.4	914
12.1	23.0	24.0	8.0	9.5	942
24.2	23.0	24.0	8.0	9.4	996
48.5	23.0	24.0	8.0	9.5	1105
97	23.0	24.0	8.0	8.9	1309
Initials	JW	KL	JW	KL	JW

Instruments: Thermometer: CER #6 **Cond. Meter:** 3 **pH meter:** 3
Sample Description: Clear with black precipitate.
Comments:
Reviewed: KL **Date Reviewed:** June 9/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LCDSSLCC.WS.2015-05-06.N
Work Order #: 15378

Start Date: May 8, 2015
Termination Date: May 15, 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	88										MLT/JW
	B	6	100										
	C	6	96										
	D	6	68										
1.5	A	6	75										
	B	6	88			X							
	C	6	73										
	D	6	89										
3.0	A	6	86										
	B	6	88										
	C	6	95										
	D	6	107										
6.1	A	6	98										
	B	6	85										
	C	6	74										
	D	6	79										
12.1	A	6	106										
	B	6	107										
	C	6	83										
	D	6	96										
24.2	A	6	116										
	B	6	97										
	C	6	102										
	D	6	105										

Comments: algae growth prominent in all concentrations except 97%o (v/v)

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- LCDSSLCC-INS-2015-05-06-N
Work Order #: 15378

Start Date: May 8 , 2015
Termination Date: May 15 , 2015
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	104										MLT/JW
	B	6	83										
	C	6	109										
	D	6	76										
97	A	6	72			X							
	B	6	74			X							
	C	6	73			X							
	D	6	81			X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Start Date: May 8, 2015
Sample ID: LC-LCDSSLCC-WS-2015-05-06-N
Termination Date: May 15, 2015
Work Order #: 15378

Concentration % (v/v)	Rep	Lemna Pan No. Red	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	969.41	975.09	KL / JW
	B	2	956.46	962.90	KL
	C	3	961.99	968.30	KL
	D	4	967.24	971.28	KL
1.5	A	5	977.39	982.31	KL
	B	6	956.65	962.68	KL
	C	7	933.14	937.84	KL
	D	8	981.80	987.67	KL
3.0	A	9	948.55	954.19	KL
	B	10	951.76	957.39	KL
	C	11	958.32	964.41	KL
	D	12	961.94	969.35	KL
6.1	A	13	974.56	980.984 JW	KL
	B	14	961.26	966.85	KL
	C	15	962.70	967.93	KL
	D	16	947.26	952.70	KL
12.1	A	17	962.81	969.73	KL
	B	18	968.60	975.81	KL
	C	19	969.83	975.35	KL
	D	20	967.72	974.29	KL
24.2	A	21	957.91	965.70	KL
	B	22	976.62	983.23	KL
	C	23	974.82	981.93	KL
	D	24	1004.61	1011.94	KL
48.5	A	25	975.62	982.99	KL
	B	26	978.85	984.22	KL
	C	27	~~988~~ KL 989.03	996.46	KL
	D	28	938.07	943.57	KL

Comments: 10% reweigh: #3: 968.25 #22: 983.14
#15: 967.79 #30: 981.82

Reviewed by: [signature] Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck Start Date: May 8, 2015

Sample ID: LC- LCDSSLCC-WS-2015-05-06.N Termination Date: May 15, 2015

Work Order #: 15378

Concentration % (v/v)	Rep	Lemna Pan No. Red	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	980.12	985.99	KL / JW
	B	30	978.04	983.94	KL
	C	31	972.56	978.26	KL
	D	32	976.18	983.04	KL
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: KL Date Reviewed: June 4/15

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	18-9211-8472	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	646700	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	57.89	N/A	65.72	1.728	1.522	NA
IC10	69.05	17.53	88.75	1.448	1.127	5.705
IC15	82.34	24.22	N/A	1.215	NA	4.129
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	82	62	94	7.118	14.24	17.36%	0.0%
1.5		4	75.25	67	83	4.211	8.421	11.19%	8.23%
3		4	88	80	101	4.743	9.487	10.78%	-7.32%
6.1		4	78	68	92	5.18	10.36	13.28%	4.88%
12.1		4	92	77	101	5.583	11.17	12.14%	-12.2%
24.2		4	99	91	110	4.021	8.042	8.12%	-20.73%
48.5		4	87	70	103	7.99	15.98	18.37%	-6.1%
97		4	69	66	75	2.041	4.082	5.92%	15.85%

Frond Count Detail

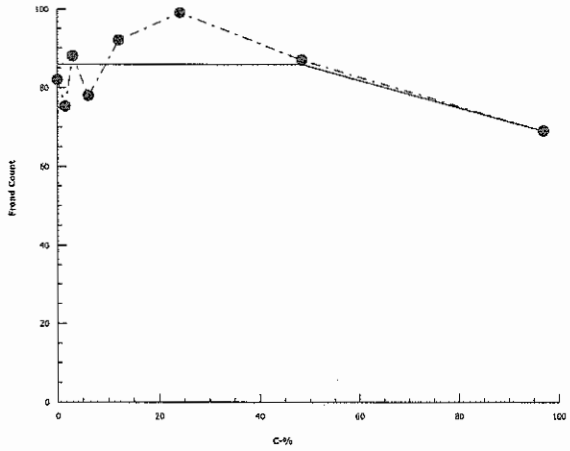
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	82	94	90	62
1.5		69	82	67	83
3		80	82	89	101
6.1		92	79	68	73
12.1		100	101	77	90
24.2		110	91	96	99
48.5		98	77	103	70
97		66	68	67	75

June 4/15

Lemna Growth Inhibition Test | Nautilus Environmental

Analysis ID:	18-9211-8472	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	18-3721-1928	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:59	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	23.1%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.8843	2.482	18.95	6	0.9861	CDF	Non-Significant Effect
		3	0.786	2.482	18.95	6	0.5808	CDF	Non-Significant Effect
		6.1	-0.524	2.482	18.95	6	0.9624	CDF	Non-Significant Effect
		12.1	1.31	2.482	18.95	6	0.3426	CDF	Non-Significant Effect
		24.2	2.227	2.482	18.95	6	0.0819	CDF	Non-Significant Effect
		48.5	0.655	2.482	18.95	6	0.6406	CDF	Non-Significant Effect
		97	-1.703	2.482	18.95	6	0.9990	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2620.719	374.3884	7	3.213	0.0151	Significant Effect
Error	2796.75	116.5313	24			
Total	5417.469		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.242	18.48	0.6305	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9686	0.9081	0.4611	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	82	59.35	104.7	86	62	94	7.118	17.36%	0.0%
1.5		4	75.25	61.85	88.65	75.5	67	83	4.211	11.19%	8.23%
3		4	88	72.9	103.1	85.5	80	101	4.743	10.78%	-7.32%
6.1		4	78	61.51	94.49	76	68	92	5.18	13.28%	4.88%
12.1		4	92	74.23	109.8	95	77	101	5.583	12.14%	-12.2%
24.2		4	99	86.2	111.8	97.5	91	110	4.021	8.12%	-20.73%
48.5		4	87	61.57	112.4	87.5	70	103	7.99	18.37%	-6.1%
97		4	69	62.5	75.5	67.5	66	75	2.041	5.92%	15.85%

Frond Count Detail

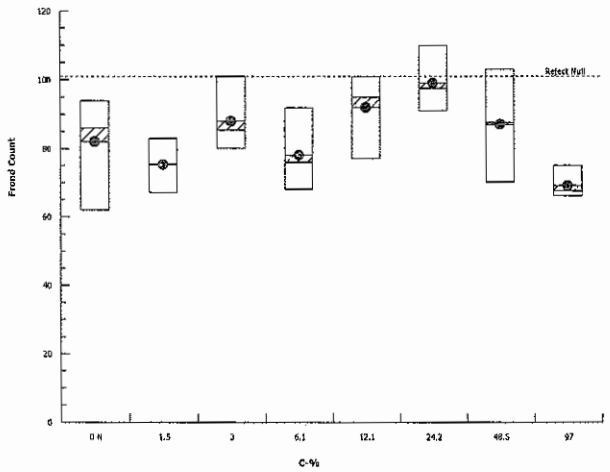
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	82	94	90	62
1.5		69	82	67	83
3		80	82	89	101
6.1		92	79	68	73
12.1		100	101	77	90
24.2		110	91	96	99
48.5		98	77	103	70
97		66	68	67	75

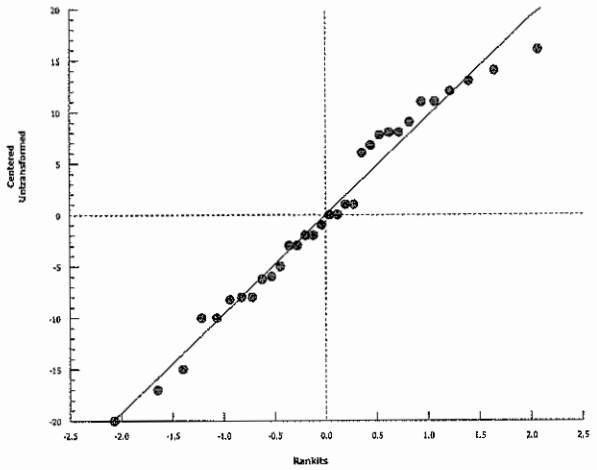
June 4/15

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID: 18-3721-1928 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 21 May-15 10:59 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Graphics





June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-4677-9763	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 9:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	171126	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.618	4.04	6.44	0.5514	1.103	19.63%	0.0%
1.5		4	5.38	4.7	6.03	0.3337	0.6675	12.41%	4.23%
3		4	6.192	5.63	7.41	0.4198	0.8395	13.56%	-10.24%
6.1		4	5.66	5.23	6.38	0.2511	0.5022	8.87%	-0.76%
12.1		4	6.555	5.52	7.21	0.369	0.738	11.26%	-16.69%
24.2		4	7.21	6.61	7.79	0.2451	0.4902	6.8%	-28.35%
48.5		4	6.617	5.5	7.43	0.4722	0.9444	14.27%	-17.8%
97		4	6.083	5.7	6.86	0.2629	0.5257	8.64%	-8.28%

Total Dry Weight-mg Detail

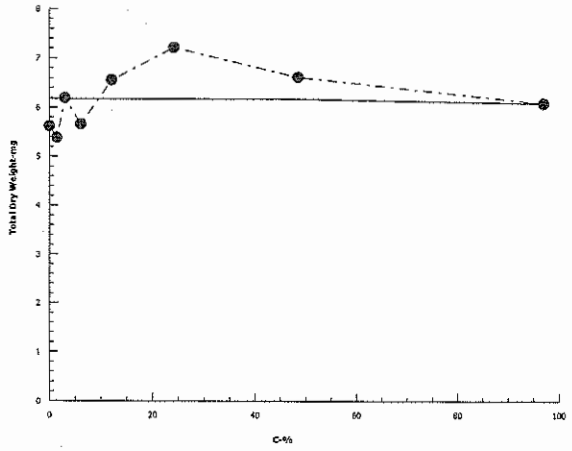
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5.68	6.44	6.31	4.04
1.5		4.92	6.03	4.7	5.87
3		5.64	5.63	6.09	7.41
6.1		6.38	5.59	5.23	5.44
12.1		6.92	7.21	5.52	6.57
24.2		7.79	6.61	7.11	7.33
48.5		7.37	6.17	7.43	5.5
97		5.87	5.9	5.7	6.86

June 8/15

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	03-4677-9763	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 9:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Jun 8/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-3806-0118	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 10:01	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	23.6%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.4444	2.482	1.327	6	0.9540	CDF	Non-Significant Effect
		3	1.076	2.482	1.327	6	0.4459	CDF	Non-Significant Effect
		6.1	0.07944	2.482	1.327	6	0.8541	CDF	Non-Significant Effect
		12.1	1.754	2.482	1.327	6	0.1848	CDF	Non-Significant Effect
		24.2*	2.979	2.482	1.327	6	0.0174	CDF	Significant Effect
		48.5	1.871	2.482	1.327	6	0.1533	CDF	Non-Significant Effect
		97	0.8699	2.482	1.327	6	0.5418	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	10.5098	1.5014	7	2.627	0.0364	Significant Effect
Error	13.71531	0.5714714	24			
Total	24.22511		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	3.461	18.48	0.8394	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9636	0.9081	0.3437	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	5.618	3.863	7.372	5.995	4.04	6.44	0.5514	19.63%	0.0%
1.5		4	5.38	4.318	6.442	5.395	4.7	6.03	0.3337	12.41%	4.23%
3		4	6.192	4.857	7.528	5.865	5.63	7.41	0.4198	13.56%	-10.24%
6.1		4	5.66	4.861	6.459	5.515	5.23	6.38	0.2511	8.87%	-0.76%
12.1		4	6.555	5.381	7.729	6.745	5.52	7.21	0.369	11.26%	-16.69%
24.2		4	7.21	6.43	7.99	7.22	6.61	7.79	0.2451	6.8%	-28.35%
48.5		4	6.617	5.115	8.12	6.77	5.5	7.43	0.4722	14.27%	-17.8%
97		4	6.083	5.246	6.919	5.885	5.7	6.86	0.2629	8.64%	-8.28%

Total Dry Weight-mg Detail

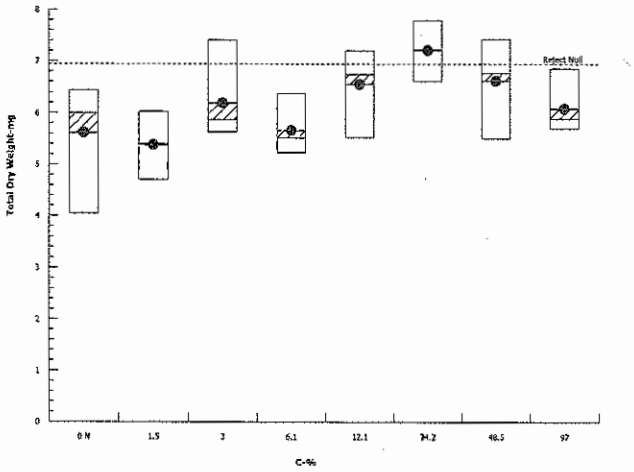
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5.68	6.44	6.31	4.04
1.5		4.92	6.03	4.7	5.87
3		5.64	5.63	6.09	7.41
6.1		6.38	5.59	5.23	5.44
12.1		6.92	7.21	5.52	6.57
24.2		7.79	6.61	7.11	7.33
48.5		7.37	6.17	7.43	5.5
97		5.87	5.9	5.7	6.86

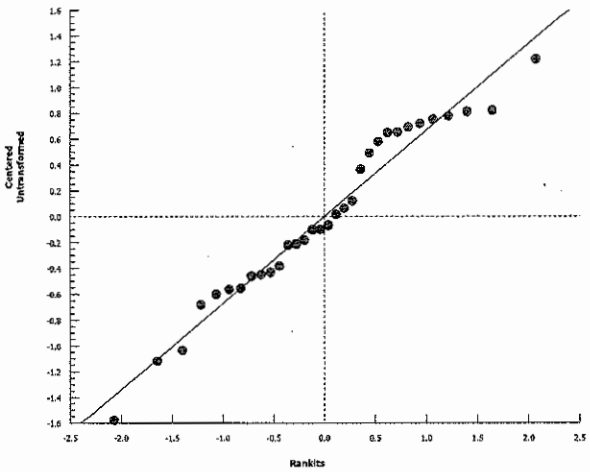
June 8/15

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	14-3806-0118	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 10:01	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





6/8/15

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 15378

Start Date: May 8, 2015
Set up by: JW

Sample Information:

Sample ID: LC-LC3-WS-2015-05-06-N
Sample Date: May 5, 2015
Date Received: May 6, 2015
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: 050115
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (35 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 118
Date Initiated: May 20, 2015

7-d No. of Fronds IC50 (95% CL): 4.1 (3.8 - 4.3) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.1 (3.1 - 5.4) g/L KCl CV (%): 15

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	75.9 (57.9 - 96.9)	> 97
	IC50 %(v/v) (95% CL)	> 97	> 97

Reviewed by: [signature]

Date reviewed: June 8/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck
Setup by: JW
Sample ID: LC_ LC3_ INS_ 2015-05-06_N
Test Date: May 8 , 2015
Work Order No.: 15378
Test Species: *Lemna minor*
Culture Source: CPCC # 490
Test Culture Age: 7 days
> 8X Growth? (Y/N): Y (35 fronds)
Light Intensity Range: 4200-4900 lux
Date Measured: ~~April~~ JW May 7, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.5	24.0	24.0	24.0	24.0	24.0
Initials	JW	A	MLT	MLT	MLT	KeP	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	23.0
DO (mg/L)	9.4	Nutrients added?: Y →	8.6
pH	7.8		7.8
Conductivity (µS)	779		1536

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.0	8.2	9.3	882
1.5	23.0	24.0	8.2	9.5	896
3.0	23.0	24.0	8.2	9.5	909
6.1	23.0	24.0	8.2	9.4	927
12.1	23.0	24.0	8.2	9.1	971
24.2	23.0	24.0	8.2[1]	9.2	1055
48.5	23.0	24.0	8.0	9.0	1217
97	23.0	24.0	7.9	8.7	1526
Initials	JW	KE	JW	KE	JW

Instruments: Thermometer: CER # 6 Cond. Meter: 3 pH meter: 3
Sample Description: Clear
Comments:
Reviewed: [signature] **Date Reviewed:** June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- LC3 - WS - 2015 - 05 - 06 - N
Work Order #: 15378

Start Date: May 8 , 2015
Termination Date: May 15 , 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	87										MLT/JW
	B	6	62										
	C	6	89										
	D	6	57										
1.5	A	6	85										
	B	6	93										
	C	6	104										
	D	6	83 ~~83~~										
3.0	A	6	90										
	B	6	74										
	C	6	87										
	D	6	94										
6.1	A	6	97			X							
	B	6	69										
	C	6	76										
	D	6	82										
12.1	A	6	79										
	B	6	95			X							
	C	6	96										
	D	6	84		X								
24.2	A	6	77										
	B	6	91										
	C	6	85			X							
	D	6	75										

Comments: algae growth prominent in all concentrations except 97% (v/v)

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LC3-WS-2015-05-06-N
Work Order #: 15378

Start Date: May 8, 2015
Termination Date: May 15, 2015
Test set up by: JN

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	69										MLT/JN
	B	6	84										
	C	6	83										
	D	6	76										
97	A	6	57			X							
	B	6	~~56~~51			X							
	C	6	56			X							
	D	6	51			X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: KW

Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC- LC3-WS-2015-05-06-N
Work Order #: 15378

Start Date: May 8, 2015
Termination Date: May 15, 2015

Concentration % (v/v)	Rep	Pan No. Red KH	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	977.00	983.40	KL
	B	2	946.31	950.63	KL
	C	3	964.28	970.72	KL
	D	4	965.34	969.02	KL
1.5	A	5	955.45	961.66	KL
	B	6	973.31	980.08	KL
	C	7	979.54	986.88	KL
	D	8	969.89 92	975.44	KL
3.0	A	9	970.15	976.59	KL
	B	10	970.59	976.47	KL
	C	11	953.69	959.82	KL
	D	12	958.58	965.69	KL
6.1	A	13	985.16	992.34	KL
	B	14	972.41	977.35	KL
	C	15	955.70	961.71	KL
	D	16	973.43	979.69	KL
12.1	A	17	984.46	990.14	KL
	B	18	984.30	991.54	KL
	C	19	1006.93	1014.26	KL
	D	20	1015.10	1021.86	KL
24.2	A	21	995.90	1001.62	KL
	B	22	970.59	976.80	KL
	C	23	1010.46	1017.00	KL
	D	24	1003.54	1009.30	KL
48.5	A	25	999.79	1004.53	KL
	B	26	994.07	1000.43	KL
	C	27	998.70	1004.81	KL
	D	28	999.03	1004.36	KL

Comments: 10% reweigh : #3: 970.45 #20: 1021.61
#11: 959.57 #31: 1008.64

Reviewed by: [signature] Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - LC3 - WS - 2015 - 05 - 06 - N
Work Order #: 15378

Start Date: May 8 , 2015
Termination Date: May 15 , 2015

Concentration % (V/V)	Rep	Kit Pan No. Rep	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	994.67	1000.85	KL
	B	30	984.85	990.25	KL
	C	31	1002.86	1008.80	KL
	D	32	1012.86	1017.91	KL
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-0272-6236	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Jun-15 9:48	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
21	-88.79	187.1	191.4	0.4582	Yes	1.895	2.776	0.1440	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	43.83	N/A	62.61	2.281	1.597	NA
IC10	51.82	N/A	71.59	1.93	1.397	NA
IC15	59.63	40.08	79.81	1.677	1.253	2.495
IC20	67.58	49.29	87.88	1.48	1.138	2.029
IC25	75.92	57.88	96.92	1.317	1.032	1.728
IC40	105.5	75.29	150.3	0.9483	0.6654	1.328
IC50	132	80.45	250.1	0.7575	0.3998	1.243

JW
≥ 97 % (v/v)
JW

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	75.9	3.608	68.83	82.97	21.04	<0.0001	Significant Parameter
C	1.809	0.5944	0.6443	2.974	3.044	0.0050	Significant Parameter
D	132	38.22	57.11	206.9	3.454	0.0018	Significant Parameter
E	0.008164	0.01371	-0.01871	0.03503	0.5955	0.5563	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	3158.366	3158.366	1	29.22	<0.0001	Significant
Lack of Fit	726.5094	181.6273	4	1.895	0.1440	Non-Significant
Pure Error	2300	95.83334	24			
Residual	3026.509	108.0896	28			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	7.047	14.07	0.4240	Equal Variances
	Mod Levene Equality of Variance	2.414	2.423	0.0507	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9742	0.9338	0.6217	Normal Distribution
	Anderson-Darling A2 Normality	0.3586	2.492	0.4561	Normal Distribution

June 8/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 11-0272-6236 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 08 Jun-15 9:48 **Analysis:** Nonlinear Regression **Official Results:** Yes

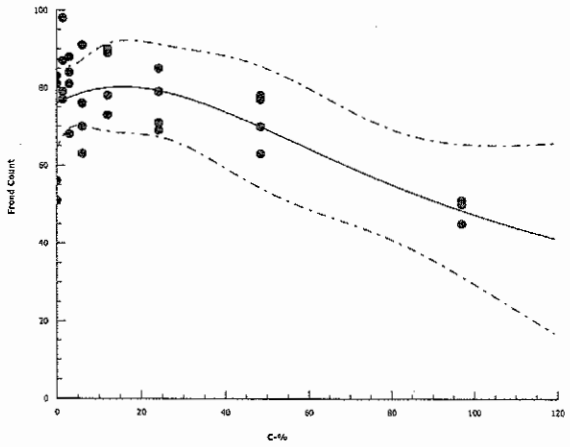
Frond Count Summary

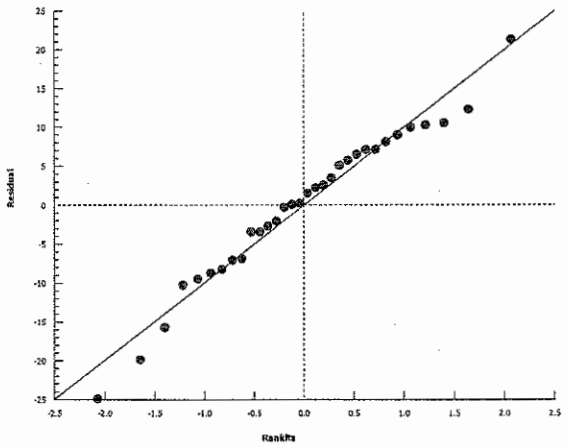
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	67.75	51	83	8.3	16.6	24.5%	0.0%
1.5		4	85.25	77	98	4.768	9.535	11.18%	-25.83%
3		4	80.25	68	88	4.328	8.655	10.79%	-18.45%
6.1		4	75	63	91	5.958	11.92	15.89%	-10.7%
12.1		4	82.5	73	90	4.173	8.347	10.12%	-21.77%
24.2		4	76	69	85	3.697	7.394	9.73%	-12.18%
48.5		4	72	63	78	3.488	6.976	9.69%	-6.27%
97		4	47.75	45	51	1.601	3.202	6.71%	29.52%

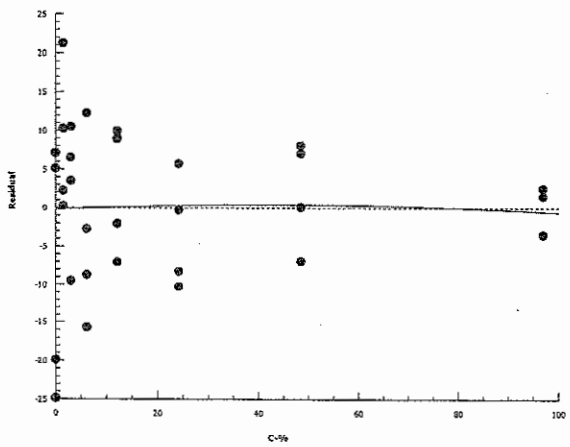
Frond Count Detail

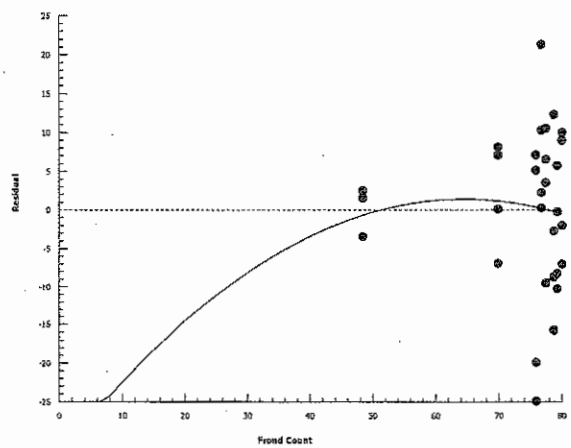
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	81	56	83	51
1.5		79	87	98	77
3		84	68	81	88
6.1		91	63	70	76
12.1		73	89	90	78
24.2		71	85	79	69
48.5		63	78	77	70
97		51	45	50	45

Graphics 4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]









June 8/14

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-2429-0906	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:13	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
4	-10.1	24.62	27.14	0.0127	Yes	1.573	2.508	0.1980	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	53.11	N/A	129.1	1.883	0.7749	NA
IC10	109.1	N/A	278.4	0.9166	0.3592	~~NA~~ JW
IC15	168.3	N/A	458.8	0.5943	~~0.218~~	NA
IC20	231	N/A	671	~~0.4328~~	0.149	NA
IC25	297.9	N/A	~~926.3~~	0.3357	0.108	NA
IC40	528.9	~~N/A~~	2381	0.1891	0.042	NA
IC50	~~717.7~~	N/A	N/A	0.1393	NA	NA

> 97 % (v/v) JW

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	6.17	0.1931	5.791	6.548	31.95	<0.0001	Significant Parameter
D	717.7	622.1	-501.6	1937	1.154	0.2577	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	1.033074	1.033074	1	1.4	0.2460	Non-Significant
Lack of Fit	6.248579	1.04143	6	1.573	0.1980	Non-Significant
Pure Error	15.88541	0.661892	24			
Residual	22.13399	0.7378	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	6.124	14.07	0.5254	Equal Variances
	Mod Levene Equality of Variance	2.266	2.423	0.0639	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9343	0.9338	0.0518	Normal Distribution
	Anderson-Darling A2 Normality	0.6112	2.492	0.1129	Normal Distribution

Total Dry Weight-mg Summary — Calculated Variate

C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.21	3.68	6.44	0.7107	1.421	27.28%	0.0%
1.5		4	6.46	5.52	7.34	0.3891	0.7782	12.05%	-23.99%
3		4	6.39	5.88	7.11	0.2659	0.5319	8.32%	-22.65%
6.1		4	6.098	4.94	7.18	0.4606	0.9212	15.11%	-17.04%
12.1		4	6.753	5.68	7.33	0.3788	0.7575	11.22%	-29.61%
24.2		4	6.057	5.72	6.54	0.1955	0.3909	6.45%	-16.27%
48.5		4	5.635	4.74	6.36	0.3703	0.7405	13.14%	-8.16%
97		4	5.643	5.05	6.18	0.2561	0.5123	9.08%	-8.3%

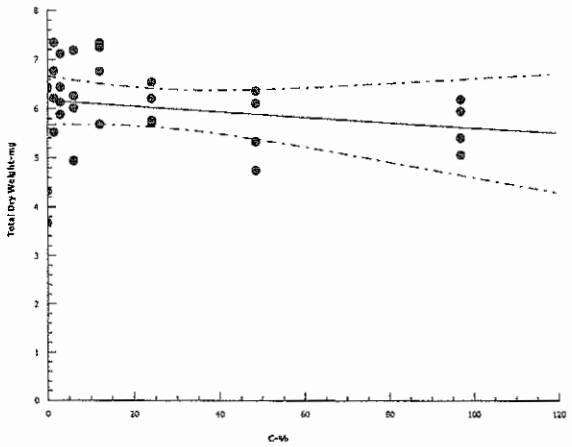
June 4/15

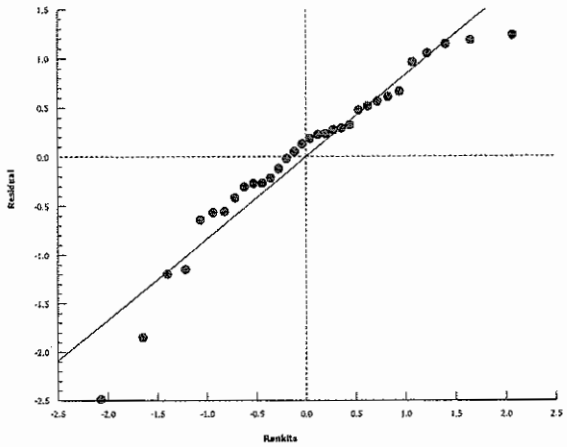
Analysis ID:	03-2429-0906	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:13	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

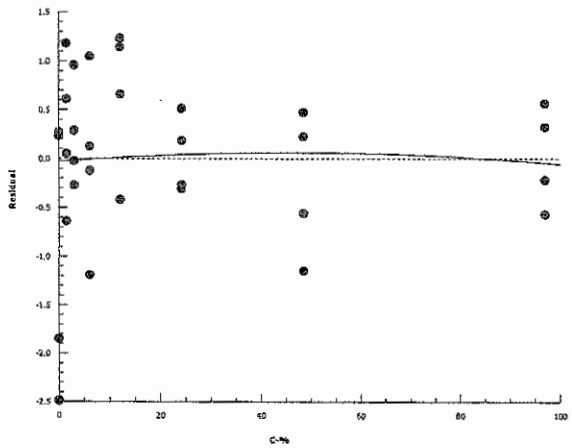
Total Dry Weight-mg Detail

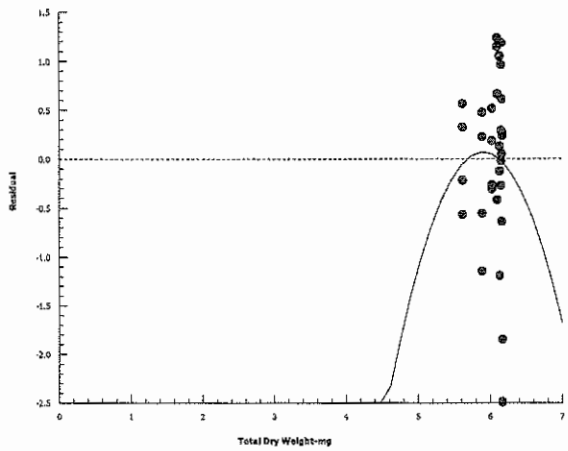
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.4	4.32	6.44	3.68
1.5		6.21	6.77	7.34	5.52
3		6.44	5.88	6.13	7.11
6.1		7.18	4.94	6.01	6.26
12.1		5.68	7.24	7.33	6.76
24.2		5.72	6.21	6.54	5.76
48.5		4.74	6.36	6.11	5.33
97		6.18	5.4	5.94	5.05

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-5988-9254	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:14	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	27.4%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	2.173	2.482	1.428	6	0.0906	CDF	Non-Significant Effect
		3	2.051	2.482	1.428	6	0.1128	CDF	Non-Significant Effect
		6.1	1.543	2.482	1.428	6	0.2525	CDF	Non-Significant Effect
		12.1*	2.681	2.482	1.428	6	0.0332	CDF	Significant Effect
		24.2	1.473	2.482	1.428	6	0.2779	CDF	Non-Significant Effect
		48.5	0.7388	2.482	1.428	6	0.6026	CDF	Non-Significant Effect
		97	0.7518	2.482	1.428	6	0.5966	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.281652	1.040236	7	1.572	0.1918	Non-Significant Effect
Error	15.88541	0.6618923	24			
Total	23.16707		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.124	18.48	0.5254	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9779	0.9081	0.7374	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	5.21	2.948	7.472	5.36	3.68	6.44	0.7107	27.28%	0.0%
1.5		4	6.46	5.222	7.698	6.49	5.52	7.34	0.3891	12.05%	-23.99%
3		4	6.39	5.544	7.236	6.285	5.88	7.11	0.2659	8.32%	-22.65%
6.1		4	6.098	4.632	7.563	6.135	4.94	7.18	0.4606	15.11%	-17.04%
12.1		4	6.753	5.547	7.958	7	5.68	7.33	0.3788	11.22%	-29.61%
24.2		4	6.057	5.435	6.68	5.985	5.72	6.54	0.1955	6.45%	-16.27%
48.5		4	5.635	4.457	6.813	5.72	4.74	6.36	0.3703	13.14%	-8.16%
97		4	5.643	4.827	6.458	5.67	5.05	6.18	0.2561	9.08%	-8.3%

Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.4	4.32	6.44	3.68
1.5		6.21	6.77	7.34	5.52
3		6.44	5.88	6.13	7.11
6.1		7.18	4.94	6.01	6.26
12.1		5.68	7.24	7.33	6.76
24.2		5.72	6.21	6.54	5.76
48.5		4.74	6.36	6.11	5.33
97		6.18	5.4	5.94	5.05

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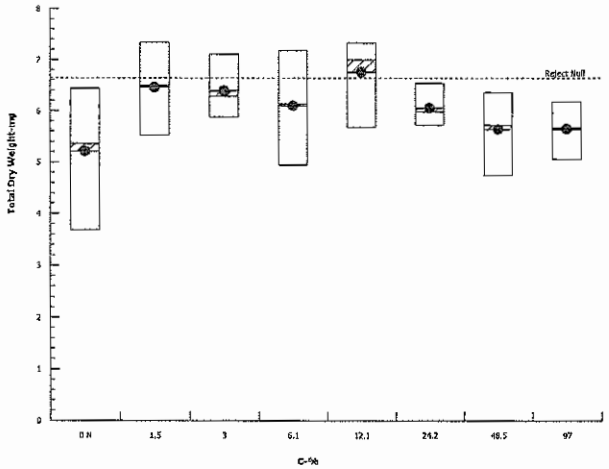
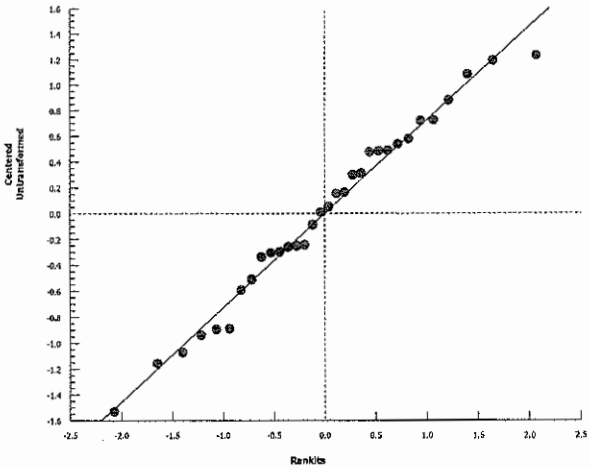
Analysis ID:	12-5988-9254	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:14	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 15378

Start Date: May 7, 2015
Set up by: JW

Sample Information:

Sample ID: LC-DCL-WS-2015-05-05-N
Sample Date: May 5, 2015
Date Received: May 6, 2015
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: 043015
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (35 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 118
Date Initiated: May 20, 2015

7-d No. of Fronds IC50 (95% CL): 4.1 (3.8 - 4.3) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.1 (3.1 - 5.4) g/L KCl CV (%): 15

Test Results:		Number of Fronds	Dry Weight
	IC25 %(v/v) (95% CL)	>97	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: June 4/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck
Setup by: JW
Sample ID: LC_DC1_WS-2015-05-05-N
Test Date: May 7, 2015
Work Order No.: 15378
Test Species: *Lemna minor*
Culture Source: CPCC # 490
Test Culture Age: 7 days
> 8X Growth? (Y/N): Y (35 fronds)
Light Intensity Range: 4200 - 5300
Date Measured: ~~April~~ May 7, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Initials	JW	MLT	"	MLT	MLT	MLT	KLP	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.0	Aeration?: 20 min	23.0
DO (mg/L)	9.5	Nutrients added?: Y →	7.8
pH	7.8		8.0
Conductivity (µS)	235		1034

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.0	8.3	8.3	868
1.5	~~23.0~~ KL	24.0	8.2	9.1	871
3.0	23.0	24.0	8.2	8.8	876
6.1	23.0	24.0	8.2	9.3	881
12.1	23.0	24.0	8.2	9.4	890
24.2	23.0	24.0	8.1	9.3	910
48.5	23.0	24.0	8.1	9.4	951
97	23.0	24.0	8.0	9.3	1034
Initials	JW	KL	JW	KL	JW

Instruments: Thermometer: CER # 6 Cond. Meter: 3 pH meter: 3
Sample Description: Clear w/ black precipitate
Comments:
Reviewed: [signature] **Date Reviewed:** June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- DC L. WS. 2015 - 05 - 05 . N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	91										JW
	B	6	89										
	C	6	96										
	D	6	84										
1.5	A	6	65										
	B	6	64										
	C	6	99										
	D	6	93										
3.0	A	6	98										
	B	6	91										
	C	6	99										
	D	6	71										
6.1	A	6	96		X	X						Emerging fronds are necrotic ↓	
	B	6	90		X	X							
	C	6	110			X							
	D	6	83										
12.1	A	6	90			X							
	B	6	123										
	C	6	97			X							
	D	6	102										
24.2	A	6	97										
	B	6	109										
	C	6	87										
	D	6	112			X							↓

Comments: Algal growth is prominent across all concentrations

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC_DCL_WS_2015-05-05_N
Work Order #: 153798

Start Date: May 7, 2015
Termination Date: May 14, 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	103			X							JW
	B	6	86										
	C	6	108			X							
	D	6	102										
97	A	6	116			X							
	B	6	82										
	C	6	85										
	D	6	106		X	X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC-DCL-WS-2015-05-05_N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015

Concentration % (v/v)	Rep	Kit Pan No. Black	Pan weight (mg)	Pan + plant (mg)	Initials
CONTROL	A	33	980.79	~~1011.65~~ 987.05	KL / JW
	B	34	990.24	~~1003.84~~ 996.39	KL
	C	35	1008.13	1015.43	KL
	D	36	1008.38	1014.38	KL
1.5	A	37	1003.12	1008.57	KL
	B	38	969.90	974.81	KL
	C	39	989.28	996.48	KL
	D	40	987.68	994.25	KL
3.0	A	41	976.85	984.14	KL
	B	42	966.96	973.65	KL
	C	43	979.07	986.11	KL
	D	44	990.87	997.53	KL
6.1	A	45	988.02	993.11	KL
	B	46	~~969~~ KL 968.99	975.75	KL
	C	47	984.81	992.80	KL
	D	48	980.28	986.42	KL
12.1	A	49	985.57	991.75	KL
	B	50	990.08	999.40	KL
	C	51	977.34	984.63	KL
	D	52	984.62	992.07	KL
24.2	A	53	973.57	980.42	KL
	B	54	988.88	996.53	KL
	C	55	981.17	988.45	KL
	D	56	984.80	992.80	KL
48.5	A	57	980.48	986.88	KL
	B	58	999.80	1005.90	KL
	C	59	1012.~~59~~ KL 68	1019.79	KL
	D	60	1011.48	1018.35	KL

Comments: 10% reweigh: #35: 1015.42 #55: 988.33
#43: 986.01 #63: 999.21

Reviewed by: [signature] Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - DCL - WS - 2015 - 05 - 05 - N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015

Concentration % (v/v)	Rep	KH Pan No. Block	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	61	991.34	999.63	KL / JW
	B	62	974.82	981.06	KL
	C	63	992.82	999.33	KL
	D	64	987.07	996.62	KL
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: KL

Date Reviewed: June 9/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-2738-4464	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	185349	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	84	78	90	2.483	4.967	5.91%	0.0%
1.5		4	74.25	58	93	9.178	18.36	24.72%	11.61%
3		4	83.75	65	93	6.498	13	15.52%	0.3%
6.1		4	88.75	77	104	5.735	11.47	12.93%	-5.66%
12.1		4	97	84	117	7.106	14.21	14.65%	-15.48%
24.2		4	95.25	81	106	5.75	11.5	12.07%	-13.39%
48.5		4	93.75	80	102	4.768	9.535	10.17%	-11.61%
97		4	91.25	76	110	8.22	16.44	18.02%	-8.63%

Frond Count Detail

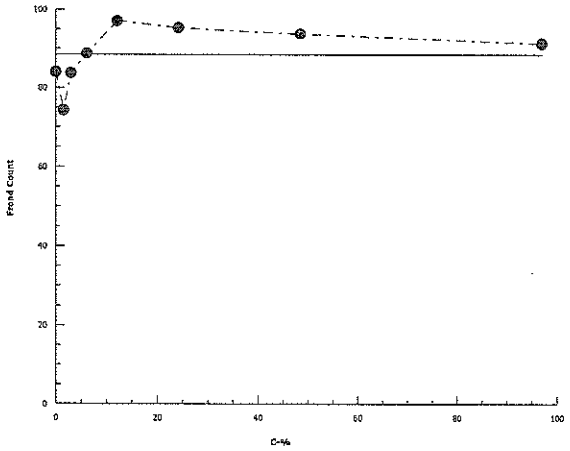
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	85	83	90	78
1.5		59	58	93	87
3		92	85	93	65
6.1		90	84	104	77
12.1		84	117	91	96
24.2		91	103	81	106
48.5		97	80	102	96
97		110	76	79	100

June 4/15

Lemna Growth Inhibition Test — Nautilus Environmental

Analysis ID:	13-2738-4464	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-5762-8429	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:37	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	27.2%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-1.059	2.482	22.86	6	0.9918	CDF	Non-Significant Effect
		3	-0.02714	2.482	22.86	6	0.8816	CDF	Non-Significant Effect
		6.1	0.5157	2.482	22.86	6	0.7009	CDF	Non-Significant Effect
		12.1	1.411	2.482	22.86	6	0.3016	CDF	Non-Significant Effect
		24.2	1.221	2.482	22.86	6	0.3805	CDF	Non-Significant Effect
		48.5	1.059	2.482	22.86	6	0.4538	CDF	Non-Significant Effect
		97	0.7871	2.482	22.86	6	0.5803	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1595.5	227.9286	7	1.343	0.2738	Non-Significant Effect
Error	4072.5	169.6875	24			
Total	5668		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.627	18.48	0.7054	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9512	0.9081	0.1561	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	84	76.1	91.9	84	78	90	2.483	5.91%	0.0%
1.5		4	74.25	45.04	103.5	73	58	93	9.178	24.72%	11.61%
3		4	83.75	63.07	104.4	88.5	65	93	6.498	15.52%	0.3%
6.1		4	88.75	70.5	107	87	77	104	5.735	12.93%	-5.66%
12.1		4	97	74.38	119.6	93.5	84	117	7.106	14.65%	-15.48%
24.2		4	95.25	76.95	113.5	97	81	106	5.75	12.07%	-13.39%
48.5		4	93.75	78.58	108.9	96.5	80	102	4.768	10.17%	-11.61%
97		4	91.25	65.09	117.4	89.5	76	110	8.22	18.02%	-8.63%

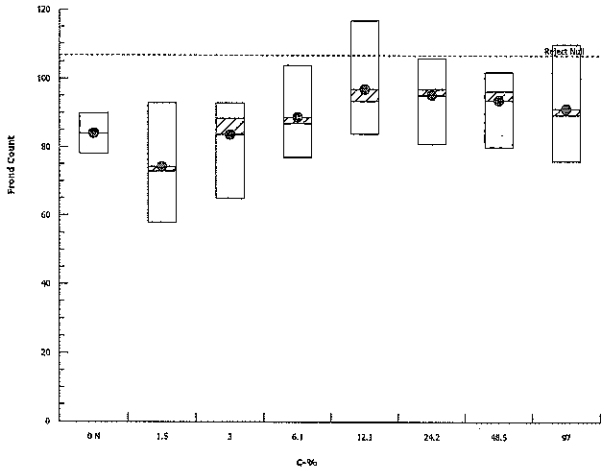
Frond Count Detail

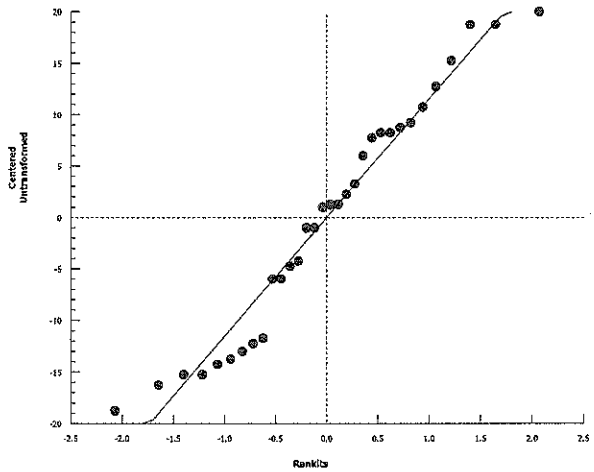
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	85	83	90	78
1.5		59	58	93	87
3		92	85	93	65
6.1		90	84	104	77
12.1		84	117	91	96
24.2		91	103	81	106
48.5		97	80	102	96
97		110	76	79	100

June 9/15

Analysis ID:	14-5762-8429	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:37	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-1120-5263	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:37	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	678283	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.428	6	7.3	0.2957	0.5913	9.2%	0.0%
1.5		4	6.032	4.91	7.2	0.5205	1.041	17.26%	6.15%
3		4	6.92	6.66	7.29	0.1505	0.301	4.35%	-7.66%
6.1		4	6.495	5.09	7.99	0.6059	1.212	18.66%	-1.05%
12.1		4	7.56	6.18	9.32	0.6511	1.302	17.22%	-17.62%
24.2		4	7.445	6.85	8	0.2469	0.4937	6.63%	-15.83%
48.5		4	6.62	6.1	7.11	0.2275	0.4551	6.88%	-3.0%
97		4	7.447	6.24	8.75	0.6287	1.257	16.88%	-15.87%

Total Dry Weight-mg Detail

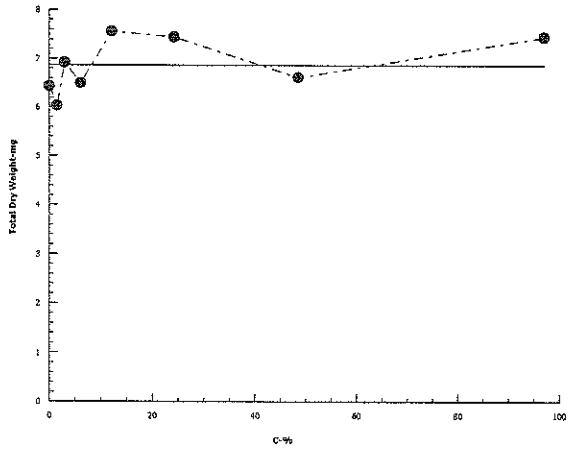
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.26	6.15	7.3	6
1.5		5.45	4.91	7.2	6.57
3		7.29	6.69	7.04	6.66
6.1		5.09	6.76	7.99	6.14
12.1		6.18	9.32	7.29	7.45
24.2		6.85	7.65	7.28	8
48.5		6.4	6.1	7.11	6.87
97		8.29	6.24	6.51	8.75

June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-1120-5263	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:37	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	17-1889-0351	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:37	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	25.0%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.6095	2.482	1.608	6	0.9700	CDF	Non-Significant Effect
		3	0.7599	2.482	1.608	6	0.5929	CDF	Non-Significant Effect
		6.1	0.1041	2.482	1.608	6	0.8472	CDF	Non-Significant Effect
		12.1	1.747	2.482	1.608	6	0.1866	CDF	Non-Significant Effect
		24.2	1.57	2.482	1.608	6	0.2430	CDF	Non-Significant Effect
		48.5	0.297	2.482	1.608	6	0.7855	CDF	Non-Significant Effect
		97	1.574	2.482	1.608	6	0.2417	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.972311	1.281759	7	1.526	0.2061	Non-Significant Effect
Error	20.16042	0.8400177	24			
Total	29.13273		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	9.58	18.48	0.2136	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9738	0.9081	0.6093	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	6.428	5.487	7.368	6.205	6	7.3	0.2957	9.2%	0.0%
1.5		4	6.032	4.376	7.689	6.01	4.91	7.2	0.5205	17.26%	6.15%
3		4	6.92	6.441	7.399	6.865	6.66	7.29	0.1505	4.35%	-7.66%
6.1		4	6.495	4.567	8.423	6.45	5.09	7.99	0.6059	18.66%	-1.05%
12.1		4	7.56	5.488	9.632	7.37	6.18	9.32	0.6511	17.22%	-17.62%
24.2		4	7.445	6.659	8.231	7.465	6.85	8	0.2469	6.63%	-15.83%
48.5		4	6.62	5.896	7.344	6.635	6.1	7.11	0.2275	6.88%	-3.0%
97		4	7.447	5.447	9.448	7.4	6.24	8.75	0.6287	16.88%	-15.87%

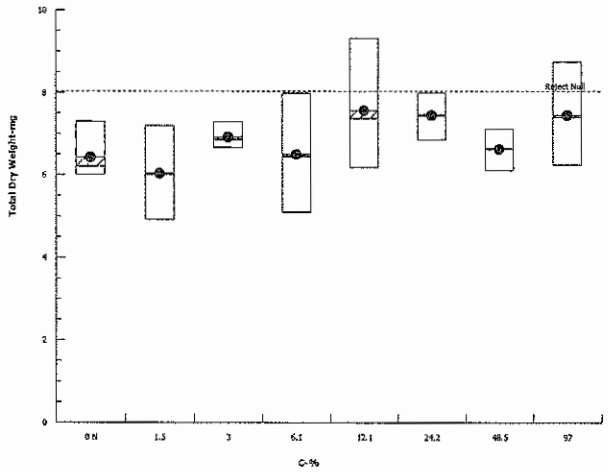
Total Dry Weight-mg Detail

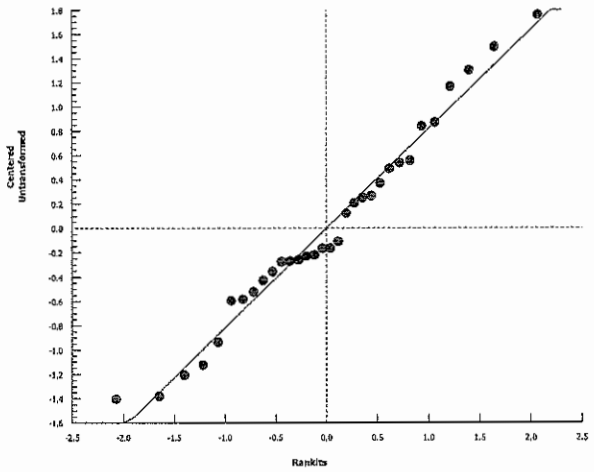
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.26	6.15	7.3	6
1.5		5.45	4.91	7.2	6.57
3		7.29	6.69	7.04	6.66
6.1		5.09	6.76	7.99	6.14
12.1		6.18	9.32	7.29	7.45
24.2		6.85	7.65	7.28	8
48.5		6.4	6.1	7.11	6.87
97		8.29	6.24	6.51	8.75

June 4/15

Analysis ID:	17-1889-0351	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:37	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JW QA: June 4/15

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 15378

Start Date: May 7, 2015
Set up by: JW

Sample Information:

Sample ID: LC-FRDSOC-WS-2015-05-05-N
Sample Date: May 5, 2015
Date Received: May 6, 2015
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: 043015
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (35 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 118
Date Initiated: May 20, 2015

7-d No. of Fronds IC50 (95% CL): 4.1 (3.8 - 4.3) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.1 (3.1 - 5.4) g/L KCl CV (%): 15

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	>97	>97
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: June 4/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck **Setup by:** JW

Sample ID: LC_ FRDSDC_WS-2015-05-05_N **Test Date:** May 7, 2015

Work Order No.: 15378 **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 7 days **> 8X Growth? (Y/N):** Y (35 fronds)

Light Intensity Range: 4000-4900 **Date Measured:** MLT ~~April~~ May 7, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Initials	JW	MLT	A	MLT	MLT	MLT	KLP	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.0	Aeration?: 20 min	23.0
DO (mg/L)	9.5	Nutrients added?:	7.8
pH	7.9	Y →	MLT ~~7.9~~ 8.1
Conductivity (µS)	571		1325

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.0	8.3	MLT ~~9~~ 8.3	868
1.5	23.0	24.0	8.2	9.2	876
3.0	23.0	24.0	8.2	8.5	884
6.1	23.0	24.0	8.2	9.2	898
12.1	23.0	24.0	8.2	9.4	929
24.2	23.0	24.0	8.2	9.1	988
48.5	23.0	24.0	8.2	8.8	1103
97	23.0	24.0	8.1	9.0	1325
Initials	JW	KL	JW	KL	JW

Instruments: Thermometer: CER #6 Cond. Meter: 3 pH meter: 3

Sample Description: Clear w/ brown precipitate.

Comments:

Reviewed: [signature] **Date Reviewed:** June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- FRDSDC - WS - 2015 - 05 - 05 - N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	106										ML / JW
	B	6	109										
	C	6	97										
	D	6	87										
1.5	A	6	93		X								
	B	6	109		X								
	C	6	103		X	X							
	D	6	93		X	X							
3.0	A	6	120			X							
	B	6	81			X							
	C	6	84		X	X							
	D	6	87		X	X							
6.1	A	6	95		X	X							
	B	6	109		X	X							
	C	6	91		X								
	D	6	103										
12.1	A	6	72		X								
	B	6	97										
	C	6	84		X								
	D	6	103		X	X							
24.2	A	6	101										
	B	6	94		X								
	C	6	113										
	D	6	118		X								↓

Comments: algae growth is prominent in all concentrations

Reviewed by: [signature]

Date Reviewed: June 9/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- FRDSDC-WS-2015-05-05-N
Work Order #: 15378

Start Date: May 7, 2015
Termination Date: May 14, 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	93										MJ/JW
	B	6	99										
	C	6	101										
	D	6	119										
97	A	6	92			X							
	B	6	98										
	C	6	96										
	D	6	95			X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: KW

Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Start Date: May 7, 2015
Sample ID: LC- ERDSDC-WS-2015-05-05-N
Termination Date: May 14, 2015
Work Order #: 15378

Concentration % (v/v)	Rep	RTC 12 Pan No. ORANGE	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	972.05	980.24	KL
	B	2	967.60	975.94	KL
	C	3	981.66	989.36	KL
	D	4	973.87	980.14	KL
1.5	A	5	995.60	1002.79	KL
	B	6	983.27	991.49	KL
	C	7	1004.33	1012.72	KL
	D	8	995.10	1001.98	KL
3.0	A	9	1000.44	1009.23	KL
	B	10	1000.18	1006.49	KL
	C	11	1001.08	1007.07	KL
	D	12	996.80	1003.66	KL
6.1	A	13	986.47	993.57	KL
	B	14	1010.80	1018.79	KL
	C	15	1013.21	1020.19	KL
	D	16	984.91	992.55	KL
12.1	A	17	990.94	996.24	KL
	B	18	1000.8 KL 77	1007.81	KL
	C	19	988.38	994.71	KL
	D	20	991.26	998.63	KL
24.2	A	21	1007.76	1014.82	KL
	B	22	986.39	993.23	KL
	C	23	988.90	997.00	KL
	D	24	1011.03	1019.53	KL
48.5	A	25	1036.66	1043.13	KL
	B	26	1022.14	1028.35	KL
	C	27	1015.93	1023.50	KL
	D	28	1014.15	1023.35	KL

Comments: 10% reweigh: #4: 980.00 #25: 1043.05
#14: 1018.65 #32: 1024.84

Reviewed by: [signature] Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: TECK JIN Start Date: May 7, 2015

Sample ID: LC- FRDSDC-2WS-2015-05-05-N Termination Date: May 14, 2015

Work Order #: ~~15378~~ mg 15378

Concentration % (V/V)	Rep	RTOL 12 Pan No. Grams	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	1018.94	1025.95	KL
	B	30	975.64	983.77	KL
	C	31	1010.47	1017.71	KL
	D	32	1017.83	1024.97	KL
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: _____

Reviewed by: _____ Date Reviewed: June 9/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-6668-2257	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:45	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	34h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Log-Logistic EV [Y=A/(1+(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
27	-95.56	198	201.5		Yes	2.6	2.621	0.0514	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.2555	N/A	3268000	391.4	0.0000306	NA JW
IC10	2160	N/A	9.12E+11	0.0463	0.0000000	NA
IC15	583100	N/A	3.55E+28	0.0001715	2.82E-27	NA
IC20	39470000	N/A	N/A	0.0000025	NA	NA
IC25	12830000	N/A	N/A	0.0000000	NA	NA
IC40	56360000	N/A	N/A	0.0000000	NA	NA
IC50	76190000	N/A	N/A	1.312E-13	NA	NA

> 97 % (V/V) JW

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	93.26	6.31	80.89	105.6	14.78	<0.0001	Significant Parameter
C	0.08264	0.3036	-0.5124	0.6777	0.2722	0.7874	Non-Significant Parameter
D	7.62E+14	8.64E+16	-1.7E+17	1.70E+17	0.008818	0.9930	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0	0	1	0	1.0000	Non-Significant
Lack of Fit	1623.357	324.6714	5	2.6	0.0514	Non-Significant
Pure Error	2996.5	124.8542	24			
Residual	4619.857	159.3054	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	8.576	14.07	0.2846	Equal Variances
	Mod Levene Equality of Variance	0.6436	2.423	0.7158	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9747	0.9338	0.6371	Normal Distribution
	Anderson-Darling A2 Normality	0.3391	2.492	0.5039	Normal Distribution

June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 06-6668-2257 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 21 May-15 10:45 **Analysis:** Nonlinear Regression **Official Results:** Yes

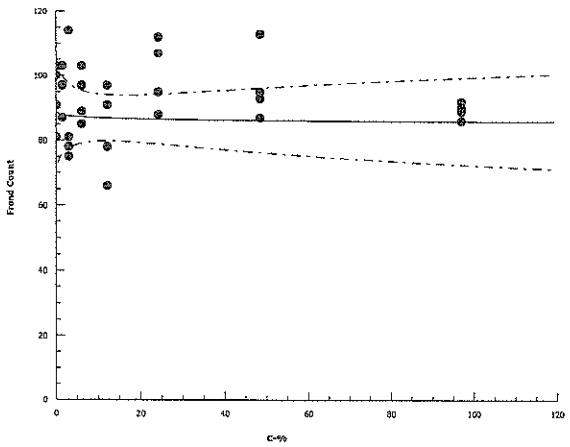
Frond Count Summary

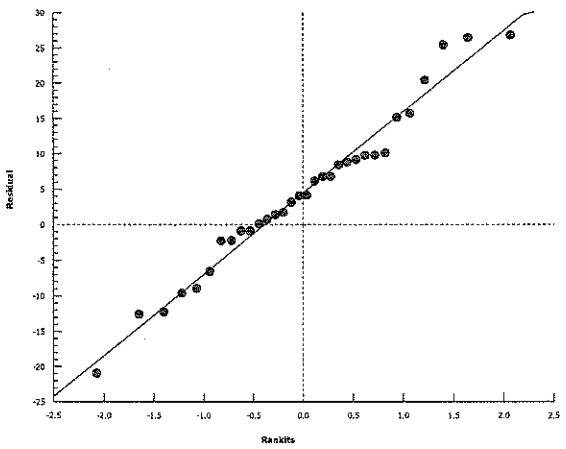
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	93.75	81	103	4.956	9.912	10.57%	0.0%
1.5		4	93.5	87	103	3.948	7.895	8.44%	0.27%
3		4	87	75	114	9.083	18.17	20.88%	7.2%
6.1		4	93.5	85	103	4.031	8.062	8.62%	0.27%
12.1		4	83	66	97	6.916	13.83	16.67%	11.47%
24.2		4	100.5	88	112	5.485	10.97	10.92%	-7.2%
48.5		4	97	87	113	5.598	11.2	11.54%	-3.47%
97		4	89.25	86	92	1.25	2.5	2.8%	4.8%

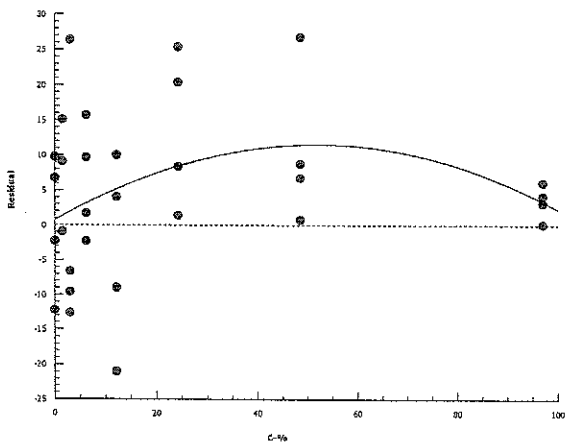
Frond Count Detail

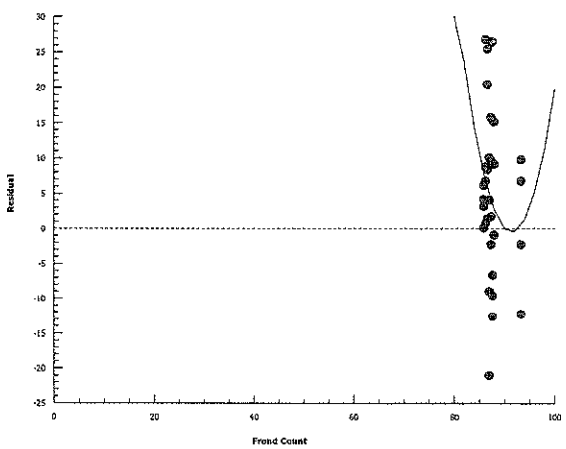
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	100	103	91	81
1.5		87	103	97	87
3		114	75	78	81
6.1		89	103	85	97
12.1		66	91	78	97
24.2		95	88	107	112
48.5		87	93	95	113
97		86	92	90	89

Graphics 3P Log-Logistic EV [Y=A/(1+(X/D)^C)]









June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-8056-9085	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:45	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	34h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	20.9%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.03164	2.482	19.61	6	0.8827	CDF	Non-Significant Effect
		3	-0.8543	2.482	19.61	6	0.9848	CDF	Non-Significant Effect
		6.1	-0.03164	2.482	19.61	6	0.8827	CDF	Non-Significant Effect
		12.1	-1.361	2.482	19.61	6	0.9969	CDF	Non-Significant Effect
		24.2	0.8543	2.482	19.61	6	0.5490	CDF	Non-Significant Effect
		48.5	0.4113	2.482	19.61	6	0.7430	CDF	Non-Significant Effect
		97	-0.5695	2.482	19.61	6	0.9666	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	872.375	124.625	7	0.9982	0.4565	Non-Significant Effect
Error	2996.5	124.8542	24			
Total	3868.875		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	8.576	18.48	0.2846	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9665	0.9081	0.4087	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	93.75	77.98	109.5	95.5	81	103	4.956	10.57%	0.0%
1.5		4	93.5	80.94	106.1	92	87	103	3.948	8.44%	0.27%
3		4	87	58.09	115.9	79.5	75	114	9.083	20.88%	7.2%
6.1		4	93.5	80.67	106.3	93	85	103	4.031	8.62%	0.27%
12.1		4	83	60.99	105	84.5	66	97	6.916	16.67%	11.47%
24.2		4	100.5	83.04	118	101	88	112	5.485	10.92%	-7.2%
48.5		4	97	79.19	114.8	94	87	113	5.598	11.54%	-3.47%
97		4	89.25	85.27	93.23	89.5	86	92	1.25	2.8%	4.8%

Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	100	103	91	81
1.5		87	103	97	87
3		114	75	78	81
6.1		89	103	85	97
12.1		66	91	78	97
24.2		95	88	107	112
48.5		87	93	95	113
97		86	92	90	89

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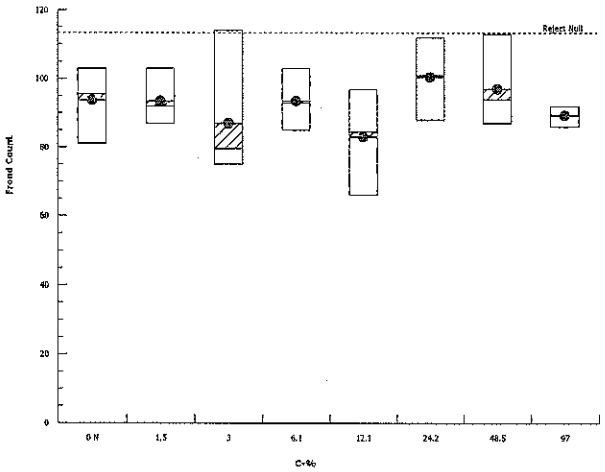
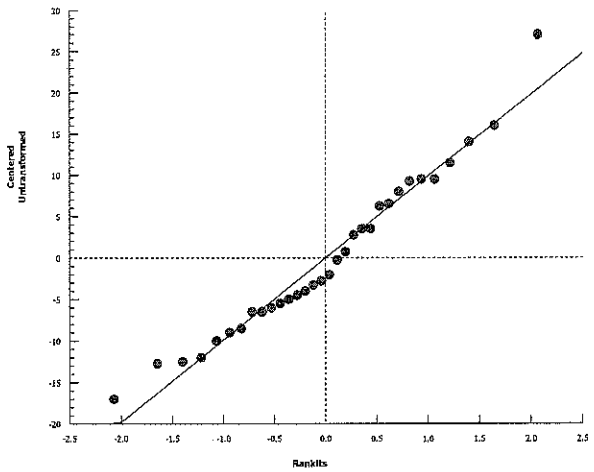
Analysis ID:	11-8056-9085	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:45	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-4548-6710	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:46	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	34h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
21	-15.03	36.91	40.46		Yes	2.251	2.621	0.0818	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.005502	N/A	43150	18170	0.002318	~~NA~~ JW
IC10	12.45	0.005245	1326	8.031	~~0.07544~~	19070
IC15	1303	N/A	1.99E+08	~~0.07672~~	0.0000005	NA
IC20	39130	N/A	~~8.32E+12~~	0.002555	0.0000000	NA
IC25	597700	N/A	N/A	0.0001673	NA	NA
IC40	28340000	~~N/A~~	N/A	0.0000003	NA	NA
IC50	~~74950000~~	N/A	N/A	0.0000000	NA	NA

> 97 %. (v/v) JW

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	7.608	0.5095	6.609	8.606	14.93	<0.0001	Significant Parameter
C	0.09319	0.2024	-0.3036	0.4899	0.4604	0.6487	Non-Significant Parameter
D	7.5E+09	3.14E+11	-6.1E+11	6.23E+11	0.02385	0.9811	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0	0	1	0	1.0000	Non-Significant
Lack of Fit	9.615332	1.923066	5	2.251	0.0818	Non-Significant
Pure Error	20.50029	0.854179	24			
Residual	30.11562	1.03847	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	4.908	14.07	0.6712	Equal Variances
	Mod Levene Equality of Variance	0.6803	2.423	0.6872	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9893	0.9338	0.9840	Normal Distribution
	Anderson-Darling A2 Normality	0.2043	2.492	0.9159	Normal Distribution

June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-4548-6710	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:46	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

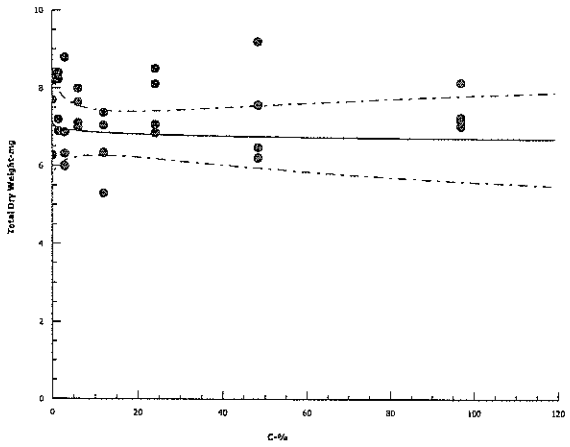
Total Dry Weight-mg Summary

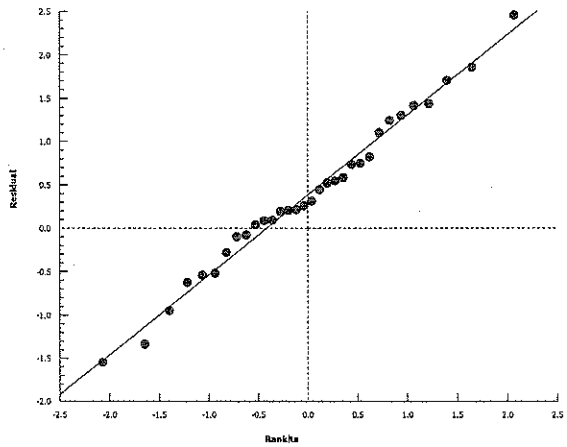
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	7.625	6.27	8.34	0.4719	0.9438	12.38%	0.0%
1.5		4	7.67	6.88	8.39	0.3736	0.7473	9.74%	-0.59%
3		4	6.987	5.99	8.79	0.6271	1.254	17.95%	8.36%
6.1		4	7.428	6.98	7.99	0.2361	0.4723	6.36%	2.59%
12.1		4	6.51	5.3	7.37	0.458	0.916	14.07%	14.62%
24.2		4	7.625	6.84	8.5	0.4007	0.8014	10.51%	0.0%
48.5		4	7.362	6.21	9.2	0.6797	1.359	18.46%	3.44%
97		4	7.38	7.01	8.13	0.2544	0.5088	6.89%	3.21%

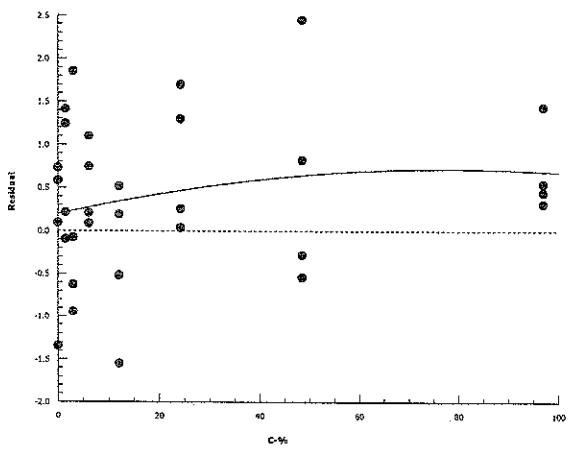
Total Dry Weight-mg Detail

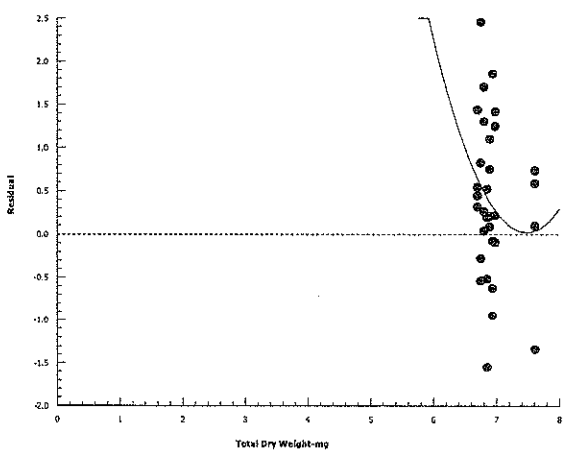
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	8.19	8.34	7.7	6.27
1.5		7.19	8.22	8.39	6.88
3		8.79	6.31	5.99	6.86
6.1		7.1	7.99	6.98	7.64
12.1		5.3	7.04	6.33	7.37
24.2		7.06	6.84	8.1	8.5
48.5		6.47	6.21	7.57	9.2
97		7.01	8.13	7.24	7.14

Graphics — 3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]









June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-0529-6258	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:46	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	34h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	21.3%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.06881	2.482	1.622	6	0.8570	CDF	Non-Significant Effect
		3	-0.9755	2.482	1.622	6	0.9894	CDF	Non-Significant Effect
		6.1	-0.3022	2.482	1.622	6	0.9351	CDF	Non-Significant Effect
		12.1	-1.706	2.482	1.622	6	0.9990	CDF	Non-Significant Effect
		24.2	-4.7E-05	2.482	1.622	6	0.8750	CDF	Non-Significant Effect
		48.5	-0.4017	2.482	1.622	6	0.9489	CDF	Non-Significant Effect
		97	-0.3749	2.482	1.622	6	0.9454	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.368309	0.6240442	7	0.7306	0.6481	Non-Significant Effect
Error	20.50029	0.8541786	24			
Total	24.8686		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.908	18.48	0.6712	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.963	0.9081	0.3321	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	7.625	6.123	9.127	7.945	6.27	8.34	0.4719	12.38%	0.0%
1.5		4	7.67	6.481	8.859	7.705	6.88	8.39	0.3736	9.74%	-0.59%
3		4	6.987	4.992	8.983	6.585	5.99	8.79	0.6271	17.95%	8.36%
6.1		4	7.428	6.676	8.179	7.37	6.98	7.99	0.2361	6.36%	2.59%
12.1		4	6.51	5.052	7.968	6.685	5.3	7.37	0.458	14.07%	14.62%
24.2		4	7.625	6.35	8.9	7.58	6.84	8.5	0.4007	10.51%	0.0%
48.5		4	7.362	5.199	9.526	7.02	6.21	9.2	0.6797	18.46%	3.44%
97		4	7.38	6.57	8.19	7.19	7.01	8.13	0.2544	6.89%	3.21%

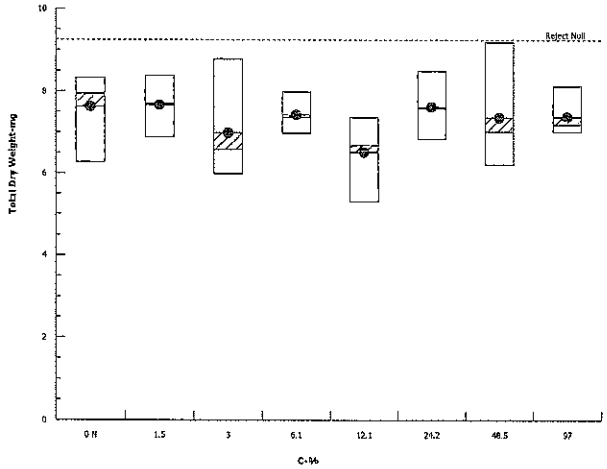
Total Dry Weight-mg Detail

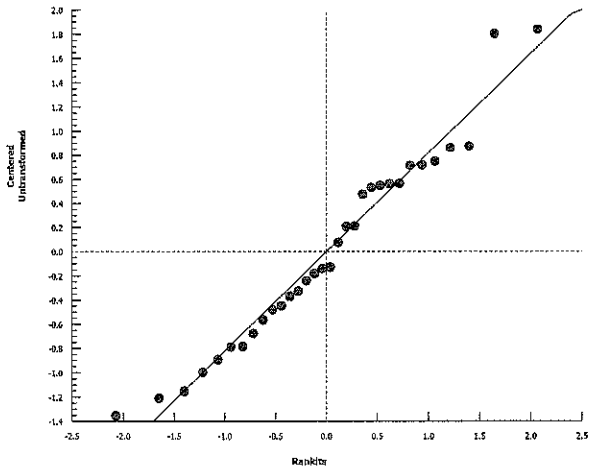
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	8.19	8.34	7.7	6.27
1.5		7.19	8.22	8.39	6.88
3		8.79	6.31	5.99	6.86
6.1		7.1	7.99	6.98	7.64
12.1		5.3	7.04	6.33	7.37
24.2		7.06	6.84	8.1	8.5
48.5		6.47	6.21	7.57	9.2
97		7.01	8.13	7.24	7.14

June 4/15

Analysis ID:	02-0529-6258	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:46	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 15378

Start Date: May 7, 2015
Set up by: JW

Sample Information:

Sample ID: LC-DCDS_INS-2015-05-05 N
Sample Date: May 5, 2015
Date Received: May 6, 2015
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: 043015
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (35 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 118
Date Initiated: May 20, 2015

7-d No. of Fronds IC50 (95% CL): 4.1 (3.8 - 4.3) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.1 (3.1 - 5.4) g/L KCl CV (%): 15

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	> 97	> 97
IC50 %(v/v) (95% CL)	> 97	> 97

Reviewed by: [signature]

Date reviewed: June 4/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck
Setup by: JW
Sample ID: LC_DCDS_WS_2015-05-05_N
Test Date: May 7, 2015
Work Order No.: 15378
Test Species: *Lemna minor*
Culture Source: CPCC # 490
Test Culture Age: 7 days
> 8X Growth? (Y/N): Y (35 fronds)
Light Intensity Range: 4000 - 4600
Date Measured: MLT ~~April~~ May 7, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Initials	JW	MLT	A	~~MLT~~	MLT	MLT	KLP	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.0	Aeration?: 20 min	23.0
DO (mg/L)	9.3	Nutrients added?:	8.1
pH	7.8	Y →	~~8.0~~ MLT 8.0
Conductivity (µS)	192		1003

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.0	8.3	8.6	868
1.5	23.0	24.0	8.2	8.2	868
3.0	23.0	24.0	8.2	9.0	870
6.1	23.0	24.0	8.2	8.7	875
12.1	23.0	24.0	8.2	8.4	883
24.2	23.0	24.0	8.2	8.6	900
48.5	23.0	24.0	8.1	9.3	934
97	23.0	24.0	8.0	9.4	1003
Initials	JW	MLT	JW	MLT	JW

Instruments: Thermometer: CER # 6 Cond. Meter: 3 pH meter: 3
Sample Description: slightly turbid w/ black precipitate
Comments:
Reviewed: [signature] **Date Reviewed:** June 9/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- PCDS - WS - 2015 - 05 - 05 - N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	102										MG/JW
	B	6	66										
	C	6	87 MG										
	D	6	96										
1.5	A	6	100										
	B	6	110										
	C	6	104										
	D	6	84			X							
3.0	A	6	101										
	B	6	99										
	C	6	109		X								
	D	6	89										
6.1	A	6	95										
	B	6	94										
	C	6	118		X								
	D	6	77										
12.1	A	6	113										
	B	6	78										
	C	6	88										
	D	6	99										
24.2	A	6	106										
	B	6	98										
	C	6	87										
	D	6	93										

Comments: algae growth prominent in all concentrations

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC- DCDS - WS - 2015 - 05 - 05 - N
Work Order #: 15378

Start Date: May 7 , 2015
Termination Date: May 14 , 2015
Test set up by: JN

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	105										MLT/JW
	B	6	104										
	C	6	92										
	D	6	77										
97	A	6	106										
	B	6	109										
	C	6	106										
	D	6	115										
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [illegible]

Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC- DCDS-WS-2015-05-05N
Work Order #: 15378

Start Date: May 7, 2015
Termination Date: May 14, 2015

Concentration % (v/v)	Rep	ME Pan No. Red	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	1006.34	1013.12	KL
	B	2	1005.65	1010.00	KL
	C	3	990.38	996.23	KL
	D	4	987.89	993.54	KL
1.5	A	5	1004.60	1011.45	KL
	B	6	1008.95	1016.94	KL
	C	7	1006.62	1013.68	KL
	D	8	1008.02	1013.29	KL
3.0	A	9	984.94	991.58 #3	KL
	B	10	989.91	996.46	KL
	C	11	1003.75	1010.96	KL
	D	12	1015.04	1020.96	KL
6.1	A	13	1004.09	1010.37	KL
	B	14	1002.34	1008.66	KL
	C	15	996.64	1004.70	KL
	D	16	1001.90	1007.15	KL
12.1	A	17	985.73	993.09	KL
	B	18	994.43	999.89	KL
	C	19	992.23	998.27	KL
	D	20	984.96	991.24	KL
24.2	A	21	984.82	992.32	KL
	B	22	977.32	984.37	KL
	C	23	1002.09	1008.23	KL
	D	24	998.72	1004.84	KL
48.5	A	25	993.95	1001.05	KL
	B	26	988.29	995.29	KL
	C	27	977.80	984.03	KL
	D	28	969.15	974.22	KL

Comments: 10% reweigh: #1: 1013.00 #21: 992.12
#12: 1020.77 #31: 1046.28

Reviewed by: [signature] Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Start Date: May 7, 2015
Sample ID: LC- DCDS-WS-2015-05-05-N
Termination Date: May 14, 2015
Work Order #: 15378

Concentration % (V/V)	Rep	ME Pan No. Rep	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	980.384	987.31	KL
	B	30	990.25	997.59	KL
	C	31	1039.32	1046.44	KL
	D	32	994.38	1002.36	KL
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by:
Date Reviewed: June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-3916-6138	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	715546	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	81.75	60	96	7.878	15.76	19.27%	0.0%
1.5		4	93.5	78	104	5.56	11.12	11.89%	-14.37%
3		4	93.5	83	103	4.113	8.226	8.8%	-14.37%
6.1		4	90	71	112	8.416	16.83	18.7%	-10.09%
12.1		4	88.5	72	107	7.511	15.02	16.97%	-8.26%
24.2		4	90	81	100	4.021	8.042	8.94%	-10.09%
48.5		4	88.5	71	99	6.538	13.08	14.78%	-8.26%
97		4	103	100	109	2.121	4.243	4.12%	-25.99%

Frond Count Detail

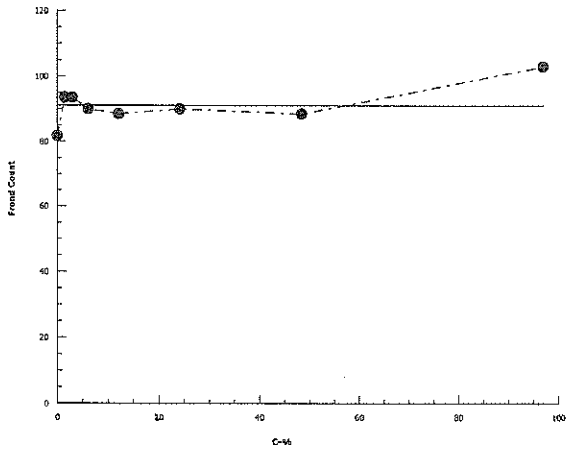
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	96	60	81	90
1.5		94	104	98	78
3		95	93	103	83
6.1		89	88	112	71
12.1		107	72	82	93
24.2		100	92	81	87
48.5		99	98	86	71
97		100	103	100	109

June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-3916-6138	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-4468-0489	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	26.3%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.356	2.482	21.51	6	0.3239	CDF	Non-Significant Effect
		3	1.356	2.482	21.51	6	0.3239	CDF	Non-Significant Effect
		6.1	0.9517	2.482	21.51	6	0.5034	CDF	Non-Significant Effect
		12.1	0.7787	2.482	21.51	6	0.5842	CDF	Non-Significant Effect
		24.2	0.9517	2.482	21.51	6	0.5034	CDF	Non-Significant Effect
		48.5	0.7787	2.482	21.51	6	0.5842	CDF	Non-Significant Effect
		97	2.451	2.482	21.51	6	0.0531	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1025.969	146.567	7	0.9753	0.4713	Non-Significant Effect
Error	3606.75	150.2813	24			
Total	4632.719		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.097	18.48	0.5284	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9733	0.9081	0.5943	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	81.75	56.68	106.8	85.5	60	96	7.878	19.27%	0.0%
1.5		4	93.5	75.8	111.2	96	78	104	5.56	11.89%	-14.37%
3		4	93.5	80.41	106.6	94	83	103	4.113	8.8%	-14.37%
6.1		4	90	63.22	116.8	88.5	71	112	8.416	18.7%	-10.09%
12.1		4	88.5	64.6	112.4	87.5	72	107	7.511	16.97%	-8.26%
24.2		4	90	77.2	102.8	89.5	81	100	4.021	8.94%	-10.09%
48.5		4	88.5	67.69	109.3	92	71	99	6.538	14.78%	-8.26%
97		4	103	96.25	109.8	101.5	100	109	2.121	4.12%	-25.99%

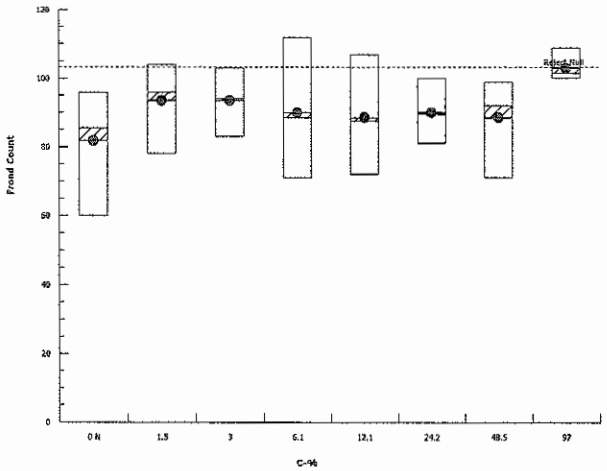
Frond Count Detail

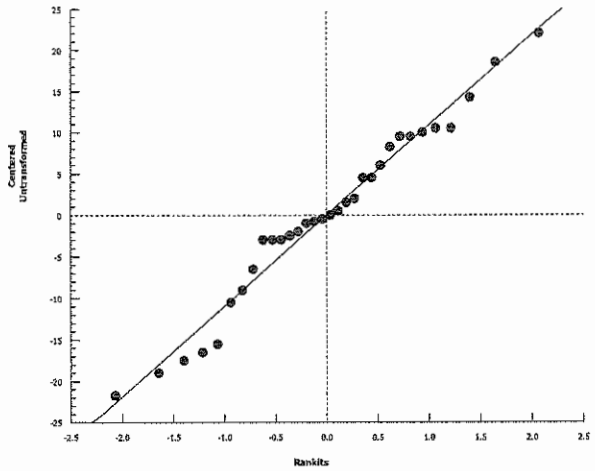
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	96	60	81	90
1.5		94	104	98	78
3		95	93	103	83
6.1		89	88	112	71
12.1		107	72	82	93
24.2		100	92	81	87
48.5		99	98	86	71
97		100	103	100	109

June 4/15

Analysis ID:	10-4468-0489	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-5132-5540	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	820281	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.657	4.35	6.78	0.5006	1.001	17.7%	0.0%
1.5		4	6.792	5.27	7.99	0.5647	1.129	16.63%	-20.06%
3		4	6.568	5.92	7.21	0.2634	0.5269	8.02%	-16.09%
6.1		4	6.477	5.25	8.06	0.5827	1.165	17.99%	-14.49%
12.1		4	6.285	5.46	7.36	0.3975	0.7951	12.65%	-11.09%
24.2		4	6.702	6.12	7.5	0.3431	0.6862	10.24%	-18.47%
48.5		4	6.35	5.07	7.1	0.4689	0.9377	14.77%	-12.24%
97		4	7.352	6.97	7.98	0.2225	0.4451	6.05%	-29.96%

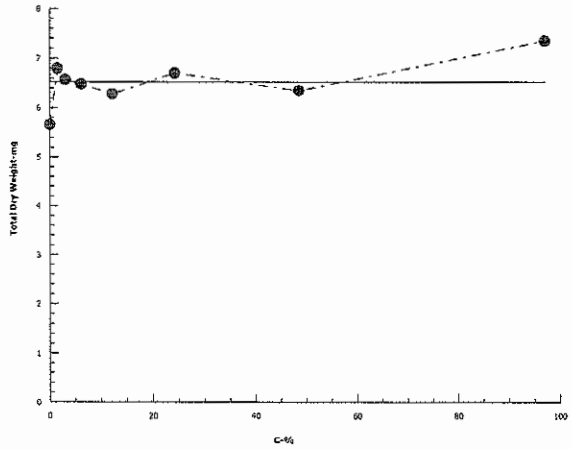
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.78	4.35	5.85	5.65
1.5		6.85	7.99	7.06	5.27
3		6.59	6.55	7.21	5.92
6.1		6.28	6.32	8.06	5.25
12.1		7.36	5.46	6.04	6.28
24.2		7.5	7.05	6.14	6.12
48.5		7.1	7	6.23	5.07
97		6.97	7.34	7.12	7.98

June 4/15

Analysis ID:	06-5132-5540	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 9/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-7968-0224	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-7839-7338	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	07 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	14 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	27.1%	48.5	97	68.59	2.062

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.839	2.482	1.532	6	0.1614	CDF	Non-Significant Effect
		3	1.475	2.482	1.532	6	0.2774	CDF	Non-Significant Effect
		6.1	1.329	2.482	1.532	6	0.3349	CDF	Non-Significant Effect
		12.1	1.017	2.482	1.532	6	0.4731	CDF	Non-Significant Effect
		24.2	1.693	2.482	1.532	6	0.2028	CDF	Non-Significant Effect
		48.5	1.122	2.482	1.532	6	0.4247	CDF	Non-Significant Effect
		97*	2.747	2.482	1.532	6	0.0289	CDF	Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	6.530683	0.9329547	7	1.225	0.3280	Non-Significant Effect
Error	18.28234	0.7617644	24			
Total	24.81303		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.033	18.48	0.7760	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9777	0.9081	0.7297	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	5.657	4.064	7.25	5.75	4.35	6.78	0.5006	17.7%	0.0%
1.5		4	6.792	4.995	8.59	6.955	5.27	7.99	0.5647	16.63%	-20.06%
3		4	6.568	5.729	7.406	6.57	5.92	7.21	0.2634	8.02%	-16.09%
6.1		4	6.477	4.623	8.332	6.3	5.25	8.06	0.5827	17.99%	-14.49%
12.1		4	6.285	5.02	7.55	6.16	5.46	7.36	0.3975	12.65%	-11.09%
24.2		4	6.702	5.611	7.794	6.595	6.12	7.5	0.3431	10.24%	-18.47%
48.5		4	6.35	4.858	7.842	6.615	5.07	7.1	0.4689	14.77%	-12.24%
97		4	7.352	6.644	8.061	7.23	6.97	7.98	0.2225	6.05%	-29.96%

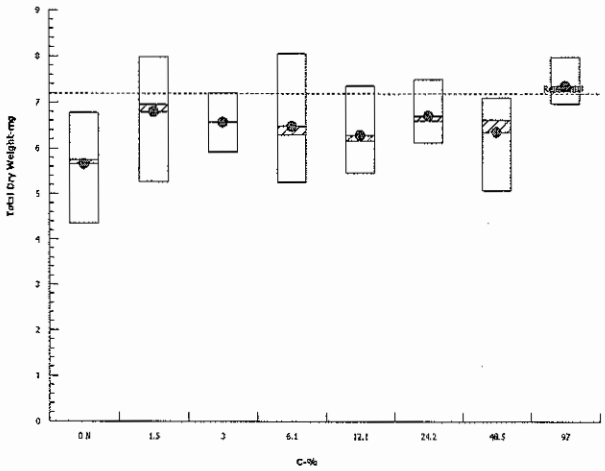
Total Dry Weight-mg Detail

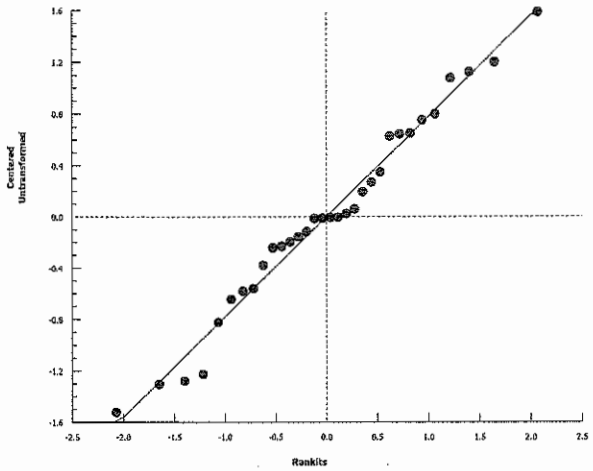
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.78	4.35	5.85	5.65
1.5		6.85	7.99	7.06	5.27
3		6.59	6.55	7.21	5.92
6.1		6.28	6.32	8.06	5.25
12.1		7.36	5.46	6.04	6.28
24.2		7.5	7.05	6.14	6.12
48.5		7.1	7	6.23	5.07
97		6.97	7.34	7.12	7.98

June 4/15

Analysis ID:	12-7968-0224	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 10:52	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 15378

Start Date: May 8, 2015
Set up by: JW

Sample Information:

Sample ID: LC_LC5_INS_2015-05-06_N
Sample Date: May 5, 2015
Date Received: May 6, 2015
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: 050115
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (35 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 118
Date Initiated: May 20, 2015

7-d No. of Fronds IC50 (95% CL): 4.1 (3.8 - 4.3) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.1 (3.1 - 5.4) g/L KCl CV (%): 15

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	>97	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: June 4/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck
Setup by: JW
Sample ID: LC_ LC5_INS_2015-05-06_N
Test Date: May 8 , 2015
Work Order No.: 15378
Test Species: *Lemna minor*
Culture Source: CPCC # 490
Test Culture Age: 7 days
> 8X Growth? (Y/N): Y (35 fronds)
Light Intensity Range: 4100 - 5200 lux
Date Measured: ~~April~~ JW May 7, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.5	24.0	24.0	24.0	24.0	24.0
Initials	JW	A	MLT	MLT	MLT	KLP	MLT	MLT

Sample Characteristics: Initial Water Quality

	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	23.0 KC
DO (mg/L)	9.2	Nutrients added?:	8.2
pH	8.0	Y →	8.0
Conductivity (µS)	580		1356

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.0	8.2	9.1	882
1.5	23.0	24.0	8.2 KC	9.2	888
3.0	23.0	24.0	8.2	9.6	900
6.1	23.0	24.0	8.2	9.2	919
12.1	23.0	24.0	8.2	9.1	945
24.2	23.0	24.0	8.2	9.2	1013
48.5	23.0	24.0	8.1	9.1	1128
97	23.0	24.0	8.1	8.9	1350
Initials	JW	MLT	JW	MLT	JW

Instruments: Thermometer: CER # 6 Cond. Meter: 3 pH meter: 3
Sample Description: Clear with brown precipitate.
Comments:
Reviewed: [signature] **Date Reviewed:** June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LC5.WS-2015-05-06.N
Work Order #: 15378

Start Date: May 8, 2015
Termination Date: May 15, 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	106										MLT/JW
	B	6	89										
	C	6	67										
	D	6	101										
1.5	A	6	99										
	B	6	86										
	C	6	98										
	D	6	89										
3.0	A	6	74										
	B	6	106										
	C	6	70										
	D	6	100										
6.1	A	6	69										
	B	6	87										
	C	6	99										
	D	6	110										
12.1	A	6	94										
	B	6	69										
	C	6	100										
	D	6	103										
24.2	A	6	102										
	B	6	97										
	C	6	91										
	D	6	92										

Comments: algae growth prominent in all concentrations except 97%(v/v)

Reviewed by: [signature]

Date Reviewed: June 4/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LC5-NS-2015-05-06-N
Work Order #: 15378

Start Date: May 8 , 2015
Termination Date: May 15 , 2015
Test set up by: JN

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	81										MLT/JW
	B	6	72										
	C	6	80										
	D	6	76										
97	A	6	87										
	B	6	59										
	C	6	80										
	D	6	94										↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC- LC5 - WS - 2015 - 05 - 06 - N
Work Order #: 15378

Start Date: May 8 , 2015
Termination Date: May 15 , 2015

Concentration % (v/v)	Rep	KT1 Pan No. BLACK	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	1004.51	1011.65	KL
	B	2	997.64	1003.64	KL
	C	3	989.15	993.84	KL
	D	4	988.52	995.70	KL
1.5	A	5	991.05	997.75	KL
	B	6	994.86	1001.02	KL
	C	7	989.82	996.62	KL
	D	8	984.17	990.99	KL
3.0	A	9	984.30	989.52	KL
	B	10	993.29	1001.14	KL
	C	11	993.72	998.91	KL
	D	12	1000.60	1007.89	KL
6.1	A	13	984.63	989.76	KL
	B	14	973.87	980.06	KL
	C	16	988.87	995.96	KL
	D	16	994.66	1002.70	KL
12.1	A	17	997.23	1003.90	KL
	B	18	989.82	994.67	KL
	C	19	1004.96	1012.21	KL
	D	20	988.75	996.16	KL
24.2	A	21	964.69	971.51	KL
	B	22	991.06	998.16	KL
	C	23	980.23	986.89	KL
	D	24	977.60	984.61	KL
48.5	A	25	981.95	987.89	KL
	B	26	988.02	993.08	KL
	C	27	992.76	998.39	KL
	D	28	989.02	994.62	KL

Comments: 10% Reweigh : #5 : 997.61 #23 : 986.86
#16 : 1002.63 #32 : 987.82

Reviewed by: KL Date Reviewed: June 4/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC-LE5-WS-2015-05-06-N
Work Order #: 15378

Start Date: May 8, 2015
Termination Date: May 15, 2015

Concentration % (V/V)	Rep	Pan No. (KRT Block)	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	986.60	993.64	KL
	B	30	984.20	988.45	KL
	C	31	978.24	984.50	KL
	D	32	980.63	987.77	KL
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-8591-8137	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	58h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	895300	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	29.88	N/A	42.75	3.347	2.339	NA
IC10	37.72	N/A	N/A	2.651	NA	NA
IC15	47.55	N/A	N/A	2.103	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	84.75	61	100	8.683	17.37	20.49%	0.0%
1.5		4	87	80	93	3.24	6.481	7.45%	-2.66%
3		4	81.5	64	100	9.069	18.14	22.26%	3.84%
6.1		4	85.25	63	104	8.779	17.56	20.59%	-0.59%
12.1		4	85.5	63	97	7.73	15.46	18.08%	-0.89%
24.2		4	89.5	85	96	2.533	5.066	5.66%	-5.61%
48.5		4	71.25	66	75	2.056	4.113	5.77%	15.93%
97		4	74	53	88	7.561	15.12	20.43%	12.68%

Frond Count Detail

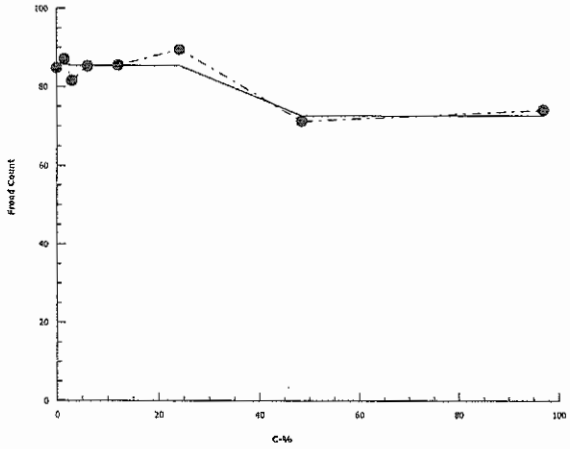
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	100	83	61	95
1.5		93	80	92	83
3		68	100	64	94
6.1		63	81	93	104
12.1		88	63	94	97
24.2		96	91	85	86
48.5		75	66	74	70
97		81	53	74	88

June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-8591-8137	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-6915-5539	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:25	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	58h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	28.3%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.2331	2.482	23.96	6	0.8074	CDF	Non-Significant Effect
		3	-0.3367	2.482	23.96	6	0.9401	CDF	Non-Significant Effect
		6.1	0.05179	2.482	23.96	6	0.8616	CDF	Non-Significant Effect
		12.1	0.07769	2.482	23.96	6	0.8546	CDF	Non-Significant Effect
		24.2	0.492	2.482	23.96	6	0.7107	CDF	Non-Significant Effect
		48.5	-1.398	2.482	23.96	6	0.9972	CDF	Non-Significant Effect
		97	-1.114	2.482	23.96	6	0.9931	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1161.969	165.9955	7	0.8906	0.5291	Non-Significant Effect
Error	4473.25	186.3854	24			
Total	5635.219		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	10.31	18.48	0.1716	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.943	0.9081	0.0913	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	84.75	57.12	112.4	89	61	100	8.683	20.49%	0.0%
1.5		4	87	76.69	97.31	87.5	80	93	3.24	7.45%	-2.66%
3		4	81.5	52.64	110.4	81	64	100	9.069	22.26%	3.84%
6.1		4	85.25	57.31	113.2	87	63	104	8.779	20.59%	-0.59%
12.1		4	85.5	60.9	110.1	91	63	97	7.73	18.08%	-0.89%
24.2		4	89.5	81.44	97.56	88.5	85	96	2.533	5.66%	-5.61%
48.5		4	71.25	64.71	77.79	72	66	75	2.056	5.77%	15.93%
97		4	74	49.94	98.06	77.5	53	88	7.561	20.43%	12.68%

Frond Count Detail

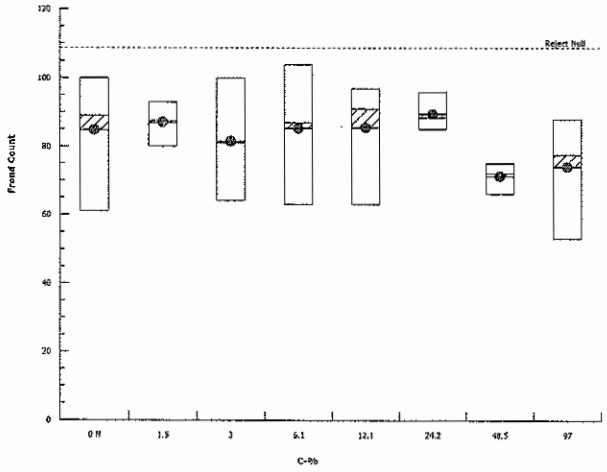
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	100	83	61	95
1.5		93	80	92	83
3		68	100	64	94
6.1		63	81	93	104
12.1		88	63	94	97
24.2		96	91	85	86
48.5		75	66	74	70
97		81	53	74	88

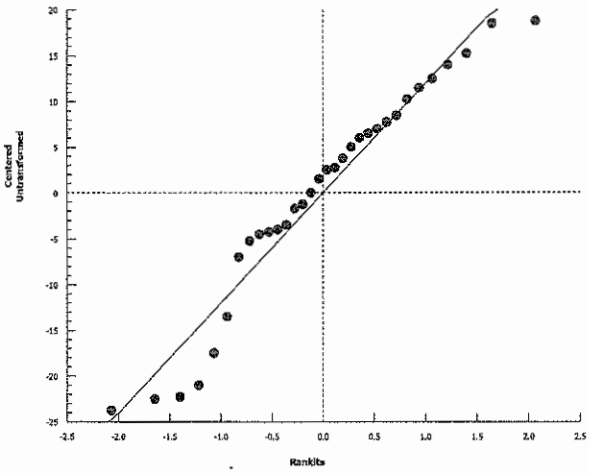
June 4/15

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	16-6915-5539	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:25	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-2874-0677	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	58h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	776202	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	33.76	N/A	N/A	2.962	NA	NA
IC10	46.96	N/A	N/A	2.13	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.253	4.69	7.18	0.5883	1.177	18.82%	0.0%
1.5		4	6.62	6.16	6.82	0.1556	0.3111	4.7%	-5.88%
3		4	6.388	5.19	7.85	0.6923	1.385	21.68%	-2.16%
6.1		4	6.613	5.13	8.04	0.622	1.244	18.81%	-5.76%
12.1		4	6.545	4.85	7.41	0.5869	1.174	17.94%	-4.68%
24.2		4	6.898	6.66	7.1	0.09834	0.1967	2.85%	-10.32%
48.5		4	5.557	5.06	5.94	0.1828	0.3655	6.58%	11.12%
97		4	6.173	4.25	7.14	0.6703	1.341	21.72%	1.28%

Total Dry Weight-mg Detail

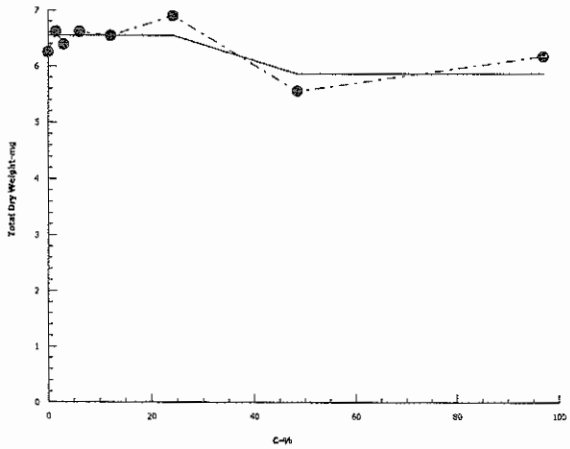
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.14	6	4.69	7.18
1.5		6.7	6.16	6.8	6.82
3		5.22	7.85	5.19	7.29
6.1		5.13	6.19	7.09	8.04
12.1		6.67	4.85	7.25	7.41
24.2		6.82	7.1	6.66	7.01
48.5		5.94	5.06	5.63	5.6
97		7.04	4.25	6.26	7.14

June 4/15

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	11-2874-0677	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-3932-0494	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	21 May-15 11:27	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-5380-8605	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	08 May-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	15 May-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	58h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	28.6%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.5105	2.482	1.787	6	0.7031	CDF	Non-Significant Effect
		3	0.1875	2.482	1.787	6	0.8221	CDF	Non-Significant Effect
		6.1	0.5001	2.482	1.787	6	0.7074	CDF	Non-Significant Effect
		12.1	0.4063	2.482	1.787	6	0.7450	CDF	Non-Significant Effect
		24.2	0.8959	2.482	1.787	6	0.5296	CDF	Non-Significant Effect
		48.5	-0.9654	2.482	1.787	6	0.9891	CDF	Non-Significant Effect
		97	-0.1111	2.482	1.787	6	0.9005	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	4.570322	0.6529031	7	0.6298	0.7266	Non-Significant Effect
Error	24.87947	1.036644	24			
Total	29.44979		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	14.85	18.48	0.0380	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9417	0.9081	0.0834	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	6.253	4.38	8.125	6.57	4.69	7.18	0.5883	18.82%	0.0%
1.5		4	6.62	6.125	7.115	6.75	6.16	6.82	0.1556	4.7%	-5.88%
3		4	6.388	4.184	8.591	6.255	5.19	7.85	0.6923	21.68%	-2.16%
6.1		4	6.613	4.633	8.592	6.64	5.13	8.04	0.622	18.81%	-5.76%
12.1		4	6.545	4.677	8.413	6.96	4.85	7.41	0.5869	17.94%	-4.68%
24.2		4	6.898	6.585	7.21	6.915	6.66	7.1	0.09834	2.85%	-10.32%
48.5		4	5.557	4.976	6.139	5.615	5.06	5.94	0.1828	6.58%	11.12%
97		4	6.173	4.039	8.306	6.65	4.25	7.14	0.6703	21.72%	1.28%

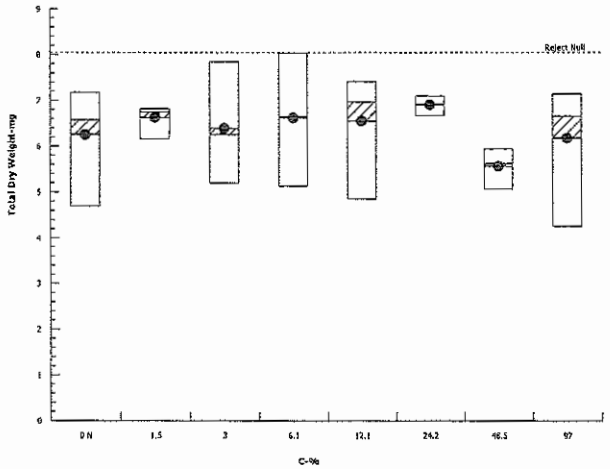
Total Dry Weight-mg Detail

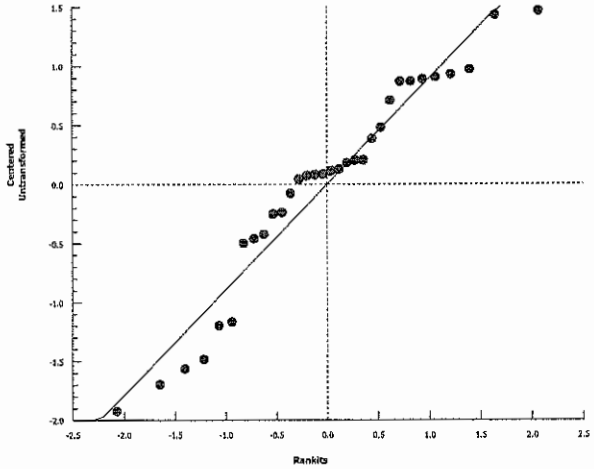
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.14	6	4.69	7.18
1.5		6.7	6.16	6.8	6.82
3		5.22	7.85	5.19	7.29
6.1		5.13	6.19	7.09	8.04
12.1		6.67	4.85	7.25	7.41
24.2		6.82	7.1	6.66	7.01
48.5		5.94	5.06	5.63	5.6
97		7.04	4.25	6.26	7.14

June 4/15

Analysis ID: 16-3932-0494 **Endpoint:** Total Dry Weight-mg **CETIS Version:** CETISv1.8.7
Analyzed: 21 May-15 11:27 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Graphics





June 4/15

APPENDIX D – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15377

Start Date: May 8/15
Set up by: MLT

Sample Information:

Sample ID: LC-LCDSSLCC_WS-2015-05-06_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 4x20L

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0 - 42.4) µg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6 - 51.1) µg/L Zn CV (%): 39

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 9/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MLT

Sample ID: LC_LCDSSLCC_WS_2015-05-06_N **Test Date/Time:** May 8/15 @ 1150h

Work Order No.: 15377 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 **Age of Culture:** 7d **Culture Health:** Good

Culture Count: 1 625 2 650 **Average:** 637.5 **Culture Cell Density (c1):** 637.5 x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 637.5 x10⁴ cells/ml = 3.4 mL

Time Zero Counts: 1 21 2 21 **Average:** 21

No. of Cells/mL: 21 x10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.9	24.0	25.0	24.5	25.0	25.0	✓	✓	✓	✓
1.5	6.9	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.1	24.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.3	24.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.5	24.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.7	24.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.0	24.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 Well 2: 6.9

Final control pH: Well 1: 6.9 Well 2: 6.9

Light intensity (lux): 4200 **Date measured:** May 8/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear, some ppt present

Comments:

Reviewed: [signature] **Date reviewed:** June 3/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: May 8/15 @ 1150h

Work Order #: 15377 — Termination Date: May 11/15 @ 1150h

Sample ID: LC_LCDSSLCC-WS_2015-05-06_N — Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	35					MLT
	B	37					
	C	41					
	D	34					
	E	32					
	F	34					
	G	38					
	H	35					
1.5	A	50					
	B	42					
	C	44					
	D	46					
3.0	A	69					
	B	66					
	C	60					
	D	63					
6.0	A	83					
	B	93					
	C	64	90	97			
	D	92					
11.9	A	114					
	B	108					
	C	117					
	D	104					
23.8	A	118					
	B	129					
	C	114					
	D	100					
47.6	A	121					
	B	130					
	C	109					
	D	119					
95.2	A	77					
	B	73					
	C	65					
	D	66					

Comments:

Reviewed by: — Date Reviewed: June 3/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	08-May-15 @ 1150h
WO#:	15377	Termination Date:	11-May-15 @ 1150h
Sample ID:	LC_LCDSSLCC_WS_2015-05-06_N		
		Initial Cell Density:	9545 cell/mL

									210000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	35				35	34.0	mean	34.8
	B	37				37	36.0	SD	2.815772
	C	41				41	40.0	CV	8.092356
	D	34				34	33.0		
	E	32				32	31.0		
	F	34				34	33.0		
	G	38				38	37.0		
	H	35				35	34.0		
1.5	A	50				50	49.0		
	B	42				42	41.0		
	C	44				44	43.0		
	D	46				46	45.0		
3	A	69				69	68.0		
	B	66				66	65.0		
	C	60				60	59.0		
	D	63				63	62.0		
6	A	83				83	82.0		
	B	93				93	92.0		
	C	64	90	97		83.666667	82.7		
	D	92				92	91.0		
11.9	A	114				114	113.0		
	B	108				108	107.0		
	C	117				117	116.0		
	D	104				104	103.0		
23.8	A	118				118	117.0		
	B	129				129	128.0		
	C	114				114	113.0		
	D	100				100	99.0		
47.6	A	121				121	120.0		
	B	130				130	129.0		
	C	109				109	108.0		
	D	119				119	118.0		
95.2	A	77				77	76.0		
	B	73				73	72.0		
	C	65				65	64.0		
	D	66				66	65.0		

June 3/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	08-5083-7188	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	10-9311-0363	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 11:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 11:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	69h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2109744	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7232	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	59.73	53.88	71.35	1.674	1.402	~~1.856~~ mg
IC10	74.88	60.71	~~105.7~~	~~1.336~~	0.9464	1.647 795.2%(v/v) mg
IC15	~~83.81~~	68.05	N/A	1.066	NA	1.469
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	34.75	31	40	0.9955	2.816	8.1%	0.0%
1.5		4	44.5	41	49	1.708	3.416	7.68%	-28.06%
3		4	63.5	59	68	1.936	3.873	6.1%	-82.73%
6		4	87	82	92	2.614	5.228	6.01%	-150.4%
11.9		4	109.8	103	116	2.926	5.852	5.33%	-215.8%
23.8		4	114.3	99	128	5.991	11.98	10.49%	-228.8%
47.6		4	118.8	108	129	4.308	8.617	7.26%	-241.7%
95.2		4	69.25	64	76	2.869	5.737	8.29%	-99.28%

Cell Yield Detail

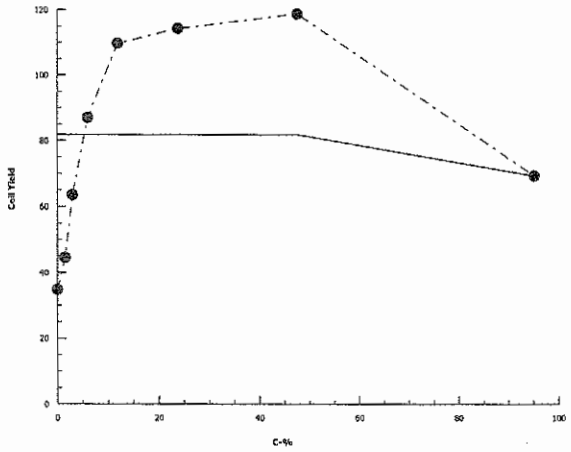
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	34	36	40	33	31	33	37	34
1.5		49	41	43	45				
3		68	65	59	62				
6		82	92	83	91				
11.9		113	107	116	103				
23.8		117	128	113	99				
47.6		120	129	108	118				
95.2		76	72	64	65				

June 3/15

EC Alga Growth Inhibition Test — Nautilus Environmental

Analysis ID:	08-5083-7188	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 3/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-6951-7192	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	10-9311-0363	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 11:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 11:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	08-2003-7136	**Code:**	30E0C610	**Client:**	Teck Coal
Sample Date:	05 May-15 14:34	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	69h (7 °C)	**Station:**	LC_LCDSSLCC_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	27.6%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	2.573	2.526	9.574	10	0.0453	CDF	Significant Effect
		3*	7.586	2.526	9.574	10	<0.0001	CDF	Significant Effect
		6*	13.79	2.526	9.574	10	<0.0001	CDF	Significant Effect
		11.9*	19.79	2.526	9.574	10	<0.0001	CDF	Significant Effect
		23.8*	20.98	2.526	9.574	10	<0.0001	CDF	Significant Effect
		47.6*	22.16	2.526	9.574	10	<0.0001	CDF	Significant Effect
		95.2*	9.103	2.526	9.574	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7232	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	36566.5	5223.786	7	136.4	<0.0001	Significant Effect
Error	1072.5	38.30357	28			
Total	37639		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.88	18.48	0.1047	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9782	0.9166	0.6829	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	34.75	32.4	37.1	34	31	40	0.9955	8.1%	0.0%
1.5		4	44.5	39.06	49.94	44	41	49	1.708	7.68%	-28.06%
3		4	63.5	57.34	69.66	63.5	59	68	1.936	6.1%	-82.73%
6		4	87	78.68	95.32	87	82	92	2.614	6.01%	-150.4%
11.9		4	109.8	100.4	119.1	110	103	116	2.926	5.33%	-215.8%
23.8		4	114.3	95.18	133.3	115	99	128	5.991	10.49%	-228.8%
47.6		4	118.8	105	132.5	119	108	129	4.308	7.26%	-241.7%
95.2		4	69.25	60.12	78.38	68.5	64	76	2.869	8.29%	-99.28%

June 3/15

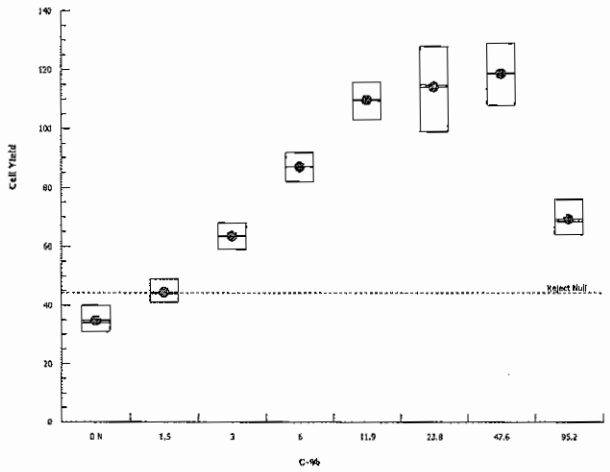
EC Alga Growth Inhibition Test — **Nautilus Environmental**

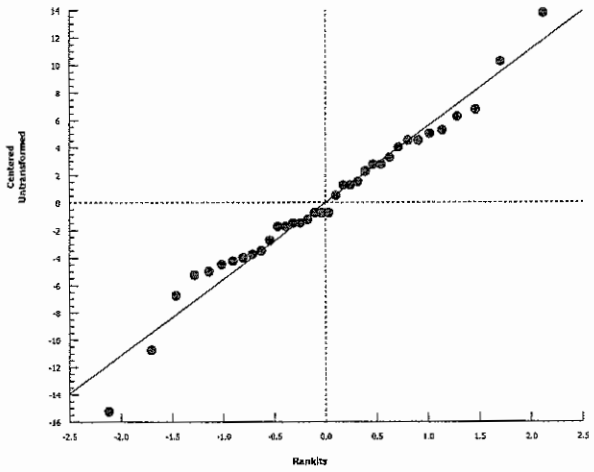
Analysis ID:	13-6951-7192	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:40	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	34	36	40	33	31	33	37	34
1.5		49	41	43	45				
3		68	65	59	62				
6		82	92	83	91				
11.9		113	107	116	103				
23.8		117	128	113	99				
47.6		120	129	108	118				
95.2		76	72	64	65				

Graphics





June 3/15

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15377

Start Date: May 8/15
Set up by: MLT

Sample Information:

Sample ID: LC_LC3_WS_2015-05-06_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x20L

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0 - 42.4) µg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6 - 51.1) µg/L Zn CV (%): 39

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 4/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | **Setup by:** MLT

Sample ID: LC_LC3_WS_2015-05-06_N | **Test Date/Time:** May 8/15 @ 1130h

Work Order No.: 15377 | **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 | **Age of Culture:** 7d | **Culture Health:** Good

Culture Count: 1 625 2 650 | **Average:** 637.5 | **Culture Cell Density (c1):** 637.5 x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 637.5 x10⁴ cells/ml x 10 mL = 3.4 mL

Time Zero Counts: 1 21 2 21 | **Average:** 21

No. of Cells/mL: 21 x10⁴ | **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.9	24.0	25.0	24.5	25.0	25.0	✓	✓	✓	✓
1.5	6.9	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.3	24.0					–	✓	✓	✓
6.0	7.4	24.0					✓	✓	✓	–
11.9	7.5	24.0					✓	✓	✓	✓
23.8	7.8	24.0					✓	✓	✓	✓
47.6	7.9	24.0					✓	✓	✓	✓
95.2	8.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 | Well 2: 6.9

Final control pH: Well 1: 6.9 | Well 2: 6.9

Light intensity (lux): 4060 | **Date measured:** May 8/15

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear

Comments:

Reviewed: [signature] | **Date reviewed:** June 3/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: May 8/15 @ 1130h
Work Order #: 15377 Termination Date: May 11/15 @ 1130h
Sample ID: LC-LC3-WS-2015-05-06-N Test set up by: ML
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	35					ML
	B	33					
	C	39					
	D	32					
	E	37					
	F	32					
	G	35					
	H	32					
1.5	A	40					
	B	38					
	C	34					
	D	36					
3.0	A	55					
	B	58					
	C	59					
	D	52					
6.0	A	93					
	B	81					
	C	88					
	D	89					
11.9	A	98					
	B	117					
	C	103					
	D	115					
23.8	A	98					
	B	118					
	C	97					
	D	103					
47.6	A	104					
	B	108					
	C	102					
	D	92					
95.2	A	67					
	B	74					
	C	59					
	D	64					↓

Comments:

Reviewed by: Date Reviewed: June 3/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	08-May-15 @ 1130h
WO#:	15377	Termination Date:	11-May-15 @ 1130h
Sample ID:	LC_LC3_WS_2015-05-06_N		
		Initial Cell Density:	9545 cell/mL

									210000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	35				35	34.0	mean	33.4
	B	33				33	32.0	SD	2.615203
	C	39				39	38.0	CV	7.825156
	D	32				32	31.0		
	E	37				37	36.0		
	F	32				32	31.0		
	G	35				35	34.0		
	H	32				32	31.0		
1.5	A	40				40	39.0		
	B	38				38	37.0		
	C	34				34	33.0		
	D	36				36	35.0		
3	A	55				55	54.0		
	B	58				58	57.0		
	C	59				59	58.0		
	D	52				52	51.0		
6	A	93				93	92.0		
	B	81				81	80.0		
	C	88				88	87.0		
	D	89				89	88.0		
11.9	A	98				98	97.0		
	B	117				117	116.0		
	C	103				103	102.0		
	D	115				115	114.0		
23.8	A	98				98	97.0		
	B	118				118	117.0		
	C	97				97	96.0		
	D	103				103	102.0		
47.6	A	104				104	103.0		
	B	108				108	107.0		
	C	102				102	101.0		
	D	92				92	91.0		
95.2	A	67				67	66.0		
	B	74				74	73.0		
	C	59				59	58.0		
	D	64				64	63.0		

June 3/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-3153-2802	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-0261-7271	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 11:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 11:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	69h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	108557	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2166	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	62.44	53.4	92.82	1.602	~~1.077~~	~~1.873~~ mLT
IC10	~~81.8~~	~~59.25~~	N/A	1.222	NA	1.688
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

>95.2% (v/v) mLT

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	33.38	31	38	0.9246	2.615	7.84%	0.0%
1.5		4	36	33	39	1.291	2.582	7.17%	-7.87%
3		4	55	51	58	1.581	3.162	5.75%	-64.79%
6		4	86.75	80	92	2.496	4.992	5.75%	-159.9%
11.9		4	107.3	97	116	4.608	9.215	8.59%	-221.3%
23.8		4	103	96	117	4.848	9.695	9.41%	-208.6%
47.6		4	100.5	91	107	3.403	6.807	6.77%	-201.1%
95.2		4	65	58	73	3.136	6.272	9.65%	-94.76%

Cell Yield Detail

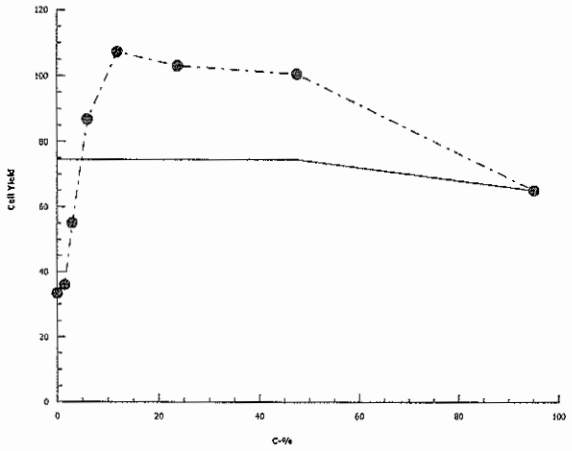
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	34	32	38	31	36	31	34	31
1.5		39	37	33	35				
3		54	57	58	51				
6		92	80	87	88				
11.9		97	116	102	114				
23.8		97	117	96	102				
47.6		103	107	101	91				
95.2		66	73	58	63				

June 3/15

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	04-3153-2802	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 3/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-6042-9291	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:47	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-0261-7271	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 11:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 11:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	01-8455-4594	**Code:**	B001462	**Client:**	Teck Coal
Sample Date:	05 May-15 14:49	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	69h (6.8 °C)	**Station:**	LC_LC3_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	27.2%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.7297	2.526	9.088	10	0.6842	CDF	Non-Significant Effect
		3*	6.011	2.526	9.088	10	<0.0001	CDF	Significant Effect
		6*	14.84	2.526	9.088	10	<0.0001	CDF	Significant Effect
		11.9*	20.53	2.526	9.088	10	<0.0001	CDF	Significant Effect
		23.8*	19.35	2.526	9.088	10	<0.0001	CDF	Significant Effect
		47.6*	18.66	2.526	9.088	10	<0.0001	CDF	Significant Effect
		95.2*	8.791	2.526	9.088	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2166	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	31062.38	4437.482	7	128.6	<0.0001	Significant Effect
Error	966.375	34.51339	28			
Total	32028.75		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.52	18.48	0.0847	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9836	0.9166	0.8600	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	33.38	31.19	35.56	33	31	38	0.9246	7.84%	0.0%
1.5		4	36	31.89	40.11	36	33	39	1.291	7.17%	-7.87%
3		4	55	49.97	60.03	55.5	51	58	1.581	5.75%	-64.79%
6		4	86.75	78.81	94.69	87.5	80	92	2.496	5.75%	-159.9%
11.9		4	107.3	92.59	121.9	108	97	116	4.608	8.59%	-221.3%
23.8		4	103	87.57	118.4	99.5	96	117	4.848	9.41%	-208.6%
47.6		4	100.5	89.67	111.3	102	91	107	3.403	6.77%	-201.1%
95.2		4	65	55.02	74.98	64.5	58	73	3.136	9.65%	-94.76%

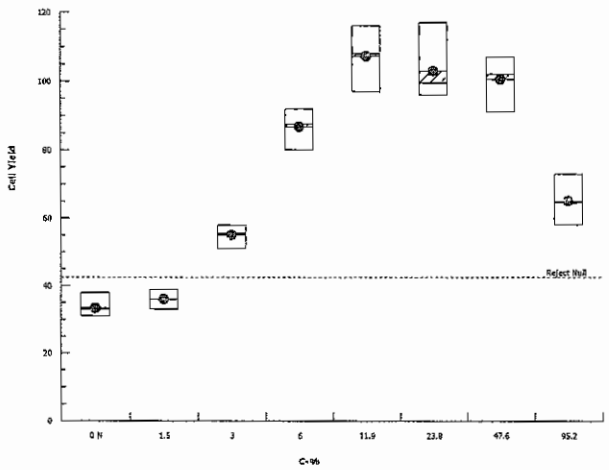
June 3/15

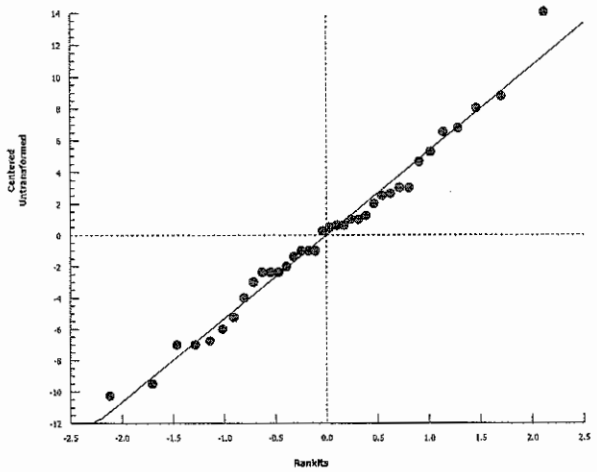
Analysis ID: 06-6042-9291 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 20 May-15 14:47 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	34	32	38	31	36	31	34	31
1.5		39	37	33	35				
3		54	57	58	51				
6		92	80	87	88				
11.9		97	116	102	114				
23.8		97	117	96	102				
47.6		103	107	101	91				
95.2		66	73	58	63				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15377
Start Date: May 7/15
Set up by: MLT

Sample Information:

Sample ID: LC_DCI_WS_2015-05-05_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 6d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0-42.4) mg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6-51.1) mg/L Zn CV (%): 39

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]
Date reviewed: June 4/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MLT

Sample ID: LC-DCI_WS_2015-05-05_N **Test Date/Time:** May 7/15 @ 1300h

Work Order No.: 15377 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 **Age of Culture:** 6d **Culture Health:** Good

Culture Count: 1 435 2 450 **Average:** 442.5 **Culture Cell Density (c1):** 442.5 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 442.5x104 cells/ml = 5 mL

Time Zero Counts: 1 20 2 22 **Average:** 21

No. of Cells/mL: 21 x10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.8	24.0	25.0	25.0	24.5	25.0	✓	✓	✓	✓
1.5	6.8	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	6.9	24.0					✓	✓	✓	✓
6.0	7.1	24.0					✓	✓	✓	✓
11.9	7.2	24.0					✓	✓	✓	✓
23.8	7.5	24.0					✓	✓	✓	✓
47.6	7.8	24.0					✓	✓	✓	✓
95.2	8.1	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.8 Well 2: 6.8

Final control pH: Well 1: 6.6 Well 2: 6.6

Light intensity (lux): 3900 **Date measured:** May 7/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear

Comments:

Reviewed: [signature] **Date reviewed:** June 2/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: May 7/15 @ 1300h
Work Order #: 15377 Termination Date: May 10/15 @ 1300h
Sample ID: LC-DCI-WS-2015-05-05-N Test set up by: MLT
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	38					MLT
	B	33					
	C	34					
	D	39					
	E	33					
	F	31					
	G	36					
	H	35					
1.5	A	38					
	B	34					
	C	39					
	D	40					
3.0	A	50					
	B	47					
	C	46					
	D	48					
6.0	A	75					
	B	~~7577~~ TNTC					
	C	77					
	D	64					
11.9	A	90					
	B	79					
	C	81					
	D	88					
23.8	A	113					
	B	114					
	C	95					
	D	107					
47.6	A	117					
	B	123					
	C	109					
	D	110					
95.2	A	134					
	B	118					
	C	117					
	D	122					

Comments:

Reviewed by: Date Reviewed: June 2/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	07-May-15 @ 1300h		
WO#:	15377	Termination Date:	10-May-15 @ 1300h		
Sample ID:	LC_DC1_WS_2015-05-05_N				
		Initial Cell Density:	9545 cell/mL		210000
					0.22
					0.01

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	38				38	37.0	mean	33.9
	B	33				33	32.0	SD	2.695896
	C	34				34	33.0	CV	7.947701
	D	39				39	38.0		
	E	33				33	32.0		
	F	31				31	30.0		
	G	36				36	35.0		
	H	35				35	34.0		
1.5	A	38				38	37.0		
	B	34				34	33.0		
	C	39				39	38.0		
	D	40				40	39.0		
3	A	50				50	49.0		
	B	47				47	46.0		
	C	46				46	45.0		
	D	48				48	47.0		
6	A	75				75	74.0		
	B	75				75	74.0		
	C	77				77	76.0		
	D	64				64	63.0		
11.9	A	90				90	89.0		
	B	79				79	78.0		
	C	81				81	80.0		
	D	88				88	87.0		
23.8	A	113				113	112.0		
	B	114				114	113.0		
	C	95				95	94.0		
	D	107				107	106.0		
47.6	A	117				117	116.0		
	B	123				123	122.0		
	C	109				109	108.0		
	D	110				110	109.0		
95.2	A	134				134	133.0		
	B	118				118	117.0		
	C	117				117	116.0		
	D	122				122	121.0		

June 2/15

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	12-3819-7494	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-6079-6586	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	49h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1256765	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7195	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	33.88	30	38	0.9531	2.696	7.96%	0.0%
1.5		4	36.75	33	39	1.315	2.63	7.16%	-8.49%
3		4	46.75	45	49	0.8539	1.708	3.65%	-38.01%
6		4	71.75	63	76	2.955	5.909	8.24%	-111.8%
11.9		4	83.5	78	89	2.661	5.323	6.38%	-146.5%
23.8		4	106.3	94	113	4.366	8.732	8.22%	-213.7%
47.6		4	113.8	108	122	3.276	6.551	5.76%	-235.8%
95.2		4	121.8	116	133	3.902	7.805	6.41%	-259.4%

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	37	32	33	38	32	30	35	34
1.5		37	33	38	39				
3		49	46	45	47				
6		74	74	76	63				
11.9		89	78	80	87				
23.8		112	113	94	106				
47.6		116	122	108	109				
95.2		133	117	116	121				

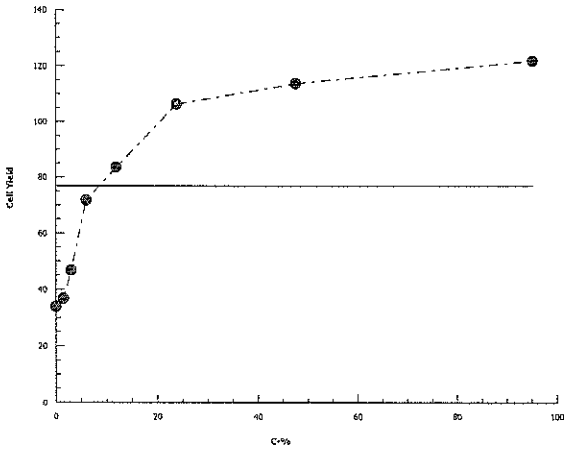
June 2/15

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	12-3819-7494	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-7024-4433	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:24	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-6079-6586	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d
Sample ID:	10-1375-8269	**Code:**	3C6CB93D	**Client:**	Teck Coal
Sample Date:	05 May-15 11:41	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	49h (6.3 °C)	**Station:**	LC_DC1_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	24.6%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.8727	2.526	8.322	10	0.6152	CDF	Non-Significant Effect
		3*	3.908	2.526	8.322	10	0.0018	CDF	Significant Effect
		6*	11.5	2.526	8.322	10	<0.0001	CDF	Significant Effect
		11.9*	15.06	2.526	8.322	10	<0.0001	CDF	Significant Effect
		23.8*	21.97	2.526	8.322	10	<0.0001	CDF	Significant Effect
		47.6*	24.25	2.526	8.322	10	<0.0001	CDF	Significant Effect
		95.2*	26.67	2.526	8.322	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7195	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	41242.6	5891.8	7	203.6	<0.0001	Significant Effect
Error	810.375	28.94197	28			
Total	42052.97		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.57	18.48	0.0833	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9909	0.9166	0.9897	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	33.88	31.62	36.13	33.5	30	38	0.9531	7.96%	0.0%
1.5		4	36.75	32.57	40.93	37.5	33	39	1.315	7.16%	-8.49%
3		4	46.75	44.03	49.47	46.5	45	49	0.8539	3.65%	-38.01%
6		4	71.75	62.35	81.15	74	63	76	2.955	8.24%	-111.8%
11.9		4	83.5	75.03	91.97	83.5	78	89	2.661	6.38%	-146.5%
23.8		4	106.3	92.36	120.1	109	94	113	4.366	8.22%	-213.7%
47.6		4	113.8	103.3	124.2	112.5	108	122	3.276	5.76%	-235.8%
95.2		4	121.8	109.3	134.2	119	116	133	3.902	6.41%	-259.4%

June 2/15

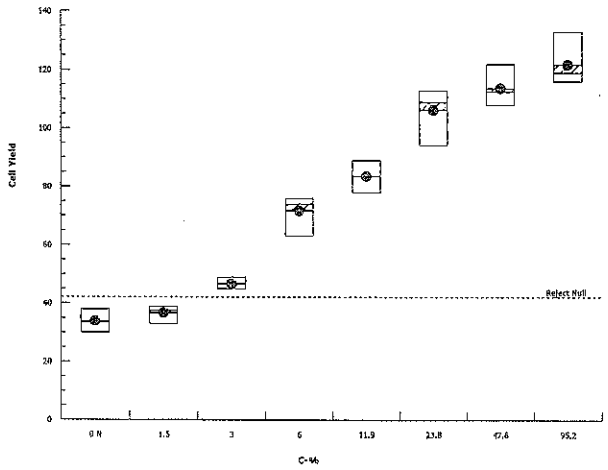
EC Alga Growth Inhibition Test — **Nautilus Environmental**

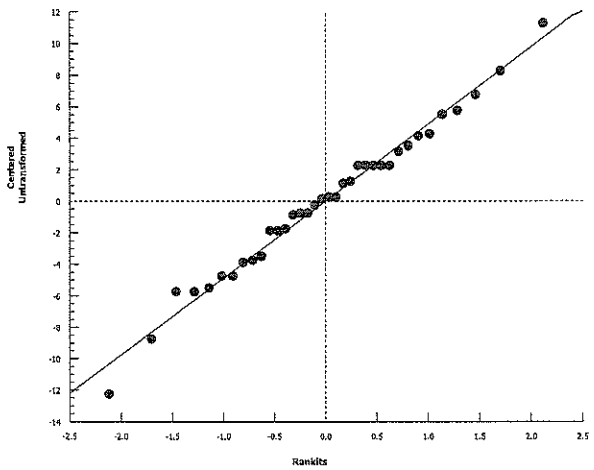
Analysis ID: 12-7024-4433 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 20 May-15 12:24 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	37	32	33	38	32	30	35	34
1.5		37	33	38	39				
3		49	46	45	47				
6		74	74	76	63				
11.9		89	78	80	87				
23.8		112	113	94	106				
47.6		116	122	108	109				
95.2		133	117	116	121				

Graphics





June 2/15

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15377

Start Date: May 8/15
Set up by: MLT

Sample Information:

Sample ID: LC_FRDSDC_WS_2015-05-05_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1 x 20L

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0 - 42.4) mg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6 - 51.1) mg/L Zn CV (%): 39

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 4/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT

Sample ID: LC-TRDSDC_WS_2015-05-05_N | Test Date/Time: May 8/15 @ 1140h

Work Order No.: 15377 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 625 2 650 | Average: 637.5 | Culture Cell Density (c1): 637.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 637.5 x 10^4 cells/ml = 3.4 mL

Time Zero Counts: 1 21 2 21 | Average: 21

No. of Cells/mL: 21 x 10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.9	24.0	25.0	24.5	25.0	25.0	✓	✓	✓	✓
1.5	6.9	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	24.0					✓	✓	✓	✓
6.0	7.2	24.0					✓	✓	✓	✓
11.9	7.5	24.0					✓	✓	✓	✓
23.8	7.7	24.0					✓	✓	✓	✓
47.6	8.0	24.0					✓	✓	✓	✓
95.2	8.2	24.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 Well 2: 6.9

Final control pH: Well 1: 6.9 Well 2: 6.9

Light intensity (lux): 3900 | Date measured: May 8/15

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear

Comments:

Reviewed: [signature] | Date reviewed: June 3/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: May 8/15 @ 1140h

Work Order #: 15377 — Termination Date: May 11/15 @ 1140h

Sample ID: LC-FRDSDC_WS_2015-05-05_N — Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	33					MLT
	B	34					
	C	31					
	D	31					
	E	37					
	F	35					
	G	31					
	H	32					
1.5	A	33					
	B	36					
	C	41					
	D	38					
3.0	A	51					
	B	54					
	C	46					
	D	45					
6.0	A	75					
	B	63					
	C	58					
	D	65					
11.9	A	97					
	B	86					
	C	80					
	D	82					
23.8	A	108					
	B	116					
	C	92					
	D	90					
47.6	A	83					
	B	97					
	C	82					
	D	76					
95.2	A	73					
	B	77					
	C	75					
	D	70					↓

Comments:

Reviewed by: — Date Reviewed: June 3/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	08-May-15 @ 1140h
WO#:	15377	Termination Date:	11-May-15 @ 1140h
Sample ID:	LC_FRDSDC_WS_2015-05-05_N		
		Initial Cell Density:	9545 cell/mL

									210000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	33				33	32.0	mean	32.0
	B	34				34	33.0	SD	2.203893
	C	31				31	30.0	CV	6.877396
	D	31				31	30.0		
	E	37				37	36.0		
	F	35				35	34.0		
	G	31				31	30.0		
	H	32				32	31.0		
1.5	A	33				33	32.0		
	B	36				36	35.0		
	C	41				41	40.0		
	D	38				38	37.0		
3	A	51				51	50.0		
	B	54				54	53.0		
	C	46				46	45.0		
	D	45				45	44.0		
6	A	75				75	74.0		
	B	63				63	62.0		
	C	58				58	57.0		
	D	65				65	64.0		
11.9	A	97				97	96.0		
	B	86				86	85.0		
	C	80				80	79.0		
	D	82				82	81.0		
23.8	A	108				108	107.0		
	B	116				116	115.0		
	C	92				92	91.0		
	D	90				90	89.0		
47.6	A	83				83	82.0		
	B	97				97	96.0		
	C	82				82	81.0		
	D	76				76	75.0		
95.2	A	73				73	72.0		
	B	77				77	76.0		
	C	75				75	74.0		
	D	70				70	69.0		

June 3/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-3885-9475	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 13:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	12-8273-8012	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 11:40	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 11:40	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	70h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	122847	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7295	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	32	30	36	0.7792	2.204	6.89%	0.0%
1.5		4	36	32	40	1.683	3.367	9.35%	-12.5%
3		4	48	44	53	2.121	4.243	8.84%	-50.0%
6		4	64.25	57	74	3.568	7.136	11.11%	-100.8%
11.9		4	85.25	79	96	3.794	7.588	8.9%	-166.4%
23.8		4	100.5	89	115	6.292	12.58	12.52%	-214.1%
47.6		4	83.5	75	96	4.444	8.888	10.64%	-160.9%
95.2		4	72.75	69	76	1.493	2.986	4.11%	-127.3%

Cell Yield Detail

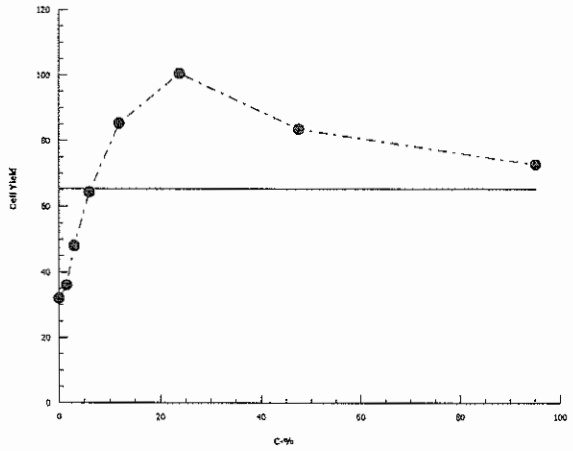
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	32	33	30	30	36	34	30	31
1.5		32	35	40	37				
3		50	53	45	44				
6		74	62	57	64				
11.9		96	85	79	81				
23.8		107	115	91	89				
47.6		82	96	81	75				
95.2		72	76	74	69				

June 3/15

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	10-3885-9475	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 13:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 3/15

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	17-2147-6863	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	12-8273-8012	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 11:40	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 11:40	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	20-4735-3291	**Code:**	7A0821CB	**Client:**	Teck Coal
Sample Date:	05 May-15 13:32	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	70h (6 °C)	**Station:**	LC_FRDSDC_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	31.5%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.004	2.526	10.07	10	0.5495	CDF	Non-Significant Effect
		3*	4.014	2.526	10.07	10	0.0013	CDF	Significant Effect
		6*	8.091	2.526	10.07	10	<0.0001	CDF	Significant Effect
		11.9*	13.36	2.526	10.07	10	<0.0001	CDF	Significant Effect
		23.8*	17.19	2.526	10.07	10	<0.0001	CDF	Significant Effect
		47.6*	12.92	2.526	10.07	10	<0.0001	CDF	Significant Effect
		95.2*	10.22	2.526	10.07	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7295	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	21104.5	3014.928	7	71.16	<0.0001	Significant Effect
Error	1186.25	42.36607	28			
Total	22290.75		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	17.08	18.48	0.0169	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9609	0.9166	0.2287	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	32	30.16	33.84	31.5	30	36	0.7792	6.89%	0.0%
1.5		4	36	30.64	41.36	36	32	40	1.683	9.35%	-12.5%
3		4	48	41.25	54.75	47.5	44	53	2.121	8.84%	-50.0%
6		4	64.25	52.9	75.6	63	57	74	3.568	11.11%	-100.8%
11.9		4	85.25	73.18	97.32	83	79	96	3.794	8.9%	-166.4%
23.8		4	100.5	80.48	120.5	99	89	115	6.292	12.52%	-214.1%
47.6		4	83.5	69.36	97.64	81.5	75	96	4.444	10.64%	-160.9%
95.2		4	72.75	68	77.5	73	69	76	1.493	4.11%	-127.3%

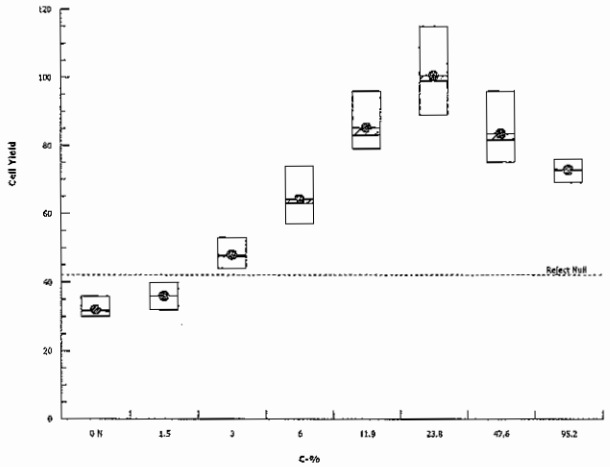
June 3/15

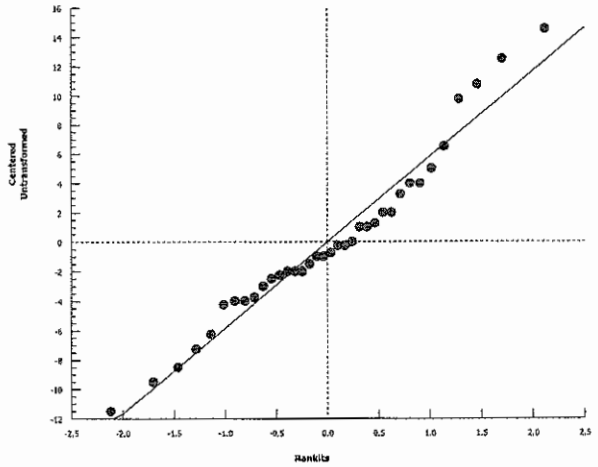
Analysis ID:	17-2147-6863	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 14:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	32	33	30	30	36	34	30	31
1.5		32	35	40	37				
3		50	53	45	44				
6		74	62	57	64				
11.9		96	85	79	81				
23.8		107	115	91	89				
47.6		82	96	81	75				
95.2		72	76	74	69				

Graphics





June 3/15

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15377

Start Date: May 7/15
Set up by: MLT

Sample Information:

Sample ID: LC_DCDS_WS_2015-05-05_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x20L

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 6d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0 - 42.4) µg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6 - 51.1) µg/L Zn CV (%): 39

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 4/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MLT

Sample ID: LC_DCDS_WS_2015-05-05_N **Test Date/Time:** May 7/15 @ 1300h

Work Order No.: 15377 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 **Age of Culture:** 6d **Culture Health:** Good

Culture Count: 1 435 2 450 **Average:** 442.5 **Culture Cell Density (c1):** 442.5 x10⁴ cells/mL

v1 = 220,000 cells/ml (c1) x 100 ml / 442.5 x10⁴ cells/ml = 5mL

Time Zero Counts: 1 20 2 22 **Average:** 21

No. of Cells/mL: 21 x10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.8	24.0	25.0	25.0	24.5	25.0	✓	~	✓	✓
1.5	6.9	24.0	↓	↓	↓	↓	✓	~	✓	✓
3.0	7.0	24.0					✓	~	~	✓
6.0	7.1	24.0					✓	~	~	✓
11.9	7.2	24.0					✓	~	~	✓
23.8	7.4	24.0					✓	~	✓	✓
47.6	7.7	24.0					✓	~	✓	~
95.2	8.0	24.0	↓	↓	↓	↓ MLT	✓	~	✓	~
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.8 Well 2: 6.8

Final control pH: Well 1: 6.6 Well 2: 6.6

Light intensity (lux): 4100 **Date measured:** May 7/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear, some ppt present

Comments:

Reviewed: [signature] **Date reviewed:** June 2/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: May 7/15 @ 1300h

Work Order #: 15377 Termination Date: May 10/15 @ 1300h

Sample ID: LC_PCDS_WS_2015-05-05_N Test set up by: ML

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	40					ML
	B	38					
	C	32					
	D	33					
	E	ML 38					
	F	39					
	G	37					
	H	36					
1.5	A	42					
	B	38					
	C	45					
	D	35					
3.0	A	ML 63					
	B	58					
	C	61					
	D	53					
6.0	A	ML 75					
	B	69					
	C	62					
	D	74					
11.9	A	81					
	B	86					
	C	95					
	D	83					
23.8	A	167					
	B	172					
	C	132					
	D	129					
47.6	A	156					
	B	138					
	C	131					
	D	126					
95.2	A	135					
	B	139					
	C	134					
	D	126					✓

Comments:

Reviewed by: Date Reviewed: May 29/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	07-May-15 @ 1300h		
WO#:	15377	Termination Date:	10-May-15 @ 1300h		
Sample ID:	LC_DCDS_WS_2015-05-05_N				
		Initial Cell Density:	9545 cell/mL		210000
					0.22
					0.01

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	40				40	39.0	mean	35.2
	B	38				38	37.0	SD	3.090885
	C	32				32	31.0	CV	8.7883
	D	33				33	32.0		
	E	38				38	37.0		
	F	39				39	38.0		
	G	33				33	32.0		
	H	36				36	35.0		
1.5	A	42				42	41.0		
	B	38				38	37.0		
	C	45				45	44.0		
	D	35				35	34.0		
3	A	63				63	62.0		
	B	58				58	57.0		
	C	61				61	60.0		
	D	53				53	52.0		
6	A	75				75	74.0		
	B	69				69	68.0		
	C	62				62	61.0		
	D	74				74	73.0		
11.9	A	81				81	80.0		
	B	86				86	85.0		
	C	95				95	94.0		
	D	83				83	82.0		
23.8	A	107				107	106.0		
	B	112				112	111.0		
	C	132				132	131.0		
	D	129				129	128.0		
47.6	A	156				156	155.0		
	B	138				138	137.0		
	C	131				131	130.0		
	D	136				136	135.0		
95.2	A	135				135	134.0		
	B	139				139	138.0		
	C	134				134	133.0		
	D	126				126	125.0		

June 2/15

CETIS Analytical Report

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	02-4292-0299	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 13:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	12-5093-4433	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	50h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	516634	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5540	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	35.13	31	39	1.093	3.091	8.8%	0.0%
1.5		4	39	34	44	2.198	4.397	11.27%	-11.03%
3		4	57.75	52	62	2.175	4.349	7.53%	-64.41%
6		4	69	61	74	2.972	5.944	8.62%	-96.44%
11.9		4	85.25	80	94	3.092	6.185	7.26%	-142.7%
23.8		4	119	106	131	6.178	12.36	10.38%	-238.8%
47.6		4	139.3	130	155	5.452	10.9	7.83%	-296.4%
95.2		4	132.5	125	138	2.723	5.447	4.11%	-277.2%

Cell Yield Detail

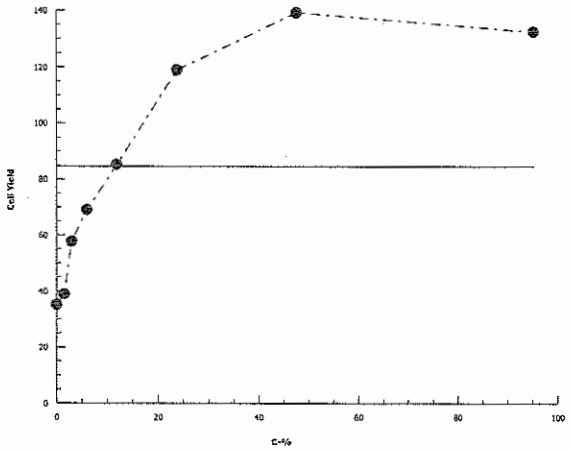
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	39	37	31	32	37	38	32	35
1.5		41	37	44	34				
3		62	57	60	52				
6		74	68	61	73				
11.9		80	85	94	82				
23.8		106	111	131	128				
47.6		155	137	130	135				
95.2		134	138	133	125				

June 2/15

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	02-4292-0299	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 13:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-5623-5728	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 13:54	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	12-5093-4433	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	07 May-15 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	10 May-15 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	6d
Sample ID:	12-7328-6829	**Code:**	4BE4D0AD	**Client:**	Teck Coal
Sample Date:	05 May-15 11:14	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	50h (7.8 °C)	**Station:**	LC_DCDS_WS_2015-05-05_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	30.1%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.9265	2.526	10.57	10	0.5884	CDF	Non-Significant Effect
		3*	5.41	2.526	10.57	10	<0.0001	CDF	Significant Effect
		6*	8.099	2.526	10.57	10	<0.0001	CDF	Significant Effect
		11.9*	11.98	2.526	10.57	10	<0.0001	CDF	Significant Effect
		23.8*	20.05	2.526	10.57	10	<0.0001	CDF	Significant Effect
		47.6*	24.9	2.526	10.57	10	<0.0001	CDF	Significant Effect
		95.2*	23.28	2.526	10.57	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5540	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	56531.43	8075.918	7	173.1	<0.0001	Significant Effect
Error	1306.125	46.64732	28			
Total	57837.55		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.53	18.48	0.1170	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9875	0.9166	0.9495	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	35.13	32.54	37.71	36	31	39	1.093	8.8%	0.0%
1.5		4	39	32	46	39	34	44	2.198	11.27%	-11.03%
3		4	57.75	50.83	64.67	58.5	52	62	2.175	7.53%	-64.41%
6		4	69	59.54	78.46	70.5	61	74	2.972	8.62%	-96.44%
11.9		4	85.25	75.41	95.09	83.5	80	94	3.092	7.26%	-142.7%
23.8		4	119	99.34	138.7	119.5	106	131	6.178	10.38%	-238.8%
47.6		4	139.3	121.9	156.6	136	130	155	5.452	7.83%	-296.4%
95.2		4	132.5	123.8	141.2	133.5	125	138	2.723	4.11%	-277.2%

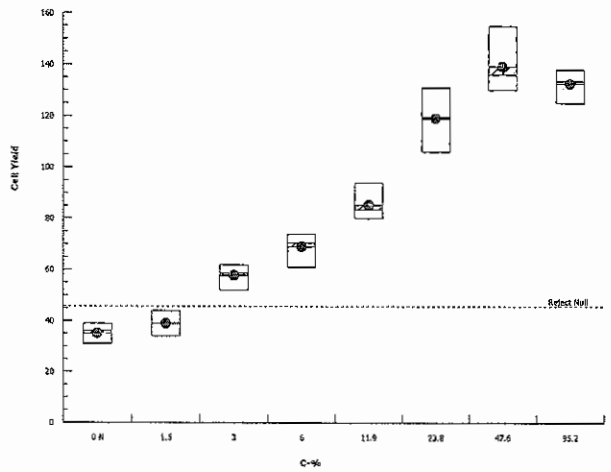
June 2/15

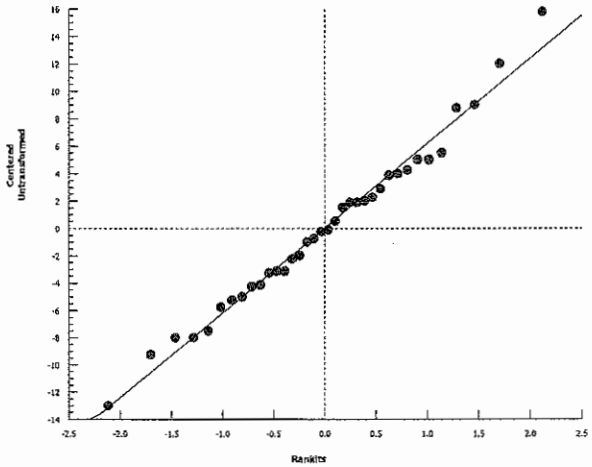
Analysis ID: 15-5623-5728 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 20 May-15 13:54 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	39	37	31	32	37	38	32	35
1.5		41	37	44	34				
3		62	57	60	52				
6		74	68	61	73				
11.9		80	85	94	82				
23.8		106	111	131	128				
47.6		155	137	130	135				
95.2		134	138	133	125				

Graphics





June 2/15

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15377

Start Date: May 8/15
Set up by: MLT

Sample Information:

Sample ID: LC_LC5_WS_2015-05-06_N
Sample Date: May 5/15
Date Received: May 6/15
Sample Volume: 1x 20L

Test Organism Information:

Culture Date: May 1/15
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC129
Stock Solution ID: 15Zn01
Date Initiated: May 5/15

72-h IC50 (95% CL): 38.6 (35.0 - 42.4) µg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 26.4 (13.6 - 51.1) µg/L Zn CV (%): 39

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 4/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT

Sample ID: LC_LC5_WS_2015-05-06_N | Test Date/Time: May 8/15 @ 1200h

Work Order No.: 15377 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: May 1/15 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 ~~125~~ MLT 625 2 ~~130~~ MLT 650 | Average: 637.5 | Culture Cell Density (c1): 637.5x104 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 637.5 x104 cells/ml = 3.4 mL

Time Zero Counts: 1 21 2 21 | Average: 21

No. of Cells/mL: 21 x104 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.9	24.0	25.0	24.5	25.0	25.0	✓	✓	✓	✓
1.5	6.9	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	24.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.3	24.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.5	24.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.7	24.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	7.9	24.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 Well 2: 6.9

Final control pH: Well 1: 6.9 Well 2: 6.9

Light intensity (lux): 3850 | Date measured: May 8/15

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear

Comments:

Reviewed: [signature] | Date reviewed: June 2/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: May 8/15 @ 1200h

Work Order #: 15377 — Termination Date: May 11/15 @ 1200h

Sample ID: LC_LC5_WS-2015-05-06_N — Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	33					MLT
	B	32					
	C	41					
	D	33					
	E	36					
	F	32					
	G	33					
	H	34					
1.5	A	61					
	B	63					
	C	70					
	D	60					
3.0	A	84					
	B	81					
	C	81					
	D	76					
6.0	A	120					
	B	109					
	C	93					
	D	108					
11.9	A	121					
	B	130					
	C	110					
	D	108					
23.8	A	117					
	B	124					
	C	111					
	D	114					
47.6	A	85					
	B	97					
	C	88					
	D	95					
95.2	A	83					
	B	71					
	C	75					
	D	66					↓

Comments:

Reviewed by: [signature] — Date Reviewed: June 2/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	08-May-15 @ 1200h		
WO#:	15377	Termination Date:	11-May-15 @ 1200h		
Sample ID:	LC_LC5_WS_2015-05-06_N				
		Initial Cell Density:	9545 cell/mL		210000
					0.22
					0.01

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	33				33	32.0	mean	33.3
	B	32				32	31.0	SD	3.011881
	C	41				41	40.0	CV	9.045923
	D	33				33	32.0		
	E	36				36	35.0		
	F	32				32	31.0		
	G	33				33	32.0		
	H	34				34	33.0		
1.5	A	61				61	60.0		
	B	63				63	62.0		
	C	70				70	69.0		
	D	60				60	59.0		
3	A	84				84	83.0		
	B	81				81	80.0		
	C	81				81	80.0		
	D	76				76	75.0		
6	A	120				120	119.0		
	B	109				109	108.0		
	C	93				93	92.0		
	D	108				108	107.0		
11.9	A	121				121	120.0		
	B	130				130	129.0		
	C	110				110	109.0		
	D	108				108	107.0		
23.8	A	117				117	116.0		
	B	124				124	123.0		
	C	111				111	110.0		
	D	114				114	113.0		
47.6	A	85				85	84.0		
	B	97				97	96.0		
	C	88				88	87.0		
	D	95				95	94.0		
95.2	A	83				83	82.0		
	B	71				71	70.0		
	C	75				75	74.0		
	D	66				66	65.0		

June 2/15

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-4163-8071	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	08-1217-8386	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 12:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 12:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	70h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	791042	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9122	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	59.45	53.3	89.68	1.682	1.115	~~1.876~~ mLT
IC10	74.18	59.96	N/A	~~1.348~~	NA	1.668 > 95.2 %(v/v) mLT
IC15	~~92.5~~	66.9	N/A	1.081	NA	1.495
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	33.25	31	40	1.065	3.012	9.06%	0.0%
1.5		4	62.5	59	69	2.255	4.509	7.22%	-87.97%
3		4	79.5	75	83	1.658	3.317	4.17%	-139.1%
6		4	106.5	92	119	5.545	11.09	10.41%	-220.3%
11.9		4	116.3	107	129	5.121	10.24	8.81%	-249.6%
23.8		4	115.5	110	123	2.784	5.568	4.82%	-247.4%
47.6		4	90.25	84	96	2.839	5.679	6.29%	-171.4%
95.2		4	72.75	65	82	3.591	7.182	9.87%	-118.8%

Cell Yield Detail

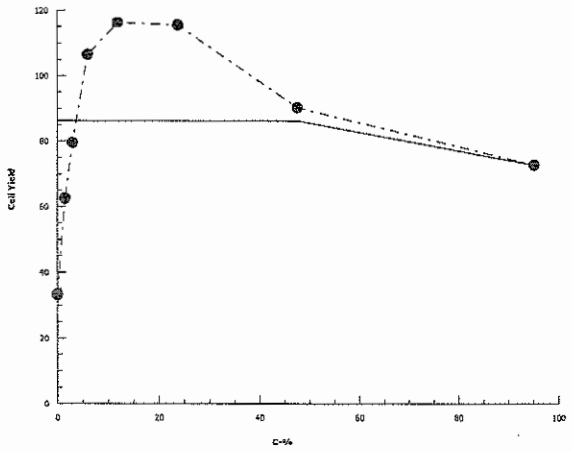
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	32	31	40	32	35	31	32	33
1.5		60	62	69	59				
3		83	80	80	75				
6		119	108	92	107				
11.9		120	129	109	107				
23.8		116	123	110	113				
47.6		84	96	87	94				
95.2		82	70	74	65				

June 2/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-4163-8071	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 2/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-5688-7537	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:33	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	08-1217-8386	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	08 May-15 12:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	11 May-15 12:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	11-8749-7839	**Code:**	46C7C76F	**Client:**	Teck Coal
Sample Date:	05 May-15 14:02	**Material:**	Water Sample	**Project:**	
Receive Date:	06 May-15 08:34	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	70h (6.8 °C)	**Station:**	LC_LC5_WS_2015-05-06_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	30.3%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	7.34	2.526	10.07	10	<0.0001	CDF	Significant Effect
		3*	11.61	2.526	10.07	10	<0.0001	CDF	Significant Effect
		6*	18.38	2.526	10.07	10	<0.0001	CDF	Significant Effect
		11.9*	20.83	2.526	10.07	10	<0.0001	CDF	Significant Effect
		23.8*	20.64	2.526	10.07	10	<0.0001	CDF	Significant Effect
		47.6*	14.3	2.526	10.07	10	<0.0001	CDF	Significant Effect
		95.2*	9.912	2.526	10.07	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9122	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	32400.55	4628.651	7	109.3	<0.0001	Significant Effect
Error	1185.75	42.34821	28			
Total	33586.3		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	10.99	18.48	0.1389	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9801	0.9166	0.7486	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	33.25	30.73	35.77	32	31	40	1.065	9.06%	0.0%
1.5		4	62.5	55.32	69.68	61	59	69	2.255	7.22%	-87.97%
3		4	79.5	74.22	84.78	80	75	83	1.658	4.17%	-139.1%
6		4	106.5	88.85	124.1	107.5	92	119	5.545	10.41%	-220.3%
11.9		4	116.3	99.95	132.5	114.5	107	129	5.121	8.81%	-249.6%
23.8		4	115.5	106.6	124.4	114.5	110	123	2.784	4.82%	-247.4%
47.6		4	90.25	81.21	99.29	90.5	84	96	2.839	6.29%	-171.4%
95.2		4	72.75	61.32	84.18	72	65	82	3.591	9.87%	-118.8%

June 2/15

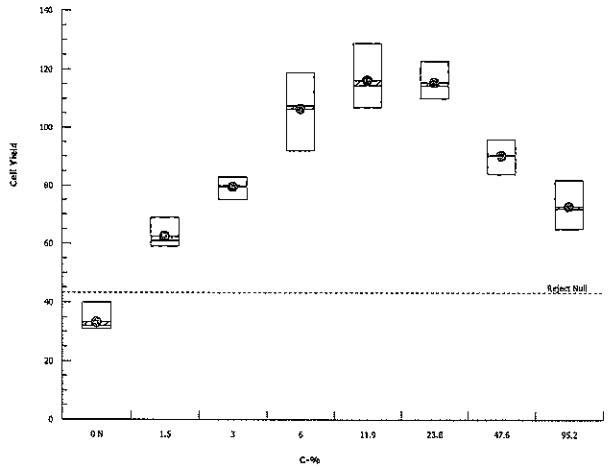
EC Alga Growth Inhibition Test — Nautilus Environmental

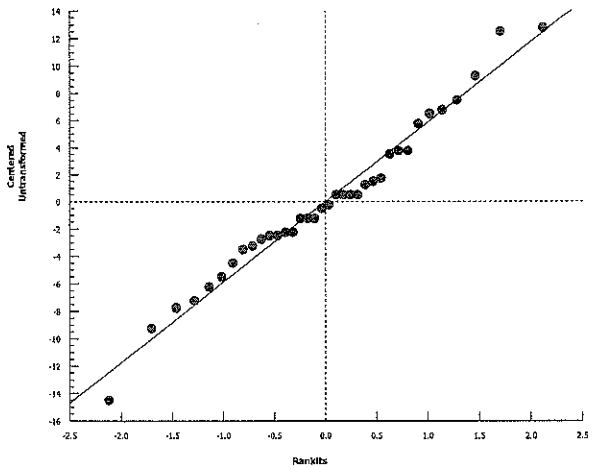
Analysis ID:	13-5688-7537	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	20 May-15 12:33	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	32	31	40	32	35	31	32	33
1.5		60	62	69	59				
3		83	80	80	75				
6		119	108	92	107				
11.9		120	129	109	107				
23.8		116	123	110	113				
47.6		84	96	87	94				
95.2		82	70	74	65				

Graphics





June 2/15

APPENDIX E – Analytical Chemistry

GH_ER2 (0200378)

statistic	sample_date	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)	ARSENIC (T)	BARIUM (D)	BARIUM (T)
	4/14/2015	< 0.0030	0.0332	< 0.00010	< 0.00010	< 0.00010	0.00013	0.0483	0.0496
	4/14/2015	< 0.0030	0.0097	< 0.00010	< 0.00010	< 0.00010	0.00010	0.0509	0.0498
	4/21/2015	< 0.0030	0.0452	< 0.00010	< 0.00010	< 0.00010	0.00013	0.0486	0.0475
	4/28/2015	< 0.0030	0.0308	< 0.00010	< 0.00010	< 0.00010	0.00011	0.0467	0.0478
	5/5/2015	< 0.0030	0.0761	< 0.00010	< 0.00010	0.00011	0.00016	0.0462	0.0476
	5/12/2015	< 0.0030	0.0432	< 0.00010	< 0.00010	0.00010	0.00014	0.0446	0.0449
	5/19/2015	< 0.0030	0.0590	< 0.00010	< 0.00010	0.00011	0.00016	0.0448	0.0450
	5/26/2015	< 0.0030	0.203	< 0.00010	< 0.00010	0.00013	0.00023	0.0397	0.0432
	6/2/2015	0.0062	0.540	< 0.00010	< 0.00010	0.00012	0.00053	0.0350	0.0444
	6/9/2015	0.230	0.773	< 0.00010	< 0.00010	0.00032	0.00050	0.0415	0.0423
	6/16/2015	< 0.0030	0.0652	< 0.00010	< 0.00010	0.00010	0.00017	0.0383	0.0394
	6/23/2015	< 0.0030	0.0281	< 0.00010	< 0.00010	0.00010	0.00014	0.0387	0.0383
	6/30/2015	0.0043	0.351	< 0.00010	< 0.00010	0.00010	0.00027	0.0377	0.0408
Average Sample Result		0.020808	0.17365	0.00010000	0.00010000	0.00012231	0.00021308	0.043154	0.044662
Exceedance Count		1	0	0	0	0	0	0	0
Maximum Sample Result		0.23	0.773	0.0001	0.0001	0.00032	0.00053	0.0509	0.0498
Minimum Sample Result		0.003	0.0097	0.0001	0.0001	0.0001	0.0001	0.035	0.0383
Sample Count		13	13	13	13	13	13	13	13
Sample Range		0.22700	0.76330	0.0000	0.0000	0.00022000	0.00043000	0.015900	0.011500
Std Deviation		0.062861	0.23838	0.0000	0.0000	0.000060160	0.00014191	0.0049757	0.0037456
Std Error		0.017435	0.066114	0.0000	0.0000	0.000016685	0.000039360	0.0013800	0.0010388

GH_ER2 (0200378)

statistic	sample_date	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)	BORON (T)	BROMIDE (D)	CADMIUM (D)
	4/14/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000051
	4/14/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000056
	4/21/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050
	4/28/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050
	5/5/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	< 0.0000050
	5/12/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000060
	5/19/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000059
	5/26/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000052
	6/2/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000084
	6/9/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000872
	6/16/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000067
	6/23/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000067
	6/30/2015	< 0.00010	< 0.00010	< 0.000050	< 0.000050	< 0.010	< 0.010	< 0.050	0.0000069
Average Sample Result		0.00010000	0.00010000	0.000050000	0.000050000	0.010000	0.010000	0.050000	0.000012208
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0.0001	0.0001	5e-005	5e-005	0.01	0.01	0.05	8.72e-005
Minimum Sample Result		0.0001	0.0001	5e-005	5e-005	0.01	0.01	0.05	5e-006
Sample Count		13	13	13	13	13	13	13	13
Sample Range		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.000082200
Std Deviation		0.0000	0.0000	0.0000	0.0000	2.6885E-10	2.6885E-10	0.0000000010754	0.000022555
Std Error		0.0000	0.0000	0.0000	0.0000	7.4565E-11	7.4565E-11	2.9826E-10	0.0000062556

GH_ER2 (0200378)

statistic	sample_date	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)	CHROMIUM (D)	CHROMIUM (T)
	4/14/2015	0.0000102	55.5	1.01	< 1.0	0.00024	0.00034
	4/14/2015	< 0.0000050	50.9	0.92	< 1.0	0.00027	0.00034
	4/21/2015	0.0000108	51.6	1.10	1.1	0.00021	0.00034
	4/28/2015	0.0000085	50.9	0.94	< 1.0	0.00019	0.00031
	5/5/2015	0.0000155	48.2	0.84	1.0	0.00022	0.00037
	5/12/2015	0.0000113	49.6	1.24	1.1	0.00022	0.00034
	5/19/2015	0.0000171	49.9	1.30	1.5	0.00019	0.00214
	5/26/2015	0.0000309	46.9	1.26	1.2	0.00013	0.00061
	6/2/2015	0.0000950	49.7	1.46	< 1.0	0.00022	0.00149
	6/9/2015	0.0000964	45.8		< 0.50	0.00064	0.00185
	6/16/2015	0.0000140	45.7	0.88	1.2	0.00021	0.00062
	6/23/2015	0.0000086	43.1	0.69	1.2	0.00025	0.00026
	6/30/2015	0.0000270	42.7	0.72	1.1	0.00021	0.00073
Average Sample Result		0.000026946	48.500	1.0300	1.0692	0.00024615	0.00074923
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		9.64e-005	55.5	1.46	1.5	0.00064	0.00214
Minimum Sample Result		5e-006	42.7	0.69	0.5	0.00013	0.00026
Sample Count		13	13	12	13	13	13
Sample Range		0.000091400	12.800	0.77000	1.0000	0.00051000	0.0018800
Std Deviation		0.000031372	3.5977	0.24320	0.22130	0.00012299	0.00064402
Std Error		0.0000087012	0.99782	0.070205	0.061378	0.000034110	0.00017862

GH_ER2 (0200378)

statistic	sample_date	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)	COPPER (D)	COPPER (T)
	4/14/2015	< 0.00010	< 0.00010	238.9	330	< 0.00050	< 0.00050
	4/14/2015	< 0.00010	< 0.00010		322	< 0.00050	< 0.00050
	4/21/2015	< 0.00010	< 0.00010	248.2	321	< 0.00050	< 0.00050
	4/28/2015	< 0.00010	< 0.00010	244.4	321	< 0.00050	< 0.00050
	5/5/2015	< 0.00010	< 0.00010	254.5	303	< 0.00050	< 0.00050
	5/12/2015	< 0.00010	< 0.00010	309	300	< 0.00050	< 0.00050
	5/19/2015	< 0.00010	< 0.00010	307	289	< 0.00050	< 0.00050
	5/26/2015	< 0.00010	0.00010	276	270	< 0.00050	< 0.00050
	6/2/2015	< 0.00010	0.00036	217.3	253	< 0.00050	0.00117
	6/9/2015	0.00023	0.00033	206.6	256	0.00065	0.00104
	6/16/2015	< 0.00010	< 0.00010	224.7	254	< 0.00050	< 0.00050
	6/23/2015	< 0.00010	< 0.00010	225.2	286	< 0.00050	< 0.00050
	6/30/2015	< 0.00010	0.00017	215.8	270	< 0.00050	0.00053
Average Sample Result		0.00011000	0.00014308	247.30	290.38	0.00051154	0.00059538
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.00023	0.00036	309	330	0.00065	0.00117
Minimum Sample Result		0.0001	0.0001	206.6	253	0.0005	0.0005
Sample Count		13	13	12	13	13	13
Sample Range		0.00013000	0.00026000	102.40	77.000	0.00015000	0.00067000
Std Deviation		0.000036056	0.000091868	34.211	28.064	0.000041603	0.00022787
Std Error		0.000010000	0.000025480	9.8758	7.7836	0.000011538	0.000063201

GH_ER2 (0200378)

statistic	sample_date	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)	IRON (D)	IRON (T)	LEAD (D)
	4/14/2015	11.41	0.156	184	< 0.010	0.032	< 0.000050
	4/14/2015		0.158	174	< 0.010	0.015	< 0.000050
	4/21/2015	11.48	0.161	177	< 0.010	0.051	< 0.000050
	4/28/2015	11.39	0.152	171	< 0.010	0.032	< 0.000050
	5/5/2015	11.53	0.153	160	< 0.010	0.066	< 0.000050
	5/12/2015	10.19	0.159	167	< 0.010	0.046	< 0.000050
	5/19/2015	10.28	0.159	164	< 0.010	0.101	< 0.000050
	5/26/2015	9.34	0.148	150	< 0.010	0.220	< 0.000050
	6/2/2015	10.24	0.153	141	< 0.010	0.842	< 0.000050
	6/9/2015	9.64	0.149	163	0.315	0.884	0.000440
	6/16/2015	8.74	0.151	151	< 0.010	0.077	< 0.000050
	6/23/2015	9.39	0.152	149	< 0.010	0.037	< 0.000050
	6/30/2015	9.53	0.157	143	< 0.010	0.302	< 0.000050
Average Sample Result		10.263	0.15446	161.08	0.033462	0.20808	0.000080000
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		11.53	0.161	184	0.315	0.884	0.00044
Minimum Sample Result		8.74	0.148	141	0.01	0.015	5e-005
Sample Count		12	13	13	13	13	13
Sample Range		2.7900	0.013000	43.000	0.30500	0.86900	0.00039000
Std Deviation		0.97874	0.0041355	13.518	0.084592	0.30222	0.00010817
Std Error		0.28254	0.0011470	3.7493	0.023462	0.083820	0.000030000

GH_ER2 (0200378)

statistic	sample_date	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)	MANGANESE (T)	MERCURY (D)
	4/14/2015	< 0.000050	0.0015	0.0015	12.7	0.00262	0.00459	< 0.0000050
	4/14/2015	< 0.000050	0.0016	0.0016	11.4	0.00275	0.00340	< 0.0000050
	4/21/2015	< 0.000050	0.0017	0.0018	11.5	0.00283	0.00484	< 0.0000050
	4/28/2015	< 0.000050	0.0017	0.0016	11.4	0.00328	0.00509	< 0.0000050
	5/5/2015	< 0.000050	0.0017	0.0016	10.8	0.00327	0.00594	< 0.0000050
	5/12/2015	< 0.000050	0.0016	0.0015	11.6	0.00311	0.00548	< 0.0000050
	5/19/2015	0.000053	0.0018	0.0020	10.8	0.00273	0.00694	0.0000073
	5/26/2015	0.000155	0.0013	0.0019	9.98	0.00235	0.0133	< 0.0000050
	6/2/2015	0.000598	0.0013	0.0022	9.92	0.00093	0.0475	< 0.0000050
	6/9/2015	0.000542	0.0014	0.0022	9.24	0.0509	0.0486	< 0.0000050
	6/16/2015	0.000064	0.0016	0.0014	9.70	0.00311	0.00786	< 0.0000050
	6/23/2015	< 0.000050	0.0013	0.0014	9.17	0.00308	0.00515	< 0.0000050
	6/30/2015	0.000216	0.0013	0.0020	8.78	0.00218	0.0136	< 0.0000050
Average Sample Result		0.00015215	0.0015231	0.0017462	10.538	0.0063954	0.013253	0.0000051769
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.000598	0.0018	0.0022	12.7	0.0509	0.0486	7.3e-006
Minimum Sample Result		5e-005	0.0013	0.0014	8.78	0.00093	0.0034	5e-006
Sample Count		13	13	13	13	13	13	13
Sample Range		0.00054800	0.00050000	0.00080000	3.9200	0.049970	0.045200	0.0000023000
Std Deviation		0.00019268	0.00018328	0.00028756	1.1688	0.013387	0.015760	0.00000063791
Std Error		0.000053439	0.000050831	0.000079756	0.32417	0.0037128	0.0043710	0.00000017692

GH_ER2 (0200378)

statistic	sample_date	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)
	4/14/2015	< 0.0000050	0.000900	0.000946	< 0.00050	< 0.00050	0.0972
	4/14/2015	< 0.0000050	0.000908	0.000919	< 0.00050	< 0.00050	0.0869
	4/21/2015	< 0.0000050	0.000912	0.000906	< 0.00050	< 0.00050	0.0869
	4/28/2015	< 0.0000050	0.000920	0.000946	< 0.00050	< 0.00050	0.0897
	5/5/2015	< 0.0000050	0.000918	0.000936	< 0.00050	< 0.00050	0.0856
	5/12/2015	< 0.0000050	0.00101	0.00101	< 0.00050	< 0.00050	0.0742
	5/19/2015	< 0.0000050	0.000982	0.00102	< 0.00050	< 0.00050	0.0673
	5/26/2015	< 0.0000050	0.000914	0.000891	< 0.00050	0.00055	0.0945
	6/2/2015	< 0.0000050	0.000863	0.000967	< 0.00050	0.00168	0.0817
	6/9/2015	< 0.0000050	0.000451	0.000888	0.00113	0.00168	0.0691
	6/16/2015	< 0.0000050	0.000929	0.00104	< 0.00050	< 0.00050	0.0563
	6/23/2015	< 0.0000050	0.000943	0.000885	< 0.00050	< 0.00050	0.0464
	6/30/2015	< 0.0000050	0.000857	0.000831	< 0.00050	0.00069	0.0478
Average Sample Result		0.0000050000	0.00088515	0.00093731	0.00054846	0.00070000	0.075662
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		5e-006	0.00101	0.00104	0.00113	0.00168	0.0972
Minimum Sample Result		5e-006	0.000451	0.000831	0.0005	0.0005	0.0464
Sample Count		13	13	13	13	13	13
Sample Range		0.0000	0.00055900	0.00020900	0.00063000	0.0011800	0.050800
Std Deviation		9.2825E-14	0.00013681	0.000060298	0.00017473	0.00043812	0.017142
Std Error		2.5745E-14	0.000037944	0.000016724	0.000048462	0.00012151	0.0047543

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statistic	sample_date	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)
	4/14/2015	< 0.0010	< 0.0050	< 0.0010	8.21	8.38
	4/14/2015	< 0.0010	< 0.0050	< 0.0010		8.30
	4/21/2015	< 0.0010	< 0.0050	< 0.0010	8.13	8.48
	4/28/2015	< 0.0010	< 0.0050	< 0.0010	8.51	8.43
	5/5/2015	< 0.0010	< 0.0050	< 0.0010	7.98	8.30
	5/12/2015	< 0.0010	< 0.0050	< 0.0010	8.15	8.30
	5/19/2015	< 0.0010	< 0.0050	< 0.0010	8.39	8.37
	5/26/2015	< 0.0010	0.0140	0.0014	8.21	8.29
	6/2/2015	< 0.0010	< 0.0050	0.0015	7.99	8.36
	6/9/2015	< 0.0010		0.0013	8.19	8.30
	6/16/2015	< 0.0010	< 0.0050	0.0015	8.27	8.27
	6/23/2015	< 0.0010	< 0.0050	< 0.0010	8.21	8.32
	6/30/2015	< 0.0010	< 0.0050	< 0.0010	8.15	8.29
Average Sample Result		0.0010000	0.0057500	0.0011308	8.1992	8.3377
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.001	0.014	0.0015	8.51	8.48
Minimum Sample Result		0.001	0.005	0.001	7.98	8.27
Sample Count		13	12	13	12	13
Sample Range		0.0000	0.0090000	0.00050000	0.53000	0.21000
Std Deviation		0.0000	0.0025981	0.00020970	0.14768	0.062737
Std Error		0.0000	0.00075000	0.000058160	0.042631	0.017400

GH_ER2 (0200378)

statistic	sample_date	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)	SILVER (D)	SILVER (T)	SODIUM (T)
	4/14/2015	0.0034	0.339	0.855	0.912	< 0.000010	< 0.000010	0.703
	4/14/2015	< 0.0020	0.338	0.907	0.924	< 0.000010	< 0.000010	0.671
	4/21/2015	0.0022	0.403	0.945	0.914	< 0.000010	< 0.000010	0.796
	4/28/2015	0.0042	0.347	0.808	0.868	< 0.000010	< 0.000010	0.716
	5/5/2015	0.0080	0.367	0.787	0.87	< 0.000010	< 0.000010	0.726
	5/12/2015	0.0051	0.358	0.769	0.791	< 0.000010	< 0.000010	0.722
	5/19/2015	0.0069	0.354	0.765	0.777	< 0.000010	< 0.000010	0.799
	5/26/2015	0.0206	0.431	0.601	0.659	< 0.000010	< 0.000010	0.718
	6/2/2015	0.0810	0.576	0.609	0.637	< 0.000010	0.000019	0.567
	6/9/2015		0.654	0.578	0.579	< 0.000010	0.000016	0.466
	6/16/2015	< 0.0020	0.367	0.656	0.695	< 0.000010	< 0.000010	0.566
	6/23/2015	< 0.0020	0.335	0.616	0.628	< 0.000010	< 0.000010	0.511
	6/30/2015	0.0022	0.483	0.54	0.611	< 0.000010	< 0.000010	0.481
Average Sample Result		0.011633	0.41169	0.72585	0.75885	0.000010000	0.000011154	0.64938
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.081	0.654	0.945	0.924	1e-005	1.9e-005	0.799
Minimum Sample Result		0.002	0.335	0.54	0.579	1e-005	1e-005	0.466
Sample Count		12	13	13	13	13	13	13
Sample Range		0.079000	0.31900	0.40500	0.34500	0.0000	0.0000090000	0.33300
Std Deviation		0.022462	0.10093	0.13354	0.12931	1.8565E-13	0.0000028823	0.11633
Std Error		0.0064842	0.027992	0.037037	0.035864	5.1490E-14	0.00000079941	0.032263

GH_ER2 (0200378)

statistic	sample_date	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)
	4/14/2015	0.214	0.223	20.9	4.3	< 0.000010	< 0.000010
	4/14/2015	0.208	0.214	20.5		< 0.000010	< 0.000010
	4/21/2015	0.216	0.213	20.1	6.1	< 0.000010	< 0.000010
	4/28/2015	0.205	0.206	19.1	5.4	< 0.000010	< 0.000010
	5/5/2015	0.200	0.210	17.7	3.8	< 0.000010	< 0.000010
	5/12/2015	0.211	0.215	17.6	4.17	< 0.000010	< 0.000010
	5/19/2015	0.202	0.207	17.2	4.76	< 0.000010	< 0.000010
	5/26/2015	0.198	0.223	13.4	5.68	< 0.000010	0.000012
	6/2/2015	0.188	0.196	13.2	6.5	< 0.000010	0.000032
	6/9/2015	0.190	0.190	12.4	9.4	0.000013	0.000032
	6/16/2015	0.192	0.204	13.9	8.9	< 0.000010	< 0.000010
	6/23/2015	0.192	0.188	14.1	8.9	< 0.000010	< 0.000010
	6/30/2015	0.184	0.188	13.7	11	< 0.000010	0.000012
Average Sample Result		0.20000	0.20592	16.446	6.5758	0.000010231	0.000013692
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.216	0.223	20.9	11	1.3e-005	3.2e-005
Minimum Sample Result		0.184	0.188	12.4	3.8	1e-005	1e-005
Sample Count		13	13	13	12	13	13
Sample Range		0.032000	0.035000	8.5000	7.2000	0.0000030000	0.000022000
Std Deviation		0.010400	0.012237	3.1071	2.3882	0.00000083205	0.0000081587
Std Error		0.0028845	0.0033939	0.86177	0.68942	0.00000023077	0.0000022628

GH_ER2 (0200378)

statistic	sample_date	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)
	4/14/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	192
	4/14/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	180
	4/21/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	180
	4/28/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	184
	5/5/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	191
	5/12/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	184
	5/19/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	188
	5/26/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	161
	6/2/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	153
	6/9/2015	< 0.00010	< 0.00010	0.012	0.015	
	6/16/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	162
	6/23/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	154
	6/30/2015	< 0.00010	< 0.00010	< 0.010	< 0.010	171
Average Sample Result		0.00010000	0.00010000	0.010154	0.010385	175.00
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.0001	0.0001	0.012	0.015	192
Minimum Sample Result		0.0001	0.0001	0.01	0.01	153
Sample Count		13	13	13	13	12
Sample Range		0.0000	0.0000	0.0020000	0.0050000	39.000
Std Deviation		0.0000	0.0000	0.00055470	0.0013868	14.245
Std Error		0.0000	0.0000	0.00015385	0.00038462	4.1121

GH_ER2 (0200378)

statistic	sample_date	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)	TOTAL SUSPENDED SOLIDS, LAB (N)
	4/14/2015	< 0.050	0.89	2.1
	4/14/2015	0.078	0.64	< 1.0
	4/21/2015	0.086	1.10	2.6
	4/28/2015	< 0.050	1.13	1.9
	5/5/2015	0.067	1.80	4.4
	5/12/2015	0.093	1.38	3.2
	5/19/2015	0.065	1.09	5.4
	5/26/2015	0.126	1.55	13.8
	6/2/2015	0.163	2.80	51.9
	6/9/2015			65.9
	6/16/2015	< 0.050	0.86	6.8
	6/23/2015	< 0.050	0.70	3.5
	6/30/2015	0.066	0.84	16.8
Average Sample Result		0.078667	1.2317	13.792
Exceedance Count		0	0	0
Maximum Sample Result		0.163	2.8	65.9
Minimum Sample Result		0.05	0.64	1
Sample Count		12	12	13
Sample Range		0.11300	2.1600	64.900
Std Deviation		0.034880	0.60263	20.755
Std Error		0.010069	0.17396	5.7564

GH_ER2 (0200378)

statistic	sample_date	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)	ZINC (D)	ZINC (T)
	4/14/2015	0.73	0.000757	0.000789	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	4/14/2015	0.42	0.000792	0.000808	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	4/21/2015	1.03	0.000807	0.000799	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	4/28/2015	0.96	0.000788	0.000805	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	5/5/2015	3.89	0.000785	0.000778	< 0.00050	0.00051	< 0.0030	< 0.0030
	5/12/2015	1.07	0.000793	0.000802	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	5/19/2015	2.59	0.000814	0.000824	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	5/26/2015	10.4	0.000681	0.000732	< 0.00050	0.00106	< 0.0030	0.0030
	6/2/2015	26.5	0.000655	0.000743	< 0.00050	0.00250	< 0.0030	0.0079
	6/9/2015	27.4	0.000663	0.000690	0.00129	0.00330	0.0043	0.0077
	6/16/2015	2.90	0.000661	0.000695	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	6/23/2015	0.73	0.000625	0.000604	< 0.00050	< 0.00050	< 0.0030	< 0.0030
	6/30/2015	9.99	0.000577	0.000593	< 0.00050	0.00141	< 0.0030	< 0.0030
Average Sample Result		6.8162	0.00072292	0.00074323	0.00056077	0.00098308	0.0031000	0.0037385
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		27.4	0.000814	0.000824	0.00129	0.0033	0.0043	0.0079
Minimum Sample Result		0.42	0.000577	0.000593	0.0005	0.0005	0.003	0.003
Sample Count		13	13	13	13	13	13	13
Sample Range		26.980	0.00023700	0.00023100	0.00079000	0.0028000	0.0013000	0.0049000
Std Deviation		9.5377	0.000081125	0.000077267	0.00021911	0.00091050	0.00036056	0.0018030
Std Error		2.6453	0.000022500	0.000021430	0.000060769	0.00025253	0.00010000	0.00050007

LC_LC3 (200337)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)	ARSENIC (T)
	4/6/2015	214	< 0.0030	0.0085	0.34	0.35	0.15	0.16
	4/13/2015	214	< 0.0030	0.0089	0.34	0.34	0.13	0.15
	4/20/2015	< 1.0	< 0.0030	< 0.0030	< 0.10	< 0.10	< 0.10	< 0.10
	4/20/2015	199	< 0.0030	0.0102	0.33	0.33	0.14	0.22
	4/27/2015	163	< 0.0030	0.0091	0.32	0.31	0.15	0.17
	4/28/2015	143	< 0.0030	0.0144	0.31	0.30	0.11	0.19
	4/29/2015	186	< 0.0030	0.0123	0.30	0.34	0.11	0.13
	4/30/2015							
	5/5/2015	168	< 0.0030	0.0108	0.29	0.30	0.13	0.15
	5/11/2015	193	< 0.0030	0.0061	0.26	0.31	0.12	0.15
	5/19/2015	182	< 0.0030	0.0072	0.28	0.30	0.12	0.13
	5/26/2015	132	< 0.0030	0.0081	0.34	0.35	0.11	0.13
		145	< 0.0030	0.0096	0.33	0.35	0.10	0.12
	6/2/2015	143	< 0.0030	0.0087	0.32	0.31	0.12	0.14
	6/2/2015	149	< 0.0030	0.0113	0.32	0.31	0.11	0.15
	6/8/2015	155	< 0.0030	0.0072	0.29	0.32	0.13	0.13
	6/16/2015	177	< 0.0030	0.0052	0.29	0.29	0.13	0.15
		175	< 0.0030	0.0051	0.27	0.31	0.12	0.15
	6/16/2015							
	6/23/2015	< 1.0	< 0.0030	< 0.0030	< 0.10	< 0.10	< 0.10	< 0.10
		173	< 0.0030	0.0065	0.28	0.29	0.12	0.13
	6/30/2015	188	< 0.0030	0.0063	0.33	0.33	0.12	0.15
Average Sample Result		155.05	0.0030000	0.0080750	0.28700	0.29700	0.12100	0.14500
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		214	0.003	0.0144	0.34	0.35	0.15	0.22
Minimum Sample Result		1	0.003	0.003	0.1	0.1	0.1	0.1
Sample Count		20	20	20	20	20	20	20
Sample Range		213.00	0.0000	0.011400	0.24000	0.25000	0.050000	0.12000
Std Deviation		57.559	0.0000	0.0029426	0.068449	0.070120	0.014832	0.027625
Std Error		12.871	0.0000	0.00065798	0.015306	0.015679	0.0033166	0.0061772

LC_LC3 (200337)

statistic	sample_date	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	4/6/2015	0.0607	0.0618	< 0.10	< 0.10	< 0.000050	< 0.000050	0.014
	4/13/2015	0.0686	0.0691	< 0.10	< 0.10	< 0.000050	< 0.000050	0.017
	4/20/2015	< 0.000050	< 0.000050	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/20/2015	0.0666	0.0661	< 0.10	< 0.10	< 0.000050	< 0.000050	0.014
	4/27/2015	0.0393	0.0389	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	4/28/2015	0.0412	0.0410	< 0.10	< 0.10	< 0.000050	< 0.000050	0.013
	4/29/2015	0.0396	0.0406	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	4/30/2015							
	5/5/2015	0.0354	0.0353	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	5/11/2015	0.0363	0.0359	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	5/19/2015	0.0408	0.0403	< 0.10	< 0.10	< 0.000050	< 0.000050	0.014
	5/26/2015	0.0296	0.0305	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
		0.0297	0.0305	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	6/2/2015	0.0299	0.0305	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/2/2015	0.0301	0.0309	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/8/2015	0.0314	0.0323	< 0.10	< 0.10	< 0.000050	< 0.000050	0.013
	6/16/2015	0.0402	0.0403	< 0.10	< 0.10	< 0.000050	< 0.000050	0.014
		0.0406	0.0412	< 0.10	< 0.10	< 0.000050	< 0.000050	0.015
	6/16/2015							
	6/23/2015	< 0.000050	< 0.000050	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
		0.0437	0.0432	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	6/30/2015	0.0506	0.0513	< 0.10	< 0.10	< 0.000050	< 0.000050	0.013
Average Sample Result		0.037720	0.037990	0.10000	0.10000	0.000050000	0.000050000	0.012650
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.0686	0.0691	0.1	0.1	5e-005	5e-005	0.017
Minimum Sample Result		5e-005	5e-005	0.1	0.1	5e-005	5e-005	0.01
Sample Count		20	20	20	20	20	20	20
Sample Range		0.068550	0.069050	0.0000	0.0000	0.0000	0.0000	0.0070000
Std Deviation		0.017312	0.017333	0.0000000012086	0.0000000012086	0.0000	0.0000	0.0016944
Std Error		0.0038710	0.0038758	2.7026E-10	2.7026E-10	0.0000	0.0000	0.00037888

LC_LC3 (200337)

statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	4/6/2015	0.015	< 0.25	0.322	0.325	133	0.93	3.1
	4/13/2015	0.018	< 0.25	0.297	0.287	125	0.86	3.3
	4/20/2015	< 0.010	< 0.050	< 0.0050	< 0.0050	< 0.050	< 0.50	< 1.0
	4/20/2015	0.015	< 0.25	0.279	0.313	139	0.75	2.9
	4/27/2015	0.012	< 0.10	0.320	0.338	109	0.82	2.3
	4/28/2015	0.013	< 0.10	0.318	0.341	104	0.84	2.5
	4/29/2015	0.013	< 0.10	0.348	0.368	106	0.95	2.1
	4/30/2015							
	5/5/2015	0.012	< 0.10	0.353	0.382	93.2	0.74	1.9
	5/11/2015	0.013	< 0.10	0.391	0.389	104	0.77	2.0
	5/19/2015	0.012	< 0.10	0.389	0.394	97.9	0.76	2.1
	5/26/2015	0.014	< 0.050	0.423	0.430	81.2	0.67	1.2
		0.013	< 0.050	0.431	0.449	80.2	0.65	1.4
	6/2/2015	0.012	< 0.050	0.415	0.425	71.5	1.05	< 1.0
	6/2/2015	0.012	< 0.050	0.434	0.429	68.5	0.81	1.2
	6/8/2015	0.014	< 0.050	0.431	0.458	72.5	0.85	1.3
	6/16/2015	0.014	< 0.050	0.521	0.537	86.6	0.63	2.0
		0.014	< 0.050	0.519	0.535	87.5	0.61	2.1
	6/16/2015							
	6/23/2015	< 0.010	< 0.050	< 0.0050	< 0.0050	< 0.050	< 0.50	< 1.0
		0.011	< 0.10	0.515	0.512	89.3	0.80	2.0
	6/30/2015	0.015	< 0.10	0.566	0.588	97.1	0.63	2.0
Average Sample Result		0.013100	0.10000	0.36410	0.37550	87.280	0.75600	1.9200
Exceedance Count		0	0	2	0	0	0	0
Maximum Sample Result		0.018	0.25	0.566	0.588	139	1.05	3.3
Minimum Sample Result		0.01	0.05	0.005	0.005	0.05	0.5	1
Sample Count		20	20	20	20	20	20	20
Sample Range		0.0080000	0.20000	0.56100	0.58300	138.95	0.55000	2.3000
Std Deviation		0.0018890	0.068825	0.14677	0.15006	35.499	0.14387	0.69176
Std Error		0.00042240	0.015390	0.032818	0.033555	7.9379	0.032171	0.15468

LC_LC3 (200337)

statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)	COPPER (D)
	4/6/2015	0.14	0.18	< 0.10	< 0.10	947	974	< 0.50
	4/13/2015	0.15	0.19	< 0.10	< 0.10	955	1030	< 0.50
	4/20/2015	< 0.10	< 0.10	< 0.10	< 0.10		< 2.0	< 0.50
	4/20/2015	0.15	0.18	< 0.10	< 0.10	930	970	< 0.50
	4/27/2015	0.14	0.18	< 0.10	< 0.10	772.5	798	< 0.50
	4/28/2015	0.11	0.17	< 0.10	0.12	782.9	811	< 0.50
	4/29/2015	0.14	0.16	< 0.10	0.10		788	< 0.50
	4/30/2015					700.5		
	5/5/2015	0.17	0.19	0.10	0.11	703.4	760	< 0.50
	5/11/2015	0.12	0.16	< 0.10	< 0.10	724.0	774	< 0.50
	5/19/2015	0.19	0.20	< 0.10	< 0.10	720.9	798	< 0.50
	5/26/2015	0.14 < 0.10	0.13 0.13	0.13 0.12	0.14 0.14	574.6	619 615	< 0.50 0.75
	6/2/2015	0.18	0.17	0.12	0.13	547.7	534	< 0.50
	6/2/2015	0.19	0.19	0.11	0.13		537	< 0.50
	6/8/2015	0.15	0.18	0.12	0.13	339.9	543	0.57
	6/16/2015	0.18 0.22	0.19 0.18	0.10 < 0.10	< 0.10 < 0.10	666.0	631 636	< 0.50 < 0.50
	6/16/2015					669		
	6/23/2015	< 0.10 0.12	< 0.10 0.16	< 0.10 < 0.10	< 0.10 0.11	503.3	< 2.0 666	< 0.50 0.50
	6/30/2015	< 0.10	0.15	< 0.10	< 0.10	673.9	785	< 0.50
Average Sample Result		0.14450	0.16450	0.10500	0.11050	700.66	663.65	0.51600
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.22	0.2	0.13	0.14	955	1030	0.75
Minimum Sample Result		0.1	0.1	0.1	0.1	339.9	2	0.5
Sample Count		20	20	20	20	16	20	20
Sample Range		0.12000	0.10000	0.030000	0.040000	615.10	1028.0	0.25000
Std Deviation		0.035165	0.029105	0.0094591	0.015035	163.74	267.84	0.057253
Std Error		0.0078631	0.0065081	0.0021151	0.0033619	40.935	59.890	0.012802

LC_LC3 (200337)

statistic	sample_date	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)	IRON (D)	IRON (T)	LEAD (D)
	4/6/2015	< 0.50	12.46	0.21	570	< 0.010	< 0.010	< 0.050
	4/13/2015	< 0.50	11.46	0.19	564	< 0.010	< 0.010	< 0.050
	4/20/2015	< 0.50		< 0.020	< 0.50	< 0.010	< 0.010	< 0.050
	4/20/2015	0.53	12.50	0.19	575	< 0.010	< 0.010	< 0.050
	4/27/2015	< 0.50	11.29	0.195	456	< 0.010	< 0.010	< 0.050
	4/28/2015	< 0.50	11.78	0.190	453	< 0.010	0.015	< 0.050
	4/29/2015	< 0.50		0.195	448	< 0.010	< 0.010	< 0.050
	4/30/2015		12.52					
	5/5/2015	< 0.50	10.11	0.210	401	< 0.010	< 0.010	< 0.050
	5/11/2015	< 0.50	12.12	0.205	444	< 0.010	< 0.010	< 0.050
	5/19/2015	< 0.50	11.12	0.197	421	< 0.010	< 0.010	< 0.050
	5/26/2015	0.54 0.56	12.07	0.230 0.229	337 331	< 0.010 < 0.010	< 0.010 < 0.010	< 0.050 < 0.050
	6/2/2015	0.56	11.18	0.235	291	< 0.010	< 0.010	< 0.050
	6/2/2015	0.58		0.236	279	< 0.010	< 0.010	< 0.050
	6/8/2015	0.71	11.64	0.233	285	< 0.010	< 0.010	< 0.050
	6/16/2015	0.56 0.61	11.40	0.219 0.218	352 353	< 0.010 < 0.010	< 0.010 < 0.010	< 0.050 < 0.050
	6/16/2015		11.34					
	6/23/2015	< 0.50 < 0.50	11.06	< 0.020 0.191	< 0.50 370	< 0.010 < 0.010	< 0.010 < 0.010	< 0.050 < 0.050
	6/30/2015	0.55	11.46	0.210	406	< 0.010	< 0.010	< 0.050
Average Sample Result		0.53500	11.594	0.19115	366.85	0.010000	0.010250	0.050000
Exceedance Count		2	0	0	0	0	0	0
Maximum Sample Result		0.71	12.52	0.236	575	0.01	0.015	0.05
Minimum Sample Result		0.5	10.11	0.02	0.5	0.01	0.01	0.05
Sample Count		20	16	20	20	20	20	20
Sample Range		0.21000	2.4100	0.21600	574.50	0.0000	0.0050000	0.0000
Std Deviation		0.053262	0.63677	0.060713	153.59	0.0000	0.0011180	6.0432E-10
Std Error		0.011910	0.15919	0.013576	34.343	0.0000	0.00025000	1.3513E-10

LC_LC3 (200337)

statistic	sample_date	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)	MANGANESE (D)	MANGANESE (T)	MERCURY (D)
	4/6/2015	< 0.050	0.0432	0.0448	58.4	< 0.00010	0.00026	< 0.0050
	4/13/2015	< 0.050	0.0456	0.0475	64.4	< 0.00010	0.00022	< 0.0050
	4/20/2015	< 0.050	< 0.0010	< 0.0010	< 0.10	< 0.00010	< 0.00010	< 0.0050
	4/20/2015	< 0.050	0.0429	0.0430	55.2	0.00015	0.00029	< 0.0050
	4/27/2015	0.060	0.0335	0.0328	46.3	0.00012	0.00023	< 0.0050
	4/28/2015	< 0.050	0.0335	0.0337	44.8	0.00011	0.00056	< 0.0050
	4/29/2015	< 0.050	0.0332	0.0345	48.1	0.00011	0.00034	< 0.0050
	4/30/2015							
	5/5/2015	< 0.050	0.0297	0.0304	41.4	0.00010	0.00030	< 0.0050
	5/11/2015	< 0.050	0.0305	0.0321	47.0	0.00012	0.00021	< 0.0050
	5/19/2015	< 0.050	0.0307	0.0300	42.2	0.00011	0.00019	< 0.0050
	5/26/2015	< 0.050	0.0247	0.0254	34.0	0.00011	0.00027	< 0.0050
		< 0.050	0.0251	0.0255	34.3	0.00011	0.00034	< 0.0050
	6/2/2015	< 0.050	0.0229	0.0231	29.3	0.00022	0.00040	< 0.0050
	6/2/2015	< 0.050	0.0225	0.0234	27.7	0.00020	0.00042	< 0.0050
	6/8/2015	< 0.050	0.0194	0.0201	28.4	0.00017	0.00031	< 0.0050
	6/16/2015	< 0.050	0.0278	0.0281	34.3	0.00019	0.00027	< 0.0050
		< 0.050	0.0282	0.0293	35.2	0.00018	0.00027	< 0.0050
	6/16/2015							
	6/23/2015	< 0.050	< 0.0010	< 0.0010	< 0.10	< 0.00010	< 0.00010	< 0.0050
								< 0.00050
		< 0.050	0.0237	0.0231	35.6	0.00021	0.00041	< 0.0050
	6/30/2015	< 0.050	0.0314	0.0329	40.8	0.00021	0.00026	< 0.00050
Average Sample Result		0.050500	0.027525	0.028085	37.380	0.00014100	0.00028750	0.0043864
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.06	0.0456	0.0475	64.4	0.00022	0.00056	0.005
Minimum Sample Result		0.05	0.001	0.001	0.1	0.0001	0.0001	0.0005
Sample Count		20	20	20	20	20	20	22
Sample Range		0.010000	0.044600	0.046500	64.300	0.00012000	0.00046000	0.0045000
Std Deviation		0.0022361	0.011471	0.011788	16.125	0.000044827	0.00010804	0.0015806
Std Error		0.00050000	0.0025649	0.0026358	3.6056	0.000010024	0.000024158	0.00033699

LC_LC3 (200337)

statistic	sample_date	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)
	4/6/2015	< 0.0050	0.00203	0.00211	8.78	8.92	18.2	< 0.0050
	4/13/2015	< 0.0050	0.00215	0.00225	9.03	9.23	18.0	< 0.0050
	4/20/2015	< 0.0050	< 0.000050	< 0.000050	< 0.50	< 0.50	< 0.0050	< 0.0010
	4/20/2015	< 0.0050	0.00206	0.00205	9.34	9.17	17.3	< 0.0050
	4/27/2015	< 0.0050	0.00183	0.00180	7.98	8.05	12.8	0.0022
	4/28/2015	< 0.0050	0.00180	0.00184	7.79	8.08	13.1	0.0025
	4/29/2015	< 0.00050	0.00183	0.00188	8.29	8.63	13.1	0.0020
	4/30/2015							
	5/5/2015	< 0.0050	0.00167	0.00172	8.79	9.15	11.5	< 0.0020
	5/11/2015	< 0.0050	0.00165	0.00176	8.67	8.60	11.7	< 0.0020
	5/19/2015	< 0.0050	0.00165	0.00165	8.69	9.02	11.4	< 0.0020
	5/26/2015	< 0.0050	0.00167	0.00176	8.51	8.76	7.69	< 0.0010
		< 0.0050	0.00167	0.00177	8.52	8.92	7.69	< 0.0010
	6/2/2015	< 0.0050	0.00149	0.00154	8.33	8.43	5.98	< 0.0010
	6/2/2015	< 0.0050	0.00150	0.00157	8.47	9.01	5.98	< 0.0010
	6/8/2015	< 0.0050	0.00143	0.00148	8.65	8.71	5.66	< 0.0010
	6/16/2015	< 0.0050	0.00158	0.00157	9.78	10.2	8.43	< 0.0010
		< 0.0050	0.00156	0.00159	9.93	10.3	8.44	< 0.0010
	6/16/2015							
	6/23/2015	< 0.0050	< 0.000050	< 0.000050	< 0.50	< 0.50	< 0.0050	< 0.0010
		< 0.00050						
		< 0.0050	0.00150	0.00143	9.96	9.92	9.00	< 0.0020
	6/30/2015	0.00059	0.00159	0.00162	10.9	11.1	9.94	0.0033
Average Sample Result		0.0041859	0.0015380	0.0015745	8.0705	8.2600	9.7960	0.0021000
Exceedance Count		0	0	0	0	0	18	0
Maximum Sample Result		0.005	0.00215	0.00225	10.9	11.1	18.2	0.005
Minimum Sample Result		0.0005	5e-005	5e-005	0.5	0.5	0.005	0.001
Sample Count		22	20	20	20	20	20	20
Sample Range		0.0045000	0.0021000	0.0022000	10.400	10.600	18.195	0.0040000
Std Deviation		0.0017677	0.00054559	0.00056192	2.6947	2.7584	5.0544	0.0014101
Std Error		0.00037687	0.00012200	0.00012565	0.60256	0.61679	1.1302	0.00031531

LC_LC3 (200337)

statistic	sample_date	NITROGEN, AMMONIA (AS N) (N)	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)
	4/6/2015	< 0.0050	0.0016	8.62	8.25	0.0031	1.58	72.3
	4/13/2015	< 0.0050	0.0013	8.65	8.28	0.0024	1.66	78.2
	4/20/2015	< 0.0050	< 0.0010		5.76	< 0.0020	< 0.050	< 0.050
	4/20/2015	< 0.0050	0.0017	8.11	8.24	0.0032	1.58	75.9
	4/27/2015	< 0.0050	0.0021	8.03	8.18	0.0042	1.27	50.8
	4/28/2015	< 0.0050	0.0015	8.02	8.22	0.0044	1.27	52
	4/29/2015	< 0.0050	0.0029		8.14	0.0036	1.41	55
	4/30/2015			7.64				
	5/5/2015	< 0.0050	0.0025	8.05	8.31	0.0034	1.34	50.2
	5/11/2015	< 0.0050	0.0017	7.96	8.22	0.0029	1.32	53.4
	5/19/2015	< 0.0050	0.0026	8.19	8.36	0.0037	1.31	51.1
	5/26/2015	< 0.0050	0.0022	7.98	8.14	0.0023	1.23	39.5
		< 0.0050	0.0019		8.23	0.0028	1.25	39.3
	6/2/2015	< 0.0050	0.0018	7.99	8.31	0.0028	1.20	31.1
	6/2/2015	< 0.0050	0.0023		8.28	0.0026	1.22	32
	6/8/2015	< 0.0050	0.0021	8.26	8.41	0.0035	1.25	26.1
	6/16/2015	< 0.0050	0.0019	8.06	8.11	0.0023	1.30	37
		< 0.0050	0.0077		8.15	0.0036	1.34	37.3
	6/16/2015			7.87				
	6/23/2015	< 0.0050	< 0.0010	7.89	5.89	< 0.0020	< 0.050	< 0.050
		< 0.0050	0.0022		8.05	0.0023	1.24	42.2
	6/30/2015	< 0.0050	0.0020	8.00	8.34	0.0022	1.36	49.5
Average Sample Result		0.0050000	0.0022000	8.0825	7.9935	0.0029650	1.2115	43.650
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.005	0.0077	8.65	8.41	0.0044	1.66	78.2
Minimum Sample Result		0.005	0.001	7.64	5.76	0.002	0.05	0.05
Sample Count		20	20	16	20	20	20	20
Sample Range		0.0000	0.0067000	1.0100	2.6500	0.0024000	1.6100	78.150
Std Deviation		0.0000	0.0013849	0.25585	0.74726	0.00071692	0.41712	20.594
Std Error		0.0000	0.00030967	0.063963	0.16709	0.00016031	0.093272	4.6049

LC_LC3 (200337)

statistic	sample_date	SELENIUM (T)	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)
	4/6/2015	72.9	< 0.010	< 0.010	6.76	0.210	0.217	305
	4/13/2015	77.7	< 0.010	< 0.010	7.29	0.218	0.229	292
	4/20/2015	< 0.050	< 0.010	< 0.010	< 0.050	< 0.00020	< 0.00020	< 0.30
	4/20/2015	72.7	< 0.010	< 0.010	6.79	0.220	0.215	300
	4/27/2015	50.4	< 0.010	< 0.010	5.14	0.183	0.178	212
	4/28/2015	51.9	< 0.010	< 0.010	5.19	0.180	0.180	217
	4/29/2015	55.7	< 0.010	< 0.010	5.66	0.176	0.181	219
	4/30/2015							
	5/5/2015	50.1	< 0.010	< 0.010	5.06	0.158	0.160	197
	5/11/2015	54.2	< 0.010	< 0.010	4.99	0.158	0.172	208
	5/19/2015	53.2	< 0.010	< 0.010	5.08	0.162	0.161	211
	5/26/2015	40.6	< 0.010	< 0.010	3.71	0.138	0.142	145
		41	< 0.010	< 0.010	3.76	0.142	0.147	145
	6/2/2015	30.9	< 0.010	< 0.010	3.46	0.123	0.124	115
	6/2/2015	31.5	< 0.010	< 0.010	3.50	0.121	0.126	115
	6/8/2015	26.4	< 0.010	< 0.010	3.19	0.116	0.122	107
	6/16/2015	39	< 0.010	< 0.010	4.16	0.152	0.154	154
		38.8	< 0.010	< 0.010	4.27	0.153	0.155	155
	6/16/2015							
	6/23/2015	< 0.050	< 0.010	< 0.010	< 0.050	< 0.00020	< 0.00020	< 0.30
		40.8	< 0.010	< 0.010	4.24	0.149	0.148	166
	6/30/2015	48	< 0.010	< 0.010	4.69	0.166	0.166	187
Average Sample Result		43.795	0.010000	0.010000	4.3520	0.14627	0.14887	172.53
Exceedance Count		18	0	0	0	0	0	0
Maximum Sample Result		77.7	0.01	0.01	7.29	0.22	0.229	305
Minimum Sample Result		0.05	0.01	0.01	0.05	0.0002	0.0002	0.3
Sample Count		20	20	20	20	20	20	20
Sample Range		77.650	0.0000	0.0000	7.2400	0.21980	0.22880	304.70
Std Deviation		20.339	0.0000	0.0000	1.8591	0.057978	0.058745	82.641
Std Error		4.5479	0.0000	0.0000	0.41570	0.012964	0.013136	18.479

LC_LC3 (200337)

statistic	sample_date	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)
	4/6/2015	3.8	0.013	0.014	< 0.00010	< 0.00010	< 10	< 10
	4/13/2015	4.6	0.013	0.013	< 0.00010	< 0.00010	< 10	< 10
	4/20/2015		< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/20/2015	4.8	0.013	0.014	< 0.00010	< 0.00010	10	11
	4/27/2015	4.6	0.012	0.015	< 0.00010	< 0.00010	< 10	< 10
	4/28/2015	4.9	0.013	0.012	< 0.00010	< 0.00010	< 10	< 10
	4/29/2015		0.014	0.014	< 0.00010	< 0.00010	< 10	< 10
	4/30/2015	4.4						
	5/5/2015	4.7	0.013	0.014	< 0.00010	< 0.00010	< 10	< 10
	5/11/2015	4.1	0.013	0.014	< 0.00010	< 0.00010	< 10	< 10
	5/19/2015	5.0	0.013	0.013	< 0.00010	< 0.00010	< 10	< 10
	5/26/2015	4.4	0.011 0.014	0.014 0.020	< 0.00010 < 0.00010	< 0.00010 < 0.00010	< 10 < 10	< 10 < 10
	6/2/2015	4.3	0.018	0.013	< 0.00010	< 0.00010	< 10	< 10
	6/2/2015		0.013	0.014	< 0.00010	< 0.00010	< 10	< 10
	6/8/2015	4.7	0.013	0.014	< 0.00010	< 0.00010	< 10	
	6/16/2015	5.7	0.013 0.013	0.015 0.015	< 0.00010 < 0.00010	< 0.00010 < 0.00010	< 10 < 10	< 10 < 10
	6/16/2015							
	6/23/2015	5.4	< 0.010 0.014	< 0.010 0.013	< 0.00010 < 0.00010	< 0.00010 < 0.00010	< 10 < 10	< 10 < 10
	6/30/2015	6.2	0.015	0.015	< 0.00010	< 0.00010	< 10	< 10
Average Sample Result		4.7733	0.013050	0.013800	0.00010000	0.00010000	10.000	10.053
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		6.2	0.018	0.02	0.0001	0.0001	10	11
Minimum Sample Result		3.8	0.01	0.01	0.0001	0.0001	10	10
Sample Count		15	20	20	20	20	20	19
Sample Range		2.4000	0.0080000	0.010000	0.0000	0.0000	0.0000	1.0000
Std Deviation		0.61698	0.0017006	0.0020417	0.0000	0.0000	0.0000	0.22942
Std Error		0.15930	0.00038027	0.00045653	0.0000	0.0000	0.0000	0.052632

LC_LC3 (200337)

statistic	sample_date	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)
	4/6/2015	707	< 0.050	0.65	< 1.0	0.62	4.45	4.47
	4/13/2015	741	< 0.050	0.52	< 1.0	0.39	4.73	4.83
	4/20/2015	< 3.0	< 0.050	< 0.50	< 1.0	< 0.10	< 0.010	< 0.010
	4/20/2015	708	< 0.050	0.69	< 1.0	0.67	4.54	4.40
	4/27/2015	556	< 0.050	0.69	< 1.0	0.45	3.32	3.30
	4/28/2015	590	< 0.050	0.82	3.4	0.65	3.40	3.41
	4/29/2015	575	< 0.050	1.02	< 1.0	0.50	3.54	3.67
	4/30/2015							
	5/5/2015	519	< 0.050	0.77	1.1	0.42	3.30	3.36
	5/11/2015	510	< 0.050	0.86	< 1.0	0.23	3.24	3.58
	5/19/2015	528	< 0.050	0.57	< 1.0	0.27	3.23	3.19
	5/26/2015	426	< 0.050	0.56	< 1.0	0.60	2.60	2.65
		422	< 0.050	0.54	< 1.0	0.78	2.61	2.60
	6/2/2015	356	0.091	1.08	< 1.0	0.42	2.08	2.08
	6/2/2015	352	0.106	0.73	< 1.0	0.45	2.11	2.12
	6/8/2015	328	0.123	0.74	< 1.0	0.45	2.05	2.14
	6/16/2015	448	0.095	0.76	< 1.0	0.33	2.82	2.81
		444	0.089	0.55	< 1.0	0.27	2.80	2.87
	6/16/2015							
	6/23/2015	< 3.0	< 0.050	< 0.50	< 1.0	< 0.10	< 0.010	< 0.010
		473	< 0.050	0.61	1.2	0.35	2.69	2.68
	6/30/2015	528	0.082	0.73	< 1.0	0.29	3.16	3.05
Average Sample Result		460.85	0.064300	0.69450	1.1350	0.41700	2.8345	2.8615
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		741	0.123	1.08	3.4	0.78	4.73	4.83
Minimum Sample Result		3	0.05	0.5	1	0.1	0.01	0.01
Sample Count		20	20	20	20	20	20	20
Sample Range		738.00	0.073000	0.58000	2.4000	0.68000	4.7200	4.8200
Std Deviation		194.23	0.023649	0.16317	0.53536	0.18397	1.2269	1.2349
Std Error		43.432	0.0052881	0.036487	0.11971	0.041136	0.27435	0.27614

LC_LC3 (200337)

statistic	sample_date	VANADIUM (D)	VANADIUM (T)	ZINC (D)	ZINC (T)
	4/6/2015	< 0.50	< 0.50	11.5	12.4
	4/13/2015	< 0.50	< 0.50	11.1	26.6
	4/20/2015	< 0.50	< 0.50	< 3.0	< 3.0
	4/20/2015	< 0.50	0.59	11.3	11.7
	4/27/2015	< 0.50	< 0.50	13.1	14.2
	4/28/2015	< 0.50	< 0.50	12.8	14.2
	4/29/2015	< 0.50	< 0.50	13.7	13.9
	4/30/2015				
	5/5/2015	< 0.50	< 0.50	16.9	17.4
	5/11/2015	< 0.50	< 0.50	16.5	16.7
	5/19/2015	< 0.50	< 0.50	16.2	16.5
	5/26/2015	< 0.50	< 0.50	18.2	19.6
		< 0.50	< 0.50	18.5	19.4
	6/2/2015	< 0.50	< 0.50	19.6	19.8
	6/2/2015	< 0.50	< 0.50	19.6	20.4
	6/8/2015	< 0.50	< 0.50	19.4	20.2
	6/16/2015	< 0.50	< 0.50	23.2	23.6
		< 0.50	< 0.50	24.2	24.1
	6/16/2015				
	6/23/2015	< 0.50	< 0.50	< 3.0	< 3.0
		< 0.50	< 0.50	23.0	22.5
	6/30/2015	< 0.50	< 0.50	23.1	23.3
Average Sample Result		0.50000	0.50450	15.895	17.125
Exceedance Count		0	0	0	0
Maximum Sample Result		0.5	0.59	24.2	26.6
Minimum Sample Result		0.5	0.5	3	3
Sample Count		20	20	20	20
Sample Range		0.0000	0.090000	21.200	23.600
Std Deviation		0.0000	0.020125	6.0534	6.3451
Std Error		0.0000	0.0045000	1.3536	1.4188

LC_LCDSSLCC (E297110)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	4/6/2015	186	< 0.0030	0.0093	0.20	0.22	0.12
	4/13/2015	197	< 0.0030	0.0055	0.20	0.21	0.10
	4/20/2015	185	< 0.0030	0.0083	0.19	0.19	0.13
	4/27/2015	181	< 0.0030	0.0106	0.18	0.19	0.12
	4/28/2015	150	< 0.0030	0.0096	0.17	0.19	0.13
	5/5/2015	150	< 0.0030	0.0163	0.15	0.17	0.11
	5/12/2015	158	< 0.0030	0.0099	0.17	0.16	0.13
	5/19/2015	157	< 0.0030	0.0110	0.15	0.16	0.12
	5/26/2015	131	< 0.0030	0.320	0.11	0.15	0.11
	6/2/2015	119	0.0126	1.95	0.11	0.20	0.13
	6/8/2015	120	< 0.0030	0.0137	0.17	0.17	0.12
	6/16/2015	159	< 0.0030	0.0073	0.17	0.17	0.11
	6/16/2015						
	6/23/2015	159	< 0.0030	0.0065	0.16	0.18	0.11
	6/24/2015	159	< 0.0030	0.0076	0.20	0.22	0.11
	6/30/2015						
	6/30/2015	168	< 0.0030	0.0068	0.19	0.21	< 0.10
Average Sample Result		158.60	0.0036400	0.15949	0.16800	0.18600	0.11667
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		197	0.0126	1.95	0.2	0.22	0.13
Minimum Sample Result		119	0.003	0.0055	0.11	0.15	0.1
Sample Count		15	15	15	15	15	15
Sample Range		78.000	0.0096000	1.9445	0.090000	0.070000	0.030000
Std Deviation		23.120	0.0024787	0.50175	0.028835	0.022615	0.010465
Std Error		5.9696	0.00064000	0.12955	0.0074450	0.0058391	0.0027021

LC_LCDSSLCC (E297110)

statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	4/6/2015	0.13	0.0698	0.0703	< 0.10	< 0.10	< 0.000050	< 0.000050	0.013
	4/13/2015	0.12	0.0734	0.0699	< 0.10	< 0.10	< 0.000050	< 0.000050	0.013
	4/20/2015	0.22	0.0663	0.0679	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	4/27/2015	0.15	0.0522	0.0509	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/28/2015	0.17	0.0515	0.0515	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/5/2015	0.14	0.0414	0.0421	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/12/2015	0.11	0.0463	0.0448	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/19/2015	0.11	0.0425	0.0426	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/26/2015	0.33	0.0308	0.0363	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/2/2015	1.20	0.0301	0.0540	< 0.10	0.12	< 0.000050	0.000186	< 0.010
	6/8/2015	0.14	0.0346	0.0344	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/16/2015	0.13	0.0451	0.0458	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/16/2015								
	6/23/2015	0.11	0.0479	0.0492	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/24/2015	0.13	0.0497	0.0512	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/30/2015								
	6/30/2015	0.16	0.0527	0.0523	< 0.10	< 0.10	< 0.000050	< 0.000050	0.010
Average Sample Result		0.22333	0.048953	0.050880	0.10000	0.10133	0.000050000	0.000059067	0.010600
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		1.2	0.0734	0.0703	0.1	0.12	5e-005	0.000186	0.013
Minimum Sample Result		0.11	0.0301	0.0344	0.1	0.1	5e-005	5e-005	0.01
Sample Count		15	15	15	15	15	15	15	15
Sample Range		1.0900	0.043300	0.035900	0.0000	0.020000	0.0000	0.00013600	0.0030000
Std Deviation		0.27603	0.013031	0.011136	0.0000000014080	0.0051640	0.0000	0.000035115	0.0010556
Std Error		0.071272	0.0033647	0.0028754	3.6355E-10	0.0013333	0.0000	0.0000090667	0.00027255

LC_LCDSSLCC (E297110)

statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	4/6/2015	0.015	< 0.10	0.116	0.134	102	1.18	2.5
	4/13/2015	0.014	< 0.10	0.119	0.122	105	0.77	2.4
	4/20/2015	0.011	< 0.10	0.101	0.105	103	0.96	2.4
	4/27/2015	< 0.010	< 0.10	0.132	0.150	85.9	1.02	2.0
	4/28/2015	< 0.010	< 0.10	0.136	0.147	81.2	1.10	2.0
	5/5/2015	< 0.010	< 0.050	0.135	0.139	68.2	1.24	1.4
	5/12/2015	< 0.010	< 0.050	0.167	0.164	75.6	1.33	1.8
	5/19/2015	0.011	< 0.050	0.144	0.158	72.1	1.68	1.4
	5/26/2015	< 0.010	< 0.050	0.0738	0.262	60.1	2.10	1.2
	6/2/2015	< 0.010	< 0.050	0.0356	0.493	78.5	3.19	1.2
	6/8/2015	0.012	< 0.050	0.166	0.181	56.2	1.22	1.2
	6/16/2015	0.012	< 0.050	0.218	0.211	70.6	0.78	1.8
	6/16/2015							
	6/23/2015	< 0.010	< 0.050	0.191	0.223	75.4	0.98	1.7
	6/24/2015	< 0.010	< 0.050	0.234	0.224	75.1	0.81	2.0
	6/30/2015							
	6/30/2015	< 0.010	< 0.050	0.221	0.227	76.8	0.84	1.9
Average Sample Result		0.011000	0.066667	0.14596	0.19600	79.047	1.2800	1.7933
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.015	0.1	0.234	0.493	105	3.19	2.5
Minimum Sample Result		0.01	0.05	0.0356	0.105	56.2	0.77	1.2
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0050000	0.050000	0.19840	0.38800	48.800	2.4200	1.3000
Std Deviation		0.0016036	0.024398	0.055353	0.093856	14.614	0.63893	0.44315
Std Error		0.00041404	0.0062994	0.014292	0.024233	3.7734	0.16497	0.11442

LC_LCDSSLCC (E297110)

statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)
	4/6/2015	0.15	0.17	< 0.10	< 0.10	744.6	672
	4/13/2015	0.15	0.17	< 0.10	< 0.10	740.8	801
	4/20/2015	0.16	0.19	< 0.10	< 0.10	679.7	719
	4/27/2015	0.14	0.16	< 0.10	< 0.10	610.5	632
	4/28/2015	0.14	0.17	< 0.10	< 0.10	586.9	612
	5/5/2015	0.14	0.19	< 0.10	< 0.10	481.6	535
	5/12/2015	0.16	0.18	< 0.10	< 0.10	531.8	585
	5/19/2015	< 0.10	0.47	< 0.10	< 0.10	503.1	552
	5/26/2015	0.11	0.79	< 0.10	0.30	348.8	370
	6/2/2015	0.19	4.33	< 0.10	1.10	314.2	306
	6/8/2015	0.20	0.26	< 0.10	< 0.10	412.7	421
	6/16/2015	0.19	0.19	< 0.10	< 0.10	519.9	497
	6/16/2015						
	6/23/2015	0.11	0.18	< 0.10	< 0.10	414.1	569
	6/24/2015	0.14	0.19	< 0.10	< 0.10	508.3	531
	6/30/2015						
	6/30/2015	0.16	0.16	< 0.10	< 0.10	530.4	605
Average Sample Result		0.14933	0.52000	0.10000	0.18000	528.49	560.47
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.2	4.33	0.1	1.1	744.6	801
Minimum Sample Result		0.1	0.16	0.1	0.1	314.2	306
Sample Count		15	15	15	15	15	15
Sample Range		0.10000	4.1700	0.0000	1.0000	430.40	495.00
Std Deviation		0.029391	1.0675	0.0000000014080	0.25967	128.96	128.72
Std Error		0.0075886	0.27562	3.6355E-10	0.067047	33.297	33.235

LC_LCDSSLCC (E297110)

statistic	sample_date	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)
	4/6/2015	< 0.50	< 0.50	12.85	0.205	439
	4/13/2015	< 0.50	1.50	11.54	0.221	454
	4/20/2015	< 0.50	< 0.50	12.37	0.220	416
	4/27/2015	< 0.50	< 0.50	10.97	0.201	360
	4/28/2015	< 0.50	< 0.50	10.64	0.198	337
	5/5/2015	< 0.50	< 0.50	10.17	0.215	269
	5/12/2015	< 0.50	< 0.50	12.52	0.225	325
	5/19/2015	< 0.50	< 0.50	12.40	0.220	289
	5/26/2015	< 0.50	1.08	12.69	0.191	202
	6/2/2015	< 0.50	2.83	11.58	0.185	167
	6/8/2015	< 0.50	< 0.50	10.78	0.218	217
	6/16/2015	< 0.50	< 0.50	11.10	0.221	278
	6/16/2015					
	6/23/2015	< 0.50	< 0.50	10.90	0.223	287
	6/24/2015	< 0.50	< 0.50	10.84	0.234	290
	6/30/2015					
	6/30/2015	< 0.50	< 0.50	10.99	0.231	311
Average Sample Result		0.50000	0.76067	11.489	0.21387	309.40
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.5	2.83	12.85	0.234	454
Minimum Sample Result		0.5	0.5	10.17	0.185	167
Sample Count		15	15	15	15	15
Sample Range		0.0000	2.3300	2.6800	0.049000	287.00
Std Deviation		0.0000	0.64065	0.86088	0.014525	83.195
Std Error		0.0000	0.16542	0.22228	0.0037504	21.481

LC_LCDSSLCC (E297110)

statistic	sample_date	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)
	4/6/2015	0.935	< 0.010	< 0.010	< 0.050	< 0.050	0.0286	0.0298	45.4
	4/13/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0293	0.0288	43.9
	4/20/2015	1.275	< 0.010	< 0.010	< 0.050	< 0.050	0.0248	0.0249	38.3
	4/27/2015		< 0.010	0.011	< 0.050	< 0.050	0.0219	0.0215	33.8
	4/28/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0203	0.0201	31.7
	5/5/2015		< 0.010	0.018	< 0.050	< 0.050	0.0163	0.0160	25.2
	5/12/2015	2.684	< 0.010	0.012	< 0.050	< 0.050	0.0198	0.0200	32.8
	5/19/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0173	0.0176	26.2
	5/26/2015		< 0.010	0.376	< 0.050	0.356	0.0101	0.0105	18.4
	6/2/2015		< 0.010	2.41	< 0.050	1.70	0.0075	0.0106	20.2
	6/8/2015		< 0.010	0.015	< 0.050	< 0.050	0.0116	0.0117	18.6
	6/16/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0174	0.0186	25.5
	6/16/2015								
	6/23/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0148	0.0146	26.1
	6/24/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0190	0.0195	26.9
	6/30/2015	0.665							
	6/30/2015		< 0.010	< 0.010	< 0.050	< 0.050	0.0196	0.0199	28.9
Average Sample Result		1.3898	0.010000	0.19547	0.050000	0.18040	0.018553	0.018940	29.460
Exceedance Count		0	0	1	0	0	0	0	0
Maximum Sample Result		2.684	0.01	2.41	0.05	1.7	0.0293	0.0298	45.4
Minimum Sample Result		0.665	0.01	0.01	0.05	0.05	0.0075	0.0105	18.4
Sample Count		4	15	15	15	15	15	15	15
Sample Range		2.0190	0.0000	2.4000	0.0000	1.6500	0.021800	0.019300	27.000
Std Deviation		0.89820	1.7600E-10	0.61980	7.0401E-10	0.42771	0.0061910	0.0058769	8.2996
Std Error		0.44910	4.5444E-11	0.16003	1.8178E-10	0.11043	0.0015985	0.0015174	2.1430

LC_LCDSSLCC (E297110)

statistic	sample_date	MANGANESE (D)	MANGANESE (T)	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)
	4/6/2015	< 0.00010	0.00033	< 0.0050	< 0.0050	0.00157	0.00164	3.82
	4/13/2015	0.00010	0.00020	< 0.0050	< 0.0050	0.00170	0.00163	3.61
	4/20/2015	< 0.00010	0.00035	< 0.0050	< 0.0050	0.00152	0.00145	3.39
	4/27/2015	0.00011	0.00044	< 0.0050	< 0.0050	0.00139	0.00138	3.74
	4/28/2015	0.00015	0.00038	< 0.0050	< 0.0050	0.00132	0.00133	3.62
	5/5/2015	0.00016	0.00051	< 0.0050	< 0.0050	0.00114	0.00115	3.56
	5/12/2015	0.00011	0.00055	< 0.0050	< 0.0050	0.00124	0.00120	4.02
	5/19/2015	< 0.00010	0.00031	< 0.0050	< 0.0050	0.00120	0.00121	3.59
	5/26/2015	0.00035	0.0194	< 0.0050	< 0.0050	0.000859	0.000883	2.21
	6/2/2015	0.00066	0.0889	< 0.0050	< 0.025	0.000727	0.00108	1.70
	6/8/2015	0.00021	0.00077	< 0.0050	< 0.0050	0.00103	0.00103	3.87
	6/16/2015	0.00013	0.00040	< 0.0050	< 0.0050	0.00123	0.00126	4.50
	6/16/2015							
	6/23/2015	0.00011	0.00032	< 0.0050	< 0.0050	0.00118	0.00117	4.63
	6/24/2015	0.00012	0.00032	< 0.0050	< 0.0050	0.00133	0.00132	4.71
	6/30/2015							
	6/30/2015	0.00016	0.00038	< 0.0050	< 0.0050	0.00131	0.00124	4.70
Average Sample Result		0.00017800	0.0075707	0.0050000	0.0063333	0.0012497	0.0012649	3.7113
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.00066	0.0889	0.005	0.025	0.0017	0.00164	4.71
Minimum Sample Result		0.0001	0.0002	0.005	0.005	0.000727	0.000883	1.7
Sample Count		15	15	15	15	15	15	15
Sample Range		0.00056000	0.088700	0.0000	0.020000	0.00097300	0.00075700	3.0100
Std Deviation		0.00014838	0.023025	8.8002E-11	0.0051640	0.00025455	0.00020599	0.84654
Std Error		0.000038312	0.0059451	2.2722E-11	0.0013333	0.000065723	0.000053188	0.21858

LC_LCDSSLCC (E297110)

statistic	sample_date	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)
	4/6/2015	3.77	11.6	0.0023	< 0.0050
	4/13/2015	3.65	11.6	0.0036	< 0.0050
	4/20/2015	3.50	10.1	0.0044	< 0.0050
	4/27/2015	3.72	8.13	0.0034	< 0.0050
	4/28/2015	3.55	7.46	0.0029	< 0.0050
	5/5/2015	3.61	5.83	0.0014	< 0.0050
	5/12/2015	4.09	6.62	0.0012	< 0.0050
	5/19/2015	3.73	5.77	< 0.0010	< 0.0050
	5/26/2015	4.98	2.82	< 0.0010	< 0.0050
	6/2/2015	7.63	1.85	< 0.0010	< 0.0050
	6/8/2015	4.18	3.24	< 0.0010	< 0.0050
	6/16/2015	4.62	5.02	< 0.0010	< 0.0050
	6/16/2015		5.02	< 0.0010	< 0.0050
	6/23/2015	4.91	5.44	< 0.0010	< 0.0050
	6/24/2015	5.04	5.59	0.0018	< 0.0050
	6/30/2015				
	6/30/2015	4.78	5.92	0.0013	< 0.0050
Average Sample Result		4.3840	6.3756	0.0018313	0.0050000
Exceedance Count		0	16	0	0
Maximum Sample Result		7.63	11.6	0.0044	0.005
Minimum Sample Result		3.5	1.85	0.001	0.005
Sample Count		15	16	16	16
Sample Range		4.1300	9.7500	0.0034000	0.0000
Std Deviation		1.0623	2.8492	0.0011330	8.5018E-11
Std Error		0.27429	0.71230	0.00028324	2.1254E-11

LC_LCDSSLCC (E297110)

statistic	sample_date	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)
	4/6/2015	< 0.0010	8.85	8.33	< 0.0020	1.13	48.8	48.9
	4/13/2015	< 0.0010	8.87	8.38	< 0.0020	1.14	49.8	48.8
	4/20/2015	< 0.0010	8.28	8.37	0.0020	1.06	43.1	42.5
	4/27/2015	0.0010	8.36	8.15	0.0030	0.922	34.1	33.9
	4/28/2015	< 0.0010	8.33	8.36	0.0040	0.898	33	31.5
	5/5/2015	0.0027	8.46	8.42	0.0056	0.821	24.8	25.1
	5/12/2015	< 0.0010	8.18	8.43	0.0030	0.900	33.4	31.4
	5/19/2015	< 0.0010	8.03	8.42	0.0025	0.782	29.3	28.2
	5/26/2015	0.0019	8.22	8.33	0.0445	0.749	14.8	14.4
	6/2/2015	0.0024	8.21	8.31	0.244	1.34	9.68	9.56
	6/8/2015	0.0024	8.59	8.43	0.0047	0.809	15.1	14.9
	6/16/2015	0.0014	8.25	8.29	< 0.0020	0.938	23.2	24.3
	6/16/2015	0.0019			0.0026			
	6/23/2015	0.0015	8.16	8.30	0.0025	0.937	27.7	27.8
	6/24/2015	0.0017	8.43	8.30	0.0021	1.01	28.9	29.7
	6/30/2015							
	6/30/2015	0.0010	8.30	8.45	0.0039	0.941	31	30.5
Average Sample Result		0.0014938	8.3680	8.3513	0.020650	0.95847	29.779	29.431
Exceedance Count		0	0	0	0	0	0	15
Maximum Sample Result		0.0027	8.87	8.45	0.244	1.34	49.8	48.9
Minimum Sample Result		0.001	8.03	8.15	0.002	0.749	9.68	9.56
Sample Count		16	15	15	16	15	15	15
Sample Range		0.0017000	0.84000	0.30000	0.24200	0.59100	40.120	39.340
Std Deviation		0.00060163	0.24105	0.077907	0.060463	0.15738	11.653	11.450
Std Error		0.00015041	0.062238	0.020116	0.015116	0.040635	3.0087	2.9565

LC_LCDSSLCC (E297110)

statistic	sample_date	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)
	4/6/2015	< 0.010	< 0.010	4.92	0.193	0.202	211
	4/13/2015	< 0.010	< 0.010	4.99	0.202	0.197	207
	4/20/2015	< 0.010	< 0.010	4.47	0.190	0.187	186
	4/27/2015	< 0.010	< 0.010	3.56	0.163	0.165	147
	4/28/2015	< 0.010	< 0.010	3.44	0.158	0.157	136
	5/5/2015	< 0.010	< 0.010	2.90	0.128	0.131	107
	5/12/2015	< 0.010	< 0.010	3.35	0.140	0.138	125
	5/19/2015	< 0.010	< 0.010	3.10	0.134	0.136	113
	5/26/2015	< 0.010	< 0.010	1.64	0.0965	0.101	58.6
	6/2/2015	< 0.010	0.048	1.38	0.0776	0.104	40.6
	6/8/2015	< 0.010	< 0.010	2.07	0.0975	0.0983	67.4
	6/16/2015	< 0.010	< 0.010	2.85	0.130	0.133	104
	6/16/2015						
	6/23/2015	< 0.010	< 0.010	3.04	0.127	0.128	112
	6/24/2015	< 0.010	< 0.010	3.21	0.142	0.148	116
	6/30/2015						
	6/30/2015	< 0.010	< 0.010	3.26	0.146	0.144	125
Average Sample Result		0.010000	0.012533	3.2120	0.14164	0.14462	123.71
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.01	0.048	4.99	0.202	0.202	211
Minimum Sample Result		0.01	0.01	1.38	0.0776	0.0983	40.6
Sample Count		15	15	15	15	15	15
Sample Range		0.0000	0.038000	3.6100	0.12440	0.10370	170.40
Std Deviation		1.7600E-10	0.0098116	1.0439	0.035904	0.032542	49.591
Std Error		4.5444E-11	0.0025333	0.26955	0.0092703	0.0084023	12.804

LC_LCDSSLCC (E297110)

statistic	sample_date	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)
	4/6/2015	3.0	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/13/2015	4.3	< 0.010	< 0.010	< 0.00010	< 0.00010	12	12
	4/20/2015	4.5	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/27/2015	5.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/28/2015	6.4	0.011	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/5/2015	5.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/12/2015	3.9	0.013	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/19/2015	3.3	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/26/2015	4.2	< 0.010	0.025	< 0.00010	< 0.00010	< 10	10
	6/2/2015	4.3	< 0.010	0.092	< 0.00010	< 0.00010	< 10	28
	6/8/2015	5.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	
	6/16/2015	6.2	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/16/2015							
	6/23/2015	5.8	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/24/2015	7.9	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/30/2015							
	6/30/2015	6.8	< 0.010	0.011	< 0.00010	< 0.00010	< 10	< 10
Average Sample Result		5.1600	0.010267	0.016533	0.00010000	0.00010000	10.133	11.429
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		7.9	0.013	0.092	0.0001	0.0001	12	28
Minimum Sample Result		3	0.01	0.01	0.0001	0.0001	10	10
Sample Count		15	15	15	15	15	15	14
Sample Range		4.9000	0.0030000	0.082000	0.0000	0.0000	2.0000	18.000
Std Deviation		1.3721	0.00079881	0.021230	0.0000	0.0000	0.51640	4.7993
Std Error		0.35427	0.00020625	0.0054815	0.0000	0.0000	0.13333	1.2827

LC_LCDSSLCC (E297110)

statistic	sample_date	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)
	4/6/2015	530	< 0.050	0.99
	4/13/2015	546	< 0.050	0.63
	4/20/2015	509	< 0.050	0.94
	4/27/2015	429	< 0.050	0.98
	4/28/2015	399	< 0.050	1.05
	5/5/2015	337	< 0.050	1.52
	5/12/2015	379	< 0.050	1.22
	5/19/2015	347	< 0.050	1.26
	5/26/2015	249	0.298	2.73
	6/2/2015	206	0.647	7.50
	6/8/2015	244	0.159	1.51
	6/16/2015	332	0.082	1.73
	6/16/2015		0.092	0.72
	6/23/2015	347	0.134	0.83
	6/24/2015	369	0.133	0.78
	6/30/2015			
	6/30/2015	393	0.129	0.73
Average Sample Result		374.40	0.12963	1.5700
Exceedance Count		0	0	0
Maximum Sample Result		546	0.647	7.5
Minimum Sample Result		206	0.05	0.63
Sample Count		15	16	16
Sample Range		340.00	0.59700	6.8700
Std Deviation		100.55	0.15304	1.6653
Std Error		25.962	0.038260	0.41631

LC_LCDSSLCC (E297110)

statistic	sample_date	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)
	4/6/2015	< 1.0	0.44	3.26	3.31	< 0.50	< 0.50
	4/13/2015	1.1	0.25	3.34	3.27	< 0.50	< 0.50
	4/20/2015	< 1.0	0.34	2.98	2.91	< 0.50	0.60
	4/27/2015	1.1	0.34	2.40	2.35	< 0.50	< 0.50
	4/28/2015	< 1.0	0.49	2.27	2.33	< 0.50	< 0.50
	5/5/2015	1.6	0.48	1.98	2.00	< 0.50	< 0.50
	5/12/2015	1.6	0.32	2.30	2.28	< 0.50	< 0.50
	5/19/2015	< 1.0	0.35	2.11	2.19	< 0.50	< 0.50
	5/26/2015	42.1	14.1	1.24	1.29	< 0.50	1.11
	6/2/2015	251	97.4	0.925	1.17	< 0.50	5.54
	6/8/2015	1.6	0.63	1.41	1.42	< 0.50	< 0.50
	6/16/2015	< 1.0	0.24	1.94	1.99	< 0.50	< 0.50
	6/16/2015						
	6/23/2015	1.1	0.24	1.90	1.89	< 0.50	< 0.50
	6/24/2015	< 1.0	0.38	2.07	2.13	< 0.50	< 0.50
	6/30/2015						
	6/30/2015	1.0	0.32	2.21	2.08	< 0.50	< 0.50
Average Sample Result		20.547	7.7547	2.1557	2.1740	0.50000	0.88333
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		251	97.4	3.34	3.31	0.5	5.54
Minimum Sample Result		1	0.24	0.925	1.17	0.5	0.5
Sample Count		15	15	15	15	15	15
Sample Range		250.00	97.160	2.4150	2.1400	0.0000	5.0400
Std Deviation		64.619	25.051	0.67926	0.63323	0.0000	1.2978
Std Error		16.685	6.4680	0.17538	0.16350	0.0000	0.33509

LC_LCDSSLCC (E297110)

statistic	sample_date	ZINC (D)	ZINC (T)
	4/6/2015	5.0	5.4
	4/13/2015	4.3	4.2
	4/20/2015	4.1	4.5
	4/27/2015	5.8	6.2
	4/28/2015	5.4	5.9
	5/5/2015	6.1	6.6
	5/12/2015	6.5	6.8
	5/19/2015	6.1	7.8
	5/26/2015	4.0	16.8
	6/2/2015	< 3.0	42.3
	6/8/2015	8.7	9.7
	6/16/2015	10.3	11.0
	6/16/2015		
	6/23/2015	10.4	10.8
	6/24/2015	10.3	11.1
	6/30/2015		
	6/30/2015	8.6	9.2
Average Sample Result		6.5733	10.553
Exceedance Count		0	0
Maximum Sample Result		10.4	42.3
Minimum Sample Result		3	4.2
Sample Count		15	15
Sample Range		7.4000	38.100
Std Deviation		2.4875	9.3788
Std Error		0.64228	2.4216

LC_LC5 (0200028)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	4/6/2015	165	< 0.0030	0.0149	0.11	0.14	< 0.10
	4/13/2015	201	< 0.0030	0.0093	0.10	0.11	< 0.10
	4/20/2015	182	< 0.0030	0.0298	0.11	0.12	< 0.10
	4/27/2015	159	< 0.0030	0.0429	0.12	0.14	< 0.10
	4/28/2015	173	< 0.0030	0.0283	0.12	0.13	< 0.10
	5/4/2015	131	< 0.0030	0.0303	0.13	0.12	< 0.10
	5/5/2015	167	0.0041	0.0222	0.12	0.14	0.11
	5/11/2015	170	< 0.0030	0.116	0.12	0.13	< 0.10
	5/19/2015	166	< 0.0030	0.0253	0.11	0.13	< 0.10
	5/26/2015	129	< 0.0030	0.185	0.11	0.14	< 0.10
	6/2/2015	134	< 0.0030	0.209	0.12	0.14	< 0.10
	6/8/2015	147	< 0.0030	0.0722	0.12	0.14	0.11
	6/15/2015	163	< 0.0030	0.0196	0.13	0.13	0.11
	6/15/2015						
	6/23/2015	166	< 0.0030	0.0184	0.11	0.13	< 0.10
	6/30/2015	170	< 0.0030	0.0212	0.12	0.16	< 0.10
Average Sample Result		161.53	0.0030733	0.056293	0.11667	0.13333	0.10200
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		201	0.0041	0.209	0.13	0.16	0.11
Minimum Sample Result		129	0.003	0.0093	0.1	0.11	0.1
Sample Count		15	15	15	15	15	15
Sample Range		72.000	0.0011000	0.19970	0.030000	0.050000	0.010000
Std Deviation		19.460	0.00028402	0.063303	0.0081650	0.011751	0.0041404
Std Error		5.0246	0.000073333	0.016345	0.0021082	0.0030342	0.0010690

LC_LC5 (0200028)

statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	4/6/2015	0.12	0.101	0.102	< 0.10	< 0.10	< 0.000050	< 0.000050	0.013
	4/13/2015	0.11	0.0966	0.0928	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	4/20/2015	0.21	0.0930	0.0939	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/27/2015	0.16	0.0868	0.0856	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/28/2015	0.15	0.0858	0.0851	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/4/2015	0.14	0.0760	0.0761	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/5/2015	0.13	0.0765	0.0786	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/11/2015	0.18	0.0757	0.0791	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/19/2015	0.13	0.0732	0.0745	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/26/2015	0.24	0.0615	0.0681	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/2/2015	0.24	0.0575	0.0627	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/8/2015	0.16	0.0618	0.0621	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/15/2015	0.14	0.0711	0.0729	< 0.10	< 0.10	< 0.000050	< 0.000050	0.010
	6/15/2015								
	6/23/2015	0.11	0.0771	0.0759	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/30/2015	0.15	0.0824	0.0807	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
Average Sample Result		0.15800	0.078400	0.079340	0.10000	0.10000	0.000050000	0.000050000	0.010333
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0.24	0.101	0.102	0.1	0.1	5e-005	5e-005	0.013
Minimum Sample Result		0.11	0.0575	0.0621	0.1	0.1	5e-005	5e-005	0.01
Sample Count		15	15	15	15	15	15	15	15
Sample Range		0.13000	0.043500	0.039900	0.0000	0.0000	0.0000	0.0000	0.0030000
Std Deviation		0.042292	0.012798	0.011241	0.0000000014080	0.0000000014080	0.0000	0.0000	0.00081650
Std Error		0.010920	0.0033045	0.0029025	3.6355E-10	3.6355E-10	0.0000	0.0000	0.00021082

LC_LC5 (0200028)

statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	4/6/2015	0.014	< 0.10	0.0134	0.0303	99.8	0.94	2.8
	4/13/2015	0.011	< 0.10	0.0155	0.0289	88.2	1.09	2.7
	4/20/2015	< 0.010	< 0.10	0.0126	0.0295	99.8	1.05	2.4
	4/27/2015	< 0.010	< 0.10	0.0207	0.0415	86.3	1.05	2.0
	4/28/2015	< 0.010	< 0.10	0.0276	0.0400	84.1	1.24	2.2
	5/4/2015	< 0.010	< 0.050	0.0254	0.0462	74.8	1.36	1.5
	5/5/2015	< 0.010	< 0.050	0.0350	0.0336	74.8	1.17	1.5
	5/11/2015	< 0.010	< 0.050	0.0269	0.0522	80.9	1.58	1.6
	5/19/2015	< 0.010	< 0.050	0.0192	0.0401	76.8	1.41	1.4
	5/26/2015	< 0.010	< 0.050	0.0142	0.0940	68.4	1.31	1.3
	6/2/2015	< 0.010	< 0.050	0.0191	0.0996	62.1	1.47	1.0
	6/8/2015	0.012	< 0.050	0.0240	0.0562	63.4	1.29	1.2
	6/15/2015	< 0.010	< 0.050	0.0345	0.0444	69.9	1.83	1.4
	6/15/2015							
	6/23/2015	< 0.010	< 0.050	0.0165	0.0463	77.1	1.06	1.5
	6/30/2015	< 0.010	< 0.050	0.0194	0.0455	77.1	0.82	1.8
Average Sample Result		0.010467	0.066667	0.021600	0.048553	78.900	1.2447	1.7533
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.014	0.1	0.035	0.0996	99.8	1.83	2.8
Minimum Sample Result		0.01	0.05	0.0126	0.0289	62.1	0.82	1
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0040000	0.050000	0.022400	0.070700	37.700	1.0100	1.8000
Std Deviation		0.0011255	0.024398	0.0071421	0.021180	11.352	0.26259	0.54885
Std Error		0.00029059	0.0062994	0.0018441	0.0054688	2.9311	0.067801	0.14171

LC_LC5 (0200028)

statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)
	4/6/2015	0.14	0.24	< 0.10	< 0.10	695.0	733
	4/13/2015	0.13	0.15	< 0.10	< 0.10	679.9	734
	4/20/2015	0.15	0.19	< 0.10	< 0.10	654	694
	4/27/2015	< 0.10	0.20	< 0.10	< 0.10	604.5	641
	4/28/2015	< 0.10	0.17	< 0.10	< 0.10	599.8	647
	5/4/2015	0.11	0.20	< 0.10	< 0.10	549.7	585
	5/5/2015	0.16	0.21	< 0.10	< 0.10	516.4	576
	5/11/2015	0.11	0.34	< 0.10	0.11	532.3	577
	5/19/2015	0.22	0.41	< 0.10	< 0.10	523.4	579
	5/26/2015	0.11	0.40	< 0.10	0.19	435	469
	6/2/2015	0.14	0.60	< 0.10	0.17	431.5	424
	6/8/2015	0.15	0.32	< 0.10	< 0.10	459.7	467
	6/15/2015	0.14	0.18	< 0.10	< 0.10		487
	6/15/2015					520.8	
	6/23/2015	0.14	0.19	< 0.10	< 0.10	415.8	571
	6/30/2015	< 0.10	0.18	< 0.10	< 0.10	530.1	609
Average Sample Result		0.13333	0.26533	0.10000	0.11133	543.19	586.20
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.22	0.6	0.1	0.19	695	734
Minimum Sample Result		0.1	0.15	0.1	0.1	415.8	424
Sample Count		15	15	15	15	15	15
Sample Range		0.12000	0.45000	0.0000	0.090000	279.20	310.00
Std Deviation		0.031547	0.12541	0.0000000014080	0.028251	88.761	95.170
Std Error		0.0081455	0.032380	3.6355E-10	0.0072943	22.918	24.573

LC_LC5 (0200028)

statistic	sample_date	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)
	4/6/2015	< 0.50	< 0.50	13.83	0.176	408
	4/13/2015	< 0.50	< 0.50	12.25	0.191	396
	4/20/2015	< 0.50	< 0.50	12.88	0.178	404
	4/27/2015	< 0.50	< 0.50	11.63	0.172	358
	4/28/2015	< 0.50	6.49	10.97	0.172	348
	5/4/2015	< 0.50	< 0.50	10.17	0.198	306
	5/5/2015	< 0.50	< 0.50	9.8	0.193	300
	5/11/2015	< 0.50	< 0.50	12.2	0.203	328
	5/19/2015	< 0.50	< 0.50	13.07	0.201	307
	5/26/2015	< 0.50	0.57	16.52	0.193	250
	6/2/2015	< 0.50	0.57	11.16	0.196	231
	6/8/2015	< 0.50	< 0.50	10.06	0.205	246
	6/15/2015	< 0.50	< 0.50		0.203	272
	6/15/2015			10.38		
	6/23/2015	< 0.50	< 0.50	10.13	0.207	302
	6/30/2015	< 0.50	< 0.50	9.64	0.214	312
Average Sample Result		0.50000	0.90867	11.646	0.19347	317.87
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.5	6.49	16.52	0.214	408
Minimum Sample Result		0.5	0.5	9.64	0.172	231
Sample Count		15	15	15	15	15
Sample Range		0.0000	5.9900	6.8800	0.042000	177.00
Std Deviation		0.0000	1.5442	1.8797	0.013298	56.413
Std Error		0.0000	0.39872	0.48535	0.0034335	14.566

LC_LC5 (0200028)

statistic	sample_date	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)
	4/6/2015		< 0.010	0.022	< 0.050	< 0.050	0.0160	0.0162	39.2
	4/13/2015		< 0.010	0.014	< 0.050	< 0.050	0.0168	0.0164	41.1
	4/20/2015		< 0.010	0.039	< 0.050	< 0.050	0.0157	0.0158	35.9
	4/27/2015		< 0.010	0.058	< 0.050	0.051	0.0155	0.0152	33.1
	4/28/2015		< 0.010	0.033	< 0.050	0.125	0.0152	0.0152	32.8
	5/4/2015		< 0.010	0.049	< 0.050	< 0.050	0.0141	0.0140	29.3
	5/5/2015		0.013	0.031	< 0.050	< 0.050	0.0138	0.0142	29.7
	5/11/2015		< 0.010	0.169	< 0.050	0.130	0.0148	0.0147	32.2
	5/19/2015		< 0.010	0.031	< 0.050	< 0.050	0.0135	0.0145	29.4
	5/26/2015		< 0.010	0.259	< 0.050	0.201	0.0117	0.0124	24.3
	6/2/2015		< 0.010	0.264	< 0.050	0.185	0.0112	0.0117	21.3
	6/8/2015		< 0.010	0.110	< 0.050	0.082	0.0115	0.0117	21.6
	6/15/2015		< 0.010	0.030	< 0.050	< 0.050	0.0151	0.0155	26.4
	6/15/2015								
	6/23/2015		< 0.010	0.035	< 0.050	< 0.050	0.0120	0.0119	26.0
	6/30/2015		< 0.010	0.030	< 0.050	< 0.050	0.0152	0.0168	29.3
Average Sample Result		0	0.010200	0.078267	0.050000	0.081600	0.014140	0.014413	30.107
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0	0.013	0.264	0.05	0.201	0.0168	0.0168	41.1
Minimum Sample Result		0	0.01	0.014	0.05	0.05	0.0112	0.0117	21.3
Sample Count		0	15	15	15	15	15	15	15
Sample Range		0	0.0030000	0.25000	0.0000	0.15100	0.0056000	0.0051000	19.800
Std Deviation		0	0.00077460	0.084327	7.0401E-10	0.052846	0.0017948	0.0017439	5.8181
Std Error		0	0.00020000	0.021773	1.8178E-10	0.013645	0.00046340	0.00045028	1.5022

LC_LC5 (0200028)

statistic	sample_date	MANGANESE (D)	MANGANESE (T)	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)
	4/6/2015	0.00040	0.00182	< 0.0050	< 0.0050	0.00107	0.00110	1.09
	4/13/2015	0.00039	0.00109	< 0.0050	< 0.0050	0.00109	0.00105	1.38
	4/20/2015	0.00046	0.00246	< 0.0050	< 0.0050	0.00104	0.00105	1.23
	4/27/2015	0.00072	0.00474	< 0.0050	< 0.0050	0.00106	0.00108	1.18
	4/28/2015	0.00063	0.00267	< 0.0050	< 0.0050	0.00109	0.00107	1.15
	5/4/2015	0.00072	0.00374	< 0.0050	< 0.0050	0.00106	0.00102	1.19
	5/5/2015	0.00248	0.00257	< 0.0050	< 0.0050	0.00105	0.00105	1.25
	5/11/2015	0.00042	0.0110	< 0.0050	< 0.0050	0.00103	0.000970	1.17
	5/19/2015	0.00034	0.00236	< 0.0050	< 0.0050	0.00102	0.00103	1.15
	5/26/2015	0.00049	0.0149	< 0.0050	< 0.0050	0.000964	0.00100	1.12
	6/2/2015	0.00026	0.0158	< 0.0050	< 0.0050	0.000887	0.000890	1.19
	6/8/2015	0.00038	0.00702	< 0.0050	< 0.0050	0.000937	0.000943	1.22
	6/15/2015	0.00054	0.00187	< 0.0050	< 0.0050	0.00103	0.00108	1.21
	6/15/2015							
	6/23/2015	0.00035	0.00242	< 0.0050	< 0.0050	0.00100	0.000990	1.35
	6/30/2015	0.00025	0.00216	< 0.0050	< 0.0050	0.00107	0.00106	1.20
Average Sample Result		0.00058867	0.0051080	0.0050000	0.0050000	0.0010265	0.0010255	1.2053
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.00248	0.0158	0.005	0.005	0.00109	0.0011	1.38
Minimum Sample Result		0.00025	0.00109	0.005	0.005	0.000887	0.00089	1.09
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0022300	0.014710	0.0000	0.0000	0.00020300	0.00021000	0.29000
Std Deviation		0.00054318	0.0048615	8.8002E-11	8.8002E-11	0.000057925	0.000057737	0.077170
Std Error		0.00014025	0.0012552	2.2722E-11	2.2722E-11	0.000014956	0.000014908	0.019925

LC_LC5 (0200028)

statistic	sample_date	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)
	4/6/2015	1.14	10.2	0.0025	< 0.0050
	4/13/2015	0.96	9.79	0.0041	< 0.0050
	4/20/2015	1.11	9.24	0.0036	< 0.0050
	4/27/2015	1.47	7.69	0.0042	< 0.0050
	4/28/2015	1.42	7.58	0.0057	< 0.0050
	5/4/2015	1.38	6.82	0.0045	< 0.0050
	5/5/2015	1.74	6.69	0.0037	< 0.0050
	5/11/2015	1.53	7.16	0.0027	< 0.0050
	5/19/2015	1.26	7.22	0.0026	< 0.0050
	5/26/2015	1.83	5.26	0.0018	< 0.0050
	6/2/2015	1.96	4.59	0.0016	< 0.0050
	6/8/2015	1.45	5.10	0.0022	< 0.0050
	6/15/2015	1.33	6.25	0.0032	< 0.0050
	6/15/2015				
	6/23/2015	1.45	6.63	0.0026	< 0.0050
	6/30/2015	1.33	7.24	0.0030	< 0.0050
Average Sample Result		1.4240	7.1640	0.0032000	0.0050000
Exceedance Count		0	15	0	0
Maximum Sample Result		1.96	10.2	0.0057	0.005
Minimum Sample Result		0.96	4.59	0.0016	0.005
Sample Count		15	15	15	15
Sample Range		1.0000	5.6100	0.0041000	0.0000
Std Deviation		0.26830	1.6225	0.0011078	8.8002E-11
Std Error		0.069274	0.41893	0.00028602	2.2722E-11

LC_LC5 (0200028)

statistic	sample_date	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)
	4/6/2015	< 0.0010	8.82	8.37	0.0031	1.06	38.6	39
	4/13/2015	< 0.0010	8.91	8.42	< 0.0020	1.03	41.3	39.6
	4/20/2015	< 0.0010	8.26	8.40	0.0039	1.09	38.9	38.2
	4/27/2015	< 0.0010	8.47	8.46	0.0068	0.974	33.8	32.2
	4/28/2015	< 0.0010	8.49	8.48	0.0061	0.962	35.1	32.8
	5/4/2015	< 0.0010	8.54	8.48	0.0064	0.954	27.7	27.7
	5/5/2015	0.0012	8.35	8.48	0.0076	0.997	26.4	27.3
	5/11/2015	< 0.0010	8.28	8.44	0.0081	1.06	27.8	28.1
	5/19/2015	< 0.0010	8.31	8.46	0.0039	0.945	27	28.3
	5/26/2015	< 0.0010	8.34	8.36	0.0244	0.926	19.6	21.2
	6/2/2015	< 0.0010	8.54	8.39	0.0251	0.926	17.4	17.5
	6/8/2015	0.0016	8.76	8.47	0.0142	0.904	17.8	17.6
	6/15/2015	0.0011		8.36	0.0052	0.992	22.4	23
	6/15/2015		8.46					
	6/23/2015	0.0016	8.15	8.35	0.0044	1.01	25.5	25.6
	6/30/2015	0.0014	8.33	8.47	0.0049	1.04	26.7	27.9
Average Sample Result		0.0011267	8.4673	8.4260	0.0084067	0.99133	28.400	28.400
Exceedance Count		0	0	0	0	0	0	15
Maximum Sample Result		0.0016	8.91	8.48	0.0251	1.09	41.3	39.6
Minimum Sample Result		0.001	8.15	8.35	0.002	0.904	17.4	17.5
Sample Count		15	15	15	15	15	15	15
Sample Range		0.00060000	0.76000	0.13000	0.023100	0.18600	23.900	22.100
Std Deviation		0.00022190	0.21868	0.049828	0.0072168	0.056236	7.6516	7.0406
Std Error		0.000057293	0.056463	0.012866	0.0018634	0.014520	1.9756	1.8179

LC_LC5 (0200028)

statistic	sample_date	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)
	4/6/2015	< 0.010	< 0.010	2.83	0.170	0.178	187
	4/13/2015	< 0.010	< 0.010	2.77	0.164	0.161	178
	4/20/2015	< 0.010	< 0.010	2.64	0.154	0.154	172
	4/27/2015	< 0.010	< 0.010	2.18	0.142	0.140	145
	4/28/2015	< 0.010	< 0.010	2.20	0.142	0.142	143
	5/4/2015	< 0.010	< 0.010	2.00	0.122	0.124	125
	5/5/2015	< 0.010	< 0.010	2.06	0.124	0.128	120
	5/11/2015	< 0.010	< 0.010	2.03	0.127	0.127	123
	5/19/2015	< 0.010	< 0.010	2.16	0.123	0.127	118
	5/26/2015	< 0.010	< 0.010	1.56	0.111	0.118	86.6
	6/2/2015	< 0.010	< 0.010	1.50	0.0979	0.102	73.5
	6/8/2015	< 0.010	< 0.010	1.50	0.0999	0.0991	78.1
	6/15/2015	< 0.010	< 0.010	1.86	0.113	0.117	97.0
	6/15/2015						
	6/23/2015	< 0.010	< 0.010	1.89	0.117	0.119	107
	6/30/2015	< 0.010	< 0.010	2.08	0.132	0.132	117
Average Sample Result		0.010000	0.010000	2.0840	0.12925	0.13121	124.68
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.01	0.01	2.83	0.17	0.178	187
Minimum Sample Result		0.01	0.01	1.5	0.0979	0.0991	73.5
Sample Count		15	15	15	15	15	15
Sample Range		0.0000	0.0000	1.3300	0.072100	0.078900	113.50
Std Deviation		1.7600E-10	1.7600E-10	0.41574	0.021595	0.021210	35.011
Std Error		4.5444E-11	4.5444E-11	0.10734	0.0055759	0.0054763	9.0398

LC_LC5 (0200028)

statistic	sample_date	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)
	4/6/2015	1.7	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/13/2015	3.1	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/20/2015	3.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/27/2015	4.8	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/28/2015	7.4	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/4/2015	6.60	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/5/2015	6.9	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/11/2015	5.4	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/19/2015	4.4	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/26/2015	6	< 0.010	0.010	< 0.00010	< 0.00010	< 10	< 10
	6/2/2015	6.7	< 0.010	0.010	< 0.00010	< 0.00010	< 10	< 10
	6/8/2015	8.2	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	
	6/15/2015		< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/15/2015	8.6						
	6/23/2015	7.7	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/30/2015	9.8	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
Average Sample Result		6.0600	0.010000	0.010000	0.00010000	0.00010000	10.000	10.000
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		9.8	0.01	0.01	0.0001	0.0001	10	10
Minimum Sample Result		1.7	0.01	0.01	0.0001	0.0001	10	10
Sample Count		15	15	15	15	15	15	14
Sample Range		8.1000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000
Std Deviation		2.2283	1.7600E-10	1.7600E-10	0.0000	0.0000	0.0000	0.0000
Std Error		0.57535	4.5444E-11	4.5444E-11	0.0000	0.0000	0.0000	0.0000

LC_LC5 (0200028)

statistic	sample_date	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)
	4/6/2015	478	< 0.050	0.92
	4/13/2015	495	< 0.050	0.91
	4/20/2015	479	0.068	1.03
	4/27/2015	426	< 0.050	1.13
	4/28/2015	430	< 0.050	1.13
	5/4/2015	378	0.151	1.48
	5/5/2015	368	< 0.050	1.44
	5/11/2015	372	< 0.050	1.19
	5/19/2015	369	< 0.050	1.18
	5/26/2015	310	0.192	2.24
	6/2/2015	278	0.217	1.99
	6/8/2015	280	0.170	1.47
	6/15/2015	375	0.176	1.80
	6/15/2015			
	6/23/2015	364	0.144	1.01
	6/30/2015	389	0.152	1.32
Average Sample Result		386.07	0.10800	1.3493
Exceedance Count		0	0	0
Maximum Sample Result		495	0.217	2.24
Minimum Sample Result		278	0.05	0.91
Sample Count		15	15	15
Sample Range		217.00	0.16700	1.3300
Std Deviation		66.918	0.064162	0.39572
Std Error		17.278	0.016566	0.10217

LC_LC5 (0200028)

statistic	sample_date	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)
	4/6/2015	1.9	0.81	2.13	2.14	< 0.50	< 0.50
	4/13/2015	1.0	0.49	2.09	2.06	< 0.50	< 0.50
	4/20/2015	3.0	0.60	1.97	1.93	< 0.50	0.63
	4/27/2015	3.6	0.60	1.73	1.71	< 0.50	< 0.50
	4/28/2015	2.4	1.12	1.65	1.65	< 0.50	< 0.50
	5/4/2015	2.6	0.82	1.53	1.52	< 0.50	< 0.50
	5/5/2015	5.1	1.12	1.56	1.62	< 0.50	< 0.50
	5/11/2015	5.7	0.65	1.62	1.62	< 0.50	0.52
	5/19/2015	2.4	0.65	1.63	1.68	< 0.50	< 0.50
	5/26/2015	19.6	4.05	1.28	1.38	< 0.50	0.81
	6/2/2015	18.6	4.93	1.15	1.19	< 0.50	0.92
	6/8/2015	7.9	1.11	1.27	1.25	< 0.50	< 0.50
	6/15/2015	3.5	1.04	1.42	1.46	< 0.50	< 0.50
	6/15/2015						
	6/23/2015	3.3	0.63	1.48	1.46	< 0.50	< 0.50
	6/30/2015	1.6	0.76	1.61	1.62	< 0.50	< 0.50
Average Sample Result		5.4800	1.2920	1.6080	1.6193	0.50000	0.55867
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		19.6	4.93	2.13	2.14	0.5	0.92
Minimum Sample Result		1	0.49	1.15	1.19	0.5	0.5
Sample Count		15	15	15	15	15	15
Sample Range		18.600	4.4400	0.98000	0.95000	0.0000	0.42000
Std Deviation		5.8010	1.3255	0.28596	0.26903	0.0000	0.13043
Std Error		1.4978	0.34225	0.073835	0.069464	0.0000	0.033677

LC_LC5 (0200028)

statistic	sample_date	ZINC (D)	ZINC (T)
	4/6/2015	< 3.0	< 3.0
	4/13/2015	< 3.0	< 3.0
	4/20/2015	< 3.0	< 3.0
	4/27/2015	< 3.0	< 3.0
	4/28/2015	< 3.0	5.5
	5/4/2015	< 3.0	< 3.0
	5/5/2015	3.2	< 3.0
	5/11/2015	< 3.0	3.2
	5/19/2015	< 3.0	< 3.0
	5/26/2015	< 3.0	5.7
	6/2/2015	< 3.0	5.4
	6/8/2015	< 3.0	3.3
	6/15/2015	< 3.0	< 3.0
	6/15/2015		
	6/23/2015	< 3.0	< 3.0
	6/30/2015	< 3.0	< 3.0
Average Sample Result		3.0133	3.5400
Exceedance Count		0	0
Maximum Sample Result		3.2	5.7
Minimum Sample Result		3	3
Sample Count		15	15
Sample Range		0.20000	2.7000
Std Deviation		0.051640	1.0370
Std Error		0.013333	0.26776

LC_FRDSDC (E288272)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	4/7/2015	179	< 0.0030	0.0106	< 0.10	< 0.10	< 0.10
	4/13/2015	167	< 0.0030	0.0103	< 0.10	< 0.10	< 0.10
	4/20/2015	178	< 0.0030	0.0196	0.11	0.13	0.12
	4/27/2015	165	< 0.0030	0.0246	0.13	0.13	< 0.10
	4/28/2015	182	< 0.0030	0.0264	0.13	0.15	0.11
	5/4/2015	134	< 0.0030	0.0462	0.13	0.12	0.10
	5/5/2015	163	< 0.0030	0.0192	0.12	0.14	< 0.10
	5/11/2015	131	< 0.0030	0.0254	0.12	0.13	0.10
	5/19/2015	163	< 0.0030	0.0316	0.12	0.13	0.11
	5/25/2015	153	< 0.0030	0.0923	0.11	0.13	0.11
	6/1/2015	143	< 0.0030	0.108	< 0.10	0.13	0.10
	6/8/2015	129	< 0.0030	0.0578	0.12	0.12	0.10
	6/15/2015	166	< 0.0030	0.0279	0.12	0.15	0.10
	6/22/2015	165	< 0.0030	0.0199	0.11	0.12	< 0.10
	6/29/2015	174	< 0.0030	0.0144	0.12	0.13	0.10
Average Sample Result		159.47	0.0030000	0.035613	0.11600	0.12733	0.10333
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		182	0.003	0.108	0.13	0.15	0.12
Minimum Sample Result		129	0.003	0.0103	0.1	0.1	0.1
Sample Count		15	15	15	15	15	15
Sample Range		53.000	0.0000	0.097700	0.030000	0.050000	0.020000
Std Deviation		17.586	0.0000	0.029195	0.010556	0.014376	0.0061721
Std Error		4.5407	0.0000	0.0075381	0.0027255	0.0037118	0.0015936

LC_FRDSDC (E288272)

statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	4/7/2015	< 0.10	0.122	0.124	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/13/2015	0.10	0.117	0.117	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/20/2015	0.19	0.110	0.108	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/27/2015	0.15	0.103	0.100	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/28/2015	0.14	0.105	0.103	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/4/2015	0.15	0.0914	0.0908	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/5/2015	0.15	0.0900	0.0897	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/11/2015	0.14	0.0890	0.0901	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/19/2015	0.14	0.0874	0.0856	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/25/2015	0.18	0.0741	0.0785	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/1/2015	0.20	0.0715	0.0740	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/8/2015	0.16	0.0702	0.0701	< 0.10	< 0.10	< 0.000050	< 0.000050	0.010
	6/15/2015	0.14	0.0809	0.0822	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/22/2015	0.11	0.0853	0.0861	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/29/2015	0.11	0.0890	0.0918	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
Average Sample Result		0.14400	0.092387	0.092727	0.10000	0.10000	0.000050000	0.000050000	0.010000
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0.2	0.122	0.124	0.1	0.1	5e-005	5e-005	0.01
Minimum Sample Result		0.1	0.0702	0.0701	0.1	0.1	5e-005	5e-005	0.01
Sample Count		15	15	15	15	15	15	15	15
Sample Range		0.10000	0.051800	0.053900	0.0000	0.0000	0.0000	0.0000	0.0000
Std Deviation		0.030659	0.015956	0.015237	0.0000000014080	0.0000000014080	0.0000	0.0000	1.7600E-10
Std Error		0.0079162	0.0041198	0.0039341	3.6355E-10	3.6355E-10	0.0000	0.0000	4.5444E-11

LC_FRDSDC (E288272)

statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	4/7/2015	< 0.010	< 0.10	0.0224	0.0243	109	0.90	2.3
	4/13/2015	0.011	< 0.25	0.0164	0.0259	97.2	0.83	2.2
	4/20/2015	< 0.010	< 0.10	0.0166	0.0286	100	1.10	1.9
	4/27/2015	< 0.010	< 0.10	0.0270	0.0302	83.0	1.14	1.7
	4/28/2015	< 0.010	< 0.10	0.0176	0.0288	81.8	1.38	1.8
	5/4/2015	< 0.010	< 0.050	0.0154	0.0319	70.9	1.56	1.2
	5/5/2015	< 0.010	< 0.050	0.0215	0.0255	72.1	1.18	1.1
	5/11/2015	< 0.010	< 0.050	0.0200	0.0247	78.0	1.11	1.7
	5/19/2015	< 0.010	< 0.050	0.0204	0.0278	73.6	1.51	1.4
	5/25/2015	< 0.010	< 0.050	0.0117	0.0366	68.2	1.14	1.2
	6/1/2015	< 0.010	< 0.050	0.0148	0.0409	63.9	1.18	1.0
	6/8/2015	0.011	< 0.050	0.0147	0.0340	64.0	1.13	1.3
	6/15/2015	< 0.010	< 0.050	0.0207	0.0255	72.4	1.14	1.1
	6/22/2015	0.012	< 0.050	0.0160	0.0168	73.2	0.88	1.3
	6/29/2015	< 0.010	< 0.050	0.0131	0.0237	78.4	0.88	1.3
Average Sample Result		0.010267	0.076667	0.017887	0.028347	79.047	1.1373	1.5000
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.012	0.25	0.027	0.0409	109	1.56	2.3
Minimum Sample Result		0.01	0.05	0.0117	0.0168	63.9	0.83	1
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0020000	0.20000	0.015300	0.024100	45.100	0.73000	1.3000
Std Deviation		0.00059362	0.053005	0.0040509	0.0058620	13.327	0.21803	0.40883
Std Error		0.00015327	0.013686	0.0010459	0.0015136	3.4411	0.056294	0.10556

LC_FRDSDC (E288272)

statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)
	4/7/2015	0.11	0.15	< 0.10	< 0.10	738.8	786
	4/13/2015	0.12	0.14	< 0.10	< 0.10	719.3	764
	4/20/2015	0.10	0.19	< 0.10	< 0.10	665.6	694
	4/27/2015	< 0.10	0.15	< 0.10	< 0.10	597.4	630
	4/28/2015	< 0.10	0.18	< 0.10	< 0.10	603.2	632
	5/4/2015	0.11	0.27	< 0.10	< 0.10	542.4	562
	5/5/2015	< 0.10	0.17	< 0.10	< 0.10	338.1	559
	5/11/2015	< 0.10	0.15	< 0.10	< 0.10	530.1	575
	5/19/2015	< 0.10	0.22	< 0.10	< 0.10	533.9	571
	5/25/2015	< 0.10	0.24	< 0.10	< 0.10	443.0	471
	6/1/2015	< 0.10	0.28	< 0.10	0.10	453.8	436
	6/8/2015	0.12	0.30	< 0.10	< 0.10	453.8	484
	6/15/2015	0.12	0.17	< 0.10	< 0.10	543.9	501
	6/22/2015	0.10	0.18	< 0.10	< 0.10	292.2	586
	6/29/2015	0.13	0.16	< 0.10	< 0.10	373.4	629
Average Sample Result		0.10733	0.19667	0.10000	0.10000	521.93	592.00
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.13	0.3	0.1	0.1	738.8	786
Minimum Sample Result		0.1	0.14	0.1	0.1	292.2	436
Sample Count		15	15	15	15	15	15
Sample Range		0.030000	0.16000	0.0000	0.0000	446.60	350.00
Std Deviation		0.010328	0.052463	0.0000000014080	0.0000000014080	132.07	101.32
Std Error		0.0026667	0.013546	3.6355E-10	3.6355E-10	34.100	26.160

LC_FRDSDC (E288272)

statistic	sample_date	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)
	4/7/2015	< 0.50	< 0.50	13.01	0.143	448
	4/13/2015	< 0.50	< 0.50	12.21	0.16	424
	4/20/2015	< 0.50	4.71	11.63	0.135	406
	4/27/2015	< 0.50	< 0.50	11.56	0.136	345
	4/28/2015	< 0.50	< 0.50	11.05	0.141	345
	5/4/2015	< 0.50	< 0.50	10.08	0.166	288
	5/5/2015	< 0.50	< 0.50	9.78	0.168	295
	5/11/2015	< 0.50	< 0.50	12.18	0.175	329
	5/19/2015	< 0.50	< 0.50	11.45	0.182	299
	5/25/2015	< 0.50	0.82	13.01	0.179	259
	6/1/2015	< 0.50	< 0.50	10.75	0.185	248
	6/8/2015	< 0.50	< 0.50	10.75	0.188	255
	6/15/2015	< 0.50	< 0.50	9.52	0.179	288
	6/22/2015	< 0.50	< 0.50	9.88	0.185	305
	6/29/2015	< 0.50	< 0.50	9.73	0.186	327
Average Sample Result		0.50000	0.80200	11.106	0.16720	324.07
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.5	4.71	13.01	0.188	448
Minimum Sample Result		0.5	0.5	9.52	0.135	248
Sample Count		15	15	15	15	15
Sample Range		0.0000	4.2100	3.4900	0.053000	200.00
Std Deviation		0.0000	1.0843	1.1711	0.019483	61.060
Std Error		0.0000	0.27995	0.30238	0.0050306	15.766

LC_FRDSDC (E288272)

statistic	sample_date	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)
	4/7/2015		< 0.010	0.025	< 0.050	< 0.050	0.0164	0.0172	44.6
	4/13/2015		< 0.010	0.023	< 0.050	< 0.050	0.0170	0.0177	45.4
	4/20/2015		< 0.010	0.033	< 0.050	< 0.050	0.0173	0.0174	36.4
	4/27/2015		< 0.010	0.038	< 0.050	< 0.050	0.0156	0.0150	33.1
	4/28/2015		< 0.010	0.037	< 0.050	< 0.050	0.0154	0.0151	32.2
	5/4/2015		< 0.010	0.059	< 0.050	< 0.050	0.0142	0.0137	26.7
	5/5/2015		< 0.010	0.022	< 0.050	< 0.050	0.0133	0.0130	28.2
	5/11/2015		< 0.010	0.038	< 0.050	< 0.050	0.0149	0.0151	31.9
	5/19/2015		< 0.010	0.044	< 0.050	0.081	0.0138	0.0135	28.1
	5/25/2015		< 0.010	0.125	< 0.050	0.109	0.0116	0.0123	24.6
	6/1/2015		< 0.010	0.150	< 0.050	0.135	0.0109	0.0109	22.0
	6/8/2015		< 0.010	0.094	< 0.050	0.080	0.0122	0.0121	22.0
	6/15/2015		< 0.010	0.038	< 0.050	< 0.050	0.0153	0.0152	29.8
	6/22/2015		< 0.010	0.029	< 0.050	< 0.050	0.0151	0.0162	30.6
	6/29/2015		< 0.010	0.018	< 0.050	< 0.050	0.0152	0.0150	32.7
Average Sample Result		0	0.010000	0.051533	0.050000	0.063667	0.014547	0.014627	31.220
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0	0.01	0.15	0.05	0.135	0.0173	0.0177	45.4
Minimum Sample Result		0	0.01	0.018	0.05	0.05	0.0109	0.0109	22
Sample Count		0	15	15	15	15	15	15	15
Sample Range		0	0.0000	0.13200	0.0000	0.085000	0.0064000	0.0068000	23.400
Std Deviation		0	1.7600E-10	0.039763	7.0401E-10	0.026411	0.0018901	0.0020310	6.9158
Std Error		0	4.5444E-11	0.010267	1.8178E-10	0.0068192	0.00048803	0.00052440	1.7857

LC_FRDSDC (E288272)

statistic	sample_date	MANGANESE (D)	MANGANESE (T)	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)
	4/7/2015	0.00117	0.00228	< 0.0050	< 0.0050	0.000728	0.000760	0.57
	4/13/2015	0.00139	0.00220	< 0.0050	< 0.0050	0.000726	0.000770	< 0.50
	4/20/2015	0.00119	0.00279	< 0.0050	< 0.0050	0.000825	0.000828	0.58
	4/27/2015	0.00125	0.00309	< 0.0050	< 0.0050	0.000967	0.000947	0.78
	4/28/2015	0.00123	0.00282	< 0.0050	< 0.0050	0.000985	0.000932	0.90
	5/4/2015	0.00099	0.00352	< 0.0050	< 0.0050	0.000978	0.000963	0.77
	5/5/2015	0.00147	0.00207	< 0.0050	< 0.0050	0.000868	0.000915	0.91
	5/11/2015	0.00114	0.00285	< 0.0050	< 0.0050	0.000901	0.000937	0.83
	5/19/2015	0.00105	0.00293	< 0.0050	< 0.0050	0.000910	0.000881	0.77
	5/25/2015	0.00118	0.00682	< 0.0050	< 0.0050	0.000890	0.000932	0.58
	6/1/2015	0.00091	0.00784	< 0.0050	< 0.0050	0.000854	0.000850	0.61
	6/8/2015	0.00085	0.00515	< 0.0050	< 0.0050	0.000866	0.000862	0.67
	6/15/2015	0.00137	0.00382	< 0.0050	< 0.0050	0.000915	0.000944	0.68
	6/22/2015	0.00190	0.00335	< 0.0050	< 0.0050	0.000817	0.000875	0.72
	6/29/2015	0.00118	0.00275	< 0.0050	< 0.0050	0.000898	0.000901	0.67
Average Sample Result		0.0012180	0.0036187	0.0050000	0.0050000	0.00087520	0.00088647	0.70267
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.0019	0.00784	0.005	0.005	0.000985	0.000963	0.91
Minimum Sample Result		0.00085	0.00207	0.005	0.005	0.000726	0.00076	0.5
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0010500	0.0057700	0.0000	0.0000	0.00025900	0.00020300	0.41000
Std Deviation		0.00025426	0.0016937	8.8002E-11	8.8002E-11	0.000078227	0.000063033	0.12349
Std Error		0.000065648	0.00043732	2.2722E-11	2.2722E-11	0.000020198	0.000016275	0.031885

LC_FRDSDC (E288272)

statistic	sample_date	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)
	4/7/2015	0.52	12.2	0.0037	< 0.0050
	4/13/2015	0.51	12.0	< 0.0050	< 0.0050
	4/20/2015	0.56	10.5	0.0039	< 0.0050
	4/27/2015	0.87	8.03	0.0038	< 0.0050
	4/28/2015	0.88	8.11	0.0036	< 0.0050
	5/4/2015	1.01	6.91	0.0035	< 0.0050
	5/5/2015	0.81	7.05	0.0029	< 0.0050
	5/11/2015	1.06	7.85	0.0027	< 0.0050
	5/19/2015	0.79	7.86	0.0020	< 0.0050
	5/25/2015	0.85	6.01	0.0024	< 0.0050
	6/1/2015	1.00	5.62	0.0027	< 0.0050
	6/8/2015	0.91	6.10	0.0026	< 0.0050
	6/15/2015	0.75	7.53	0.0022	< 0.0050
	6/22/2015	0.73	7.91	0.0044	< 0.0050
	6/29/2015	0.63	8.96	0.0037	0.0053
Average Sample Result		0.79200	8.1760	0.0032733	0.0050200
Exceedance Count		0	15	0	0
Maximum Sample Result		1.06	12.2	0.005	0.0053
Minimum Sample Result		0.51	5.62	0.002	0.005
Sample Count		15	15	15	15
Sample Range		0.55000	6.5800	0.0030000	0.00030000
Std Deviation		0.17591	1.9992	0.00085479	0.000077460
Std Error		0.045421	0.51620	0.00022071	0.000020000

LC_FRDSDC (E288272)

statistic	sample_date	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)
	4/7/2015	< 0.0010	8.85	8.41	< 0.0020	1.13	44.5	46.7
	4/13/2015	< 0.0010	8.67	8.35	< 0.0020	1.16	47.7	48.2
	4/20/2015	0.0019	8.01	8.33	0.0060	1.15	41.9	41.8
	4/27/2015	0.0025	8.27	8.41	0.0075	1.01	34.4	33.9
	4/28/2015	0.0023	8.28	8.43	0.0053	1.02	35.1	33.5
	5/4/2015	0.0025	8.35	8.44	0.0070	0.986	28.1	27.4
	5/5/2015	0.0036	8.15	8.39	0.0118	0.997	27.3	27.7
	5/11/2015	0.0023	8.01	8.35	0.0058	1.07	29.6	29.5
	5/19/2015	0.0013	8.37	8.41	0.0070	0.954	27.9	30.3
	5/25/2015	0.0021	8.30	8.33	0.0128	0.907	20.6	21.3
	6/1/2015	0.0022	8.40	8.30	0.0157	0.757	19	18.8
	6/8/2015	0.0020	8.4	8.45	0.0136	0.902	19.6	19.5
	6/15/2015	0.0019	7.95	8.26	0.0062	1.02	24.5	24.5
	6/22/2015	0.0017	8.18	8.34	0.0038	1.08	27.4	28.3
	6/29/2015	< 0.0010	8.24	8.43	0.0159	1.08	29.8	29.5
Average Sample Result		0.0019533	8.2953	8.3753	0.0081600	1.0149	30.493	30.727
Exceedance Count		0	0	0	0	0	0	15
Maximum Sample Result		0.0036	8.85	8.45	0.0159	1.16	47.7	48.2
Minimum Sample Result		0.001	7.95	8.26	0.002	0.757	19	18.8
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0026000	0.90000	0.19000	0.013900	0.40300	28.700	29.400
Std Deviation		0.00069986	0.23889	0.056804	0.0046400	0.10687	8.7705	8.9685
Std Error		0.00018070	0.061682	0.014667	0.0011980	0.027595	2.2645	2.3156

LC_FRDSDC (E288272)

statistic	sample_date	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)
	4/7/2015	< 0.010	< 0.010	2.05	0.141	0.145	198
	4/13/2015	< 0.010	< 0.010	2.15	0.141	0.145	194
	4/20/2015	< 0.010	< 0.010	1.92	0.130	0.129	174
	4/27/2015	< 0.010	< 0.010	1.57	0.115	0.114	139
	4/28/2015	< 0.010	< 0.010	1.60	0.117	0.115	140
	5/4/2015	< 0.010	< 0.010	1.45	0.105	0.110	116
	5/5/2015	< 0.010	< 0.010	1.50	0.102	0.104	117
	5/11/2015	< 0.010	< 0.010	1.51	0.105	0.109	119
	5/19/2015	< 0.010	< 0.010	1.40	0.109	0.105	113
	5/25/2015	< 0.010	< 0.010	1.20	0.102	0.109	86.1
	6/1/2015	< 0.010	< 0.010	1.15	0.0933	0.0924	76.4
	6/8/2015	< 0.010	< 0.010	1.16	0.0901	0.0908	79.4
	6/15/2015	< 0.010	< 0.010	1.38	0.0981	0.101	97.8
	6/22/2015	< 0.010	< 0.010	1.43	0.0993	0.107	107
	6/29/2015	< 0.010	< 0.010	1.51	0.113	0.116	120
Average Sample Result		0.010000	0.010000	1.5320	0.11072	0.11281	125.11
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.01	0.01	2.15	0.141	0.145	198
Minimum Sample Result		0.01	0.01	1.15	0.0901	0.0908	76.4
Sample Count		15	15	15	15	15	15
Sample Range		0.0000	0.0000	1.0000	0.050900	0.054200	121.60
Std Deviation		1.7600E-10	1.7600E-10	0.30012	0.015828	0.016037	38.060
Std Error		4.5444E-11	4.5444E-11	0.077492	0.0040867	0.0041408	9.8271

LC_FRDSDC (E288272)

statistic	sample_date	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)
	4/7/2015	1.7	< 0.010	< 0.010	< 0.00010	< 0.00010	11	11
	4/13/2015	2.1	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/20/2015	2.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/27/2015	3.0	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/28/2015	3.5	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/4/2015	4.0	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/5/2015	4.4	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/11/2015	4.0	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/19/2015	4.5	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/25/2015	5.3	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/1/2015	6.7	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/8/2015	6.7	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	
	6/15/2015	5.8	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/22/2015	8.2	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/29/2015	8.7	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
Average Sample Result		4.7467	0.010000	0.010000	0.00010000	0.00010000	10.067	10.071
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		8.7	0.01	0.01	0.0001	0.0001	11	11
Minimum Sample Result		1.7	0.01	0.01	0.0001	0.0001	10	10
Sample Count		15	15	15	15	15	15	14
Sample Range		7.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000
Std Deviation		2.1280	1.7600E-10	1.7600E-10	0.0000	0.0000	0.25820	0.26726
Std Error		0.54945	4.5444E-11	4.5444E-11	0.0000	0.0000	0.066667	0.071429

LC_FRDSDC (E288272)

statistic	sample_date	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)
	4/7/2015	542	< 0.050	0.68
	4/13/2015	531	< 0.050	0.74
	4/20/2015	463	< 0.050	1.05
	4/27/2015	420	< 0.050	1.20
	4/28/2015	420	< 0.050	1.28
	5/4/2015	361	< 0.050	1.63
	5/5/2015	359	< 0.050	1.50
	5/11/2015	380	< 0.050	1.20
	5/19/2015	365	< 0.050	1.37
	5/25/2015	311	< 0.10	1.37
	6/1/2015	284	0.209	1.53
	6/8/2015	282	0.193	1.04
	6/15/2015	365	0.186	1.78
	6/22/2015	348	0.156	0.79
	6/29/2015	410	0.206	1.03
Average Sample Result		389.40	0.10000	1.2127
Exceedance Count		0	0	0
Maximum Sample Result		542	0.209	1.78
Minimum Sample Result		282	0.05	0.68
Sample Count		15	15	15
Sample Range		260.00	0.15900	1.1000
Std Deviation		77.720	0.068033	0.32832
Std Error		20.067	0.017566	0.084771

LC_FRDSDC (E288272)

statistic	sample_date	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)
	4/7/2015	1.6	0.63	1.77	1.88	< 0.50	< 0.50
	4/13/2015	< 1.0	0.33	1.82	1.90	< 0.50	< 0.50
	4/20/2015	1.6	1.13	1.76	1.72	< 0.50	0.68
	4/27/2015	2.9	0.88	1.44	1.41	< 0.50	< 0.50
	4/28/2015	2.4	0.84	1.48	1.42	< 0.50	< 0.50
	5/4/2015	2.0	1.58	1.36	1.33	< 0.50	0.51
	5/5/2015	5.2	1.45	1.33	1.34	< 0.50	< 0.50
	5/11/2015	1.5	0.59	1.37	1.46	< 0.50	< 0.50
	5/19/2015	2.0	1.0	1.45	1.42	< 0.50	< 0.50
	5/25/2015	9.0	2.07	1.21	1.26	< 0.50	0.63
	6/1/2015	12.2	3.25	1.13	1.12	< 0.50	0.77
	6/8/2015	9.2	1.84	1.16	1.17	< 0.50	< 0.50
	6/15/2015	3.0	1.11	1.33	1.37	< 0.50	< 0.50
	6/22/2015	1.2	0.84	1.32	1.40	< 0.50	< 0.50
	6/29/2015	1.4	0.52	1.54	1.59	< 0.50	< 0.50
Average Sample Result		3.7467	1.2040	1.4313	1.4527	0.50000	0.53933
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		12.2	3.25	1.82	1.9	0.5	0.77
Minimum Sample Result		1	0.33	1.13	1.12	0.5	0.5
Sample Count		15	15	15	15	15	15
Sample Range		11.200	2.9200	0.69000	0.78000	0.0000	0.27000
Std Deviation		3.5244	0.75150	0.21441	0.23023	0.0000	0.084131
Std Error		0.90999	0.19404	0.055359	0.059446	0.0000	0.021723

LC_FRDSDC (E288272)

statistic	sample_date	ZINC (D)	ZINC (T)
	4/7/2015	< 3.0	< 3.0
	4/13/2015	< 3.0	< 3.0
	4/20/2015	< 3.0	< 3.0
	4/27/2015	< 3.0	< 3.0
	4/28/2015	< 3.0	< 3.0
	5/4/2015	< 3.0	< 3.0
	5/5/2015	< 3.0	< 3.0
	5/11/2015	< 3.0	< 3.0
	5/19/2015	< 3.0	< 3.0
	5/25/2015	< 3.0	< 3.0
	6/1/2015	< 3.0	< 3.0
	6/8/2015	< 3.0	< 3.0
	6/15/2015	< 3.0	< 3.0
	6/22/2015	< 3.0	< 3.0
	6/29/2015	< 3.0	< 3.0
Average Sample Result		3.0000	3.0000
Exceedance Count		0	0
Maximum Sample Result		3	3
Minimum Sample Result		3	3
Sample Count		15	15
Sample Range		0.0000	0.0000
Std Deviation		0.0000	0.0000
Std Error		0.0000	0.0000

LC_DC1 (E288270)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	4/7/2015	164	< 0.0030	0.0413	0.14	0.14	0.15
	4/13/2015	152	< 0.0030	0.0130	0.14	0.16	0.15
	4/20/2015	122	0.0090	0.0723	0.16	0.19	0.24
	4/27/2015	132	0.0051	0.0379	0.16	0.16	0.21
	4/28/2015	130	< 0.0030	0.0260	0.13	0.16	0.20
	5/4/2015	120	0.0066	0.0687	0.14	0.16	0.20
	5/5/2015	119	0.0060	0.0782	0.15	0.16	0.20
	5/11/2015	128	0.0034	0.0318	0.14	0.13	0.20
	5/19/2015	127	0.0039	0.0472	0.14	0.17	0.22
	5/25/2015	134	0.0077	0.112	0.14	0.17	0.20
	6/1/2015						
	6/1/2015	116	0.0303	0.258	0.14	0.23	0.21
	6/8/2015	95.4	0.0150	0.150	0.14	0.17	0.20
	6/15/2015	132	0.0061	0.0465	0.15	0.15	0.18
	6/22/2015	143	0.0034	0.0318	0.14	0.16	0.18
	6/29/2015	150	< 0.0030	0.0191	0.16	0.17	0.17
Average Sample Result		130.96	0.0072333	0.068920	0.14467	0.16533	0.19400
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		164	0.0303	0.258	0.16	0.23	0.24
Minimum Sample Result		95.4	0.003	0.013	0.13	0.13	0.15
Sample Count		15	15	15	15	15	15
Sample Range		68.600	0.027300	0.24500	0.030000	0.10000	0.090000
Std Deviation		16.713	0.0071498	0.063911	0.0091548	0.022636	0.024437
Std Error		4.3152	0.0018461	0.016502	0.0023637	0.0058445	0.0063095

LC_DC1 (E288270)

statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	4/7/2015	0.18	0.158	0.157	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/13/2015	0.17	0.149	0.146	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/20/2015	0.27	0.142	0.127	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/27/2015	0.26	0.144	0.133	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/28/2015	0.20	0.130	0.129	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/4/2015	0.25	0.126	0.126	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/5/2015	0.24	0.131	0.131	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/11/2015	0.21	0.132	0.131	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/19/2015	0.25	0.136	0.142	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/25/2015	0.27	0.136	0.140	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/1/2015								
	6/1/2015	0.37	0.144	0.152	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/8/2015	0.30	0.145	0.147	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	6/15/2015	0.24	0.155	0.148	< 0.10	< 0.10	< 0.000050	< 0.000050	0.010
	6/22/2015	0.20	0.153	0.154	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/29/2015	0.23	0.165	0.165	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
Average Sample Result		0.24267	0.14307	0.14187	0.10000	0.10000	0.000050000	0.000050000	0.010200
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0.37	0.165	0.165	0.1	0.1	5e-005	5e-005	0.012
Minimum Sample Result		0.17	0.126	0.126	0.1	0.1	5e-005	5e-005	0.01
Sample Count		15	15	15	15	15	15	15	15
Sample Range		0.20000	0.039000	0.039000	0.0000	0.0000	0.0000	0.0000	0.0020000
Std Deviation		0.050351	0.011392	0.012106	0.0000000014080	0.0000000014080	0.0000	0.0000	0.00056061
Std Error		0.013001	0.0029414	0.0031257	3.6355E-10	3.6355E-10	0.0000	0.0000	0.00014475

LC_DC1 (E288270)

statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	4/7/2015	0.010	< 0.050	0.0190	0.0374	42.8	1.71	1.1
	4/13/2015	0.010	< 0.050	0.0278	0.0330	36.1	1.87	< 1.0
	4/20/2015	< 0.010	< 0.050	0.0279	0.0553	34.9	1.92	1.2
	4/27/2015	< 0.010	< 0.050	0.0285	0.0389	33.7	2.03	1.3
	4/28/2015	< 0.010	< 0.050	0.0312	0.0417	32.3	2.12	1.0
	5/4/2015	< 0.010	< 0.050	0.0260	0.0461	30.3	2.06	1.1
	5/5/2015	< 0.010	< 0.050	0.0285	0.0462	29.9	1.89	< 1.0
	5/11/2015	< 0.010	< 0.050	0.0237	0.0393	32.2	1.83	< 1.0
	5/19/2015	< 0.010	< 0.050	0.0271	0.0457	33.2	2.06	< 1.0
	5/25/2015	0.010	< 0.050	0.0291	0.0669	32.0	2.14	< 1.0
	6/1/2015							
	6/1/2015	< 0.010	< 0.050	0.0282	0.123	32.3	2.31	1.2
	6/8/2015	0.012	< 0.050	0.0305	0.0769	32.6	1.95	< 1.0
	6/15/2015	< 0.010	< 0.050	0.0258	0.0432	33.9	1.75	< 1.0
	6/22/2015	0.012	< 0.050	0.0326	0.0466	36.0	1.67	< 1.0
	6/29/2015	< 0.010	< 0.050	0.0304	0.0441	37.8	1.50	< 1.0
Average Sample Result		0.010267	0.050000	0.027753	0.052287	34.000	1.9207	1.0600
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.012	0.05	0.0326	0.123	42.8	2.31	1.3
Minimum Sample Result		0.01	0.05	0.019	0.033	29.9	1.5	1
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0020000	0.0000	0.013600	0.090000	12.900	0.81000	0.30000
Std Deviation		0.00070373	7.0401E-10	0.0033106	0.022651	3.2439	0.20978	0.098561
Std Error		0.00018170	1.8178E-10	0.00085478	0.0058485	0.83757	0.054164	0.025448

LC_DC1 (E288270)

statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)
	4/7/2015	0.11	0.16	< 0.10	< 0.10	281.9	296
	4/13/2015	< 0.10	0.13	< 0.10	< 0.10	256.5	253
	4/20/2015	< 0.10	0.21	< 0.10	< 0.10	223.1	233
	4/27/2015	< 0.10	0.13	< 0.10	< 0.10	227.2	241
	4/28/2015	< 0.10	0.12	< 0.10	< 0.10	228.6	244
	5/4/2015	< 0.10	0.23	< 0.10	< 0.10	217.7	232
	5/5/2015	< 0.10	0.23	< 0.10	< 0.10	207.61	232
	5/11/2015	< 0.10	0.15	< 0.10	< 0.10	216.5	231
	5/19/2015	< 0.10	0.18	< 0.10	< 0.10	214.8	199
	5/25/2015	< 0.10	0.24	< 0.10	< 0.10	207.0	223
	6/1/2015						
	6/1/2015	< 0.10	0.55	< 0.10	0.17	223.7	218
	6/8/2015	0.13	0.38	< 0.10	< 0.10	235.1	222
	6/15/2015	< 0.10	0.19	< 0.10	< 0.10	255.7	231
	6/22/2015	0.12	0.18	< 0.10	< 0.10	204.5	278
	6/29/2015	< 0.10	0.13	< 0.10	< 0.10	259.8	301
Average Sample Result		0.10400	0.21400	0.10000	0.10467	230.65	242.27
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.13	0.55	0.1	0.17	281.9	301
Minimum Sample Result		0.1	0.12	0.1	0.1	204.5	199
Sample Count		15	15	15	15	15	15
Sample Range		0.030000	0.43000	0.0000	0.070000	77.400	102.00
Std Deviation		0.0091026	0.11388	0.0000000014080	0.018074	22.845	28.694
Std Error		0.0023503	0.029404	3.6355E-10	0.0046667	5.8985	7.4088

LC_DC1 (E288270)

statistic	sample_date	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)
	4/7/2015	< 0.50	< 0.50	12.93	0.120	168
	4/13/2015	< 0.50	< 0.50	12.16	0.123	149
	4/20/2015	< 0.50	0.87	12.75	0.108	134
	4/27/2015	< 0.50	< 0.50	11.75	0.104	129
	4/28/2015	< 0.50	< 0.50	11.71	0.104	130
	5/4/2015	< 0.50	< 0.50	10.51	0.105	119
	5/5/2015	< 0.50	< 0.50	10.33	0.102	119
	5/11/2015	< 0.50	< 0.50	12.24	0.109	131
	5/19/2015	< 0.50	< 0.50	12.83	0.109	127
	5/25/2015	< 0.50	0.55	10.96	0.103	123
	6/1/2015					
	6/1/2015	< 0.50	0.96	10.77	0.107	125
	6/8/2015	< 0.50	0.67	9.73	0.109	127
	6/15/2015	< 0.50	< 0.50	10.88	0.107	139
	6/22/2015	< 0.50	< 0.50	9.41	0.114	143
	6/29/2015	< 0.50	1.32	10.7	0.117	152
Average Sample Result		0.50000	0.62467	11.311	0.10940	134.33
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.5	1.32	12.93	0.123	168
Minimum Sample Result		0.5	0.5	9.41	0.102	119
Sample Count		15	15	15	15	15
Sample Range		0.0000	0.82000	3.5200	0.021000	49.000
Std Deviation		0.0000	0.24189	1.1221	0.0063449	13.652
Std Error		0.0000	0.062457	0.28972	0.0016382	3.5250

LC_DC1 (E288270)

statistic	sample_date	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)
	4/7/2015		< 0.010	0.038	< 0.050	< 0.050	0.0094	0.0096	15.2
	4/13/2015		< 0.010	0.019	< 0.050	< 0.050	0.0090	0.0088	13.9
	4/20/2015		< 0.010	0.090	< 0.050	0.076	0.0084	0.0076	11.0
	4/27/2015		< 0.010	0.041	< 0.050	< 0.050	0.0084	0.0082	11.2
	4/28/2015		< 0.010	0.036	< 0.050	< 0.050	0.0078	0.0079	11.0
	5/4/2015		< 0.010	0.073	< 0.050	0.076	0.0081	0.0078	10.3
	5/5/2015		< 0.010	0.073	< 0.050	0.067	0.0081	0.0081	10.5
	5/11/2015		< 0.010	0.037	< 0.050	< 0.050	0.0091	0.0086	11.1
	5/19/2015		< 0.010	0.040	< 0.050	< 0.050	0.0085	0.0090	11.4
	5/25/2015		< 0.010	0.107	< 0.050	0.120	0.0089	0.0089	10.9
	6/1/2015								
	6/1/2015		< 0.010	0.266	< 0.050	0.313	0.0088	0.0093	10.8
	6/8/2015		< 0.010	0.160	0.148	0.177	0.0093	0.0094	10.8
	6/15/2015		< 0.010	0.058	< 0.050	0.059	0.0103	0.0096	11.9
	6/22/2015		< 0.010	0.048	< 0.050	< 0.050	0.0107	0.0103	13.3
	6/29/2015		< 0.010	0.027	< 0.050	< 0.050	0.0096	0.0094	13.6
Average Sample Result		0	0.010000	0.074200	0.056533	0.085867	0.0089600	0.0088333	11.793
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0	0.01	0.266	0.148	0.313	0.0107	0.0103	15.2
Minimum Sample Result		0	0.01	0.019	0.05	0.05	0.0078	0.0076	10.3
Sample Count		0	15	15	15	15	15	15	15
Sample Range		0	0.0000	0.24700	0.098000	0.26300	0.0029000	0.0027000	4.9000
Std Deviation		0	1.7600E-10	0.064435	0.025303	0.072024	0.00081311	0.00078710	1.4762
Std Error		0	4.5444E-11	0.016637	0.0065333	0.018596	0.00020994	0.00020323	0.38116

LC_DC1 (E288270)

statistic	sample_date	MANGANESE (D)	MANGANESE (T)	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)
	4/7/2015	0.00065	0.00210	< 0.0050	< 0.0050	0.00108	0.00109	< 0.50
	4/13/2015	0.00057	0.00118	< 0.0050	< 0.0050	0.00111	0.00109	< 0.50
	4/20/2015	0.00056	0.00350	< 0.0050	< 0.0050	0.000963	0.000934	0.51
	4/27/2015	0.00050	0.00153	< 0.0050	< 0.0050	0.000944	0.000917	0.52
	4/28/2015	0.00019	0.00129	< 0.0050	< 0.0050	0.000907	0.000964	0.51
	5/4/2015	0.00030	0.00181	< 0.0050	< 0.0050	0.000945	0.000937	< 0.50
	5/5/2015	0.00040	0.00171	< 0.0050	< 0.0050	0.000934	0.000944	< 0.50
	5/11/2015	0.00041	0.00119	< 0.0050	< 0.0050	0.000963	0.000960	< 0.50
	5/19/2015	0.00029	0.00144	< 0.0050	< 0.0050	0.000974	0.00101	< 0.50
	5/25/2015	0.00050	0.00356	< 0.0050	< 0.0050	0.000966	0.000984	< 0.50
	6/1/2015							
	6/1/2015	0.00082	0.00633	< 0.0050	0.0056	0.000915	0.000946	0.51
	6/8/2015	0.00059	0.00383	< 0.0050	< 0.0050	0.000943	0.000959	< 0.50
	6/15/2015	0.00054	0.00193	< 0.0050	< 0.0050	0.00104	0.000970	< 0.50
	6/22/2015	0.00065	0.00187	< 0.0050	< 0.0050	0.000984	0.000994	< 0.50
	6/29/2015	0.00060	0.00167	< 0.0050	< 0.0050	0.00110	0.00108	< 0.50
Average Sample Result		0.00050467	0.0023293	0.0050000	0.0050400	0.00098453	0.00098527	0.50333
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.00082	0.00633	0.005	0.0056	0.00111	0.00109	0.52
Minimum Sample Result		0.00019	0.00118	0.005	0.005	0.000907	0.000917	0.5
Sample Count		15	15	15	15	15	15	15
Sample Range		0.00063000	0.0051500	0.0000	0.00060000	0.00020300	0.00017300	0.020000
Std Deviation		0.00016335	0.0014087	8.8002E-11	0.00015492	0.000065997	0.000057619	0.0061721
Std Error		0.000042177	0.00036373	2.2722E-11	0.000040000	0.000017040	0.000014877	0.0015936

LC_DC1 (E288270)

statistic	sample_date	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)
	4/7/2015	< 0.50	0.149	< 0.0010	< 0.0050
	4/13/2015	< 0.50	0.155	< 0.0010	< 0.0050
	4/20/2015	0.56	0.226	< 0.0010	< 0.0050
	4/27/2015	0.64	0.164	< 0.0010	< 0.0050
	4/28/2015	0.51	0.163	< 0.0010	< 0.0050
	5/4/2015	0.65	0.124	< 0.0010	< 0.0050
	5/5/2015	0.64	0.117	< 0.0010	< 0.0050
	5/11/2015	< 0.50	0.0768	< 0.0010	< 0.0050
	5/19/2015	0.56	0.0547	< 0.0010	< 0.0050
	5/25/2015	0.66	0.0811	< 0.0010	0.0076
	6/1/2015				
	6/1/2015	1.28	0.0983	< 0.0010	0.0057
	6/8/2015	0.93	0.108	< 0.0010	0.0052
	6/15/2015	0.56	0.0930	< 0.0010	0.0055
	6/22/2015	0.50	0.0598	< 0.0010	0.0057
	6/29/2015	0.52	0.0425	< 0.0010	0.0056
Average Sample Result		0.63400	0.11415	0.0010000	0.0053533
Exceedance Count		0	0	0	0
Maximum Sample Result		1.28	0.226	0.001	0.0076
Minimum Sample Result		0.5	0.0425	0.001	0.005
Sample Count		15	15	15	15
Sample Range		0.78000	0.18350	0.0000	0.0026000
Std Deviation		0.21088	0.050154	0.0000	0.00068229
Std Error		0.054448	0.012950	0.0000	0.00017617

LC_DC1 (E288270)

statistic	sample_date	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)
	4/7/2015	0.0107	8.81	8.44	0.0134	1.09	1.5	1.5
	4/13/2015	0.0106	8.76	8.38	0.0133	1.01	1.47	1.46
	4/20/2015	0.0189	7.97	8.33	0.0282	0.938	1.11	1.17
	4/27/2015	0.0185	8.41	8.38	0.0257	0.878	1.29	1.39
	4/28/2015	0.0173	8.31	8.36	0.0194	0.868	1.38	1.8
	5/4/2015	0.0183	8.49	8.37	0.0239	0.872	1.42	1.38
	5/5/2015	0.0182	8.27	8.37	0.0275	0.924	1.37	1.4
	5/11/2015	0.0149	8.22	8.39	0.0217	0.899	1.5	1.49
	5/19/2015	0.0126	8.52	8.27	0.0226	0.932	1.51	1.52
	5/25/2015	0.0162	8.36	8.31	0.0274	0.933	1.34	1.42
	6/1/2015							
	6/1/2015	0.0198	8.34	8.26	0.0448	0.905	1.44	1.54
	6/8/2015	0.0202	8.72	8.40	0.0588	0.990	1.36	1.49
	6/15/2015	0.0161	8.41	8.31	0.0232	0.955	1.38	1.4
	6/22/2015	0.0154	8.44	8.37	0.0163	1.07	1.47	1.46
	6/29/2015	0.0124	8.22	8.48	0.0180	1.11	1.46	1.45
Average Sample Result		0.016007	8.4167	8.3613	0.025613	0.95827	1.4000	1.4580
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.0202	8.81	8.48	0.0588	1.11	1.51	1.8
Minimum Sample Result		0.0106	7.97	8.26	0.0133	0.868	1.11	1.17
Sample Count		15	15	15	15	15	15	15
Sample Range		0.0096000	0.84000	0.22000	0.045500	0.24200	0.40000	0.63000
Std Deviation		0.0031842	0.22363	0.058781	0.011953	0.079215	0.10372	0.12907
Std Error		0.00082216	0.057741	0.015177	0.0030862	0.020453	0.026780	0.033327

LC_DC1 (E288270)

statistic	sample_date	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)
	4/7/2015	< 0.010	< 0.010	1.10	0.0474	0.0485	8.13
	4/13/2015	< 0.010	< 0.010	1.00	0.0462	0.0454	7.66
	4/20/2015	< 0.010	0.013	0.974	0.0396	0.0386	6.76
	4/27/2015	< 0.010	< 0.010	1.01	0.0385	0.0387	6.76
	4/28/2015	< 0.010	< 0.010	0.985	0.0368	0.0393	6.90
	5/4/2015	< 0.010	< 0.010	0.973	0.0383	0.0387	7.64
	5/5/2015	< 0.010	< 0.010	1.02	0.0389	0.0391	7.56
	5/11/2015	< 0.010	< 0.010	1.01	0.0401	0.0374	7.78
	5/19/2015	< 0.010	< 0.010	1.05	0.0401	0.0420	7.88
	5/25/2015	< 0.010	< 0.010	0.943	0.0402	0.0418	7.99
	6/1/2015						
	6/1/2015	< 0.010	0.019	0.991	0.0384	0.0404	7.14
	6/8/2015	< 0.010	< 0.010	1.04	0.0392	0.0402	7.01
	6/15/2015	< 0.010	< 0.010	1.04	0.0431	0.0417	7.08
	6/22/2015	< 0.010	< 0.010	1.08	0.0417	0.0426	7.35
	6/29/2015	< 0.010	< 0.010	1.23	0.0468	0.0472	7.26
Average Sample Result		0.010000	0.010800	1.0297	0.041020	0.041440	7.3933
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.01	0.019	1.23	0.0474	0.0485	8.13
Minimum Sample Result		0.01	0.01	0.943	0.0368	0.0374	6.76
Sample Count		15	15	15	15	15	15
Sample Range		0.0000	0.0090000	0.28700	0.010600	0.011100	1.3700
Std Deviation		1.7600E-10	0.0023964	0.069333	0.0033418	0.0033019	0.44875
Std Error		4.5444E-11	0.00061875	0.017902	0.00086284	0.00085255	0.11587

LC_DC1 (E288270)

statistic	sample_date	TEMPERATURE, FIELD (N)	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)
	4/7/2015	3.0	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/13/2015	1.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/20/2015	1.8	< 0.010	0.014	< 0.00010	< 0.00010	< 10	< 10
	4/27/2015	2.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/28/2015	2.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/4/2015	4.3	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/5/2015	4.8	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/11/2015	3.7	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/19/2015	5.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/25/2015	6.6	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/1/2015							
	6/1/2015	6.7	< 0.010	0.018	< 0.00010	< 0.00010	< 10	< 10
	6/8/2015	8.6	< 0.010	0.010	< 0.00010	< 0.00010	< 10	
	6/15/2015	6.1	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/22/2015	10.00	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/29/2015	8.1	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
Average Sample Result		5.0733	0.010000	0.010800	0.00010000	0.00010000	10.000	10.000
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		10	0.01	0.018	0.0001	0.0001	10	10
Minimum Sample Result		1.6	0.01	0.01	0.0001	0.0001	10	10
Sample Count		15	15	15	15	15	15	14
Sample Range		8.4000	0.0000	0.0080000	0.0000	0.0000	0.0000	0.0000
Std Deviation		2.5919	1.7600E-10	0.0022424	0.0000	0.0000	0.0000	0.0000
Std Error		0.66922	4.5444E-11	0.00057900	0.0000	0.0000	0.0000	0.0000

LC_DC1 (E288270)

statistic	sample_date	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)
	4/7/2015	165	0.094	1.46
	4/13/2015	165	0.066	1.41
	4/20/2015	128	0.157	2.10
	4/27/2015	143	0.081	1.98
	4/28/2015	145	0.092	2.40
	5/4/2015	139	0.137	2.49
	5/5/2015	135	0.146	2.18
	5/11/2015	128	0.137	1.90
	5/19/2015	134	0.126	2.22
	5/25/2015	130	0.167	2.30
	6/1/2015			
	6/1/2015	138	0.185	2.51
	6/8/2015	135	0.120	1.90
	6/15/2015	149	0.110	1.66
	6/22/2015	161	0.111	1.73
	6/29/2015	159	0.111	1.58
Average Sample Result		143.60	0.12267	1.9880
Exceedance Count		0	0	0
Maximum Sample Result		165	0.185	2.51
Minimum Sample Result		128	0.066	1.41
Sample Count		15	15	15
Sample Range		37.000	0.11900	1.1000
Std Deviation		13.233	0.032891	0.36487
Std Error		3.4168	0.0084924	0.094209

LC_DC1 (E288270)

statistic	sample_date	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)
	4/7/2015	1.9	1.28	0.369	0.372	< 0.50	0.79
	4/13/2015	1.3	0.57	0.350	0.338	< 0.50	0.57
	4/20/2015	6.6	2.52	0.281	0.282	0.87	1.41
	4/27/2015	3.2	1.17	0.250	0.254	0.80	1.10
	4/28/2015	1.8	1.07	0.241	0.263	0.73	0.90
	5/4/2015	2.5	4.51	0.242	0.248	0.76	1.19
	5/5/2015	3.6	3.59	0.244	0.253	0.81	1.23
	5/11/2015	1.2	1.56	0.247	0.223	0.74	0.88
	5/19/2015	2.0	2.78	0.256	0.256	0.76	1.03
	5/25/2015	6.5	5.21	0.226	0.238	0.76	1.43
	6/1/2015	13	35.9				
	6/1/2015	13.2	19.1	0.232	0.262	0.87	2.28
	6/8/2015	8.7	10.5	0.229	0.246	0.82	1.70
	6/15/2015	3.0	3.20	0.257	0.250	0.75	1.13
	6/22/2015	1.9	1.54	0.263	0.266	0.69	0.92
	6/29/2015	1.7	0.92	0.291	0.283	0.68	0.94
Average Sample Result		4.5063	5.9638	0.26520	0.26893	0.73600	1.1667
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		13.2	35.9	0.369	0.372	0.87	2.28
Minimum Sample Result		1.2	0.57	0.226	0.223	0.5	0.57
Sample Count		16	16	15	15	15	15
Sample Range		12.000	35.330	0.14300	0.14900	0.37000	1.7100
Std Deviation		3.9897	9.2723	0.042361	0.038625	0.11057	0.41790
Std Error		0.99743	2.3181	0.010938	0.0099730	0.028549	0.10790

LC_DC1 (E288270)

statistic	sample_date	ZINC (D)	ZINC (T)
	4/7/2015	< 3.0	< 3.0
	4/13/2015	< 3.0	< 3.0
	4/20/2015	< 3.0	< 3.0
	4/27/2015	< 3.0	< 3.0
	4/28/2015	< 3.0	< 3.0
	5/4/2015	< 3.0	< 3.0
	5/5/2015	< 3.0	< 3.0
	5/11/2015	< 3.0	< 3.0
	5/19/2015	< 3.0	< 3.0
	5/25/2015	< 3.0	3.1
	6/1/2015		
	6/1/2015	< 3.0	9.6
	6/8/2015	< 3.0	3.4
	6/15/2015	< 3.0	< 3.0
	6/22/2015	< 3.0	< 3.0
	6/29/2015	3.4	< 3.0
Average Sample Result		3.0267	3.4733
Exceedance Count		0	0
Maximum Sample Result		3.4	9.6
Minimum Sample Result		3	3
Sample Count		15	15
Sample Range		0.40000	6.6000
Std Deviation		0.10328	1.6981
Std Error		0.026667	0.43845

LC_DCDS (E295210)

statistic	sample_date	ALKALINITY, TOTAL (As CaCO3) (N)	ALUMINUM (D)	ALUMINUM (T)	ANTIMONY (D)	ANTIMONY (T)	ARSENIC (D)
	4/7/2015	108	0.0137	0.152	0.22	0.23	0.27
	4/13/2015	95.4	0.0141	0.0987	0.22	0.24	0.28
	4/20/2015	92.2	0.0248	0.102	0.19	0.21	0.28
	4/28/2015	74.9	0.0158	0.0679	0.17	0.21	0.26
	5/4/2015	108	0.0092	0.0604	0.13	0.14	0.22
	5/5/2015	92.0	0.0288	0.176	0.15	0.19	0.27
	5/11/2015	100	0.0132	0.0646	0.15	0.16	0.27
	5/19/2015	98.5	0.0133	0.111	0.16	0.17	0.26
	5/25/2015	75.6	0.0367	0.264	0.16	0.19	0.24
	6/1/2015	92.5	0.108	1.13	0.15	0.30	0.25
	6/8/2015	78.6	0.0590	0.454	0.16	0.25	0.30
	6/15/2015	107	0.0174	0.105	0.18	0.18	0.24
	6/22/2015	116	0.0058	0.0379	0.14	0.16	0.22
	6/29/2015	116	0.0083	0.0290	0.17	0.21	0.27
Average Sample Result		96.764	0.026293	0.20375	0.16786	0.20286	0.25929
Exceedance Count		0	1	0	0	0	0
Maximum Sample Result		116	0.108	1.13	0.22	0.3	0.3
Minimum Sample Result		74.9	0.0058	0.029	0.13	0.14	0.22
Sample Count		14	14	14	14	14	14
Sample Range		41.100	0.10220	1.1010	0.090000	0.16000	0.080000
Std Deviation		13.673	0.027365	0.28874	0.026941	0.042504	0.023027
Std Error		3.6542	0.0073137	0.077168	0.0072003	0.011360	0.0061541

LC_DCDS (E295210)

statistic	sample_date	ARSENIC (T)	BARIUM (D)	BARIUM (T)	BERYLLIUM (D)	BERYLLIUM (T)	BISMUTH (D)	BISMUTH (T)	BORON (D)
	4/7/2015	0.30	0.120	0.132	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/13/2015	0.31	0.118	0.116	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/20/2015	0.36	0.0901	0.0902	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	4/28/2015	0.30	0.0937	0.0911	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/4/2015	0.25	0.156	0.153	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/5/2015	0.36	0.0933	0.0961	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/11/2015	0.28	0.0990	0.0990	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/19/2015	0.30	0.102	0.103	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	5/25/2015	0.38	0.0971	0.0998	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/1/2015	0.68	0.102	0.130	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/8/2015	0.43	0.111	0.113	< 0.10	< 0.10	< 0.000050	< 0.000050	0.011
	6/15/2015	0.29	0.119	0.116	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
	6/22/2015	0.27	0.149	0.147	< 0.10	< 0.10	< 0.000050	< 0.000050	0.012
	6/29/2015	0.31	0.130	0.126	< 0.10	< 0.10	< 0.000050	< 0.000050	< 0.010
Average Sample Result		0.34429	0.11287	0.11516	0.10000	0.10000	0.000050000	0.000050000	0.010214
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0.68	0.156	0.153	0.1	0.1	5e-005	5e-005	0.012
Minimum Sample Result		0.25	0.0901	0.0902	0.1	0.1	5e-005	5e-005	0.01
Sample Count		14	14	14	14	14	14	14	14
Sample Range		0.43000	0.065900	0.062800	0.0000	0.0000	0.0000	0.0000	0.0020000
Std Deviation		0.10797	0.020613	0.020159	0.0000000014612	0.0000000014612	0.0000	0.0000	0.00057893
Std Error		0.028856	0.0055090	0.0053878	3.9052E-10	3.9052E-10	0.0000	0.0000	0.00015473

LC_DCDS (E295210)

statistic	sample_date	BORON (T)	BROMIDE (D)	CADMIUM (D)	CADMIUM (T)	CALCIUM (T)	CARBON, DISSOLVED ORGANIC (D)	CHLORIDE (D)
	4/7/2015	0.010	< 0.050	0.0385	0.0462	33.2	2.07	1.2
	4/13/2015	< 0.010	< 0.050	0.0315	0.0517	28.2	2.12	< 1.0
	4/20/2015	< 0.010	< 0.050	0.0416	0.0509	24.5	2.78	1.2
	4/28/2015	< 0.010	< 0.050	0.0444	0.0550	23.5	2.54	1.1
	5/4/2015	< 0.010	< 0.050	0.0220	0.0522	26.7	2.21	< 1.0
	5/5/2015	< 0.010	< 0.050	0.0385	0.0671	24.8	2.20	1.1
	5/11/2015	< 0.010	< 0.050	0.0319	0.0598	25.7	2.07	1.2
	5/19/2015	< 0.010	< 0.050	0.0369	0.0759	26.0	2.11	< 1.0
	5/25/2015	< 0.010	< 0.050	0.0339	0.0929	25.7	1.39	< 1.0
	6/1/2015	0.010	< 0.050	0.0314	0.273	25.7	2.92	2.2
	6/8/2015	0.012	< 0.050	0.121	0.137	25.8	2.15	1.0
	6/15/2015	< 0.010	< 0.050	0.0314	0.0653	28.0	1.91	1.1
	6/22/2015	0.012	< 0.050	0.0382	0.0510	29.8	1.75	< 1.0
	6/29/2015	< 0.010	< 0.050	0.0232	0.0483	30.1	1.83	< 1.0
Average Sample Result		0.010286	0.050000	0.040314	0.080450	26.979	2.1464	1.1500
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.012	0.05	0.121	0.273	33.2	2.92	2.2
Minimum Sample Result		0.01	0.05	0.022	0.0462	23.5	1.39	1
Sample Count		14	14	14	14	14	14	14
Sample Range		0.0020000	0.0000	0.099000	0.22680	9.7000	1.5300	1.2000
Std Deviation		0.00072627	7.3059E-10	0.024064	0.060449	2.6204	0.39814	0.31317
Std Error		0.00019410	1.9526E-10	0.0064314	0.016156	0.70033	0.10641	0.083699

LC_DCDS (E295210)

statistic	sample_date	CHROMIUM (D)	CHROMIUM (T)	COBALT (D)	COBALT (T)	CONDUCTIVITY, FIELD (N)	CONDUCTIVITY, LAB (N)
	4/7/2015	0.13	0.34	< 0.10	< 0.10	215.2	235
	4/13/2015	< 0.10	0.26	< 0.10	< 0.10	192.1	215
	4/20/2015	0.10	0.30	< 0.10	< 0.10	169.0	178
	4/28/2015	< 0.10	0.18	< 0.10	< 0.10	179.6	191
	5/4/2015	< 0.10	0.21	< 0.10	< 0.10	177.4	217
	5/5/2015	0.12	0.42	< 0.10	< 0.10	170.5	189
	5/11/2015	0.10	0.22	< 0.10	< 0.10	178.4	194
	5/19/2015	< 0.10	0.34	< 0.10	< 0.10	182.0	202
	5/25/2015	< 0.10	0.54	< 0.10	0.19	178.3	191
	6/1/2015	0.15	2.18	< 0.10	0.46	185.5	183
	6/8/2015	0.13	0.98	0.13	0.20	196.5	202
	6/15/2015	< 0.10	0.27	< 0.10	< 0.10	223.3	193
	6/22/2015	< 0.10	0.20	< 0.10	< 0.10	166.8	234
	6/29/2015	< 0.10	0.14	< 0.10	< 0.10	216.3	237
Average Sample Result		0.10929	0.47000	0.10214	0.13929	187.92	204.36
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.15	2.18	0.13	0.46	223.3	237
Minimum Sample Result		0.1	0.14	0.1	0.1	166.8	178
Sample Count		14	14	14	14	14	14
Sample Range		0.050000	2.0400	0.030000	0.36000	56.500	59.000
Std Deviation		0.016392	0.53597	0.0080178	0.098486	18.405	19.898
Std Error		0.0043808	0.14324	0.0021429	0.026321	4.9191	5.3180

LC_DCDS (E295210)

statistic	sample_date	COPPER (D)	COPPER (T)	DISSOLVED OXYGEN, FIELD (N)	FLUORIDE (D)	Hardness, Total or Dissolved CaCO3 (N)
	4/7/2015	< 0.50	< 0.50	13.38	0.102	122
	4/13/2015	< 0.50	< 0.50	11.83	0.101	112
	4/20/2015	< 0.50	0.64	12.27	0.092	93.2
	4/28/2015	< 0.50	< 0.50	11.85	0.089	91.9
	5/4/2015	< 0.50	< 0.50	10.10	0.099	108
	5/5/2015	< 0.50	0.59	10.25	0.093	95.6
	5/11/2015	< 0.50	< 0.50	11.92	0.097	101
	5/19/2015	< 0.50	0.51	10.84	0.094	103
	5/25/2015	< 0.50	0.96	10.08	0.095	101
	6/1/2015	< 0.50	2.27	10.44	0.099	97.7
	6/8/2015	0.68	1.23	8.83	0.101	100
	6/15/2015	< 0.50	0.52	10.46	0.097	112
	6/22/2015	< 0.50	< 0.50	9.40	0.102	119
	6/29/2015	< 0.50	< 0.50	9.34	0.102	119
Average Sample Result		0.51286	0.73000	10.785	0.097357	105.39
Exceedance Count		0	0	0	0	0
Maximum Sample Result		0.68	2.27	13.38	0.102	122
Minimum Sample Result		0.5	0.5	8.83	0.089	91.9
Sample Count		14	14	14	14	14
Sample Range		0.18000	1.7700	4.5500	0.013000	30.100
Std Deviation		0.048107	0.49342	1.2938	0.0042173	9.9978
Std Error		0.012857	0.13187	0.34579	0.0011271	2.6720

LC_DCDS (E295210)

statistic	sample_date	INSTANTANEOUS FLOW (N)	IRON (D)	IRON (T)	LEAD (D)	LEAD (T)	LITHIUM (D)	LITHIUM (T)	MAGNESIUM (T)
	4/7/2015		< 0.010	0.066	< 0.050	0.054	0.0079	0.0094	11.1
	4/13/2015		< 0.010	0.051	< 0.050	< 0.050	0.0080	0.0079	10.2
	4/20/2015		0.011	0.099	< 0.050	0.092	0.0049	0.0048	8.01
	4/28/2015		< 0.010	0.051	< 0.050	0.053	0.0055	0.0053	7.94
	5/4/2015		< 0.010	0.058	< 0.050	0.068	0.0121	0.0113	9.61
	5/5/2015		0.014	0.144	< 0.050	0.126	0.0051	0.0051	8.42
	5/11/2015		< 0.010	0.067	< 0.050	0.073	0.0064	0.0062	8.64
	5/19/2015		< 0.010	0.095	< 0.050	0.133	0.0061	0.0060	8.90
	5/25/2015		0.010	0.262	< 0.050	0.310	0.0061	0.0061	8.66
	6/1/2015	0.559	0.040	0.914	< 0.050	0.912	0.0064	0.0070	8.74
	6/8/2015		0.040	0.394	0.197	0.409	0.0069	0.0067	8.72
	6/15/2015		< 0.010	0.104	< 0.050	0.113	0.0083	0.0079	9.51
	6/22/2015		< 0.010	0.041	< 0.050	0.068	0.0118	0.0117	10.7
	6/29/2015		< 0.010	0.021	< 0.050	< 0.050	0.0081	0.0077	10.2
Average Sample Result		0.55900	0.014643	0.16907	0.060500	0.17936	0.0074000	0.0073643	9.2393
Exceedance Count		0	0	0	0	0	0	0	0
Maximum Sample Result		0.559	0.04	0.914	0.197	0.912	0.0121	0.0117	11.1
Minimum Sample Result		0.559	0.01	0.021	0.05	0.05	0.0049	0.0048	7.94
Sample Count		1	14	14	14	14	14	14	14
Sample Range		0.0000	0.030000	0.89300	0.14700	0.86200	0.0072000	0.0069000	3.1600
Std Deviation		0	0.010796	0.23680	0.039287	0.23613	0.0022212	0.0021568	0.99429
Std Error		0	0.0028854	0.063289	0.010500	0.063109	0.00059365	0.00057642	0.26573

LC_DCDS (E295210)

statistic	sample_date	MANGANESE (D)	MANGANESE (T)	MERCURY (D)	MERCURY (T)	MOLYBDENUM (D)	MOLYBDENUM (T)	NICKEL (D)
	4/7/2015	0.00052	0.00111	< 0.0050	< 0.0050	0.000940	0.00103	0.82
	4/13/2015	0.00047	0.00101	< 0.0050	< 0.0050	0.000986	0.00101	0.60
	4/20/2015	0.00055	0.00205	< 0.0050	< 0.0050	0.000786	0.000791	0.76
	4/28/2015	0.00056	0.00118	< 0.0050	< 0.0050	0.000777	0.000793	0.73
	5/4/2015	0.00029	0.00107	< 0.0050	< 0.0050	0.000943	0.000909	0.50
	5/5/2015	0.00080	0.00250	< 0.0050	< 0.0050	0.000784	0.000826	0.64
	5/11/2015	0.00054	0.00136	< 0.0050	< 0.0050	0.000864	0.000883	0.59
	5/19/2015	0.00049	0.00215	< 0.0050	< 0.0050	0.000867	0.000810	0.56
	5/25/2015	0.00211	0.00800	< 0.0050	0.0056	0.000870	0.000929	0.52
	6/1/2015	0.00301	0.0153	< 0.0050	0.0117	0.000857	0.000953	0.58
	6/8/2015	0.00530	0.00666	< 0.0050	< 0.0050	0.000754	0.000923	0.95
	6/15/2015	0.00078	0.00238	< 0.0050	< 0.0050	0.000929	0.000912	0.60
	6/22/2015	0.00036	0.00120	< 0.0050	< 0.0050	0.000890	0.000929	0.56
	6/29/2015	0.00025	0.00107	< 0.0050	< 0.0050	0.00106	0.00102	0.65
Average Sample Result		0.0011450	0.0033600	0.0050000	0.0055214	0.00087907	0.00090843	0.64714
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.0053	0.0153	0.005	0.0117	0.00106	0.00103	0.95
Minimum Sample Result		0.00025	0.00101	0.005	0.005	0.000754	0.000791	0.5
Sample Count		14	14	14	14	14	14	14
Sample Range		0.0050500	0.014290	0.0000	0.0067000	0.00030600	0.00023900	0.45000
Std Deviation		0.0014254	0.0040606	1.1185E-10	0.0017855	0.000087392	0.000080787	0.12603
Std Error		0.00038094	0.0010853	2.9893E-11	0.00047719	0.000023356	0.000021591	0.033683

LC_DCDS (E295210)

statistic	sample_date	NICKEL (T)	NITRATE NITROGEN (NO3), AS N (N)	NITRITE NITROGEN (NO2), AS N (N)	NITROGEN, AMMONIA (AS N) (N)
	4/7/2015	0.75	0.325	< 0.0010	< 0.0050
	4/13/2015	0.69	0.319	< 0.0010	< 0.0050
	4/20/2015	0.87	0.348	< 0.0010	< 0.0050
	4/28/2015	0.82	0.267	< 0.0010	< 0.0050
	5/4/2015	0.70	0.148	< 0.0010	< 0.0050
	5/5/2015	1.02	0.236	< 0.0010	< 0.0050
	5/11/2015	0.67	0.206	< 0.0010	< 0.0050
	5/19/2015	0.88	0.177	< 0.0010	< 0.0050
	5/25/2015	1.23	0.162	< 0.0010	< 0.0050
	6/1/2015	2.97	0.162	< 0.0010	< 0.0050
	6/8/2015	1.59	0.177	< 0.0010	< 0.0050
	6/15/2015	0.88	0.173	< 0.0010	< 0.0050
	6/22/2015	0.67	0.125	< 0.0010	< 0.0050
	6/29/2015	0.70	0.0995	0.0015	< 0.0050
Average Sample Result		1.0314	0.20889	0.0010357	0.0050000
Exceedance Count		0	0	0	0
Maximum Sample Result		2.97	0.348	0.0015	0.005
Minimum Sample Result		0.67	0.0995	0.001	0.005
Sample Count		14	14	14	14
Sample Range		2.3000	0.24850	0.00050000	0.0000
Std Deviation		0.61413	0.078205	0.00013363	1.1185E-10
Std Error		0.16413	0.020901	0.000035714	2.9893E-11

LC_DCDS (E295210)

statistic	sample_date	ORTHO-PHOSPHATE (N)	pH, Field (N)	pH, LAB (N)	PHOSPHORUS (N)	POTASSIUM (T)	SELENIUM (D)	SELENIUM (T)
	4/7/2015	0.0283	8.76	8.31	0.0326	1.04	1.18	1.29
	4/13/2015	0.0329	8.36	8.16	0.0382	0.965	1.15	1.18
	4/20/2015	0.0351	7.93	8.25	0.0406	0.890	0.892	0.969
	4/28/2015	0.0293	8.34	8.30	0.0294	0.772	1.16	1.24
	5/4/2015	0.0179	8.27	8.34	0.0231	0.777	1.36	1.41
	5/5/2015	0.0314	8.19	8.27	0.0479	0.871	1.3	1.35
	5/11/2015	0.0293	8.16	8.29	0.0366	0.818	1.36	1.37
	5/19/2015	0.0266	8.44	8.31	0.0387	0.825	1.45	1.5
	5/25/2015	0.0224	9.36	8.25	0.0497	0.905	1.4	1.45
	6/1/2015	0.0271	8.51	8.18	0.0911	1.08	1.3	1.5
	6/8/2015	0.0279	9.05	8.32	0.0725	0.999	1.25	1.4
	6/15/2015	0.0277	8.36	8.23	0.0384	0.901	1.39	1.32
	6/22/2015	0.0246	8.17	8.35	0.0240	0.931	1.38	1.49
	6/29/2015	0.0187	8.32	8.27	0.0290	0.949	1.43	1.5
Average Sample Result		0.027086	8.4443	8.2736	0.042271	0.90879	1.2859	1.3549
Exceedance Count		0	2	0	0	0	0	0
Maximum Sample Result		0.0351	9.36	8.35	0.0911	1.08	1.45	1.5
Minimum Sample Result		0.0179	7.93	8.16	0.0231	0.772	0.892	0.969
Sample Count		14	14	14	14	14	14	14
Sample Range		0.017200	1.4300	0.19000	0.068000	0.30800	0.55800	0.53100
Std Deviation		0.0048993	0.37882	0.055968	0.018813	0.093289	0.15032	0.15036
Std Error		0.0013094	0.10124	0.014958	0.0050279	0.024932	0.040176	0.040186

LC_DCDS (E295210)

statistic	sample_date	SILVER (D)	SILVER (T)	SODIUM (T)	STRONTIUM (D)	STRONTIUM (T)	SULFATE (AS SO4) (D)	TEMPERATURE, FIELD (N)
	4/7/2015	< 0.010	< 0.010	1.18	0.0376	0.0405	7.59	1.5
	4/13/2015	< 0.010	< 0.010	0.956	0.0372	0.0405	6.78	1.9
	4/20/2015	< 0.010	< 0.010	0.582	0.0302	0.0306	6.25	2.3
	4/28/2015	< 0.010	< 0.010	0.566	0.0310	0.0310	7.09	3.2
	5/4/2015	< 0.010	< 0.010	1.51	0.0390	0.0388	6.94	4.0
	5/5/2015	< 0.010	< 0.010	0.584	0.0321	0.0330	8.65	4.8
	5/11/2015	< 0.010	< 0.010	0.640	0.0347	0.0346	8.94	4.2
	5/19/2015	< 0.010	< 0.010	0.625	0.0353	0.0347	9.33	5.9
	5/25/2015	< 0.010	0.017	0.530	0.0362	0.0371	9.37	6.5
	6/1/2015	< 0.010	0.044	0.552	0.0344	0.0395	7.97	7.1
	6/8/2015	< 0.010	0.020	0.672	0.0348	0.0362	7.73	11.6
	6/15/2015	< 0.010	< 0.010	0.785	0.0372	0.0370	7.77	6.5
	6/22/2015	< 0.010	< 0.010	1.27	0.0369	0.0389	7.85	10.1
	6/29/2015	< 0.010	< 0.010	0.821	0.0409	0.0406	8.56	12.4
Average Sample Result		0.010000	0.013643	0.80521	0.035536	0.036643	7.9157	5.8571
Exceedance Count		0	0	0	0	0	0	0
Maximum Sample Result		0.01	0.044	1.51	0.0409	0.0406	9.37	12.4
Minimum Sample Result		0.01	0.01	0.53	0.0302	0.0306	6.25	1.5
Sample Count		14	14	14	14	14	14	14
Sample Range		0.0000	0.034000	0.98000	0.010700	0.010000	3.1200	10.900
Std Deviation		2.2370E-10	0.0092787	0.31008	0.0029912	0.0034355	0.96021	3.4844
Std Error		5.9785E-11	0.0024798	0.082873	0.00079942	0.00091818	0.25663	0.93125

LC_DCDS (E295210)

statistic	sample_date	THALLIUM (D)	THALLIUM (T)	TIN (D)	TIN (T)	TITANIUM (D)	TITANIUM (T)
	4/7/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/13/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	4/20/2015	< 0.010	0.011	< 0.00010	< 0.00010	< 10	< 10
	4/28/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/4/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/5/2015	< 0.010	0.012	< 0.00010	< 0.00010	< 10	< 10
	5/11/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	5/19/2015	< 0.010	0.010	< 0.00010	< 0.00010	< 10	< 10
	5/25/2015	< 0.010	0.022	< 0.00010	< 0.00010	< 10	13
	6/1/2015	< 0.010	0.051	< 0.00010	< 0.00010	< 10	39
	6/8/2015	< 0.010	0.024	< 0.00010	< 0.00010	< 10	
	6/15/2015	< 0.010	0.010	< 0.00010	< 0.00010	< 10	< 10
	6/22/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
	6/29/2015	< 0.010	< 0.010	< 0.00010	< 0.00010	< 10	< 10
Average Sample Result		0.010000	0.015000	0.00010000	0.00010000	10.000	12.462
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		0.01	0.051	0.0001	0.0001	10	39
Minimum Sample Result		0.01	0.01	0.0001	0.0001	10	10
Sample Count		14	14	14	14	14	13
Sample Range		0.0000	0.041000	0.0000	0.0000	0.0000	29.000
Std Deviation		2.2370E-10	0.011354	0.0000	0.0000	0.0000	8.0168
Std Error		5.9785E-11	0.0030346	0.0000	0.0000	0.0000	2.2235

LC_DCDS (E295210)

statistic	sample_date	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	TOTAL KJELDAHL NITROGEN (N)	TOTAL ORGANIC CARBON (T)
	4/7/2015	129	0.156	1.85
	4/13/2015	123	0.079	2.01
	4/20/2015	101	0.125	2.53
	4/28/2015	110	0.076	2.57
	5/4/2015	127	0.084	2.51
	5/5/2015	114	0.136	2.94
	5/11/2015	112	0.156	2.50
	5/19/2015	121	0.151	2.77
	5/25/2015	116	0.206	4.02
	6/1/2015	121	0.267	5.92
	6/8/2015	114	0.202	2.52
	6/15/2015	132	0.141	2.61
	6/22/2015	131	0.087	1.82
	6/29/2015	131	0.149	1.79
Average Sample Result		120.14	0.14393	2.7400
Exceedance Count		0	0	0
Maximum Sample Result		132	0.267	5.92
Minimum Sample Result		101	0.076	1.79
Sample Count		14	14	14
Sample Range		31.000	0.19100	4.1300
Std Deviation		9.3632	0.054653	1.0783
Std Error		2.5024	0.014607	0.28818

LC_DCDS (E295210)

statistic	sample_date	TOTAL SUSPENDED SOLIDS, LAB (N)	TURBIDITY, LAB (N)	URANIUM (D)	URANIUM (T)	VANADIUM (D)	VANADIUM (T)
	4/7/2015	< 1.0	3.40	0.303	0.330	1.28	1.99
	4/13/2015	< 1.0	3.49	0.299	0.294	1.26	1.73
	4/20/2015	2.4	4.02	0.184	0.191	1.46	2.23
	4/28/2015	1.9	2.87	0.162	0.165	1.32	1.55
	5/4/2015	1.0	4.94	0.253	0.251	0.72	1.11
	5/5/2015	3.9	10.7	0.178	0.196	1.28	2.07
	5/11/2015	1.1	4.36	0.183	0.188	1.18	1.53
	5/19/2015	2.3	7.63	0.200	0.198	1.17	1.74
	5/25/2015	7.5	12.9	0.189	0.210	1.15	2.49
	6/1/2015	25.3	58.1	0.207	0.296	1.51	6.71
	6/8/2015	14.1	27.3	0.191	0.231	1.49	3.44
	6/15/2015	3.5	8.78	0.201	0.205	1.27	1.89
	6/22/2015	< 1.0	3.17	0.220	0.228	1.03	1.29
	6/29/2015	1.1	1.54	0.239	0.228	1.40	1.58
Average Sample Result		4.7929	10.943	0.21493	0.22936	1.2514	2.2393
Exceedance Count		0	0	0	0	0	0
Maximum Sample Result		25.3	58.1	0.303	0.33	1.51	6.71
Minimum Sample Result		1	1.54	0.162	0.165	0.72	1.11
Sample Count		14	14	14	14	14	14
Sample Range		24.300	56.560	0.14100	0.16500	0.79000	5.6000
Std Deviation		6.9176	15.101	0.043629	0.047726	0.20561	1.4088
Std Error		1.8488	4.0360	0.011660	0.012755	0.054951	0.37653

LC_DCDS (E295210)

statistic	sample_date	ZINC (D)	ZINC (T)
	4/7/2015	< 3.0	< 3.0
	4/13/2015	< 3.0	< 3.0
	4/20/2015	< 3.0	< 3.0
	4/28/2015	< 3.0	< 3.0
	5/4/2015	< 3.0	< 3.0
	5/5/2015	< 3.0	3.4
	5/11/2015	< 3.0	< 3.0
	5/19/2015	< 3.0	< 3.0
	5/25/2015	< 3.0	5.0
	6/1/2015	< 3.0	11.3
	6/8/2015	3.3	5.5
	6/15/2015	< 3.0	< 3.0
	6/22/2015	< 3.0	< 3.0
	6/29/2015	< 3.0	< 3.0
Average Sample Result		3.0214	3.9429
Exceedance Count		0	0
Maximum Sample Result		3.3	11.3
Minimum Sample Result		3	3
Sample Count		14	14
Sample Range		0.30000	8.3000
Std Deviation		0.080178	2.2677
Std Error		0.021429	0.60608

APPENDIX F – Chain-of-Custody Forms

Nautilus

Chain Of Custody Record

COC ID: February_2015_Monthly_West | Page: 1 of 1

Turnaround Time: | Rush:

PROJECT/CLIENT INFO		LABORATORY		OTHER INFO	
Facility Name	~~Greenhills Operation~~ Line Creek	Lab Name	Nautilus Environmental	Send Invoice To	
Project Number		Contact Name	Kryst pearcy	Address	
Contact Name	~~Zahin Jina~~	Address	Burnaby BC		
Address	P.O. BOX ~~3007~~ 2003			City	State
City	~~Elkford~~ Sparwood State ~~BC~~	City	Burnaby State BC	Postal Code	Country
Postal Code	V0C 2G0 ~~V0B 1M0~~ Country Canada	Postal Code	Country Canada	Task Code	
Phone Number	~~250-865-3516~~ 250-425-6111	Phone Number	604-420-8773	Shipping Company	
Email EDD To	~~Zahin.Jina@teck.com~~	Email Address	krystal@nautilusenvironmental.com	Tracking Number	
Email Report To	~~Zahin.Jina@teck.com~~ jenny.hutchinson@teck.com	Quote Number		CC Hardcopy To	
				CC Hardcopy To	

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 day early life stage RT pass fail	7day RT development dilution series								
~~GH_ERI_WS_2015-04-28_N~~	~~WS~~	~~2015/04/28~~		~~G~~	~~6~~		X	X								
LC_DCI_WS_2015-04-28_N	WS		0949	C	3			X								3x20L 3x20L reed Ku
LC_DCDS_WS_2015-01-28_N			0910		3			X								3x20L 3x20L reed Ku
LC_FRDSDC_WS_2015-01-28_N			0919		3			X								3x20L 3x20L reed Ku
LC_LC3_2015-01-28_N			1506		3			X								3x20L 3x20L reed C
LC_LC5_2015-01-28_N			1024		3			X								3x20L 3x20L reed Ku
LC_LCDSSLCC_WS_2015-28_N			1027		8		X	X								8x20L 8x20L reed Ku
																Max capacity 40L extra
							#3305363	#3305365								

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
* Contact V. Mercer for EMS number comparison. to close sample IDs *	V. Mercer	Apr 28/15	1800	Krysta Pearcy Nautilus Environmental	Apr 29/15	0700	8.0	(Y) / N	(Y) / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

Sampler's Name	Tyler Phillips	Mobile #	1 250 919 0965	Temp in °C	Samples on ice? / Sample intact? / Trip Blank?
Sampler's Signature		Date/Time	Apr 28, 15		

Chain Of Custody Record

COC ID:

Turnaround Time:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Line Creek Operations			Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Jay Jones			Contact Name	Krysta			Address			
Address	Box 2003			Address	8664 commerce Court						
City	Sparwood	Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada	City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425-6111			Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	jay.jones@teck.com			Phone Number				Shipping Company			
				Email Address				Tracking Number			
				PO Number				CC Hardcopy To			
								CC Hardcopy To			

SAMPLE DETAILS / **ANALYSIS REQUESTED** / **ADDITIONAL INFORMATION**

Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS PRESERV	96 hr ~~Rainbow trout~~ NY Pass/Fail 30d EA test P/F (15364 ①)	48 hr Daphnia Pass/Fail	7 d C. dubia (15376)	72 h P. subcapitata (15377)	30 d fathead minnow	28 d H. Azteca	7 d. minor plant growth (dilution series) (15378)			Temp	ADDITIONAL INFORMATION
LC_DC1_WS_2015-05-05_N	WS	May 5, 2015	11:41	G	1				✓	✓			✓			6.3	
LC_LC5_WS_2015-05-06_N	WS	"	14:02	G	1				✓	✓			✓			6.8	
LC_DCDS_WS_2015-05-05_N	WS	"	11:14	G	1				✓	✓			✓			7.8	
LC_FRDSDC_WS_2015-05-05_N	WS	"	13:32	G	1				✓	✓			✓			6.0	
LC_LCDSSLCC_WS_2015-05-06_N	WS	"	14:34	G	4		✓		✓	✓			✓			7.0	
LC_LC3_WS_2015-05-06_N	WS	"	14:49	G	1				✓	✓			✓			6.8	

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	T. Phillips/Nupqu							Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
	Sampler's Name	Tyler Phillips		Mobile #	250-919-0965		Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
	Sampler's Signature	[signature]		Date/Time						

4x20L

Received - NY - Nair Yamamoto - Nautilus

Nautilus Environmental

Toxicity testing on Line Creek Operations samples with *Ceriodaphnia dubia*, *Oncorhynchus mykiss*, *Lemna minor* and *Pseudokirchneriella subcapitata*

4th Quarter, 2015

Final Report

Report date: March 31, 2016

Submitted to:

Teck Coal Ltd.
Sparwood, BC

8664 Commerce Court
Burnaby, BC
V5A 4N7

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SIGNATURE PAGE



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This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on samples collected from the Line Creek Operations as part of a toxicity testing program required under BC Ministry of Environment permit number 106970, Section 5.2. Test types included survival and reproduction of a cladoceran (*Ceriodaphnia dubia*), embryo development of rainbow trout (*Oncorhynchus mykiss*), population growth of a unicellular green alga (*Pseudokirchneriella subcapitata*) and growth of a freshwater plant (*Lemna minor*). Table 1 outlines the toxicity tests that were conducted on each sample and Figure 1 shows the locations of sample sites. Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 2.5 to 4.5°C and were stored in the dark at 4 ± 2°C prior to testing.

Table 1. Summary of toxicity testing program.

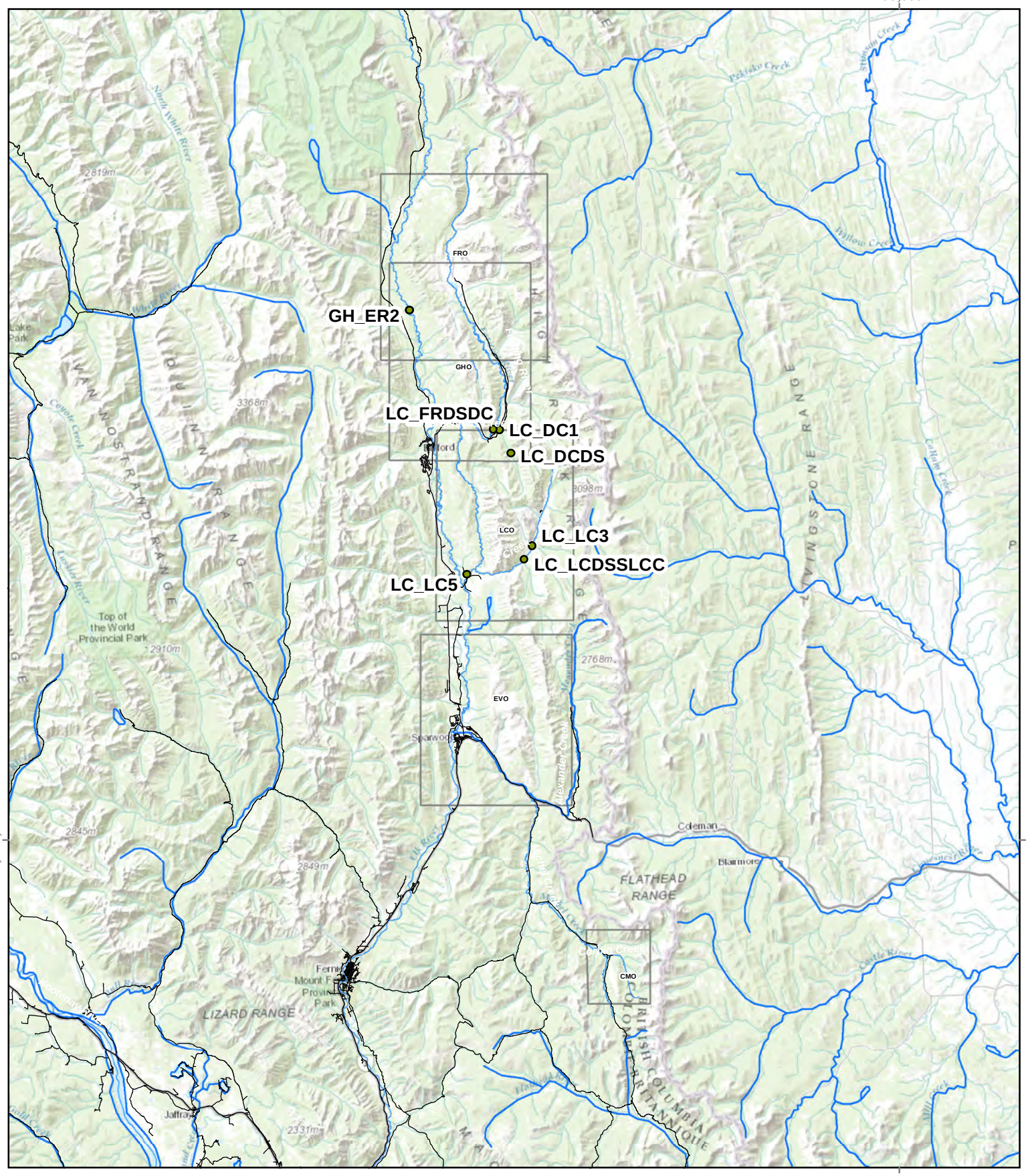
Sample ID	EMS #	Location Description	Species Tested	Sample Collection Date
GH_ER2*	200389	Elk River upstream of Greenhill Operations	*C. dubia*, *O. mykiss*, and *P. subcapitata*	October 26, 2015
LC_LCDSSLCC	297110	Line Creek downstream of South Line Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 26, 2015
LC_DC1	E288270	Dry Creek near mouth	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 26, 2015
LC_FRDSDC	E288272	Fording River downstream of Dry Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 26, 2015
LC_DCDS	E295210	Dry Creek downstream of sedimentation ponds	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 26, 2015
LC_LC5	200028	Lower Fording River (downstream of Line Creek)	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 26, 2015

*Reference site. Conducted as a single concentration toxicity test.

The Line Creek Operations samples were tested using serial dilutions of the sample with laboratory control water. Sample GH_ER2 was tested using only a single (100%) concentration with no dilution. GH_ER2 is an upstream reference location that is not required as part of the Line Creek Operations testing program, but the data for this sample were included here as a basis for comparison to Line Creek Operations mine-influenced samples.

This report describes the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. Results of analytical chemistry that was performed on the samples tested in this program have been uploaded to the

were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix F.



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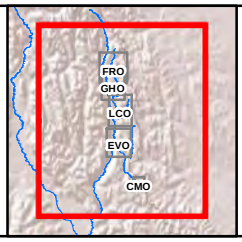

Line Creek Chronic Toxicity Monitoring Locations

- Roads
- Rivers
- Monitoring Locations

N

0 2.5 5 10 15 Kilometers

DATE:	MINE OPERATION:
8/28/2015	Elk Valley
SCALE:	COORDINATE SYSTEM:
1:550,000	NAD 1983 UTM Zone 11N

Document Path: \\teckcominco\CGO\Groups\TCGIS\Data\Operations\SPO\Dan_Vasiga\BaseLandscape_letter_v2.mxd

2.0 METHODS

Methods for the toxicity tests are summarized in Tables 2 through 5. Testing was conducted according to procedures described by Environment Canada protocols (1998, 2007a, 2007b and 2007c). Statistical analyses for the tests were performed using CETIS (Tidepool Scientific Software, 2013).

Table 2. Summary of test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test organism	*Ceriodaphnia dubia*
Test organism source	In-house culture
Test organism age	<24 h old neonates produced within 12 h
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20 mL test tube
Test volume	15 mL
Test replicates	10
Number of organisms	1 per replicate
Control water	20% Perrier water
Test solution renewal	Daily
Test temperature	25 ± 1°C
Feeding	*Pseudokirchneriella subcapitata* and YCT
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light/8 hours dark
Aeration	None
Test protocol	Environment Canada (2007a)
Statistical software	CETIS
Test endpoint	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods
Reference toxicant	Sodium chloride

Table 3. Summary of test conditions: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Test organism	*Oncorhynchus mykiss*
Test organism source	Vancouver Island Trout Hatchery, Duncan, BC
Test organism age	<30 min post fertilization, <24 h old gametes
Test type	Static renewal
Test duration	7 days
Test vessel	2 L plastic containers
Test volume	2 L
Test replicates	4
Number of organisms	30 eggs per replicate
Control water	Dechlorinated tapwater (hardness ~12 mg/L $CaCO_3$)
Test solution renewal	Daily
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark
Aeration	6.5 ± 1 mL/min/L
Test protocol	Environment Canada (1998); Canaria et al. (1999)
Statistical software	CETIS
Test endpoint	Embryo viability
Test acceptability criteria for controls	Embryo viability ≥70%
Reference toxicant	Sodium dodecyl sulphate

Table 4. Summary of test conditions: *Lemna minor* growth inhibition test.

Test organism	*Lemna minor*, strain CPCC# 490
Test organism source	In-house culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Wainfleet, Stinking Barn, Niagara Peninsula, Ontario, Canada
Test organism age	7-to 10-day old
Test type	Static
Test duration	7 days
Test vessel	250 mL glass containers
Test volume	100 mL
Test replicates	4
Number of organisms	Two 3-frond plants per replicate
Control water	Deionized water with added nutrients
Test solution renewal	None
Test temperature	25 ± 2°C
Feeding	None
Light intensity	4000 to 5600 lux full spectrum light
Photoperiod	24 hours light
Aeration	None
Test protocol	Environment Canada (2007b)
Statistical software	CETIS
Test endpoint	Number of fronds and dry weight
Test acceptability criteria for controls	≥ 8-fold increase in number of fronds
Reference toxicant	Potassium chloride

Table 5. Summary of test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test organism	*Pseudokirchneriella subcapitata*, strain UTCC #37
Test organism source	In-house culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Nitelva River, Norway.
Test organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test replicates	4 for samples; 8 for control
Number of organisms	10, 000 cells/mL
Control water	Deionized water with added nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Sample filtration	Through a preconditioned membrane filter of 0.45 µm using a vacuum pump
Aeration	None
pH adjustment	None
Test protocol	Environment Canada (2007c)
Statistical software	CETIS
Test endpoint	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc

3.0 RESULTS

The results of the toxicity tests and associated statistical analyses are provided in Appendices A through D, with the exception of data for sample GH_ER2 for *C. dubia* and *P. subcapitata*, which are reproduced here, but the raw data are provided a separate report (Nautilus Environmental, 2015).

There were no adverse effects in any samples for any endpoints for *C. dubia, O. mykiss or P. subcapitata.* For *L. minor*, an adverse effect on frond count was observed in three of five samples, but there was no effect on dry weight.

Results of the toxicity tests using *C. dubia* are provided in Table 6. There were no adverse effects on survival or reproduction of *C. dubia* in the samples; the IC25, IC50 and LC50 values were >100%.

Results of the toxicity tests using *O. mykiss* are provided in Table 7. There were no adverse effects on embryo viability in the samples; the EC25 and EC50 values were >100%.

Results of the toxicity tests using *L. minor* are provided in Table 8; the highest test concentraton was 97% as a result of dilution associated with addition of nutrients, as required in the method. There were no adverse effects on *L. minor* dry weight in the samples; the IC25 and IC50 values were >97%. An adverse effect on frond count was observed in three of the five samples (LC_LCDSSLCC, LC_FRDSDC and LC_LC5). The IC25 and IC50 values for LC_LCDSSLCC were 50.3 and 90.3%, respectively. For LC_FRDSDC the IC25 was 69.2% and the IC50 was >97%. For LC_LC5 the IC25 and IC50 values were 82.5 and >97%, respectively.

Results of the toxicity tests using *P. subcapitata* are provided in Tables 9; the highest test concentraton was 95.2% as a result of dilution associated with addition of nutrients. Consequently, the IC25 and IC50 values for cell yield were >95.2% in the samples.

For reference sample GH_ER2, which was only tested at full strength with *C. dubia*, *O. mykiss* and *P. subcapitata*, there were no significant adverse effects in the results compared to the laboratory controls. In the *P. subcapitata* test, the site water control produced 3.1-fold greater growth than the laboratory water control. This finding is not unusual, since the higher ionic strength associated with the site water control would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water,

and growth enhancement of *P. subcapitata* was observed in this reference sample in a similar manner to that observed in the samples.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	GH_ER2		LC_LCDSSLCC		LC_DC1	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Control	100	17.8 ± 4.6	100	18.8 ± 3.5	90	18.4 ± 7.0
1.56	NT	NT	100	18.1 ± 3.8	100	20.9 ± 2.5
3.12	NT	NT	100	20.3 ± 4.4	100	21.8 ± 3.3
6.25	NT	NT	100	20.4 ± 3.7	100	21.9 ± 2.5
12.5	NT	NT	100	18.1 ± 5.2	100	20.1 ± 7.5
25	NT	NT	100	21.4 ± 3.2	100	22.3 ± 4.4
50	NT	NT	100	17.0 ± 3.8	100	17.8 ± 7.7
100	100	19.5 ± 5.5	100	15.9 ± 4.9	100	19.1 ± 4.1
Test endpoint (% v/v)						
LC50	--	--	>100	--	>100	--
IC25	--	--	--	>100	--	>100
IC50	--	--	--	>100	--	>100

NT = Not Tested, SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration

Table 6. (continued) Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Control	100	17.9 ± 4.1	90	17.3 ± 6.3	100	21.2 ± 2.0
1.56	100	21.9 ± 1.4	100	20.5 ± 3.4	100	21.1 ± 2.2
3.12	100	22.0 ± 2.3	100	19.9 ± 2.0	100	20.4 ± 7.5
6.25	100	19.8 ± 4.5	100	16.4 ± 8.6	100	22.2 ± 1.2
12.5	100	20.6 ± 3.8	100	21.0 ± 3.8	100	21.2 ± 4.4
25	100	18.8 ± 5.2	100	17.4 ± 7.7	100	18.9 ± 3.3
50	100	19.3 ± 5.1	100	18.5 ± 6.7	100	20.9 ± 3.5
100	100	18.9 ± 4.4	100	17.9 ± 4.6	100	16.4 ± 8.9
Test endpoint (% v/v)						
LC50	>100	--	>100	--	>100	--
IC25	--	>100	--	>100	--	>100
IC50	--	>100	--	>100	--	>100

SD = Standard Deviation, LC = Lethal Concentration, IC = Inhibition Concentration

Table 7. Results: rainbow trout embryo (*Oncorhynchus mykiss*) viability test.

Concentration (% v/v)	Embryo Viability (Mean ± SD)					
	GH_ER2	**LC_LCDSSLCC**	**LC_DC1**	**LC_FRDSDC**	**LC_DCDS**	**LC_LC5**
Control	87.5 ± 10.0	82.5 ± 5.0	93.3 ± 5.4	95.8 ± 3.3	87.5 ± 3.2	91.7 ± 4.3
6.25	NT	90.0 ± 5.4	84.2 ± 5.7	86.7 ± 4.7	90.0 ± 9.4	89.2 ± 7.4
12.5	NT	88.3 ± 6.9	91.7 ± 6.9	90.8 ± 5.0	86.7 ± 7.2	96.7 ± 3.8
25	NT	88.3 ± 4.3	85.8 ± 3.2	86.7 ± 3.8	87.5 ± 5.0	91.7 ± 6.4
50	NT	85.0 ± 4.3	85.0 ± 4.3	95.0 ± 1.9	83.3 ± 11.9	87.5 ± 8.3
100	88.3 ± 1.9	84.2 ± 7.9	90.8 ± 3.2	88.2 ± 3.4	82.5 ± 4.2	86.7 ± 15.9
Test endpoint (% v/v)						
EC25	-	>100	>100	>100	>100	>100
EC50	-	>100	>100	>100	>100	>100

NT = Not Tested, SD = Standard Deviation, EC = Effective Concentration

Table 8. Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_LCDSSLCC		LC_DC1		LC_FRDSDC	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Control	82.0 ± 4.1	6.8 ± 0.3	69.0 ± 1.8	4.6 ± 0.3	79.2 ± 8.1	6.0 ± 0.8
1.5	74.8 ± 1.7	6.2 ± 0.2	59.8 ± 1.0	4.0 ± 0.2	72.8 ± 11.1	5.6 ± 0.9
3.0	74.8 ± 12.3	6.2 ± 1.0	68.8 ± 8.1	4.7 ± 0.6	69.8 ± 9.5	5.3 ± 0.6
6.1	90.2 ± 1.9	7.4 ± 0.3	55.2 ± 6.9	4.1 ± 0.7	71.0 ± 0.8	5.5 ± 0.2
12.1	78.5 ± 8.2	6.3 ± 0.8	66.0 ± 6.5	4.9 ± 0.6	79.5 ± 7.6	6.0 ± 0.6
24.2	78.5 ± 7.4	6.8 ± 0.3	69.5 ± 9.7	5.0 ± 0.9	70.8 ± 3.9	5.5 ± 0.3
48.5	62.8 ± 14.3	5.5 ± 1.2	68.0 ± 11.2	5.0 ± 0.6	66.2 ± 4.9	5.8 ± 0.6
97	38.5 ± 2.1	5.5 ± 0.3	66.8 ± 9.2	5.2 ± 0.7	37.5 ± 2.4	4.5 ± 0.3
Test endpoint (% v/v [with 95% CL])						
IC25	50.3 (27.5 – 68.7)	>97	>97	>97	69.2 (57.7 – 79.3)	>97
IC50	90.3 (76.4 - 97.0)	>97	>97	>97	>97	>97

SD = Standard Deviation, IC = Inhibition Concentration, CL = Confidence Limits

Table 8. (continued) Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_DCDS		LC_LC5	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Control	111.0 ± 16.4	8.8 ± 1.2	68.8 ± 6.7	4.9 ± 0.4
1.5	109.5 ± 16.6	8.5 ± 1.7	60.8 ± 8.4	4.5 ± 0.6
3.0	93.2 ± 13.8	7.1 ± 1.0	71.2 ± 16.0	4.9 ± 1.1
6.1	91.8 ± 11.2	7.4 ± 1.0	61.5 ± 8.3	4.6 ± 0.7
12.1	89.2 ± 9.6	7.0 ± 1.3	65.8 ± 4.6	4.6 ± 0.3
24.2	112.3 ± 14.7	9.3 ± 1.8	66.8 ± 3.9	4.9 ± 0.2
48.5	99.8 ± 28.9	8.0 ± 2.5	64.0 ± 6.9	4.7 ± 0.3
97	89.8 ± 7.1	7.6 ± 0.5	40.5 ± 3.9	4.3 ± 0.4
Test endpoint (% v/v [with 95% CL])				
IC25	>97	>97	82.5 (60.5 – >97.0)	>97
IC50	>97	>97	>97	>97

SD = Standard Deviation, IC = Inhibition Concentration, CL = Confidence Limits

Table 9. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	GH_ER2		LC_LCDSSLCC		LC_DC1		LC_FRDSDC	
	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)
Control	32.2 ± 1.8	--	29.8 ± 1.5	--	30.5 ± 1.7	--	29.0 ± 1.1	--
1.5	NT	NT	62.2 ± 2.9*	109.2	55.2 ± 4.3*	81.2	51.0 ± 2.4*	75.9
3.0	NT	NT	69.5 ± 3.9*	133.6	67.5 ± 4.4*	121.3	69.2 ± 5.0*	138.8
6.0	NT	NT	84.5 ± 3.4*	184.0	78.0 ± 5.5*	155.7	71.0 ± 5.0*	144.8
11.9	NT	NT	99.5 ± 6.6*	234.5	90.0 ± 3.9*	195.1	88.0 ± 5.3*	203.4
23.8	NT	NT	102.0 ± 6.2*	242.9	107.8 ± 7.0*	253.3	102.3 ± 3.6*	252.6
47.6	NT	NT	111.8 ± 5.3*	275.6	127.0 ± 5.1*	316.4	110.8 ± 4.9*	281.9
95.2	132.1 ± 4.5*	309.7	112.0 ± 8.4*	276.5	118.0 ± 1.8*	286.9	117.8 ± 1.7*	306.0
Test endpoint (% v/v)								
IC25	--	--	>95.2	--	>95.2	--	>95.2	--
IC50	--	--	>95.2	--	>95.2	--	>95.2	--

NT = Not Tested, SD = Standard Deviation, IC = Inhibition Concentration
*Indicates cell yield that were significantly greater than the control

Table 9. (continued) Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	LC_DCDS Cell Yield x10⁴ (Mean ± SD)	LC_DCDS Stimulation (%)	LC_LC5 Cell Yield x10⁴ (Mean ± SD)	LC_LC5 Stimulation (%)
Control	29.5 ± 2.0	--	29.5 ± 1.2	--
1.5	52.5 ± 3.1*	78.0	47.5 ± 2.6*	61.0
3.0	63.5 ± 4.1*	115.3	59.0 ± 1.8*	100.0
6.0	74.2 ± 4.1*	151.7	69.0 ± 4.2*	133.9
11.9	77.5 ± 4.8*	162.7	91.0 ± 7.1*	208.5
23.8	89.0 ± 4.8*	201.7	99.0 ± 3.9*	235.6
47.6	116.5 ± 4.8*	294.9	99.5 ± 6.4*	237.3
95.2	118.3 ± 6.7*	300.8	102.3 ± 5.7*	246.6
Test endpoint (% v/v)				
IC25	>95.2	--	>95.2	--
IC50	>95.2	--	>95.2	--

SD = Standard Deviation, IC = Inhibition Concentration
*Indicates cell yield that were significantly greater than the control

4.0 QA/QC

The health history of the test organisms used in the exposures was acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocols throughout the tests. There were no deviations from the test methodologies. Uncertainty associated with these tests is best described by the standard deviation around the mean and/or the confidence intervals around the point estimates.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was considered appropriate.

Table 10. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.0 g/L NaCl	2.0 (1.8 – 2.2)	5	November 3, 2015
	Reproduction (IC50): 1.4 g/L NaCl	1.5 (1.2 – 2.0)	14	
O.mykiss	Embryo viability (EC50): 3.0 mg/L SDS	4.0 (2.2 – 7.4)	36	October 27, 2015
L. minor	Number of fronds (IC50): 4.3 g/L KCl	4.2 (3.2 – 5.5)	14	October 21, 2015
P. subcapitata	Growth (IC50) 35.7 µg/L Zn	28.5 (16.2 – 50.1)	32	November 3, 2015

SD = Standard Deviation, CV = Coefficient of Variation, IC = Inhibition Concentration, EC= Effective Concentration, LC = Lethal Concentration

5.0 REFERENCES

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Nautilus Environmental. 2015. Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia, Pseudokirchneriella subcapitata, Hyalella azteca, Pimephales promelas* and *Oncorhynchus mykiss*: 4th Quarter 2015 results.

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6.0 END OF REPORT

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal (Line Creek Op) Start Date/Time: October 27/15 @ 1215h
Work Order No.: 15870 Set up by: EMM

Sample Information:

Sample ID: LC-LCDSSLLC-WS-2015-0761
Sample Date: October 26/15
Date Received: October 27/15
Sample Volume: 8 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 101415A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 33
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 1,3,4,5,7,16,18,19

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd136
Stock Solution ID: 15Na03
Date Initiated: Nov 3/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCl
7-d IC50 (95% CL): 1.4 (1.1-1.7) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCl CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-2.0) g/L NaCl CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JOL Date reviewed: Nov-18/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_LCRSSLLC_WS-20151026N
Work Order #: 15870
Start Date & Time: Oct 27/15@1215h
Stop Date & Time: Nov 2/15@1230h
Test Species: *Ceriodaphnia dubia*

Concentration: Control	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	24.5	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0			
DO (mg/L)	8.1	7.9	8.0	7.9	8.0	7.6	8.1	7.7	8.0	7.6	8.0	7.6			
pH	8.0	7.9	8.0	7.9	8.0	7.8	8.1	7.8	7.9	7.9	8.0	7.8			
Cond. (µS/cm)	223	224		222		222		222		221		224			
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM			

Concentration: 1.56%(v/v)	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	24.5	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0			
DO (mg/L)	8.1	7.9	8.1	7.9	8.1	7.8	8.1	7.6	7.8	7.6	8.0	7.6			
pH	8.0	7.9	8.0	7.8	8.0	8.0	8.1	7.8	8.0	7.9	8.0	7.9			
Cond. (µS/cm)	237	235		234		232		234		231		235			
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM			

Concentration: 12.5%(v/v)	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	24.5	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0			
DO (mg/L)	8.1	7.9	8.2	7.9	8.2	7.6	8.1	7.6	7.8	7.6	8.0	7.6			
pH	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	7.9			
Cond. (µS/cm)	313	310		312		320		312		318		320			
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM			

Concentration: 100%(v/v)	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	24.5	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0			
DO (mg/L)	8.2	7.9	8.2	7.9	8.2	7.6	8.2	7.7	8.1	7.6	8.0	7.5			
pH	8.2	8.2	8.2	8.1	8.1	8.1	8.1	8.1	8.2	8.1	8.1	8.1			
Cond. (µS/cm)	868	863		848		855		846		850		849			
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM			

Thermometer: 4 **DO meter:** 1 **pH meter:** 2 **Conductivity meter:** 1

	Control	100%(v/v)		
Hardness*	100	480		
Alkalinity*	96	192		

* mg/L as CaCO3

Analysts: EMM, AWP, MLT, JW, KL
Reviewed by: JW
Date reviewed: Nov. 18/15

Sample Description: clear

Comments: **Broodboard Used:** 10145A (CH# 1, 3, 4, 5, 7, 8, 9)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC_LCDSSLCC_WS20150-26N
Work Order: 15870

Start Date & Time: Oct 27/15 @ 1215h
Stop Date & Time: Nov 2/15 @ ~~1350h~~ 1230h
Set up by: EMM EMM

% (v/v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	4	✓	✓	✓	✓	✓	EMM
4	✓	3	4	3	✓	3	4	✓	3	4	JW
5	3	6	7	7	6	8	6	5	6	8	EMM
6	9	10	9	8	12	11	10	9	9	11	EMM
7											
8											
Total	12	19	20	18	22	22	20	14	18	23	EMM

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	3	✓	✓	✓	✓	✓	✓	EMM
4	3	3	4	✓	3	4	3	3	2	3	JW
5	8	7	6	6	7	7	8	6	6	9	EMM
6	10	9	11	10	11	✓	✓	10	12	7	EMM
7											
8											
Total	21	19	21	19	21	11	11	19	20	19	EMM

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	5	3	4	3	2	4	3	✓	3	4	JW
5	9	8	8	6	7	7	6	4	6	✓	EMM
6	10	12	10	13	12	14	13	9	10	8	EMM
7											
8	er										
Total	23 24	23	22	22	21	25	22	13	19	12	EMM

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	4	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	✓	3	3	4	4	3	3	3	4	JW
5	8	6	6	9	6	5	6	8	6	7	EMM
6	11	15	10	8	10	14	12	11	12	✓	EMM
7											
8											
Total	22	25	19	20	20	23	21	22	21	11	EMM

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	4	3	4	4	4	2	3	3	4	JW
5	8	7	7	6	8	8	7	7	6	✓	EMM
6	10	11	13	✓	✓	13	10	10	8	8	EMM
7											
8											
Total	21	22	23	10	12	25	19	20	17	12	EMM

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	4	5	4	4	✓	3	4	3	4	JW
5	8	6	8	9	9	7	8	6	7	3	EMM
6	14	10	11	11	10	9	14	9	12	10	EMM
7											
8											
Total	25	20	24	24	23	16	24	19	22	17	EMM

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	2	4	3	4	5	3	3	3	4	✓	JW
5	✓	8	7	6	6	7	4	6	6	3	EMM
6	9	10	9	8	11	✓	9	10	7	10	EMM
7											
8											
Total	15	22	19	18	22	10	15	19	17	13	EMM

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MT
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	3	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	✓	✓	3	3	3	3	3	3	4	JW
5	8	6	8	7	7	9	8	6	8	7	EMM
6	10	9	10	8	11	✓	✓	✓	8	✓	EMM
7											
8											
Total	22	15	21	18	21	12	11	9	19	11	EMM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JW

Date reviewed: Nov. 18/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	12-9339-0333	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 11:49	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-5930-5291	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 12:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1166128	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

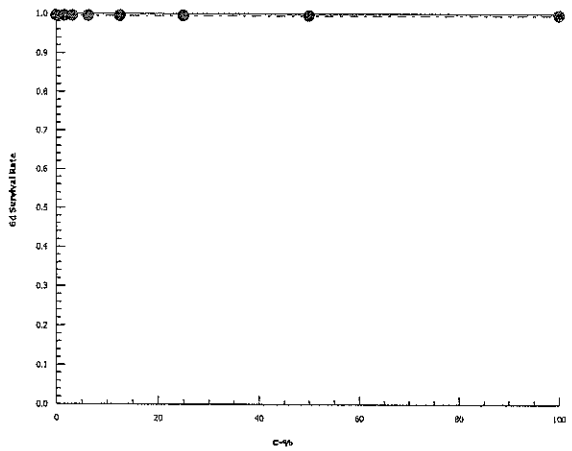
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 12-9339-0333 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 03 Nov-15 11:49 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst:_____ QA: Nov. 18/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-0956-1532	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 11:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-5930-5291	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 12:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1821847	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	32.76	1.238	78.91	3.052	1.267	80.76
IC10	42.84	12.07	N/A	2.334	NA	8.284
IC15	64.83	35.87	N/A	1.543	NA	2.788
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	18.8	12	23	1.114	3.521	18.73%	0.0%
1.56		10	18.1	11	21	1.215	3.843	21.23%	3.72%
3.12		10	20.3	12	25	1.399	4.423	21.79%	-7.98%
6.25		10	20.4	11	25	1.176	3.718	18.22%	-8.51%
12.5		10	18.1	10	25	1.636	5.174	28.58%	3.72%
25		10	21.4	16	25	1.013	3.204	14.97%	-13.83%
50		10	17	10	22	1.211	3.83	22.53%	9.57%
100		10	15.9	9	22	1.545	4.886	30.73%	15.43%

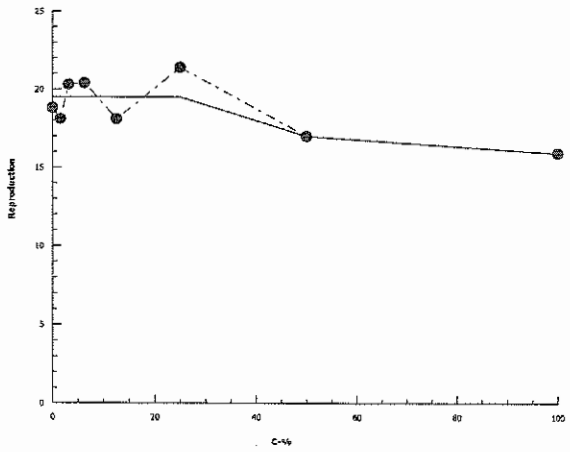
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	12	19	20	18	22	22	20	14	18	23
1.56		21	19	21	19	21	11	11	19	20	19
3.12		24	23	22	22	21	25	22	13	19	12
6.25		22	25	19	20	20	23	21	22	21	11
12.5		21	22	23	10	12	25	19	20	17	12
25		25	20	24	24	23	16	24	19	22	17
50		15	22	19	18	22	10	15	19	17	13
100		22	15	21	18	21	12	11	9	19	11

Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID:	05-0956-1532	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 11:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal (Line Creek Op) Start Date/Time: October 27/15 @ 1230h
Work Order No.: 15870 Set up by: EMM

Sample Information:

Sample ID: LC-DC-US-20151076-W
Sample Date: October 26/15
Date Received: October 27/15
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 101415B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: EMM 34 36
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day 21, 22, 23, 25, 26, 27, 29, 30

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd136
Stock Solution ID: 15Na03
Date Initiated: Nov 3/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.1-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-2.0) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JBL Date reviewed: Nov. 18/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-DC | WS-2015-10-26-N
Work Order #: 15870
Start Date & Time: Oct 27/15 @ 1230h
Stop Date & Time: Nov 7/15 @ 1600h
Test Species: *Ceriodaphnia dubia*

Concentration: Control	Days														
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.8	8.0	7.7	8.0	7.7	8.1	7.8	8.0	7.6	8.0	7.6		
pH	8.0	7.9	8.0	7.8	8.0	7.9	8.1	7.9	7.9	7.9	8.0	7.8		
Cond. (µS/cm)	223	224		222		222		222		222		221		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration: 1.56% (v/v)	Days														
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.8	8.1	7.7	8.2	7.7	8.2	7.7	7.8	7.6	8.1	7.6		
pH	8.0	7.9	8.0	7.9	8.0	7.9	8.0	7.9	8.1	8.0	8.0	8.0		
Cond. (µS/cm)	235	227		225		229		223		228		228		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration: 12.5% (v/v)	Days														
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.8	8.1	7.7	8.2	7.8	8.2	7.7	7.8	7.6	8.1	7.6		
pH	8.0	8.0	8.1	7.9	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0		
Cond. (µS/cm)	243	239		239		237		236		237		238		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration: 100% (v/v)	Days														
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	7.8	8.1	7.7	8.2	7.8	8.2	7.7	8.0	7.6	8.2	7.6		
pH	8.2	8.2	8.3	8.1	8.2	8.1	8.2	8.1	8.2	8.1	8.1	8.1		
Cond. (µS/cm)	337	333		328		328		328		329		328		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Thermometer: 4 **DO meter:** 1 **pH meter:** 2 **Conductivity meter:** 1

	Control	100% (v/v)		
Hardness*	100	186		
Alkalinity*	96	180		

* mg/L as CaCO3

Analysts: EMM, AMO, MLT, JW, MM, KL
Reviewed by: JW
Date reviewed: Nov. 18/15

Sample Description: Clear

Comments: **Broodboard Used:** 10141SB (CF# 21, 22, 23, 25, 26, 27, 29, 30)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC-DC1-WS-2015-10-26_JW
Work Order: 15870

Start Date & Time: Oct 27/15 @ 1230h
Stop Date & Time: Nov 2/15 @ 1600h
Set up by: EMM

% (v/v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	5	4	4	2	4	4	5	4	5	3	JW
5	8	X	6	6	8	6	6	8	4	4	EMM
6	10	↓	11	11	12	13	10	11	10	✓	EMM
7											
8											
Total	23	4X	21	19	24	23	21	23	19	7	EMM

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	5	3	4	4	5	2	5	4	2	4	JW
5	8	6	8	7	6	6	7	6	5	8	EMM
6	13	10	10	9	10	11	11	12	10	8	EMM
7											
8											
Total	26	19	22	20	21	19	23	22	17	20	EMM

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	2	4	3	5	5	5	3	4	3	JW
5	8	6	6	5	7	7	7	6	8	6	EMM
6	14	10	10	9	11	12	12	10	14	12	EMM
7											
8											
Total	26	18	20	17	23	24	24	19	26	21	EMM

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	5	3	3	4	4	5	4	5	4	JW
5	8	9	9	8	6	6	8	6	✓	5	EMM
6	9	10	14	12	12	11	11	10	12	12	EMM
7											
8											
Total	21	24	26	23	22	21	24	20	17	21	EMM

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	5	4	4	5	4	5	4	✓	4	JW
5	6	8	8	7	7	6	5	6	✓	8	EMM
6	12	14	11	13	13	10	10	12	✓	10	EMM
7											
8											
Total	18	27	23	24	25	20	20	22	0	22	EMM

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	4	3	3	4	5	✓	5	6	4	JW
5	9	8	8	7	6	8	4	9	8	6	EMM
6	11	12	10	10	9	14	10	13	14	10	EMM
7											
8					19						
Total	23	24	21	20	23	27	14	27	28	20	EMM

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	2	✓	✓	4	4	5	✓	5	4	JW
5	4	6	✓	7	8	8	6	5	9	8	EMM
6	8	11	✓	9	10	9	11	10	13	12	EMM
7											
8											
Total	12	19	0	16	22	21	22	15	27	24	EMM

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	3	3	4	4	3	3	✓	3	JW
5	4	4	6	7	8	7	8	8	4	9	EMM
6	10	9	10	10	9	8	12	10	11	14	EMM
7											
8											
Total	14	13	19	20	21	19	23	21	15	26	EMM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JW

Date reviewed: Nov. 18/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-2079-9200	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-3157-0784	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	279773	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	1	1	1	0	0	0.0%	-11.11%	10	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	0	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

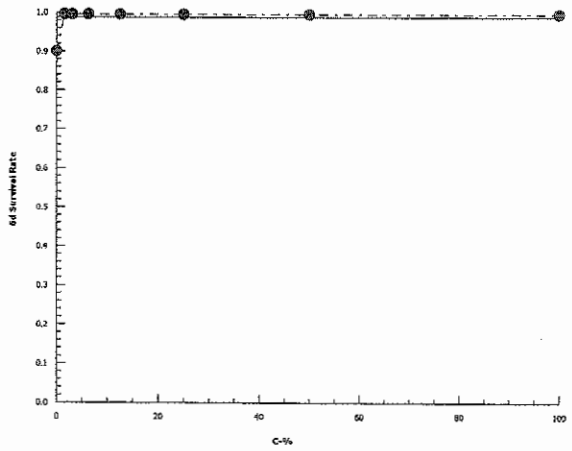
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 10-2079-9200 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 03 Nov-15 12:12 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Report Date: 03 Nov-15 12:14 (p 1 of 2)
Test Code: 15870b | 17-0849-0976

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	06-2841-9881	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	06-3157-0784	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h

Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	953721	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	33.66	8.808	N/A	2.971	~~NA~~	~~11.35~~
IC10	~~45.19~~	~~15.43~~	~~N/A~~	2.213	NA	6.479
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

7100% (UV)
emm

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	18.4	4	24	2.227	7.043	38.28%	0.0%
1.56		10	20.9	17	26	0.7951	2.514	12.03%	-13.59%
3.12		10	21.8	17	26	1.031	3.259	14.95%	-18.48%
6.25		10	21.9	17	26	0.7951	2.514	11.48%	-19.02%
12.5		10	20.1	0	27	2.383	7.534	37.48%	-9.24%
25		10	22.3	14	28	1.383	4.373	19.61%	-21.2%
50		10	17.8	0	27	2.43	7.685	43.18%	3.26%
100		10	19.1	13	26	1.295	4.095	21.44%	-3.8%

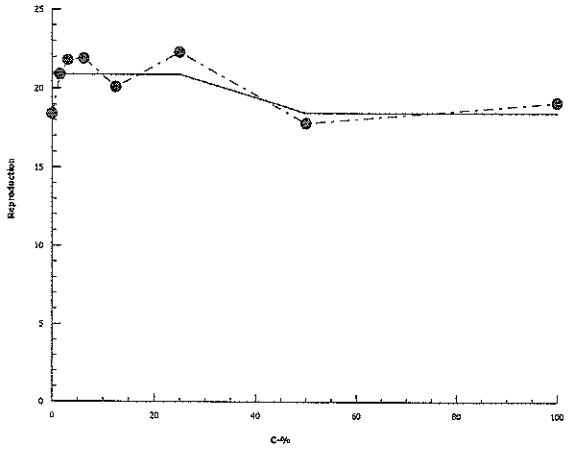
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	4	21	19	24	23	21	23	19	7
1.56		26	19	22	20	21	19	23	22	17	20
3.12		26	18	20	17	23	24	24	19	26	21
6.25		21	24	26	23	22	21	24	20	17	21
12.5		18	27	23	24	25	20	20	22	0	22
25		23	24	21	20	19	27	14	27	28	20
50		12	19	0	16	22	21	22	15	27	24
100		14	13	19	20	21	19	23	21	15	26

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	06-2841-9881	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Test Code: 15870b | 17-0849-0976

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-1972-2653	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:14	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	06-3157-0784	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	100	>100	NA	1

Nemenyi-Damico-Wolfe Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.56	17.5	243.2	13		0.8276	Asymp	Non-Significant Effect
		3.12	88	243.2	13		0.5488	Asymp	Non-Significant Effect
		6.25	107.5	243.2	13		0.4591	Asymp	Non-Significant Effect
		12.5	79.5	243.2	13		0.5876	Asymp	Non-Significant Effect
		25	120.5	243.2	13		0.4003	Asymp	Non-Significant Effect
		50	-36.5	243.2	13		0.9430	Asymp	Non-Significant Effect
		100	-60.5	243.2	13		0.9689	Asymp	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Treatment Effect	Fligner-Wolfe	0.5765	1.645	0.2821	Non-significant Overall Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	205.0875	29.29821	7	1.044	0.4088	Non-Significant Effect
Error	2021.3	28.07361	72			
Total	2226.387		79			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	24.5	18.48	0.0009	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8774	0.9579	<0.0001	Non-normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	10	18.4	13.36	23.44	21	4	24	2.227	38.28%	0.0%
1.56		10	20.9	19.1	22.7	20.5	17	26	0.7951	12.03%	-13.59%
3.12		10	21.8	19.47	24.13	22	17	26	1.031	14.95%	-18.48%
6.25		10	21.9	20.1	23.7	21.5	17	26	0.7951	11.48%	-19.02%
12.5		10	20.1	14.71	25.49	22	0	27	2.383	37.48%	-9.24%
25		10	22.3	19.17	25.43	22	14	28	1.383	19.61%	-21.2%
50		10	17.8	12.3	23.3	20	0	27	2.43	43.18%	3.26%
100		10	19.1	16.17	22.03	19.5	13	26	1.295	21.44%	-3.8%

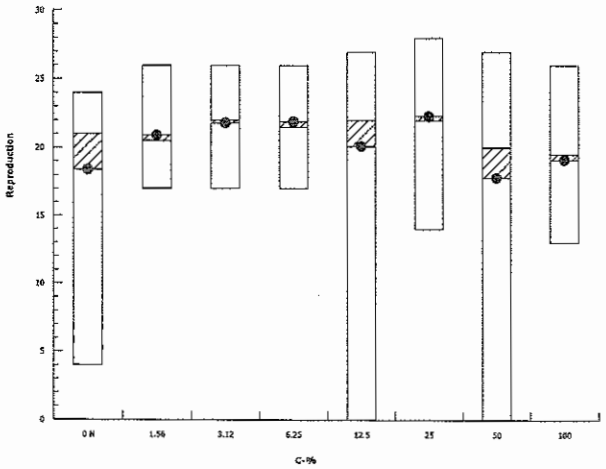
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

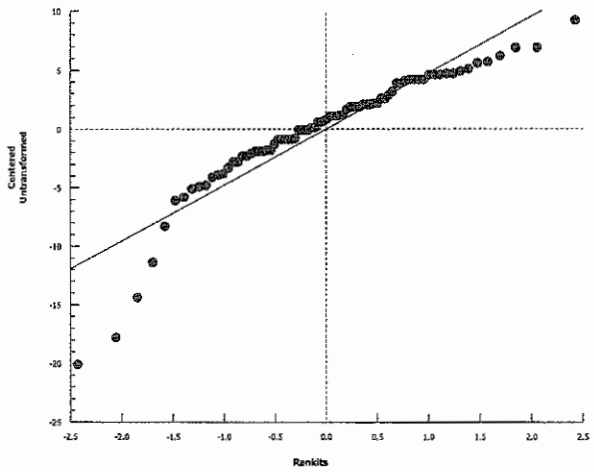
Analysis ID:	11-1972-2653	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:14	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	4	21	19	24	23	21	23	19	7
1.56		26	19	22	20	21	19	23	22	17	20
3.12		26	18	20	17	23	24	24	19	26	21
6.25		21	24	26	23	22	21	24	20	17	21
12.5		18	27	23	24	25	20	20	22	0	22
25		23	24	21	20	19	27	14	27	28	20
50		12	19	0	16	22	21	22	15	27	24
100		14	13	19	20	21	19	23	21	15	26

Graphics





Ceriodaphnia dubia Summary Sheet

Client: Teck Coal (Line Creek Op) Start Date/Time: October 27/15 @ 1245h
Work Order No.: 15870 Set up by: EMM

Sample Information:

Sample ID: LC_FRDSOCWS_2015-1026N
Sample Date: October 26/15
Date Received: October 27/15
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 101415B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 34
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 31/32/33/34/37/38/39/40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd136
Stock Solution ID: 15Na03
Date Initiated: Nov 3/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.1-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-2.0) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	7100	
IC25 % (v/v) (95% CL)		7100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JCL Date reviewed: Nov. 19/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-FRDSDC-US-2015-10-26N
Work Order #: 15870

Start Date & Time: Oct 27/15 @ 1245h
Stop Date & Time: Nov 2/15 @ 1300h
Test Species: *Ceriodaphnia dubia*

Concentration Control	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.8	8.0	7.9	8.0	7.8	8.1	7.8	8.0	7.8	8.0	7.6		
pH	8.0	8.0	8.0	8.0	8.0	7.9	8.1	7.9	7.9	7.9	8.0	7.8		
Cond. (µS/cm)	223	224		222		222		222		222		220		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 1.56% (v/v)	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.8	8.1	7.9	8.1	7.8	8.2	7.8	7.8	7.7	8.1	7.6		
pH	8.0	8.0	8.0	8.0	8.0	7.9	8.0	8.0	8.0	8.0	8.0	8.0		
Cond. (µS/cm)	237	234		230		229		230		229		228		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 12.5% (v/v)	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	7.8	8.0	7.9	8.1	7.8	8.2	7.8	7.8	7.6	8.1	7.5		
pH	8.0	8.0	8.1	8.0	8.1	8.0	8.0	8.0	8.0	8.0	8.0	8.0		
Cond. (µS/cm)	290	289		296		295		290		291		291		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 100% (v/v)	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	7.7	8.0	7.8	8.1	7.7	8.2	7.8	8.0	7.6	8.1	7.5		
pH	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1		
Cond. (µS/cm)	736	741		714		715		722		716		718		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Thermometer: 4 DO meter: 1 pH meter: 2 Conductivity meter: 1

	Control	100% (v/v)		
Hardness*	100	520		
Alkalinity*	96	176		

* mg/L as CaCO3

Analysts: EMM, AWD, MLT, JW, YML, KL
Reviewed by: JOW
Date reviewed: Nov. 19/15

Sample Description: Clear

Comments: **Broodboard Used:** 101415B (#31-34, 37-40)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC ERDSOC WS 205-10-26.N
Work Order: 15870

Start Date & Time: Oct 27/15 @ 1245h
Stop Date & Time: Nov 2/15 @ 1300h
Set up by: EMM

% Cv(v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	4	✓	4	3	4	✓	3	✓	3	EMM
4	2	✓	4	✓	5	✓	✓	✓	4	✓	JW
5	7	8	6	6	✓	6	3	6	9	6	EMM
6	10	10	✓	9	8	11	9	10	9	10	EMM
7											
8											
Total	19	22	10	19	16	21	12	19	22	19	EMM

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	4	4	✓	✓	3	✓	✓	EMM
4	4	4	7	✓	✓	2	4	✓	4	4	JW
5	8	8	5	8	7	6	6	7	8	6	EMM
6	9	10	10	11	12	13	10	13	12	10	EMM
7											
8											
Total	21	22	22	23	23	21	20	23	24	20	EMM

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	4	✓	✓	3	5	✓	4	✓	4	EMM
4	4	✓	4	3	✓	✓	5	✓	4	✓	JW
5	8	9	6	6	4	6	7	6	6	8	EMM
6	11	12	10	10	12	13	11	13	10	12	EMM
7											
8											
Total	23	25	20	19	19	24	23	23	20	24	EMM

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	4	4	✓	4	3	EMM
4	3	3	2	4	2	✓	✓	5	✓	7	JW
5	8	8	6	7	6	7	7	6	8	✓	EMM
6	10	9	✓	10	11	10	10	12	13	9	EMM
7											
8											
Total	21	20	8	21	19	21	21	23	25	19	EMM

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	4	✓	5	✓	✓	✓	✓	✓	EMM
4	4	4	✓	4	✓	3	3	6	4	4	JW
5	8	9	6	6	7	9	8	8	6	4	EMM
6	✓	10	9	12	11	10	9	12	11	10	EMM
7											
8											
Total	12	23	19	22	23	22	20	26	21	18	EMM

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	4	4	✓	✓	✓	5	✓	✓	✓	✓	EMM
4	✓	✓	3	✓	✓	4	✓	5	4	4	JW
5	6	8	9	4	4	✓	6	8	9	6	EMM
6	8	11	10	9	9	10	4	9	13	12	EMM
7											
8											
Total	18	23	22	13	13	19	10	22	26	22	EMM

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	4	✓	4	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	6	✓	5	3 6	5 7	2 3	4	4	4	JW
5	8	9	8	6	6	7	6	8	6	7	EMM
6	13	8	11	12	8	10	10	✓ 11	✓	✓	EMM
7											
8											
Total	25	23	23	23	14	22	19	12	21	11	EMM

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	3	✓	✓	✓	✓	✓	5	✓	✓	EMM
4	4	✓	5	4	4	3	4	✓	5	✓	JW
5	6	8	6	9	9	6	4	3	8	6	EMM
6	13	14	12	10	✓	9	9	10	✓	10	EMM
7											
8											
Total	23	25	23	23	13	18	17	18	13	16	EMM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JW

Date reviewed: Nov-19/15

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-0965-9155	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:27	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-4264-1689	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1801201	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

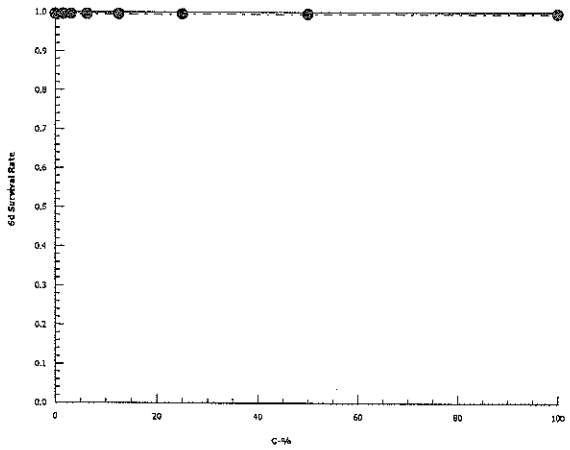
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-0965-9155	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:27	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst:_____ QA: Nov. 19/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	07-1541-9612	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:27	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-4264-1689	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	806353	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	~~18.33~~	~~4.198~~	~~N/A~~	~~5.455~~	~~NA~~	~~23.82~~
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

> 100% (v/v)
emm

Reproduction Summary

			Calculated Variate						
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	Negative Control	10	17.9	10	22	1.286	4.067	22.72%	0.0%
1.56		10	21.9	20	24	0.4333	1.37	6.26%	-22.35%
3.12		10	22	19	25	0.7149	2.261	10.28%	-22.91%
6.25		10	19.8	8	25	1.428	4.517	22.81%	-10.61%
12.5		10	20.6	12	26	1.194	3.777	18.34%	-15.08%
25		10	18.8	10	26	1.652	5.224	27.79%	-5.03%
50		10	19.3	11	25	1.613	5.1	26.43%	-7.82%
100		10	18.9	13	25	1.378	4.358	23.06%	-5.59%

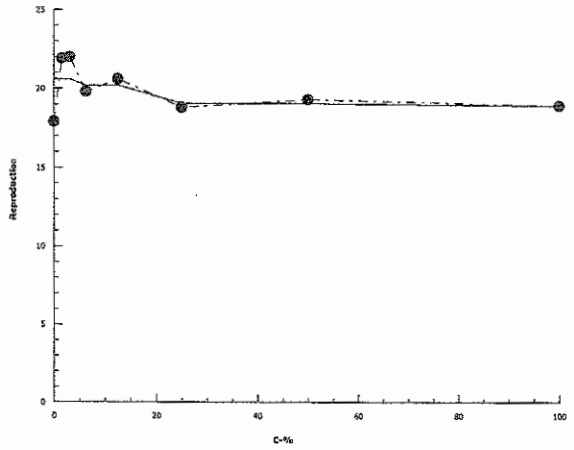
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	19	22	10	19	16	21	12	19	22	19
1.56		21	22	22	23	23	21	20	23	24	20
3.12		23	25	20	19	19	24	23	23	20	24
6.25		21	20	8	21	19	21	21	23	25	19
12.5		12	23	19	22	23	22	20	26	21	18
25		18	23	22	13	13	19	10	22	26	22
50		25	23	23	23	14	22	19	12	21	11
100		23	25	23	23	13	18	17	18	13	16

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	07-1541-9612	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:27	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-4655-8486	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:28	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	09-4264-1689	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:45	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 0h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	100	>100	NA	1

Nemenyi-Damico-Wolfe Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.56*	249.5	243.2	13		0.0432	Asymp	Significant Effect
		3.12*	266	243.2	13		0.0288	Asymp	Significant Effect
		6.25	124.5	243.2	13		0.3826	Asymp	Non-Significant Effect
		12.5	166.5	243.2	13		0.2179	Asymp	Non-Significant Effect
		25	94.5	243.2	13		0.5189	Asymp	Non-Significant Effect
		50	141.5	243.2	13		0.3108	Asymp	Non-Significant Effect
		100	85.5	243.2	13		0.5603	Asymp	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Treatment Effect	Fligner-Wolfe	2.058	1.645	0.0198	Significant Overall Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	154.8	22.11429	7	1.356	0.2374	Non-Significant Effect
Error	1174.4	16.31111	72			
Total	1329.2		79			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	18.01	18.48	0.0119	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9421	0.9579	0.0012	Non-normal Distribution

Reproduction Summary

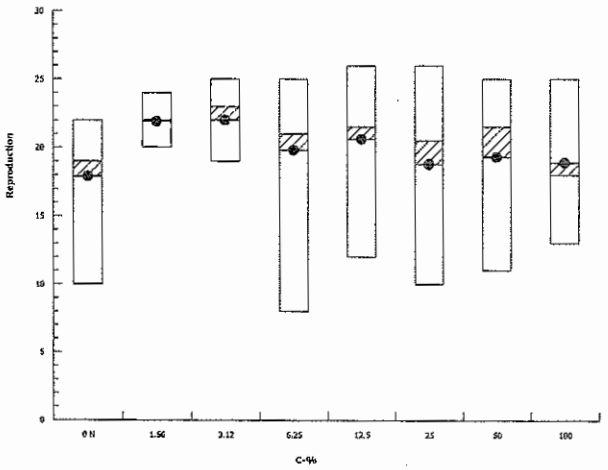
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	10	17.9	14.99	20.81	19	10	22	1.286	22.72%	0.0%
1.56		10	21.9	20.92	22.88	22	20	24	0.4333	6.26%	-22.35%
3.12		10	22	20.38	23.62	23	19	25	0.7149	10.28%	-22.91%
6.25		10	19.8	16.57	23.03	21	8	25	1.428	22.81%	-10.61%
12.5		10	20.6	17.9	23.3	21.5	12	26	1.194	18.34%	-15.08%
25		10	18.8	15.06	22.54	20.5	10	26	1.652	27.79%	-5.03%
50		10	19.3	15.65	22.95	21.5	11	25	1.613	26.43%	-7.82%
100		10	18.9	15.78	22.02	18	13	25	1.378	23.06%	-5.59%

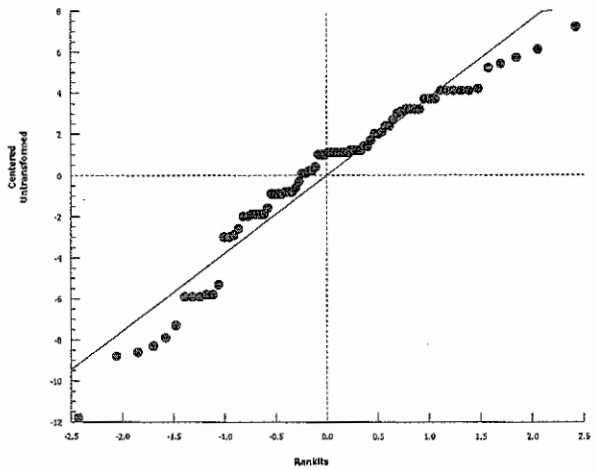
Analysis ID: 19-4655-8486 **Endpoint:** Reproduction **CETIS Version:** CETISv1.8.7
Analyzed: 03 Nov-15 12:28 **Analysis:** Nonparametric-Control vs Treatments **Official Results:** Yes

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	19	22	10	19	16	21	12	19	22	19
1.56		21	22	22	23	23	21	20	23	24	20
3.12		23	25	20	19	19	24	23	23	20	24
6.25		21	20	8	21	19	21	21	23	25	19
12.5		12	23	19	22	23	22	20	26	21	18
25		18	23	22	13	13	19	10	22	26	22
50		25	23	23	23	14	22	19	12	21	11
100		23	25	23	23	13	18	17	18	13	16

Graphics





Ceriodaphnia dubia Summary Sheet

Client: Teck Coal (Cline Creek Cp) Start Date/Time: October 27/15 @ 1300h
Work Order No.: 15870 Set up by: EMM

Sample Information:

Sample ID: LC-DCDS-US 2015-1026-N
Sample Date: October 26/15
Date Received: October 27/15
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 101615A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 24
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 3/4/5/13/15/16/19

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd136
Stock Solution ID: 15Na03
Date Initiated: Nov 3/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.1-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-2.0) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JM Date reviewed: Nov-19/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_DCDS_WS_2015-1076_N
Work Order #: 15870

Start Date & Time: Oct 27/15 @ 1300h
Stop Date & Time: Nov 2/15 @ 1500h
Test Species: *Ceriodaphnia dubia*

Concentration Control	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.0	7.7	8.0	7.6	8.1	7.7	8.0	7.6	8.0	7.6		
pH	8.0	7.9	8.0	7.9	8.0	7.9	8.1	7.9	7.9	7.9	8.0	7.8		
Cond. (µS/cm)	223	224		222		222		222		222		222		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 1.56% (v/v)	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.2	7.7	8.2	7.6	8.2	7.6	7.8	7.7	8.1	7.6		
pH	8.0	7.9	8.0	7.9	8.0	7.9	8.1	7.9	8.1	7.9	8.0	8.0		
Cond. (µS/cm)	227	226		224		222		222		222		225		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 12.5% (v/v)	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.8	8.2	7.7	8.1	7.6	8.2	7.7	7.8	7.6	8.1	7.6		
pH	8.1	8.0	8.1	7.9	8.1	7.9	8.1	8.0	8.1	8.0	8.1	8.0		
Cond. (µS/cm)	232	230		228		227		227		227		229		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 100% (v/v)	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	7.9	7.8	8.1	7.7	8.2	7.7	8.0	7.6	8.1	7.6		
pH	8.4	8.1	8.4	8.1	8.3	8.1	8.3	8.0	8.3	8.1	8.3	8.1		
Cond. (µS/cm)	273	276		259		258		262		259		263		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Thermometer: 4 DO meter: 1 pH meter: 2 Conductivity meter: 1

	Control	100% (v/v)		
Hardness*	100	158		
Alkalinity*	96	132		

* mg/L as CaCO3

Analysts: EMM, AWD, MLT, JW, YYL, KL
Reviewed by: JGL
Date reviewed: Nov. 19/15

Sample Description: Clear

Comments: Broodboard Used: 101615A (#3,4,5,13,15,16,19)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC_DCOS_WS_2015-10-26_N
Work Order: 15870

Start Date & Time: Oct 27/15 @ 1300h
Stop Date & Time: Nov 2/15 @ 1500h
Set up by: Emm

% (v/v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	X	✓	✓	✓	✓	✓	✓	Emm
4	5	2	4	|	3	3	3	3	4	4	JW
5	8	7	6	|	6	6	6	5	4	6	Emm
6	10	10	9	|	11	11	8	10	9	10	Emm
7				|						
8				X							
Total	23	19	19	8X	20	20	17	18	17	20	Emm

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Emm
4	✓	4	4	4	5	3	3	3	3	6	JW
5	4	8	8	6	7	8	6	7	7	6	Emm
6	9	10	13	12	10	10	10	8	9	12	Emm
7											
8											
Total	13	22	25	22	22	21	19	18	19	29	Emm

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	3	✓	Emm
4	3	3	4	4	4	3	4	3	✓	3	JW
5	8	6	3	5	6	7	7	6	9	6	Emm
6	10	11	9	10	11	9	12	11	10	9	Emm
7											
8											
Total	21	20	16	19	21	19	23	20	22	18	Emm

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	3	✓	✓	✓	✓	✓	✓	✓	✓	Emm
4	✓	✓	✓	3	4	4	✓	4	2	3	JW
5	✓	8	✓	8	7	7	5	7	6	6	Emm
6	✓	13	2	12	12	10	10	10	9	9	Emm
7											
8											
Total	0	24	2	23	23	21	15	24	17	18	Emm

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	Emm
4	✓	4	4	3	4	3	3	4	4	4	JW
5	9	8	7	7	9	8	6	9	8	9	Emm
6	11	9	✓	12	9	10	11	10	9	12	Emm
7											
8								8			
Total	24	21	11	22	22	21	20	21	21	25	Emm

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Emm
4	7	4	3	2	✓	2	2	3	3	6	JW
5	9	6	6	✓	✓	6	8	9	9	✓	Emm
6	10	8	10	8	✓	10	11	11	12	9	Emm
7											
8											
Total	26	18	19	10	0	18	21	23	24	15	Emm

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	Emm
4	3	4	3	✓	4	4	4	3	3	4	JW
5	6	9	9	✓	8	7	6	6	7	6	Emm
6	10	9	10	0	9	11	9	9	10	12	Emm
7											
8											
Total	19	22	22	0	21	22	19	18	20	22	Emm

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MC
3	✓	✓	4	✓	✓	✓	✓	✓	✓	✓	Emm
4	5	5	✓	4	✓	4	3	4	4	4	JW
5	6	6	8	✓	4	8	7	6	6	5	Emm
6	✓	12	12	8	9	9	7	8	11	10	Emm
7											
8											
Total	11	23	24	12	13	21	17	18	21	19	Emm

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JW

Date reviewed: Nov. 19/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-2872-9407	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:05	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	17-7402-5534	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	976422	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	1	1	1	0	0	0.0%	-11.11%	10	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	0	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

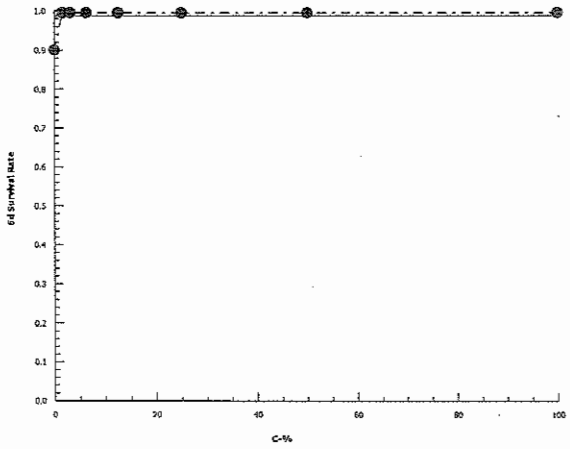
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 03-2872-9407 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 03 Nov-15 12:05 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Report Date:	03 Nov-15 12:06 (p 1 of 2)
Test Code:	15870d | 04-3659-0393

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-5341-8243	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:05	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	17-7402-5534	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h

Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1232969	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	~~18.63~~	~~3.304~~	~~N/A~~	~~5.368~~	~~NA~~	~~30.26~~
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

>100 / (CVV)
em

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	17.3	0	23	2	6.325	36.56%	0.0%
1.56		10	20.5	13	25	1.088	3.44	16.78%	-18.5%
3.12		10	19.9	16	23	0.6403	2.025	10.18%	-15.03%
6.25		10	16.4	0	24	2.725	8.618	52.55%	5.2%
12.5		10	21	11	25	1.211	3.83	18.24%	-21.39%
25		10	17.4	0	26	2.423	7.662	44.04%	-0.58%
50		10	18.5	0	22	2.11	6.671	36.06%	-6.94%
100		10	17.9	11	24	1.456	4.606	25.73%	-3.47%

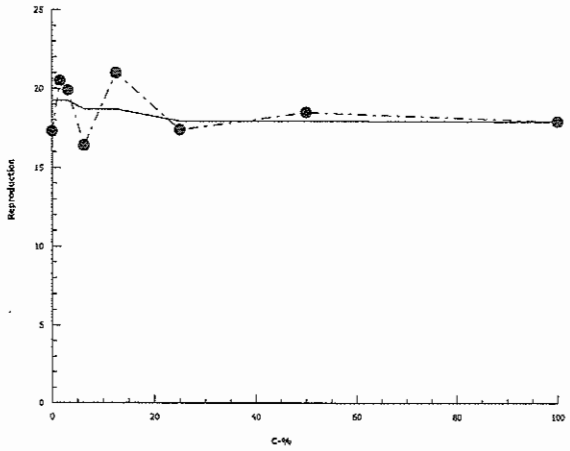
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	19	19	0	20	20	17	18	17	20
1.56		13	22	25	22	22	21	19	18	19	24
3.12		21	20	16	19	21	19	23	20	22	18
6.25		0	24	2	23	23	21	15	21	17	18
12.5		24	21	11	22	22	21	20	23	21	25
25		26	18	19	10	0	18	21	23	24	15
50		19	22	22	0	21	22	19	18	20	22
100		11	23	24	12	13	21	17	18	21	19

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-5341-8243	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:05	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	09-8983-8365	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:07	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-7402-5534	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 15:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	100	>100	NA	1

Nemenyi-Damico-Wolfe Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.56	170.5	243.2	13		0.2047	Asymp	Non-Significant Effect
		3.12	98	243.2	13		0.5028	Asymp	Non-Significant Effect
		6.25	61	243.2	13		0.6687	Asymp	Non-Significant Effect
		12.5	229.5	243.2	13		0.0679	Asymp	Non-Significant Effect
		25	61	243.2	13		0.6687	Asymp	Non-Significant Effect
		50	109.5	243.2	13		0.4499	Asymp	Non-Significant Effect
		100	30.5	243.2	13		0.7859	Asymp	Non-Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Treatment Effect	Fligner-Wolfe	1.385	1.645	0.0830	Non-significant Overall Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	195.2875	27.89821	7	0.8288	0.5668	Non-Significant Effect
Error	2423.7	33.6625	72			
Total	2618.988		79			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	22.85	18.48	0.0018	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.8187	0.9579	<0.0001	Non-normal Distribution

Reproduction Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	10	17.3	12.78	21.82	19	0	23	2	36.56%	0.0%
1.56		10	20.5	18.04	22.96	21.5	13	25	1.088	16.78%	-18.5%
3.12		10	19.9	18.45	21.35	20	16	23	0.6403	10.18%	-15.03%
6.25		10	16.4	10.24	22.56	19.5	0	24	2.725	52.55%	5.2%
12.5		10	21	18.26	23.74	21.5	11	25	1.211	18.24%	-21.39%
25		10	17.4	11.92	22.88	18.5	0	26	2.423	44.04%	-0.58%
50		10	18.5	13.73	23.27	20.5	0	22	2.11	36.06%	-6.94%
100		10	17.9	14.61	21.19	18.5	11	24	1.456	25.73%	-3.47%

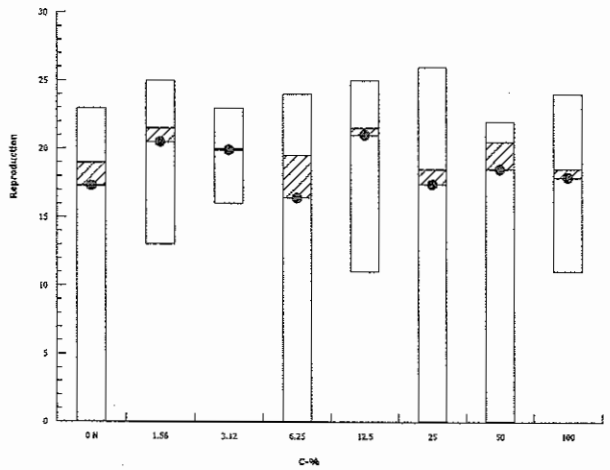
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

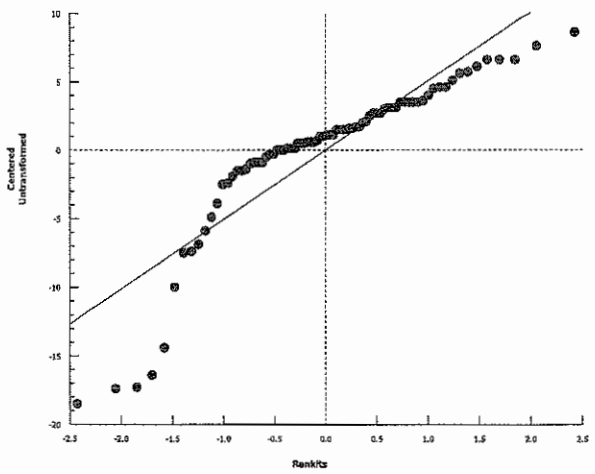
Analysis ID:	09-8983-8365	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:07	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	19	19	0	20	20	17	18	17	20
1.56		13	22	25	22	22	21	19	18	19	24
3.12		21	20	16	19	21	19	23	20	22	18
6.25		0	24	2	23	23	21	15	21	17	18
12.5		24	21	11	22	22	21	20	23	21	25
25		26	18	19	10	0	18	21	23	24	15
50		19	22	22	0	21	22	19	18	20	22
100		11	23	24	12	13	21	17	18	21	19

Graphics





Analyst:_____ QA: JOL Nov. 19/15

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal (Line Creek) Start Date/Time: October 27/15 @ 1200h
Work Order No.: 15870 Set up by: EMM

Sample Information:

Sample ID: LC-LC5_WS_2015-10-26_N
Sample Date: October 26/15
Date Received: October 27/15
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 101415A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 33
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 1,3,4,5,7,8,9,10,11,12,13,14,15,16,18,19

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd136
Stock Solution ID: 15NaD3
Date Initiated: NOV 3/15

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.1-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-2.0) g/L NaCL CV (%): 14

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JOH Date reviewed: Nov. 20/15

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LL-LC5-WS-2015-10-26-U
Work Order #: 15870
Start Date & Time: Oct 27/15 @ 1200h
Stop Date & Time: Nov 2/15 @ 1500h
Test Species: *Ceriodaphnia dubia*

Concentration Control	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.0	7.9	8.0	7.8	8.1	7.6	8.0	7.6	8.0	7.6		
pH	8.0	7.9	8.0	8.0	8.0	7.9	8.1	7.8	7.9	7.9	8.0	8.0		
Cond. (µS/cm)	223	224		222		222		JW JW 222		222		221		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 1.56% (v/v)	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.2	7.9	8.2	7.8	8.1	7.6	7.8	7.6	8.0	7.6		
pH	8.0	7.9	8.0	8.0	8.0	8.0	8.1	7.9	8.1	7.8	8.0	7.9		
Cond. (µS/cm)	226	229		233		230		231		230		230		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 12.5% (v/v)	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.9	8.2	7.9	8.2	7.8	8.1	7.6	7.8	7.6	8.0	7.5		
pH	8.1	8.0	8.1	8.0	8.1	8.0	8.1	8.0	8.1	7.9	8.1	7.9		
Cond. (µS/cm)	288	280		290		291		287		290		289		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Concentration 100% (v/v)	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	7.9	7.8	8.2	7.9	8.2	7.8	8.2	7.6	8.1	7.6	8.1	7.5		
pH	8.2	8.1	8.2	8.1	8.2	8.2	8.2	8.1	8.2	8.2	8.2	8.1		
Cond. (µS/cm)	721	711		710		717		715		716		717		
Initials	EMM	EMM		EMM		EMM		JW		EMM		EMM		

Thermometer: 4 **DO meter:** 1 **pH meter:** 2 **Conductivity meter:** 1

	Control	100% (v/v)		
Hardness*	100	380		
Alkalinity*	96	162		

* mg/L as CaCO3

Analysts: EMM, AWB, MLT, JW, MYL, KL
Reviewed by: JGU
Date reviewed: Nov. 19/15

Sample Description: clear

Comments: **Broodboard Used:** 101415A (CH# 1,3,4,7→16,18,19)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC_WS_WS 2015-10-16_N
Work Order: 15870

Start Date & Time: Oct 27/15 @ 1200h
Stop Date & Time: Oct 29/15 @ 1300h
Set up by: EMM

% (v/v)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	4	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	4	3	2	✓	4	4	4	4	4	JW
5	8	6	6	7	9	8	7	6	6	6	EMM
6	10	9	11	10	12	12	14	10	11	11	EMM
7											
8											
Total	22	19	20	19	21	24	25	20	21	21	EMM

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	4	4	4	3	4	4	2	4	5	JW
5	9	8	8	6	7	6	7	6	7	2	EMM
6	10	9	11	12	8	13	12	12	10	10	EMM
7											
8											
Total	23	21	23	22	18	23	23	20	21	17	EMM

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	3	3	2	5	3	5	4	4	3	JW
5	7	6	5	✓	8	9	8	8	10	8	EMM
6	13	10	11	✓	12	12	12	10	11	10	EMM
7											
8											
Total	24	19	19	0	25	24	25	22	25	21	EMM

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	3	4	3	4	3	4	4	4	4	JW
5	8	8	6	9	6	7	6	6	9	7	EMM
6	11	10	13	11	13	11	10	12	11	12	EMM
7											
8											
Total	22	21	23	23	23	21	20	22	24	23	EMM

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	5	4	✓	3	4	4	3	4	4	JW
5	9	9	8	4	6	7	8	8	7	6	EMM
6	10	12	11	6	12	10	11	12	13	9	EMM
7											
8											
Total	22	26	23	10	21	21	23	23	24	19	EMM

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	4	✓	4	3	5	3	4	✓	2	JW
5	3	8	6	5	6	7	8	7	6	7	EMM
6	10	10	11	9	12	9	10	11	8	11	EMM
7											
8											
Total	13	22	17	18	21	21	21	22	14	20	EMM

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	4	3	6	6	3	3	5	2	4	JW
5	8	9	6	7	8	8	9	8	5	6	EMM
6	10	11	13	10	✓	12	9	11	8	11	EMM
7											
8											
Total	22	24	22	23	14	23	21	24	15	21	EMM

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MD
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	6	4	3	4	✓	✓	2	2	3	JW
5	3	7	6	6	8	✓	✓	7	5	6	EMM
6	10	14	10	13	10	2	✓	12	10	11	EMM
7											
8											
Total	13	27	20	22	22	2	0	21	17	20	EMM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Clear
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JGL

Date reviewed: Nov. 19/15

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-8053-7222	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 11:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-6441-8940	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	218918	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

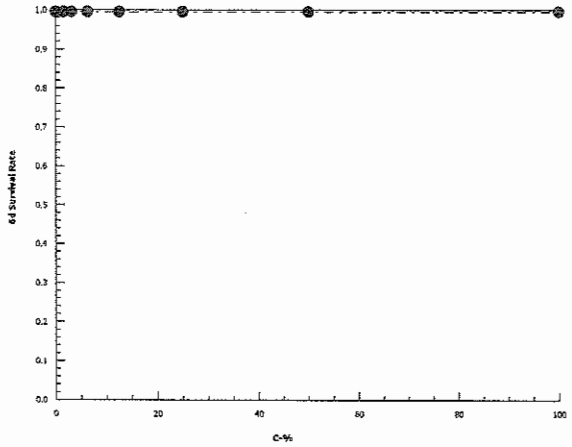
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 04-8053-7222 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 03 Nov-15 11:59 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-0956-3323	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-6441-8940	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	27 Oct-15 12:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 Nov-15 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1556147	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	21.76	1.436	N/A	4.595	NA	69.64
IC10	58.59	9.088	N/A	1.707	NA	11
IC15	72.31	44.14	N/A	1.383	NA	2.266
IC20	89.19	58.26	N/A	1.121	NA	1.717
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	21.2	19	25	0.6289	1.989	9.38%	0.0%
1.56		10	21.1	17	23	0.6904	2.183	10.35%	0.47%
3.12		10	20.4	0	25	2.386	7.545	36.99%	3.77%
6.25		10	22.2	20	24	0.3887	1.229	5.54%	-4.72%
12.5		10	21.2	10	26	1.381	4.367	20.6%	0.0%
25		10	18.9	13	22	1.038	3.281	17.36%	10.85%
50		10	20.9	14	24	1.12	3.542	16.95%	1.42%
100		10	16.4	0	27	2.81	8.884	54.17%	22.64%

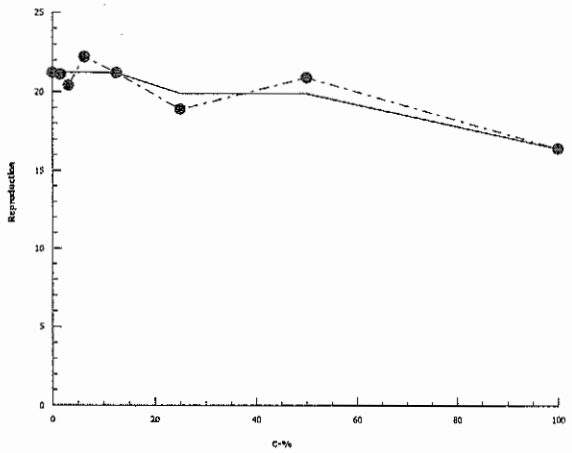
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	22	19	20	19	21	24	25	20	21	21
1.56		23	21	23	22	18	23	23	20	21	17
3.12		24	19	19	0	25	24	25	22	25	21
6.25		22	21	23	23	23	21	20	22	24	23
12.5		22	26	23	10	21	21	23	23	24	19
25		13	22	17	18	21	21	21	22	14	20
50		22	24	22	23	14	23	21	24	15	21
100		13	27	20	22	22	2	0	21	17	20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	15-0956-3323	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 12:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Client: Teck Coal (Line Creek)

W.O.#: 15870

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
LC_LCDSSLCC_WS_2015-10-26_N	Oct. 27/15	50	9.7	9.8	192		①10	4.8	480	KL
LC_DC1_WS_2015-10-26_N	Oct. 27/15	50	9.1	9.2	180		50	9.3	186	"
LC_FRDSDC_WS_2015-10-26_N	Oct. 27/15	50	8.9	9.0	176		①10	5.2	520	"
LC_DCDS_WS_2015-10-26_N	Oct. 27/15	50	6.8	7.0	132		50	7.9	158	"
LC_LC5_WS_2015-10-26_N	Oct. 27/15	50	8.3	8.5	162		①10	3.8	380	"
20% Perrier control water	Oct. 27/15	50	4.9	5.0	96		50	5.0	100	↓

Notes: ① Diluted sample to 100 mL with D.I. water.

Reviewed by: JOL

Date Reviewed: Nov. 18/15

APPENDIX B – Rainbow Trout Embryo *(Oncorhynchus mykiss)* Toxicity Test Data

Rainbow Trout Embryo Summary Sheet

Client: Teck

Start Date/Time: October 27, 2015 @ 1615h

Work Order No.: 15869

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: GH_ER2_WS_2015_10_26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: 6 x 20 L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 102715
Source: Vancouver Island Trout Hatchery, Duncan, B.C.
Loading Density: 1.00 g/L
Number of male broodstock used: 3
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15S01
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9-3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2-7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

Embryo viability (mean ± SD)	Sample ID		
	Control	GH_ER2_WS_2015_10-26-N	
EC25 % (v/v) ~~(95% CL)~~	87.5 ± 10.0	88.3 ± 1.9	
~~EC50 % (v/v)~~ (95% CL)	—	—	

Reviewed by: JGu

Date reviewed: Nov. 20/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: GH-FR2-WS-2015-10-26-N
Work Order #: 15869
Start Date & Time: Oct 27/15 @ 1615h
Stop Date & Time: Nov 3/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

0% (UJ) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.9	9.8	10.0	9.7	9.9	9.8	9.8	9.9	9.8	9.9	9.6	9.7	9.8
pH	6.8	6.9	7.1	6.9	7.0	6.9	7.0	6.9	7.1	6.9	7.1	6.8	7.0	7.0
Cond. (µS/cm)	33	35		34		33		35		35		34		35
Initials	YML	A		YML		SSD		A		A		YML		YML

Concentration (100)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.5	14.5	14.5	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	9.8	9.9	9.9	9.8	10.2	9.9	9.9	9.9	9.8	9.8	9.8	9.7	9.8
pH	8.1	8.1	8.2	8.0	8.1	7.9	7.9	8.0	8.0	8.1	8.2	7.9	8.1	8.1
Cond. (µS/cm)	307	305		308		310		312		310		312		313
Initials	YML	A		YML		SSD		A		A		YML		YML

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: Temp-7 DO meter: DO-2/3 pH meter: pH-1/3 Conductivity meter: C-2/3

	Control	100%		
Hardness*	10	164		
Alkalinity*	10	156		

* mg/L as CaCO3

Analysts: SSD, AWD, YML
Reviewed by: [illegible]
Date reviewed: Nov-20/15

Sample Description: clear

Comments:

Embryo-~~Alevin-Fry~~ Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH-EEL-WS-2015-10-26-N
Work Order #: 15869
Start Date & Time: Oct 26/15 @ 1615h (7 AM)
Stop Date: Nov. 3/15 @ 1100h
Test Species: O. mykiss

Treatments % (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead ~~Fish~~ Eggs	Total Undeveloped	Total No. ~~Fry~~ Embryo	Total Exposed
Control	A	0	0	0	0	0	0	0	0	0	330	30
	B	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	C	↓	↓	↓	↓	↓	↓	↓	0	7	23	30
	D	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
100	A	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	B	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	C	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	D	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	A											
	B											
	C											
	D											
	A											
	B											
	C											
	D											
	A											
	B											
	C											
	D											
	A											
	B											
	C											
	D											
	A											
	B											
	C											
	D											
	A											
	B											
	C											
	D											
Tech Initials		YML	YML	KL	[illegible]	[illegible]	KL	KL	YML	YML	YML	YML

Comments:

Reviewed by: [signature] **Date reviewed:** Nov. 20/15

CETIS Summary Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Batch ID:	00-8430-3542	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	17-3819-8852	**Code:**	GH_ER2	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (4.5 °C)	**Station:**	GH_ER2_WS_2015_10_26_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
03-3005-0191	Proportion Normal	100	>100	NA	NA	1	Fisher Exact Test

Proportion Normal Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.875	0.7166	1	0.7667	1	0.04977	0.09954	11.38%	0.0%
100		4	0.8833	0.8527	0.914	0.8667	0.9	0.009623	0.01925	2.18%	-0.95%

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.9	0.7667	0.8333
100		0.8667	0.9	0.9	0.8667

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	27/30	23/30	25/30
100		26/30	27/30	27/30	26/30

CETIS Analytical Report

Test Code: 15869 | 05-1797-9701

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-3005-0191	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 12:50	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	00-8430-3542	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	17-3819-8852	**Code:**	GH_ER2	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (4.5 °C)	**Station:**	GH_ER2_WS_2015_10_26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes proportion normal

Fisher Exact Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		100	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Negative Contr	105	15	120	0.875	0.125	0.0%
100		106	14	120	0.8833	0.1167	-0.95%

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.9	0.7667	0.8333
100		0.8667	0.9	0.9	0.8667

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	27/30	23/30	25/30
100		26/30	27/30	27/30	26/30

Client: Teck

W.O.#: 15869

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
GH_ER2	Oct-27/15	50	7.6	7.7	150		50	8.2	164	KL
Dechlor	↓	↓	0.6	0.7	10		↓	0.5	10	EC

Notes:

Reviewed by: JM

Date Reviewed: Nov-20/15

Rainbow Trout Embryo Summary Sheet

Client: Teck (Line Creek) Start Date/Time: October 27, 2015 @ 1615h

Work Order No.: 15873 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 102715
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 1.00 g/L
Number of male broodstock used: 3
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15501
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9-3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2-7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

	Sample ID		
	LC_LCDSSLCC_WS_2015-10-26_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCh Date reviewed: Nov. 20/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-LCDSSLCC-WS2015-10-26-N
Work Order #: 15813

Start Date & Time: Oct 28/15 @ 1615h
Stop Date & Time: Nov 3/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: Control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.9	9.6	10.0	9.9	9.9	9.9	9.8	9.9	9.8	9.8	9.6	9.7	9.9
pH	6.8	6.9	7.0	6.9	6.9	7.0	6.9	7.0	7.1	7.0	7.1	6.8	6.9	6.8
Cond. (µS/cm)	33	35		34		33		35		35		34		35
Initials	YYL	YML		YML		SSD		A		A		YML		YML

Concentration: 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	10.0	9.8	10.0	9.9	9.9	9.9	9.8	9.8	9.5	9.9	9.8	9.7	9.9
pH	7.3	7.1	7.1	7.2	7.1	7.2	7.0	7.1	7.2	7.2	7.3	7.1	7.1	7.0
Cond. (µS/cm)	100	97		98		96		100		105		98		109
Initials	YYL	YML		YML		SSD		A		A		YML		YML

Concentration: 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	9.9	9.8	9.9	9.9	9.9	10.0	9.8	9.9	9.9	9.9	9.8	9.8	9.9
pH	7.9	7.7	7.5	7.7	7.4	7.6	7.3	7.3	7.5	7.4	7.5	7.5	7.4	7.3
Cond. (µS/cm)	277	264		278		274		280		282		281		288
Initials	YYL	YML		YML		SSD		A		A		YML		YML

Concentration: 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	14.5	14.5	15.0	14.5	14.0	14.5	14.5	14.6	14.5	14.6	14.5	14.5	14.5
DO (mg/L)	10.2	10.0	9.8	9.9	10.0	9.9	10.0	9.9	9.8	9.9	9.8	9.8	9.9	9.9
pH	8.1	8.1	8.1	8.0	8.1	8.1	8.0	8.0	8.0	8.1	8.0	8.1	7.9	8.0
Cond. (µS/cm)	862	861		864		867		872		870		867		868
Initials	YYL	YML		YML		SSD		A		A		YML		YML

Thermometer: Temp-7 **DO meter:** DO-2/3 **pH meter:** pH 1/3 **Conductivity meter:** C-2/3

	Control	100 %		
Hardness*	10	480		
Alkalinity*	10	192		

* mg/L as CaCO3

Analysts: YYL, AMD, SSD
Reviewed by: JCL
Date reviewed: Nov-20/15

Sample Description: clear

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_LCDSSLCC_WS2015-10-26_N
Work Order #: 15873
Start Date & Time: Oct 27/15 @ 1615h
Stop Date & Time: Nov 3rd/15 @ 1100h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	6	24	30
	2	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	3	↓	↓	↓	↓	↓	↓	↓	0	7	23	30
	4	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
6.25	1	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	2	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	3	↓	↓	↓	↓	↓	↓	↓	0	1	29	30
	4	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
12.5	1	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	2	↓	↓	↓	↓	↓	↓	↓	0	6	24	30
	3	↓	↓	↓	↓	↓	↓	↓	0	1	29	30
	4	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
25	1	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	2	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	3	↓	↓	↓	↓	↓	↓	↓	0	2	28	30
	4	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
50	1	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	2	↓	↓	↓	↓	↓	↓	↓	0	6	24	30
	3	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	4	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
100	1	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	2	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	3	↓	↓	↓	↓	↓	↓	1	1	2	27	30
	4	↓	↓	↓	↓	↓	↓	0	0	8	22	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	SSD	A	AD	KL	KL	YMC	YMC	YMC	YMC

Comments:

Reviewed by: JOL **Date reviewed:** Nov-20/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-5678-4505	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-0695-8960	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	205503	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.825	0.7667	0.8667	0.025	0.05	6.06%	0.0%	99	120
6.25		4	0.9	0.8333	0.9667	0.02722	0.05443	6.05%	-9.09%	108	120
12.5		4	0.8833	0.8	0.9667	0.03469	0.06939	7.86%	-7.07%	106	120
25		4	0.8833	0.8333	0.9333	0.02152	0.04303	4.87%	-7.07%	106	120
50		4	0.85	0.8	0.9	0.02152	0.04303	5.06%	-3.03%	102	120
100		4	0.8417	0.7333	0.9	0.03938	0.07876	9.36%	-2.02%	101	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8	0.8667	0.7667	0.8667
6.25		0.8333	0.9	0.9667	0.9
12.5		0.8667	0.8	0.9667	0.9
25		0.8333	0.8667	0.9333	0.9
50		0.8333	0.8	0.9	0.8667
100		0.9	0.8333	0.9	0.7333

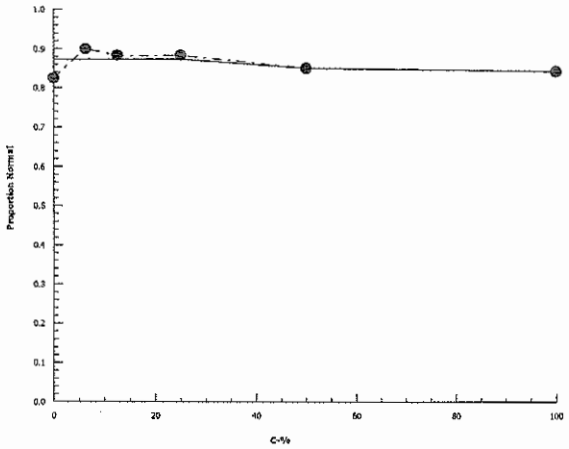
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	24/30	26/30	23/30	26/30
6.25		25/30	27/30	29/30	27/30
12.5		26/30	24/30	29/30	27/30
25		25/30	26/30	28/30	27/30
50		25/30	24/30	27/30	26/30
100		27/30	25/30	27/30	22/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-5678-4505	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Embryo Summary Sheet

Client: Teck (Line Creek) Start Date/Time: October 27, 2015 @ 1615h

Work Order No.: 15873 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DCI_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: ~~x~~ 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 102715
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 1.00 g/L
Number of male broodstock used: 3
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15501
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9-3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2-7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

	Sample ID		
	LC-DCI_WS_2015-10-26_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JBL Date reviewed: Nov. 20/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-DCI-WS-2015-10-26-N
Work Order #: 15873

Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3/15 @ 1130h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: Control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.8	9.7	10.0	9.9	9.9	9.9	9.8	9.6	9.8	9.9	9.6	9.8	10.0
pH	6.8	6.9	6.9	6.9	6.9	7.0	6.9	7.0	7.1	7.0	7.1	6.8	7.0	7.0
Cond. (µS/cm)	33	35		34		33		36		35		34		35
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Concentration: 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	9.9	9.8	10.0	9.8	10.0	9.9	9.9	9.5	9.8	9.8	9.6	9.9	10.0
pH	7.1	7.2	7.2	7.2	7.2	7.2	7.1	7.2	7.2	7.2	7.3	7.2	7.2	7.2
Cond. (µS/cm)	53	52		51		52		55		54		55		55
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Concentration: 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.9	9.8	9.8	9.9	9.8	10.0	10.0	9.9	9.8	9.8	9.8	9.6	9.9	10.0
pH	7.5	7.5	7.5	7.6	7.5	7.5	7.4	7.5	7.5	7.6	7.7	7.6	7.6	7.6
Cond. (µS/cm)	108	108		106		112		115		116		111		112
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Concentration: 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	14.0	14.5	14.5	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	10.0	9.8	10.1	9.9	10.0	10.0	9.9	9.8	9.9	9.9	9.4	9.8	10.1
pH	8.1	8.2	8.0	8.1	8.1	8.2	8.0	8.1	8.0	8.1	8.1	8.1	8.0	7.9
Cond. (µS/cm)	326	325		328		326		329		330		330		332
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Thermometer: Temp-7 DO meter: DO-2/3 pH meter: pH 1/3 Conductivity meter: C-2/3

	Control	100 %		
Hardness*	10	180		
Alkalinity*	10	180		

* mg/L as CaCO3

Analysts: YYL, AMD, SSD

Reviewed by: JCL

Date reviewed: Nov. 20/15

Sample Description: clear

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_DC1_WS_2015-10-26_N
Work Order #: 15873
Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3rd/15 @ 1130h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	2	28	30
	2	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	3	↓	↓	↓	↓	↓	↓	↓	0	0	30	30
	4	↓	↓	↓	↓	↓	↓	↓	0	2	28	30
6.25	1	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	2	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	3	↓	↓	↓	↓	1	↓	↓	1	6	23	30
	4	↓	↓	↓	↓	0	↓	↓	0	3	27	30
12.5	1	↓	↓	↓	↓	↓	↓	↓	0	0	30	30
	2	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	3	↓	↓	↓	↓	↓	↓	↓	0	2	28	30
	4	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
25	1	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	2	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	3	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	4	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
50	1	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	2	↓	↓	↓	↓	0	↓	↓	0	3	27	30
	3	↓	↓	↓	↓	1	↓	1	2	3	25	30
	4	↓	↓	↓	↓	1	↓	0	1	5	24	30
100	1	↓	↓	↓	↓	5	↓	↓	0	2	28	30
	2	↓	↓	↓	↓	2	↓	↓	0	2	28	30
	3	↓	↓	↓	↓	0	1	↓	1	2	27	30
	4	↓	↓	↓	↓	2	0	1	1	3	26	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	SSD	A	A	KL	KL	YML	YML	YML	YML

Comments:

Reviewed by: JOL **Date reviewed:** Nov. 20/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	02-5088-1826	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	08-3967-2525	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 11:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	67131	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	4.511	0.001655	N/A	22.17	NA	60430
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9333	0.8667	1	0.02722	0.05443	5.83%	0.0%	112	120
6.25		4	0.8417	0.7667	0.9	0.02846	0.05693	6.76%	9.82%	101	120
12.5		4	0.9167	0.8333	1	0.03469	0.06939	7.57%	1.79%	110	120
25		4	0.8583	0.8333	0.9	0.01596	0.03191	3.72%	8.04%	103	120
50		4	0.85	0.8	0.9	0.02152	0.04303	5.06%	8.93%	102	120
100		4	0.9083	0.8667	0.9333	0.01596	0.03191	3.51%	2.68%	109	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9333	0.8667	1	0.9333
6.25		0.8333	0.8667	0.7667	0.9
12.5		1	0.9	0.9333	0.8333
25		0.8333	0.8667	0.9	0.8333
50		0.8667	0.9	0.8333	0.8
100		0.9333	0.9333	0.9	0.8667

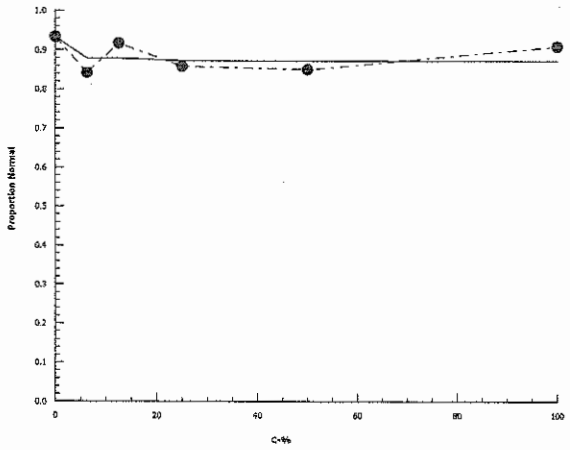
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	28/30	26/30	30/30	28/30
6.25		25/30	26/30	23/30	27/30
12.5		30/30	27/30	28/30	25/30
25		25/30	26/30	27/30	25/30
50		26/30	27/30	25/30	24/30
100		28/30	28/30	27/30	26/30

Salmonid Embryo Survival and Development Test | **Nautilus Environmental**

Analysis ID:	02-5088-1826	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: Nov. 20/15

Rainbow Trout Embryo Summary Sheet

Client: Teck (Line Creek) Start Date/Time: October 27, 2015 @ 1615h

Work Order No.: 15873 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_FRDSDC_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 102715
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 1.00 g/L
Number of male broodstock used: 3
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15501
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9-3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2-7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

	Sample ID		
	LC-FRDSDC_WS-2015-10-26_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JBL Date reviewed: Nov. 20/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-FRDSDC_WS-2015-10-26N
Work Order #: 15873

Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 23/15 @ 1145h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration Control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.9	9.8	10.0	10.0	9.9	9.9	9.8	9.9	9.8	9.9	9.6	9.7	9.8
pH	6.8	6.9	6.9	6.9	6.9	7.0	6.9	7.0	7.1	7.0	7.0	6.8	6.9	7.0
Cond. (µS/cm)	33	35		34		33		35		35		34		35
Initials	YYL	YUL		YUL		SSD		A		A		YUL		YUL

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.8	9.7	9.8	9.9	10.0	9.8	9.9	9.8	9.9	9.9	9.8	9.7	9.8
pH	7.0	7.2	7.1	7.3	7.1	7.2	7.0	7.2	7.1	7.1	7.2	7.3	7.2	7.2
Cond. (µS/cm)	87	85 ~~8.5~~ YUL		87		86		90		91		89		90
Initials	YYL	YUL		YUL		SSD		A		A		YUL		YUL

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	9.8	9.8	9.7	9.9	9.9	9.8	9.9	9.9	9.9	9.8	9.8	9.6	9.9
pH	7.4	7.6	7.5	7.7	7.5	7.6	7.4	7.7	7.3	7.6	7.7	7.6	7.6	7.6
Cond. (µS/cm)	231	236		241		236		235		240		244		241
Initials	YYL	YUL		YUL		SSD		A		A		YUL		YUL

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.0	14.5	14.5	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	10.1	9.9	9.9	10.0	10.1	9.9	9.9	9.8	10.0	9.8	9.8	9.7	9.9
pH	8.0	8.1	8.0	8.1	8.1	8.1	8.0	8.1	8.0	8.1	8.1	8.0	8.1	8.0
Cond. (µS/cm)	732	732		733		731		733		735		739		733
Initials	YYL	YUL		YUL		SSD		A		A		YUL		YUL

Thermometer: Temp-7 **DO meter:** DO-2/3 **pH meter:** pH 1/3 **Conductivity meter:** C-2/3

	Control	100 %		
Hardness*	10	520		
Alkalinity*	10	176		

* mg/L as CaCO3

Analysts: YYL, AND, SSD

Reviewed by: [signature]

Date reviewed: Nov-20/15

Sample Description: clear

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC-FRDSDC-WS-2015-10-26-N
Work Order #: 15973
Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3rd/15 @ 1145h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	0	30	30
	2								0	2	27	29
	3								0	1	29	30
	4								0	2	28	30
6.25	1								0	5	25	30
	2								0	2	28	30
	3						↓		0	5	25	30
	4						1		1	3	26	30
12.5	1						0		0	1	29	30
	2								0	2	28	30
	3								0	4	26	30
	4								0	4	26	30
25	1								0	5	25	30
	2								0	5	25	30
	3								0	3	27	30
	4								0	3	27	30
50	1								0	2	28	30
	2								0	2	28	30
	3								0	1	29	30
	4								0	1	29	30
100	1								0	2	28	30
	2								0	4	26	30
	3						↓		0	4	26	30
	4	↓	↓	↓	↓	↓	2	↓	2	2	25	29
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	SSD	A	AD	KL	KL	YML	YML	YML	YML

Comments:

Reviewed by: JCL **Date reviewed:** Nov. 20/15

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-1104-3745	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	13-5183-1846	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 11:45	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1984984	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	3.854	0.7596	129.9	25.95	0.7699	131.6
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9578	0.931	1	0.01626	0.03253	3.4%	0.0%	114	119
6.25		4	0.8667	0.8333	0.9333	0.02357	0.04714	5.44%	9.51%	104	120
12.5		4	0.9083	0.8667	0.9667	0.025	0.05	5.51%	5.16%	109	120
25		4	0.8667	0.8333	0.9	0.01924	0.03849	4.44%	9.51%	104	120
50		4	0.95	0.9333	0.9667	0.009622	0.01924	2.03%	0.81%	114	120
100		4	0.8822	0.8621	0.9333	0.01708	0.03417	3.87%	7.89%	105	119

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.931	0.9667	0.9333
6.25		0.8333	0.9333	0.8333	0.8667
12.5		0.9667	0.9333	0.8667	0.8667
25		0.8333	0.8333	0.9	0.9
50		0.9333	0.9333	0.9667	0.9667
100		0.9333	0.8667	0.8667	0.8621

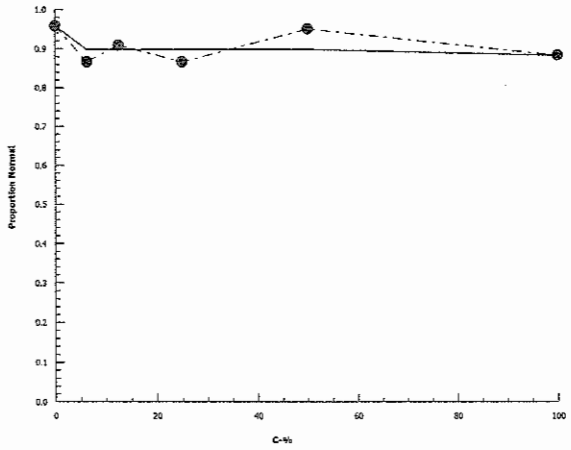
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	27/29	29/30	28/30
6.25		25/30	28/30	25/30	26/30
12.5		29/30	28/30	26/30	26/30
25		25/30	25/30	27/30	27/30
50		28/30	28/30	29/30	29/30
100		28/30	26/30	26/30	25/29

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-1104-3745	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Embryo Summary Sheet

Client: Teck (Line Creek) Start Date/Time: October 27, 2015 @ 1615h

Work Order No.: 15873 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC-DCDS-WS-2015-10-26-N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: ~ 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 102715
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 1.00 g/L
Number of male broodstock used: 3
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15501
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9-3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2-7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

	Sample ID		
	LC-DCDS-WS-2015-10-26-N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JBL Date reviewed: Nov. 20/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_DCDS_WS_2015-10-26_N
Work Order #: 15873

Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3/15 @ 1200h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: Control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.9	9.7	10.0	9.9	9.9	9.8	9.8	9.7	9.8	9.9	9.6	9.7	9.8
pH	6.8	6.9	6.9	6.9	7.0	7.0	7.0	7.0	6.9	7.0	7.1	6.8	6.9	7.1
Cond. (µS/cm)	33	35		34		33		35		35		34		35
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Concentration: 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.7	9.6	9.7	9.9	10.0	9.9	9.9	9.7	9.9	9.8	9.5	9.8	9.9
pH	7.0	7.1	7.1	7.2	7.1	7.3	7.1	7.2	7.2	7.2	7.3	7.3	7.2	7.3
Cond. (µS/cm)	49	50		50		48		49		52		51		57
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Concentration: 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.8	9.7	9.7	10.0	10.0	9.9	9.9	9.8	9.9	9.8	9.6	9.8	9.8
pH	7.3	7.5	7.4	7.5	7.4	7.5	7.3	7.6	7.4	7.7	7.8	7.5	7.5	7.5
Cond. (µS/cm)	90	99		96		95		100		102		101		117
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Concentration: 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.5	14.5	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	10.1	9.7	9.9	10.1	10.0	9.8	9.9	9.9	9.8	9.3	9.6	9.9	9.7
pH	8.3	8.4	7.9	8.3	7.9	8.3	7.8	8.2	7.9	8.2	8.2	8.2	8.0	7.9
Cond. (µS/cm)	258	257		259		258		262		265		264		267
Initials	YYL	YYL		YYL		SSD		A		A		YYL		YYL

Thermometer: Temp-7 **DO meter:** DO-2/3 **pH meter:** pH 1/3 **Conductivity meter:** C-2/3

	Control	100 %		
Hardness*	10	158		
Alkalinity*	10	132		

* mg/L as CaCO3

Analysts: YYL, AWD, SSD

Reviewed by: JOC

Date reviewed: Nov. 20/15

Sample Description: Clear

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_DCDS_WS_2015-10-26
Work Order #: 15873
Start Date & Time: Oct 27/15 @ 1615h
Stop Date & Time: Nov 3/15 @ 1200h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	5	25	30
	2								0	4	26	30
	3								0	3	27	30
	4								0	3	27	30
6.25	1								0	1	29	30
	2								0	7	23	30
	3								0	1	29	30
	4								0	3	27	30
12.5	1								0	4	26	30
	2								0	1	29	30
	3								0	5	25	30
	4								0	6	24	30
25	1								0	3	27	30
	2							↓	0	5	25	30
	3							1	1	4	25	30
	4							0	0	2	28	30
50	1								0	9	21	30
	2								0	7	23	30
	3								0	2	28	30
	4								0	2	28	30
100	1								0	4	26	30
	2								0	5	25	30
	3								0	7	23	30
	4	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	SSD	A	AD	KL	KL	YMK	YMK	YMK	YMK

Comments:

Reviewed by: JCh **Date reviewed:** Nov. 20/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	10-2180-6082	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-8627-5619	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 12:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1164262	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	41.77	N/A	N/A	2.394	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.875	0.8333	0.9	0.01596	0.03191	3.65%	0.0%	105	120
6.25		4	0.9	0.7667	0.9667	0.04714	0.09428	10.48%	-2.86%	108	120
12.5		4	0.8667	0.8	0.9667	0.036	0.07201	8.31%	0.95%	104	120
25		4	0.875	0.8333	0.9333	0.025	0.05	5.71%	0.0%	105	120
50		4	0.8333	0.7	0.9333	0.05932	0.1186	14.24%	4.76%	100	120
100		4	0.825	0.7667	0.8667	0.02097	0.04194	5.08%	5.71%	99	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8333	0.8667	0.9	0.9
6.25		0.9667	0.7667	0.9667	0.9
12.5		0.8667	0.9667	0.8333	0.8
25		0.9	0.8333	0.8333	0.9333
50		0.7	0.7667	0.9333	0.9333
100		0.8667	0.8333	0.7667	0.8333

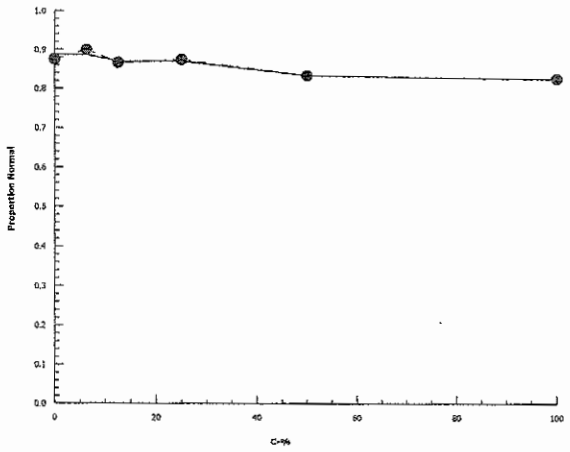
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	25/30	26/30	27/30	27/30
6.25		29/30	23/30	29/30	27/30
12.5		26/30	29/30	25/30	24/30
25		27/30	25/30	25/30	28/30
50		21/30	23/30	28/30	28/30
100		26/30	25/30	23/30	25/30

Salmonid Embryo Survival and Development Test | **Nautilus Environmental**

Analysis ID:	10-2180-6082	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 7:58	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Embryo Summary Sheet

Client: Teck (Line Creek) Start Date/Time: October 27, 2015 @ 1615h

Work Order No.: 15873 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC-LCS-WS-2015-10-26-N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 102715
Source: Vancouver Island Trout Hatchery, Duncan, BC
Loading Density: 1.00 g/L
Number of male broodstock used: 3
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE80
Stock Solution ID: 15501
Date Initiated: October 27, 2015
7-d EC50 (95% CL): 3.0 (2.9-3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.2-7.4) mg/L SDS
Reference Toxicant CV (%): 36

Test Results:

	Sample ID		
	LC-LCS-WS-2015-10-26-N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JOH Date reviewed: Nov. 20/15

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_LCS_WS_2015-10-26_N
Work Order #: 15873
Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3/15 @ 1215h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: Control	Days														
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.6	14.5	14.6	14.5	14.5	14.5
DO (mg/L)	9.8	9.9	9.9	10.0	9.7	9.9	9.9	9.8	9.8	9.8	9.7	9.6	9.9	9.8
pH	6.8	6.9	7.0	6.9	7.0	7.0	6.9	7.0	7.1	7.0	7.1	6.8	7.0	7.1
Cond. (µS/cm)	33	35		34		33		35		35		34		34
Initials	YYL	YYL		YMC		SSD		A		A		YMC		YMC

Concentration: 6.25	Days														
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.6	14.5	14.5	14.5
DO (mg/L)	9.8	9.8	9.8	10.0	9.8	9.9	10.0	9.9	9.9	9.8	9.8	9.7	9.8	9.8
pH	7.2	7.2	7.1	7.2	7.0	7.2	6.9	7.2	7.1	7.3	7.4	7.3	7.2	7.3
Cond. (µS/cm)	86	84		87		85		86		90		86		87
Initials	YYL	YMC		YMC		SSD		A		A		YMC		YMC

Concentration: 25	Days														
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.6	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	9.8	9.8	9.8	10.0	9.8	9.9	9.9	9.8	9.8	9.8	9.8	9.7	9.9	9.8
pH	7.6	7.7	7.6	7.8	7.5	7.7	7.3	7.6	7.2	7.7	7.8	7.6	7.7	7.6
Cond. (µS/cm)	232	237		244		236		244		242		246		245
Initials	YYL	YMC		YMC		SSD		A		A		YMC		YMC

Concentration: 100	Days														
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.5	14.6	14.5	14.5	14.5
DO (mg/L)	9.7	9.9	9.9	10.1	9.8	10.0	9.9	9.9	9.8	9.9	9.9	9.6	9.9	9.9
pH	8.1	8.2	8.0	8.2	8.0	8.0	8.0	8.1	7.9	8.0	8.1	8.2	8.1	8.0
Cond. (µS/cm)	727	728		722		718		734		730		724		730
Initials	YYL	YMC		YMC		SSD		A		A		YMC		YMC

Thermometer: Temp-7 **DO meter:** DO-2/3 **pH meter:** pH 1/3 **Conductivity meter:** C-2/3

	Control	100 %		
Hardness*	10	380		
Alkalinity*	10	162		

* mg/L as CaCO3

Analysts: YYL, AND, SSD
Reviewed by: JCK
Date reviewed: Nov-20/15

Sample Description: clear

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC-LCS_WS_2015-10-26_N
Work Order #: 15873
Start Date & Time: Oct 26/15 @ 1615h
Stop Date & Time: Nov 3rd/15 @ 1215h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	2	28	30
	2	↓	↓	↓	↓	↓	↓	↓	0	1	29	30
	3								0	4	26	30
	4								0	3	27	30
6.25	1								0	5	25	30
	2								0	0	30	30
	3								0	4	26	30
	4								0	4	26	30
12.5	1								0	0	30	30
	2								0	0	30	30
	3								0	2	28	30
	4								0	2	28	30
25	1								0	1	29	30
	2								0	5	25	30
	3								0	1	29	30
	4								0	3	27	30
50	1								0	7	23	30
	2								0	4	26	30
	3								0	3	27	30
	4							↓	0	1	29	30
100	1							1	1	0	29	30
	2					↓		0	0	1	29	30
	3						↓	↓	0	3	27	30
	4	↓	↓	↓	↓	1	6	↓	7	4	19	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	SSD	A	A	KL	KL	MMC	MMC	MMC	MMC

Comments:

Reviewed by: JCh **Date reviewed:** Nov. 20/15

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-0076-6746	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 8:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-6257-3757	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	27 Oct-15 16:15	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 Nov-15 12:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1861063	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	47	4.375	N/A	2.128	NA	22.86
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9167	0.8667	0.9667	0.02152	0.04303	4.7%	0.0%	110	120
6.25		4	0.8917	0.8333	1	0.03696	0.07391	8.29%	2.73%	107	120
12.5		4	0.9667	0.9333	1	0.01924	0.03849	3.98%	-5.46%	116	120
25		4	0.9167	0.8333	0.9667	0.03191	0.06383	6.96%	0.0%	110	120
50		4	0.875	0.7667	0.9667	0.04167	0.08333	9.52%	4.55%	105	120
100		4	0.8667	0.6333	0.9667	0.07935	0.1587	18.31%	5.46%	104	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9333	0.9667	0.8667	0.9
6.25		0.8333	1	0.8667	0.8667
12.5		1	1	0.9333	0.9333
25		0.9667	0.8333	0.9667	0.9
50		0.7667	0.8667	0.9	0.9667
100		0.9667	0.9667	0.9	0.6333

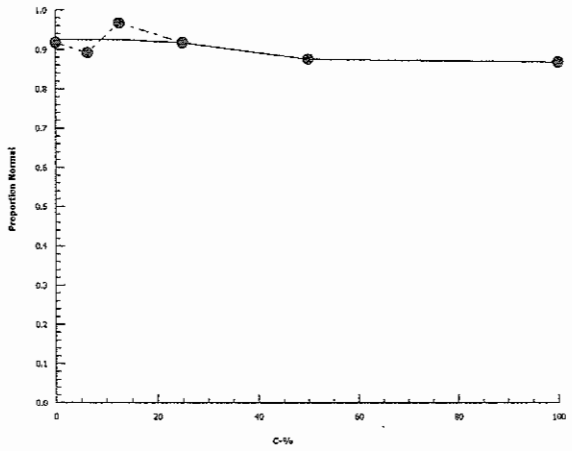
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	28/30	29/30	26/30	27/30
6.25		25/30	30/30	26/30	26/30
12.5		30/30	30/30	28/30	28/30
25		29/30	25/30	29/30	27/30
50		23/30	26/30	27/30	29/30
100		29/30	29/30	27/30	19/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	03-0076-6746	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 8:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: JGL Nov-20/15

Client: Teck (Line Creek)

W.O.#: 15873

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID WS-2015-10-26-N	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/L CaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
LC_LCDSSLCC_A	Oct27/15	50	9.7	9.8	192		100①	4.8	480	KL
LC_DC1_WS-2015-10-26-N	↓	↓	9.1	9.2	180		50	9.3	186	↓
LC_FRDSDC_WS-2015-10-26-N			8.9	9.0	176		100①	5.2	520	
LC_DCDS_WS-2015-10-26-N			6.8	7.0	132		50	7.9	158	
LC_LC5_WS-2015-10-26-N			8.3	8.5	162		100①	3.8	380	
Dechlor	Oct. 27/15	50	0.6	0.7	10		50	0.5	10	EC

Notes: ① Sample diluted w/ DI up to 100mL

Reviewed by: JM

Date Reviewed: Nov. 20/15

APPENDIX C – ***Lemna minor*** **Toxicity Test Data**

Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 15872

Start Date: October 29, 2015
Set up by: JW

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: 8x20L

Test Organism Information:

Culture Date: 102215
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (29 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 125
Date Initiated: October 21, 2015

7-d No. of Fronds IC50 (95% CL): 4.3 (3.9-4.7) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.2 (3.2-5.5) g/L KCl CV (%): 14

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	50.3 ~~(28.1-69.5)~~ (27.5-68.7)	>97
	IC50 %(v/v) (95% CL)	90.3 ~~(78.6-99.1)~~ (76.4-97)	>97

Reviewed by: JW
Date reviewed: Nov. 20/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: JW

Sample ID: LC_ LCDSSLCC_WS_2015-10-26_N | Test Date: Oct 29, 2015

Work Order No.: 15872 | Test Species: *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 7 days | > 8X Growth? (Y/N): Y (29 fronds)

Light Intensity Range: 4030 - 4730 lux | Date Measured: Oct 28, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	26.0	27.0	26.0	26.0	26.0	26.0	27.0	27.0 26.0
Initials	JW	ML	JW		ML	ML	ML	ML

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	26.5	Aeration?: 20 min	26.5
DO (mg/L)	8.1	Nutrients added?: Y →	7.9
pH	8.1		8.0
Conductivity (µS)	865		1589

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	26.0	25.0	8.3	8.9	895
1.5	25.5	25.0	8.2	9.3	902
3.0	25.5	25.0	8.2	9.6	920
6.1	25.5	25.0	8.2	9.1	945
12.1	25.5	25.0	8.2	9.2	991
24.2	25.5	25.0	8.2	9.0	1082
48.5	26.0	25.0	8.1	9.8 8	1257
97	26.5	25.0	8.0	8.5	1589
Initials	JW	KL	JW	KL	JW

Instruments: Thermometer: CER-4 Cond. Meter: C-4 pH meter: PH-2

Sample Description: Clear

Comments: Light Meter = Lit-1

Reviewed: JW Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - LCDSSLCC - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 29 , 2015
Termination Date: November 5 , 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	88										MG
	B	6	88										
	C	6	93										
	D	6	83										
1.5	A	6	80										
	B	6	83										
	C	6	81										
	D	6	79										
3.0	A	6	79										
	B	6	66										
	C	6	96										
	D	6	82										
6.1	A	6	96										
	B	6	99										
	C	6	95										
	D	6	95										
12.1	A	6	75			X							
	B	6	83										
	C	6	85										
	D	6	95										
24.2	A	6	75		X								
	B	6	93										
	C	6	86										
	D	6	84										↓

Comments:

Reviewed by: JGa

Date Reviewed: Nov 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - LCDSSLCC - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 29 , 2015
Termination Date: November 5 , 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	50			X			X				MLT
	B	6	74		X	X							
	C	6	84			X							
	D	6	67		X	X							
97	A	6	47		X								
	B	6	45		X								
	C	6	42		X								
	D	6	44		X								
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JCh

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Start Date: October 29 , 2015
Sample ID: LC - LCDSSLCC - WS - 2015 - 10 - 26 - N
Termination Date: November 5 , 2015
WO #: 15872
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		CC Black			
	A	1	975.10	981.98	JW / RMT
Control	B	2	987.26	993.94	
	C	3	980.23	987.45	
	D	4	976.45	982.93	
1.5	A	5	994.769 JW	1000.76	
	B	6	971.98	978.15	
	C	7	985.78	992.25	
	D	8	971.64	977.53	
3.0	A	9	964.14	970.13	
	B	10	1008.65	1013.54	
	C	11	978.95	985.98	
	D	12	995.03	1001.98	
6.1	A	13	991.73	999.32	
	B	14	960.90	968.48	
	C	15	971.38	978.35	
	D	16	977.31	984.62	
12.1	A	17	988.42	993.69	
	B	18	987.84	994.14	
	C	19	1046.20	1052.32	
	D	20	1018.54	1025.88	
24.2	A	21	1028.70	1035.00	
	B	22	1005.78	1012.85	
	C	23	988.96	995.66	
	D	24	1018.75	1025.70	
48.5	A	25	1039.09	1043.08	
	B	26	1038.29	1044.44	
	C	27	1024.39	1031.22	
	D	28	985.14	990.26	↓

Comments: 10% reweigh: #2: 993.94, #12: 1001.92, #26: 1044.32

Reviewed by: JOL
Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Start Date: October 29 , 2015
Sample ID: LC_LCDSSLCC_WS_2015-10-26_N
Termination Date: November 5 , 2015
WO #: 15872
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		CC Block			
	A	29	1037.45	1043.15	JW / MC
97	B	30	1045.22	1050.73	
	C	31	1027.91	1033.01	
	D	32	1049.56	1055.26	
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% reweigh: #32: 1055.20

Reviewed by: JCh
Date Reviewed: Nov. 19/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-0116-7324	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 14:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-8226-0060	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	29 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	72h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	89256	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	24.86	N/A	31.77	4.023	3.148	NA
IC10	29.82	7.735	60.54	3.353	1.652	12.93
IC15	35.75	21.17	63.29	2.797	1.58	4.724
IC20	42.81	25.04	65.85	2.336	1.519	3.994
IC25	50.27	27.49	68.71	1.989	1.455	3.637
IC40	71.5	35.67	83.25	1.399	1.201	2.803
IC50	90.34	76.39	98.99	1.107	1.01	1.309

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	82	77	87	2.041	4.082	4.98%	0.0%
1.5		4	74.75	73	77	0.8539	1.708	2.29%	8.84%
3		4	74.75	60	90	6.156	12.31	16.47%	8.84%
6.1		4	90.25	89	93	0.9465	1.893	2.1%	-10.06%
12.1		4	78.5	69	89	4.113	8.226	10.48%	4.27%
24.2		4	78.5	69	87	3.708	7.416	9.45%	4.27%
48.5		4	62.75	44	78	7.157	14.31	22.81%	23.48%
97		4	38.5	36	41	1.041	2.082	5.41%	53.05%

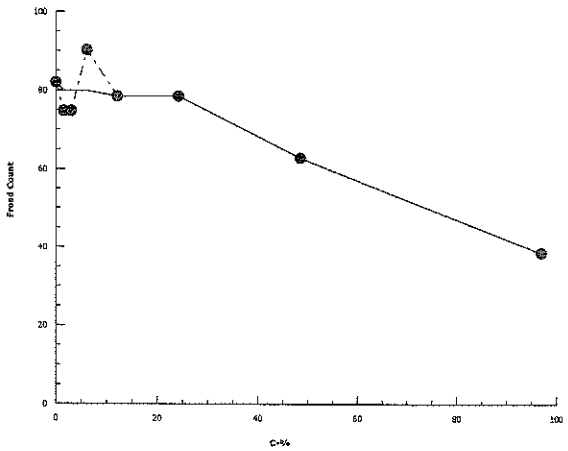
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	82	82	87	77
1.5		74	77	75	73
3		73	60	90	76
6.1		90	93	89	89
12.1		69	77	79	89
24.2		69	87	80	78
48.5		44	68	78	61
97		41	39	36	38

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	16-0116-7324	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 14:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	05-2327-6649	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 14:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-8226-0060	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	29 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	72h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1177875	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	24.76	N/A	57.71	4.04	1.733	NA
IC10	31.48	N/A	83.64	3.176	1.196	NA
IC15	39.97	26.3	123.7	2.502	0.8081	3.803
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.815	6.48	7.22	0.1578	0.3156	4.63%	0.0%
1.5		4	6.15	5.89	6.47	0.1214	0.2427	3.95%	9.76%
3		4	6.215	4.89	7.03	0.5009	1.002	16.12%	8.81%
6.1		4	7.362	6.97	7.59	0.146	0.2921	3.97%	-8.03%
12.1		4	6.258	5.27	7.34	0.425	0.85	13.58%	8.18%
24.2		4	6.755	6.3	7.07	0.1701	0.3402	5.04%	0.88%
48.5		4	5.515	3.99	6.83	0.6176	1.235	22.4%	19.08%
97		4	5.503	5.1	5.7	0.1415	0.2829	5.14%	19.26%

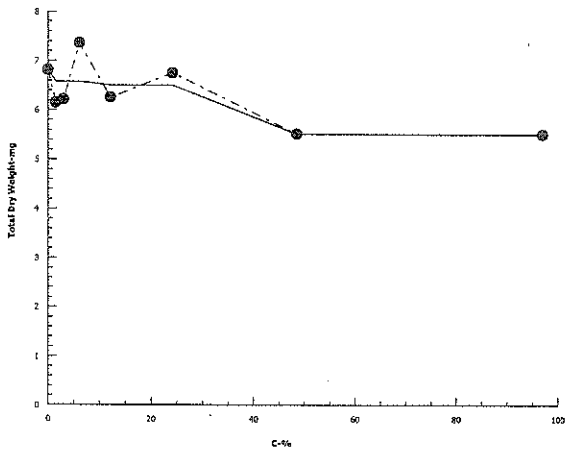
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.88	6.68	7.22	6.48
1.5		6.07	6.17	6.47	5.89
3		5.99	4.89	7.03	6.95
6.1		7.59	7.58	6.97	7.31
12.1		5.27	6.3	6.12	7.34
24.2		6.3	7.07	6.7	6.95
48.5		3.99	6.12	6.83	5.12
97		5.7	5.51	5.1	5.7

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	05-2327-6649	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 14:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: JOL Nov-19/15

Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 15872

Start Date: October 28 , 2015
Set up by: JW

Sample Information:

Sample ID: LC - DC L - WS - 2015 - 10 - 26 - N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 102115
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (29 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: LM 125
Date Initiated: October 21, 2015

7-d No. of Fronds IC50 (95% CL): 4.3 (3.9 - 4.7) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.2 (3.2 - 5.5) g/L KCl CV (%): 14

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	>97	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JOH

Date reviewed: NOV. 19/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck Coal

Sample ID: LC_DCL_WS_2015-10-26_N

Work Order No.: 15872

Culture Source: CPCC # 490

Test Culture Age: 7 days

Light Intensity Range: 4000 - 4680 lux

Setup by: JW

Test Date: Oct 28 , 2015

Test Species: *Lemna minor*

> 8X Growth? (Y/N): Y (29 fronds)

Date Measured: Oct 28 , 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	26.0	27.0	26.0	26.0	26.0	26.0	27.0
Initials	JW	JW	MLT	JW	A	MLT	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	27.0	Aeration?: 20 min	25.0
DO (mg/L)	9.0	Nutrients added?: Y →	8.2
pH	8.1		8.0
Conductivity (µS)	331		1146

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	25.5	26.5	8.2	8.3	884
1.5	25.0	26.5	8.2	8.4	885
3.0	25.0	26.5	8.2	8.7	890
6.1	25.0	26.5	8.2	8.5	900
12.1	25.0	26.5	8.2	8.5	920
24.2	25.0	26.5	8.1	8.6	951
48.5	25.0	26.5	8.1	8.7	1013
97	25.0	26.5	8.0	9.0	1146
Initials	JW	JW	JW	JW	JW

Instruments: Thermometer: CER - 4 Cond. Meter: C-4 pH meter: PH - 2

Sample Description: Clear

Comments: Light Meter = Lit - L

Reviewed: JOL Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - DCL - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 28, 2015
Termination Date: November 4, 2015
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	76										JW
	B	6	77										
	C	6	73										
	D	6	74										
1.5	A	6	67										
	B	6	65										
	C	6	66										
	D	6	65										
3.0	A	6	83										
	B	6	74										
	C	6	64										
	D	6	78										
6.1	A	6	64										
	B	6	64										
	C	6	66										
	D	6	51		X								
12.1	A	6	80										
	B	6	74										
	C	6	65										
	D	6	69										
24.2	A	6	73										
	B	6	66										
	C	6	89										
	D	6	74										↓

Comments:

Reviewed by: JW

Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - DCL - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	61										JW
	B	6	76										
	C	6	88										
	D	6	71										
97	A	6	74										
	B	6	82										
	C	6	75										
	D	6	60										
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JCh

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - DC 1 - WS - 2015 - 10 - 26 - N
WO #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DC1 Green			
	A	1	990.21	994.70	JW / ML
	B	2	987.70	992.71	
Control	C	3	983.65	988.36	
	D	4	982.32	986.65	
	A	5	1035.27	1039.44	
	B	6	1026.82	1030.66	
1.5	C	7	1027.12	1031.29	
	D	8	986.05	989.99	
	A	9	978.57	983.53	
	B	10	982.29	986.37	
3.0	C	11	981.02	985.39	
	D	12	989.35	994.75	
	A	13	991.64	995.84	
	B	14	977.64	982.35	
6.1	C	15	988.27	992.61	
	D	16	985.83	988.88	
	A	17	987.02	992.42	
	B	18	1037.62	1042.77	
12.1	C	19	1006.91	1011.02	
	D	20	1024.44	1029.26	
	A	21	1025.58	1030.43	
	B	22	981.73	986.16	
24.2	C	23	991.84	998.12	
	D	24	975.~~60~~ 58 JW	979.90	
	A	25	987.27	991.~~35~~ 40	
	B	26	979.02	984.44	
48.5	C	27	979.00	984.56	
	D	28	979.94	984.94	↓

Comments: 10% re-weigh: #4: 986.67, #13: 995.82, #27: 984.56

Reviewed by: JW Date Reviewed: Nov-19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_DC1_WS_2015-10-26_N
WO #: 15872

Start Date: October 28, 2015
Termination Date: November 4, 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)					
	A	29	981.95	987.25	JW / MLT
97	B	30	978.46	984.56	↓
	C	31	985.18	990.20	
	D	32	983.89	988.40	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% re-weigh: #32: 988.33

Reviewed by: JOH

Date Reviewed: Nov. 19/15

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	00-3191-7811	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1663458	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	1.145	0.3383	N/A	87.35	NA	295.6
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	69	67	71	0.9129	1.826	2.65%	0.0%
1.5		4	59.75	59	61	0.4787	0.9574	1.6%	13.41%
3		4	68.75	58	77	4.029	8.057	11.72%	0.36%
6.1		4	55.25	45	60	3.449	6.898	12.49%	19.93%
12.1		4	66	59	74	3.24	6.481	9.82%	4.35%
24.2		4	69.5	60	83	4.839	9.678	13.93%	-0.72%
48.5		4	68	55	82	5.612	11.22	16.51%	1.45%
97		4	66.75	54	76	4.608	9.215	13.81%	3.26%

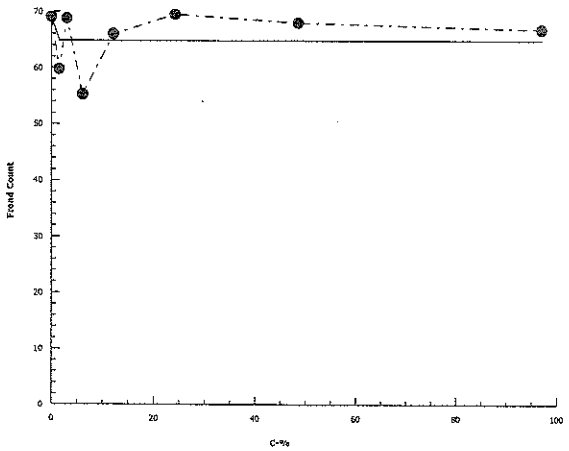
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	70	71	67	68
1.5		61	59	60	59
3		77	68	58	72
6.1		58	58	60	45
12.1		74	68	59	63
24.2		67	60	83	68
48.5		55	70	82	65
97		68	76	69	54

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	00-3191-7811	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: Nov. 19/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-2663-0271	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:34	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	343248	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	4.635	4.33	5.01	0.1473	0.2946	6.36%	0.0%
1.5		4	4.03	3.84	4.17	0.08335	0.1667	4.14%	13.05%
3		4	4.703	4.08	5.4	0.2959	0.5919	12.59%	-1.46%
6.1		4	4.075	3.05	4.71	0.3582	0.7164	17.58%	12.08%
12.1		4	4.87	4.11	5.4	0.2798	0.5596	11.49%	-5.07%
24.2		4	4.97	4.32	6.28	0.4513	0.9027	18.16%	-7.23%
48.5		4	5.027	4.13	5.56	0.322	0.6439	12.81%	-8.47%
97		4	5.232	4.51	6.1	0.3322	0.6644	12.7%	-12.89%

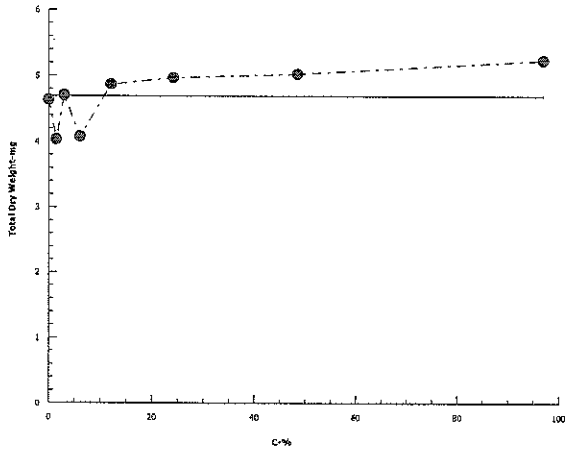
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	4.49	5.01	4.71	4.33
1.5		4.17	3.84	4.17	3.94
3		4.96	4.08	4.37	5.4
6.1		4.2	4.71	4.34	3.05
12.1		5.4	5.15	4.11	4.82
24.2		4.85	4.43	6.28	4.32
48.5		4.13	5.42	5.56	5
97		5.3	6.1	5.02	4.51

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	12-2663-0271	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:34	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-3519-0387	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:36	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	23.0%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-1.406	2.482	1.068	6	0.9973	CDF	Non-Significant Effect
		3	0.1569	2.482	1.068	6	0.8316	CDF	Non-Significant Effect
		6.1	-1.302	2.482	1.068	6	0.9962	CDF	Non-Significant Effect
		12.1	0.5462	2.482	1.068	6	0.6881	CDF	Non-Significant Effect
		24.2	0.7786	2.482	1.068	6	0.5843	CDF	Non-Significant Effect
		48.5	0.9122	2.482	1.068	6	0.5219	CDF	Non-Significant Effect
		97	1.389	2.482	1.068	6	0.3105	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	5.343897	0.7634138	7	2.062	0.0882	Non-Significant Effect
Error	8.886062	0.3702525	24			
Total	14.22996		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.625	18.48	0.3668	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9873	0.9081	0.9630	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	4.635	4.166	5.104	4.6	4.33	5.01	0.1473	6.36%	0.0%
1.5		4	4.03	3.765	4.295	4.055	3.84	4.17	0.08335	4.14%	13.05%
3		4	4.703	3.761	5.644	4.665	4.08	5.4	0.2959	12.59%	-1.46%
6.1		4	4.075	2.935	5.215	4.27	3.05	4.71	0.3582	17.58%	12.08%
12.1		4	4.87	3.98	5.76	4.985	4.11	5.4	0.2798	11.49%	-5.07%
24.2		4	4.97	3.534	6.406	4.64	4.32	6.28	0.4513	18.16%	-7.23%
48.5		4	5.027	4.003	6.052	5.21	4.13	5.56	0.322	12.81%	-8.47%
97		4	5.232	4.175	6.29	5.16	4.51	6.1	0.3322	12.7%	-12.89%

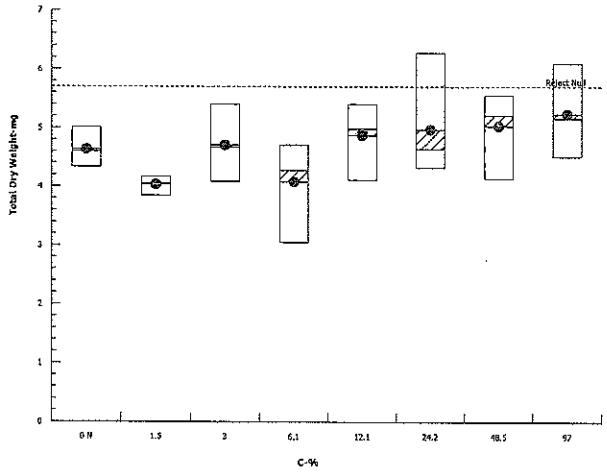
Total Dry Weight-mg Detail

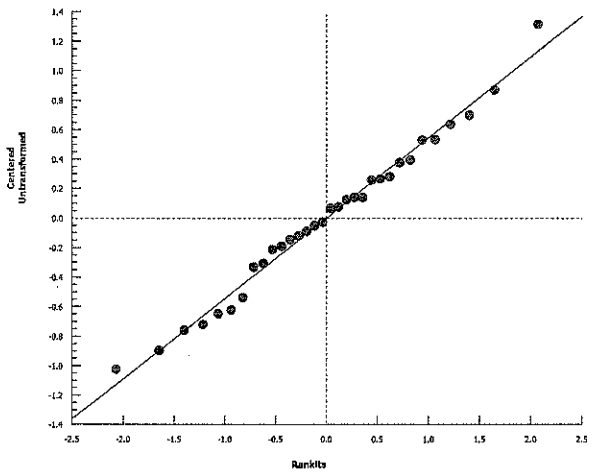
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	4.49	5.01	4.71	4.33
1.5		4.17	3.84	4.17	3.94
3		4.96	4.08	4.37	5.4
6.1		4.2	4.71	4.34	3.05
12.1		5.4	5.15	4.11	4.82
24.2		4.85	4.43	6.28	4.32
48.5		4.13	5.42	5.56	5
97		5.3	6.1	5.02	4.51

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	02-3519-0387	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:36	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 15872

Start Date: October 29, 2015
Set up by: JW

Sample Information:

Sample ID: LC-FRDSDC_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: 5x20L

Test Organism Information:

Culture Date: 102215
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (29 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 125
Date Initiated: October 21, 2015

7-d No. of Fronds IC50 (95% CL): 4.3 (3.9-4.7) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.2 (3.2-5.5) g/L KCl CV (%): 14

Test Results:		Number of Fronds	Dry Weight
	IC25 %(v/v) (95% CL)	69.2 (57.7-79.3)	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JOh

Date reviewed: Nov. 20/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck Coal
Setup by: JW
Sample ID: LC_FRDSDC_WS_2015-10-26-N
Test Date: Oct 29, 2015
Work Order No.: 15872
Test Species: *Lemna minor*
Culture Source: CPCC # 490
Test Culture Age: 7 days
> 8X Growth? (Y/N): Y (29 fronds)
Light Intensity Range: 4000 - 4390 lux
Date Measured: Oct 28, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	26.0	27.0	26.0	26.0	26.0	26.0	27.0	MLT 27.0 26.0
Initials	JW	MLT	JW	MLT	MLT	MLT	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	26.5	Aeration?: 20 min	26.5
DO (mg/L)	8.2	Nutrients added?: Y →	7.9
pH	8.0		7.9
Conductivity (µS)	727		1480

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	26.0	25.0	8.3	9.1	895
1.5	25.5	25.0	8.1	9.4	904
3.0	25.5	25.0	8.1	8.8	917
6.1	25.5	25.0	8.1	8.8	936
12.1	25.5	25.0	8.1	9.1	975
24.2	25.5	25.0	8.1	9.0	1051
48.5	26.0	25.0	8.0	9.1	1194
97	26.5	25.0	7.9	8.8	1480
Initials	JW	MLT	JW	MLT	JW

Instruments: Thermometer: CER-4 Cond. Meter: C-4 pH meter: pH-2
Sample Description: clear
Comments: Light Meter : Lt-L
Reviewed: JW **Date Reviewed:** Nov-19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - FRDSDC - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 29 , 2015
Termination Date: November 5 , 2015
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	85										MD
	B	6	92										
	C	6	90										
	D	6	74										
1.5	A	6	95										
	B	6	70										
	C	6	76										
	D	6	74										
3.0	A	6	84										
	B	6	83										
	C	6	64										
	D	6	72										
6.1	A	6	77										
	B	6	78										
	C	6	77										
	D	6	76										
12.1	A	6	96										
	B	6	81										
	C	6	86										
	D	6	79										
24.2	A	6	78										
	B	6	80										
	C	6	78			X							
	D	6	71		X								

Comments:

Reviewed by: JW

Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - FRDSDC . WS - 2015 - 10 - 26 . N
Work Order #: 15872

Start Date: October 29 , 2015
Termination Date: November 5 , 2015
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	76		X	X							ML7
	B	6	74			X							
	C	6	65		X								
	D	6	74		X								
97	A	6	42		X								
	B	6	43		X								
	C	6	47		X								
	D	6	42		X								↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JW

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - FRDSDC - INS - 2015 - 10 - 26 - N
WO #: 15872

Start Date: October 29 , 2015
Termination Date: November 5 , 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DC - Blue			
Control	A	1	1017.85	KL ~~1024~~ 1023.92	JW / KL
	B	2	1006.40	1013.03	
	C	3	996.32	1002.61	
	D	4	983.52	988.37	
1.5	A	5	993.34	1000.16 KL 7	
	B	6	1004.63	1009.53	
	C	7	1010.43	1015.92	
	D	8	1003.81	1008.91	
3.0	A	9	1035.44	1041.13	
	B	10	JW ~~1035~~ 1003.64	1009.44	
	C	11	1018.00	1022.38 KL 46	
	D	12	1024.90	1030.03	
6.1	A	13	1054.29	KL ~~1059~~ 1060.01	
	B	14	1029.50	1035.09	
	C	15	1044.69	1049.88	
	D	16	1005.60	1011.13	
12.1	A	17	980.57	987.45	
	B	18	992.78	998.25	
	C	19	1046.72	1052.74	
	D	20	1004.98	1010.54	
24.2	A	21	1015.38	1020.87	
	B	22	996.~~3~~29 JW	1002.01	
	C	23	1019.23	KL ~~1025~~ 1025.00	
	D	24	1023.05	1028.19	
48.5	A	25	1004.50	1011.~~18~~ KL 20	
	B	26	1021.33	1026.67	
	C	27	997.10	1002.50	
	D	28	1039.~~8~~78	1045.~~6~~70	↓

JW KL

Comments: 10% re-weigh: #3: 1002.58, #12: ~~1029~~ 1030.03, #27: 1002.38

Reviewed by: JOL

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - FRDSDC - WS - 2015 - 10 - 26 - N
WO #: 15872

Start Date: October 29 , 2015
Termination Date: November 5 , 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DC - Blue			
	A	29	1013.79	1018.17	JW / KL
97	B	30	1011.51	1015.76	"
	C	31	1007.56	1012.39	"
	D	32	1019.24	1023.67	"
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% re-weigh: #32: 1023.73

Reviewed by: JGa

Date Reviewed: Nov. 19/15

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	18-2673-7727	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 11:35	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	03-8226-0060	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	29 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	72h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]	None	None	Box-Cox [W=Y^(2Z-2)]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
10	-74.06	155	158.5	0.7687	Yes	1.114	2.621	0.3793	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL	
IC5	35.25	N/A	47.75	2.837	2.094	NA	
IC10	46.72	25.93	59.4	2.14	1.683	3.857	
IC15	55.35	38.57	67.62	1.807	1.479	2.593	
IC20	62.66	48.71	74.02	1.596	1.351	2.053	
IC25	69.21	57.7	79.3	1.445	1.261	1.733	
IC40	86.64	81.61	91.59	1.154	1.092	1.225	
IC50	~~97.63~~	~~94.8~~	~~100.5~~	~~1.024~~	~~0.9953~~	~~1.055~~	>97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	74.16	1.749	70.73	77.59	42.41	<0.0001	Significant Parameter
C	2.556	0.648	1.286	3.826	3.944	0.0005	Significant Parameter
D	97.63	1.901	93.9	101.4	51.35	<0.0001	Significant Parameter
Z	-1.1						

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	9.39E-05	9.39E-05	1	105	<0.0001	Significant
Lack of Fit	4.88E-06	9.76E-07	5	1.114	0.3793	Non-Significant
Pure Error	2.10E-05	8.77E-07	24			
Residual	2.59E-05	8.94E-07	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	12.59	14.07	0.0827	Equal Variances
	Mod Levene Equality of Variance	0.747	2.423	0.6354	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9669	0.9338	0.4179	Normal Distribution
	Anderson-Darling A2 Normality	0.4328	2.492	0.3079	Normal Distribution

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 18-2673-7727 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 12 Nov-15 11:35 **Analysis:** Nonlinear Regression **Official Results:** Yes

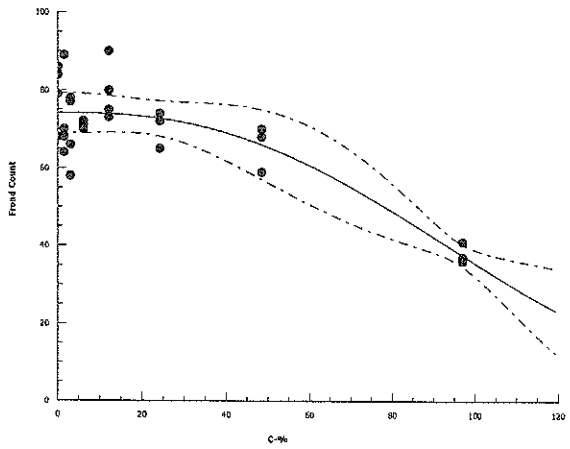
Frond Count Summary

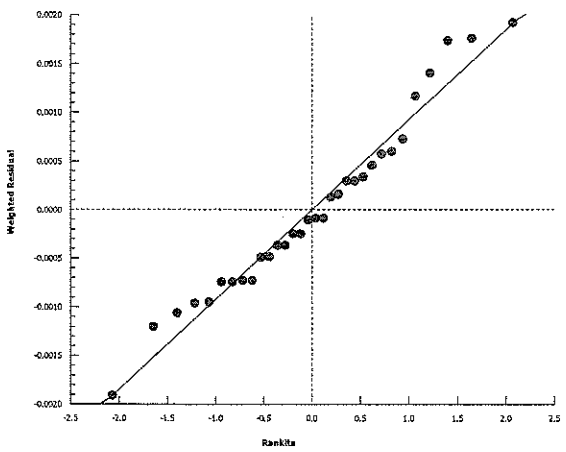
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	79.25	68	86	4.029	8.057	10.17%	0.0%
1.5		4	72.75	64	89	5.558	11.12	15.28%	8.2%
3		4	69.75	58	78	4.768	9.535	13.67%	11.99%
6.1		4	71	70	72	0.4082	0.8165	1.15%	10.41%
12.1		4	79.5	73	90	3.797	7.594	9.55%	-0.32%
24.2		4	70.75	65	74	1.974	3.948	5.58%	10.73%
48.5		4	66.25	59	70	2.462	4.924	7.43%	16.4%
97		4	37.5	36	41	1.19	2.38	6.35%	52.68%

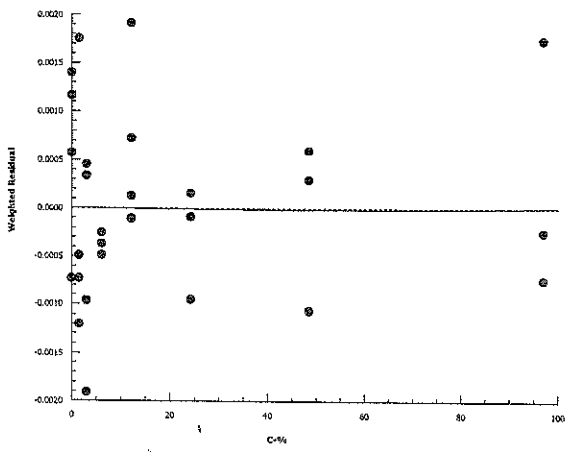
Frond Count Detail

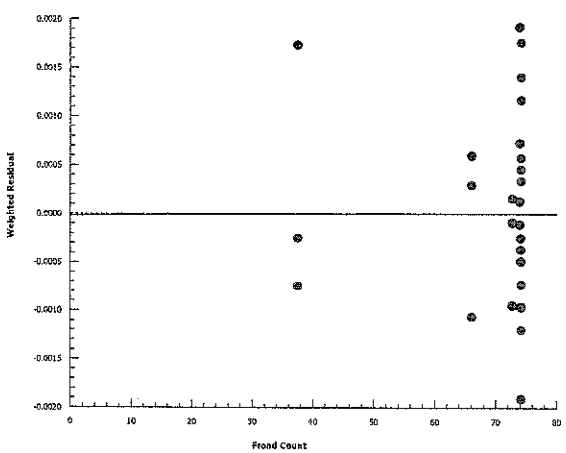
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	79	86	84	68
1.5		89	64	70	68
3		78	77	58	66
6.1		71	72	71	70
12.1		90	75	80	73
24.2		72	74	72	65
48.5		70	68	59	68
97		36	37	41	36

Graphics 3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]









CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-9542-5229	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 11:22	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	03-8226-0060	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	29 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	72h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
5	0.03042	4.353	6.871	0.1861	Yes	1.715	2.508	0.1608	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	27.62	6.315	49.8	3.621	2.008	15.84
IC10	56.73	23.89	91.71	1.763	1.09	4.185
IC15	87.51	36.59	143.8	1.143	0.6956	2.733
IC20	120.2	49.06	202.1	0.8323	0.4948	2.038
IC25	154.9	62.55	266.5	0.6455	0.3753	1.599
IC40	275.1	113.9	506.2	0.3636	0.1976	0.8781
IC50	373.2	161.4	727.6	0.2679	0.1374	0.6198

MLT
>97 %(v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	5.761	0.142	5.482	6.039	40.57	<0.0001	Significant Parameter
D	373.2	139.8	99.3	647.2	2.67	0.0121	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	3.168394	3.168394	1	8.09	0.0079	Significant
Lack of Fit	3.525404	0.587567	6	1.715	0.1608	Non-Significant
Pure Error	8.224374	0.342682	24			
Residual	11.74978	0.391659	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	8.642	14.07	0.2794	Equal Variances
	Mod Levene Equality of Variance	0.7627	2.423	0.6234	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9755	0.9338	0.6615	Normal Distribution
	Anderson-Darling A2 Normality	0.3685	2.492	0.4333	Normal Distribution

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.96	4.85	6.63	0.3875	0.775	13.0%	0.0%
1.5		4	5.58	4.9	6.83	0.4343	0.8686	15.57%	6.38%
3		4	5.27	4.46	5.8	0.3073	0.6145	11.66%	11.58%
6.1		4	5.508	5.19	5.72	0.113	0.226	4.1%	7.59%
12.1		4	5.982	5.47	6.88	0.3225	0.645	10.78%	-0.38%
24.2		4	5.53	5.14	5.77	0.1436	0.2872	5.19%	7.22%
48.5		4	5.84	5.34	6.7	0.3148	0.6297	10.78%	2.01%
97		4	4.473	4.25	4.83	0.1251	0.2501	5.59%	24.96%

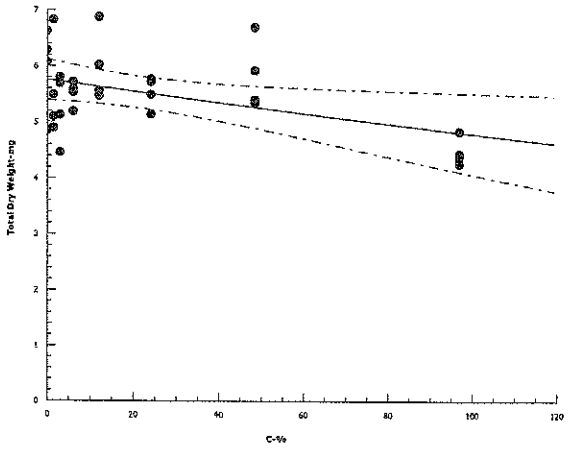
Lemna Growth Inhibition Test — **Nautilus Environmental**

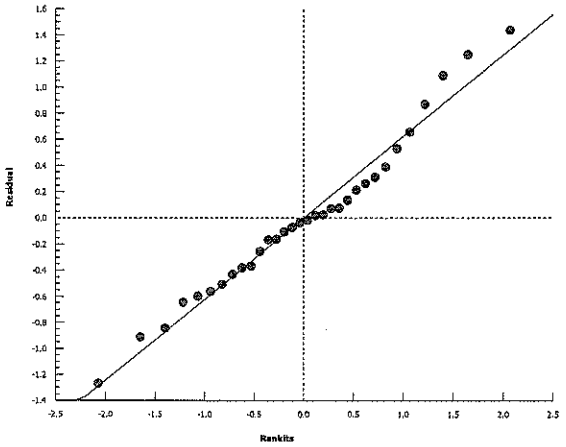
Analysis ID:	06-9542-5229	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 11:22	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

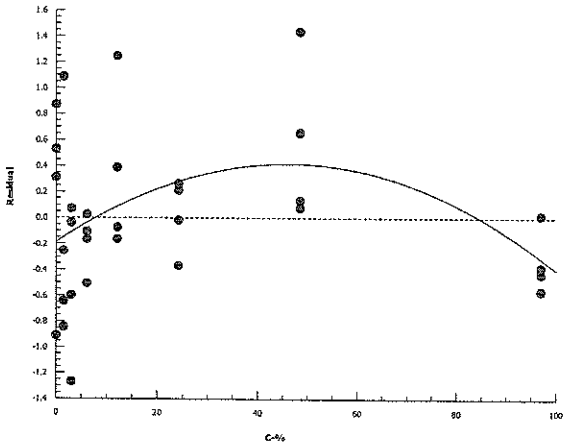
Total Dry Weight-mg Detail

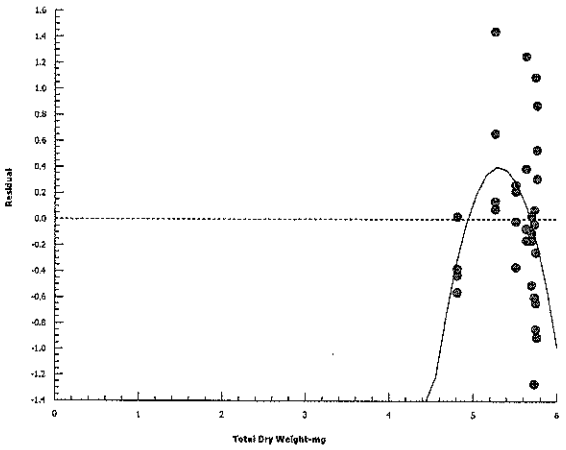
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.07	6.63	6.29	4.85
1.5		6.83	4.9	5.49	5.1
3		5.69	5.8	4.46	5.13
6.1		5.72	5.59	5.19	5.53
12.1		6.88	5.47	6.02	5.56
24.2		5.49	5.72	5.77	5.14
48.5		6.7	5.34	5.4	5.92
97		4.38	4.25	4.83	4.43

Graphics — 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









Analyst:_____ QA: JCL Nov. 19/15

Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 15872

Start Date: october 28 , 2015
Set up by: JW

Sample Information:

Sample ID: LC - DCDS_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 102115
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (29 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: LM 125
Date Initiated: October 21, 2015

7-d No. of Fronds IC50 (95% CL): 4.3 (3.9 - 4.7) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.2 (3.2 - 5.5) g/L KCl CV (%): 14

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	>97	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JCW

Date reviewed: Nov-19/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal

Sample ID: LC_DCDS_WS_2015-10-26_N

Work Order No.: 15872

Culture Source: CPCC # 490

Test Culture Age: 7 days

Light Intensity Range: 4260 - 4940 lux

Setup by: JW

Test Date: Oct 28, 2015

Test Species: *Lemna minor*

> 8X Growth? (Y/N): Y (29 fronds)

Date Measured: Oct 28, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	26.0	27.0	26.0	26.0	26.0	26.0	27.0
Initials	JW	JW	MLT	JW	[illegible]	MLT	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	27.0	Aeration?: 20 min	26.0
DO (mg/L)	8.2		8.0
pH	8.3	Nutrients added?: Y →	8.0
Conductivity (µS)	263		1084

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.0	26.5	8.3	9.3	860
1.5	24.5	26.5	8.2	9.2	865
3.0	24.5	26.5	8.2	9.4	868
6.1	24.0	26.5	8.2	9.3	875
12.1	24.0	26.5	8.2	9.2	888
24.2	24.0	26.5	8.2	9.3	915
48.5	25.0	26.5	8.2	9.5	970
97	26.0	26.5	8.0	9.2	1084
Initials	JW	JW	JW	JW	JW

Instruments: Thermometer: CER-4 Cond. Meter: C-4 pH meter: pH-2

Sample Description: Clear

Comments: Light Meter = Lt-L

Reviewed: JW Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - DCDS - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	122										JW
	B	6	104										
	C	6	138										
	D	6	104										
1.5	A	6	98										
	B	6	138										
	C	6	114										
	D	6	112										
3.0	A	6	120										
	B	6	92										
	C	6	93										
	D	6	92										
6.1	A	6	91										
	B	6	86										
	C	6	104										
	D	6	110										
12.1	A	6	87										
	B	6	94										
	C	6	109										
	D	6	91										
24.2	A	6	125										
	B	6	118										
	C	6	132										
	D	6	98										↓

Comments:

Reviewed by: JOe

Date Reviewed: Nov-19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - DCDS - NS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	123										JW
	B	6	132										
	C	6	67						X				
	D	6	101										
97	A	6	92										
	B	6	95										
	C	6	90										
	D	6	106										↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGL

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - DCDS_WS - 2015 - 10 - 26_N
WO #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DS - Brown			
	A	1	990.48	999.43	JW / MLT
	B	2	998.15	1005.59	
Control	C	3	975.73	986.16	
	D	4	1015.16	1023.69	
	A	5	1037.75	1044.52	
	B	6	984.18	994.92	
1.5	C	7	1004.62	1012.65	
	D	8	989.25	997.82	
	A	9	992.92	1001.57	
	B	10	1008.21	1015.15	
3.0	C	11	1003.920 JW	1010.53	
	D	12	1027.53	1033.90	
	A	13	1010.18	1017.79	
	B	14	983.30	989.49	
6.1	C	15	987.90	995.24	
	D	16	1017.17	1025.71	
	A	17	1001.88	1007.86	
	B	18	1006.21	1013.14	
12.1	C	19	967.40	976.19	
	D	20	1004.66	1010.82	
	A	21	1004.72	1014.67	
	B	22	990.18	999.63	
24.2	C	23	1009.76	1020.79	
	D	24	1015.36	1022.24	
	A	25	1027.09	1036.48	
	B	26	1011.86	1022.14	
48.5	C	27	1026.32	1030.88	
	D	28	1005.54	1013.41	↓

Comments: 10% re-weigh: #2: 1005.63 , #12: 1034.02 , #26: 1022.08

Reviewed by: JW

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - DCDS - ~~201~~ WS - 2015 - 10-26_N
WO #: 15872 JW

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DS - Brown			
	A	29	1018.98	1026.08	JW / MH
97	B	30	999.79	1007.40	↓
	C	31	990.43	997.70	↓
	D	32	999.77	1008.11	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% Re-weigh: #32: 1008.05

Reviewed by: JCL

Date Reviewed: Nov. 19/15

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-6851-6544	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 15:03	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
5	-105.5	215.5	218	0.0047	Yes	1.588	2.508	0.1937	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	49.26	N/A	128.9	2.03	0.776	NA
IC10	101.2	N/A	275.9	0.9883	0.3624	NA MD
IC15	156.1	N/A	458.4	0.6407	0.2182	NA
IC20	214.3	N/A	677.5	0.4667	0.1476	NA
IC25	276.3	N/A	948.6	0.362	0.1054	NA
IC40	490.6	N/A	2958	0.2039	0.0338	NA
IC50	665.6	N/A	N/A	0.1502	NA	NA

>97 %(v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	102	3.811	94.56	109.5	26.77	<0.0001	Significant Parameter
D	665.6	641.6	-591.8	1923	1.038	0.3078	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	328.9604	328.9604	1	1.146	0.2929	Non-Significant
Lack of Fit	2447.415	407.9024	6	1.588	0.1937	Non-Significant
Pure Error	6163.5	256.8125	24			
Residual	8610.914	287.0305	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	6.785	14.07	0.4516	Equal Variances
	Mod Levene Equality of Variance	1.095	2.423	0.3976	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9635	0.9338	0.3415	Normal Distribution
	Anderson-Darling A2 Normality	0.4477	2.492	0.2840	Normal Distribution

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	111	98	132	8.185	16.37	14.75%	0.0%
1.5		4	109.5	92	132	8.302	16.6	15.16%	1.35%
3		4	93.25	86	114	6.921	13.84	14.84%	15.99%
6.1		4	91.75	80	104	5.573	11.15	12.15%	17.34%
12.1		4	89.25	81	103	4.802	9.605	10.76%	19.59%
24.2		4	112.3	92	126	7.33	14.66	13.06%	-1.13%
48.5		4	99.75	61	126	14.46	28.93	29.0%	10.14%
97		4	89.75	84	100	3.568	7.136	7.95%	19.14%

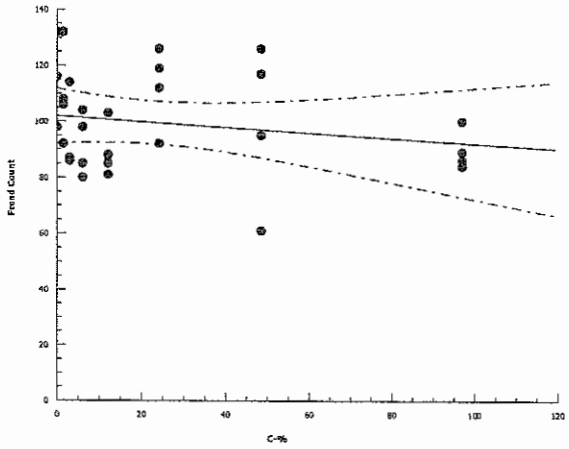
Lemna Growth Inhibition Test — **Nautilus Environmental**

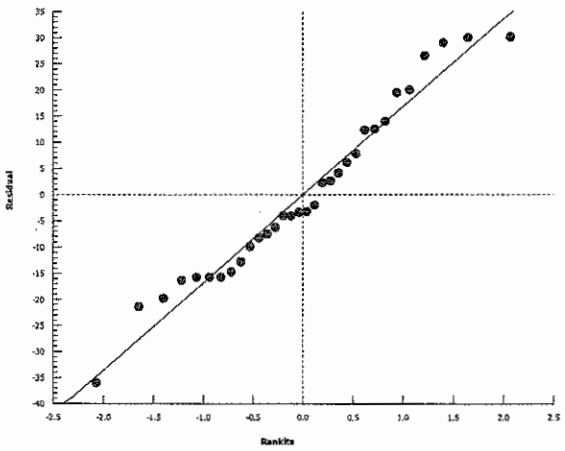
Analysis ID:	00-6851-6544	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 15:03	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

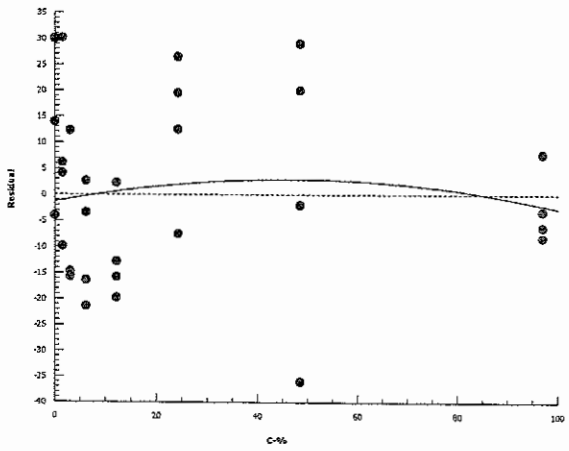
Frond Count Detail

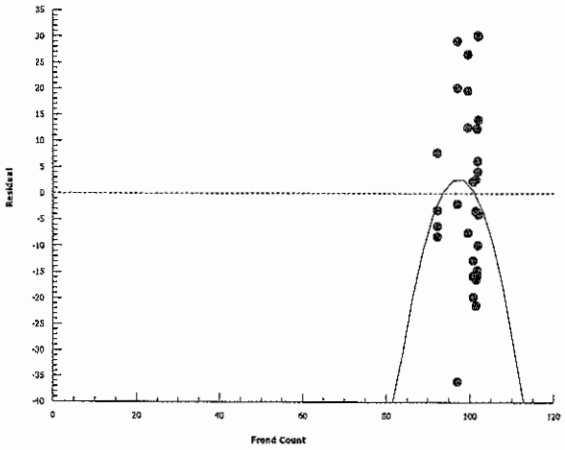
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	116	98	132	98
1.5		92	132	108	106
3		114	86	87	86
6.1		85	80	98	104
12.1		81	88	103	85
24.2		119	112	126	92
48.5		117	126	61	95
97		86	89	84	100

Graphics — 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-7555-3602	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 15:04	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
6	-29.18	62.77	65.28		Yes	1.509	2.508	0.2175	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	154.6	N/A	1207	0.6468	0.08287	NA
IC10	317.6	N/A	3452	0.3149	0.02897	NA
IC15	489.9	N/A	N/A	0.2041	NA	NA
IC20	672.6	N/A	N/A	0.1487	NA	NA
IC25	867.2	N/A	N/A	0.1153	NA	NA
IC40	1540	N/A	N/A	0.06494	NA	NA
IC50	2089	N/A	N/A	0.04786	NA	NA

nd7

>97 %(v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	8.042	0.3481	7.36	8.725	23.1	<0.0001	Significant Parameter
D	2089	7022	-11670	15850	0.2975	0.7681	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0.222163	0.222163	1	0.09141	0.7645	Non-Significant
Lack of Fit	19.97686	3.329477	6	1.509	0.2175	Non-Significant
Pure Error	52.93645	2.205686	24			
Residual	72.91331	2.430444	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	6.998	14.07	0.4291	Equal Variances
	Mod Levene Equality of Variance	0.791	2.423	0.6019	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9789	0.9338	0.7667	Normal Distribution
	Anderson-Darling A2 Normality	0.2894	2.492	0.6442	Normal Distribution

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	8.838	7.44	10.43	0.6189	1.238	14.01%	0.0%
1.5		4	8.528	6.77	10.74	0.8283	1.657	19.43%	3.51%
3		4	7.148	6.37	8.65	0.5142	1.028	14.39%	19.12%
6.1		4	7.42	6.19	8.54	0.4839	0.9678	13.04%	16.04%
12.1		4	6.965	5.98	8.79	0.6423	1.285	18.44%	21.19%
24.2		4	9.327	6.88	11.03	0.8799	1.76	18.87%	-5.54%
48.5		4	8.025	4.56	10.28	1.258	2.515	31.34%	9.19%
97		4	7.58	7.1	8.34	0.2746	0.5492	7.25%	14.23%

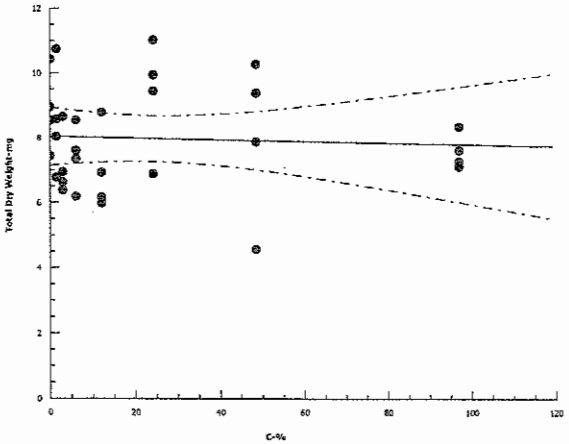
Lemna Growth Inhibition Test — **Nautilus Environmental**

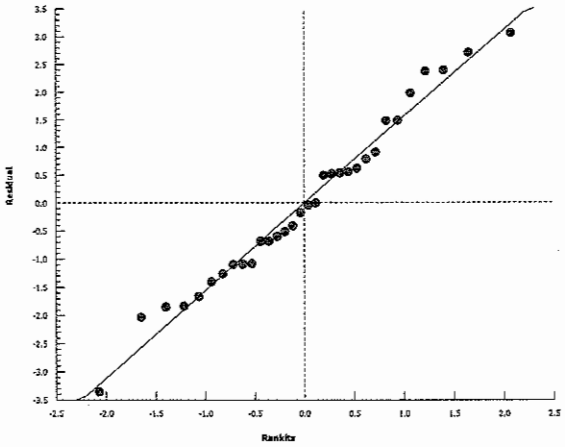
Analysis ID: 11-7555-3602 **Endpoint:** Total Dry Weight-mg **CETIS Version:** CETISv1.8.7
Analyzed: 12 Nov-15 15:04 **Analysis:** Nonlinear Regression **Official Results:** Yes

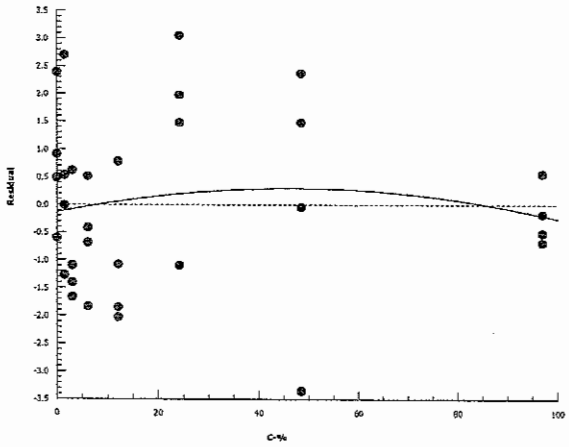
Total Dry Weight-mg Detail

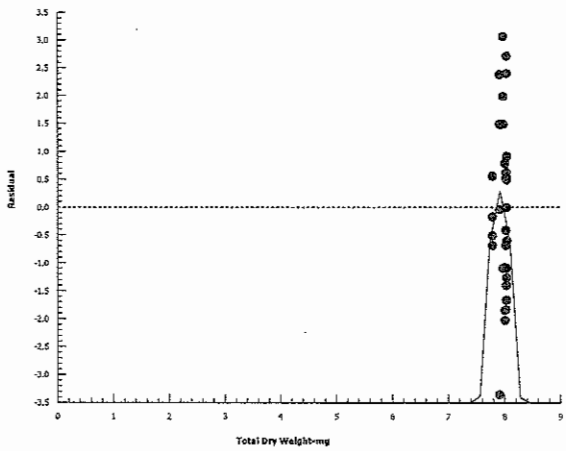
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	8.95	7.44	10.43	8.53
1.5		6.77	10.74	8.03	8.57
3		8.65	6.94	6.63	6.37
6.1		7.61	6.19	7.34	8.54
12.1		5.98	6.93	8.79	6.16
24.2		9.95	9.45	11.03	6.88
48.5		9.39	10.28	4.56	7.87
97		7.1	7.61	7.27	8.34

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 15872

Start Date: October 28, 2015
Set up by: JW

Sample Information:

Sample ID: LC_LC5_WS_2015-10-26_N
Sample Date: October 26, 2015
Date Received: October 27, 2015
Sample Volume: 5 x 2L

Test Organism Information:

Culture Date: 102115
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (29 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 125
Date Initiated: October 21, 2015

7-d No. of Fronds IC50 (95% CL): 4.3 (3.9-4.7) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.2 (3.2-5.5) g/L KCl CV (%): 14

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	82.5 (60.5-97)	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JOh

Date reviewed: Nov. 20/15

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal
Setup by: JW
Sample ID: LC - LC5_WS_2015_10-26_N
Test Date: Oct 28, 2015
Work Order No.: 15872
Test Species: *Lemna minor*
Culture Source: CPCC # 490
Test Culture Age: 7 days
> 8X Growth? (Y/N): Y (29 fronds)
Light Intensity Range: 4100 - 4950 lux
Date Measured: Oct 28, 2015

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	26.0	27.0	26.0	26.0	26.0	26.0	27.0
Initials	JW	JW	MLT	JW	A	MLT	MLT	MLT

Sample Characteristics: Initial Water Quality

Temperature (°C)	26.0
DO (mg/L)	8.6
pH	8.2
Conductivity (µS)	716

Aeration?: 20 min
Nutrients added?: Y

Adjusted Water Quality

~~25.0~~	26.0
~~8.2~~	7.9
8.0	8.0
~~1446~~	1484

JW

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	25.5	26.0	8.2	8.6	884
1.5	25.0	26.0	8.1	8.5	889
3.0	25.5	26.0	8.2	8.6	904
6.1	25.5	26.0	8.2	8.5	923
12.1	25.5	26.0	8.2	8.7	964
24.2	25.0	26.0	8.2	8.8	1045
48.5	25.0	26.0	8.1	8.8	1197
97	26.0	26.0	8.0	8.7	1484 ~~1446~~ JW
Initials	JW	JW	JW	JW	JW

Instruments: Thermometer: CER - 4 Cond. Meter: C-4 pH meter: PH-2
Sample Description: Clear
Comments: Light Meter = Lt - L

Reviewed: JW Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - LC5 - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	71										JW
	B	6	83										
	C	6	68										
	D	6	77										
1.5	A	6	60										
	B	6	75										
	C	6	73										
	D	6	59										
3.0	A	6	90										
	B	6	61										
	C	6	66										
	D	6	92										
6.1	A	6	79										
	B	6	61										
	C	6	62										
	D	6	68										
12.1	A	6	71										
	B	6	67										
	C	6	71										
	D	6	78										
24.2	A	6	71										
	B	6	68										
	C	6	76										
	D	6	76										↓

Comments:

Reviewed by: JW

Date Reviewed: Nov. 19/15

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - LC5 - WS - 2015 - 10 - 26 - N
Work Order #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Test set up by: JW

Concentration %v (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	66										JW
	B	6	80										
	C	6	65										
	D	6	69										
97	A	6	42			X			X				
	B	6	48			X			X				
	C	6	45		X								
	D	6	51		X	X							↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JW

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - LC5 - INS - 2015 - 10 - 26 - N
WO #: 15872

Start Date: October 28 , 2015
Termination Date: November 4 , 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LC5 - Red			
Control	A	1	1000.21	1004.66	JW / MLT
	B	2	979.97	984.92	
	C	3	1006.86	1011.62	
	D	4	978.76	984.22	
1.5	A	5	1002.24	1006.44	
	B	6	998.08	1003.17	
	C	7	974.70	979.56	
	D	8	944.43	948.25	
3.0	A	9	963.22	968.97	
	B	10	960.01	963.86	
	C	11	992.41	996.66	
	D	12	959.13	965.07	
6.1	A	13	945.11	950.48	
	B	14	988.564 JW	992.32	
	C	15	971.33	975.68	
	D	16	977.14	982.12	
12.1	A	17	992.17	996.38	
	B	18	996.05	1000.62	
	C	19	981.98	986.59	
	D	20	995.09	MLT ~~44~~ 1000.12	
24.2	A	21	986.75	991.40	
	B	22	999.10	1003.92	
	C	23	978.91	984.11	
	D	24	982.74	987.62	
48.5	A	25	996.89	1001.56	
	B	26	982.30	987.38	
	C	27	1020.34	MLT ~~100~~ 1024.58	
	D	28	1024.24	1028.88	↓

Comments: 10% re-weigh: #1: 1004.86, #12: 965.10, #27: 1024.61

Reviewed by: Jah

Date Reviewed: Nov. 19/15

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_LC5_WS_2015-10-26_N
WO #: 15872

Start Date: October 28, 2015
Termination Date: November 4, 2015
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LC5 - Rep1			
	A	29	1002.45	1006.31	JW / MLT
	B	30	1013.78	1018.56	
97	C	31	1026.88	1030.89	
	D	32	978.28	982.75	
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% re-weigh: #32: 982.80

Reviewed by: JCH

Date Reviewed: Nov 19/15

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-2281-2372	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:26	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
12	-81.77	170.4	173.9	0.4981	Yes	0.9889	2.621	0.4451	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	54.7	N/A	79.1	1.828	1.264	NA
IC10	63.81	N/A	89.53	1.567	1.117	NA
IC15	70.8	N/A	95.3	1.412	1.049	NA
IC20	76.9	N/A	98.7	1.3	1.013	NA
IC25	82.54	60.52	100.9	1.211	0.9913	1.652
IC40	~~98.68~~	~~84.93~~	~~113.2~~	~~1.013~~	~~0.8833~~	1.177
IC50	~~109.9~~	~~86.78~~	~~139.1~~	~~0.9102~~	~~0.7189~~	~~1.152~~ >97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	65.79	1.68	62.5	69.08	39.16	<0.0001	Significant Parameter
C	0.424	0.2804	-0.1256	0.9735	1.512	0.1413	Non-Significant Parameter
D	109.9	12.34	85.68	134.1	8.902	<0.0001	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	2204.667	2204.667	1	32.77	<0.0001	Significant
Lack of Fit	333.3015	66.6603	5	0.9889	0.4451	Non-Significant
Pure Error	1617.75	67.40625	24			
Residual	1951.052	67.27764	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	9.358	14.07	0.2279	Equal Variances
	Mod Levene Equality of Variance	4.675	2.423	0.0020	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9536	0.9338	0.1825	Normal Distribution
	Anderson-Darling A2 Normality	0.4897	2.492	0.2251	Normal Distribution

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 01-2281-2372 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 12 Nov-15 16:26 **Analysis:** Nonlinear Regression **Official Results:** Yes

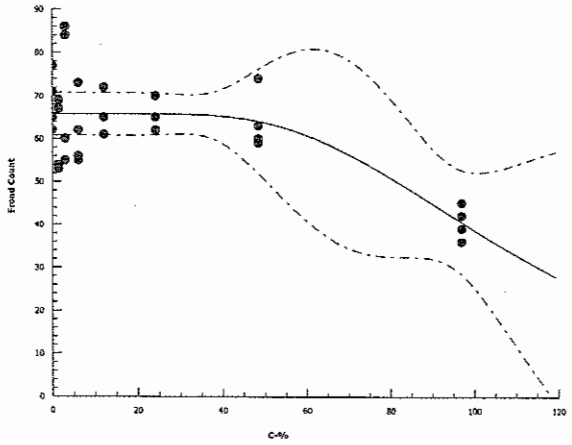
Frond Count Summary

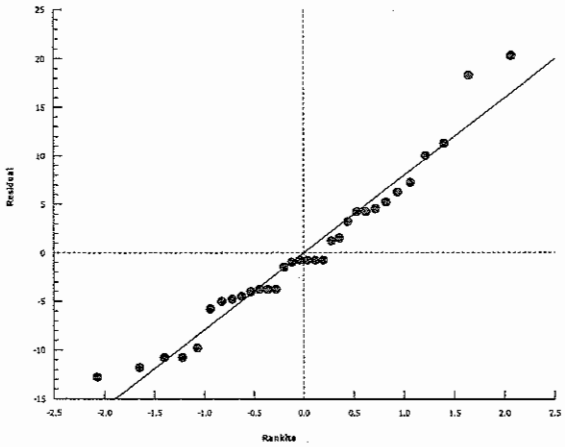
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	68.75	62	77	3.326	6.652	9.68%	0.0%
1.5		4	60.75	53	69	4.211	8.421	13.86%	11.64%
3		4	71.25	55	86	8.014	16.03	22.5%	-3.64%
6.1		4	61.5	55	73	4.133	8.266	13.44%	10.55%
12.1		4	65.75	61	72	2.287	4.573	6.96%	4.36%
24.2		4	66.75	62	70	1.974	3.948	5.91%	2.91%
48.5		4	64	59	74	3.44	6.88	10.75%	6.91%
97		4	40.5	36	45	1.936	3.873	9.56%	41.09%

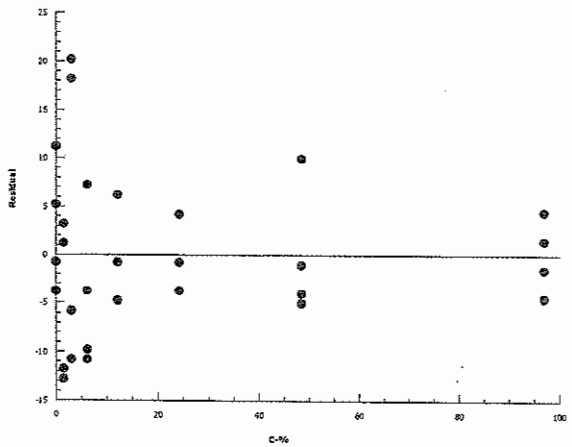
Frond Count Detail

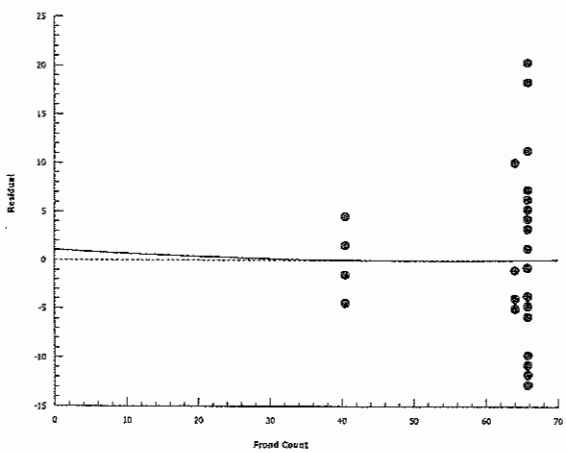
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	65	77	62	71
1.5		54	69	67	53
3		84	55	60	86
6.1		73	55	56	62
12.1		65	61	65	72
24.2		65	62	70	70
48.5		60	74	59	63
97		36	42	39	45

Graphics 3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]









CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-2025-7806	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:27	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-0870-2690	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	28 Oct-15	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 Nov-15	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
4	4.973	-5.533	-3.015	0.0335	Yes	0.4562	2.508	0.8334	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	54.38	N/A	117.9	1.839	0.8485	NA
IC10	111.7	N/A	252.8	0.8952	0.3956	NA
IC15	172.3	N/A	411.6	0.5804	0.243	NA
IC20	236.6	N/A	593.3	0.4227	0.1685	NA
IC25	305	N/A	803.9	0.3279	0.1244	NA
IC40	541.6	N/A	1772	0.1846	0.05643	NA
IC50	734.9	31.42	3747	0.1361	0.02669	3.183

IC10

>97% (vN)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	4.78	0.1205	4.543	5.016	39.66	<0.0001	Significant Parameter
D	734.9	524.8	-293.7	1763	1.4	0.1717	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0.596286	0.596286	1	2.074	0.1602	Non-Significant
Lack of Fit	0.883241	0.147207	6	0.4562	0.8334	Non-Significant
Pure Error	7.743819	0.322659	24			
Residual	8.62706	0.287569	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	8.895	14.07	0.2603	Equal Variances
	Mod Levene Equality of Variance	5.222	2.423	0.0010	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9807	0.9338	0.8198	Normal Distribution
	Anderson-Darling A2 Normality	0.2307	2.492	0.8348	Normal Distribution

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	4.905	4.45	5.46	0.2118	0.4235	8.63%	0.0%
1.5		4	4.492	3.82	5.09	0.2929	0.5859	13.04%	8.41%
3		4	4.947	3.85	5.94	0.526	1.052	21.26%	-0.87%
6.1		4	4.62	3.78	5.37	0.3501	0.7001	15.15%	5.81%
12.1		4	4.605	4.21	5.03	0.1678	0.3356	7.29%	6.12%
24.2		4	4.888	4.65	5.2	0.115	0.23	4.71%	0.36%
48.5		4	4.657	4.24	5.08	0.1716	0.3432	7.37%	5.05%
97		4	4.28	3.86	4.78	0.2112	0.4224	9.87%	12.74%

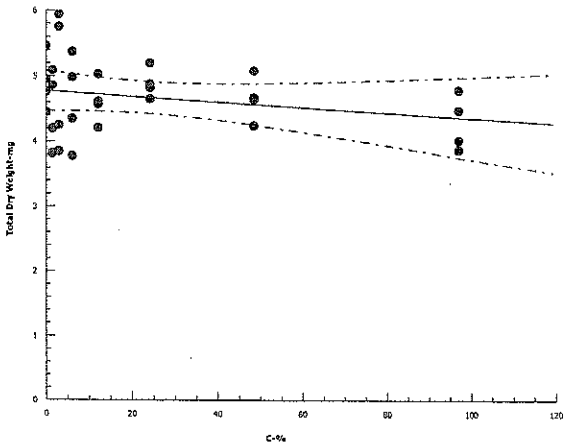
Lemna Growth Inhibition Test — **Nautilus Environmental**

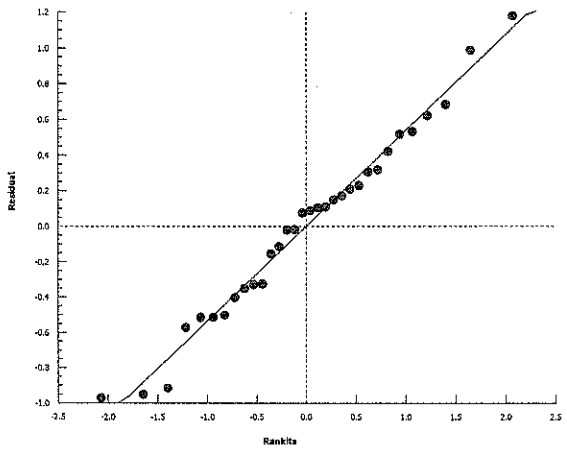
Analysis ID:	02-2025-7806	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 Nov-15 16:27	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

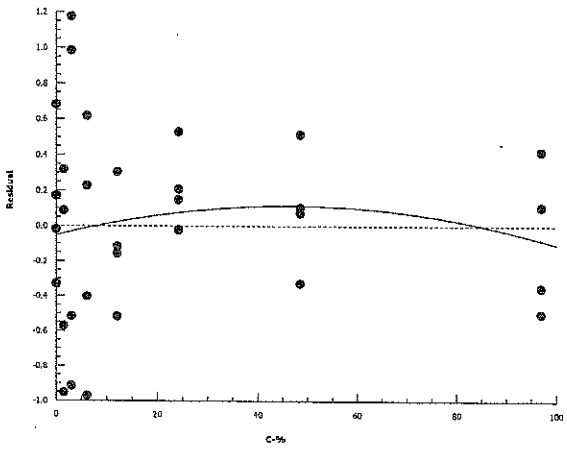
Total Dry Weight-mg Detail

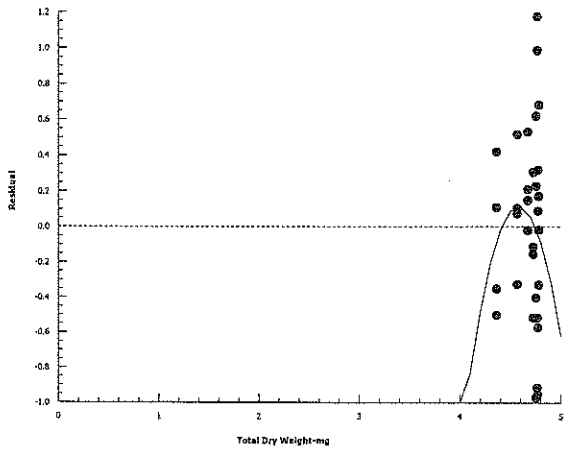
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	4.45	4.95	4.76	5.46
1.5		4.2	5.09	4.86	3.82
3		5.75	3.85	4.25	5.94
6.1		5.37	3.78	4.35	4.98
12.1		4.21	4.57	4.61	5.03
24.2		4.65	4.82	5.2	4.88
48.5		4.67	5.08	4.24	4.64
97		3.86	4.78	4.01	4.47

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









APPENDIX D – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15871

Start Date: Oct 27/15
Set up by: MT/EMM

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2015-10-26_N
Sample Date: Oct 26/15
Date Received: Oct 27/15
Sample Volume: 8 x 20L

Test Organism Information:

Culture Date: Oct 23/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC135
Stock Solution ID: 15Zn03
Date Initiated: NOV 3/15

72-h IC50 (95% CL): 35.7 (30.6 - 41.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 28.5 (16.2 - 50.1) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JCh

Date reviewed: Nov-19/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT/EMM

Sample ID: LC-LCDSSLCC_WS_2015-10-26_N | Test Date/Time: Oct 27/15 @ ~~1440h~~ MLT 1640h

Work Order No.: 15871 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 23/15 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 289 2 312 | Average: 300.5 | Culture Cell Density (c1): 300.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 300.5x10^4 cells/ml = 7.32mL

Time Zero Counts: 1 18 2 23 | Average: 20.5

No. of Cells/mL: 20.5 x10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.1	23.0	24.5	24.5	25.0	25.0	✓	✓	✓	✓
1.5	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.2	23.0					✓	✓	✓	✓
6.0	7.3	23.0					✓	✓	✓	✓
11.9	7.5	23.0					✓	✓	✓	✓
23.8	7.7	23.0					✓	✓	✓	✓
47.6	8.0	23.0					✓	✓	✓	✓
95.2	8.2	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.1 | Well 2: 7.1

Final control pH: Well 1: 7.2 | Well 2: 7.2

Light intensity (lux): 4100 | Date measured: Oct 27/15

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear

Comments:

Reviewed: JCK | Date reviewed: Nov-19/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck — Start Date/Time: Oct 27/15 @ 1640h

Work Order #: 15871 — Termination Date: Oct 30/15 @ 1640h

Sample ID: LL_LCDSSLCC_WS_2015-10-26_N — Test set up by: MG/Emm

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	29					MG
	B	33					
	C	31					
	D	30					
	E	29					
	F	30					
	G	32					
	H	32					
1.5	A	64					
	B	65					
	C	59					
	D	65					
3.0	A	76					
	B	69					
	C	70					
	D	67					
6.0	A	90					
	B	84					
	C	82					
	D	86					
11.9	A	98					
	B	99					
	C	95					
	D	110					
23.8	A	96					
	B	102					
	C	111					
	D	103					
47.6	A	119					
	B	107					
	C	110					
	D	115					
95.2	A	124					
	B	114					
	C	104					
	D	110					

Comments:

Reviewed by: JCK — Date Reviewed: Nov. 19/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	27-Oct-15 @ 1640h		
WO#:	15871	Termination Date:	30-Oct-15 @ 1640h		
Sample ID:	LC_LCDSSLCC_WS_2015-10-26_N				
		Initial Cell Density:	9318 cell/mL		205000
					0.22
					0.01

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9318.182
Control	A	29				29	28.1	mean	29.8
	B	33				33	32.1	SD	1.488048
	C	31				31	30.1	CV	4.990404
	D	30				30	29.1		
	E	29				29	28.1		
	F	30				30	29.1		
	G	32				32	31.1		
	H	32				32	31.1		
1.5	A	64				64	63.1		
	B	65				65	64.1		
	C	59				59	58.1		
	D	65				65	64.1		
3	A	76				76	75.1		
	B	69				69	68.1		
	C	70				70	69.1		
	D	67				67	66.1		
6	A	90				90	89.1		
	B	84				84	83.1		
	C	82				82	81.1		
	D	86				86	85.1		
11.9	A	98				98	97.1		
	B	99				99	98.1		
	C	95				95	94.1		
	D	110				110	109.1		
23.8	A	96				96	95.1		
	B	102				102	101.1		
	C	111				111	110.1		
	D	103				103	102.1		
47.6	A	119				119	118.1		
	B	107				107	106.1		
	C	110				110	109.1		
	D	115				115	114.1		
95.2	A	124				124	123.1		
	B	114				114	113.1		
	C	104				104	103.1		
	D	110				110	109.1		

JCL
Nov. 19/15

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	06-4934-4653	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-2153-9277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:40	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:40	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	41h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	431451	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9087	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	29.75	28	32	0.5261	1.488	5.0%	0.0%
1.5		4	62.25	58	64	1.436	2.872	4.61%	-109.2%
3		4	69.5	66	75	1.936	3.873	5.57%	-133.6%
6		4	84.5	81	89	1.708	3.416	4.04%	-184.0%
11.9		4	99.5	94	109	3.279	6.557	6.59%	-234.5%
23.8		4	102	95	110	3.082	6.164	6.04%	-242.9%
47.6		4	111.8	106	118	2.658	5.315	4.76%	-275.6%
95.2		4	112	103	123	4.203	8.406	7.51%	-276.5%

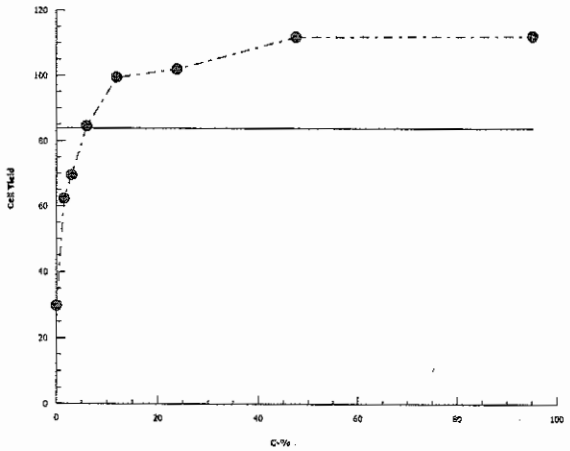
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	28	32	30	29	28	29	31	31
1.5		63	64	58	64				
3		75	68	69	66				
6		89	83	81	85				
11.9		97	98	94	109				
23.8		95	101	110	102				
47.6		118	106	109	114				
95.2		123	113	103	109				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	06-4934-4653	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	05-6907-1498	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:12	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-2153-9277	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:40	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:40	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	13-5006-3600	**Code:**	507855F0	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	41h (2.5 °C)	**Station:**	LC_LCDSSLCC_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	25.2%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	10.93	2.526	7.511	10	<0.0001	CDF	Significant Effect
		3*	13.37	2.526	7.511	10	<0.0001	CDF	Significant Effect
		6*	18.42	2.526	7.511	10	<0.0001	CDF	Significant Effect
		11.9*	23.46	2.526	7.511	10	<0.0001	CDF	Significant Effect
		23.8*	24.3	2.526	7.511	10	<0.0001	CDF	Significant Effect
		47.6*	27.58	2.526	7.511	10	<0.0001	CDF	Significant Effect
		95.2*	27.66	2.526	7.511	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9087	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	33407.55	4772.508	7	202.5	<0.0001	Significant Effect
Error	660	23.57143	28			
Total	34067.55		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	14.42	18.48	0.0442	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9636	0.9166	0.2772	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	29.75	28.51	30.99	29.5	28	32	0.5261	5.0%	0.0%
1.5		4	62.25	57.68	66.82	63.5	58	64	1.436	4.61%	-109.2%
3		4	69.5	63.34	75.66	68.5	66	75	1.936	5.57%	-133.6%
6		4	84.5	79.06	89.94	84	81	89	1.708	4.04%	-184.0%
11.9		4	99.5	89.07	109.9	97.5	94	109	3.279	6.59%	-234.5%
23.8		4	102	92.19	111.8	101.5	95	110	3.082	6.04%	-242.9%
47.6		4	111.8	103.3	120.2	111.5	106	118	2.658	4.76%	-275.6%
95.2		4	112	98.62	125.4	111	103	123	4.203	7.51%	-276.5%

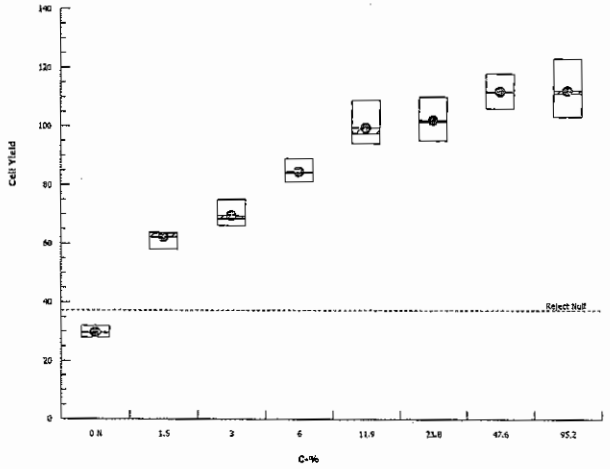
EC Alga Growth Inhibition Test — **Nautilus Environmental**

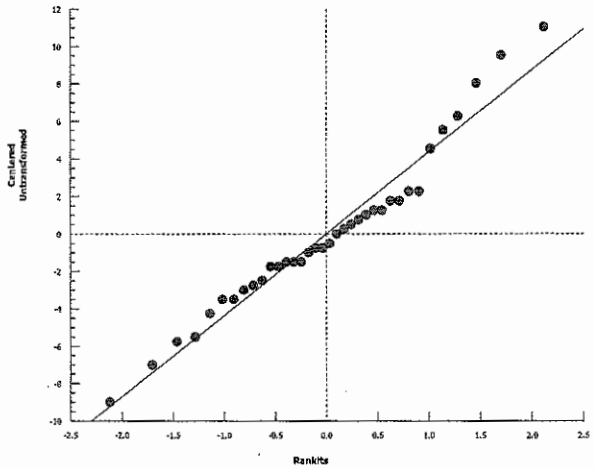
Analysis ID:	05-6907-1498	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:12	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	28	32	30	29	28	29	31	31
1.5		63	64	58	64				
3		75	68	69	66				
6		89	83	81	85				
11.9		97	98	94	109				
23.8		95	101	110	102				
47.6		118	106	109	114				
95.2		123	113	103	109				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15871

Start Date: Oct 27/15
Set up by: MLT/EMM

Sample Information:

Sample ID: LC_PCI_WS_2015-10-26_N
Sample Date: Oct 26/15
Date Received: Oct 27/15
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: Oct 23/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC135
Stock Solution ID: 15Zn03
Date Initiated: NOV 3/15

72-h IC50 (95% CL): 35.7 (30.6-41.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 28.5 (16.2-50.1) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JCH

Date reviewed: Nov. 19/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT/EMM

Sample ID: LC-DC1-WS-2015-10-26-N | Test Date/Time: Oct 27/15 @ ~~1450h~~ 1650h MLT

Work Order No.: 15871 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 23/15 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 289 2 312 | Average: 300.5 | Culture Cell Density (c1): 300.5 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 300.5 x 10⁴ cells/ml = 7.32 mL

Time Zero Counts: 1 18 2 23 | Average: 20.5

No. of Cells/mL: 20.5 x 10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.1	23.0	24.5	24.5	25.0	25.0	✓	✓	✓	✓
1.5	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.1	23.0					✓	✓	✓	✓
6.0	7.2	23.0					✓	✓	✓	✓
11.9	7.4	23.0					✓	✓	✓	✓
23.8	7.6	23.0					✓	✓	✓	✓
47.6	7.9	23.0					✓	✓	✓	✓
95.2	8.2	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.1 Well 2: 7.1

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 4100 Date measured: Oct 27/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear

Comments:

Reviewed: JGL Date reviewed: Nov. 19/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Start Date/Time: Oct 27/15 @ 1650h

Work Order #: ~~LC_DC1~~ 15871 Termination Date: Oct 30/15 @ 1650h

Sample ID: LC_DC1_WS_2015-10-26_N Test set up by: ML7

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	31					ML7
	B	32					
	C	35					
	D	31					
	E	31					
	F	32					
	G	29					
	H	31					
1.5	A	58					
	B	60					
	C	57					
	D	50					
3.0	A	74					
	B	70					
	C	64					
	D	66					
6.0	A	85					
	B	76					
	C	82					
	D	73					
11.9	A	95					
	B	86					
	C	93					
	D	90					
23.8	A	108					
	B	100					
	C	117					
	D	110					
47.6	A	128					
	B	135					
	C	126					
	D	123					
95.2	A	121					
	B	117					
	C	118					
	D	120					

Comments:

Reviewed by: JCL Date Reviewed: Nov-19/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	27-Oct-15 @ 1650h		
WO#:	15871	Termination Date:	30-Oct-15 @ 1650h		
Sample ID:	LC_DC1_WS_2015-10-26_N				
		Initial Cell Density:	9318 cell/mL		205000
					0.22
					0.01
					9318.182

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		
Control	A	31				31	30.1	mean	30.6
	B	32				32	31.1	SD	1.690309
	C	35				35	34.1	CV	5.529634
	D	31				31	30.1		
	E	31				31	30.1		
	F	32				32	31.1		
	G	29				29	28.1		
	H	31				31	30.1		
1.5	A	58				58	57.1		
	B	60				60	59.1		
	C	57				57	56.1		
	D	50				50	49.1		
3	A	74				74	73.1		
	B	70				70	69.1		
	C	64				64	63.1		
	D	66				66	65.1		
6	A	85				85	84.1		
	B	76				76	75.1		
	C	82				82	81.1		
	D	73				73	72.1		
11.9	A	95				95	94.1		
	B	86				86	85.1		
	C	93				93	92.1		
	D	90				90	89.1		
23.8	A	108				108	107.1		
	B	100				100	99.1		
	C	117				117	116.1		
	D	110				110	109.1		
47.6	A	128				128	127.1		
	B	135				135	134.1		
	C	126				126	125.1		
	D	123				123	122.1		
95.2	A	121				121	120.1		
	B	117				117	116.1		
	C	118				118	117.1		
	D	120				120	119.1		

JGH
Nov. 19/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-4935-7833	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:16	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	19-9937-6694	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	41h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1457012	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2202	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	30.5	28	34	0.5976	1.69	5.54%	0.0%
1.5		4	55.25	49	59	2.175	4.349	7.87%	-81.15%
3		4	67.5	63	73	2.217	4.435	6.57%	-121.3%
6		4	78	72	84	2.739	5.477	7.02%	-155.7%
11.9		4	90	85	94	1.958	3.916	4.35%	-195.1%
23.8		4	107.8	99	116	3.497	6.994	6.49%	-253.3%
47.6		4	127	122	134	2.55	5.099	4.02%	-316.4%
95.2		4	118	116	120	0.9129	1.826	1.55%	-286.9%

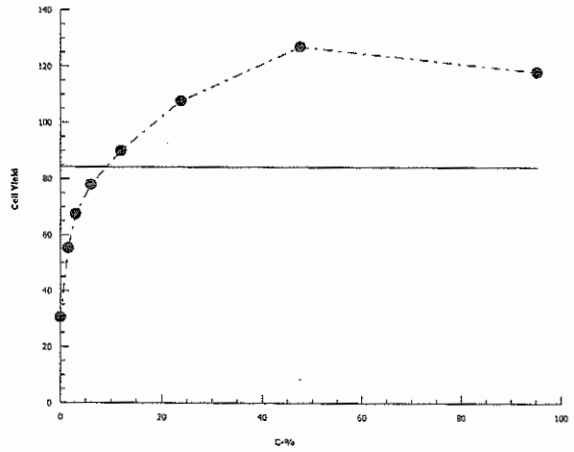
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	31	34	30	30	31	28	30
1.5		57	59	56	49				
3		73	69	63	65				
6		84	75	81	72				
11.9		94	85	92	89				
23.8		107	99	116	109				
47.6		127	134	125	122				
95.2		120	116	117	119				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	03-4935-7833	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:16	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Test Code: 15871b | 09-6884-8943

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-5476-7242	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:16	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	19-9937-6694	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	16-9503-3844	**Code:**	650829F4	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	41h (2.5 °C)	**Station:**	LC_DC1_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	21.6%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	9.503	2.526	6.58	10	<0.0001	CDF	Significant Effect
		3*	14.21	2.526	6.58	10	<0.0001	CDF	Significant Effect
		6*	18.24	2.526	6.58	10	<0.0001	CDF	Significant Effect
		11.9*	22.84	2.526	6.58	10	<0.0001	CDF	Significant Effect
		23.8*	29.66	2.526	6.58	10	<0.0001	CDF	Significant Effect
		47.6*	37.05	2.526	6.58	10	<0.0001	CDF	Significant Effect
		95.2*	33.6	2.526	6.58	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2202	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	40678.72	5811.246	7	321.3	<0.0001	Significant Effect
Error	506.5	18.08928	28			
Total	41185.22		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.21	18.48	0.1297	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.989	0.9166	0.9720	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	30.5	29.09	31.91	30	28	34	0.5976	5.54%	0.0%
1.5		4	55.25	48.33	62.17	56.5	49	59	2.175	7.87%	-81.15%
3		4	67.5	60.44	74.56	67	63	73	2.217	6.57%	-121.3%
6		4	78	69.28	86.72	78	72	84	2.739	7.02%	-155.7%
11.9		4	90	83.77	96.23	90.5	85	94	1.958	4.35%	-195.1%
23.8		4	107.8	96.62	118.9	108	99	116	3.497	6.49%	-253.3%
47.6		4	127	118.9	135.1	126	122	134	2.55	4.02%	-316.4%
95.2		4	118	115.1	120.9	118	116	120	0.9129	1.55%	-286.9%

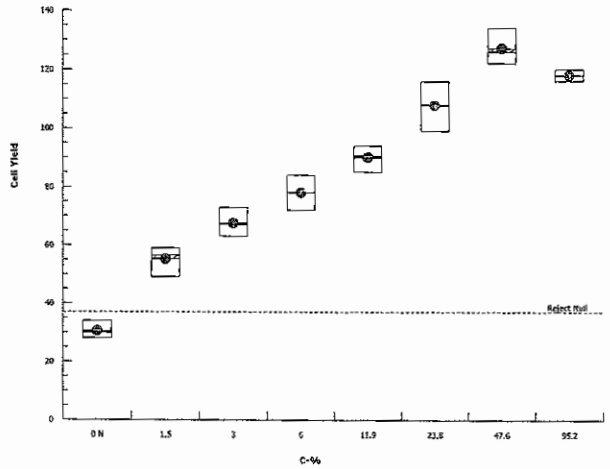
EC Alga Growth Inhibition Test | **Nautilus Environmental**

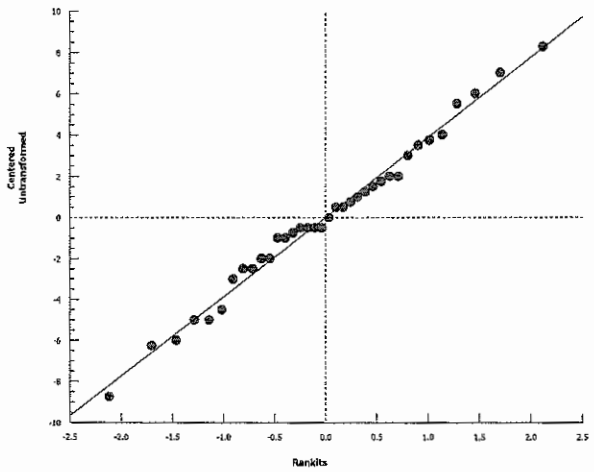
Analysis ID:	16-5476-7242	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:16	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	31	34	30	30	31	28	30
1.5		57	59	56	49				
3		73	69	63	65				
6		84	75	81	72				
11.9		94	85	92	89				
23.8		107	99	116	109				
47.6		127	134	125	122				
95.2		120	116	117	119				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15871

Start Date: Oct 27/15
Set up by: MLT / EMM

Sample Information:

Sample ID: LC_FRDSPC_WS_2015-10-26_N
Sample Date: Oct 26/15
Date Received: Oct 27/15
Sample Volume: 5 X 20L

Test Organism Information:

Culture Date: Oct 23/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC135
Stock Solution ID: 15Zn03
Date Initiated: NOV 3/15

72-h IC50 (95% CL): 35.7 (30.6-41.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 28.5 (16.2-50.1) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGL

Date reviewed: Nov-19/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT/EMM

Sample ID: LC-FRDSDC_WS_2015-10-26_N | Test Date/Time: Oct 27/15 @ 1450h MLT 1620h

Work Order No.: 15871 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 23/15 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 289 2 312 | Average: 300.5 | Culture Cell Density (c1): 300.5

v1 = 220,000 cells/ml x 100 ml / (c1) 300,5 x10⁴ cells/ml = 7.32mL

Time Zero Counts: 1 18 2 23 | Average: 20.5

No. of Cells/mL: 20,5 x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.1	23.0	24.5	24.5	25.0	25.0	✓	✓	✓	✓
1.5	7.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.3	23.0					✓	✓	✓	✓
6.0	7.4	23.0					✓	✓	✓	✓
11.9	7.5	23.0					✓	✓	✓	✓
23.8	7.6	23.0					✓	✓	✓	✓
47.6	~~8.0~~ MLT 7.9	23.0					✓	✓	✓	✓
95.2	8.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.1 Well 2: 7.1

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 4080 Date measured: Oct 27/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear

Comments:

Reviewed: JOL Date reviewed: Nov. 19/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Start Date/Time: Oct 27/15 @ 1620h

Work Order #: ~~LC_PRDSDC~~ 15871 Termination Date: Oct 30/15 @ 1620h

Sample ID: LC_PRDSDC_WS_2015-10-26_N Test set up by: ML

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	29					ML
	B	32					
	C	30					
	D	29					
	E	30					
	F	31					
	G	30					
	H	29					
1.5	A	50					
	B	55					
	C	50					
	D	53					
3.0	A	74					
	B	75					
	C	65					
	D	67					
6.0	A	70					
	B	77					
	C	75					
	D	66					
11.9	A	96					
	B	84					
	C	90					
	D	86					
23.8	A	106					
	B	104					
	C	105					
	D	98					
47.6	A	118					
	B	106					
	C	111					
	D	112					
95.2	A	118					
	B	121					
	C	119					
	D	117					

Comments:

Reviewed by: JCL Date Reviewed: Nov. 19/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	27-Oct-15 @ 1620h
WO#:	15871	Termination Date:	30-Oct-15 @ 1620h
Sample ID:	LC_FRDSDC_WS_2015-10-26_N		
		Initial Cell Density:	9318 cell/mL

									205000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9318.182
Control	A	29				29	28.1	mean	29.1
	B	32				32	31.1	SD	1.069045
	C	30				30	29.1	CV	3.677715
	D	29				29	28.1		
	E	30				30	29.1		
	F	31				31	30.1		
	G	30				30	29.1		
	H	29				29	28.1		
1.5	A	50				50	49.1		
	B	55				55	54.1		
	C	50				50	49.1		
	D	53				53	52.1		
3	A	74				74	73.1		
	B	75				75	74.1		
	C	65				65	64.1		
	D	67				67	66.1		
6	A	70				70	69.1		
	B	77				77	76.1		
	C	75				75	74.1		
	D	66				66	65.1		
11.9	A	96				96	95.1		
	B	84				84	83.1		
	C	90				90	89.1		
	D	86				86	85.1		
23.8	A	106				106	105.1		
	B	104				104	103.1		
	C	105				105	104.1		
	D	98				98	97.1		
47.6	A	118				118	117.1		
	B	106				106	105.1		
	C	111				111	110.1		
	D	112				112	111.1		
95.2	A	118				118	117.1		
	B	121				121	120.1		
	C	119				119	118.1		
	D	117				117	116.1		

Nov. 19/15

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	18-8201-4006	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-9241-0522	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	718437	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.4937	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	29	28	31	0.378	1.069	3.69%	0.0%
1.5		4	51	49	54	1.225	2.449	4.8%	-75.86%
3		4	69.25	64	74	2.496	4.992	7.21%	-138.8%
6		4	71	65	76	2.483	4.967	7.0%	-144.8%
11.9		4	88	83	95	2.646	5.292	6.01%	-203.4%
23.8		4	102.3	97	105	1.797	3.594	3.52%	-252.6%
47.6		4	110.8	105	117	2.462	4.924	4.45%	-281.9%
95.2		4	117.8	116	120	0.8539	1.708	1.45%	-306.0%

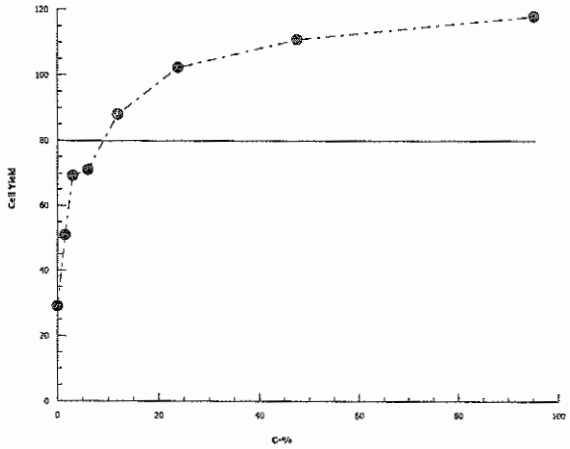
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	28	31	29	28	29	30	29	28
1.5		49	54	49	52				
3		73	74	64	66				
6		69	76	74	65				
11.9		95	83	89	85				
23.8		105	103	104	97				
47.6		117	105	110	111				
95.2		117	120	118	116				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	18-8201-4006	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	12-7775-1414	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:19	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	04-9241-0522	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	10-5788-9285	**Code:**	3F0E1C05	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_FRDSDC_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	19.6%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	9.765	2.526	5.692	10	<0.0001	CDF	Significant Effect
		3*	17.87	2.526	5.692	10	<0.0001	CDF	Significant Effect
		6*	18.64	2.526	5.692	10	<0.0001	CDF	Significant Effect
		11.9*	26.19	2.526	5.692	10	<0.0001	CDF	Significant Effect
		23.8*	32.51	2.526	5.692	10	<0.0001	CDF	Significant Effect
		47.6*	36.29	2.526	5.692	10	<0.0001	CDF	Significant Effect
		95.2*	39.39	2.526	5.692	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.4937	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	35475.22	5067.889	7	374.4	<0.0001	Significant Effect
Error	379	13.53571	28			
Total	35854.22		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	15.17	18.48	0.0339	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9777	0.9166	0.6663	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	29	28.11	29.89	29	28	31	0.378	3.69%	0.0%
1.5		4	51	47.1	54.9	50.5	49	54	1.225	4.8%	-75.86%
3		4	69.25	61.31	77.19	69.5	64	74	2.496	7.21%	-138.8%
6		4	71	63.1	78.9	71.5	65	76	2.483	7.0%	-144.8%
11.9		4	88	79.58	96.42	87	83	95	2.646	6.01%	-203.4%
23.8		4	102.3	96.53	108	103.5	97	105	1.797	3.52%	-252.6%
47.6		4	110.8	102.9	118.6	110.5	105	117	2.462	4.45%	-281.9%
95.2		4	117.8	115	120.5	117.5	116	120	0.8539	1.45%	-306.0%

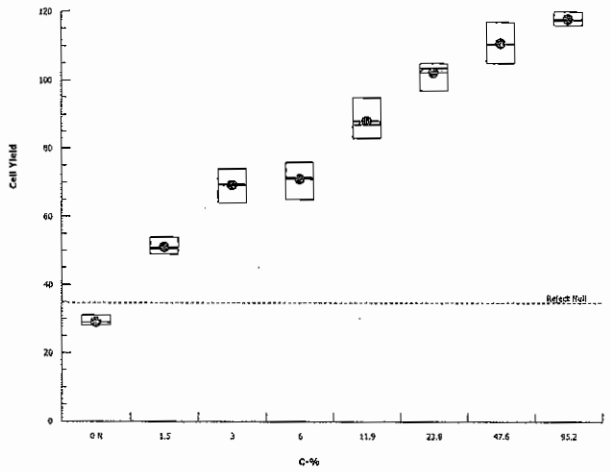
EC Alga Growth Inhibition Test **Nautilus Environmental**

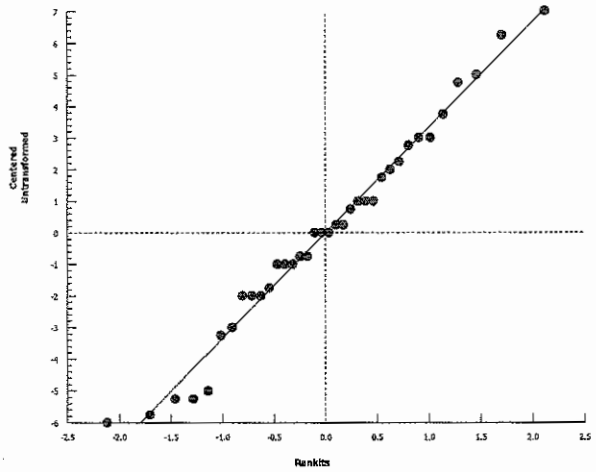
Analysis ID: 12-7775-1414 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 03 Nov-15 16:19 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	28	31	29	28	29	30	29	28
1.5		49	54	49	52				
3		73	74	64	66				
6		69	76	74	65				
11.9		95	83	89	85				
23.8		105	103	104	97				
47.6		117	105	110	111				
95.2		117	120	118	116				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15871

Start Date: Oct 27/15
Set up by: MLT/EMM

Sample Information:

Sample ID: LC_DCDS_WS_2015-10-26_N
Sample Date: Oct 26/15
Date Received: Oct 27/15
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: Oct 23/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC135
Stock Solution ID: 15Zn03
Date Initiated: NOV 3/15

72-h IC50 (95% CL): 35.7 (30.6 - 41.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 28.5 (16.2-50.1) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGL

Date reviewed: Nov 19/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT/EMM

Sample ID: LC_DCDS_WS_2015-10-26_N | Test Date/Time: Oct 27/15 @ ~~1430~~ MLT 1630h

Work Order No.: 15871 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 23/15 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 289 2 312 | Average: 300.5 | Culture Cell Density (c1): 300.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 160 ml / (c1) 300.5 x 10^4 cells/ml = 7.32mL

Time Zero Counts: 1 18 2 23 | Average: 20.5

No. of Cells/mL: 20.5 x 10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.1	23.0	24.5	24.5	25.0	25.0	✓	✓	✓	✓
1.5	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.2	23.0					✓	✓	✓	✓
6.0	7.3	23.0					✓	✓	✓	✓
11.9	7.5	23.0					✓	✓	✓	✓
23.8	7.7	23.0					✓	✓	✓	✓
47.6	7.9	23.0					✓	✓	✓	✓
95.2	8.2	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.1 | Well 2: 7.1

Final control pH: Well 1: 7.2 | Well 2: 7.2

Light intensity (lux): 3900 | Date measured: Oct 27/15

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear

Comments:

Reviewed: JOL | Date reviewed: Nov. 19/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: Oct 27/15 @ 1630h
Work Order #: ~~LC-DCDS~~ 15871
Termination Date: Oct 30/15 @ 1630h
Sample ID: LC_DCDS_WS_2015-10-26_N
Test set up by: ML

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	30					ML
	B	33					
	C	30					
	D	34					
	E	30					
	F	28					
	G	29					
	H	30					
1.5	A	55					
	B	56					
	C	49					
	D	54					
3.0	A	61					
	B	61					
	C	69					
	D	67					
6.0	A	76					
	B	75					
	C	70					
	D	80					
11.9	A	74					
	B	81					
	C	75					
	D	84					
23.8	A	94					
	B	83					
	C	92					
	D	91					
47.6	A	117					
	B	111					
	C	120					
	D	122					
95.2	A	110					
	B	125					
	C	123					
	D	119					

Comments:

Reviewed by: JDL
Date Reviewed: Nov. 19/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	27-Oct-15 @ 1630h
WO#:	15871	Termination Date:	30-Oct-15 @ 1630h
Sample ID:	LC_DCDS_WS_2015-10-26_N		
		Initial Cell Density:	9318 cell/mL

									205000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9318.182
Control	A	30				30	29.1	mean	29.6
	B	33				33	32.1	SD	2
	C	30				30	29.1	CV	6.764028
	D	34				34	33.1		
	E	30				30	29.1		
	F	28				28	27.1		
	G	29				29	28.1		
	H	30				30	29.1		
1.5	A	55				55	54.1		
	B	56				56	55.1		
	C	49				49	48.1		
	D	54				54	53.1		
3	A	61				61	60.1		
	B	61				61	60.1		
	C	69				69	68.1		
	D	67				67	66.1		
6	A	76				76	75.1		
	B	75				75	74.1		
	C	70				70	69.1		
	D	80				80	79.1		
11.9	A	74				74	73.1		
	B	81				81	80.1		
	C	75				75	74.1		
	D	84				84	83.1		
23.8	A	94				94	93.1		
	B	83				83	82.1		
	C	92				92	91.1		
	D	91				91	90.1		
47.6	A	117				117	116.1		
	B	111				111	110.1		
	C	120				120	119.1		
	D	122				122	121.1		
95.2	A	110				110	109.1		
	B	125				125	124.1		
	C	123				123	122.1		
	D	119				119	118.1		

JCL
Nov-19/15

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	05-4531-8232	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-8284-1356	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1815716	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.1869	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	29.5	27	33	0.7071	2	6.78%	0.0%
1.5		4	52.5	48	55	1.555	3.109	5.92%	-77.97%
3		4	63.5	60	68	2.062	4.123	6.49%	-115.3%
6		4	74.25	69	79	2.056	4.113	5.54%	-151.7%
11.9		4	77.5	73	83	2.398	4.796	6.19%	-162.7%
23.8		4	89	82	93	2.415	4.83	5.43%	-201.7%
47.6		4	116.5	110	121	2.398	4.796	4.12%	-294.9%
95.2		4	118.3	109	124	3.326	6.652	5.63%	-300.8%

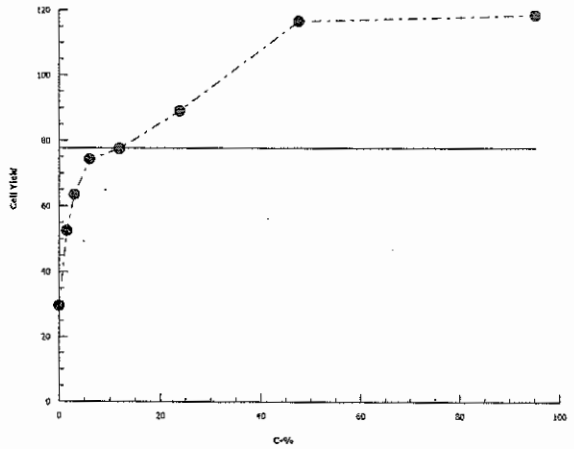
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	29	32	29	33	29	27	28	29
1.5		54	55	48	53				
3		60	60	68	66				
6		75	74	69	79				
11.9		73	80	74	83				
23.8		93	82	91	90				
47.6		116	110	119	121				
95.2		109	124	122	118				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	05-4531-8232	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	08-7660-8054	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:23	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	06-8284-1356	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	11-3850-9437	**Code:**	43DC467D	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (3.5 °C)	**Station:**	LC_DCDS_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	22.1%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	8.892	2.526	6.534	10	<0.0001	CDF	Significant Effect
		3*	13.15	2.526	6.534	10	<0.0001	CDF	Significant Effect
		6*	17.3	2.526	6.534	10	<0.0001	CDF	Significant Effect
		11.9*	18.56	2.526	6.534	10	<0.0001	CDF	Significant Effect
		23.8*	23	2.526	6.534	10	<0.0001	CDF	Significant Effect
		47.6*	33.64	2.526	6.534	10	<0.0001	CDF	Significant Effect
		95.2*	34.31	2.526	6.534	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.1869	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	34031.72	4861.675	7	272.5	<0.0001	Significant Effect
Error	499.5	17.83928	28			
Total	34531.22		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.766	18.48	0.4536	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9582	0.9166	0.1886	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	29.5	27.83	31.17	29	27	33	0.7071	6.78%	0.0%
1.5		4	52.5	47.55	57.45	53.5	48	55	1.555	5.92%	-77.97%
3		4	63.5	56.94	70.06	63	60	68	2.062	6.49%	-115.3%
6		4	74.25	67.71	80.79	74.5	69	79	2.056	5.54%	-151.7%
11.9		4	77.5	69.87	85.13	77	73	83	2.398	6.19%	-162.7%
23.8		4	89	81.31	96.69	90.5	82	93	2.415	5.43%	-201.7%
47.6		4	116.5	108.9	124.1	117.5	110	121	2.398	4.12%	-294.9%
95.2		4	118.3	107.7	128.8	120	109	124	3.326	5.63%	-300.8%

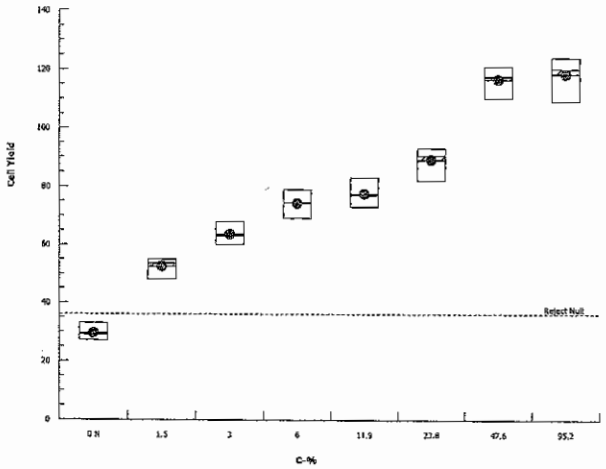
EC Alga Growth Inhibition Test | **Nautilus Environmental**

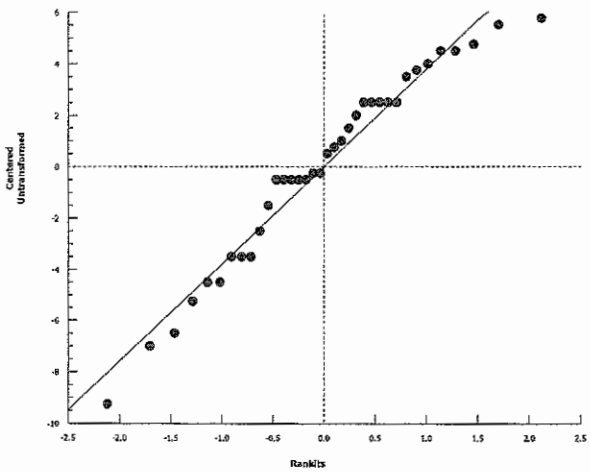
Analysis ID:	08-7660-8054	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Nov-15 16:23	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	29	32	29	33	29	27	28	29
1.5		54	55	48	53				
3		60	60	68	66				
6		75	74	69	79				
11.9		73	80	74	83				
23.8		93	82	91	90				
47.6		116	110	119	121				
95.2		109	124	122	118				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 15871

Start Date: Oct 27/15
Set up by: MIT/EMM

Sample Information:

Sample ID: LC_LC5_WS_2015-10-26_N
Sample Date: Oct 26/15
Date Received: Oct 27/15
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: Oct 23/15
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC135
Stock Solution ID: 152n03
Date Initiated: NOV 3/15

72-h IC50 (95% CL): 35.7 (30.6 - 41.4) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 28.5 (16.2 - 50.1) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JOL

Date reviewed: Nov-19/15

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT / EMM

Sample ID: LC_LCG_WS_2015-10-26_N | Test Date/Time: Oct 27/15 @ ~~1410h~~ MG 1610h

Work Order No.: 15871 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 23/15 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 289 2 312 | Average: 300.5 | Culture Cell Density (c1): 300.5 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 300.5 x 10⁴ cells/ml = 7.32mL

Time Zero Counts: 1 18 2 23 | Average: 20.5

No. of Cells/mL: 20.5 x 10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control	7.1	23.0	24.5	24.5	25.0	25.0	✓	✓	✓	✓
1.5	7.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.2	23.0					✓	✓	✓	✓
6.0	7.4	23.0					✓	✓	✓	✓
11.9	7.5	23.0					✓	✓	✓	✓
23.8	7.7	23.0					✓	✓	✓	✓
47.6	MG 7.8.0	23.0					✓	✓	✓	✓
95.2	8.2	23.0					✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.1 Well 2: 7.1

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 3900 Date measured: Oct 27/15

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear

Comments:

Reviewed: JOL Date reviewed: Nov. 19/15

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Start Date/Time: Oct 27/15 @ ~~163~~ MLT 1610h
Work Order #: 15871 Termination Date: Oct 30/15 @ 1610h
Sample ID: LC_LC5_WS_2015-10-26_N Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	31					MLT
	B	30					
	C	30					
	D	33					
	E	30					
	F	30					
	G	31					
	H	29					
1.5	A	50					
	B	51					
	C	45					
	D	48					
3.0	A	59					
	B	62					
	C	58					
	D	61					
6.0	A	69					
	B	71					
	C	75 ~~74~~ MLT					
	D	65					
11.9	A	88 ~~88~~ MLT					
	B	84					
	C	98					
	D	98					
23.8	A	101					
	B	105					
	C	96					
	D	98					
47.6	A	109					
	B	101					
	C	94					
	D	98					
95.2	A	103					
	B	96					
	C	110					
	D	104					

Comments:

Reviewed by: JGU Date Reviewed: Nov-19/15

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	27-Oct-15 @ 1610h		
WO#:	15871	Termination Date:	30-Oct-15 @ 1610h		
Sample ID:	LC_LC5_WS_2015-10-26_N				
		Initial Cell Density:	9318 cell/mL		205000
					0.22
					0.01

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		
									9318.182
Control	A	31				31	30.1	mean	29.6
	B	30				30	29.1	SD	1.195229
	C	30				30	29.1	CV	4.04228
	D	33				33	32.1		
	E	30				30	29.1		
	F	30				30	29.1		
	G	31				31	30.1		
	H	29				29	28.1		
1.5	A	50				50	49.1		
	B	51				51	50.1		
	C	45				45	44.1		
	D	48				48	47.1		
3	A	59				59	58.1		
	B	62				62	61.1		
	C	58				58	57.1		
	D	61				61	60.1		
6	A	69				69	68.1		
	B	71				71	70.1		
	C	75				75	74.1		
	D	65				65	64.1		
11.9	A	88				88	87.1		
	B	84				84	83.1		
	C	98				98	97.1		
	D	98				98	97.1		
23.8	A	101				101	100.1		
	B	105				105	104.1		
	C	96				96	95.1		
	D	98				98	97.1		
47.6	A	109				109	108.1		
	B	101				101	100.1		
	C	94				94	93.1		
	D	98				98	97.1		
95.2	A	103				103	102.1		
	B	96				96	95.1		
	C	110				110	109.1		
	D	104				104	103.1		

JOL
Nov-19/15

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	08-3035-8367	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 16:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-2850-6043	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:10	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:10	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	245839	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2202	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	29.5	28	32	0.4226	1.195	4.05%	0.0%
1.5		4	47.5	44	50	1.323	2.646	5.57%	-61.02%
3		4	59	57	61	0.9129	1.826	3.09%	-100.0%
6		4	69	64	74	2.082	4.163	6.03%	-133.9%
11.9		4	91	83	97	3.559	7.118	7.82%	-208.5%
23.8		4	99	95	104	1.958	3.916	3.96%	-235.6%
47.6		4	99.5	93	108	3.175	6.351	6.38%	-237.3%
95.2		4	102.3	95	109	2.869	5.737	5.61%	-246.6%

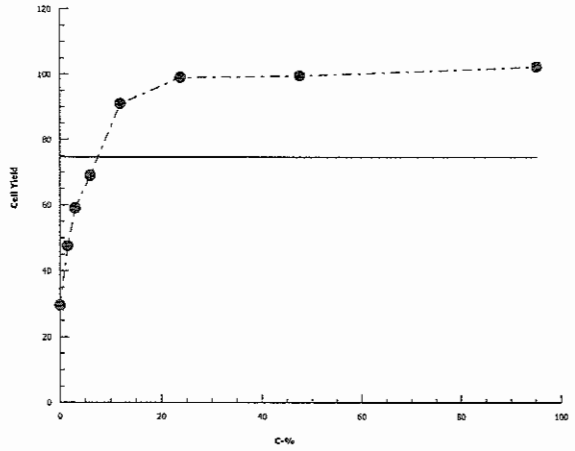
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	29	29	32	29	29	30	28
1.5		49	50	44	47				
3		58	61	57	60				
6		68	70	74	64				
11.9		87	83	97	97				
23.8		100	104	95	97				
47.6		108	100	93	97				
95.2		102	95	109	103				

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	08-3035-8367	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 16:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: 10 Nov. 15/11

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	09-6263-7117	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-15 16:27	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	02-2850-6043	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	27 Oct-15 16:10	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	30 Oct-15 16:10	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	09-9298-8395	**Code:**	3B2FCCEB	**Client:**	Teck Coal
Sample Date:	26 Oct-15	**Material:**	Water Sample	**Project:**	
Receive Date:	27 Oct-15 10:10	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (2.5 °C)	**Station:**	LC_LC5_WS_2015-10-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	22.4%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	6.882	2.526	6.607	10	<0.0001	CDF	Significant Effect
		3*	11.28	2.526	6.607	10	<0.0001	CDF	Significant Effect
		6*	15.1	2.526	6.607	10	<0.0001	CDF	Significant Effect
		11.9*	23.51	2.526	6.607	10	<0.0001	CDF	Significant Effect
		23.8*	26.57	2.526	6.607	10	<0.0001	CDF	Significant Effect
		47.6*	26.76	2.526	6.607	10	<0.0001	CDF	Significant Effect
		95.2*	27.82	2.526	6.607	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2202	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	28398	4056.857	7	222.4	<0.0001	Significant Effect
Error	510.75	18.24107	28			
Total	28908.75		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	17.25	18.48	0.0158	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9733	0.9166	0.5213	Normal Distribution

Cell Yield Summary

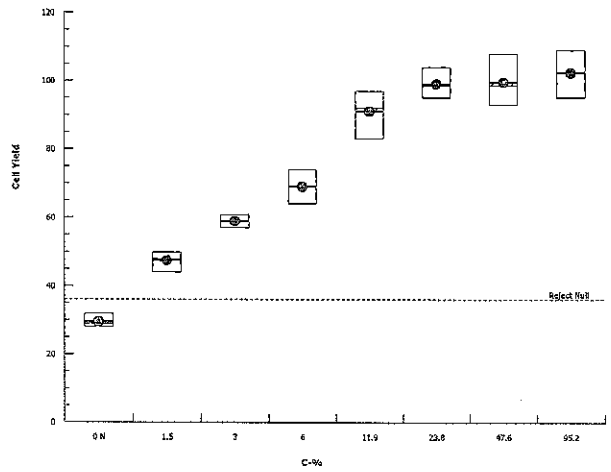
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	29.5	28.5	30.5	29	28	32	0.4226	4.05%	0.0%
1.5		4	47.5	43.29	51.71	48	44	50	1.323	5.57%	-61.02%
3		4	59	56.09	61.91	59	57	61	0.9129	3.09%	-100.0%
6		4	69	62.38	75.62	69	64	74	2.082	6.03%	-133.9%
11.9		4	91	79.67	102.3	92	83	97	3.559	7.82%	-208.5%
23.8		4	99	92.77	105.2	98.5	95	104	1.958	3.96%	-235.6%
47.6		4	99.5	89.39	109.6	98.5	93	108	3.175	6.38%	-237.3%
95.2		4	102.3	93.12	111.4	102.5	95	109	2.869	5.61%	-246.6%

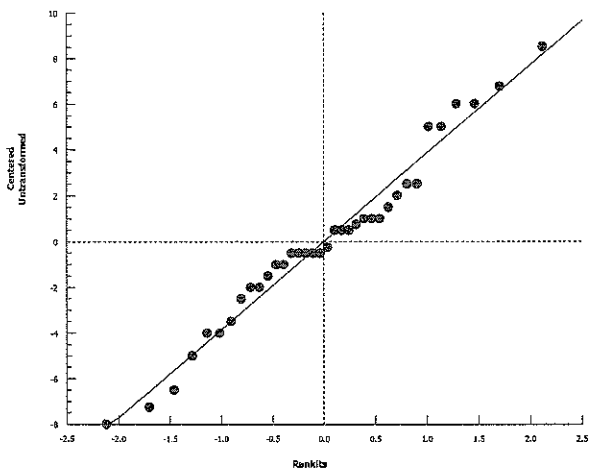
Analysis ID: 09-6263-7117 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 10 Nov-15 16:27 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	29	29	32	29	29	30	28
1.5		49	50	44	47				
3		58	61	57	60				
6		68	70	74	64				
11.9		87	83	97	97				
23.8		100	104	95	97				
47.6		108	100	93	97				
95.2		102	95	109	103				

Graphics





APPENDIX E – Analytical Chemistry

Analytical chemistry data has been uploaded to EMS.

APPENDIX F – Chain-of-Custody Forms

Chain Of Custody Record

COC ID: Quarterly_FR1_F.Minnow_HydroQual, Re-Fresh #1 | Page: 1 of 1

Turnaround Time: | **Rush:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operation			Lab Name	Nautilus Environmental Laboratories Lt			Send Invoice To			
Project Number				Contact Name	Kryst Pearcy			Address			
Contact Name	Leigh Stickney			Address	8664 Commerce Court						
Address	P.O. BOX 5000							City		State	
				City	Burnaby	State	BC	Postal Code		Country	
City	Elkford	State	BC	Postal Code	V5A 4N7	Country	Canada	Task Code			
Postal Code	V0B1H0	Country	Canada	Phone Number				Shipping Company			
Phone Number	250-865-3274			Email Address				Tracking Number			
Email EDD To	Leigh.Stickney@Teck.com			Quote Number				CC Hardcopy To			
Email Report To	Leigh.Stickney@Teck.com							CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						PRESERV.										Initial - PASS/FAIL
Sample ID	Matrix	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	30 d early life stage, fathead minnow Pass/Fail	28 d Hyalella Pass Fail:	72 h P. subcapitata Pass fail	7 d C. dubia Pass fail	96 hr Rainbow trout pass/fail	48 hr Daphnia pass/Fail	30 Day rainbow trout Early Life stage Pass Fail	7 day Rainbow trout Pass Fail	Lemna minor Pass Fail	
GH_ER2_WS_2015_10_26_N	WS	10/26/2015		G	6			X	X	X			X	X	X	
						WO #		15865	15865	15864			15866	15869		

Temp. 4.5°C

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
				Nautilus	Oct 27/15	10:10		Y / N	Y / N	Y / N
				NY - Nan Yamamoto				Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
				6X20L				Y / N	Y / N	Y / N

Sampler's Name	Leigh Stickney	Mobile #	250 910 0627
Sampler's Signature		Date/Time	

Temp in °C	Samples on ice?	Sample intact?	Trip Blank?

Chain Of Custody Record

COC ID: Nautilus_2015-10-26_chronic | Page: 1 of 1

Turnaround Time:

PROJECT/CLIENT INFO					LABORATORY				OTHER INFO			
Facility Name	Line Creek Operations				Lab Name	Nautilus Environmental			Send Invoice To			
Contact Name	Jay Jones				Contact Name	Krysta Pearcy			Address			
Address	Box 2003				Address	8664 commerce Court						
City	Sparwood		Prov.	BC					City		State	
Postal Code	V0B 2G0	Country	Canada		City	Burnaby	State	BC	Postal Code		Country	
Phone Number	250 425-6111				Postal Code	V5A 4N7	Country	Canada	Task Code			
Email EDD To	jay.jones@teck.com				Phone Number				Shipping Company			
	cait.good@teck.com				Email Address	Krysta@NautilusEnvironmental.com			Tracking Number			
					PO Number				CC Hardcopy To			
									CC Hardcopy To			

SAMPLE DETAILS						ANALYSIS REQUESTED										ADDITIONAL INFORMATION
						ANALYSIS	7-d *C. dubia* dilution series	72-h *P. subcapitata* dilution series	7-d *L. minor* plant growth dilution series	7-d *O. mykiss* development dilution series	30-d *O. mykiss* embryo-alevin & (semi-annual) pass/fail				Temp °C	
LC_LCDSSLCC_WS_2015-10-26_N	WS	26-Oct-15		20L	8 ✓		X	X	X	X	X					2.5	
LC_DC1_WS_2015-10-26_N	WS	26-Oct-15		20L	5 ✓		X	X	X	X						2.5	
LC_FRDSDC_WS_2015-10-26_N	WS	26-Oct-15		20L	5 ✓		X	X	X	X						2.5	
LC_DCDS_WS_2015-10-26_N	WS	26-Oct-15		20L	5 ✓		X	X	X	X						3.5	
LC_LC6_WS_2015-10-26_N	WS	26-Oct-15		20L	5 ✓		X	X	X	X						2.5	
							15870	15871	15872	15873	15866						

Additional Comments/Special Instructions	Relinquished By/Affiliation	Date	Time	Accepted By/Affiliation	Date	Time	Sample Receipt Conditions			
	T. Phillips/ Nupqu	26/10/2015		Nautilus N. Nori Yamamoto.	Oct 27/15	10:10		Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N
								Y / N	Y / N	Y / N

						Temp in °C	Samples on ice?	Sample intact?	Trip Blank?
Sampler's Name	Tyler Phillips	Mobile #	(250) 919-0965						
Sampler's Signature		Date/Time	26-Oct-15						

Nautilus Environmental

Toxicity testing on Line Creek Operations samples with *Ceriodaphnia dubia*, *Oncorhynchus mykiss*, *Lemna minor* and *Pseudokirchneriella subcapitata*

Second Quarter 2016 Results

Final Report

Report date:
October 31, 2016

Submitted to:

Teck Coal Ltd.
Sparwood, BC

8664 Commerce Court
Burnaby, BC
V5A 4N7

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APPENDIX F – Chain-of-Custody Forms

SIGNATURE PAGE



Krysta Pearcy, B.Sc.
Testing Manager



James Elphick, R.P.Bio.
Senior Reviewer

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on samples collected from the Line Creek Operations as part of a toxicity testing program required under BC Ministry of Environment permit number 106970, Section 5.2. Test types included survival and reproduction of a cladoceran (*Ceriodaphnia dubia*), embryo development of rainbow trout (*Oncorhynchus mykiss*), growth of a freshwater plant (*Lemna minor*) and population growth of a unicellular green alga (*Pseudokirchneriella subcapitata*). Table 1 outlines the toxicity tests that were conducted on each sample and Figure 1 shows the locations of sample sites. Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 6.0 to 10.2°C and were stored in the dark at 4 ± 2°C prior to testing.

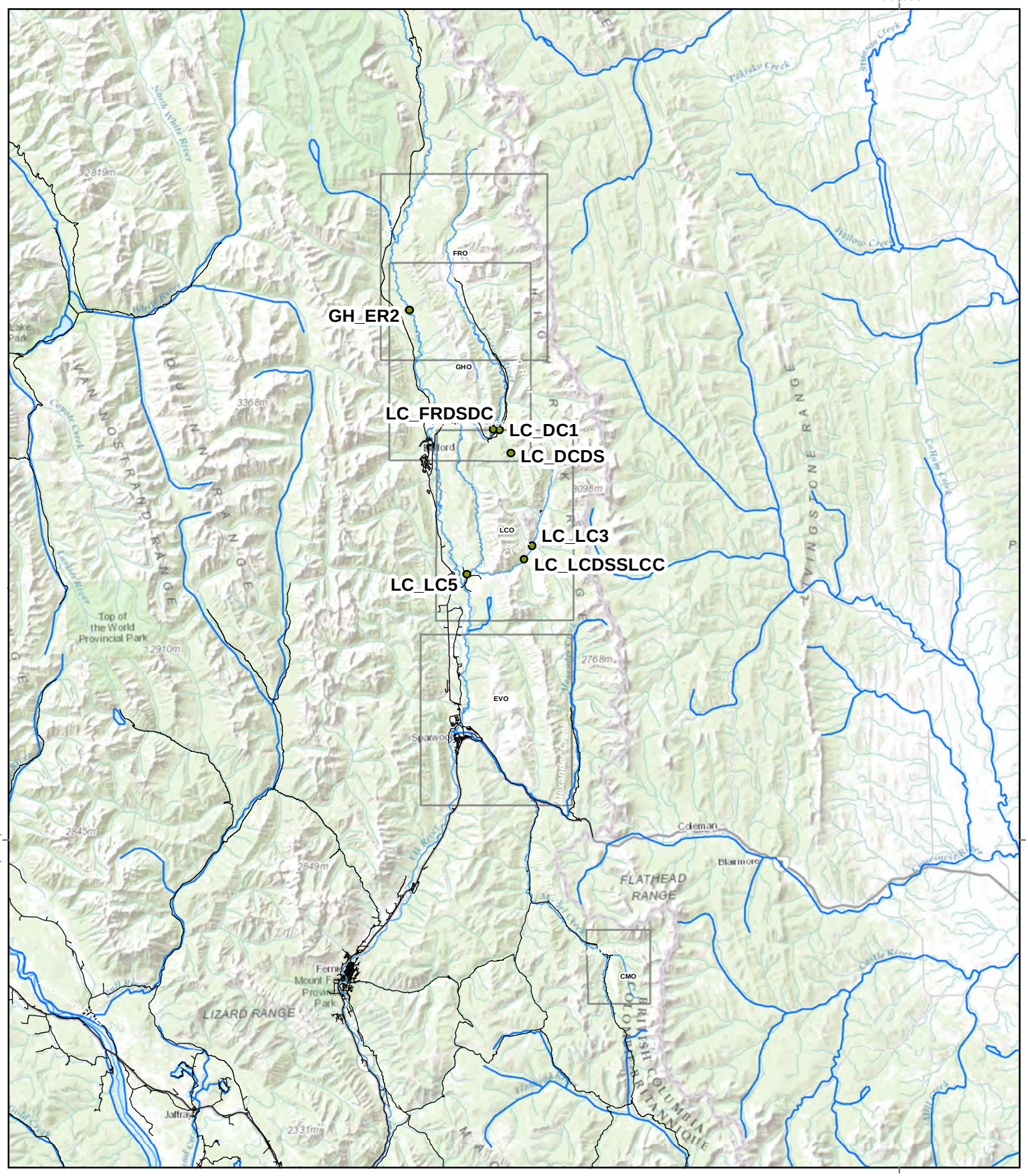
Table 1. Summary of toxicity testing program.

Sample ID	EMS #	Location Description	Species Tested	Sample Collection Date
GH_ER2*	200389	Elk River upstream of Greenhill Operations	*C. dubia*, *O. mykiss*, and *P. subcapitata*	April 27, 2016
LC_LCDSSLCC	297110	Line Creek downstream of South Line Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 27, 2016
LC_DC1	E288270	Dry Creek near mouth	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 27, 2016
LC_FRDSDC	E288272	Fording River downstream of Dry Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 27, 2016
LC_DCDS	E295210	Dry Creek downstream of sedimentation ponds	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 27, 2016
LC_LC5	200028	Lower Fording River (downstream of Line Creek)	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 27, 2016
LC_WTF_OUT	E291569	West Line Creek Active Water Treatment Facility Effluent Outfall	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 27, 2016

*Reference site. Conducted as a single concentration toxicity test.

The samples from Line Creek Operations were tested using serial dilutions of the sample with laboratory control water. Sample GH_ER2 was tested using only a single (100%) concentration with no dilution. GH_ER2 is an upstream reference location that is not required as part of the Line Creek Operations testing program, but the data for this sample were included here as a basis for comparison to Line Creek Operations mine-influenced samples.

This report describes the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. Results of analytical chemistry that was performed on the samples tested in this program have been uploaded to the BC Ministry of Environment web reporting system (EMS). Samples for water chemistry analysis were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix F.



Teck

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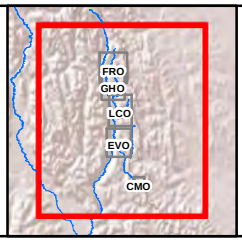

Line Creek Chronic Toxicity Monitoring Locations

- Roads
- Rivers
- Monitoring Locations

N

0 2.5 5 10 15 Kilometers

DATE:	MINE OPERATION:
8/28/2015	Elk Valley
SCALE:	COORDINATE SYSTEM:
1:550,000	NAD 1983 UTM Zone 11N

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2.0 METHODS

Methods for the toxicity tests are summarized in Tables 2 through 5. Testing was conducted according to procedures described by Environment Canada protocols (1998, 2007a, 2007b and 2007c). Statistical analyses for the tests were performed using CETIS (Tidepool Scientific Software, 2013).

Table 2. Summary of test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test organism	*Ceriodaphnia dubia*
Test organism source	In-house culture
Test organism age	<24 h old neonates produced within 12 h
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20 mL glass test tube
Test volume	15 mL
Test solution depth	10 cm
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	10 test replicates per treatment
Number of organisms	1 per replicate
Control water	20% Perrier water and 80% deionized water (hardness 80-100 mg/L $CaCO_3$)
Test solution renewal	Daily (100% renewal)
Test temperature	25 ± 1°C
Feeding	Daily with *Pseudokirchneriella subcapitata* and YCT (3:1 ratio)
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light/8 hours dark
Sample filtration	None
Aeration	None
pH adjustment	None
Test protocol	Environment Canada (2007a)
Statistical software	CETIS
Test endpoint	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods, no ephippia present
Reference toxicant	Sodium chloride

Table 3. Summary of test conditions: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Test organism	*Oncorhynchus mykiss*
Test organism source	Ted's Trout Farm, Little Fort, BC
Gamete quality	Small amount of water added to milt on a dry glass slide; verification of vigorous sperm motility using a compound microscope (100 X magnification)
Test organism age	<30 minutes post fertilization, <24 hour old gametes
Test type	Static-renewal
Test duration	7 days
Test vessel	2-L plastic container
Test volume	2 L
Test solution depth	17 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	4 test replicates per treatment
No. of organisms	30 eggs per replicate
Control/dilution water	Dechlorinated municipal water (hardness 10 mg/L $CaCO_3$)
Test solution renewal	Daily (80% renewal)
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark
Sample filtration	None
Aeration	6.5 ± 1 mL/min/L
pH adjustment	None
Test protocol	Environment Canada (1998); Canaria et al. (1999)
Statistical software	CETIS
Test endpoint	Embryo viability
Test acceptability criteria for controls	Embryo viability ≥70%
Reference toxicant	Sodium dodecyl sulphate

Table 4. Summary of test conditions: *Lemna minor* growth inhibition test.

Test organism	*Lemna minor*, strain CPCC# 490
Test organism source	In-house axenic culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Wainfleet, Stinking Barn, Niagara Peninsula, Ontario, Canada
Test organism age	7-to 10-day old
Test type	Static
Test duration	7 days
Test vessel	250-mL glass container
Test volume	100 mL
Test solution depth	4 cm
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	4 test replicates per treatment
No. of organisms	Two 3-frond plants per replicate
Control/dilution water	Modified APHA media (deionized water plus 1% of each APHA stock solution A, B and C)
Test solution renewal	None
Test temperature	25 ± 2°C
Feeding	None
Light intensity	4000 to 5600 lux
Photoperiod	24 hours light
Sample filtration	None
Aeration	None
pH adjustment	None
Test protocol	Environment Canada (2007b)
Statistical software	CETIS
Test endpoints	Number of fronds and dry weight
Test acceptability criteria for controls	≥ 8-fold increase in number of fronds
Reference toxicant	Potassium chloride

Table 5. Summary of test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test organism	*Pseudokirchneriella subcapitata*, strain UTCC# 37
Test organism source	In-house axenic culture, obtained from Canadian Phycological Culture Center, and originally isolated from Nivelta River, Norway.
Test organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	4 test replicates per treatment; 8 test replicates for control
No. of organisms	10, 000 cells/mL
Control/dilution water	Deionized water with supplemented nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Sample filtration	Through a preconditioned membrane filter of 0.45 µm using a vacuum pump
Aeration	None
pH adjustment	None
Test protocol	Environment Canada (2007c)
Statistical software	CETIS
Test endpoint	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤ 20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc

3.0 RESULTS

The results of the toxicity tests and associated statistical analyses are provided in Appendices A through D, with the exception of data for sample GH_ER2 for *C. dubia* and *P. subcapitata*, which are reproduced here, but the raw data are provided in a separate report (Nautilus Environmental, 2016). The statistical analysis for sample GH_ER2 involved a comparison of performance in the site water with the control using a hypothesis test, since there were no dilutions tested for this sample. The results for all of the other samples are presented here on the basis of point estimates (e.g., IC25), since the data available for a range of test concentrations in these samples enabled statistical fitting of dose-response relationships. This approach is considered preferable to hypothesis testing in cases where the data allow. Hypothesis tests were conducted for all samples in the *P. subcapitata* test to identify stimulation in cell growth relative to the control, as specified in the test method for this species.

Results of the toxicity tests using *C. dubia* are provided in Table 6. There was no adverse effect on survival in the samples; the LC50 values were >100%. An adverse effect on reproduction was observed in four of the six samples. The IC25 values for LC_LCDSSLCC, LC_DC1, LC_DCDS and LC_WTF_OUT were 22.6, 70.6, 32.9 and 29.2 , respectively.

Results of the toxicity tests using *O. mykiss* are provided in Table 7. An adverse effect on embryo viability was observed only in sample LC_WTF_OUT; the EC25 value was 65.1%.

Results of the toxicity tests using *L. minor* are provided in Table 8; the highest test concentration was 97% as a result of dilution associated with addition of nutrients, as required in the method. There were no adverse effects on frond count or dry weight in the samples; therefore the IC25 values for all samples were >97%.

Results of the toxicity tests using *P. subcapitata* are provided in Table 9; the highest test concentraton was 95.2% as a result of dilution associated with addition of nutrients. An adverse inhibition effect on cell yield was only observed in sample LC_WTF_OUT; the IC25 was 72.7%.

Reference sample GH_ER2 was only tested at full strength with *C. dubia*, *O. mykiss* and *P. subcapitata*. There were no significant adverse effects in GH_ER2 compared to the laboratory control for *C. dubia* survival, *O. mykiss* viability and *P. subcapitata* cell yield. In the *P. subcapitata* test, the site water control produced 2.9-fold greater growth than the laboratory water control. This finding is not unusual, since the higher ionic strength associated with the reference sample

would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water, and growth enhancement of *P. subcapitata* observed in this reference sample was similar to that observed in most of the samples. Reproduction of *C. dubia* in reference sample GH_ER2 was statistically significantly reduced by 26% compared to the laboratory control.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	GH_ER2		LC_LCDSSLCC		LC_DC1	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Control	100	22.7 ± 2.5	100	19.8 ± 7.6	90	22.5 ± 8.0
1.56	NT	NT	100	21.1 ± 4.8	100	25.4 ± 1.5
3.12	NT	NT	100	15.6 ± 8.9	90	21.9 ± 6.8
6.25	NT	NT	100	20.5 ± 4.7	100	23.6 ± 2.8
12.5	NT	NT	80	19.2 ± 8.1	90	21.8 ± 6.8
25	NT	NT	100	14.8 ± 7.5	100	22.0 ± 3.3
50	NT	NT	90	14.1 ± 8.2	90	20.3 ± 5.1
100	90	16.8 ± 7.0*	100	15.3 ± 8.8	80	15.6 ± 8.6
Test endpoint (% v/v) [with 95% CL]						
LC50	--	--	>100	--	>100	--
IC25	--	--	--	22.6 (2.9 – N/A)	--	70.6 (40.1 – N/A)
IC50	--	--	--	>100	--	>100

NT = Not Tested, SD = Standard Deviation, CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration, N/A = Not Available

* Result was significantly lower than the laboratory control (hypothesis tests were only conducted for sample GH_ER2)

Table 6. (continued) Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5		LC_WTF_OUT	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Control	100	23.4 ± 2.4	100	21.7 ± 3.2	100	21.7 ± 3.4	100	24.2 ± 2.0
1.56	90	21.0 ± 4.2	100	22.6 ± 8.8	100	19.4 ± 5.0	100	24.7 ± 1.2
3.12	100	21.3 ± 3.3	100	18.4 ± 9.8	100	20.6 ± 4.4	100	25.3 ± 1.6
6.25	90	19.2 ± 6.2	100	19.4 ± 7.5	100	18.7 ± 4.4	100	23.9 ± 5.5
12.5	100	23.6 ± 2.5	100	22.9 ± 3.0	80	17.2 ± 9.2	80	17.8 ± 11.7
25	90	21.0 ± 4.2	90	17.4 ± 9.5	100	19.2 ± 4.2	90	22.5 ± 7.9
50	100	21.7 ± 2.1	100	15.4 ± 5.7	100	19.2 ± 4.2	100	13.0 ± 3.5
100	100	18.7 ± 3.2	90	13.5 ± 9.6	100	20.7 ± 2.8	90	0.7 ± 1.6
Test Endpoint (% v/v) [with 95% CL]								
LC50	>100	--	>100	--	>100	--	>100	--
IC25	--	>100	--	32.9 (14.8 – N/A)	--	>100	--	29.2 (9.5 – 36.0)
IC50	--	>100	--	>100	--	>100	--	51.8 (43.0 – 57.0)

SD = Standard Deviation, CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration, N/A = Not Available

Table 7. Results: rainbow trout embryo (*Oncorhynchus mykiss*) viability test.

Concentration (% v/v)	Embryo Viability (%) (Mean ± SD)						
	GH_ER2	**LC_LCDSSLCC**	**LC_DC1**	**LC_FRDSDC**	**LC_DCDS**	**LC_LC5**	**LC_WTF_OUT**
Control	90.1 ± 8.9	84.0 ± 9.0	89.2 ± 5.0	88.3 ± 8.8	90.8 ± 4.2	88.3 ± 4.3	87.5 ± 10.3
6.25	NT	90.0 ± 7.2	88.3 ± 4.3	87.5 ± 3.2	85.0 ± 4.3	90.0 ± 6.7	85.4 ± 5.6
12.5	NT	87.5 ± 5.0	91.7 ± 4.3	90.0 ± 3.8	86.7 ± 2.7	89.1 ± 5.7	81.5 ± 6.9
25	NT	88.2 ± 3.3	92.5 ± 3.2	88.3 ± 1.9	90.0 ± 5.2	85.8 ± 7.4	79.0 ± 5.7
50	NT	86.8 ± 2.7	86.7 ± 4.7	88.3 ± 3.3	85.8 ± 3.2	84.2 ± 5.0	73.5 ± 10.7
100	93.2 ± 6.2	85.0 ± 6.9	87.5 ± 7.4	85.0 ± 4.3	88.4 ± 6.9	79.2 ± 7.4	48.4 ± 13.9
Test endpoint (% v/v) [with 95% CL]							
EC25	-	>100	>100	>100	>100	>100	65.1 (38.3 – 80.5)
EC50	-	>100	>100	>100	>100	>100	100 (93.8 – 100)

NT = Not Tested, SD = Standard Deviation, CL = Confidence Limits, EC = Effective Concentration

Table 8. Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_LCDSSLCC		LC_DC1		LC_FRDSDC	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Control	80.2 ± 5.3	6.6 ± 0.4	69.5 ± 5.9	6.0 ± 0.5	74.2 ± 9.2	5.7 ± 0.8
1.5	58.8 ± 4.4	4.5 ± 0.5	68.0 ± 2.4	6.0 ± 0.3	64.5 ± 3.1	5.4 ± 0.4
3.0	76.8 ± 3.9	6.1 ± 0.4	63.2 ± 7.9	6.0 ± 0.8	65.2 ± 3.8	5.2 ± 0.4
6.1	74.0 ± 12.8	5.6 ± 0.9	69.2 ± 15.6	6.3 ± 1.3	72.8 ± 3.6	6.2 ± 0.3
12.1	70.0 ± 7.3	5.4 ± 0.6	61.8 ± 5.7	5.7 ± 0.5	73.8 ± 4.3	5.8 ± 0.6
24.2	78.0 ± 9.1	6.2 ± 0.7	78.5 ± 16.7	6.8 ± 1.2	65.2 ± 11.9	5.4 ± 0.7
48.5	80.8 ± 10.2	6.4 ± 0.8	75.0 ± 9.1	6.4 ± 0.5	77.5 ± 9.8	6.0 ± 0.5
97	65.5 ± 6.4	5.3 ± 0.4	66.0 ± 9.2	5.8 ± 0.4	65.8 ± 4.6	5.9 ± 0.3
Test Endpoint (% v/v)						
IC25	>97	>97	>97	>97	>97	>97
IC50	>97	>97	>97	>97	>97	>97

SD = Standard Deviation, IC = Inhibition Concentration

Table 8. (continued) Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_DCDS		LC_LC5		LC_WTF_OUT	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Control	73.5 ± 10.2	6.8 ± 1.2	84.5 ± 12.7	6.5 ± 1.1	62.0 ± 11.2	6.3 ± 0.7
1.5	70.8 ± 1.7	6.3 ± 0.6	78.5 ± 9.5	6.1 ± 0.9	53.8 ± 7.8	5.0 ± 1.0
3.0	87.0 ± 13.6	8.5 ± 1.2	78.8 ± 7.8	5.8 ± 0.4	57.5 ± 6.4	5.8 ± 0.8
6.1	77.0 ± 24.4	7.1 ± 2.6	73.2 ± 15.1	5.8 ± 1.2	62.5 ± 11.4	6.0 ± 0.8
12.1	73.5 ± 10.8	6.7 ± 1.2	83.0 ± 4.9	6.4 ± 0.4	63.2 ± 11.5	6.5 ± 1.0
24.2	87.8 ± 14.9	7.6 ± 1.1	94.5 ± 8.3	7.4 ± 0.7	62.5 ± 5.3	6.5 ± 0.5
48.5	83.2 ± 9.4	7.3 ± 0.9	90.5 ± 7.1	6.9 ± 0.6	46.5 ± 5.3	6.1 ± 0.9
97	84.0 ± 5.4	8.0 ± 0.6	85.2 ± 5.4	6.6 ± 0.5	52.5 ± 5.7	6.9 ± 1.0
Test Endpoint (% v/v)						
IC25	>97	>97	>97	>97	>97	>97
IC50	>97	>97	>97	>97	>97	>97

SD = Standard Deviation, IC = Inhibition Concentration

Table 9. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	GH_ER2		LC_LCDSSLCC		LC_DC1		LC_FRDSDC	
	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)
Control	34.4 ± 2.7	--	31.6 ± 1.7	--	31.6 ± 2.5	--	31.5 ± 2.6	--
1.5	NT	NT	32.5 ± 2.1	2.8	31.8 ± 2.5	0.4	34.0 ± 2.2	7.9
3.0	NT	NT	40.8 ± 3.5 [α]	28.8	34.8 ± 1.7	9.9	45.8 ± 4.6 [α]	45.2
6.0	NT	NT	59.5 ± 3.9 [α]	88.1	45.2 ± 3.5 [α]	43.1	64.2 ± 4.0 [α]	104.0
11.9	NT	NT	86.2 ± 7.8 [α]	172.7	58.2 ± 4.0 [α]	84.2	76.0 ± 4.8 [α]	141.3
23.8	NT	NT	90.8 ± 2.8 [α]	187.0	73.5 ± 2.6 [α]	132.4	84.0 ± 4.2 [α]	166.7
47.6	NT	NT	91.0 ± 2.7 [α]	187.7	94.0 ± 5.4 [α]	197.2	92.5 ± 6.2 [α]	193.7
95.2	98.8 ± 5.3 [α]	187.3	91.0 ± 4.8 [α]	187.7	98.8 ± 8.6 [α]	212.3	86.8 ± 4.0 [α]	175.4
Test Endpoint (% v/v)								
IC25	--	--	>95.2	--	>95.2	--	>95.2	--
IC50	--	--	>95.2	--	>95.2	--	>95.2	--

NT = Not Tested, SD = Standard Deviation, IC = Inhibition Concentration

[α] Result was significantly greater than the laboratory control

Table 9. (continued) Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	LC_DCDS		LC_LC5		LC_WTF_OUT	
	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)	Cell Yield x10⁴ (Mean ± SD)	Stimulation (%)
Control	31.9 ± 3.0	--	31.8 ± 2.3	--	32.5 ± 2.1	--
1.5	36.0 ± 2.4	12.9	45.5 ± 3.8 α	43.3	72.5 ± 2.1 †	--
3.0	42.2 ± 2.4 α	32.6	60.0 ± 6.6 α	89.0	79.5 ± 6.2 †	--
6.0	51.8 ± 4.1 α	62.4	65.8 ± 4.1 α	107.1	92.5 ± 8.1 †	--
11.9	59.8 ± 4.0 α	87.4	84.0 ± 6.2 α	164.6	106.5 ± 5.8 †	--
23.8	91.2 ± 3.3 α	186.3	93.8 ± 5.3 α	195.3	87.0 ± 3.6 †	--
47.6	110.5 ± 9.6 α	246.7	95.5 ± 3.4 α	200.8	73.0 ± 2.6 †	--
95.2	118.5 ± 8.1 α	271.8	85.2 ± 5.6 α	168.5	19.5 ± 1.7	--
Test endpoint (% v/v) [with 95% CL]						
IC25	>95.2	--	>95.2	--	72.7 (64.9 – 82.6)	--
IC50	>95.2	--	>95.2	--	>95.2	--

SD = Standard Deviation, CL = Confidence Limits, IC = Inhibition Concentration

α Result was significantly greater than the laboratory control

† The data did not fit the hormesis regression model; therefore the cell yield was adjusted to that of the control value and analyzed using linear interpolation.

4.0 QA/QC

The health history of the test organisms used in the exposures was acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocols throughout the tests. There were no deviations from the test methodologies. Uncertainty associated with these tests is best described by the standard deviation around the mean and/or the confidence intervals around the point estimates.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was considered appropriate.

Table 10. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.1 g/L NaCl	2.0 (1.8 – 2.2)	5	April 13, 2016
	Reproduction (IC50): 1.6 g/L NaCl	1.5 (1.2 – 1.9)	12	
O.mykiss	Embryo viability (EC50): 5.5 mg/L SDS	4.1 (2.1 – 8.0)	40	April 28, 2016
L. minor	Number of fronds (IC50): 4.2 g/L KCl	4.0 (3.2 – 5.0)	12	April 28, 2016
P. subcapitata	Growth (IC50) 34.0 µg/L Zn	30.5 (17.4 – 53.5)	32	April 26, 2016

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration, EC= Effective Concentration

5.0 REFERENCES

Canaria, E.C., J.R. Elphick and H.C. Bailey. 1999. A simplified procedure for conducting small-scale short-term embryo toxicity tests with salmonids. Environ Toxicol 14:301-307.

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Nautilus Environmental. 2016. Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia, Pseudokirchneriella subcapitata, Hyalella azteca, Pimephales promelas* and *Oncorhynchus mykiss*: Second Quarter 2016 results.

Tidepool Scientific Software. 2013. CETIS comprehensive environmental toxicity information system, version 1.8.7.16 Tidepool Scientific Software, McKinleyville, CA. 222 pp.

6.0 END OF REPORT

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 16479

Start Date/Time: April 28/16 @ 1600h
Set up by: EMM

Sample Information:

Sample ID: LC_LCDSICC WS 20160428
Sample Date: April 27/16 25N
Date Received: April 28/16
Sample Volume: 8x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: ~~042016~~ emm 041416B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 29
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 22,23,24,25,26,27,28,29,30,35,39,40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd143
Stock Solution ID: 16Na01**
Date Initiated: April 13/16

7-d LC50 (95% CL): 2.1 (2.0-2.2) g/L NaCl
7-d IC50 (95% CL): 1.6 (1.4-1.8) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCl CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCl CV (%): 12

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		22.6 (29 - N/A)
IC50 % (v/v) (95% CL)		>100

Reviewed by: JGR
Date reviewed: May 19/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC-CROSSLCC WS ~~2016-04-25~~ 2016-04-25N (MG)
Work Order #: 16479
Start Date & Time: April 28/16 @ 1605 h
Stop Date & Time: May 4/16 @ 1630 h
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days													
	0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	
DO (mg/L)	8.0	7.5 JS	8.2	7.6	7.9	7.4	8.2	7.5	8.2	7.4	8.2	7.5	8.1	
pH	7.8	7.7 JS	8.0	7.7	8.0	7.7	7.9	7.9	8.0	7.6	7.9	7.6	8.1	
Cond. (µS/cm)	222	222		212		223		223		216		221	216	
Initials	EMM	EMM		KL		YML		JS		JS		EMM (MG)	MG	

Concentration: 1.56% (v/v)

	Days													
	0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	
DO (mg/L)	7.9	7.4 JS	8.1	7.6	8.1	7.5	8.1	7.5	8.2	7.4	8.1	7.5	8.2	
pH	7.8	7.7 JS	8.0	7.8	7.9	7.8	8.0	7.9	7.9	7.6	7.8	7.6	7.9	
Cond. (µS/cm)	224	224		221		222		~~224~~ 222		227		224	221	
Initials	EMM	EMM		KL		YML		JS		JS		EMM (MG)	MG	

Concentration: 12.5% (v/v)

	Days													
	0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	
DO (mg/L)	7.9	7.4	8.1	7.5	8.1	7.6	8.0	7.5	8.2	7.3	8.1	7.4	8.2	
pH	7.9	7.9	8.0	7.9	8.0	7.9	8.1	7.7	7.9	7.6	7.8	7.6	8.0	
Cond. (µS/cm)	264	263		259		264		260		262		260	258	
Initials	EMM	EMM		KL		YML		JS		JS		EMM (MG)	MG	

Concentration: 100% (v/v)

	Days													
	0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.5	25.0	24.6	25.0	25.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	
DO (mg/L)	7.8	7.5	8.1	7.5	8.1	7.5	8.2	7.5	8.2	7.3	8.2	7.3	8.2	
pH	8.2	8.0	8.1	8.1	8.0	8.1	8.0	7.7	8.0	7.7	8.0	7.7	7.9	
Cond. (µS/cm)	553	555		543		555		546		543		549	525	
Initials	EMM	EMM		KL		YML		JS		JS		EMM (MG)	MG	

Thermometer: 4 DO meter: 2 pH meter: 4 Conductivity meter: 2

	Control	100% (v/v)		
Hardness*	100	282		
Alkalinity*	98	160		

* mg/L as CaCO3

Analysts: EMM, AWD, JS, MG, YML, KL
Reviewed by: JGH
Date reviewed: May 19/16

Sample Description: clear, some particulate ~~or precipitate~~, odourless, colourless

Comments: **Broodboard Used:** 041416B

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: CC ICP5SLCC WS 2016-04-25 N
Work Order: 16-779

(v/v) %

Start Date & Time: April 28/16 @ 1600h
Stop Date & Time: May 4/16 @ 1630h
Set up by: EMM

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KL
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4	2	4	3	3	✓	4	4	3	4	4	MM
5	6	8	8	9	✓	8	10	9	7	✓	MG
6	10	11	12	12	✓	12	11	12	11	11	MG
7											
8											
Total	18	23	23	24	0	24	25	24	22	15	MG

Days	Concentration: 1.56%										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KL
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4	4	2	3	4	3	3	4	3	3	3	MM
5	8	9	9	10	6	9	8	✓	✓	8	MG
6	12	12	11	13	10	12	12	11	9	10	MG
7											
8			23								
Total	24	23	23 MG	27	19	24	24	14	12	21	MG

Days	Concentration: 3.12%										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KL
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4	3	✓	3	3	✓	4	4	4	3	4	MM
5	6	✓	5	7	✓	✓	7	✓	8	9	MG
6	12	✓	10	10	✓	9	11	11	11	12	MG
7											
8											
Total	21	0	18	20	0	13	22	15	22	25	MG

Days	Concentration: 6.25%										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KL
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4	4	4	4	3	3	1	3	✓	4	4	MM
5	7	9	8	9	10	6	6	5	✓	8	MG
6	12	12	11	12	12	9	10	10	8	11	MG
7											
8											
Total	23	25	23	24	25	16	19	15	12	23	MG

Days	Concentration: 12.5%										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KL
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4	4	3	3	3	4	4	6	3	3	3	MM
5	6	10	6	8	9	9	X	X	9	6	MG
6	12	13	12	11	12	13	|	|	10	10	MG
7											
8											
Total	22	26	21	22	25	26	6X	3X	22	19	MG

Days	Concentration: 25%										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KL
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4	3	4	✓	4	3	2	3	✓	3	3	MM
5	6	6	6	7	7	4	7	✓	✓	✓	MG
6	10	9	12	10	10	9	10	✓	✓	10	MG
7											
8											
Total	19	19	18	21	20	15	20	0	3	13	MG

Days	Concentration: 50%										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KL
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4	4	4	5	4	3	✓	3	X	4	3	MM
5	6	6	4	4	3	✓	8	|	✓	✓	MG
6	10	13	10	9	10	✓	10	|	8	10	MG
7											
8											
Total	20	23	19	17	16	0	21	09	12	13	MG

Days	Concentration: 100%										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KL
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
4	✓	3	2	3	✓	4	4	3	3	3	MM
5	✓	9	6	9	✓	✓	9	✓	8	10	MG
6	✓	11	9	8	✓	9	10	11	10	9	MG
7											
8											
Total	0	23	17	20	0	13	23	14	21	22	MG

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: some particulate clear, ~~no precipitate or particulate~~, odourless, colourless

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JSR

Date reviewed: May 19/16

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	01-8271-3680	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-3451-4972	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	28 Apr-16 16:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	04 May-16 16:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	12-8781-3119	**Code:**	4CC277FF	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:18	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	32h (8 °C)	**Station:**	LC LCDSSLCC WS 2016-04-25 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1972985	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	9.973	7.919	N/A	10.03	NA	12.63
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	0.8	0	1	0.1333	0.4216	52.7%	20.0%	8	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	0	0	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	0	1	1
100		1	1	1	1	1	1	1	1	1	1

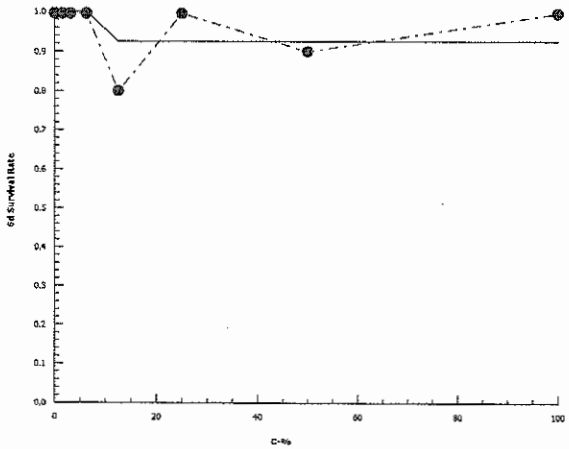
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 01-8271-3680 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 11 May-16 12:25 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-4952-9143	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-16 14:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-3451-4972	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	28 Apr-16 16:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	04 May-16 16:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	12-8781-3119	**Code:**	4CC277FF	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:18	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	32h (8 °C)	**Station:**	LC LCDSSLCC WS 2016-04-25 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	873355	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.259	0.329	16.3	44.28	6.134	304
IC10	12.57	0.7662	35.4	7.956	2.825	130.5
IC15	15.32	1.347	60.13	6.528	1.663	74.23
IC20	18.62	2.069	N/A	5.37	NA	48.34
IC25	22.6	2.861	N/A	4.425	NA	34.95
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	19.8	0	25	2.412	7.627	38.52%	0.0%
1.56		10	21.1	12	27	1.509	4.771	22.61%	-6.57%
3.12		10	15.6	0	25	2.825	8.934	57.27%	21.21%
6.25		10	20.5	12	25	1.478	4.673	22.79%	-3.54%
12.5		10	19.2	3	26	2.56	8.094	42.16%	3.03%
25		10	14.8	0	21	2.356	7.451	50.34%	25.25%
50		10	14.1	0	23	2.584	8.171	57.95%	28.79%
100		10	15.3	0	23	2.781	8.795	57.48%	22.73%

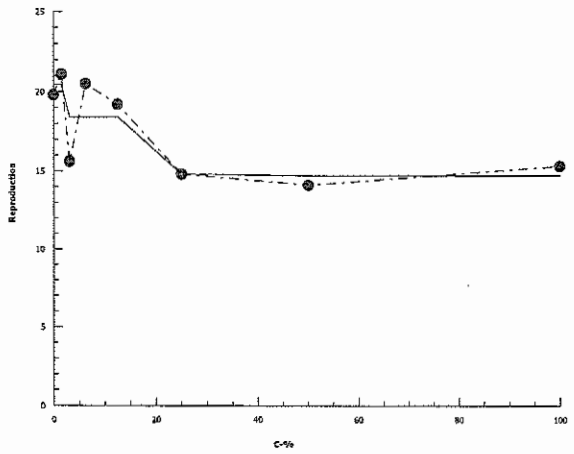
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	18	23	23	24	0	24	25	24	22	15
1.56		24	23	23	27	19	24	24	14	12	21
3.12		21	0	18	20	0	13	22	15	22	25
6.25		23	25	23	24	25	16	19	15	12	23
12.5		22	26	21	22	25	26	6	3	22	19
25		19	19	18	21	20	15	20	0	3	13
50		20	23	19	17	16	0	21	0	12	13
100		0	23	17	20	0	13	23	14	21	22

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-4952-9143	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-16 14:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 16479

Start Date/Time: Apr 28/16 @ 1300h
Set up by: EMM

Sample Information:

Sample ID: LC_DCL_WS_2016-04-26_N
Sample Date: Apr 27/16
Date Received: Apr 28/16
Sample Volume: 5x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042016B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 18
Mortality (%) in previous 7 d: 10
Individual female # used ≥8 young on test day: 23, 26, 28, 29, 30, 32, 33, 34, 36, 37, 40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd 143
Stock Solution ID: 16NaCl
Date Initiated: Apr 13/16

7-d LC50 (95% CL): 2.1 (2.0-2.2) g/L NaCL
7-d IC50 (95% CL): 1.6 (1.4-1.8) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCL CV (%): 12

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		70.6 (40.1-NA)
IC50 % (v/v) (95% CL)		>100

Reviewed by: JGL
Date reviewed: May 18/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_DC1_WS_2016-04-26_N
Work Order #: 16479
Start Date & Time: April 28/16 @ 1300h
Stop Date & Time: May 5/16 @ 0905h
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.0	7.3	8.2	7.3	7.9	7.4	8.2	7.2	8.2	8.0	8.2	7.5	8.1	7.3
pH	7.8	7.9	8.0	7.7	8.0	7.7	7.9	7.3	8.0	7.6	7.9	7.6	8.1	7.6
Cond. (µS/cm)	222	222		212		223		223		216		221		222
Initials	EMM	EMM		KL		MW		JS		JS		EMM		MG

Concentration: 1.56% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.0	7.4	8.1	7.3	8.0	7.3	8.1	7.3	8.2	7.4	8.2	7.5	8.1	7.3
pH	8.0	7.9	8.0	7.8	7.9	7.8	8.0	7.5	8.0	7.7	7.9	7.5	8.0	7.6
Cond. (µS/cm)	222	222		215		214		216		218		222		220
Initials	EMM	EMM		KL		MW		JS		JS		EMM		MG

Concentration: 12.5% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.5	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.0	7.4	8.1	7.4	8.1	7.2	8.1	7.4	8.2	7.4	8.2	7.4	8.1	7.2
pH	8.0	7.9	8.0	7.8	7.9	7.8	8.1	7.5	8.1	7.7	7.9	7.5	8.0	7.6
Cond. (µS/cm)	223	224		217		219		218		221		222		221
Initials	EMM	EMM		KL		MW		JS		JS		EMM		MG

Concentration: 100% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.5	25.0	24.0	25.0	25.5	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	7.9	7.4	8.1	7.3	8.4	7.3	8.2	7.4	8.2	7.3	8.2	7.4	8.1	7.2
pH	8.1	7.9	8.1	7.9	8.0	7.8	8.0	7.6	8.0	7.7	7.9	7.5	8.0	7.7
Cond. (µS/cm)	229	231		225		228		225		226		228		227
Initials	EMM	EMM		KL		MW		JS		JS		EMM		MG

Thermometer: 4 DO meter: 2 pH meter: 4 Conductivity meter: 2

	Control	100% (v/v)		
Hardness*	100	124		
Alkalinity*	98	116		

* mg/L as CaCO3

Analysts: EMM, AMW, JS, MG, MCT, MW, KL
Reviewed by: JSW
Date reviewed: May 18/16

Sample Description: clear, ~~no precipitate~~ emm / ~~no~~ some particulate, odourless, colourless

Comments: Broodboard Used: 042016B

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC-DC-WS_2016-04-26_N
Work Order: 16479

Start Date & Time: April 28/16 @ 1300h
Stop Date & Time: May 5/16 @ 0905h
Set up by: EMM

% (v/v)

Concentration: CONTROL

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	YWL
4	4	X	4	3	4	3	3	4	4	4	EMM
5	10	|	9	9	10	8	8	9	10	9	EMM
6	✓	|	13	✓	✓	✓	✓	✓	✓	✓	MLT
7	12	|	✓	12	13	13	12	11	13	11	MLT
8											
Total	26	0X	26	24	27	24	23	24	27	24	MLT

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	—	—	—	—	—	✓	✓	—	—	—	KC
3	—	—	—	—	—	—	—	—	—	—	YWL
4	4	4	4	3	4	4	4	3	5	4	EMM
5	8	9	9	8	10	8	6	✓	8	9	EMM
6	✓	✓	✓	✓	✓	10	✓	9	✓	✓	MLT
7	14	13	12	14	13	✓	14	14	14	13	MLT
8											
Total	26	26	25	25	27	22	24	26	27	26	MLT

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	—	—	—	—	—	—	—	—	—	—	KC
3	—	—	—	—	—	—	—	—	—	4X	YWL
4	4	4	3	4	4	3	3	5	4	|	EMM
5	8	9	8	✓	9	8	8	✓	10	|	EMM
6	✓	✓	10	6	11	✓	✓	9	✓	|	MLT
7	10	14	✓	11	10	11	12	13	14	|	MLT
8											
Total	22	27	21	21	24	22	23	27	28	4X	MLT

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	—	—	—	—	—	—	—	—	—	—	KC
3	—	—	—	—	—	—	—	—	—	—	YWL
4	4	4	5	4	3	4	4	5	2	4	EMM
5	6	8	8	9	8	9	10	✓	9	✓	EMM
6	✓	✓	10	✓	11	✓	✓	10	9	9	MLT
7	10	13	12	11	✓	12	11	14	✓	11	MLT
8											
Total	20	25	23	24	21	25	25	29	20	24	MLT

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	—	—	—	—	—	—	—	—	—	—	KC
3	—	—	—	—	—	—	—	—	—	—	YWL
4	4	4	4	4	4	3	3	4	3	4	EMM
5	✓	✓	✓	10	9	X	9	9	✓	8	EMM
6	8	8	9	✓	10	|	✓	✓	9	✓	MLT
7	10	12	14	12	12	|	12	11	11	10	MLT
8											
Total	22	24	27	26	23	3X	24	24	23	22	MLT

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	—	—	—	—	—	—	—	✓	—	—	KC
3	—	—	—	—	—	—	—	—	—	—	YWL
4	4	3	4	4	✓	3	4	4	3	5	EMM
5	6	✓	7	✓	5	✓	✓	10	8	✓	EMM
6	✓	7	9	7	4	8	8	✓	✓	5	MLT
7	13	13	✓	12	5	13	12	11	10	14	MLT
8											
Total	23	23	20	23	14	24	24	25	20	24	MLT

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	—	—	—	—	—	—	—	—	—	—	KC
3	—	—	—	—	—	—	—	—	—	—	YWL
4	5	4	3	3	✓	4	4	✓	3	3	EMM
5	10	8	✓	9	4	10	8	5	✓	✓	EMM
6	✓	11	6	✓	9	✓	✓	10	6	9X	MLT
7	12	✓	14	10	✓	11	10	✓	12	|	MLT
8								MLT			
Total	27	23	23	22	13	25	22	13 15	21	12X	MLT

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	—	—	—	—	—	—	—	—	—	KC
3	—	—	—	—	X	—	—	—	—	—	YWL
4	X	4	3	3	|	✓	3	4	4	3	EMM
5	|	✓	9	✓	|	5	✓	✓	✓	10	EMM
6	|	3	✓	4	|	10	5	5	6	✓	MLT
7	|	10	11	11	|	✓	11	11	10	11	MLT
8											
Total	0X	17	23	18	0X	15	19	20	20	24	MLT

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear, no precipitate ~~or particulate~~, some particulate, odourless, colourless

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JGR

Date reviewed: May 18/16

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-2808-1729	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-16 14:48	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	16-2804-2804	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	28 Apr-16 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	05 May-16 09:05	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 20h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	00-8128-9240	**Code:**	4D86018	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:30	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (7.5 °C)	**Station:**	LC_DC1_WS_2016-04-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	536760	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	48.31	2.248	N/A	2.07	NA	44.49
EC10	68.36	8.893	N/A	1.463	NA	11.24
EC15	94.95	34.32	N/A	1.053	NA	2.914
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
100		10	0.8	0	1	0.1333	0.4216	52.7%	11.11%	8	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	0	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	0
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	0	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	0
100		0	1	1	1	0	1	1	1	1	1

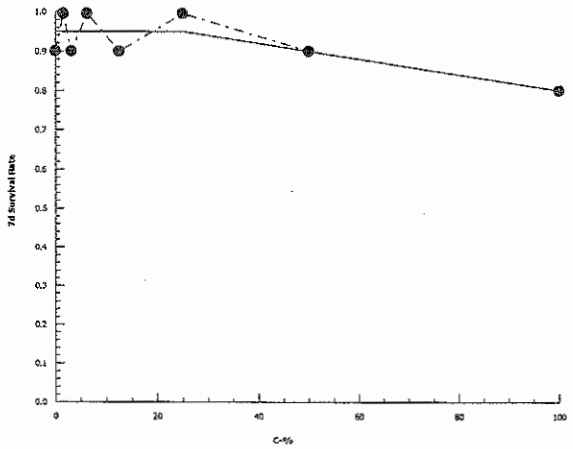
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	13-2808-1729	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-16 14:48	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
100		0/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst:_____ QA: 18/16

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-5027-5753	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-16 15:03	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	16-2804-2804	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	28 Apr-16 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	05 May-16 09:05	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 20h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	00-8128-9240	**Code:**	4D86018	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:30	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (7.5 °C)	**Station:**	LC_DC1_WS_2016-04-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1630851	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	3.116	1.976	50.08	32.09	1.997	50.6
IC10	29.07	2.529	63.32	3.441	1.579	39.54
IC15	48.78	6.421	N/A	2.05	NA	15.57
IC20	59.19	26.37	N/A	1.689	NA	3.792
IC25	70.64	40.14	N/A	1.416	NA	2.491
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	22.5	0	27	2.54	8.031	35.69%	0.0%
1.56		10	25.4	22	27	0.4761	1.506	5.93%	-12.89%
3.12		10	21.9	4	28	2.152	6.806	31.08%	2.67%
6.25		10	23.6	20	29	0.8718	2.757	11.68%	-4.89%
12.5		10	21.8	3	27	2.149	6.795	31.17%	3.11%
25		10	22	14	25	1.033	3.266	14.85%	2.22%
50		10	20.3	12	27	1.627	5.143	25.34%	9.78%
100		10	15.6	0	24	2.729	8.631	55.32%	30.67%

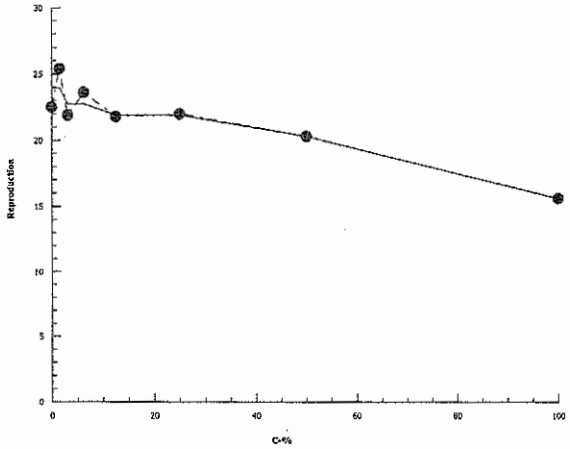
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	26	0	26	24	27	24	23	24	27	24
1.56		26	26	25	25	27	22	24	26	27	26
3.12		22	27	21	21	24	22	23	27	28	4
6.25		20	25	23	24	21	25	25	29	20	24
12.5		22	24	27	26	23	3	24	24	23	22
25		23	23	20	23	14	24	24	25	20	24
50		27	23	23	22	13	25	22	15	21	12
100		0	17	23	18	0	15	19	20	20	24

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	04-5027-5753	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-16 15:03	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 16479

Start Date/Time: April 28/16 @ 1330h
Set up by: EMM

Sample Information:

Sample ID: LC_FRDSDC_W32016-0426 N
Sample Date: April 27/16
Date Received: April 28/16
Sample Volume: 5x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042016A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 18
Mortality (%) in previous 7 d: Ø
Individual female # used ≥8 young on test day: 2,3,4,5,6,9,11,12,13,16→20

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd143
Stock Solution ID: 16NaCl**
Date Initiated: April 13/16

7-d LC50 (95% CL): 2.1 (2.0–2.2) g/L NaCL
7-d IC50 (95% CL): 1.6 (1.4–1.8) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8–2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2–1.9) g/L NaCL CV (%): 12

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JGH
Date reviewed: May 19/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TECK
Sample ID: LC-FRDSDC-WS20160426
Work Order #: 16479

Start Date & Time: April 28/16 @ 1330
Stop Date & Time: May 5/16 @ 1115h
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.5	8.2	7.3	7.9	7.4	8.2	7.1	8.2	7.1	8.2	7.1	8.1	7.3
pH	7.8	7.8	8.0	7.7	8.0	7.7	7.9	7.5	8.0	7.6	7.9	7.6	8.1	7.6
Cond. (µS/cm)	227	227		212		223		223		216		221		223
Initials	EMM	EMM		KL		YML		JS		JS		EMM		MLT

Concentration: 1.56% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	7.9	7.4	8.1	7.3	8.1	7.4	8.0	7.1	8.2	7.1	8.2	7.0	8.2	7.3
pH	7.9	7.8	8.0	7.8	8.0	7.9	8.0	7.6	8.0	7.6	7.9	7.6	7.9	7.6
Cond. (µS/cm)	224	224		220		223		220		226		224		222
Initials	EMM	EMM		KL		YML		JS		JS		EMM		MLT

Concentration: 12.5% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.5	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	7.8	7.4	8.1	7.3	8.1	7.5	8.0	7.2	8.2	7.1	8.2	7.0	8.2	7.3
pH	8.0	7.7	8.0	7.8	8.0	7.9	8.1	7.7	8.0	7.7	7.9	7.7	7.9	7.7
Cond. (µS/cm)	263	266		256		258		258		263		269		262
Initials	EMM	EMM		KL		YML		JS		JS		EMM		MLT

Concentration: 100% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	7.6	7.4	8.0	7.3	8.2	7.5	8.0	7.2	8.2	7.2	8.2	7.1	8.2	7.3
pH	8.1	8.0	8.1	8.0	8.0	8.0	8.0	7.9	8.0	7.9	8.0	7.9	8.0	7.8
Cond. (µS/cm)	547	547		539		543		542		551		549		519
Initials	EMM	EMM		KL		YML		JS		JS		EMM		MLT

Thermometer: 4 DO meter: 2 pH meter: 4 Conductivity meter: 2

	Control	100% (v/v)		
Hardness*	100	287		
Alkalinity*	98	158		

* mg/L as CaCO3

Analysts: EMM, AWD, JS, MLT, MH, KL
Reviewed by: JBL
Date reviewed: May 19/16

Sample Description: clear, ~~no particulate~~ some particulate, ~~no precipitate~~, odorless, colorless

Comments: **Broodboard Used:** 042016A

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: ~~LC-FRD3SCC~~ LC-FRD5DC WS 2016-04-26N
Work Order: 16479
% (v/v)

Start Date & Time: April 28/16 @ 1330
Stop Date & Time: May 5/16 @ 1115h
Set up by: EMM

Concentration: CONTROL

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KL
3	/	/	/	/	/	/	/	/	/	/	A
4	✓	4	4	4	3	4	5	4	4	3	EMM
5	6	7	8	8	8	✓	8	8	7	7	JS
6	9	✓	✓	✓	✓	10	✓	✓	✓	✓	JS
7	13	10	12	11	11	12	12	11	10	11	MG
8											
Total	28	21	24	23	22	26	25	23	21	21	MG

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	–	–	–	–	–	–	–	–	–	–	KL
3	/	/	/	/	/	/	/	/	/	/	A
4	3	3	4	3	4	3	4	✓	4	5	EMM
5	7X	8?	7	9	8	8	6	5	7	7	JS
6	|	✓	✓	✓	✓	✓	✓	9	✓	✓	JS
7	|	10	11	9	12	9	12	10	12	12	MG
8											
Total	10X	20	22	21	24	20	22	24	23	24	MG

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	–	–	–	–	–	–	–	–	–	–	KL
3	/	/	/	/	/	/	/	/	/	/	A
4	①	5	4	3	4	3	✓	4	4	✓	JS
5	6	8	8	7	8	8	5	8	8	5	JS
6	✓	✓	11	✓	✓	✓	✓	✓	✓	10	JS
7	12	11	✓	10	12	12	11	10	12	✓	MG
8											
Total	22	24	23	20	24	23	16	22	24	15	MG

① 4 eggs

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	–	–	–	–	–	–	–	–	–	–	KL
3	/	/	/	/	/	/	/	/	/	/	A
4	3	5	3	3	3	2	3X	5	✓	4	JS
5	8	✓	7	8	8	7	|	✓	6	7	JS
6	✓	9	✓	✓	✓	✓	|	9	9	✓	JS
7	10	9	12	11	10	10	|	10	✓	11	MG
8											
Total	21	23	22	22	21	19	3X	24	15	22	MG

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	–	–	–	–	–	–	–	–	–	–	KL
3	/	/	/	/	/	/	/	/	/	/	A
4	4	4	✓	5	4	3	3	4	4	4	EMM
5	8	7	6	7	8	8	7	6	8	7	JS
6	13	✓	13	✓	✓	✓	13	✓	✓	✓	JS
7	✓	10	11	10	10	11	✓	13	12	13	MG
8											
Total	25	21	30	22	22	22	23	23	24	24	MG

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	–	–	–	–	–	–	–	–	–	–	KL
3	/	/	/	/	/	/	/	/	/	/	A
4	✓	4	4	5	3	4	4	5	4	4	JS
5	4	7	7	✓	8	7	7	6	9	8	JS
6	9	✓	✓	10	✓	✓	✓	✓	✓	✓	JS
7	11	X	10	11	11	10	9	8	12	12	MG
8											
Total	24	11X	21	26	22	21	20	18	23	24	MG

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	–	–	–	–	–	–	–	–	–	–	KL
3	/	/	/	/	/	/	/	/	/	/	A
4	4	4	3	3	4	2	3	4	4	3	JS
5	8	7	7	7	8	7	8	8	8	8	JS
6	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
7	12	11	11	10	13	9	10	11	8	12	MG
8											
Total	24	22	21	20	25	18	21	23	20	23	MG

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	–	–	–	–	–	–	–	–	–	–	KL
3	/	/	/	/	/	/	/	/	/	/	A
4	4	✓	✓	4	3	3	3	2	3	4	EMM
5	7	4	6	7	8	7	6	7	8	7	JS
6	✓	9	9	✓	✓	✓	✓	✓	✓	✓	JS
7	10	✓	✓	10	6	9	10	8	11	12	MG
8											
Total	21	13	15	21	17	19	19	17	22	23	MG

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Same particulate

Sample Description: clear, ~~no particulate, no precipitate~~, odourless, colourless

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JGL

Date reviewed: May 19/16

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	15-8089-6457	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	17-2769-4644	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	28 Apr-16 13:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	05 May-16 11:15	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 22h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	07-5438-7274	**Code:**	2CF7094A	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:04	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (8 °C)	**Station:**	LC FRDSDC WS 2016-04-26 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1328034	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		0	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	0	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	0	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

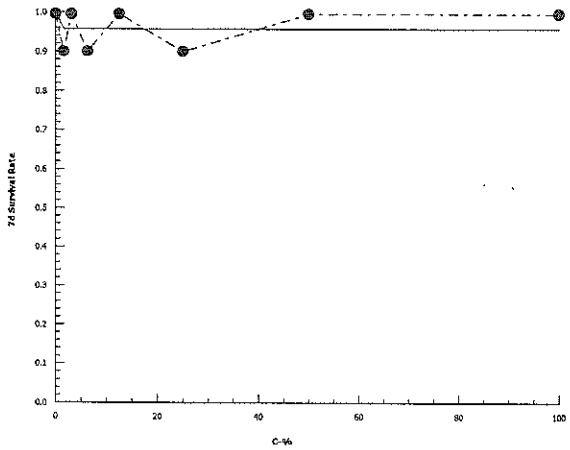
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-8089-6457	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst:_____ QA: JGL May 19/16

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	06-6421-9313	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	17-2769-4644	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	28 Apr-16 13:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	05 May-16 11:15	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 22h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	07-5438-7274	**Code:**	2CF7094A	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:04	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (8 °C)	**Station:**	LC FRDSDC WS 2016-04-26 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	204869	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.6883	0.4173	57.94	145.3	1.726	239.7
IC10	53.32	1.009	86.34	1.875	1.158	99.14
IC15	72.88	2.729	N/A	1.372	NA	36.64
IC20	99.47	61.08	N/A	1.005	NA	1.637
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	23.4	21	28	0.7483	2.366	10.11%	0.0%
1.56		10	21	10	24	1.317	4.163	19.83%	10.26%
3.12		10	21.3	15	24	1.044	3.302	15.5%	8.97%
6.25		10	19.2	3	24	1.965	6.215	32.37%	17.95%
12.5		10	23.6	21	30	0.8055	2.547	10.79%	-0.85%
25		10	21	11	26	1.325	4.19	19.95%	10.26%
50		10	21.7	18	25	0.6675	2.111	9.73%	7.27%
100		10	18.7	13	23	1.012	3.199	17.11%	20.09%

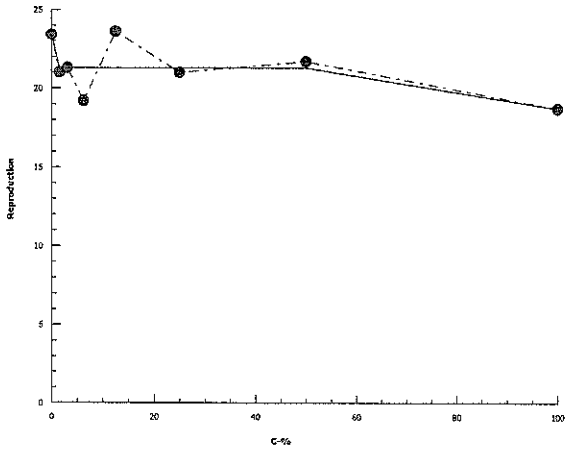
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	28	21	24	23	22	26	25	23	21	21
1.56		10	20	22	21	24	20	22	24	23	24
3.12		22	24	23	20	24	23	16	22	24	15
6.25		21	23	22	22	21	19	3	24	15	22
12.5		25	21	30	22	22	22	23	23	24	24
25		24	11	21	26	22	21	20	18	23	24
50		24	22	21	20	25	18	21	23	20	23
100		21	13	15	21	17	19	19	17	22	23

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	06-6421-9313	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 16479

Start Date/Time: April 28/16 @ 1600h
Set up by: EMM

Sample Information:

Sample ID: LC_DCDSWS20160426N
Sample Date: April 27/16
Date Received: April 28/16
Sample Volume: 5 x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: ~~042016~~ 041416B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 29
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 22,23,24,25,26,27,28,29,30,35,39,40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd143
Stock Solution ID: 16NaCl*
Date Initiated: April 13/16

7-d LC50 (95% CL): 2.1 (2.0-2.2) g/L NaCl
7-d IC50 (95% CL): 1.6 (1.4-1.8) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCl CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCl CV (%): 12

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		32.9 (14.8 – N/A)
IC50 % (v/v) (95% CL)		>100

Reviewed by: JGL
Date reviewed: May 19/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-DCDS WS 2016-04-26
Work Order #: 16479
Start Date & Time: April 28/16 @ 1600h
Stop Date & Time: May 5/16 @ 1050h
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.5	8.2	7.3	7.9	7.4	8.2	7.5	8.2	7.5	8.1	7.7	8.1	7.3
pH	7.8	7.8	8.0	7.5	8.0	7.7	7.9	7.9	8.0	7.7	8.0	7.6	8.1	7.6
Cond. (µS/cm)	222	222		212		223		223		219		221		222
Initials	EMM	EMM		KC		YuL		JS		EMM		EMM		MLT

Concentration: 1.56% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	7.9	7.4	7.9	7.8	8.0	7.5	8.1	7.5	8.2	7.4	8.1	7.7	8.1	7.3
pH	7.8	7.7	7.8	7.8	8.0	7.8	8.0	7.9	8.0	7.7	8.0	7.6	8.0	7.6
Cond. (µS/cm) (1)	~~238~~	220		214		~~214~~ 214		215		218		216		216
Initials	EMM	EMM		KC		YuL		JS		EMM		EMM		MLT

(1) 223 ev

Concentration: 12.5% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	7.9	7.5	7.9	7.8	8.1	7.4	8.0	7.5	8.2	7.4	8.0	7.7	8.1	7.3
pH	7.8	7.8	7.8	7.8	8.0	7.8	8.0	7.9	8.0	7.7	8.0	7.6	8.0	7.6
Cond. (µS/cm)	223	218		212		211		214		213		213		214
Initials	EMM	EMM		KC		YuL		JS		EMM		EMM		MLT

Concentration: 100% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	7.8	7.8	7.9	7.3	8.1	7.5	8.0	7.5	8.2	7.2	7.9	7.6	8.0	7.2
pH	7.8	7.5	7.8	7.8	8.0	8.0	8.0	7.8	8.0	7.6	7.9	7.6	7.8	7.5
Cond. (µS/cm)	204	193		189		191		190		192		191		204
Initials	EMM	EMM		KC		YuL		JS		EMM		EMM		MLT

Thermometer: 4 **DO meter:** 2 **pH meter:** 4 **Conductivity meter:** 2

	Control	100% (v/v)		
Hardness*	100	104		
Alkalinity*	98	86		

* mg/L as CaCO3

Analysts: ~~EMM~~, AWD, JS, MLT, DS, KC, YuL

Reviewed by: JM

Date reviewed: May 19/16

Sample Description: clear, odourless, some particulate, ~~no precipitate~~ colourless

Comments: **Broodboard Used:** 041416B

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: C-DCDSWS2016-04-26 D
Work Order: 16479

Start Date & Time: April ~~28/16 @ 1115~~ JS 28/16 @ 1600h
Stop Date & Time: May 5/16 @ 1050h
Set up by: AMM

(v/v) %

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	–	–	–	–	–	–	–	+	–	–	KK
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM
4	4	5	✓	3	3	✓	4	5	3	4	JS
5	6	✓	8	9	7	9	8	8	6	5	MG
6	✓	12	10	11	12	12	✓	✓	✓	✓	MG
7	10	12	✓	✓	✓	✓	12	10	10	10	MG
8											
Total	20	29	18	23	22	21	24	22	19	19	MG

Concentration: 1.56%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	–	–	–	–	–	–	–	–	–	–	KK
3	✓	✓	✓	✓	✓	✓	✓	✓	3	✓	AM
4	✓	5	5	3	4	4	✓	✓	✓	2	JS
5	7	✓	✓	8	✓	9	9	✓	10	7	MG
6	10	6	10	✓	11	✓	12	✓	13	✓	MG
7	14	12	14	12	14	12	✓	✓	✓	10	MG
8											
Total	31	23	29	23	29	25	21	0	26	19	MG

Concentration: 3.12%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	–	–	–	–	–	–	–	–	–	–	KK
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM
4	✓	✓	5	✓	4	5	✓	4	✓	4	JS
5	8	✓	✓	✓	9	✓	6	9	3	8	MG
6	✓	4	12	✓	10	8	8	✓	6	✓	MG
7	9	✓	13	✓	✓	10	11	11	✓	11	MG
8											
Total	21	6	30	0	23	23	25	24	9	23	MG

Concentration: 6.25%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	–	–	–	–	–	–	–	–	–	–	KK
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM
4	✓	4	✓	5	3	✓	3	3	4	4	JS
5	5	8	8	9	9	✓	9	8	8	9	MG
6	9	✓	10	✓	✓	✓	✓	✓	✓	✓	MG
7	✓	12	✓	11	10	✓	10	12	11	10	MG
8											
Total	14	24	18	25	22	0	22	23	23	23	MG

Concentration: 12.5%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	–	–	–	–	–	–	–	–	–	–	KK
3	✓	✓	✓	✓	✓	✓	3	✓	✓	✓	AM
4	2	5	4	✓	3	2	✓	4	4	3	JS
5	8	✓	9	10	7	7	9	8	9	8	MG
6	✓	12	12	12	✓	11	10	✓	✓	✓	MG
7	10	13	✓	✓	11	✓	✓	10	10	13	MG
8											
Total	20	30	25	22	21	20	22	22	23	24	MG

Concentration: 25%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	–	–	–	–	–	–	–	–	–	–	KK
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM
4	✓	4	4	5	3	3	2	3	✓	5	JS
5	✓	6	✓	✓	8	7	8	8	9	X	MG
6	✓	✓	9	11	✓	✓	✓	✓	✓	1	MG
7	✓	10	12	11	10	9	11	11	10	1	MG
8											
Total	0	20	25	27	21	19	19	21	22	0X	MG

Concentration: 50%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	–	–	–	–	–	–	–	–	–	–	KK
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM
4	5	5	2	3	✓	✓	✓	✓	✓	✓	JS
5	5	6	4	7	✓	6	8	5	6	6	MG
6	✓	✓	✓	✓	✓	10	11	11	12	10	MG
7	10	9	7	8	✓	✓	✓	✓	✓	✓	MG
8											
Total	19	19	13	18	0	16	19	16	18	16	MG

Concentration: 100%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	–	–	–	–	–	–	–	–	–	–	KK
3	✓	✓	+	✓	✓	✓	✓	✓	✓	✓	AM
4	✓	4	|	3	3	✓	5	✓	3	5	JS
5	✓	6	|	6	5	6	6	✓	5	✓	MG
6	✓	✓	|	✓	✓	11	✓	✓	✓	8	MG
7	✓	10	|	11	9	✓	8	✓	10	12	MG
8											
Total	0	20	0X	20	17	17	18	0	18	25	MG

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: clear, odourless, some particulate, ~~no particulate, no precipitate present~~, colourless

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: May 19/16

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-1747-8434	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-9629-3832	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	28 Apr-16 16:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	05 May-16 10:50	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 19h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	13-8345-2068	**Code:**	5275CDA4	**Client:**	Teck Coal
Sample Date:	27 Apr-16 07:58	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	32h (6 °C)	**Station:**	LC DCDS WS 2016-04-26 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	476804	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	50	16.26	N/A	2	NA	6.15
EC10	100	21.07	N/A	1	NA	4.746
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	0
50		1	1	1	1	1	1	1	1	1	1
100		1	1	0	1	1	1	1	1	1	1

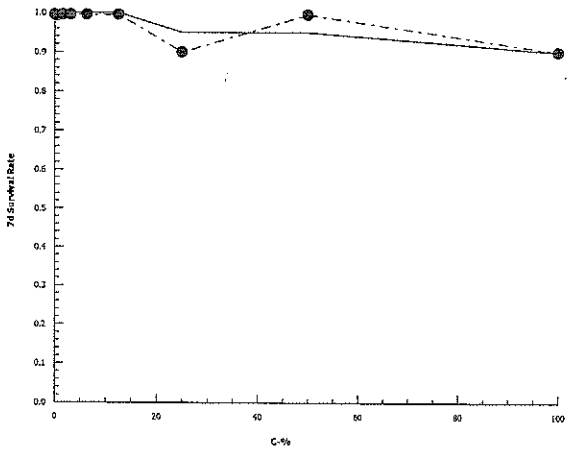
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-1747-8434	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	17-9041-4250	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-9629-3832	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	28 Apr-16 16:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	05 May-16 10:50	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 19h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	13-8345-2068	**Code:**	5275CDA4	**Client:**	Teck Coal
Sample Date:	27 Apr-16 07:58	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	32h (6 °C)	**Station:**	LC DCDS WS 2016-04-26 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	164674	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.37	0.3974	27.57	42.19	3.627	251.6
IC10	13.46	0.9527	32.15	7.427	3.11	105
IC15	17.69	2.265	40.83	5.654	2.449	44.14
IC20	23.14	2.984	58.94	4.321	1.697	33.51
IC25	32.9	14.81	N/A	3.04	NA	6.754
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	21.7	18	29	1.012	3.199	14.74%	0.0%
1.56		10	22.6	0	31	2.782	8.796	38.92%	-4.15%
3.12		10	18.4	0	30	3.092	9.778	53.14%	15.21%
6.25		10	19.4	0	25	2.386	7.545	38.89%	10.6%
12.5		10	22.9	20	30	0.9363	2.961	12.93%	-5.53%
25		10	17.4	0	27	3.008	9.513	54.67%	19.82%
50		10	15.4	0	19	1.815	5.739	37.26%	29.03%
100		10	13.5	0	25	3.034	9.595	71.07%	37.79%

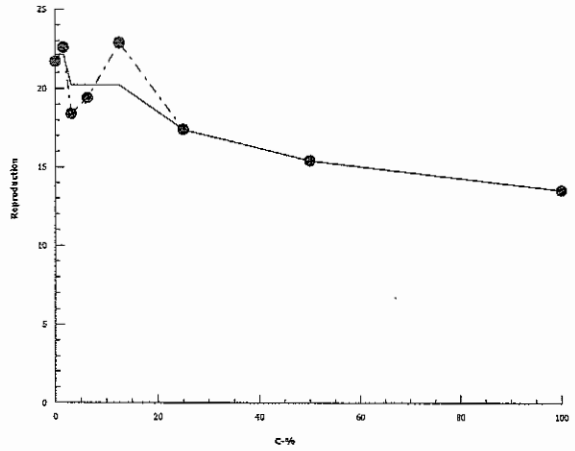
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	20	29	18	23	22	21	24	22	19	19
1.56		31	23	29	23	29	25	21	0	26	19
3.12		21	6	30	0	23	23	25	24	9	23
6.25		14	24	18	25	22	0	22	23	23	23
12.5		20	30	25	22	21	20	22	22	23	24
25		0	20	25	27	21	19	19	21	22	0
50		19	19	13	18	0	16	19	16	18	16
100		0	20	0	20	17	17	18	0	18	25

Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID:	17-9041-4250	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 16479

Start Date/Time: Apr 28/16 @ 1330h
Set up by: EMM

Sample Information:

Sample ID: LC-LCSWS 2016-0425-N
Sample Date: Apr 27/16
Date Received: Apr 28/16
Sample Volume: 5x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042016A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 18
Mortality (%) in previous 7 d: Ø
Individual female # used ≥8 young on test day: 2,3,4,5,6,9,11,12,13,16→20

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd143
Stock Solution ID: 16Na01
Date Initiated: Apr 13/16

7-d LC50 (95% CL): 2.1 (2.0-2.2) g/L NaCl
7-d IC50 (95% CL): 1.6 (1.4-1.8) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCl CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCl CV (%): 12

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JOL
Date reviewed: May 19/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_LC5_WS-2016-04-25_N
Work Order #: 16479

Start Date & Time: April 28/16 @ 1330h
Stop Date & Time: ~~May 5/16~~ ① May 5/16 @ 1400h
Test Species: *Ceriodaphnia dubia*

① May 5/16 emm

Concentration: control

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.5	8.2	7.2	7.9	7.4	8.2	7.0	8.2	7.4	8.1	7.5	8.1	7.6
pH	7.8	7.8	8.0	7.7	8.0	7.7	7.9	7.7	8.0	7.8	8.0	7.7	8.1	7.7
Cond. (µS/cm)	222	221		212		223		223		219		221		220
Initials	EMM	EMM		KL		YML		JS		EMM		EMM		EMM

emm

Concentration: 1.56% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.5	8.0	7.2	8.0	7.4	8.2	7.1	8.2	7.4	8.1	7.5	8.2	7.6
pH	7.9	7.8	8.0	7.8	8.0	7.8	8.0	7.7	8.0	7.8	8.0	7.7	8.0	7.7
Cond. (µS/cm)	226	225		221		220		223		220		221		225
Initials	EMM	EMM		KL		YML		JS		EMM		EMM		EMM

Concentration: 12.5% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.5	25.0	24.0	25.0	25.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	7.8	7.5	8.0	7.2	8.0	7.3	8.1	7.1	8.2	7.4	8.1	7.5	8.2	7.6
pH	8.0	7.8	8.0	7.9	8.0	7.9	8.0	7.7	8.0	7.8	8.0	7.7	8.0	7.7
Cond. (µS/cm)	262	261		262		256		259		260		258		259
Initials	EMM	EMM		KL		YML		JS		EMM		EMM		EMM

Concentration: 100% (v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.0	25.0	24.0	25.0	26.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	7.7	7.5	7.9	7.3	8.0	7.4	8.2	7.3	8.2	7.4	8.1	7.5	8.3	7.4
pH	8.1	8.0	8.1	8.0	8.1	8.0	8.1	7.8	8.1	7.8	8.1	7.7	8.1	7.7
Cond. (µS/cm)	529	533		529		532		532		533		532		501
Initials	EMM	EMM		KL		YML		JS		EMM		EMM		EMM

Thermometer: 4 **DO meter:** 2 **pH meter:** 4 **Conductivity meter:** 2

	Control	100% (v/v)		
Hardness*	100	268		
Alkalinity*	98	156		

* mg/L as CaCO3

Analysts: EMM, AWD, JS, ~~HG~~, KL, YML
Reviewed by: JOH
Date reviewed: May 19/16

Sample Description: clear, no (some) particulate ~~or precipitate~~ (emm), odourless, colourless

Comments: **Broodboard Used:** 042016A

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: CC-LCS-WS-2016-04-25-N
Work Order: 164714

% (v/v)

Start Date & Time: April 28/16 @ 1330h
Stop Date & Time: May 4/16 @ 1400h
Set up by: emm 5 emm

Concentration: CONTROL

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	kc
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	3	4	4	4	4	4	3	3	✓	5	JS
5	8	✓	✓	8	9	9	7	7	5	✓	emm
6	✓	8	8	✓	✓	✓	✓	10	✓	9	JS
7	11	10	9	12	12	10	10	✓	9	12	emm
8											
Total	22	22	21	24	25	23	20	20	14	26	emm

Concentration: 1,56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	—	—	—	—	—	—	—	—	—	—	kc
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	✓	5	✓	2	4	4	✓	✓	3	JS
5	8	4	9	4	7	8	7	3	4	✓	emm
6	✓	9	✓	8	✓	✓	✓	9	9	6	JS
7	11	✓	11	✓	10	12	12	10	✓	11	emm
8											
Total	23	13	25	12	19	24	23	22	13	20	emm

Concentration: 3,12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	—	—	—	—	—	—	—	—	—	—	kc
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	3	✓	4	3	5	✓	5	5	✓	✓	JS
5	8	4	6	✓	9	4	✓	6	3	4	emm
6	✓	3	✓	8	✓	6	8	8	9	9	JS
7	11	10	10	9	10	✓	12	12	10	9	emm
8											
Total	22	17	20	20	24	10	25	24	22	22	emm

Concentration: 6,25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	—	—	—	—	—	—	—	—	—	—	kc
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	3	5	3	✓	4	3	2	✓	✓	JS
5	9	✓	✓	✓	4	✓	✓	✓	4	3	emm
6	✓	7	7	6	9	✓	6	7	9	3	JS
7	11	13	12	10	✓	10	12	11	✓	10	emm
8											
Total	24	23	24	19	13	14	21	20	13	16	emm

Concentration: 12,5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	—	—	—	—	—	—	—	—	—	—	kc
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	A
4	3	✓	4	5	ex	4	3	4	4		JS
5	7	3	8	✓		✓	✓	✓	7		emm
6	✓	5	✓	8		6	7	9	✓		JS
7	10	11	10	10		12	12	11	9		emm
8											
Total	20	19	22	23	0X	22	22	24	20	0X	emm

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	—	—	—	—	—	—	—	—	—	—	kc
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	3	4	4	4	4	4	✓	✓	3	JS
5	✓	9	✓	✓	✓	✓	✓	4	3	✓	emm
6	6	9	7	7	6	8	8	8	8	5	JS
7	12	10	12	10	10	9	9	✓	✓	12	emm
8											
Total	22	22	23	21	20	21	20	12	11	20	emm

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	—	—	—	—	—	—	—	—	—	—	kc
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	4	2	5	3	✓	3	4	4	4	JS
5	✓	8	✓	✓	✓	3	✓	✓	9	9	emm
6	✓	✓	6	✓	8	9	6	5	✓	✓	JS
7	10	13	11	10	10	✓	12	11	9	10	emm
8											
Total	19	25	19	15	21	12	21	20	22	23	emm

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	—	—	—	—	—	—	—	—	—	—	kc
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	3	5	4	4	3	4	3	4	✓	2	JS
5	7	7	6	✓	✓	✓	✓	✓	5	6	emm
6	✓	✓	✓	7	8	6	3	5	9	✓	JS
7	11	12	10	10	12	11	11	13	✓	11	emm
8											
Total	21	24	20	21	23	21	21	23	14	19	emm

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Clear, ~~no particulate or precipitate~~ same particulate, odourless / colourless

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JGh

Date reviewed: May 19/16

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	14-9968-9844	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:18	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	13-4242-4617	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	28 Apr-16 13:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	05 May-16 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	18-5443-1080	**Code:**	6E885F68	**Client:**	Teck Coal
Sample Date:	27 Apr-16 06:50	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	31h (6.6 °C)	**Station:**	LC_LC5_WS_2016-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	638875	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	100	8.893	N/A	1	NA	11.24
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	0.8	0	1	0.1333	0.4216	52.7%	20.0%	8	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	0	1	1	1	1	0
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

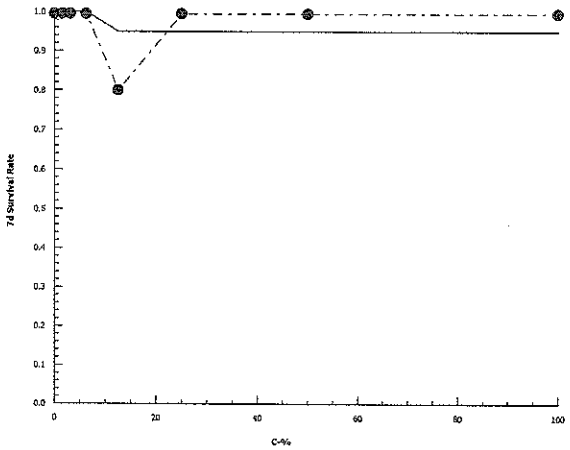
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	14-9968-9844	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:18	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	0/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst:_____ QA: JOH

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	16-6335-0518	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	13-4242-4617	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	28 Apr-16 13:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	05 May-16 14:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 1h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	18-5443-1080	**Code:**	6E885F68	**Client:**	Teck Coal
Sample Date:	27 Apr-16 06:50	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	31h (6.6 °C)	**Station:**	LC_LC5_WS_2016-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1639451	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.822	0.3023	N/A	121.7	NA	330.8
IC10	4.373	0.696	N/A	22.87	NA	143.7
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	21.7	14	26	1.065	3.368	15.52%	0.0%
1.56		10	19.4	12	25	1.572	4.971	25.62%	10.6%
3.12		10	20.6	10	25	1.392	4.402	21.37%	5.07%
6.25		10	18.7	13	24	1.399	4.423	23.65%	13.82%
12.5		10	17.2	0	24	2.905	9.187	53.41%	20.74%
25		10	19.2	11	23	1.323	4.185	21.79%	11.52%
50		10	19.2	12	25	1.332	4.211	21.93%	11.52%
100		10	20.7	14	24	0.8825	2.791	13.48%	4.61%

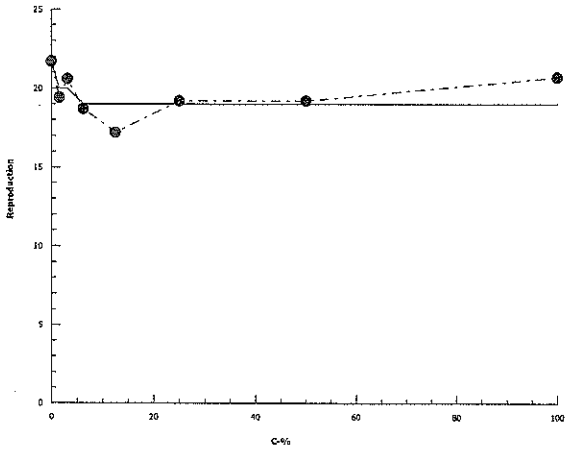
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	22	22	21	24	25	23	20	20	14	26
1.56		23	13	25	12	19	24	23	22	13	20
3.12		22	17	20	20	24	10	25	24	22	22
6.25		24	23	24	19	13	14	21	20	13	16
12.5		20	19	22	23	0	22	22	24	20	0
25		22	22	23	21	20	21	20	12	11	20
50		14	25	19	15	21	12	21	20	22	23
100		21	24	20	21	23	21	21	23	14	19

Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID:	16-6335-0518	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 12:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: May 19/16

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 16479

Start Date/Time: Apr 28/16 @ 1300h
Set up by: EMM

Sample Information:

Sample ID: ~~LC_WF_OUT_WS_20160427N~~ LC_WF_OUT_WS_20160427N
Sample Date: Apr 27/16
Date Received: Apr 28/16 EM
Sample Volume: 5x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 042016B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 18
Mortality (%) in previous 7 d: 10
Individual female # used ≥8 young on test day: 23, 26, 28, 29, 30, 32, 33, 34, 36, 37, 40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd143
Stock Solution ID: 16NaCl
Date Initiated: Apr 13/16

7-d LC50 (95% CL): 2.1 (2.0-2.2) g/L NaCl
7-d IC50 (95% CL): 1.6 (1.4-1.8) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCl CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.2-1.9) g/L NaCl CV (%): 12

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		29.2 (9.5-36.0)
IC50 % (v/v) (95% CL)		51.8 (43.0-57.0)

Reviewed by: JGL
Date reviewed: May 19/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck QUL **Start Date & Time:** April 28/16 @ 1300h
Sample ID: LC_WTF-WS_20160407-N **Stop Date & Time:** May 5/16 @ 1000h
Work Order #: 16479 **Test Species:** *Ceriodaphnia dubia*

Concentration: Control	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.0	7.6	8.2	7.1	7.9	7.9	8.2	7.0	8.2	7.0	8.2	7.5	8.1	7.3
pH	7.8	7.7	8.0	7.7	8.0	7.7	7.9	7.8	8.0	7.8	7.9	7.7	8.1	7.6
Cond. (µS/cm)	222	222		212		223		223		216		221		223
Initials	EMM	EMM		KL		YML		JS		JS		EMM		MLT

Concentration: 1.56%(v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.0	7.6	8.1	7.1	7.9	7.1	8.1	7.1	8.2	7.0	8.2	7.14	8.2	7.3
pH	7.9	7.9	8.0	7.8	7.9	7.8	8.0	7.7	7.9	7.8	7.8	7.7	7.9	7.6
Cond. (µS/cm)	258	259		250		256		252		258		257		257
Initials	EMM	EMM		KL		YML		JS		JS		EMM		MLT

Concentration: 12.5%(v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.5	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.0	7.6	8.1	7.1	8.0	7.2	8.1	7.1	8.2	7.3	8.2	7.1	8.2	7.2
pH	7.9	7.9	7.9	7.9	7.9	7.7	7.9	7.8	7.9	7.7	7.8	7.8	7.9	7.6
Cond. (µS/cm)	497	495		483		479		487		486		490		477
Initials	EMM	EMM		KL		YML		JS		JS		EMM		MLT

Concentration: 100%(v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	25.5	25.0	24.0	25.0	24.5	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	7.8	7.6	8.0	7.2	8.0	6.9	7.8	7.1	8.2	6.4	8.2	6.1	8.2	6.2
pH	7.8	7.9	7.9	7.7	7.96	7.6	7.6	7.7	7.7	7.6	7.6	7.6	7.9	7.6
Cond. (µS/cm)	1966	1988		1979		1976		1975		JS 1931973		1989		1845
Initials	EMM	EMM		KL		YML		JS		JS		EMM		MLT

Thermometer: 4 DO meter: 2 pH meter: 4 Conductivity meter: 2

	Control	100%(v/v)		
Hardness*	100	1040		
Alkalinity*	98	352		

* mg/L as $CaCO_3$

Analysts: EMM, AWD, JS, MLT, YML, KL
Reviewed by: JOL
Date reviewed: May 19/16

Sample Description: clear, ~~no precipitate or particulate~~, some brown debris, colourless, odourless, hydrocarbon smell

Comments: **Broodboard Used:** 042016B

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC_WTF_OUTLOS_20160427-N
Work Order: 16479

Start Date & Time: April 28/16 @ 1300h
Stop Date & Time: May 5/16 @ 1000h
Set up by: EMM

(U/N)%

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	YML
4	4	4	3	3	3	4	4	3	3	4	EMM
5	10	9	9	9	8	8	11	9	9	9	EMM
6	✓	✓	✓	✓	✓	✓	13	✓	✓	✓	MLT
7	11	12	11	10	10	11	✓	12	13	13	MLT
8											
Total	25	25	23	22	21	23	28	24	25	26	MLT

Concentration: 1.56%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	YML
4	4	4	3	3	5	4	4	4	4	3	EMM
5	9	10	✓	8	10	9	9	8	10	9	EMM
6	10	✓	10	✓	✓	11	✓	✓	✓	✓	MLT
7	✓	10	11	14	10	14	14	12	12	13	MLT
8											
Total	23	24	24	25	25	24	27	24	26	25	MLT

Concentration: 3.12%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
3	✓	✓	4	✓	✓	✓	✓	✓	✓	✓	YML
4	4	4	✓	3	3	4	4	4	4	4	EMM
5	9	9	8	✓	10	9	✓	8	10	9	EMM
6	✓	✓	10	8	✓	✓	9	✓	✓	✓	MLT
7	13	14	✓	12	14	12	13	13	12	13	MLT
8											
Total	26	27	22	23	27	25	26	25	26	26	MLT

Concentration: 6.25%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	YML
4	4	4	3	3		4	3	5	4	4	EMM
5	9	8	11	10	4	✓	9	✓	9	8	EMM
6	✓	✓	✓	✓	5	10	✓	8	✓	✓	MLT
7	14	14	14	12	✓	13	14	11	12	10	MLT
8											
Total	27	26	28	25	9	27	26	24	25	22	MLT

Concentration: 12.5%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	X	✓	✓	✓	KC
3	✓	✓	✓	✓	✓	✓	↓	✓	✓	✓	YML
4	4	✓	4	4	3	3	↓	3	4	3	EMM
5	10	✓	9	9	X	8	↓	11	10	9	EMM
6	10	✓	✓	✓	|	✓	↓	14	✓	✓	MLT
7	8	✓	12	11	|	14	↓	✓	11	12	MLT
8							↓				
Total	24	0	25	24	3X	25	0X	28	25	24	MLT

Concentration: 25%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
3	✓	✓	✓	✓	✓	✓	X	✓	✓	✓	YML
4	4	3	4	4	3	3	|	5	4	4	EMM
5	10	9	9	8	9	9	|	8	9	10	EMM
6	✓	✓	✓	✓	✓	14	|	✓	✓	✓	MLT
7	10	14	12	14	13	✓	|	11	12	10	MLT
8						26					
Total	24	26	25	26	25	23	OX	24	25	24	MLT

Concentration: 50%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	YML
4	✓	3	✓	✓	✓	✓	✓	✓	✓	✓	EMM
5	8	✓	6	5	6	12	✓	3	✓	2	JS
6	✓	2	12	✓	✓	07	8	10	12	11	MLT
7	9	10	✓	12	8	✓	✓	✓	✓	✓	MLT
8											
Total	13	15	18	17	14	7	8	13	12	13	MLT

Concentration: 100%

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	KC
3	✓	✓	X	✓	✓	✓	✓	✓	✓	✓	YML
4	✓	✓	|	✓	✓	✓	✓	✓	✓	✓	EMM
5	2	✓	|	✓	✓	✓	✓	✓	✓	✓	JS
6	3	✓	|	✓	✓	✓	✓	✓	2	✓	MLT
7	✓	✓	|	✓	✓	✓	✓	✓	✓	✓	MLT
8											
Total	5	0	OX	0	0	0	0	0	2	0	MLT

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											JS
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality. some debris, hydrocarbon smell and odourless

Sample Description: clear / ~~no precipitate or particulate~~, odourless

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JON

Date reviewed: May 19/16

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	10-1715-8360	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 13:06	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	12-2989-4008	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	28 Apr-16 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	05 May-16 10:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 21h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	05-4497-8051	**Code:**	207BB483	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (10.2 °C)	**Station:**	LC_WTF_OUT_WS_20160427_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	472996	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	8.893	7.469	N/A	11.24	NA	13.39
EC10	100	8.893	N/A	1	NA	11.24
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	0.8	0	1	0.1333	0.4216	52.7%	20.0%	8	10
25		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	0	1	0	1	1	1
25		1	1	1	1	1	1	0	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	0	1	1	1	1	1	1	1

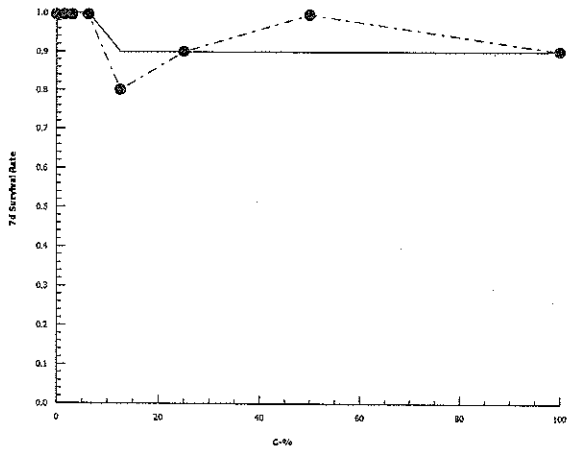
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 10-1715-8360 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 11 May-16 13:06 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	0/1	1/1	0/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-6427-1346	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 13:06	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	12-2989-4008	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	28 Apr-16 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	05 May-16 10:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 21h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	05-4497-8051	**Code:**	207BB483	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (10.2 °C)	**Station:**	LC_WTF_OUT_WS_20160427_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1621668	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	6.751	3.806	14.12	14.81	7.081	26.28
IC10	8.515	4.726	27.02	11.74	3.701	21.16
IC15	10.68	5.75	29.26	9.363	3.417	17.39
IC20	25.91	7.867	32.3	3.86	3.096	12.71
IC25	29.23	9.501	36	3.421	2.778	10.53
IC40	41.88	26.73	50.5	2.388	1.98	3.741
IC50	51.83	43	57.01	1.93	1.754	2.326

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	24.2	21	28	0.6464	2.044	8.45%	0.0%
1.56		10	24.7	23	27	0.3667	1.16	4.69%	-2.07%
3.12		10	25.3	22	27	0.5175	1.636	6.47%	-4.55%
6.25		10	23.9	9	28	1.741	5.507	23.04%	1.24%
12.5		10	17.8	0	28	3.693	11.68	65.61%	26.45%
25		10	22.5	0	26	2.513	7.948	35.32%	7.03%
50		10	13	7	18	1.095	3.464	26.65%	46.28%
100		10	0.7	0	5	0.5175	1.636	233.8%	97.11%

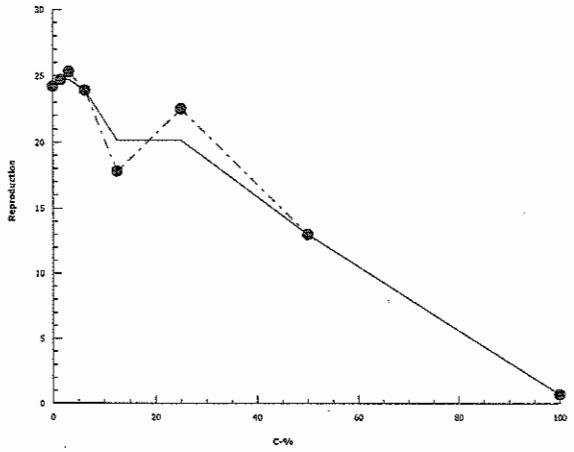
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	25	25	23	22	21	23	28	24	25	26
1.56		23	24	24	25	25	24	27	24	26	25
3.12		26	27	22	23	27	25	26	25	26	26
6.25		27	26	28	25	9	27	26	24	25	22
12.5		24	0	25	24	3	25	0	28	25	24
25		24	26	25	26	25	26	0	24	25	24
50		13	15	18	17	14	7	8	13	12	13
100		5	0	0	0	0	0	0	0	2	0

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	00-6427-1346	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 13:06	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Client: Teck

W.O.#: ~~16474~~ emr 16479

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
LC_LCDSSLCC	Apr 28/16	50	8.1	8.2	160		50	14.1	282	KL
LC_DC1	↓	↓	5.9	6.0	116		↓	6.2	124	↓
LC_FRDSDC			8.0 ~~7.9~~ KL	8.1	158			14.1	282	
LC_DCDS			4.4	4.5	86			5.2	104	
LC_LCS		↓	7.9	8.0	156		↓	13.4	268	
LC_WTF	↓	50	17.8	18.0	352		10①	10.4	1040	↓
201. pemer	apr 28/16	50	5.0	5.1	98		50	5.0	100	EMM

Notes: ① Sample diluted w/ DI up to 100mL

Reviewed by: JGu

Date Reviewed: May 18/16

APPENDIX B – Rainbow Trout Embryo *(Oncorhynchus mykiss)* Toxicity Test Data

Rainbow Trout Embryo Summary Sheet

Client: Teck

Start Date/Time: Apr 28/16 @ 1640h.

Work Order No.: 16475

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: GH_ER2_WS_2016-04_27_N
Sample Date: Apr 27/16
Date Received: Apr 28/16
Sample Volume: 6x20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 042816
Source: Ted's Trout Farm (Campbell Lake)
Loading Density: 1.35 g/L

Number of male broodstock used: 4
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE84
Stock Solution ID: 15503
Date Initiated: Apr 28/16
7-d EC50 (95% CL): 5.5 (5.0 – 5.8) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.1 – 8.0) mg/L SDS
Reference Toxicant CV (%): 40

Test Results:

Embryo viability (mean ± SD) %	Sample ID		
	Control	GH_ER2_WS_2016_04_27_N	
EC25 % (v/v) (95% CL)	90.1 ± 8.9	93.2 ± 6.2	
~~EC50 %~~ (v/v) (95% CL)			

Reviewed by: JGh

Date reviewed: May 26/16

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

7d

Client: Teck
Sample ID: GH-ER2-WS-2016-04-27-N
Work Order #: 16475

Start Date & Time: Apr 28/16 @ 1640h
Stop Date & Time: May 5/16 @ 1145h
Test Species: *Oncorhynchus mykiss*

Control Concentration (%v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	14.5
DO (mg/L)	10.0	9.9	9.5	10.1	9.9	10.1	9.9	10.1	10.0	9.9	9.5	10.0	9.9	9.8
pH	7.0	7.0	7.2	7.0	7.1	7.0	7.1	7.0	7.1	6.7	6.7	6.9	7.0	7.0
Cond. (µS/cm)	29	29		27		28		29		27		26		28
Initials	VML	KL		AD		AD		KL		KL		KL		KL

100 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	15.0	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	14.5
DO (mg/L)	9.9	9.8	9.6	10.0	9.8	10.0	9.7	10.1	10.0	9.5	9.5	9.9	9.9	9.9
pH	8.1	8.1	8.3	8.1	8.2	8.1	8.2	8.1	8.2	7.6	7.7	8.2	8.3	8.2
Cond. (µS/cm)	301	292		292		293		293		300		292		292
Initials	KL	KL		AD		AD		KL		KL		KL		KL

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: temp-3 DO meter: DO-1/3 pH meter: pH-1/3 Conductivity meter: C-1/3

	Control	100% (v/v)		
Hardness*	10	136		
Alkalinity*	5	138		

* mg/L as CaCO3

Analysts: MML, AWD, KL

Reviewed by: JGA

Date reviewed: May 25/16

Sample Description: clear, colourless, some debris, no odour

Comments:

Embryo Toxicity Test
Daily Mortality

7d

Client: Teck
Sample ID: GH_ER2_WS_2016_04_27_N
Work Order #: 16475
Start Date & Time: Apr 28/16 @ 1640h.
Stop Date & Time: ~~AF~~ KL May 5/16 @ 1145h.
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	3	0	0	0	~~40~~ KL	~~20~~ KL	KL 60	0	31	31
	2	|	|	|	|	|	1	1	2	1	24	27
	3	|	|	|	|	|	5	1	6	1	26	33
	4	|	|	|	↓	|	2	0	2	0	26	28
100	1	|	|	|	2	|	0	1	3	1	26	30
	2	|	|	|	1	|	1	0	2	1	25	28
	3	|	|	|	0	|	0	0	0	1	29	30
	4	↓	↓	↓	0	↓	0	0	0	0	30	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
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	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	A	~	KL	KL	KL	KL	KL	KL	KL	KL

Comments:

Reviewed by: JBL **Date reviewed:** May 25/16

CETIS Summary Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Batch ID:	08-1274-1635	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	28 Apr-16 16:40	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	05 May-16 11:45	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Campbel Lake	**Age:**	

Sample ID:	01-0356-4872	**Code:**	62C4648	**Client:**	Teck Coal
Sample Date:	27 Apr-16	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	41h (8 °C)	**Station:**	GH_ER2_WS_2016_04_27_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
01-9202-1345	Proportion Normal	100	>100	NA	NA	1	Fisher Exact Test

Proportion Normal Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.9013	0.7605	1	0.7879	1	0.04426	0.08851	9.82%	0.0%
100		4	0.9315	0.8325	1	0.8667	1	0.03113	0.06225	6.68%	-3.35%

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.8889	0.7879	0.9286
100		0.8667	0.8929	0.9667	1

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	31/31	24/27	26/33	26/28
100		26/30	25/28	29/30	30/30

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	01-9202-1345	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 16:22	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	08-1274-1635	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	28 Apr-16 16:40	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	05 May-16 11:45	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Campbel Lake	**Age:**	
Sample ID:	01-0356-4872	**Code:**	62C4648	**Client:**	Teck Coal
Sample Date:	27 Apr-16	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	41h (8 °C)	**Station:**	GH_ER2_WS_2016_04_27_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes proportion normal

Fisher Exact Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		100	1	1.0000	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Negative Contr	107	12	119	0.8992	0.1008	0.0%
100		110	8	118	0.9322	0.0678	-3.68%

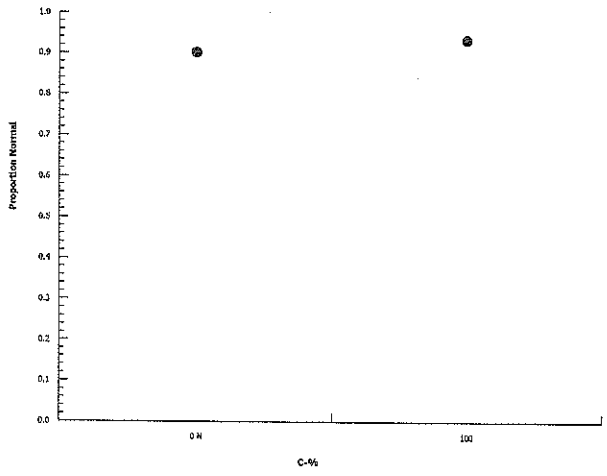
Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.8889	0.7879	0.9286
100		0.8667	0.8929	0.9667	1

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	31/31	24/27	26/33	26/28
100		26/30	25/28	29/30	30/30

Graphics



Analyst:_____ QA: JOL May 26/16

Rainbow Trout Embryo Summary Sheet

Client: Teck

Start Date/Time: Apr 28/16 @ 1640h.

Work Order No.: 16474

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC, LCDSSLCC WS 2016-04-25 N

Sample Date: Apr 27/16

Date Received: Apr 28/16

Sample Volume: 8 x 20L

Dilution Water:

Type: Dechlorinated Tap Water

Hardness (mg/L $CaCO_3$): 10

Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 042816

Source: Ted's Trout ~~Lodge~~ Farm (Campbell Lake)

Loading Density: 1.135 g/L

Number of male broodstock used: 4

Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: ~~RTE 84~~ RTE84

Stock Solution ID: 15503

Date Initiated: Apr 28/16

7-d EC50 (95% CL): 5.5 (5.0 – 5.8) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.1 – 8.0) mg/L SDS

Reference Toxicant CV (%): 40

Test Results:

	Sample ID		
	LC_LCDSSLCC WS	2016-04-25 N	
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JGL

Date reviewed: May 25/16

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-LCDSSLCC WS 2016-04-25 N
Work Order #: KL 16474
Start Date & Time: April 28/16 @ 1640h
Stop Date & Time: May 5/16 @ 1000h
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	~~14.5~~ KL 15.0		14.5
DO (mg/L)	10.0	9.9	9.8	10.1	9.9	10.1	9.7	~~9.7~~ KL	10.1 KL	9.9	9.5	10.0	10.0	9.9
pH	7.0	7.0	7.2	7.0	7.1	7.0	7.1	7.0	7.1	6.7	6.6	6.9	6.9	7.0
Cond. (µS/cm)	29	28		27		28		29		27		26		28
Initials	MM	KL		AM		AS		KL		KL		KL		KL

① 10.1

6.25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	~~14.5~~ KL 15.0		14.5
DO (mg/L)	9.6	9.7	9.8	10.1	9.8	10.0	9.8	10.2 KL	10.3 KL	9.7	9.5	10.0	10.1	9.9
pH	7.2 KL	7.4	7.1	7.2	7.3	7.3	7.4	7.3	7.3	7.1	6.8	7.2	7.1	7.2
Cond. (µS/cm)	57	61		62		63		66		58		58		60
Initials	KL	KL		AM		AS		KL		KL		KL		KL

25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	14.5
DO (mg/L)	9.7	9.8	9.8	10.0	9.9	10.1	9.7	10.1 KL	10.1 KL	9.7	9.6	10.1	10.1	9.9
pH	7.4	7.7	7.6	7.5	7.7	7.5	7.7	7.7	7.8	7.2	~~6.7~~ 7.1	7.6	7.5	7.5
Cond. (µS/cm)	166	164		170		173		170		169		170		168
Initials	KL	KL		AM		AS		KL		KL		KL		KL

100 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	15.0	15.0	14.5
DO (mg/L)	9.7	10.2 KL	9.8	10.0	9.8	10.1	9.7	10.1 KL	10.1 KL	9.5	9.5	9.8	10.0	9.9
pH	8.01 KL	8.1	8.3	~~7.8~~ 8.1	8.2	8.1	8.2	8.2	8.3	7.6	7.7	7.9	8.2	8.1
Cond. (µS/cm)	562	544		540		539		544		559		542		543
Initials	KL	KL		AM		AS		KL		KL		KL		KL

Thermometer: Temp-3 **DO meter:** DO-1/3 **pH meter:** pH-1/3 **Conductivity meter:** C-1/3

	Control	100% (v/v)		
Hardness*	10	282		
Alkalinity*	5	160		

* mg/L as CaCO3

Analysts: MM, AS, KL
Reviewed by: JGL
Date reviewed: May 25/16

Sample Description: Clear, colourless, some debris, no odour

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC#LCDSSLCC WS 2016-04-25N
Work Order #: 16474
Start Date & Time: April 28/16 @ 1640h
Stop Date & Time: May 5/16 @ 10:00h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	2	KL 23	5	2	22	29
	2				0		0	1	1	2	27	30
	3				0		1	0	1	KL ~~28~~ 1	28	30
	4				1		2	2	5	2	23	30
6.25	1				0		1	1	2	KL ~~0~~ 3	KL ~~26~~ 25	KL ~~28~~ 30
	2						3	0	3	KL ~~0~~ 1	KL ~~25~~ 26	KL ~~28~~ 30
	3						0	0	0	0	30	30
	4					↓	1	0	1	2	27	30
12.5	1				↓	1	2	0	3	0	27	30
	2				1	0	2	0	3	2	25	30
	3				0	1	1	0	2	0	28	30
	4				0	0	1	1	2	3	25	30
25	1				1	1	1	0	2	1	27	30
	2					0	2	0	2	1	26	29
	3					0	3	0	3	0	27	30
	4					1	2	1	4	1	25	30
50	1					1	1	1	3	1	26	30
	2					2	1	1	4	0	27	31
	3					2	0	2	4	1	25	30
	4					0	2	1	3	0	27	30
100	1				↓	0	3	1	4	1	25	30
	2				1	2	1	2	6	1	23	30
	3				1	0	1	2	4	0	26	30
	4	↓	↓	↓	0	1	1	0	2	0	28	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	AS	A	KL	KL	KL	KL	KL	KL	KL	KL

Comments:

Reviewed by: JBe **Date reviewed:** May 25/16

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	20-7375-0701	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 16:35	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-7514-1410	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	28 Apr-16 16:40	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	05 May-16 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 17h	**Source:**	Campbel Lake	**Age:**	
Sample ID:	12-8781-3119	**Code:**	4CC277FF	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:18	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	32h (8 °C)	**Station:**	LC LCDSSLCC WS 2016-04-25 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	768156	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.8397	0.7586	0.9333	0.04501	0.09002	10.72%	0.0%	100	119
6.25		4	0.9	0.8333	1	0.036	0.07201	8.0%	-7.19%	108	120
12.5		4	0.875	0.8333	0.9333	0.025	0.05	5.71%	-4.21%	105	120
25		4	0.8825	0.8333	0.9	0.0164	0.0328	3.72%	-5.1%	105	119
50		4	0.8677	0.8333	0.9	0.01365	0.0273	3.15%	-3.35%	105	121
100		4	0.85	0.7667	0.9333	0.03469	0.06939	8.16%	-1.23%	102	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.7586	0.9	0.9333	0.7667
6.25		0.8333	0.8667	1	0.9
12.5		0.9	0.8333	0.9333	0.8333
25		0.9	0.8966	0.9	0.8333
50		0.8667	0.871	0.8333	0.9
100		0.8333	0.7667	0.8667	0.9333

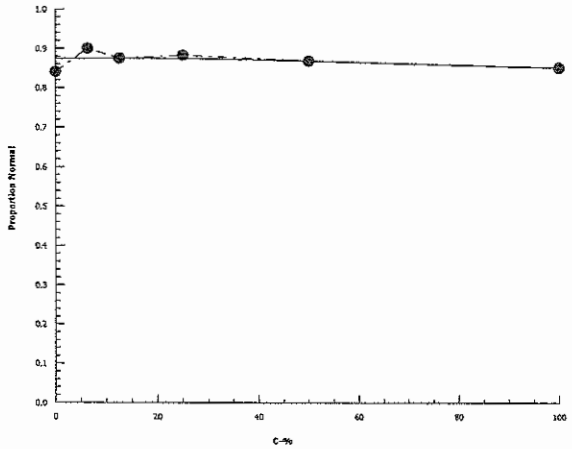
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	22/29	27/30	28/30	23/30
6.25		25/30	26/30	30/30	27/30
12.5		27/30	25/30	28/30	25/30
25		27/30	26/29	27/30	25/30
50		26/30	27/31	25/30	27/30
100		25/30	23/30	26/30	28/30

Salmonid Embryo Survival and Development Test **Nautilus Environmental**

Analysis ID:	20-7375-0701	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 16:35	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Embryo Summary Sheet

Client: Teck

Start Date/Time: Apr 28/16 @ 1640h.

Work Order No.: 16474

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DC1_WS_2016-04-26_N
Sample Date: Apr 27/16
Date Received: Apr 28/16
Sample Volume: 5X 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 042816
Source: Ted's Trout Farm (Campbell Lake)
Loading Density: 1.135 g/L

Number of male broodstock used: 4
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE84
Stock Solution ID: 15503
Date Initiated: Apr 28/16
7-d EC50 (95% CL): 5.5 (5.0-5.8) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.1 - 8.0) mg/L SDS
Reference Toxicant CV (%): 40

Test Results:

	Sample ID		
	LC_DC1_WS_2016-04-26_N		
EC25 % (v/v) (95% CL)	> 100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JGL

Date reviewed: May 25/16

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-DC1-WS-2016-04-26-N
Work Order #: 16474
Start Date & Time: April 28/16 @ 1640h
Stop Date & Time: May 5th/16 @ 1015h
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	10.0	9.9	9.9	10.1	9.8	10.1	9.7	10.1	10.1	9.9	9.6	10.0	9.9	9.9
pH	7.0	7.0	7.2	7.0	7.1	7.0	7.0	7.0	7.1	6.7	6.6	6.9	7.0	7.0
Cond. (µS/cm)	29	29		27		28		29		27		26		28
Initials	VML	KL		AW		AD		KL		KL		KL		KL

6.25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	9.7	9.9	9.9	10.0	9.9	10.1	9.8	9.9	10.1	9.7	9.6	10.1	9.9	9.9
pH	7.1	7.4	7.2	7.3	7.2	7.3	7.4	7.1	7.2	7.4	7.5	7.1	7.1	7.4
Cond. (µS/cm)	43	41		40		41		40		37		38		40
Initials	KL	KL		AW		AD		KL		KL		KL		KL

25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	9.7	9.9	9.9	10.0	9.8	10.1	9.8	10.1	10.1	9.7	9.6	10.1	9.9	9.9
pH	7.4	7.3	7.4	7.5	7.6	7.5	7.7	7.5	7.5	7.4	7.3	7.4	7.5	7.4
Cond. (µS/cm)	76	82		83		82		79		83		81		81
Initials	KL	KL		AW		AD		KL		KL		KL		KL

100 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	15.0	15.0	15.0
DO (mg/L)	9.7	10.3	9.9	10.0	9.7	10.0	9.7	10.1	10.0	9.7	9.6	10.1	9.9	9.9
pH	8.0	8.1 KL	8.2	8.1	8.2	8.1	8.1	8.1	8.1	7.6	7.7	7.9	8.0	8.0
Cond. (µS/cm)	237	223		225		229		223		228		222		223
Initials	KL	KL		AW		AD		KL		KL		KL		KL

Thermometer: Temp-3 **DO meter:** DO-1/3 **pH meter:** pH-1/3 **Conductivity meter:** C-1/3

	Control	100% (v/v)		
Hardness*	10	124		
Alkalinity*	5	116		

* mg/L as CaCO3

Analysts: VML, KL, AWD

Reviewed by: JOL

Date reviewed: May 25/16

Sample Description: Clear, colourless, some debris, no odour

Comments:

Embryo Toxicity Test
Daily Mortality

Client: TRCK
Sample ID: LC-DE1-WS-2016-04-26_N
Work Order #: 16474
Start Date & Time: Apr 28/16 @1640h
Stop Date & Time: May 5/16 @1015h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	2	2	4	KL ~~26~~ 0	26	30
	2	1					KL ~~0~~ 1	3	5	KL ~~25~~ 0	25	30
	3	0					1	0	KL ~~2~~ 1	1	28	30
	4						1	1	2	0	28	30
6.25	1					↓	1	3	4	1	25	30
	2					1	1	1	3	0	27	30
	3				↓	0	0	1	1	1	28	30
	4				1		1	2	4	0	26	30
12.5	1				0		0	1	1	0	29	30
	2						1	2	3	0	27	30
	3					↓	1	1	2	0	28	30
	4					1	0	2	3	1	26	30
25	1					0	2	0	2	KL ~~2~~ ~~2~~ 0	28	30
	2					0	0	1	1	0	29	30
	3					0	2	1	3	0	27	30
	4				↓	2	0	0	2	1	27	30
50	1				1	1	2	2	6	0	24	30
	2				0	0	1	0	1	2	27	30
	3				0	0	0	1	1	2	27	30
	4				1	0	1	2	4	0	26	30
100	1				0	0	4	0	4	2	24	30
	2				~~1~~ KL 0	1	0	0	1	2	27	30
	3				0	2	1	0	3	2	25	30
	4	↓	↓	↓	0	1	0	0	1	0	29	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	AO	A	KL	KL	KL	KL	KL	KL	KL	KL

Comments:

Reviewed by: JGK **Date reviewed:** May 25/16

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	05-9825-0157	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 16:39	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-2486-7524	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	28 Apr-16 16:40	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	05 May-16 10:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 18h	**Source:**	Campbel Lake	**Age:**	
Sample ID:	00-8128-9240	**Code:**	4D86018	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:30	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	32h (7.5 °C)	**Station:**	LC_DC1_WS_2016-04-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	490097	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.8917	0.8333	0.9333	0.025	0.05	5.61%	0.0%	107	120
6.25		4	0.8833	0.8333	0.9333	0.02152	0.04303	4.87%	0.93%	106	120
12.5		4	0.9167	0.8667	0.9667	0.02152	0.04303	4.7%	-2.8%	110	120
25		4	0.925	0.9	0.9667	0.01596	0.03191	3.45%	-3.74%	111	120
50		4	0.8667	0.8	0.9	0.02357	0.04714	5.44%	2.8%	104	120
100		4	0.875	0.8	0.9667	0.03696	0.07391	8.45%	1.87%	105	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8667	0.8333	0.9333	0.9333
6.25		0.8333	0.9	0.9333	0.8667
12.5		0.9667	0.9	0.9333	0.8667
25		0.9333	0.9667	0.9	0.9
50		0.8	0.9	0.9	0.8667
100		0.8	0.9	0.8333	0.9667

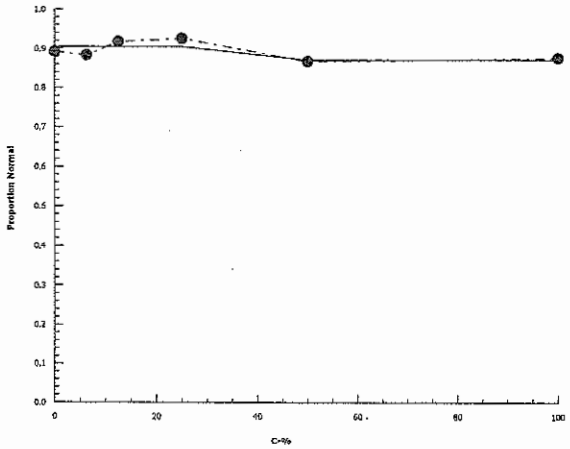
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	25/30	28/30	28/30
6.25		25/30	27/30	28/30	26/30
12.5		29/30	27/30	28/30	26/30
25		28/30	29/30	27/30	27/30
50		24/30	27/30	27/30	26/30
100		24/30	27/30	25/30	29/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	05-9825-0157	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 16:39	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: JOL 25 MAY 16

Rainbow Trout Embryo Summary Sheet

Client: Teck

Start Date/Time: Apr 28/16 @ 1640h

Work Order No.: 16474

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: ~~LC~~ FRDSDC WS 2016-04-26 N

Sample Date: Apr 27/16

Date Received: Apr 28/16

Sample Volume: 5 X 20L

Dilution Water:

Type: Dechlorinated Tap Water

Hardness (mg/L $CaCO_3$): 40

Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 042816

Source: Ted's Trout Farm (Campbell Lake)

Loading Density: 1.135 g/L

Number of male broodstock used: 4

Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE84

Stock Solution ID: IS503

Date Initiated: Apr 28/16

7-d EC50 (95% CL): 5.5 (5.0 – 5.8) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.1 – 8.0) mg/L SDS

Reference Toxicant CV (%): 40

Test Results:

	Sample ID		
	LC FRDSDC WS 2016-04-26 N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JGh

Date reviewed: May 25/16

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LCFRDSDC WS 2016-04-26 N
Work Order #: 16474
Start Date & Time: April 28/16 @ 1640h
Stop Date & Time: May 5/16 @ 1030h
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	10.0	9.9	9.9	10.1	9.8	10.1	9.7	10.1	10.0	9.9	9.6	10.0	9.8	9.9
pH	7.0	7.0	7.2 final	7.0	7.1	7.0	7.0	7.0	7.1	6.7	6.6	6.9	7.0	7.0
Cond. (µS/cm)	29	29		27		28		29		27		26		28
Initials	MM	KL		AW		AD		KL		KL		KL		KL

6.25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	9.7	9.8	9.9	10.1	9.8	10.1	9.7	10.0	10.1	9.7	9.5	10.1	9.8	9.9
pH	7.1	7.2	7.3	7.2	7.3	7.3	7.2	7.2	7.3	7.4	7.1	7.2	7.3	7.2
Cond. (µS/cm)	68	66		60		59		64		63		61		63
Initials	KL	KL		AW		AD		KL		KL		KL		KL

25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	14.5
DO (mg/L)	9.7	9.9	9.9	10.0	9.9	10.0	9.8	10.1	10.1	9.7	9.5	10.1	9.9	9.9
pH	7.5	7.2	7.6	7.5	7.6	7.6	7.5	7.8	7.7	7.4	7.3	7.5	7.6	7.5
Cond. (µS/cm)	167	177		174		173		171		182		171		174
Initials	KL	KL		AW		AD		KL		KL		KL		KL

100 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	15.0	15.0	14.5
DO (mg/L)	9.7	10.0	9.9	10.1	9.8	10.0	9.8	10.1	10.0	9.7	9.5	10.1	9.9	9.9
pH	8.1	8.0	8.3	8.1	8.2	8.1	8.1	8.2	8.3	7.8	7.8	8.0	8.2	8.1
Cond. (µS/cm)	554	539		541		545		536		553		536		539
Initials	KL	KL		AW		AD		KL		KL		KL		KL

Thermometer: temp-3 **DO meter:** DO-1|3 **pH meter:** pH-1|3 **Conductivity meter:** C-1|3

	Control	100% (v/v)		
Hardness*	10	282		
Alkalinity*	5	158		

* mg/L as CaCO3

Analysts: YYL, AWD, KL
Reviewed by: JOL
Date reviewed: May 25/16

Sample Description: clear, colourless, some debris, no odour

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC FERDSDC WS 2016-04-26 N
Work Order #: 16474
Start Date & Time: April 28/16 @ 1640h
Stop Date & Time: May 5/16 @ 1030h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	1	2	3	4	23	30
	2	↓	↓	↓	↓	0	1	2	3	1	26	30
	3					0	0	2	2	0	28	30
	4					0	0	0	0	1	29	30
6.25	1					0	1	1	2	1	27	30
	2					0	1	3	4	1	25	30
	3					1	1	0	2	2	26	30
	4					0	2	0	2	1	27	30
12.5	1					0	2	0	2	0	28	30
	2					1	1	0	2	2	26	30
	3					0	2	0	2	0	28	30
	4					1	0	3	4	0	26	30
25	1					1	0	2	3	1	26	30
	2					0	1	0	1	3	26	30
	3					1	0	1	2	1	27	30
	4					1	1	1	3	0	27	30
50	1					0	1	1	2	1	27	30
	2					0	2	1	3	2	25	30
	3					0	2	1	3	0	27	30
	4					0	2	0	2	1	27	30
100	1				↓	0	2	1	3	1	26	30
	2				1	2	1	0	4	1	25	30
	3				0	0	2	3	5	1	24	30
	4	↓	↓	↓	0	1	2	0	3	0	27	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	AO	AO	KL	KL	KL	KL	KL	KL	KL	KL

Comments:

Reviewed by: JGL
Date reviewed: May 25/16

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	08-4884-2210	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 16:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-8151-7168	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	28 Apr-16 16:40	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	05 May-16 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 18h	**Source:**	Campbel Lake	**Age:**	
Sample ID:	07-5438-7274	**Code:**	2CF7094A	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:04	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	32h (8 °C)	**Station:**	LC FRDSDC WS 2016-04-26 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1220707	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.8833	0.7667	0.9667	0.0441	0.08819	9.98%	0.0%	106	120
6.25		4	0.875	0.8333	0.9	0.01596	0.03191	3.65%	0.94%	105	120
12.5		4	0.9	0.8667	0.9333	0.01925	0.03849	4.28%	-1.89%	108	120
25		4	0.8833	0.8667	0.9	0.009623	0.01925	2.18%	0.0%	106	120
50		4	0.8833	0.8333	0.9	0.01667	0.03333	3.77%	0.0%	106	120
100		4	0.85	0.8	0.9	0.02152	0.04303	5.06%	3.77%	102	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.7667	0.8667	0.9333	0.9667
6.25		0.9	0.8333	0.8667	0.9
12.5		0.9333	0.8667	0.9333	0.8667
25		0.8667	0.8667	0.9	0.9
50		0.9	0.8333	0.9	0.9
100		0.8667	0.8333	0.8	0.9

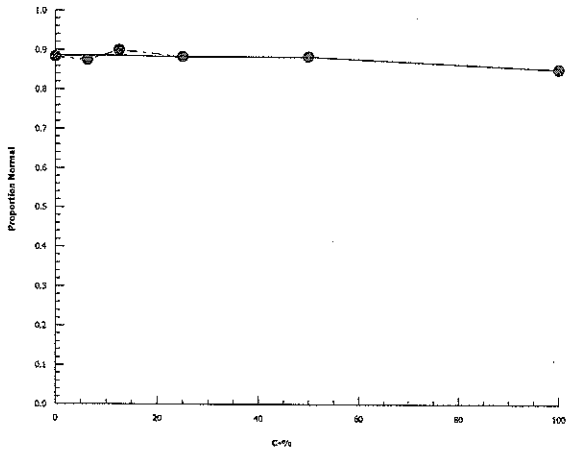
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	23/30	26/30	28/30	29/30
6.25		27/30	25/30	26/30	27/30
12.5		28/30	26/30	28/30	26/30
25		26/30	26/30	27/30	27/30
50		27/30	25/30	27/30	27/30
100		26/30	25/30	24/30	27/30

Salmonid Embryo Survival and Development Test | **Nautilus Environmental**

Analysis ID:	08-4884-2210	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 16:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Embryo Summary Sheet

Client: Teck

Start Date/Time: Apr 28/16 @ 1640h.

Work Order No.: 16474

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC DCDS WS 2016-04-26 N
Sample Date: Apr 27/16
Date Received: Apr 28/16
Sample Volume: 5x20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 042816
Source: Ted's Trout Farm (Campbell Lake)
Loading Density: 1.135 g/L

Number of male broodstock used: 4
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE84
Stock Solution ID: 15503
Date Initiated: Apr 28/16
7-d EC50 (95% CL): 5.5 (5.0 – 5.8) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.1 – 8.0) mg/L SDS
Reference Toxicant CV (%): 40

Test Results:

	Sample ID		
	LC DCDS WS 2016-04-26 N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JGL

Date reviewed: May 26/16

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC*PCDS WS 2016-04-26 N
Work Order #: 16474
Start Date & Time: April 28/16 @ 1642h
Stop Date & Time: May 5/16 1045h
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	10.0	9.9	9.9	10.1	9.9	10.1	9.7	10.1	10.0	9.9	9.5	10.0	9.8	9.9
pH	7.0	7.0	7.2	7.0	7.0	7.0	7.1	7.0	7.2	6.7	6.6	6.9	7.0	7.0
Cond. (µS/cm)	29	29		27		28		29		27		26		27
Initials	MM	KL		AV		AS		KL		KL		KL		KL

6.25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	9.7	10.0	9.9	10.1	9.9	10.1	9.8	9.9	10.0	9.7	9.5	10.1	9.8	9.9
pH	7.2	7.1	7.1	7.2	7.2	7.2	7.3	7.2	7.2	7.0	7.3	7.2	7.3	7.2
Cond. (µS/cm)	41	39		38		37		38		36		34		37
Initials	KL	KL		AS		AS		KL		KL		KL		KL

25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	14.5
DO (mg/L)	9.7	10.0	9.9	10.0	9.7	10.0	9.9	10.1	10.0	9.7	9.1	10.1	9.9	9.9
pH	7.4	7.3	7.4	7.5	7.6	7.6	7.7	7.4	7.4	7.3	7.3	7.5	7.5	7.4
Cond. (µS/cm)	68	71		68		70		68		72		70		71
Initials	KL	KL		AS		AS		KL		KL		KL		KL

100 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	9.7	10.2	9.9	10.0	9.8	10.1	9.8	10.1	10.1	9.7	9.3	9.9	9.9	10.0
pH	8.0	7.9	7.9	8.1	8.1	8.0	8.1	8.0	8.0	7.6	7.5	7.8	7.9	7.8
Cond. (µS/cm)	189	187		186		187		189		191		187		190
Initials	KL	KL		AS		AS		KL		KL		KL		KL

Thermometer: temp-3 **DO meter:** DO-1/3 **pH meter:** pH-1/3 **Conductivity meter:** C-1/3

	Control	100% (v/v)		
Hardness*	10	104		
Alkalinity*	5	86		

* mg/L as CaCO3

Analysts: MML, AWD, KL
Reviewed by: JOL
Date reviewed: May 25/16

Sample Description: clear, colourless, some debris, no odour

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC# DCDS WS 2016-04-26 N
Work Order #: 16474
Start Date & Time: April 28/16 @1640h
Stop Date & Time: May 5/16 @1045h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	1	1	0	29	30
	2	↓	↓	↓	0	1	0	1	2	1	27	30
	3	↓	↓	↓	0	0	2	0	2	1	27	30
	4	↓	↓	↓	1	0	1	0	2	2	26	30
6.25	1	↓	↓	↓	0	0	1	2	3	2	25	30
	2	↓	↓	↓	↓	0	1	1	2	1	27	30
	3	↓	↓	↓	↓	1	3	2	6	0	24	30
	4	↓	↓	↓	↓	1	0	2	3	1	26	30
12.5	1	↓	↓	↓	↓	1	1	2	4	0	26	30
	2	↓	↓	↓	1	0	0	2	3	1	26	30
	3	↓	↓	↓	0	0	1	0	1	2	27	30
	4	↓	↓	↓	↓	2	0	3	5	0	25	30
25	1	↓	↓	↓	↓	0	0	0	0	1	29	30
	2	↓	↓	↓	↓	~~10~~ 0	2	1	3	0	26	~~30~~ 29
	3	↓	↓	↓	↓	1	3	1	5	0	26	31
	4	↓	↓	↓	↓	0	0	1	1	2	27	30
50	1	↓	↓	↓	↓	0	~~2~~ 3	1	4	1	25	30
	2	↓	↓	↓	↓	2	0	1	3	2	~~25~~	30
	3	↓	↓	↓	↓	0	1	0	1	2	27	30
	4	1	↓	↓	↓	0	1	0	2	2	26	30
100	1	0	↓	↓	↓	2	2	2	6	0	24	30
	2	↓	↓	↓	↓	0	1	2	3	0	28	31
	3	↓	↓	↓	↓	0	0	1	1	0	28	29
	4	↓	↓	↓	↓	2	0	1	3	1	26	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	AM	A	KL	KL	KL	KL	KL	KL	KL	KL

Comments:

Reviewed by: JOL **Date reviewed:** May 25/16

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	14-5561-1206	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 May-16 16:22	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	01-1756-9548	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	28 Apr-16 16:40	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	05 May-16 10:45	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 18h	**Source:**	Campbel Lake	**Age:**	
Sample ID:	13-8345-2068	**Code:**	5275CDA4	**Client:**	Teck Coal
Sample Date:	27 Apr-16 07:58	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	33h (6 °C)	**Station:**	LC DCDS WS 2016-04-26 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	297288	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9083	0.8667	0.9667	0.02097	0.04194	4.62%	0.0%	109	120
6.25		4	0.85	0.8	0.9	0.02152	0.04303	5.06%	6.42%	102	120
12.5		4	0.8667	0.8333	0.9	0.01361	0.02722	3.14%	4.59%	104	120
25		4	0.9005	0.8387	0.9667	0.02616	0.05232	5.81%	0.86%	108	120
50		4	0.8583	0.8333	0.9	0.01596	0.03191	3.72%	5.51%	103	120
100		4	0.8839	0.8	0.9655	0.03461	0.06921	7.83%	2.7%	106	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9667	0.9	0.9	0.8667
6.25		0.8333	0.9	0.8	0.8667
12.5		0.8667	0.8667	0.9	0.8333
25		0.9667	0.8966	0.8387	0.9
50		0.8333	0.8333	0.9	0.8667
100		0.8	0.9032	0.9655	0.8667

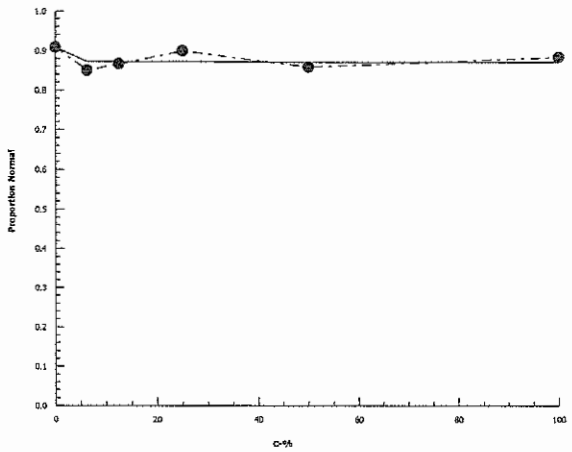
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	29/30	27/30	27/30	26/30
6.25		25/30	27/30	24/30	26/30
12.5		26/30	26/30	27/30	25/30
25		29/30	26/29	26/31	27/30
50		25/30	25/30	27/30	26/30
100		24/30	28/31	28/29	26/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	14-5561-1206	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 May-16 16:22	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: JCH 26/16

Rainbow Trout Embryo Summary Sheet

Client: Teck

Start Date/Time: Apr 28/16 @ 1640h

Work Order No.: 16474

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCS_WS-2016-04-25_N
Sample Date: Apr 27/16
Date Received: Apr 28/16
Sample Volume: 5X20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 042816
Source: Ted's Trout Farm (Campbell Lake)
Loading Density: 1.135 g/L

Number of male broodstock used: 4
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE 84
Stock Solution ID: 15503
Date Initiated: Apr 28/16
7-d EC50 (95% CL): 5.5 (5.0 - 5.8) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.1 - 8.0) mg/L SDS
Reference Toxicant CV (%): 40

Test Results:

	Sample ID		
	LC_LCS_WS_2016-04-25_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JOL

Date reviewed: May 25/16

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_LCS_WS_2016-04-25_N
Work Order #: 16474
Start Date & Time: April 28/16 @ 1640h
Stop Date & Time: May 5/16 @ 1100h
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	10.0	9.9	9.9	10.1	9.9	10.1	9.9	10.1	10.1	9.8	9.6	10.0	10.1	9.8
pH	7.0	7.0	7.2	7.0	7.1	7.0	6.9	7.0	7.1	6.7	6.6	6.9	7.0	7.0
Cond. (µS/cm)	29	29		27		28		29		27		26		30
Initials	YML	KL		AW		AD		KL		KL		KL		KL

6.25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	9.7	10.0	9.9	10.1	9.8	10.1	9.8	10.0	10.1	9.7	9.6	10.1	10.0	9.9
pH	7.4	7.2	7.2	7.2	7.3	7.3	7.4	7.2	7.2	6.8	7.3	7.5	7.4	7.3
Cond. (µS/cm)	69	60		59		60		64		60		59		61
Initials	KL	KL		AW		AD		KL		KL		KL		KL

25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	9.7	10.0	9.9	10.1	9.8	10.0	9.9	10.0	10.1	9.7	9.7	10.1	9.9	9.9
pH	7.7	7.6	7.8	7.6	7.7	7.7	7.7	7.5	7.6	7.1	7.4	7.9	7.7	7.6
Cond. (µS/cm)	164	176		164		168		188		186		175		180
Initials	KL	KL		AW		AD		KL		KL		KL		KL

100 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	15.0	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	15.0	15.0	15.0
DO (mg/L)	9.8	10.0	9.9	10.0	9.8	10.0	9.8	10.1	10.1	9.6	9.6	10.1	9.9	9.9
pH	8.2	8.2	8.5	8.2	8.3	8.3	8.2	8.2	8.2	7.7	7.7	8.2	8.1	8.2
Cond. (µS/cm)	538	526		524		525		526		541		524		527
Initials	KL	KL		AW		AD		KL		KL		KL		KL

Thermometer: Temp-3 **DO meter:** DO-1/3 **pH meter:** pH-1/3 **Conductivity meter:** C-1/3

	Control	100% (v/v)		
Hardness*	10	268		
Alkalinity*	5	156		

* mg/L as CaCO3

Analysts: YML, AWO, KL
Reviewed by: JBL
Date reviewed: May 25/16

Sample Description: Clear, colourless, some debris, no odour

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_LCS-WS-2016-04-25_N
Work Order #: 16474
Start Date & Time: April 28/16 @1640h
Stop Date & Time: May 5/16 @1100h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	1	2	1	4	0	26	30
	2	↓	↓	↓	0	0	0	1	1	1	28	30
	3	↓	↓	↓	1	0	1	3	5	0	25	30
	4	↓	↓	↓	0	1	1	1	3	0	27	30
6.25	1	↓	↓	↓	1	1	1	0	3	1	26	30
	2	↓	↓	↓	0	0	3	0	3	1	26	30
	3	↓	↓	↓	↓	0	0	0	0	0	30	30
	4	↓	↓	↓	↓	0	3	1	4	0	26	30
12.5	1	↓	↓	↓	↓	1	0	0	1	2	26	29
	2	↓	↓	↓	↓	0	1	0	1	0	29	30
	3	↓	↓	↓	↓	0	2	1	3	2	25	30
	4	↓	↓	↓	↓	0	3	0	3	1	26	30
25	1	↓	↓	↓	↓	0	4	2	6	1	23	30
	2	↓	↓	↓	↓	1	0	0	1	1	28	30
	3	↓	↓	↓	↓	1	2	0	3	0	27	30
	4	↓	↓	↓	↓	0	2	1	3	2	25	30
50	1	↓	↓	↓	↓	2	1	1	4	2	24	30
	2	↓	↓	↓	↓	1	0	0	1	2	27	30
	3	↓	↓	↓	↓	0	2	0	2	2	26	30
	4	↓	↓	↓	↓	2	2	1	5	1	24	30
100	1	↓	↓	↓	↓	2	1	0	3	1	26	30
	2	↓	↓	↓	↓	0	1	3	4	1	25	30
	3	↓	↓	↓	↓	1	4	2	7	0	23	30
	4	↓	↓	↓	2	~~3~~ 3	2	2	9	0	21	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	AS	A	KL	KL	KL	KL	KL	KL	KL	KL

Comments:

Reviewed by: JCL **Date reviewed:** May 25/16

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	08-6409-1543	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 16:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	12-6912-3480	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	28 Apr-16 16:40	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	05 May-16 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 18h	**Source:**	Campbel Lake	**Age:**	
Sample ID:	18-5443-1080	**Code:**	6E885F68	**Client:**	Teck Coal
Sample Date:	27 Apr-16 06:50	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	34h (6.6 °C)	**Station:**	LC_LC5_WS_2016-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1621035	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	39.97	N/A	101.6	2.502	0.9838	NA
EC10	86.1	6.998	N/A	1.161	NA	14.29
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.8833	0.8333	0.9333	0.02152	0.04303	4.87%	0.0%	106	120
6.25		4	0.9	0.8667	1	0.03333	0.06667	7.41%	-1.89%	108	120
12.5		4	0.8908	0.8333	0.9667	0.02839	0.05679	6.38%	-0.85%	106	119
25		4	0.8583	0.7667	0.9333	0.03696	0.07391	8.61%	2.83%	103	120
50		4	0.8417	0.8	0.9	0.025	0.05	5.94%	4.72%	101	120
100		4	0.7917	0.7	0.8667	0.03696	0.07391	9.34%	10.38%	95	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8667	0.9333	0.8333	0.9
6.25		0.8667	0.8667	1	0.8667
12.5		0.8966	0.9667	0.8333	0.8667
25		0.7667	0.9333	0.9	0.8333
50		0.8	0.9	0.8667	0.8
100		0.8667	0.8333	0.7667	0.7

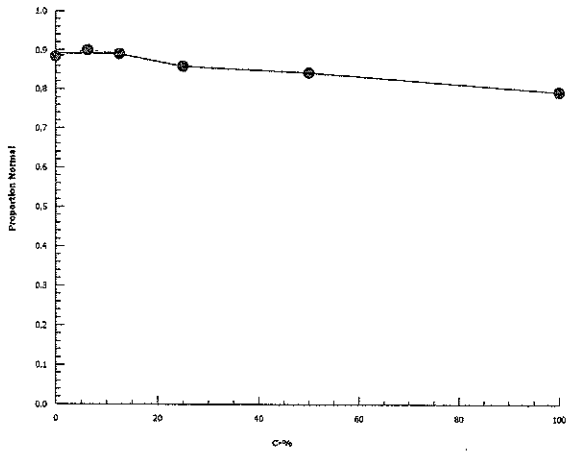
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	28/30	25/30	27/30
6.25		26/30	26/30	30/30	26/30
12.5		26/29	29/30	25/30	26/30
25		23/30	28/30	27/30	25/30
50		24/30	27/30	26/30	24/30
100		26/30	25/30	23/30	21/30

Salmonid Embryo Survival and Development Test | **Nautilus Environmental**

Analysis ID:	08-6409-1543	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 16:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Embryo Summary Sheet

Client: Teck

Start Date/Time: Apr 28 16 @ 1640h

Work Order No.: 16474

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_WTF-OUT_WS_20160427_N
Sample Date: Apr 27/16
Date Received: Apr 28/16
Sample Volume: 5X20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 042816
Source: Ted's Trout Farm (Campbell Lake)
Loading Density: 1.135 g/L

Number of male broodstock used: 4
Number of female broodstock used: 4

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE84
Stock Solution ID: 15503
Date Initiated: Apr 28/16
7-d EC50 (95% CL): 5.5 (5.0 - 5.8) mg/L SDS

Reference Toxicant Mean and Range: ~~24.1~~ 24.1 (2.1 - 8.0) mg/L SDS
Reference Toxicant CV (%): 40

Test Results:

	Sample ID		
	LC_WTF_OUT_WS_20160427_N		
EC25 % (v/v) (95% CL)	65.1 (38.3 - 80.5)		
EC50 % (v/v) (95% CL)	100 (93.8 - 100)		

Reviewed by: JGL

Date reviewed: May 25/16

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-WTF-OUT-WS-20160427-N
Work Order #: 16474
Start Date & Time: April 28, 2016 @1640h
Stop Date & Time: May 5, 2016 @1115h
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	10.0	9.9	9.8	10.1	9.9	10.1	9.9	10.1	10.0	9.9	9.2	10.0	9.7	9.7
pH	7.0	7.0	7.2	7.0	7.1	7.0	7.1	7.0	7.1	6.7	6.6	6.9	7.0	7.0
Cond. (µS/cm)	29	29		27		28		29		27		26		30
Initials	YML	KL		A		A		KL		KL		KL		KL

0.25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	9.5	10.0	9.8	10.2	9.9	10.1	9.7	10.1	10.0	9.6	9.3	10.0	9.7	9.8
pH	7.2	7.15	7.2	7.3	7.3	7.2	7.3	7.4	7.2	7.3	7.3	7.4	7.2	7.5
Cond. (µS/cm)	204	180		187		185		184		178		193		189
Initials	KL	KL		A		A		KL		KL		KL		

25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	14.5	15.0	15.0	15.0
DO (mg/L)	9.5	10.0	9.7	10.1	9.8	10.1	9.8	10.1	10.1	9.6	9.3	10.0	9.7	9.8
pH	7.4	7.40	7.6	7.5	7.6	7.5	7.6	7.8	7.4	7.4	7.6	7.6	7.8	7.9
Cond. (µS/cm)	567	638	672	594		602		606		676		605		615
Initials	KL	KL		A		A		KL		KL		KL		KL

100 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	14.5	15.0	15.0	15.0	15.0	15.0	15.0	15.0	15.0	14.5	15.0	15.0	15.0
DO (mg/L)	9.5	10.0	9.7	10.0	9.8	10.1	9.9	10.0	10.1	9.5	9.4	9.8	9.8	9.8
pH	7.5	7.6	7.9	8.0	8.1	7.9	8.0	8.02	7.9	7.9	8.0	7.6	8.3	8.5
Cond. (µS/cm)	1996	2010		2000		1997		2000		2050		1992		1951
Initials	KL	KL		A		A		KL		KL		KL		KL

@13.5

Thermometer: temp-3 **DO meter:** DO-1/3 **pH meter:** pH-1/3 **Conductivity meter:** C-1/3

	Control	100% (v/v)		
Hardness*	10	1040		
Alkalinity*	5	352		

* mg/L as CaCO3

Analysts: YML, AWD, KL
Reviewed by: JCa
Date reviewed: May 25/16

Sample Description: clear, colourless, some fine brown debris, hydrocarbon smell

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_WTF_OUT_WS_20160427_N
Work Order #: 16474
Start Date & Time: April 28, 2016 @ 1640h.
Stop Date & Time: May 5/16 @ 1115h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	1	~~2~~ 0 KL	1	2	2	26	30
	2	0			0	1	~~2~~ 1 KL	0	2	0	28	30
	3	0			0	0	~~3~~ 0 KL	1	1	0	29	30
	4	1			1	1	2	2	7	1	22	30
6.25	1	0			1	3	0	0	4	1	23	28
	2				1	0	4	1	6	0	~~24~~ 24 KL	30
	3				1	0	~~4~~ 2 KL	1	4	0	26	30
	4				0	0	0	2	2	0	25	~~30~~ 27 KL
12.5	1				0	0	1	0	1	2	27	30
	2				1	2	1	1	5	1	24	30
	3				0	1	3	1	5	3	22	30
	4				1	0	4	0	5	0	24	29
25	1				1	2	1	1	5	2	23	30
	2				1	3	2	0	6	0	23	29
	3				0	3	~~4~~ 5 KL	0	8	0	22	30
	4				1	1	0	1	3	1	26	30
50	1				4	1	3	1	9	0	21	30
	2				0	0	0	2	2	3	25	~~30~~ 30
	3				~~3~~ 3 KL	2	4	1	10	2	18	30
	4				0	1	2	1	4	2	25	31
100	1				0	8	0	2	10	6	14	30
	2				0	1	3	2	6	8	16	30
	3				2	7	0	9	18	5	10	33
	4				2	1	0	1	4	7	19	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	A	—	KL	KL	KL	KL	KL	KL	KL	KL

Comments:

Reviewed by: JGK
Date reviewed: May 25/16

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	00-7509-8675	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 16:51	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes
Batch ID:	15-7260-3829	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	28 Apr-16 16:40	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	05 May-16 11:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Campbel Lake	**Age:**	
Sample ID:	05-4497-8051	**Code:**	207BB483	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	32h (10.2 °C)	**Station:**	LC_WTF_OUT_WS_20160427_N		

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Gompertz [log(-log(1-P)=A+B*log(X)]	Control Threshold	0.125	Yes	No	No	Yes

Regression Summary

Iters	LL	AICc	BIC	Mu	Sigma	Adj R2	F Stat	Critical	P-Value	Decision(α:5%)
14	-367.3	741.8	744.1	2.161		0.6709	0.1148	3.16	0.9503	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	21.55	3.214	37.2	4.641	2.688	31.11
EC10	34.2	9.193	50.52	2.924	1.98	10.88
EC15	45.16	17.2	61.12	2.215	1.636	5.814
EC20	55.34	26.99	70.79	1.807	1.413	3.705
EC25	65.14	38.32	80.51	1.535	1.242	2.61
EC40	94.14	74.87	121.6	1.062	0.8223	1.336
EC50	114.5 >100	93.79	172.6 >100	0.8733	0.5794	1.066

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
Threshold	0.143	0.02302	0.09787	0.1881	6.212	<0.0001	Significant Parameter
Slope	3.589	1.035	1.561	5.617	3.468	0.0023	Significant Parameter
Intercept	-7.756	1.979	-11.63	-3.878	-3.92	0.0008	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	66.56597	66.56597	1	48.89	<0.0001	Significant
Lack of Fit	0.536611	0.178871	3	0.1148	0.9503	Non-Significant
Pure Error	28.05504	1.558613	18			
Residual	28.59165	1.361507	21			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF	28.59	32.67	0.1242	Non-Significant Heterogenity
	Likelihood Ratio GOF	29.77	32.67	0.0967	Non-Significant Heterogenity
Variances	Bartlett Equality of Variance	2.482	11.07	0.7792	Equal Variances
	Mod Levene Equality of Variance	0.5836	2.773	0.7123	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9634	0.9169	0.5102	Normal Distribution
	Anderson-Darling A2 Normality	0.2842	2.492	0.6604	Normal Distribution

Salmonid Embryo Survival and Development Test **Nautilus Environmental**

Analysis ID: 00-7509-8675 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.8.7
Analyzed: 12 May-16 16:51 **Analysis:** Linear Regression (MLE) **Official Results:** Yes

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.875	0.7333	0.9667	0.05159	0.1032	11.79%	0.0%	105	120
6.25		4	0.8535	0.8	0.9259	0.02785	0.05571	6.53%	2.46%	98	115
12.5		4	0.8152	0.7333	0.9	0.03449	0.06899	8.46%	6.83%	97	119
25		4	0.7899	0.7333	0.8667	0.02835	0.05669	7.18%	9.72%	94	119
50		4	0.7349	0.6	0.8333	0.0534	0.1068	14.53%	16.01%	89	121
100		4	0.4841	0.303	0.6333	0.06939	0.1388	28.67%	44.68%	59	123

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.8667	0.9333	0.9667	0.7333
6.25		0.8214	0.8	0.8667	0.9259
12.5		0.9	0.8	0.7333	0.8276
25		0.7667	0.7931	0.7333	0.8667
50		0.7	0.8333	0.6	0.8065
100		0.4667	0.5333	0.303	0.6333

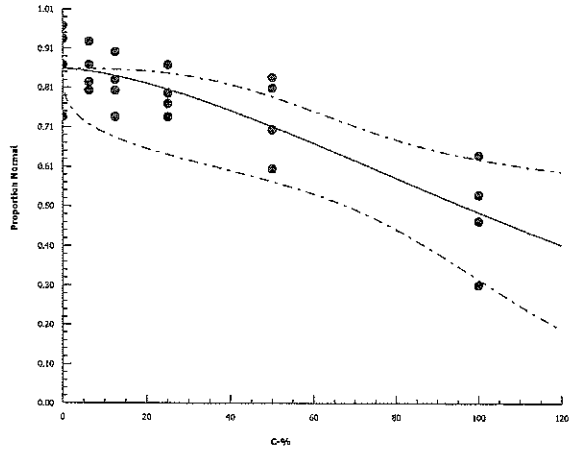
Proportion Normal Binomials

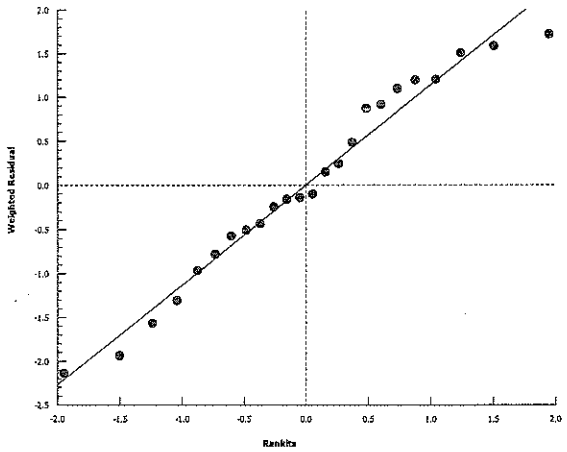
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	26/30	28/30	29/30	22/30
6.25		23/28	24/30	26/30	25/27
12.5		27/30	24/30	22/30	24/29
25		23/30	23/29	22/30	26/30
50		21/30	25/30	18/30	25/31
100		14/30	16/30	10/33	19/30

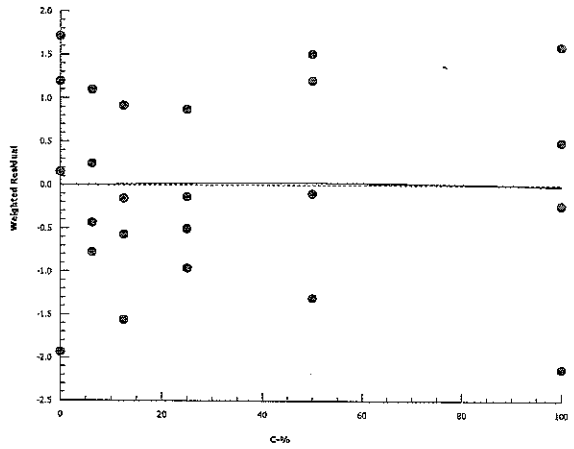
Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

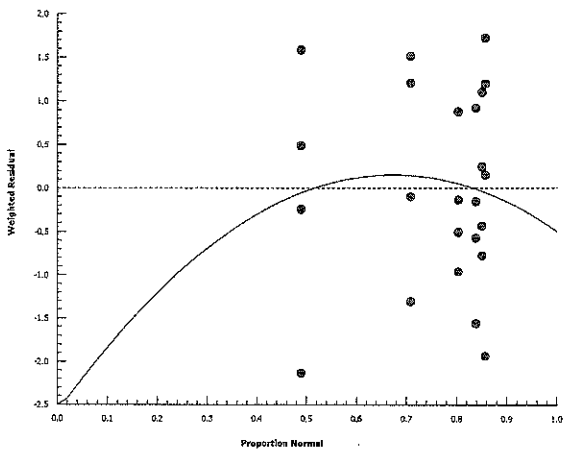
Analysis ID:	00-7509-8675	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 16:51	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes

Graphics — Log-Gompertz [log(-log(1-P)=A+B*log(X)]









 Analyst:_____ QA: JGU May 25/16

Client: Teck

W.O.#: 16475

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity (mg/L$CaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness (mg/L $CaCO_3$)	Technician
GH_ER2_WS_2016_	Apr 28/16	50	7.1	7.3	138		50	6.8	136	JS
04_27_N										
Dechlor	Apr 28/16	100	0.6	0.7	5		100	1.0	1~~0~~ KL	KL

Notes:

Reviewed by: JGh

Date Reviewed: May 24/16

Client: Teck

W.O.#: 16474

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Sample Date	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
LC_LCDSSLCC ~~WS 2016~~ KL	Apr 28/16	50	8.1	8.2	160		50	14.1	282	KL
LC_DC1	↓	↓	5.9	6.0	116		↓	6.2	124	↓
LC_FRDSDC			8.0 ~~7.9~~ KL	8.1	158			14.1	282	
LC_DCDS			4.4	4.5	86			5.2	104	
LC_CCS		↓	7.9	8.0	156		↓	13.4	268	
LC_WTF	↓	50	17.8	18.0	352		10①	10.4	1040	↓
Dechlor	Apr 28/16	~~50~~ KL 100	0.6	0.7	KL ~~40~~ 5		100 ~~50~~ KL	1.0	100 KL	KL

Notes: ① Sample diluted w/ DI up to 100mL

Reviewed by: JCh

Date Reviewed: May 24/16

APPENDIX C – ***Lemna minor*** **Toxicity Test Data**

Lemna minor Summary Sheet

Client: TECK
Work Order No.: 16482

Start Date: April 28 , 2016
Set up by: JW

Sample Information:

Sample ID: LC - LCDSSLCC - WS - 2016 - 04 - 29 - N
Sample Date: April 27 /16
Date Received: April 28 /16
Sample Volume: 8 x 20L

Test Organism Information:

Culture Date: 042016
Age of culture (Day 0): 8 days
>8X growth in APHA?: Y (45 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 132
Date Initiated: April 28/16

7-d No. of Fronds IC50 (95% CL): 4.2 (2.7 - 5.5) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.0 (3.2 - 5.0) g/L KCl CV (%): 12

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	> 97	> 97
IC50 %(v/v) (95% CL)	> 97	> 97

Reviewed by: JGL

Date reviewed: May 24/16

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck **Setup by:** JW

Sample ID: LC - LCDSS LCC - WS - 2016-04-25_N **Test Date:** April 28 , 2016

Work Order No.: 16482 **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 8 days **> 8X Growth? (Y/N):** Y (45 fronds)

Light Intensity Range: 4300 - 4900 lux **Date Measured:** April 28 , 2016

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.5	25.0	25.0	24.5	25,0	25.0	25.0
Initials	JW	JW	A>	A>	JW	MLT	JW	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	25.5	Aeration?: 20 min	25.5
DO (mg/L)	9.7	Nutrients added?[1]: Y	8.3
pH	8.1	→	8.0
Conductivity (µS)	557		1327

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (V/V)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	25.0	8.2	8.2	863
1.5	23.0	25.0	7.9	8.2	880
3.0	23.5	25.0	8.0	8.4	885
6.1	23.5	25.0	8.0	8.5	900
12.1	24.0	25.0	8.0	8.7	930
24.2	25.0	25.0	8.0	9.3	988
48.5	25.0	25.0	8.0	9.2	1104
97	25.5	25.0	8.0	8.9	1327
Initials	JW	JW	JW	KC	JW

Thermometer: # 6 **Cond. Meter:** C-2 **pH meter:** pH - 1 **Light meter:** Lit - L

Sample Description: clear, colorless, colourless, debris present

Comments: ~~Light meter - Lit - 1~~ JW

Reviewed: JGu **Date Reviewed:** May 24/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC_LCDSSLCC_WS_2016-04-25_N
Work Order #: 16482

Start Date: April 28 /16
Termination Date: May 5 /16
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	84										JW
	B	6	92										
	C	6	89										
	D	6	~~60~~	80 JW									
1.5	A	6	60										
	B	6	69										
	C	6	68										
	D	6	62										
3.0	A	6	79										
	B	6	85										
	C	6	80										
	D	6	87										
6.1	A	6	84										
	B	6	62										
	C	6	92										
	D	6	82										
12.1	A	6	79										
	B	6	70										
	C	6	85										
	D	6	70										
24.2	A	6	88										
	B	6	81										
	C	6	94										
	D	6	73										↓

Comments:

Reviewed by: JW

Date Reviewed: May 24/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LCDSSLCC-INS-2016-04-25-N
Work Order #: 16482

Start Date: April 28 /16
Termination Date: May 5 /16
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	95										JW
	B	6	76										
	C	6	80										
	D	6	96										
97	A	6	62										
	B	6	74			X							
	C	6	74										
	D	6	76			X							✓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGL

Date Reviewed: May 24/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_LCDSSLCC_WS_2016-04-25_N
WO #: 16482

Start Date: April 28 /16
Termination Date: May 5 /16
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCC Blue			
Control	A	1	1013.80	1019.89	JW / JW
	B	2	1041.61	1048.66	
	C	3	1002.15	1009.02	
	D	4	1003.83	1010.17	
1.5	A	5	1026.72	1030.95	
	B	6	1007.12	1011.75	
	C	7	1011.80	1017.01	
	D	8	1013.19	1017.14	
3.0	A	9	1016.28	1022.23	
	B	10	1010.93	1016.76	
	C	11	1009.56	1016.16	
	D	12	1012.26	1018.19	
6.1	A	13	994.52	1000.24	
	B	14	997.29	1001.60	
	C	15	1008.08	1014.59	
	D	16	1027.92	1033.97	
12.1	A	17	1024.76	1030.63	
	B	18	990.61	995.46	
	C	19	983.37	989.37	
	D	20	995.10	1000.15	
24.2	A	21	1035.46	1041.72	
	B	22	1030.09	1036.13	
	C	23	1025.30	1032.40	
	D	24	1016.52	1021.86	
48.5	A	25	1019.52	1026.53	
	B	26	999.62	1005.ϕ57 JW	
	C	27	1007.86	1013.38	
	D	28	1006.15	1013.27	✓

Comments: 10% Re-weigh : #5. 1030.96 #22. 1035.90
#14. 1001.57 #31. 1022.81

Reviewed by: JW

Date Reviewed: May 24/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC-LCDSSLCC-WS-2016-04-25-N
WO #: 16482

Start Date: April 28 / 16
Termination Date: May 5 / 16
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCC Blue			
	A	29	1011.21	1016.10	JW / JW
	B	30	1006.67	1011.91	
97	C	31	1017.62	1022.93	
	D	32	1015.65	1021.47	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JBL

Date Reviewed: May 24/16

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-2124-8247	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 9:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-1540-1191	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	28 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	12-8781-3119	**Code:**	4CC277FF	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:18	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	16h (8 °C)	**Station:**	LC LCDSSLCC WS 2016-04-25 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	615481	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.6654	0.2169	89.54	150.3	1.117	461
IC10	52.3	N/A	101.2	1.912	0.9886	NA
IC15	75.66	39.12	N/A	1.322	NA	2.556
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	80.25	74	86	2.658	5.315	6.62%	0.0%
1.5		4	58.75	54	63	2.213	4.425	7.53%	26.79%
3		4	76.75	73	81	1.931	3.862	5.03%	4.36%
6.1		4	74	56	86	6.377	12.75	17.24%	7.79%
12.1		4	70	64	79	3.674	7.348	10.5%	12.77%
24.2		4	78	67	88	4.528	9.055	11.61%	2.8%
48.5		4	80.75	70	90	5.121	10.24	12.68%	-0.62%
97		4	65.5	56	70	3.202	6.403	9.78%	18.38%

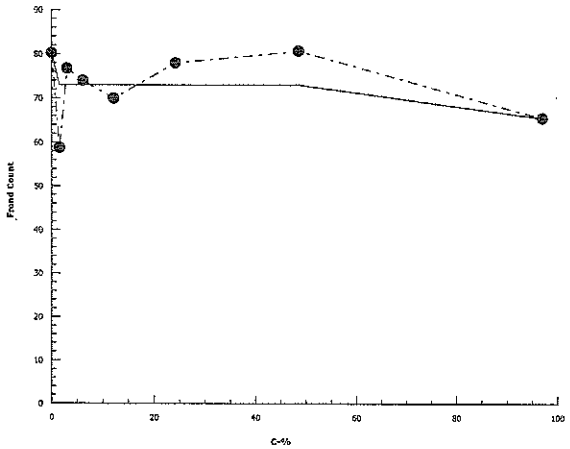
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	78	86	83	74
1.5		54	63	62	56
3		73	79	74	81
6.1		78	56	86	76
12.1		73	64	79	64
24.2		82	75	88	67
48.5		89	70	74	90
97		56	68	68	70

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	03-2124-8247	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 9:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: JW QA: JGL May 24/16

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-2435-4878	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 9:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-1540-1191	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	28 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	12-8781-3119	**Code:**	4CC277FF	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:18	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	16h (8 °C)	**Station:**	LC LCDSSLCC WS 2016-04-25 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1503641	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.4103	0.1945	1.252	243.8	79.85	514.2
IC10	0.9888	0.4093	109	101.1	0.917	244.3
IC15	58.9	N/A	N/A	1.698	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.588	6.09	7.05	0.2241	0.4481	6.8%	0.0%
1.5		4	4.505	3.95	5.21	0.2733	0.5466	12.13%	31.61%
3		4	6.077	5.83	6.6	0.1761	0.3523	5.8%	7.74%
6.1		4	5.647	4.31	6.51	0.4743	0.9487	16.8%	14.27%
12.1		4	5.443	4.85	6	0.2885	0.5769	10.6%	17.38%
24.2		4	6.185	5.34	7.1	0.3626	0.7252	11.73%	6.11%
48.5		4	6.4	5.52	7.12	0.3945	0.789	12.33%	2.85%
97		4	5.315	4.89	5.82	0.1918	0.3835	7.22%	19.32%

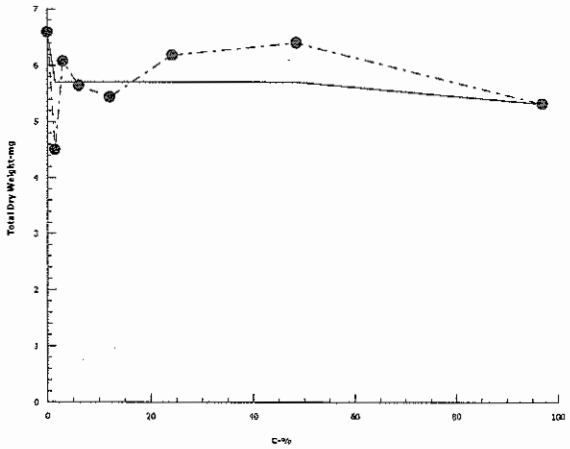
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.09	7.05	6.87	6.34
1.5		4.23	4.63	5.21	3.95
3		5.95	5.83	6.6	5.93
6.1		5.72	4.31	6.51	6.05
12.1		5.87	4.85	6	5.05
24.2		6.26	6.04	7.1	5.34
48.5		7.01	5.95	5.52	7.12
97		4.89	5.24	5.31	5.82

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	07-2435-4878	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 9:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: JW QA: JGL May 24/16

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 16482

Start Date: April 29, 2016
Set up by: JW

Sample Information:

Sample ID: LC-DCL_WS_2016_04-26_N
Sample Date: April 27 /16
Date Received: April 28 /16
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 042116
Age of culture (Day 0): 8 days
>8X growth in APHA?: Y (45 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 132
Date Initiated: April 28/16

7-d No. of Fronds IC50 (95% CL): 4.2 (2.7 - 5.5) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.0 (3.2 - 5.0) g/L KCl CV (%): 12

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	> 97	> 97
	IC50 %(v/v) (95% CL)	> 97	> 97

Reviewed by: JGL
Date reviewed: May 24/16

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck | **Setup by:** JW

Sample ID: LC - DC1 - WS - 2016 - 04 - 28 - N | **Test Date:** April 29 / 16

Work Order No.: 16482 | **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 8 days | **> 8X Growth? (Y/N):** Y (45 fronds)

Light Intensity Range: 4630 - 5440 lux | **Date Measured:** April 28 / 16

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.5	25.0	25.0	24.5	25.0	25.0	25.0	25.0
Initials	JW	A>	A>	JW	MLT	JW	JW	JW

Sample Characteristics:

	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	23.0
DO (mg/L)	9.6	Nutrients added?[1]: Y →	8.4
pH	8.0		8.0
Conductivity (µS)	224		1039

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (V/V)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	26.0	8.2	8.7	912
1.5	23.0	26.0	8.1	8.7	JW ~~921~~ 920
3.0	23.0	26.0	8.1	8.6	~~924~~ 921
6.1	23.0	26.0	8.1	8.7	~~932~~ 924
12.1	23.0	26.0	8.1	8.8	932
24.2	23.0	26.0	8.1	8.8	949
48.5	23.0	26.0	8.1	8.8	981
97	23.0	26.0	8.0	9.2	1039
Initials	JW	JW	JW	JW	JW

Thermometer: #6 **Cond. Meter:** C-3 **pH meter:** PH3 **Light meter:** Lit-1

Sample Description: Clear, colorless, odourless, some debris present.

Comments:

Reviewed: JW **Date Reviewed:** May 24/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-OCL-WS-2016-04-26-N
Work Order #: 16482

Start Date: April 29 /16
Termination Date: May 6 /16
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	70										JW
	B	6	82										
	C	6	71										
	D	6	79										
1.5	A	6	74										
	B	6	77										
	C	6	74										
	D	6	71										
3.0	A	6	64										
	B	6	65										
	C	6	81										
	D	6	67										
6.1	A	6	91										
	B	6	68										
	C	6	57										
	D	6	85										
12.1	A	6	76										
	B	6	67										
	C	6	63										
	D	6	65										
24.2	A	6	87										
	B	6	74										
	C	6	107										
	D	6	70										

Comments:

Reviewed by: JGH

Date Reviewed: May 24/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC_DCL_WS_2016-04-26_N
Work Order #: 16482

Start Date: April 29 /16
Termination Date: May 6 /16
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	77										JW
	B	6	84										↓
	C	6	71										
	D	6	92										
97	A	6	83										
	B	6	76										
	C	6	66										
	D	6	63										↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JW

Date Reviewed: May 24/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC-DC1-WS-2016-04-26-N
WO #: 16482

Start Date: April 29 /16
Termination Date: May 6 /16
Balance ID: Bal - 1

Concentration	Rep	Pan No	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DC1 Red			
Control	A	1	978.89	984.48	JW / JW
	B	2	978.54	985.25	
	C	3	964.13	969.78	
	D	4	999.75	1005.93	
1.5	A	5	1017.49	1023.33	
	B	6	1003.12	1009.41	
	C	7	1026.44	1032.05	
	D	8	1006.59	1012.81	
3.0	A	9	1023.02	1028.73	
	B	10	1012.59	1018.25	
	C	11	1020.98	1028.16	
	D	12	996.36	1001.80	
6.1	A	13	1033.26	1040.73	
	B	14	1026.26	1031.77	
	C	15	1011.86	1016.76	
	D	16	1014.40	1021.65	
12.1	A	17	996.11	1002.50	
	B	18	1000.00	1005.78	
	C	19	1024.58 ~~47~~ JW	1029.65	
	D	20	1019.34	1024.78	
24.2	A	21	1024.43	1030.77	
	B	22	1021.18	1027.66	
	C	23	997.09	1005.69	
	D	24	985.01	990.81	
48.5	A	25	1003.71	1009.85	
	B	26	1011.07	1017.96	
	C	27	1033.65	1039.49	
	D	28	980.21	987.12	↓

Comments: 10% Re-weigh : # 6. 1009.31 # 24 : 990.70
16. 1021.54 # 31. 1001.49

Reviewed by: JW Date Reviewed: May 24/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC-DCL-WS-2016-04-26-N
WO #: 16482

Start Date: April 29 / 16
Termination Date: May 6 / 16
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DCL Red			
	A	29	1005.62	1011.69	JW / JW
97	B	30	994.28	1000.53	↓
	C	31	996.10	1001.54	↓
	D	32	1005.40	1010.82	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JGL

Date Reviewed: May 24/16

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	21-0227-1789	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:19	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	18-5200-6809	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	00-8128-9240	**Code:**	4D86018	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:30	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (7.5 °C)	**Station:**	LC_DC1_WS_2016-04-26_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
5	-90.5	185.4	187.9		Yes	1.447	2.508	0.2383	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	10490000	N/A	N/A	0.0000009	NA	NA
IC10	21550000	N/A	N/A	0.0000004	NA	NA
IC15	33240000	N/A	N/A	0.0000003	NA	NA
IC20	45640000	N/A	N/A	0.0000002	NA	NA
IC25	58840000	N/A	N/A	0.0000001	NA	NA
IC40	10450000	N/A	N/A	0.0000000	NA	NA
IC50	14180000	N/A	N/A	0.0000000	NA	NA

JW

> 97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	68.47	2.357	63.85	73.09	29.05	<0.0001	Significant Parameter
D	1.42E+09	2.52E+15	-4.9E+15	4.94E+15	5.62E-07	1.0000	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0	0	1	0	1.0000	Non-Significant
Lack of Fit	894.5108	149.0851	6	1.447	0.2383	Non-Significant
Pure Error	2472.25	103.0104	24			
Residual	3366.761	112.2254	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	11.02	14.07	0.1379	Equal Variances
	Mod Levene Equality of Variance	2.385	2.423	0.0530	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9454	0.9338	0.1068	Normal Distribution
	Anderson-Darling A2 Normality	0.5102	2.492	0.2008	Normal Distribution

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	69.5	64	76	2.958	5.916	8.51%	0.0%
1.5		4	68	65	71	1.225	2.449	3.6%	2.16%
3		4	63.25	58	75	3.966	7.932	12.54%	8.99%
6.1		4	69.25	51	85	7.793	15.59	22.51%	0.36%
12.1		4	61.75	57	70	2.869	5.737	9.29%	11.15%
24.2		4	78.5	64	101	8.332	16.66	21.23%	-12.95%
48.5		4	75	65	86	4.528	9.055	12.07%	-7.91%
97		4	66	57	77	4.601	9.201	13.94%	5.04%

Analyst: JW QA: 24/16

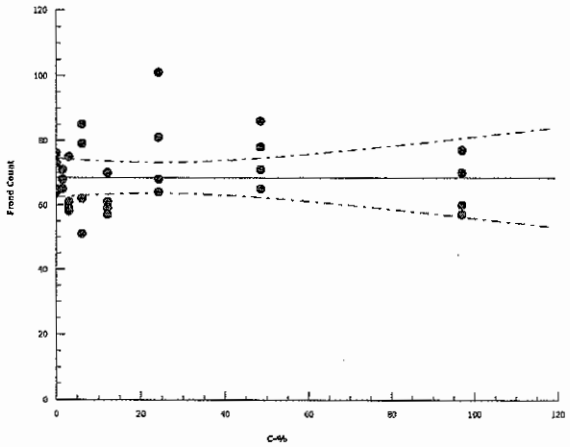
Lemna Growth Inhibition Test — **Nautilus Environmental**

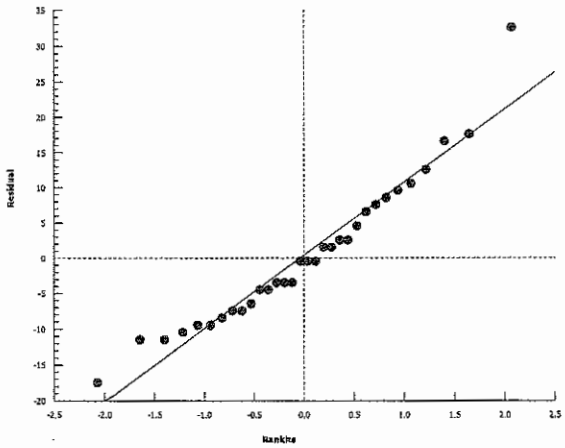
Analysis ID: 21-0227-1789 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 12 May-16 10:19 **Analysis:** Nonlinear Regression **Official Results:** Yes

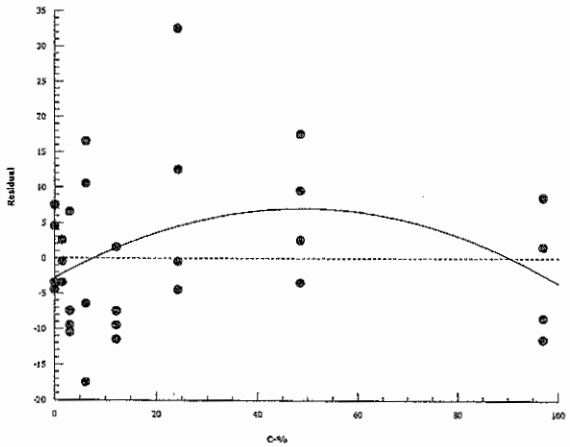
Frond Count Detail

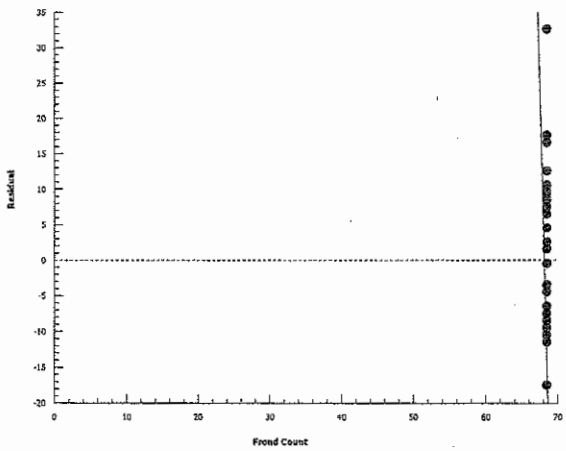
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	64	76	65	73
1.5		68	71	68	65
3		58	59	75	61
6.1		85	62	51	79
12.1		70	61	57	59
24.2		81	68	101	64
48.5		71	78	65	86
97		77	70	60	57

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	17-0050-9618	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:19	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	18-5200-6809	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	00-8128-9240	**Code:**	4D86018	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:30	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (7.5 °C)	**Station:**	LC_DC1_WS_2016-04-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	25.6%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.209	2.482	17.81	6	0.9196	CDF	Non-Significant Effect
		3	-0.8709	2.482	17.81	6	0.9856	CDF	Non-Significant Effect
		6.1	-0.03483	2.482	17.81	6	0.8835	CDF	Non-Significant Effect
		12.1	-1.08	2.482	17.81	6	0.9923	CDF	Non-Significant Effect
		24.2	1.254	2.482	17.81	6	0.3663	CDF	Non-Significant Effect
		48.5	0.7664	2.482	17.81	6	0.5899	CDF	Non-Significant Effect
		97	-0.4877	2.482	17.81	6	0.9587	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	888.4688	126.9241	7	1.232	0.3243	Non-Significant Effect
Error	2472.25	103.0104	24			
Total	3360.719		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.02	18.48	0.1379	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9816	0.9081	0.8436	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	69.5	60.09	78.91	69	64	76	2.958	8.51%	0.0%
1.5		4	68	64.1	71.9	68	65	71	1.225	3.6%	2.16%
3		4	63.25	50.63	75.87	60	58	75	3.966	12.54%	8.99%
6.1		4	69.25	44.45	94.05	70.5	51	85	7.793	22.51%	0.36%
12.1		4	61.75	52.62	70.88	60	57	70	2.869	9.29%	11.15%
24.2		4	78.5	51.98	105	74.5	64	101	8.332	21.23%	-12.95%
48.5		4	75	60.59	89.41	74.5	65	86	4.528	12.07%	-7.91%
97		4	66	51.36	80.64	65	57	77	4.601	13.94%	5.04%

Frond Count Detail

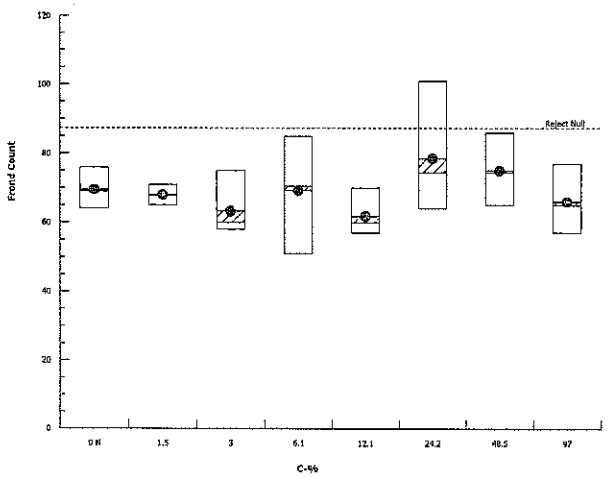
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	64	76	65	73
1.5		68	71	68	65
3		58	59	75	61
6.1		85	62	51	79
12.1		70	61	57	59
24.2		81	68	101	64
48.5		71	78	65	86
97		77	70	60	57

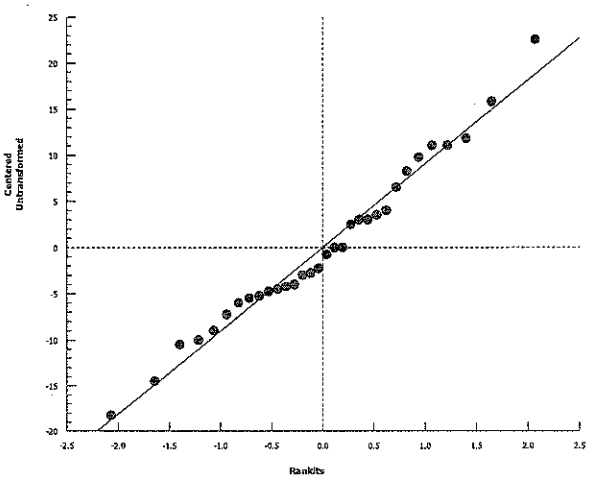
Analyst: JW QA: JGL May 24/1

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	17-0050-9618	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:19	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-5945-3571	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-5200-6809	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	00-8128-9240	**Code:**	4D86018	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:30	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (7.5 °C)	**Station:**	LC_DC1_WS_2016-04-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2114675	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	84.8	N/A	N/A	1.179	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.033	5.59	6.71	0.2619	0.5237	8.68%	0.0%
1.5		4	5.99	5.61	6.29	0.1606	0.3213	5.36%	0.7%
3		4	5.997	5.44	7.18	0.3985	0.797	13.29%	0.58%
6.1		4	6.283	4.9	7.47	0.636	1.272	20.25%	-4.14%
12.1		4	5.698	5.18	6.39	0.2615	0.523	9.18%	5.55%
24.2		4	6.805	5.8	8.6	0.616	1.232	18.11%	-12.81%
48.5		4	6.445	5.84	6.91	0.2698	0.5396	8.37%	-6.84%
97		4	5.795	5.42	6.25	0.214	0.4279	7.38%	3.94%

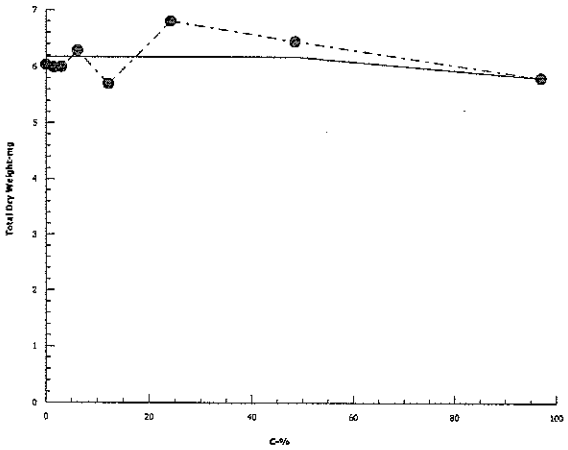
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5.59	6.71	5.65	6.18
1.5		5.84	6.29	5.61	6.22
3		5.71	5.66	7.18	5.44
6.1		7.47	5.51	4.9	7.25
12.1		6.39	5.78	5.18	5.44
24.2		6.34	6.48	8.6	5.8
48.5		6.14	6.89	5.84	6.91
97		6.07	6.25	5.44	5.42

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	04-5945-3571	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-6092-3710	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:25	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	18-5200-6809	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	00-8128-9240	**Code:**	4D86018	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:30	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (7.5 °C)	**Station:**	LC_DC1_WS_2016-04-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	22.8%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.07679	2.482	1.373	6	0.8931	CDF	Non-Significant Effect
		3	-0.06327	2.482	1.373	6	0.8901	CDF	Non-Significant Effect
		6.1	0.4519	2.482	1.373	6	0.7270	CDF	Non-Significant Effect
		12.1	-0.6055	2.482	1.373	6	0.9696	CDF	Non-Significant Effect
		24.2	1.396	2.482	1.373	6	0.3075	CDF	Non-Significant Effect
		48.5	0.7456	2.482	1.373	6	0.5995	CDF	Non-Significant Effect
		97	-0.4293	2.482	1.373	6	0.9522	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	3.695988	0.5279982	7	0.8627	0.5490	Non-Significant Effect
Error	14.68952	0.6120633	24			
Total	18.38551		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	9.121	18.48	0.2441	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9549	0.9081	0.1986	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	6.033	5.199	6.866	5.915	5.59	6.71	0.2619	8.68%	0.0%
1.5		4	5.99	5.479	6.501	6.03	5.61	6.29	0.1606	5.36%	0.7%
3		4	5.997	4.729	7.266	5.685	5.44	7.18	0.3985	13.29%	0.58%
6.1		4	6.283	4.258	8.307	6.38	4.9	7.47	0.636	20.25%	-4.14%
12.1		4	5.698	4.865	6.53	5.61	5.18	6.39	0.2615	9.18%	5.55%
24.2		4	6.805	4.845	8.765	6.41	5.8	8.6	0.616	18.11%	-12.81%
48.5		4	6.445	5.586	7.304	6.515	5.84	6.91	0.2698	8.37%	-6.84%
97		4	5.795	5.114	6.476	5.755	5.42	6.25	0.214	7.38%	3.94%

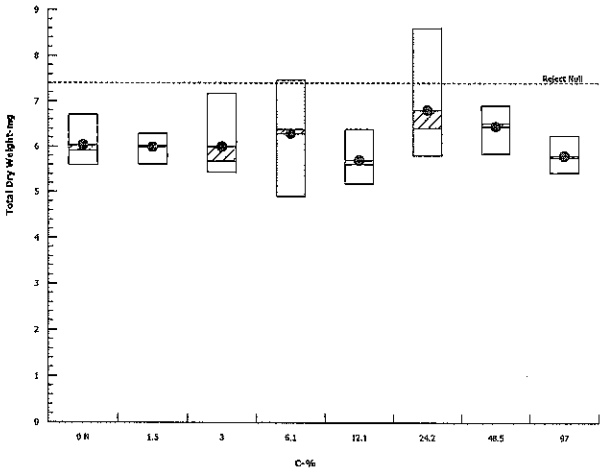
Total Dry Weight-mg Detail

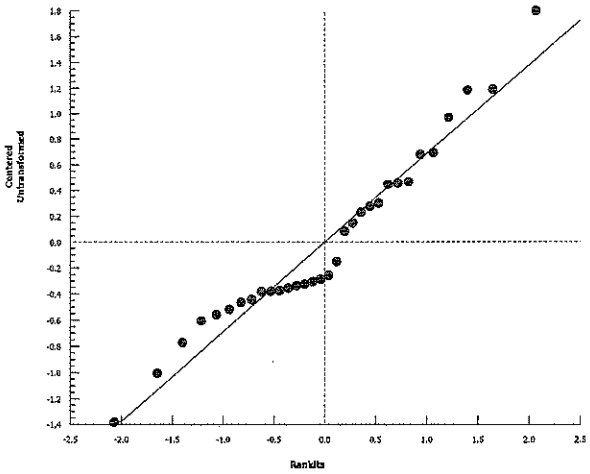
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5.59	6.71	5.65	6.18
1.5		5.84	6.29	5.61	6.22
3		5.71	5.66	7.18	5.44
6.1		7.47	5.51	4.9	7.25
12.1		6.39	5.78	5.18	5.44
24.2		6.34	6.48	8.6	5.8
48.5		6.14	6.89	5.84	6.91
97		6.07	6.25	5.44	5.42

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-6092-3710	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:25	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Lemna minor Summary Sheet

Client: TECK
Work Order No.: 16482

Start Date: April 29, 2016
Set up by: JW

Sample Information:

Sample ID: LC-FROSDC-WS-2016-04-26_N
Sample Date: April 27/16
Date Received: April 28/16
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 042016
Age of culture (Day 0): 9 days
>8X growth in APHA?: Y (45 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 132
Date Initiated: April 28/16

7-d No. of Fronds IC50 (95% CL): 4.2 (2.7 - 5.5) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.0 (3.2 - 5.0) g/L KCl CV (%): 12

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	> 97	> 97
	IC50 %(v/v) (95% CL)	> 97	> 97

Reviewed by: JGH
Date reviewed: May 24/16

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : TECK - ~~LCO~~ JW

Setup by: JW

Sample ID: LC - FRDSDC - WS - 2016 - 04 - 26 - N

Test Date: April 29, 2016

Work Order No.: 16482

Test Species: *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 9 days

> 8X Growth? (Y/N): Y (45 fronds)

Light Intensity Range: 4300 - 4900 lux

Date Measured: April 28, 2016

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.5	25.0	25.0	24.5	25.0	25.0	25.0	25.0
Initials	JW	[illegible]	[illegible]	JW	MLT	JW	JW	JW

Sample Characteristics:	Initial Water Quality			Adjusted Water Quality
Temperature (°C)	23.0	Aeration?:	20 min	23.0
DO (mg/L)	9.4	Nutrients added?[1]:	Y →	8.4
pH	8.0			8.0
Conductivity (µS)	540			1316

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration %(V/V)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	25.5	8.3	8.3	912
1.5	23.0	25.5	8.0	8.3	919
3.0	23.0	25.5	8.0	8.5	931
6.1	23.0	25.5	8.1	8.5	943
12.1	23.0	25.5	8.1	8.6	970
24.2	23.0	25.5	8.1	8.7	1020
48.5	23.0	25.5	8.1	8.8	1120
97	23.0	25.5	8.0	8.9	1316
Initials	JW	JW	JW	JW	JW

Thermometer: #6 Cond. Meter: C-4 pH meter: pH - 2 Light meter: LH - L

Sample Description: clear, colorless, odourless, some debris present,

Comments:

Reviewed: JBK

Date Reviewed: May 24/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - FRDSDC - WS - 2016 - 04 - 27 - N
Work Order #: 16482

Start Date: April 29 / 16
Termination Date: May 6 / 16
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	93										JW
	B	6	78										
	C	6	79										
	D	6	71										
1.5	A	6	72										
	B	6	73										
	C	6	66										
	D	6	71										
3.0	A	6	70										
	B	6	72										
	C	6	67										
	D	6	76										
6.1	A	6	78										
	B	6	84										
	C	6	76										
	D	6	77										
12.1	A	6	81										
	B	6	78										
	C	6	85										
	D	6	75										
24.2	A	6	71										
	B	6	85										
	C	6	73										
	D	6	56										↓

Comments:

Reviewed by: JGa

Date Reviewed: May 24/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - FRDSOC - WS - 2016 - 04 - 27 - N
Work Order #: 16482

Start Date: April 29 /16
Termination Date: May 6 /16
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	86										JW
	B	6	90										↓
	C	6	69										
	D	6	89										
97	A	6	72										
	B	6	67										
	C	6	78										
	D	6	70										↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGL

Date Reviewed: May 24/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_FROSDC_WS_2016-04-26_N
WO #: 16482

Start Date: April 29 /16
Termination Date: May 6 /16
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DSDC green			
Control	A	1	1015.08	1021.39	JW / JW
	B	2	1021.46	1026.84	
	C	3	995.18	1001.62	
	D	4	1004.38	1009.23	
1.5	A	5	1011.75	1016.54	
	B	6	992.~~38~~ 34 JW	997.89	
	C	7	995.33	1001.06	
	D	8	987.60	993.12	
3.0	A	9	1005.49	1010.95	
	B	10	1022.45	1027.84	
	C	11	1006.50	1011.08	
	D	12	1017.54	1023.09	
6.1	A	13	1008.39	1014.14	
	B	14	1014.29	1020.73	
	C	15	1010.58	1017.05	
	D	16	1011.76	1017.82	
12.1	A	17	1021.70	1026.68	
	B	18	1020.16	1026.37	
	C	19	988.30	994.54	
	D	20	1014.56	1020.52	
24.2	A	21	1025.34	1030.67	
	B	22	1011.95	1018.23	
	C	23	1025.76	1031.38	
	D	24	1007.45	1011.99	
48.5	A	25	1007.56	1013.29	
	B	26	1010.04	1016.37	
	C	27	996.01	1001.48	
	D	28	996.35	1002.80	↓

Comments: 10 % Re-weigh : # 1. 1021.32 # 27. 1001.36
11. 1011.02 # 32. 1021.39

Reviewed by: JW

Date Reviewed: May 24/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_FRDSDC_WS_2016-04-26_N
WO #: 16482

Start Date: April 29 / 16
Termination Date: May 6 / 16
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DSDC green			
	A	29	1012.61	1018.80	JW / JW
	B	30	1010.04	1015.68	
97	C	31	1033.04	1038.70	
	D	32	1015.43	1021.55	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JW

Date Reviewed: May 24/16

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	21-1258-2328	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 9:46	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-3504-4440	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	9d
Sample ID:	07-5438-7274	**Code:**	2CF7094A	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:04	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	39h (8 °C)	**Station:**	LC FRDSDC WS 2016-04-26 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	780566	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	1.16	N/A	N/A	86.19	NA	NA
IC10	80.87	N/A	N/A	1.237	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	74.25	65	87	4.608	9.215	12.41%	0.0%
1.5		4	64.5	60	67	1.555	3.109	4.82%	13.13%
3		4	65.25	61	70	1.887	3.775	5.79%	12.12%
6.1		4	72.75	70	78	1.797	3.594	4.94%	2.02%
12.1		4	73.75	69	79	2.136	4.272	5.79%	0.67%
24.2		4	65.25	50	79	5.949	11.9	18.24%	12.12%
48.5		4	77.5	63	84	4.907	9.815	12.66%	-4.38%
97		4	65.75	61	72	2.323	4.646	7.07%	11.45%

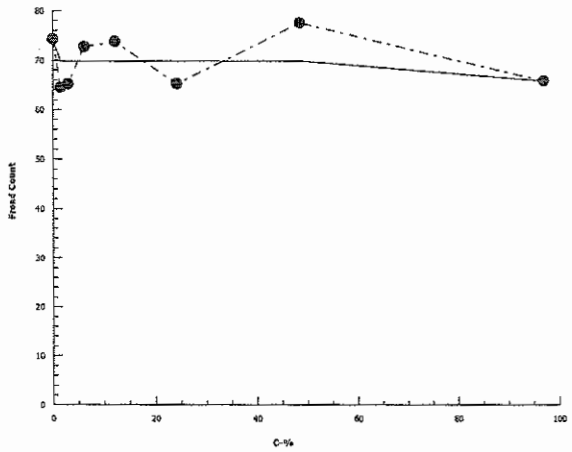
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	87	72	73	65
1.5		66	67	60	65
3		64	66	61	70
6.1		72	78	70	71
12.1		75	72	79	69
24.2		65	79	67	50
48.5		80	84	63	83
97		66	61	72	64

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	21-1258-2328	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 9:46	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: JW QA: JGL May 24/16

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-8201-6297	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 9:56	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-3504-4440	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	9d
Sample ID:	07-5438-7274	**Code:**	2CF7094A	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:04	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	39h (8 °C)	**Station:**	LC FRDSDC WS 2016-04-26 N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
6	2.809	-1.204	1.314		Yes	1.86	2.508	0.1295	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	1658000	N/A	N/A	0.0000603	NA	NA
IC10	3407000	N/A	N/A	0.0000293	NA	NA
IC15	5255000	N/A	N/A	0.0000190	NA	NA
IC20	7215000	N/A	N/A	0.0000138	NA	NA
IC25	9302000	N/A	N/A	0.0000107	NA	NA
IC40	16520000	N/A	N/A	0.0000060	NA	NA
IC50	22410000	N/A	N/A	0.0000044	NA	NA

JW

> 97 % (N/N)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	5.649	0.1277	5.399	5.899	44.24	<0.0001	Significant Parameter
D	22410000	4.14E+11	-8.1E+11	8.11E+11	5.42E-05	1.0000	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0	0	1	0	1.0000	Non-Significant
Lack of Fit	3.13529	0.522548	6	1.86	0.1295	Non-Significant
Pure Error	6.741494	0.280896	24			
Residual	9.876784	0.329226	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	4.16	14.07	0.7612	Equal Variances
	Mod Levene Equality of Variance	0.8016	2.423	0.5939	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9345	0.9338	0.0523	Normal Distribution
	Anderson-Darling A2 Normality	0.6651	2.492	0.0827	Normal Distribution

Total Dry Weight-mg Summary

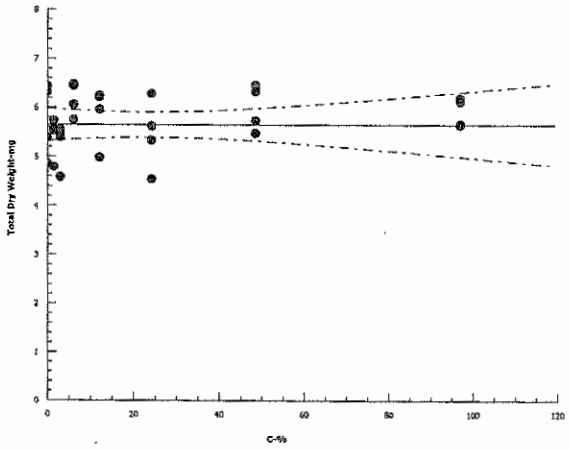
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.745	4.85	6.44	0.3804	0.7608	13.24%	0.0%
1.5		4	5.397	4.79	5.73	0.2077	0.4155	7.7%	6.05%
3		4	5.245	4.58	5.55	0.2241	0.4481	8.54%	8.7%
6.1		4	6.18	5.75	6.47	0.171	0.342	5.54%	-7.57%
12.1		4	5.848	4.98	6.24	0.2959	0.5918	10.12%	-1.79%
24.2		4	5.443	4.54	6.28	0.3606	0.7211	13.25%	5.27%
48.5		4	5.995	5.47	6.45	0.2354	0.4709	7.85%	-4.35%
97		4	5.902	5.64	6.19	0.1465	0.2931	4.97%	-2.74%

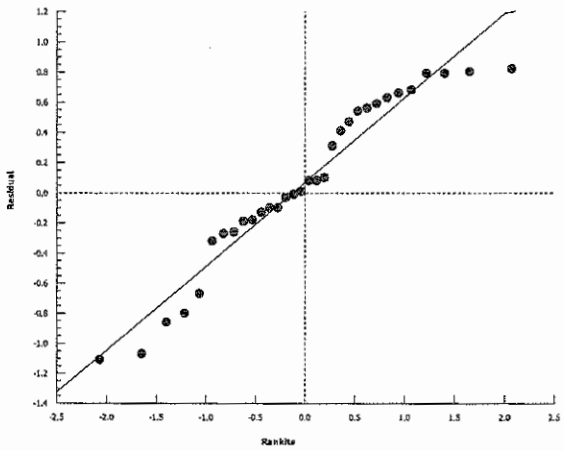
Analysis ID:	03-8201-6297	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 9:56	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

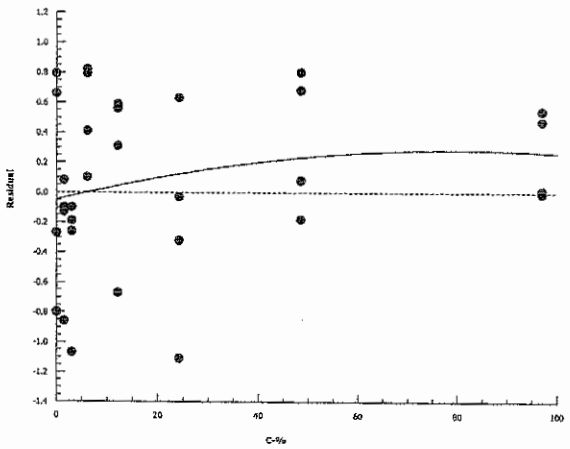
Total Dry Weight-mg Detail

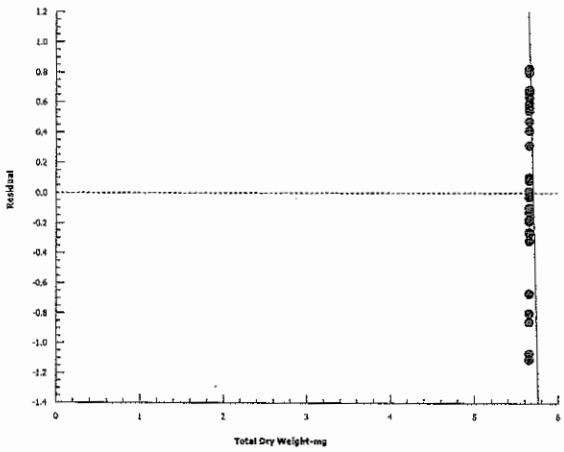
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.31	5.38	6.44	4.85
1.5		4.79	5.55	5.73	5.52
3		5.46	5.39	4.58	5.55
6.1		5.75	6.44	6.47	6.06
12.1		4.98	6.21	6.24	5.96
24.2		5.33	6.28	5.62	4.54
48.5		5.73	6.33	5.47	6.45
97		6.19	5.64	5.66	6.12

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-4526-3672	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	07-3504-4440	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	9d
Sample ID:	07-5438-7274	**Code:**	2CF7094A	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:04	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	39h (8 °C)	**Station:**	LC FRDSDC WS 2016-04-26 N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	16.2%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.9272	2.482	0.930	6	0.9878	CDF	Non-Significant Effect
		3	-1.334	2.482	0.930	6	0.9966	CDF	Non-Significant Effect
		6.1	1.161	2.482	0.930	6	0.4073	CDF	Non-Significant Effect
		12.1	0.2736	2.482	0.930	6	0.7936	CDF	Non-Significant Effect
		24.2	-0.8071	2.482	0.930	6	0.9826	CDF	Non-Significant Effect
		48.5	0.6671	2.482	0.930	6	0.6352	CDF	Non-Significant Effect
		97	0.4203	2.482	0.930	6	0.7396	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2.976109	0.4251584	7	1.514	0.2101	Non-Significant Effect
Error	6.741494	0.2808956	24			
Total	9.717604		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.16	18.48	0.7612	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9424	0.9081	0.0878	Normal Distribution

Total Dry Weight-mg Summary

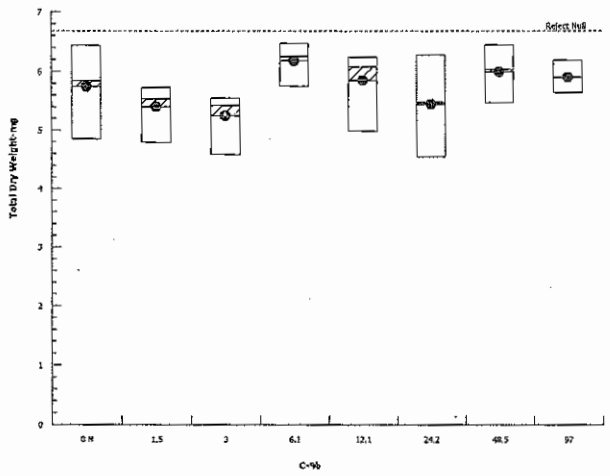
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	5.745	4.534	6.956	5.845	4.85	6.44	0.3804	13.24%	0.0%
1.5		4	5.397	4.736	6.059	5.535	4.79	5.73	0.2077	7.7%	6.05%
3		4	5.245	4.532	5.958	5.425	4.58	5.55	0.2241	8.54%	8.7%
6.1		4	6.18	5.636	6.724	6.25	5.75	6.47	0.171	5.54%	-7.57%
12.1		4	5.848	4.906	6.789	6.085	4.98	6.24	0.2959	10.12%	-1.79%
24.2		4	5.443	4.295	6.59	5.475	4.54	6.28	0.3606	13.25%	5.27%
48.5		4	5.995	5.246	6.744	6.03	5.47	6.45	0.2354	7.85%	-4.35%
97		4	5.902	5.436	6.369	5.89	5.64	6.19	0.1465	4.97%	-2.74%

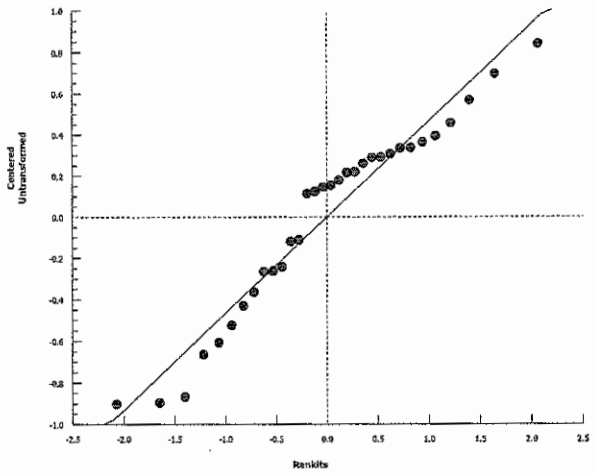
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.31	5.38	6.44	4.85
1.5		4.79	5.55	5.73	5.52
3		5.46	5.39	4.58	5.55
6.1		5.75	6.44	6.47	6.06
12.1		4.98	6.21	6.24	5.96
24.2		5.33	6.28	5.62	4.54
48.5		5.73	6.33	5.47	6.45
97		6.19	5.64	5.66	6.12

Analysis ID:	07-4526-3672	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:00	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Lemna minor Summary Sheet

Client: TECK
Work Order No.: 16482

Start Date: April 29, 2016
Set up by: JW

Sample Information:

Sample ID: LC - OCDS - WS - 2016-04-26_N
Sample Date: April 27 /16
Date Received: April 28 /16
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 042116
Age of culture (Day 0): 8 days
>8X growth in APHA?: Y (45 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 132
Date Initiated: April 28/16

7-d No. of Fronds IC50 (95% CL): 4.2 (2.7 - 5.5) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.0 (3.2 - 5.0) g/L KCl CV (%): 12

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	>97	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JGh

Date reviewed: May 24/16

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck | **Setup by:** JW

Sample ID: LC - DCDS - WS - 2016 - 04 - 26 - N | **Test Date:** April 29 / 16

Work Order No.: 16482 | **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 8 days | **> 8X Growth? (Y/N):** Y (45 fronds)

Light Intensity Range: 4630 - 5440 lux | **Date Measured:** April 28 / 16

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.5	25.0	25.0	24.5	25.0	25.0	25.0	25.0
Initials	JW	AD	AD	JW	MLT	JW	JW	JW

Sample Characteristics: Initial Water Quality

Temperature (°C)	23.0
DO (mg/L)	9.7
pH	7.9
Conductivity (µS)	188

Aeration?: 20 min

Nutrients added?[1]: Y

Adjusted Water Quality

	23.0
	8.1
→	8.0
	1003

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	25.5	8.2	8.5	912
1.5	23.0	25.5	8.1	8.8	913
3.0	23.0	25.5	8.1	8.9	917
6.1	23.0	25.5	8.1	8.9	921
12.1	23.0	25.5	8.1	8.9	927
24.2	23.0	25.5	8.1	8.8	941
48.5	23.0	25.5	8.1	9.0	966
97	23.0	25.5	8.0	9.1	1003
Initials	JW	JW	JW	JW	JW

Thermometer: #6 **Cond. Meter:** C-3 **pH meter:** PH-3 **Light meter:** Lit - 1

Sample Description: clear, colorless, colourless, some debris present.

Comments:

Reviewed: JW **Date Reviewed:** May 24/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC_DCDS_WS_2016-04-26_N
Work Order #: 16482

Start Date: April 29 /16
Termination Date: May 6 /16
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	86										JW
	B	6	87										
	C	6	80										
	D	6	65										
1.5	A	6	76										
	B	6	79										
	C	6	75										
	D	6	77										
3.0	A	6	101		X								
	B	6	108		X								
	C	6	83		X								
	D	6	80		X								
6.1	A	6	89		X								
	B	6	111		X								
	C	6	52			X						Plants have 2 fronds	
	D	6	80									^most	
12.1	A	6	73										
	B	6	93		X	X							
	C	6	83										
	D	6	69			X							
24.2	A	6	98										
	B	6	112										
	C	6	77										
	D	6	88										↓

Comments:

Reviewed by: JW

Date Reviewed: May 24/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC_DCDS_WS_2016-04-26_N
Work Order #: 16482

Start Date: April 29 /16
Termination Date: May 6 /16
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	86										JW
	B	6	103										
	C	6	82										
	D	6	86										
97	A	6	93										
	B	6	96										
	C	6	85										
	D	6	86										↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
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	B												
	C												
	D												

Comments:

Reviewed by: JGu

Date Reviewed: May 24/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_DCDS_WS_2016-04-26_N
WO #: 16482

Start Date: April 29 /16
Termination Date: May 6 /16
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DCDS Purple			
Control	A	1	1010.04	1017.90	JW / JW
	B	2	988.80	995.93	
	C	3	1012.04	1019.06	
	D	4	1012.72	1017.87	
1.5	A	5	1002.33	JW ~~1016.22~~ 1009.20	
	B	6	1009.95	↓ ~~1009.20~~ 1016.22	
	C	7	1006.23	1011.65	
	D	8	1014.92	1021.50	
3.0	A	9	1005.57	1014.17	
	B	10	998.02	1008.19	
	C	11	1005.98	1013.24	
	D	12	1005.30	1013.28	
6.1	A	13	1005.17	1013.24	
	B	14	1005.53	1015.16	
	C	15	1003.50	1006.90	
	D	16	983.30	990.57	
12.1	A	17	1008.91	1014.94	
	B	18	1021.19	1029.56	
	C	19	1012.85	1019.71	
	D	20	1026.19	1031.72	
24.2	A	21	1007.22	1015.11	
	B	22	1032.42	1041.39	
	C	23	1025.09	1031.43	
	D	24	1013.02	1020.37	
48.5	A	25	1009.25	1016.30	
	B	26	1005.26	1013.89	
	C	27	999.64	1006.10	
	D	28	997.52	1004.67	↓

Comments: 10% Re-weigh : # L. 1017.83 # 25. 1016.13
15. 1006.83 # 32. 965.36

Reviewed by: JGh Date Reviewed: May 24/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_DCDS_WS_2016-04-26_N
WO #: 16482

Start Date: April 29 / 16
Termination Date: May 6 / 16
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		DCDS Purple			
	A	29	992.64	1000.87	JW / JW
	B	30	979.34	987.099 JW	
97	C	31	1000.27	1007.60	
	D	32	957.70	965.63	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JGa

Date Reviewed: May 24/16

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	18-3890-5306	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-5200-6809	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	13-8345-2068	**Code:**	5275CDA4	**Client:**	Teck Coal
Sample Date:	27 Apr-16 07:58	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (6 °C)	**Station:**	LC DCDS WS 2016-04-26 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1757853	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	73.5	59	81	5.074	10.15	13.81%	0.0%
1.5		4	70.75	69	73	0.8539	1.708	2.41%	3.74%
3		4	87	74	102	6.819	13.64	15.68%	-18.37%
6.1		4	77	46	105	12.21	24.43	31.72%	-4.76%
12.1		4	73.5	63	87	5.377	10.75	14.63%	0.0%
24.2		4	87.75	71	106	7.443	14.89	16.96%	-19.39%
48.5		4	83.25	76	97	4.679	9.359	11.24%	-13.27%
97		4	84	79	90	2.677	5.354	6.37%	-14.29%

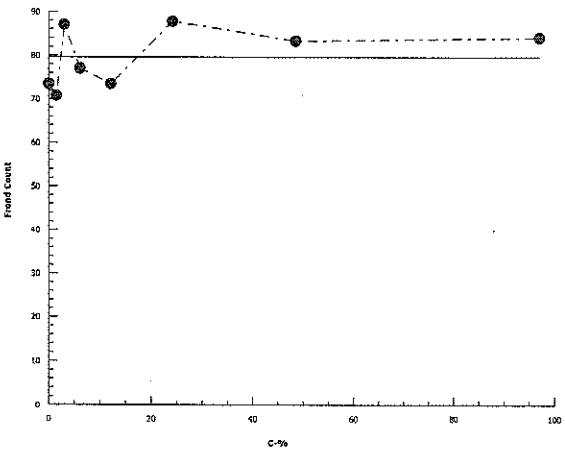
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	80	81	74	59
1.5		70	73	69	71
3		95	102	77	74
6.1		83	105	46	74
12.1		67	87	77	63
24.2		92	106	71	82
48.5		80	97	76	80
97		87	90	79	80

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	18-3890-5306	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: JW QA: JGu May 24/1

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-0174-0340	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:36	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	18-5200-6809	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	13-8345-2068	**Code:**	5275CDA4	**Client:**	Teck Coal
Sample Date:	27 Apr-16 07:58	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (6 °C)	**Station:**	LC DCDS WS 2016-04-26 N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	30.9%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.3003	2.482	22.73	6	0.9348	CDF	Non-Significant Effect
		3	1.474	2.482	22.73	6	0.2776	CDF	Non-Significant Effect
		6.1	0.3822	2.482	22.73	6	0.7543	CDF	Non-Significant Effect
		12.1	0	2.482	22.73	6	0.8750	CDF	Non-Significant Effect
		24.2	1.556	2.482	22.73	6	0.2479	CDF	Non-Significant Effect
		48.5	1.065	2.482	22.73	6	0.4510	CDF	Non-Significant Effect
		97	1.146	2.482	22.73	6	0.4137	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1253.469	179.067	7	1.067	0.4136	Non-Significant Effect
Error	4026.25	167.7604	24			
Total	5279.719		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	15.14	18.48	0.0342	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9827	0.9081	0.8742	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	73.5	57.35	89.65	77	59	81	5.074	13.81%	0.0%
1.5		4	70.75	68.03	73.47	70.5	69	73	0.8539	2.41%	3.74%
3		4	87	65.3	108.7	86	74	102	6.819	15.68%	-18.37%
6.1		4	77	38.13	115.9	78.5	46	105	12.21	31.72%	-4.76%
12.1		4	73.5	56.39	90.61	72	63	87	5.377	14.63%	0.0%
24.2		4	87.75	64.06	111.4	87	71	106	7.443	16.96%	-19.39%
48.5		4	83.25	68.36	98.14	80	76	97	4.679	11.24%	-13.27%
97		4	84	75.48	92.52	83.5	79	90	2.677	6.37%	-14.29%

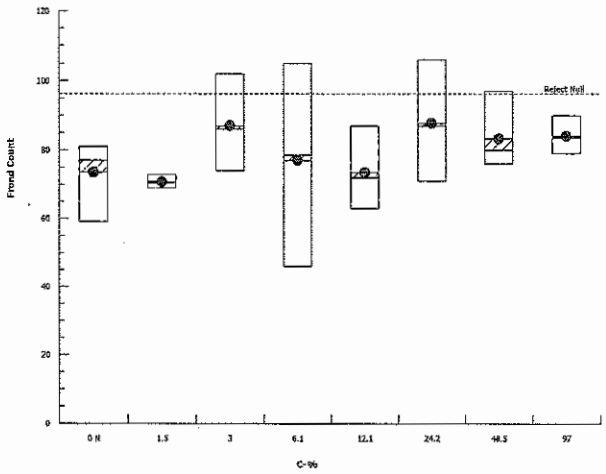
Frond Count Detail

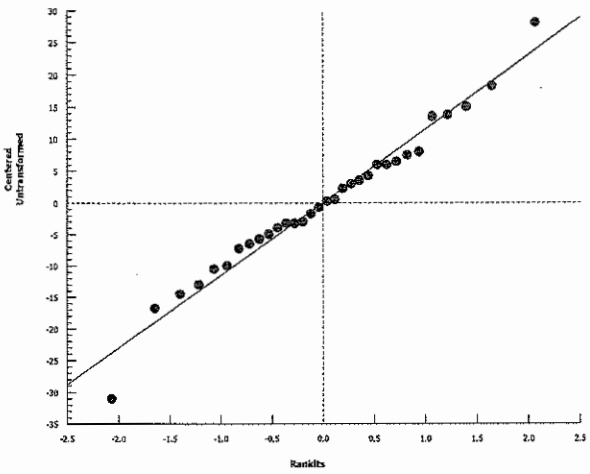
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	80	81	74	59
1.5		70	73	69	71
3		95	102	77	74
6.1		83	105	46	74
12.1		67	87	77	63
24.2		92	106	71	82
48.5		80	97	76	80
97		87	90	79	80

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	10-0174-0340	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:36	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-8685-7462	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:43	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-5200-6809	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	13-8345-2068	**Code:**	5275CDA4	**Client:**	Teck Coal
Sample Date:	27 Apr-16 07:58	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (6 °C)	**Station:**	LC DCDS WS 2016-04-26 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1098212	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.79	5.15	7.86	0.5776	1.155	17.01%	0.0%
1.5		4	6.285	5.42	6.87	0.3133	0.6265	9.97%	7.44%
3		4	8.503	7.26	10.17	0.6196	1.239	14.57%	-25.22%
6.1		4	7.092	3.4	9.63	1.325	2.65	37.36%	-4.46%
12.1		4	6.698	5.53	8.37	0.6213	1.243	18.55%	1.36%
24.2		4	7.638	6.34	8.97	0.5481	1.096	14.35%	-12.48%
48.5		4	7.322	6.46	8.63	0.4617	0.9233	12.61%	-7.84%
97		4	8.035	7.33	8.65	0.2775	0.5551	6.91%	-18.33%

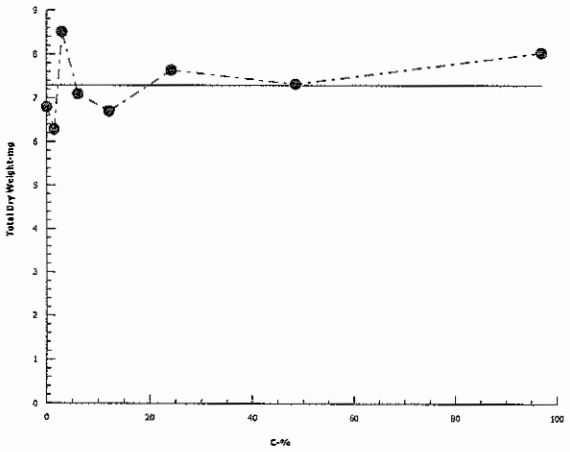
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.86	7.13	7.02	5.15
1.5		6.87	6.27	5.42	6.58
3		8.6	10.17	7.26	7.98
6.1		8.07	9.63	3.4	7.27
12.1		6.03	8.37	6.86	5.53
24.2		7.89	8.97	6.34	7.35
48.5		7.05	8.63	6.46	7.15
97		8.23	8.65	7.33	7.93

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-8685-7462	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:43	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: JW QA: JGK May 24/16

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-0366-2053	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:42	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	18-5200-6809	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	13-8345-2068	**Code:**	5275CDA4	**Client:**	Teck Coal
Sample Date:	27 Apr-16 07:58	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	40h (6 °C)	**Station:**	LC DCDS WS 2016-04-26 N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	34.4%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.5363	2.482	2.337	6	0.9636	CDF	Non-Significant Effect
		3	1.818	2.482	2.337	6	0.1668	CDF	Non-Significant Effect
		6.1	0.3212	2.482	2.337	6	0.7768	CDF	Non-Significant Effect
		12.1	-0.09821	2.482	2.337	6	0.8978	CDF	Non-Significant Effect
		24.2	0.9	2.482	2.337	6	0.5277	CDF	Non-Significant Effect
		48.5	0.5654	2.482	2.337	6	0.6799	CDF	Non-Significant Effect
		97	1.322	2.482	2.337	6	0.3376	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	15.187	2.169571	7	1.223	0.3287	Non-Significant Effect
Error	42.56688	1.77362	24			
Total	57.75388		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	9.525	18.48	0.2171	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9569	0.9081	0.2252	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	6.79	4.952	8.628	7.075	5.15	7.86	0.5776	17.01%	0.0%
1.5		4	6.285	5.288	7.282	6.425	5.42	6.87	0.3133	9.97%	7.44%
3		4	8.503	6.531	10.47	8.29	7.26	10.17	0.6196	14.57%	-25.22%
6.1		4	7.092	2.877	11.31	7.67	3.4	9.63	1.325	37.36%	-4.46%
12.1		4	6.698	4.72	8.675	6.445	5.53	8.37	0.6213	18.55%	1.36%
24.2		4	7.638	5.893	9.382	7.62	6.34	8.97	0.5481	14.35%	-12.48%
48.5		4	7.322	5.853	8.792	7.1	6.46	8.63	0.4617	12.61%	-7.84%
97		4	8.035	7.152	8.918	8.08	7.33	8.65	0.2775	6.91%	-18.33%

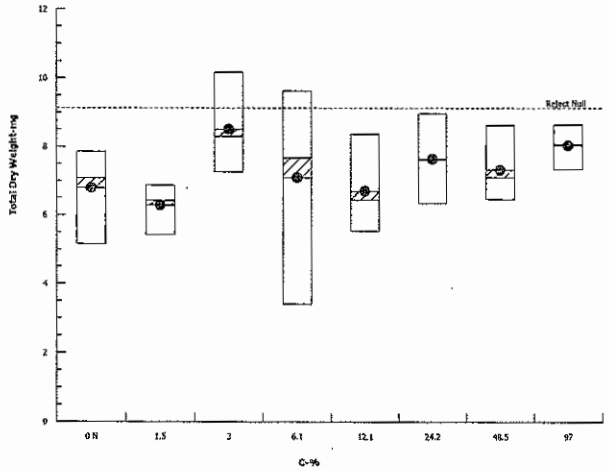
Total Dry Weight-mg Detail

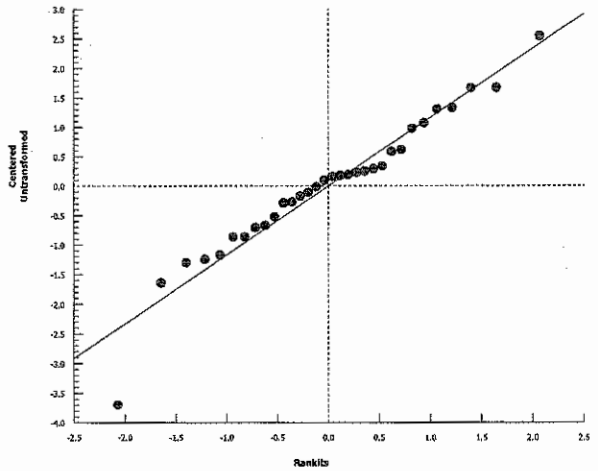
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.86	7.13	7.02	5.15
1.5		6.87	6.27	5.42	6.58
3		8.6	10.17	7.26	7.98
6.1		8.07	9.63	3.4	7.27
12.1		6.03	8.37	6.86	5.53
24.2		7.89	8.97	6.34	7.35
48.5		7.05	8.63	6.46	7.15
97		8.23	8.65	7.33	7.93

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	06-0366-2053	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:42	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Lemna minor Summary Sheet

Client: Teck
Work Order No.: 16482

Start Date: April 28, 2016
Set up by: JN

Sample Information:

Sample ID: LC-LC5-WS-2016-04-25-N
Sample Date: April 27/16
Date Received: April 28/16
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 042016
Age of culture (Day 0): 8 days
>8X growth in APHA?: Y (45 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 132
Date Initiated: April 28/16

7-d No. of Fronds IC50 (95% CL): 4.2 (2.7 - 5.5) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.0 (3.2 - 5.0) g/L KCl CV (%): 12

Test Results:		Number of Fronds	Dry Weight
	IC25 %(v/v) (95% CL)	>97	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JGL
Date reviewed: May 24/16

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck - LCO **Setup by:** JW

Sample ID: LC - LC5 _WS - 2016-04-25 _N **Test Date:** April 28 , 2016

Work Order No.: 16482 **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 8 days **> 8X Growth? (Y/N):** Y (45 fronds)

Light Intensity Range: 4300 - 4900 lux **Date Measured:** April 28 , 2016

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.5	25.0	25.0	24.5	25.0	25.0	25.0
Initials	JW	JW	AS	AS	JW	MLT	JW	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	25.5	Aeration?: 20 min	25.5
DO (mg/L)	9.8	Nutrients added?[1]: Y →	8.5
pH	8.2		8.0
Conductivity (µS)	540		1316

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	25.0	8.2	8.3	863
1.5	23.5	25.0	7.9	8.3	874
3.0	23.5	25.0	8.0	8.3	886
6.1	24.0	25.0	8.0	8.3	901
12.1	24.0	25.0	8.0	8.4	929
24.2	24.5	25.0	8.0	8.7	985
48.5	25.0	25.0	8.0	8.7	1097
97	25.5	25.0	8.0	9.1	1316
Initials	JW	JW	JW	KL	JW

Thermometer: #6 **Cond. Meter:** C-2 **pH meter:** pH-1 **Light meter:** Lt-1

Sample Description: clear, colorless, odourless, some debris present.

Comments: ~~light meter - Lt-1~~ JW

Reviewed: JGL **Date Reviewed:** May 24/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC_LCS_WS_2016-04-25_N
Work Order #: 16482

Start Date: April 28 /16
Termination Date: May 5 /16
Test set up by: JW

Concentration %/o (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	97										JW
	B	6	75										
	C	6	104										
	D	6	86										
1.5	A	6	83										
	B	6	86										
	C	6	73										
	D	6	96										
3.0	A	6	84										
	B	6	90										
	C	6	74										
	D	6	91										
6.1	A	6	86										
	B	6	74										
	C	6	61										
	D	6	96										
12.1	A	6	83										
	B	6	95										
	C	6	89										
	D	6	89										
24.2	A	6	109										
	B	6	90										
	C	6	105										
	D	6	98										

Comments:

Reviewed by: JW

Date Reviewed: May 24/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LCS-WS-2016-04-25-N
Work Order #: 16482

Start Date: April 28 /16
Termination Date: May 5 /16
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	92										JW
	B	6	89										
	C	6	101										
	D	6	104										
97	A	6	86										
	B	6	88										
	C	6	98										
	D	6	93										✓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGe

Date Reviewed: May 24/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_LCS_WS_2016-04-25_N
WO #: 16482

Start Date: April 28 /16
Termination Date: May 5 /16
Balance ID: Bal - 1

Concentration	Rep	Pan No	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCS Block			
Control	A	1	1003.18	1010.51	JW / JW
	B	2	1004.85	1010.00	
	C	3	1013.14	1020.48	
	D	4	1001.80	1007.84	
1.5	A	5	1006.01	1011.83	
	B	6	1011.66	1017.44	
	C	7	1025.50	1030.87	
	D	8	1008.06	1015.53	
3.0	A	9	1012.16	1017.89	
	B	10	1008.64	1014.55	
	C	11	995.30	1000.70	
	D	12	1010.34	1016.62	
6.1	A	13	1021.80	1028.20	
	B	14	999.93	1005.23	
	C	15	999.19	1003.59	
	D	16	1025.51	1032.73	
12.1	A	17	991.46	997.20	
	B	18	999.89	1006.43	
	C	19	1005.76	1012.47	
	D	20	1008.42	1014.86	
24.2	A	21	993.70	1001.56	
	B	22	1006.24	1012.59	
	C	23	1004.14	1012.07	
	D	24	988.51	995.86	
48.5	A	25	989.43	995.97	
	B	26	1008.31	1014.57	
	C	27	1011.04	1018.73	
	D	28	1007.53	1018.56 JW	↓

Comments: 10% Re-weigh : #5 · 1011.77 #26 · 1014.46
#18 · 1006.33 #31 · 1027.92

Reviewed by: JW Date Reviewed: May 24/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC-LC5-WS-2016-04-25-N
WO #: 16482

Start Date: April 28 / 16
Termination Date: May 5 / 16
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LC5 Blank			
	A	29	1021.00	1027.02	JW / JW
	B	30	1031.58	1038.18	
97	C	31	1021.43	1028.04	
	D	32	1015.14	1022.48	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JBL

Date Reviewed: May 24/16

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-2796-5911	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 7:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-1540-1191	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	28 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	18-5443-1080	**Code:**	6E885F68	**Client:**	Teck Coal
Sample Date:	27 Apr-16 06:50	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	17h (6.6 °C)	**Station:**	LC_LC5_WS_2016-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	503842	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>97	N/A	N/A	<1.031	NA	NA
IC10	>97	N/A	N/A	<1.031	NA	NA
IC15	>97	N/A	N/A	<1.031	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	84.5	69	98	6.357	12.71	15.05%	0.0%
1.5		4	78.5	67	90	4.735	9.469	12.06%	7.1%
3		4	78.75	68	85	3.902	7.805	9.91%	6.81%
6.1		4	73.25	55	90	7.565	15.13	20.66%	13.31%
12.1		4	83	77	89	2.449	4.899	5.9%	1.78%
24.2		4	94.5	84	103	4.173	8.347	8.83%	-11.83%
48.5		4	90.5	83	98	3.571	7.141	7.89%	-7.1%
97		4	85.25	80	92	2.689	5.377	6.31%	-0.89%

Frond Count Detail

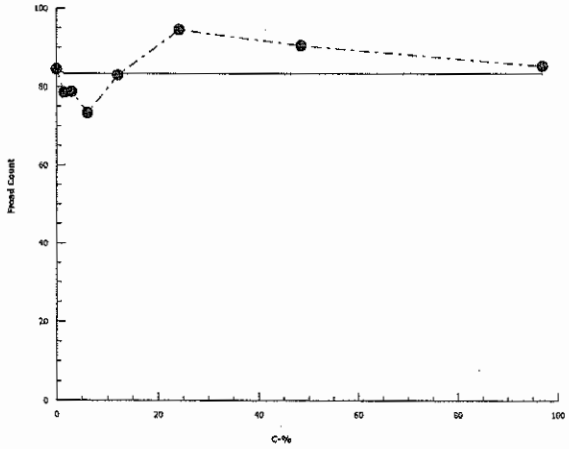
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	91	69	98	80
1.5		77	80	67	90
3		78	84	68	85
6.1		80	68	55	90
12.1		77	89	83	83
24.2		103	84	99	92
48.5		86	83	95	98
97		80	82	92	87

Analyst: JW QA: JGe May 24/16

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-2796-5911	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 7:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-0861-2047	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 7:51	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	20-1540-1191	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	28 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	18-5443-1080	**Code:**	6E885F68	**Client:**	Teck Coal
Sample Date:	27 Apr-16 06:50	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	17h (6.6 °C)	**Station:**	LC_LC5_WS_2016-04-25_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	19.6%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.8977	2.482	16.59	6	0.9867	CDF	Non-Significant Effect
		3	-0.8603	2.482	16.59	6	0.9851	CDF	Non-Significant Effect
		6.1	-1.683	2.482	16.59	6	0.9990	CDF	Non-Significant Effect
		12.1	-0.2244	2.482	16.59	6	0.9224	CDF	Non-Significant Effect
		24.2	1.496	2.482	16.59	6	0.2694	CDF	Non-Significant Effect
		48.5	0.8977	2.482	16.59	6	0.5287	CDF	Non-Significant Effect
		97	0.1122	2.482	16.59	6	0.8448	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	1307.719	186.817	7	2.091	0.0842	Non-Significant Effect
Error	2144.25	89.34375	24			
Total	3451.969		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.593	18.48	0.5880	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9845	0.9081	0.9137	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	84.5	64.27	104.7	85.5	69	98	6.357	15.05%	0.0%
1.5		4	78.5	63.43	93.57	78.5	67	90	4.735	12.06%	7.1%
3		4	78.75	66.33	91.17	81	68	85	3.902	9.91%	6.81%
6.1		4	73.25	49.17	97.33	74	55	90	7.565	20.66%	13.31%
12.1		4	83	75.2	90.8	83	77	89	2.449	5.9%	1.78%
24.2		4	94.5	81.22	107.8	95.5	84	103	4.173	8.83%	-11.83%
48.5		4	90.5	79.14	101.9	90.5	83	98	3.571	7.89%	-7.1%
97		4	85.25	76.69	93.81	84.5	80	92	2.689	6.31%	-0.89%

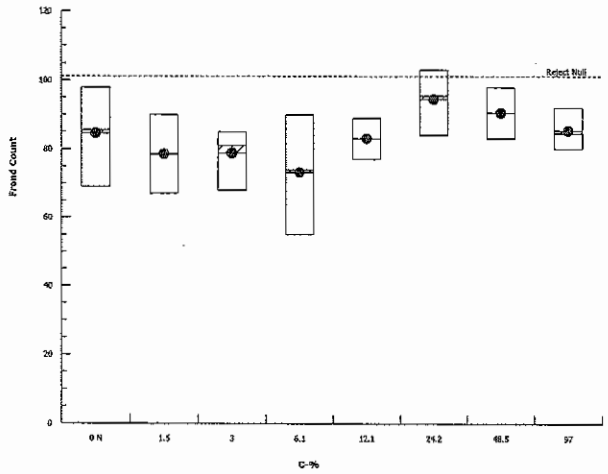
Frond Count Detail

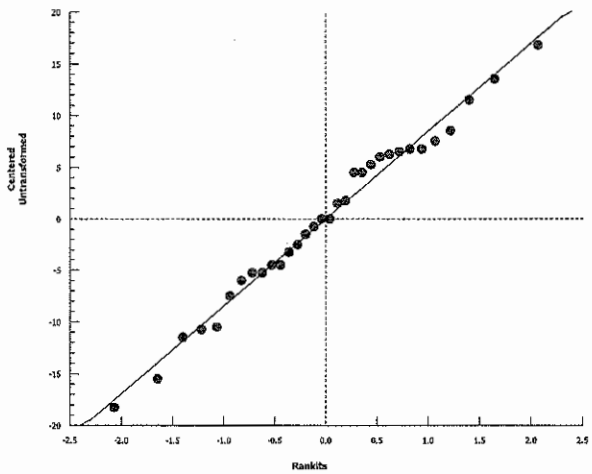
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	91	69	98	80
1.5		77	80	67	90
3		78	84	68	85
6.1		80	68	55	90
12.1		77	89	83	83
24.2		103	84	99	92
48.5		86	83	95	98
97		80	82	92	87

Lemna Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	14-0861-2047	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 7:51	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JW QA: JGL May 24/16

CETIS Analytical Report

Report Date: 12 May-16 07:57 (p 1 of 2)
Test Code: 16482a | 18-8570-1183

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-7202-5483	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 7:56	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

Batch ID:	20-1540-1191	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	28 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d

Sample ID:	18-5443-1080	**Code:**	6E885F68	**Client:**	Teck Coal
Sample Date:	27 Apr-16 06:50	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	17h (6.6 °C)	**Station:**	LC_LC5_WS_2016-04-25_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
6	-11.25	26.91	29.43		Yes	2.259	2.508	0.0719	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	9439000	N/A	N/A	0.0000105	NA	NA
IC10	19390000	N/A	N/A	0.0000051	NA	NA
IC15	29910000	N/A	N/A	0.0000033	NA	NA
IC20	41060000	N/A	N/A	0.0000024	NA	NA
IC25	52940000	N/A	N/A	0.0000018	NA	NA
IC40	94000000	N/A	N/A	0.0000010	NA	NA
IC50	12760000	N/A	N/A	0.0000007	NA	NA

JW

>97% (V/V)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	6.286	0.1981	5.897	6.674	31.73	<0.0001	Significant Parameter
D	1.28E+08	1.87E+13	-3.7E+13	3.66E+13	6.83E-06	1.0000	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0	0	1	0	1.0000	Non-Significant
Lack of Fit	8.580897	1.430149	6	2.259	0.0719	Non-Significant
Pure Error	15.19562	0.633151	24			
Residual	23.77652	0.792551	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	6.51	14.07	0.4816	Equal Variances
	Mod Levene Equality of Variance	1.35	2.423	0.2710	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9762	0.9338	0.6837	Normal Distribution
	Anderson-Darling A2 Normality	0.2948	2.492	0.6275	Normal Distribution

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.465	5.15	7.34	0.5341	1.068	16.52%	0.0%
1.5		4	6.11	5.37	7.47	0.4646	0.9292	15.21%	5.49%
3		4	5.83	5.4	6.28	0.1834	0.3668	6.29%	9.82%
6.1		4	5.83	4.4	7.22	0.618	1.236	21.2%	9.82%
12.1		4	6.357	5.74	6.71	0.2132	0.4265	6.71%	1.66%
24.2		4	7.372	6.35	7.93	0.3645	0.729	9.89%	-14.04%
48.5		4	6.88	6.26	7.69	0.3134	0.6268	9.11%	-6.42%
97		4	6.643	6.02	7.34	0.2703	0.5406	8.14%	-2.75%

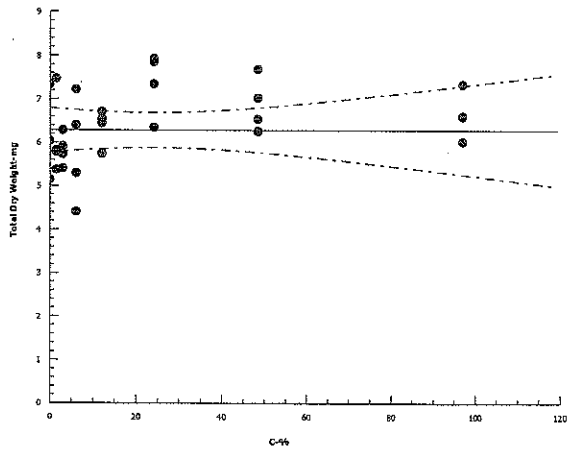
Lemna Growth Inhibition Test | **Nautilus Environmental**

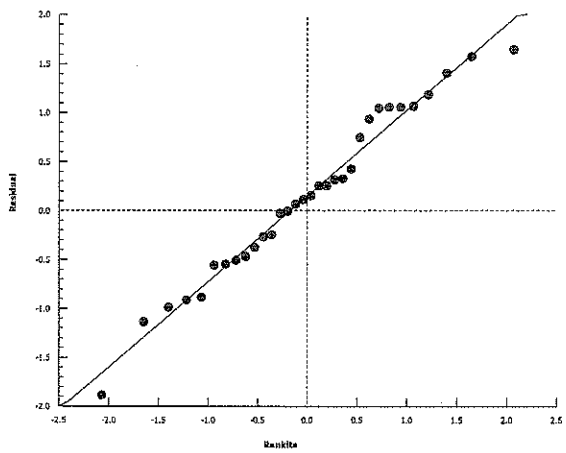
Analysis ID:	13-7202-5483	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 7:56	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

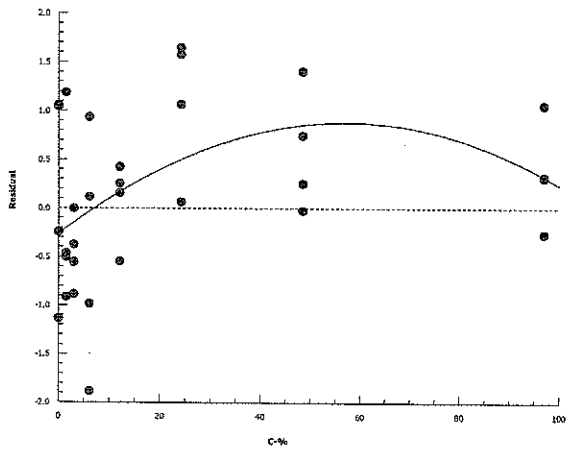
Total Dry Weight-mg Detail

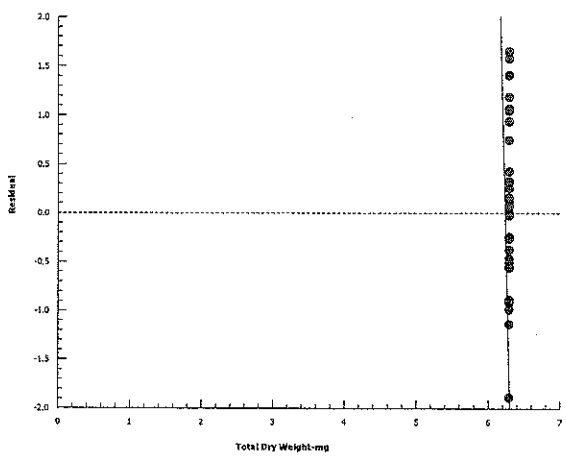
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.33	5.15	7.34	6.04
1.5		5.82	5.78	5.37	7.47
3		5.73	5.91	5.4	6.28
6.1		6.4	5.3	4.4	7.22
12.1		5.74	6.54	6.71	6.44
24.2		7.86	6.35	7.93	7.35
48.5		6.54	6.26	7.69	7.03
97		6.02	6.6	6.61	7.34

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-8348-1882	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 7:58	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	20-1540-1191	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	28 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	05 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	18-5443-1080	**Code:**	6E885F68	**Client:**	Teck Coal
Sample Date:	27 Apr-16 06:50	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	17h (6.6 °C)	**Station:**	LC_LC5_WS_2016-04-25_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	21.6%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.6309	2.482	1.396	6	0.9716	CDF	Non-Significant Effect
		3	-1.129	2.482	1.396	6	0.9934	CDF	Non-Significant Effect
		6.1	-1.129	2.482	1.396	6	0.9934	CDF	Non-Significant Effect
		12.1	-0.1911	2.482	1.396	6	0.9164	CDF	Non-Significant Effect
		24.2	1.613	2.482	1.396	6	0.2285	CDF	Non-Significant Effect
		48.5	0.7375	2.482	1.396	6	0.6032	CDF	Non-Significant Effect
		97	0.3155	2.482	1.396	6	0.7789	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	7.858274	1.12261	7	1.773	0.1395	Non-Significant Effect
Error	15.19562	0.6331508	24			
Total	23.05389		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.51	18.48	0.4816	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9848	0.9081	0.9206	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	6.465	4.765	8.165	6.685	5.15	7.34	0.5341	16.52%	0.0%
1.5		4	6.11	4.631	7.589	5.8	5.37	7.47	0.4646	15.21%	5.49%
3		4	5.83	5.246	6.414	5.82	5.4	6.28	0.1834	6.29%	9.82%
6.1		4	5.83	3.863	7.797	5.85	4.4	7.22	0.618	21.2%	9.82%
12.1		4	6.357	5.679	7.036	6.49	5.74	6.71	0.2132	6.71%	1.66%
24.2		4	7.372	6.212	8.533	7.605	6.35	7.93	0.3645	9.89%	-14.04%
48.5		4	6.88	5.883	7.877	6.785	6.26	7.69	0.3134	9.11%	-6.42%
97		4	6.643	5.782	7.503	6.605	6.02	7.34	0.2703	8.14%	-2.75%

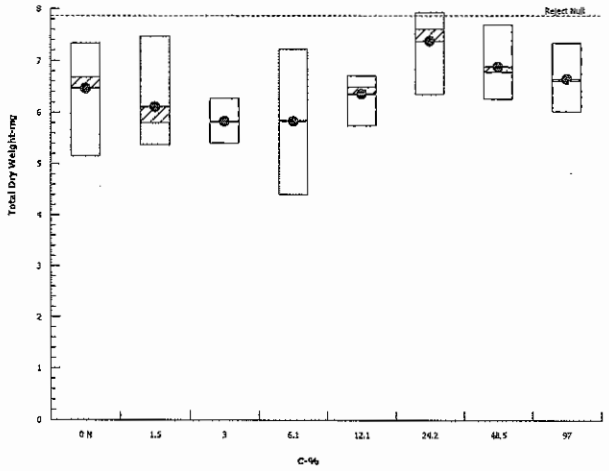
Total Dry Weight-mg Detail

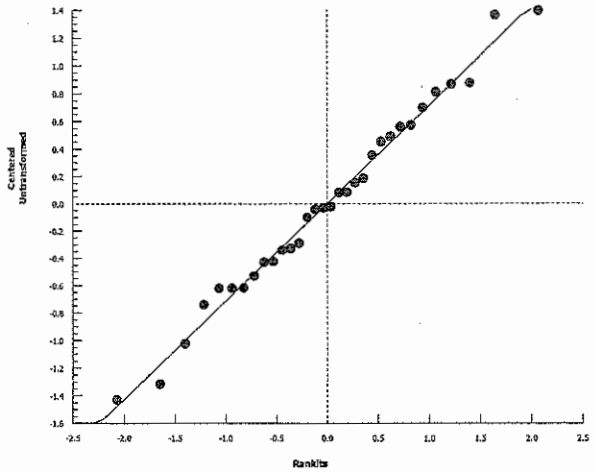
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.33	5.15	7.34	6.04
1.5		5.82	5.78	5.37	7.47
3		5.73	5.91	5.4	6.28
6.1		6.4	5.3	4.4	7.22
12.1		5.74	6.54	6.71	6.44
24.2		7.86	6.35	7.93	7.35
48.5		6.54	6.26	7.69	7.03
97		6.02	6.6	6.61	7.34

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	00-8348-1882	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 7:58	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JW QA: JGL May 24/16

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 16482

Start Date: April 29 , 2016
Set up by: JW

Sample Information:

Sample ID: LC-WTF-OUT-WS-20160427-N
Sample Date: April 27 /16
Date Received: April 28 /16
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 042116
Age of culture (Day 0): 8 days
>8X growth in APHA?: Y (45 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 132
Date Initiated: April 28/16

7-d No. of Fronds IC50 (95% CL): 4.2 (2.7 - 5.5) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 4.0 (3.2 - 5.0) g/L KCl CV (%): 12

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	>97	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JOL

Date reviewed: May 25/16

JWN

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck **Setup by:** JW

Sample ID: LC - WTF_OUT_WS_20160427_N **Test Date:** April 29 / 16

Work Order No.: 16482 **Test Species:** *Lemna minor*

Culture Source: CPCC#490

Test Culture Age: 8 days **> 8X Growth? (Y/N):** Y (45 fronds)

Light Intensity Range: 4630 - 5440 lux **Date Measured:** April 28 / 16

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.5	25.0	25.0	24.5	25.0	25.0	25.0	25.0
Initials	JW	A	A	JW	MLT	JW	JW	JW

Sample Characteristics: Initial Water Quality

	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	23.0
DO (mg/L)	7.8	Nutrients added?[1]: Y →	8.0
pH	7.5		7.8
Conductivity (µS)	2000		JW ~~2690~~ 2660

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.5	8.2	8.5	912
1.5	23.0	24.5	8.2	8.6	946
3.0	23.0	24.5	8.1	8.5	985
6.1	23.0	24.5	8.1	8.7	1052
12.1	23.0	24.5	8.1	8.8	1182
24.2	23.0	24.5	8.1	8.7	1425
48.5	23.0	24.5	8.0	8.7	1906
97	23.0	24.5	JW ~~8.~~ 7.8	8.7	2660
Initials	JW	JW	JW	JW	JW

Thermometer: #6 **Cond. Meter:** C-3 **pH meter:** pH-3 **Light meter:** Lit - 1

Sample Description: clear, colourless, hydrocarbon odour, brown debris present.

Comments:

Reviewed: JGh **Date Reviewed:** May 24/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-WTF-OUT-WS-20160427-N
Work Order #: 16482

Start Date: April 29 / 16
Termination Date: May 6 / 16
Test set up by: JW

Concentration %/o (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	59										JW
	B	6	58										
	C	6	80										
	D	6	75										
1.5	A	6	52										
	B	6	70										
	C	6	61										
	D	6	56										
3.0	A	6	70										
	B	6	63										
	C	6	66										
	D	6	55										
6.1	A	6	56			X						JW	
	B	6	83		X	X						~~Protruding~~ Fronds are necrotic	
	C	6	71		X	X						Emerging ↓	
	D	6	64			X						JW	
12.1	A	6	69		X	X						~~Protruding~~ Fronds are necrotic	
	B	6	68		X	X						Emerging	
	C	6	56		X	X							
	D	6	84		X	X						↓	
24.2	A	6	66		X	X							
	B	6	76			X						JW	
	C	6	68		X	X						~~Protruding~~ Fronds are necrotic	
	D	6	64		X	X						Emerging ↓	↓

Comments:

Reviewed by: JGu

Date Reviewed: May 24/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-WTF-OUT-WS-20160427-N
Work Order #: 16482

Start Date: April 29 /16
Termination Date: May 6 /16
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	53		X	X	X					Fronds are very small & necrotic	JW
	B	6	52		X	X	X					↓	↓
	C	6	59		X	X	X						
	D	6	46		X	X	X						
97	A	6	56		X	X	X						
	B	6	56		X								
	C	6	67		X								
	D	6	55		X								✓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGL

Date Reviewed: May 24/16

7-d *Lemna minor* Weight Data Sheet

Client: TECK
Sample ID: LC_WTF_OUT_WS_20160427_N
WO #: 16482

Start Date: April 29 /16
Termination Date: May 6 /16
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		WTF Brown			
	A	1	1037.59	1042.96	JW / JW
	B	2	1027.89	1034.24	
Control	C	3	1029.42	1036.39	
	D	4	1027.08	1033.62	
	A	5	979.98	983.76	
	B	6	964.25	970.42	
1.5	C	7	957.09	962.21	
	D	8	966.41	971.53	
	A	9	973.19	979.57	
	B	10	1006.16	1011.50	
3.0	C	11	1007.54	1014.11	
	D	12	1026.80	1031.69	
	A	13	1034.90	1039.93	
	B	14	1021.87	1028.93	
6.1	C	15	1033.81	1039.72	
	D	16	994.62	1000.61	
	A	17	998.98	1005.78	
	B	18	1003.59	1010.31	
12.1	C	19	1006.05	1011.00	
	D	20	1005.35	1012.72	
	A	21	1004.25	1010.78	
	B	22	1013.61	1020.62	
24.2	C	23	1018.54	1024.38	
	D	24	1012.72	1019.20	
	A	25	1009.64	1015.76	
	B	26	1013.62	1019.04	
48.5	C	27	951.91	959.20	
	D	28	972.85	978.34	↓

Comments: ID Re-weigh = #6. 970.24 #24. 1019.05
#15. 1039.61 #32. 1021.54

Reviewed by: JW

Date Reviewed: May 24/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_WTF_OUT_WS_20160427_N
WO #: 16482

Start Date: April 29 / 16
Termination Date: May 6 / 16
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
0/0 (v/v)		WTF BROWN			
	A	29	964.00	970.03	JW / JW
97	B	30	994.16	1000.48 45 JW	↓
	C	31	999.50	1007.73	↓
	D	32	1014.84	1021.71	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JGe

Date Reviewed: May 24/16

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-1463-1897	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-16 10:50	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	18-5200-6809	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	05-4497-8051	**Code:**	207BB483	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	39h (10.2 °C)	**Station:**	LC_WTF_OUT_WS_20160427_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
26	-85.21	177.3	180.8	0.0703	Yes	1.919	2.621	0.1285	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	30.35	N/A	85.41	3.294	1.171	NA
IC10	55.54	3.175	114.5	1.801	0.8733	31.49
IC15	83.48	22.15	166.1	1.198	0.6022	4.514
IC20	115.4	8.396	296.8	0.8664	0.3369	~~11.91~~ JW
IC25	152.4	N/A	567.6	~~0.6562~~	0.1762	NA
IC40	307	N/A	N/A	0.3258	NA	NA
IC50	~~467.8~~	N/A	N/A	0.2138	NA	NA

> 97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	59.92	2.469	55.09	64.76	24.27	<0.0001	Significant Parameter
C	1.663	1.683	-1.635	4.961	0.9882	0.3312	Non-Significant Parameter
D	467.8	831.5	-1162	2097	0.5626	0.5780	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	362.488	362.488	1	4.345	0.0460	Significant
Lack of Fit	690.887	138.1774	5	1.919	0.1285	Non-Significant
Pure Error	1728.5	72.02084	24			
Residual	2419.387	83.42714	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	4.531	14.07	0.7170	Equal Variances
	Mod Levene Equality of Variance	1.027	2.423	0.4383	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9666	0.9338	0.4119	Normal Distribution
	Anderson-Darling A2 Normality	0.3737	2.492	0.4217	Normal Distribution

Analyst: JW QA: May 24/16

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 06-1463-1897 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 12 May-16 10:50 **Analysis:** Nonlinear Regression **Official Results:** Yes

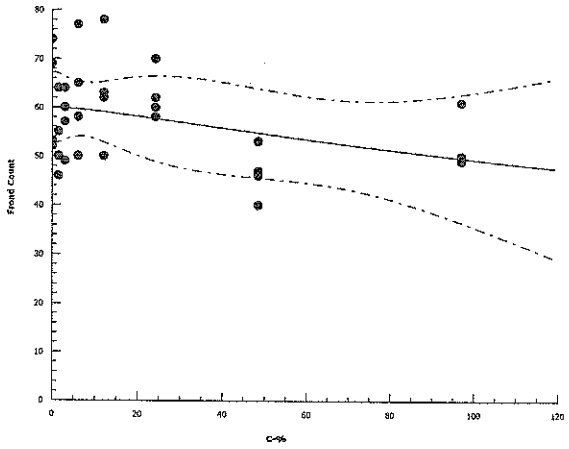
Frond Count Summary

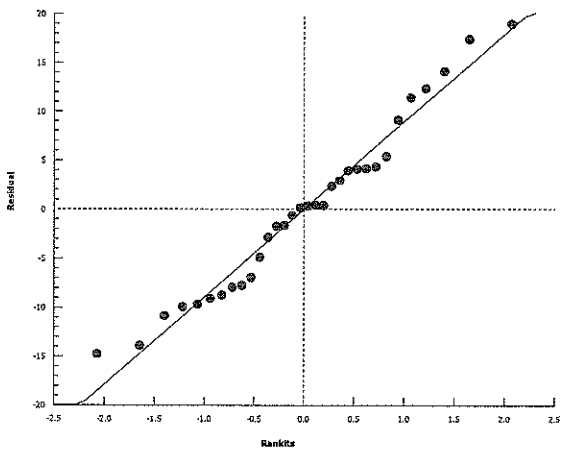
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	62	52	74	5.583	11.17	18.01%	0.0%
1.5		4	53.75	46	64	3.881	7.762	14.44%	13.31%
3		4	57.5	49	64	3.175	6.351	11.04%	7.26%
6.1		4	62.5	50	77	5.723	11.45	18.31%	-0.81%
12.1		4	63.25	50	78	5.735	11.47	18.14%	-2.02%
24.2		4	62.5	58	70	2.63	5.26	8.42%	-0.81%
48.5		4	46.5	40	53	2.661	5.323	11.45%	25.0%
97		4	52.5	49	61	2.843	5.686	10.83%	15.32%

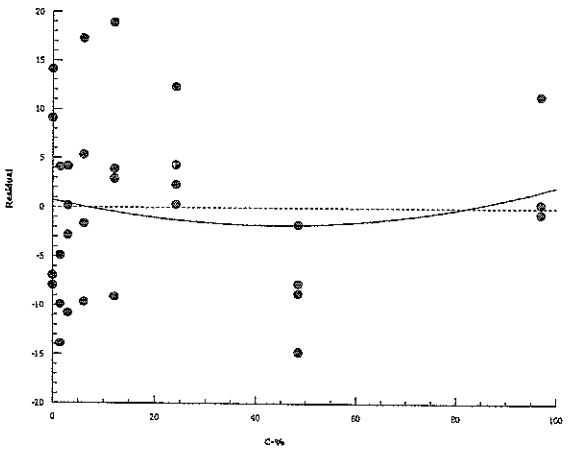
Frond Count Detail

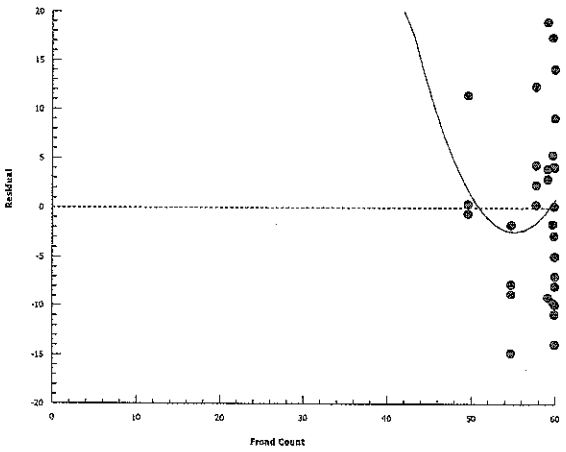
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	53	52	74	69
1.5		46	64	55	50
3		64	57	60	49
6.1		50	77	65	58
12.1		63	62	50	78
24.2		60	70	62	58
48.5		47	46	53	40
97		50	50	61	49

Graphics 3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]









CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-9163-4081	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 May-16 9:23	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	18-5200-6809	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	05-4497-8051	**Code:**	207BB483	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	39h (10.2 °C)	**Station:**	LC_WTF_OUT_WS_20160427_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
4	-13.58	31.58	34.1		Yes	2.319	2.508	0.0659	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	32930000	N/A	N/A	0.0000030	NA	NA
IC10	67640000	N/A	N/A	0.0000014	NA	NA
IC15	104300000	N/A	N/A	0.0000009	NA	NA
IC20	143300000	N/A	N/A	0.0000006	NA	NA
IC25	184700000	N/A	N/A	0.0000005	NA	NA
IC40	327900000	N/A	N/A	0.0000003	NA	NA
IC50	445000000	N/A	N/A	0.0000002	NA	NA

> 97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	5.891	0.2131	5.473	6.309	27.64	<0.0001	Significant Parameter
D	445000000	2.61E+14	-5.12E+14	5.116E+14	1.705E-06	1.0000	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	0	0	1	0	1.0000	Non-Significant
Lack of Fit	10.09603	1.682671	6	2.319	0.0659	Non-Significant
Pure Error	17.41594	0.7256642	24			
Residual	27.51197	0.9170657	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	1.993	14.07	0.9602	Equal Variances
	Mod Levene Equality of Variance	0.2106	2.423	0.9796	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9819	0.9338	0.8516	Normal Distribution
	Anderson-Darling A2 Normality	0.2859	2.492	0.6550	Normal Distribution

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.307	5.37	6.97	0.3383	0.6767	10.73%	0.0%
1.5		4	5.048	3.78	6.17	0.4896	0.9793	19.4%	19.98%
3		4	5.795	4.89	6.57	0.4051	0.8102	13.98%	8.13%
6.1		4	5.997	5.03	7.06	0.4156	0.8312	13.86%	4.92%
12.1		4	6.46	4.95	7.37	0.5237	1.047	16.21%	-2.42%
24.2		4	6.465	5.84	7.01	0.2402	0.4803	7.43%	-2.5%
48.5		4	6.08	5.42	7.29	0.433	0.8659	14.24%	3.61%
97		4	6.855	6.03	8.23	0.4908	0.9816	14.32%	-8.68%

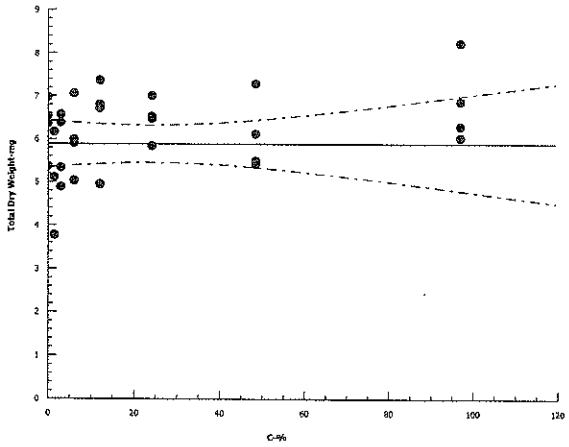
Analyst: JW QA: JGH May 25/16

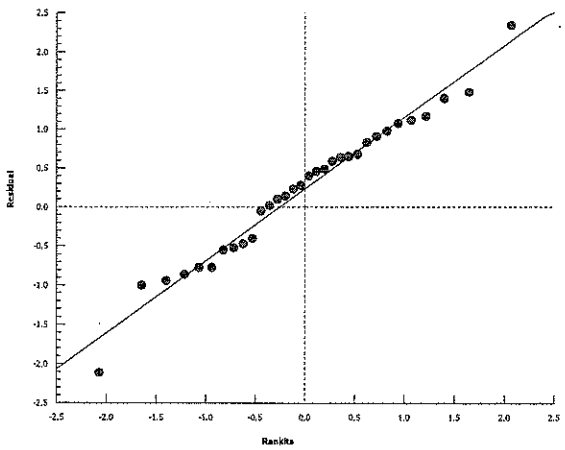
Analysis ID: 04-9163-4081 **Endpoint:** Total Dry Weight-mg **CETIS Version:** CETISv1.8.7
Analyzed: 25 May-16 9:23 **Analysis:** Nonlinear Regression **Official Results:** Yes

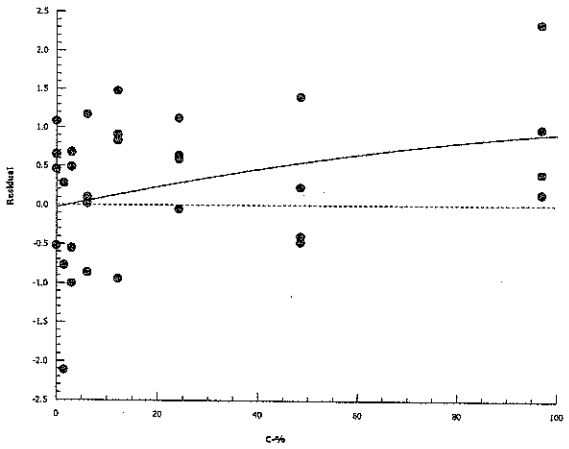
Total Dry Weight-mg Detail

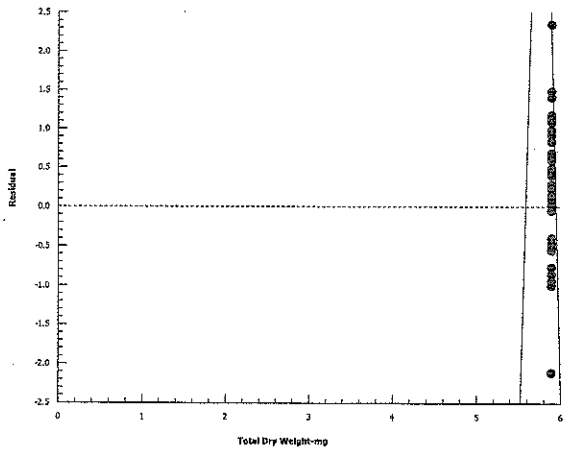
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5.37	6.35	6.97	6.54
1.5		3.78	6.17	5.12	5.12
3		6.38	5.34	6.57	4.89
6.1		5.03	7.06	5.91	5.99
12.1		6.8	6.72	4.95	7.37
24.2		6.53	7.01	5.84	6.48
48.5		6.12	5.42	7.29	5.49
97		6.03	6.29	8.23	6.87

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-9499-8501	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 May-16 9:23	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	18-5200-6809	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	29 Apr-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	06 May-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	05-4497-8051	**Code:**	207BB483	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	39h (10.2 °C)	**Station:**	LC_WTF_OUT_WS_20160427_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	23.7%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-2.092	2.482	1.495	6	0.9998	CDF	Non-Significant Effect
		3	-0.8508	2.482	1.495	6	0.9847	CDF	Non-Significant Effect
		6.1	-0.5146	2.482	1.495	6	0.9615	CDF	Non-Significant Effect
		12.1	0.2532	2.482	1.495	6	0.8006	CDF	Non-Significant Effect
		24.2	0.2615	2.482	1.495	6	0.7978	CDF	Non-Significant Effect
		48.5	-0.3776	2.482	1.495	6	0.9458	CDF	Non-Significant Effect
		97	0.909	2.482	1.495	6	0.5234	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	8.328899	1.189843	7	1.64	0.1723	Non-Significant Effect
Error	17.41594	0.7256642	24			
Total	25.74484		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	1.993	18.48	0.9602	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9736	0.9081	0.6041	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	6.307	5.231	7.384	6.445	5.37	6.97	0.3383	10.73%	0.0%
1.5		4	5.048	3.489	6.606	5.12	3.78	6.17	0.4896	19.4%	19.98%
3		4	5.795	4.506	7.084	5.86	4.89	6.57	0.4051	13.98%	8.13%
6.1		4	5.997	4.675	7.32	5.95	5.03	7.06	0.4156	13.86%	4.92%
12.1		4	6.46	4.793	8.127	6.76	4.95	7.37	0.5237	16.21%	-2.42%
24.2		4	6.465	5.701	7.229	6.505	5.84	7.01	0.2402	7.43%	-2.5%
48.5		4	6.08	4.702	7.458	5.805	5.42	7.29	0.433	14.24%	3.61%
97		4	6.855	5.293	8.417	6.58	6.03	8.23	0.4908	14.32%	-8.68%

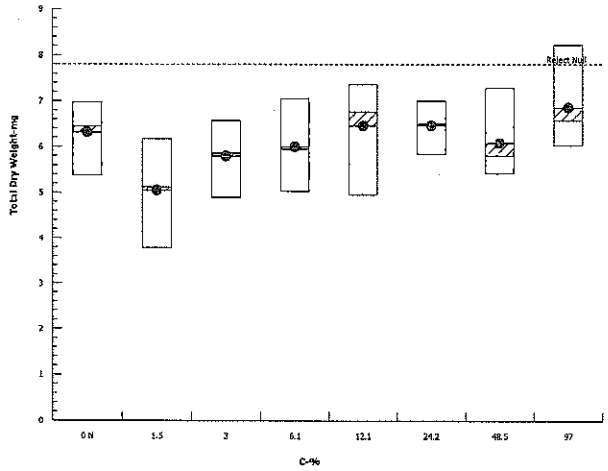
Total Dry Weight-mg Detail

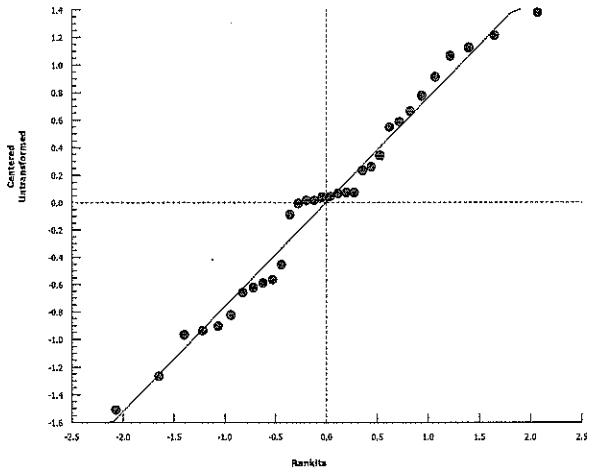
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5.37	6.35	6.97	6.54
1.5		3.78	6.17	5.12	5.12
3		6.38	5.34	6.57	4.89
6.1		5.03	7.06	5.91	5.99
12.1		6.8	6.72	4.95	7.37
24.2		6.53	7.01	5.84	6.48
48.5		6.12	5.42	7.29	5.49
97		6.03	6.29	8.23	6.87

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	11-9499-8501	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 May-16 9:23	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Analyst: JW QA: JW May 25/16

APPENDIX D – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 16481

Start Date: April 29/16
Set up by: MLT

Sample Information:

Sample ID: LC LCDSSLCC WS 2016-04-25 N
Sample Date: April 27/16
Date Received: April 28/16
Sample Volume: 8 x 20L

Test Organism Information:

Culture Date: April 22/16
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC141
Stock Solution ID: 157n03
Date Initiated: April 26/16

72-h IC50 (95% CL): 34.0 (31.2 - 36.6) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.5 (17.4 - 53.5) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGR

Date reviewed: May 24/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MLT

Sample ID: LC LE MLT LCDSSLCC WS 2016-04-25 N **Test Date/Time:** April 29/16 @ 1435h

Work Order No.: 16481 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: April 22/16 **Age of Culture:** 7d **Culture Health:** Good

Culture Count: 1 555 2 535 **Average:** 545 **Culture Cell Density (c1):** 545 x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 545 x 10⁴ cells/ml = 4.04 mL

Time Zero Counts: 1 20 2 22 **Average:** 21

No. of Cells/mL: 21 x10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.4	23.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	7.7	23.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	[illegible]	[illegible]	[illegible]	MLT	MLT	[illegible]	[illegible]	MLT

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 6.8 Well 2: 6.8

Light intensity (lux): 3740 **Date measured:** April 29/16

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear, colourless, some debris, odourless

Comments:

Reviewed: JCL **Date reviewed:** May 24/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal
Work Order #: 16481
Sample ID: ~~LC LCDSSLCC WS~~ MG
%(v/v) LC LCDSSLCC WS 2016-04-25 N

Start Date/Time: April 29/16 @ 1435h
Termination Date: May 2/16 @ 1435h
Test set up by: MG

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	35					MG
	B	32					
	C	34					
	D	31					
	E	32					
	F	33					
	G	34					
	H	30					
1.5	A	33					
	B	31					
	C	34					
	D	36					
3.0	A	43					
	B	40					
	C	46					
	D	38					
6.0	A	65					
	B	59					
	C	56					
	D	62					
11.9	A	95					
	B	93					
	C	80					
	D	81					
23.8	A	90					
	B	95					
	C	93					
	D	89					
47.6	A	90					
	B	91					
	C	96					
	D	91					
95.2	A	95					
	B	97					
	C	89					
	D	87					

Comments:

Reviewed by: JBL Date Reviewed: May 29/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	29-Apr-16 @ 1435h		
WO#:	16481	Termination Date:	02-May-16 @ 1435h		
Sample ID:	LC LCDSSLCC WS 2016-04-25 N				
		Initial Cell Density:	9545 cell/mL		210000
					0.22
					0.01

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	35				35	34.0	mean	31.7
	B	32				32	31.0	SD	1.685018
	C	34				34	33.0	CV	5.320473
	D	31				31	30.0		
	E	32				32	31.0		
	F	33				33	32.0		
	G	34				34	33.0		
	H	30				30	29.0		
1.5	A	33				33	32.0		
	B	31				31	30.0		
	C	34				34	33.0		
	D	36				36	35.0		
3	A	43				43	42.0		
	B	40				40	39.0		
	C	46				46	45.0		
	D	38				38	37.0		
6	A	65				65	64.0		
	B	59				59	58.0		
	C	56				56	55.0		
	D	62				62	61.0		
11.9	A	95				95	94.0		
	B	93				93	92.0		
	C	80				80	79.0		
	D	81				81	80.0		
23.8	A	90				90	89.0		
	B	95				95	94.0		
	C	93				93	92.0		
	D	89				89	88.0		
47.6	A	90				90	89.0		
	B	91				91	90.0		
	C	96				96	95.0		
	D	91				91	90.0		
95.2	A	95				95	94.0		
	B	97				97	96.0		
	C	89				89	88.0		
	D	87				87	86.0		

JOH
May 29/16

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-8986-3455	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-16 16:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-6669-7151	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	29 Apr-16 14:35	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	02 May-16 14:35	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	12-8781-3119	**Code:**	4CC277FF	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:18	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	54h (8 °C)	**Station:**	LC LCDSSLCC WS 2016-04-25 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	489168	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7232	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	31.63	29	34	0.5957	1.685	5.33%	0.0%
1.5		4	32.5	30	35	1.041	2.082	6.41%	-2.77%
3		4	40.75	37	45	1.75	3.5	8.59%	-28.85%
6		4	59.5	55	64	1.936	3.873	6.51%	-88.14%
11.9		4	86.25	79	94	3.924	7.848	9.1%	-172.7%
23.8		4	90.75	88	94	1.377	2.754	3.03%	-187.0%
47.6		4	91	89	95	1.354	2.708	2.98%	-187.7%
95.2		4	91	86	96	2.38	4.761	5.23%	-187.7%

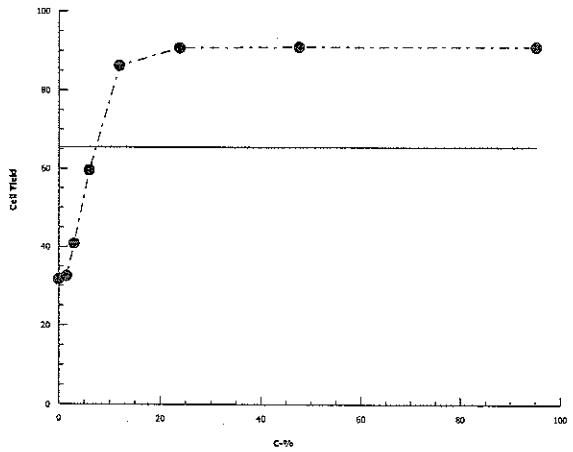
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	34	31	33	30	31	32	33	29
1.5		32	30	33	35				
3		42	39	45	37				
6		64	58	55	61				
11.9		94	92	79	80				
23.8		89	94	92	88				
47.6		89	90	95	90				
95.2		94	96	88	86				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	07-8986-3455	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-16 16:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Test Code: 16481b | 06-4302-0045

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-8993-1717	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-16 16:31	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	18-6669-7151	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	29 Apr-16 14:35	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	02 May-16 14:35	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	12-8781-3119	**Code:**	4CC277FF	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:18	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	54h (8 °C)	**Station:**	LC LCDSSLCC WS 2016-04-25 N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	18.8%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.3724	2.526	5.935	10	0.8297	CDF	Non-Significant Effect
		3*	3.884	2.526	5.935	10	0.0019	CDF	Significant Effect
		6*	11.86	2.526	5.935	10	<0.0001	CDF	Significant Effect
		11.9*	23.25	2.526	5.935	10	<0.0001	CDF	Significant Effect
		23.8*	25.17	2.526	5.935	10	<0.0001	CDF	Significant Effect
		47.6*	25.27	2.526	5.935	10	<0.0001	CDF	Significant Effect
		95.2*	25.27	2.526	5.935	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7232	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	25075.88	3582.268	7	243.4	<0.0001	Significant Effect
Error	412.125	14.71875	28			
Total	25488		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.7	18.48	0.0799	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.992	0.9166	0.9949	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	31.63	30.22	33.03	31.5	29	34	0.5957	5.33%	0.0%
1.5		4	32.5	29.19	35.81	32.5	30	35	1.041	6.41%	-2.77%
3		4	40.75	35.18	46.32	40.5	37	45	1.75	8.59%	-28.85%
6		4	59.5	53.34	65.66	59.5	55	64	1.936	6.51%	-88.14%
11.9		4	86.25	73.76	98.74	86	79	94	3.924	9.1%	-172.7%
23.8		4	90.75	86.37	95.13	90.5	88	94	1.377	3.03%	-187.0%
47.6		4	91	86.69	95.31	90	89	95	1.354	2.98%	-187.7%
95.2		4	91	83.42	98.58	91	86	96	2.38	5.23%	-187.7%

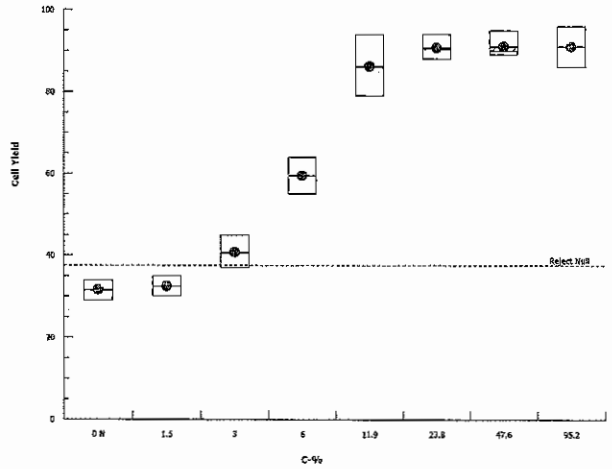
EC Alga Growth Inhibition Test — **Nautilus Environmental**

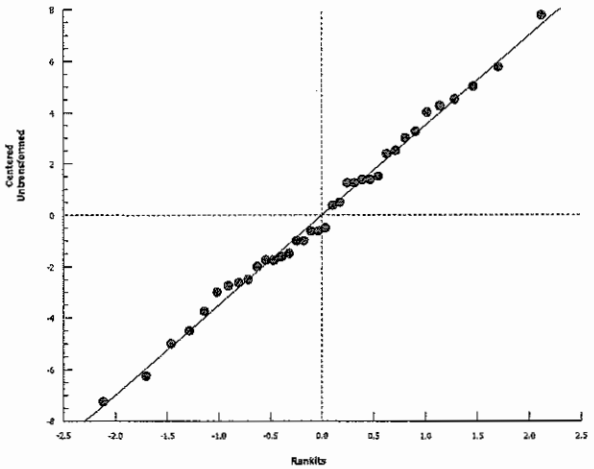
Analysis ID:	01-8993-1717	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-16 16:31	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	34	31	33	30	31	32	33	29
1.5		32	30	33	35				
3		42	39	45	37				
6		64	58	55	61				
11.9		94	92	79	80				
23.8		89	94	92	88				
47.6		89	90	95	90				
95.2		94	96	88	86				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 16481

Start Date: April 29/16
Set up by: MLT

Sample Information:

Sample ID: LC-DCI_WS_2016-04-26_N
Sample Date: April 27/16
Date Received: April 28/16
Sample Volume: 5x20L

Test Organism Information:

Culture Date: April 22/16
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC141
Stock Solution ID: 157n03
Date Initiated: April 26/16

72-h IC50 (95% CL): 34.0 (31.2 - 36.6) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.5 (17.4 - 53.5) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGe

Date reviewed: May 24/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT

Sample ID: LC-DCLWS-2016-04-26-N | Test Date/Time: April 29/16 @ 1445h

Work Order No.: 16481 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: April 22/16 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 555 2 535 | Average: 545 | Culture Cell Density (c1): 545 x 10^4 cells/mL.

v1 = 220,000 cells/ml x 100 ml / (c1) 545 x 10^4 cells/ml = 4.04mL

Time Zero Counts: 1 20 2 22 | Average: 21

No. of Cells/mL: 21 x 10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.2	23.0					✓	✓	✓	✓
6.0	7.3	23.0					✓	✓	✓	✓
11.9	7.4	23.0					✓	✓	✓	✓
23.8	7.5	23.0					✓	✓	✓	✓
47.6	7.7	23.0					✓	✓	✓	✓
95.2	8.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	A	A	MLT	MLT	A	A	MLT

Initial control pH: Well 1: 7.0 | Well 2: 7.0

Final control pH: Well 1: 6.8 | Well 2: 6.8

Light intensity (lux): 3880 | Date measured: April 29/16

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear, colourless, some debris, odourless

Comments:

Reviewed: JCR | Date reviewed: May 29/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: April 29/16 @ 1445h
Work Order #: 10481 Termination Date: May 2/16 @ 1445h
Sample ID: LE_DC1_WS_2016-04-26_N Test set up by: MLT
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	31					MLT
	B	38					
	C	30					
	D	31					
	E	32					
	F	34					
	G	32					
	H	33					
1.5	A	30					
	B	33					
	C	32					
	D	36					
3.0	A	36					
	B	35					
	C	38					
	D	34					
6.0	A	48					
	B	42					
	C	45					
	D	50					
11.9	A	55					
	B	57					
	C	64					
	D	61					
23.8	A	77					
	B	74					
	C	71					
	D	76					
47.6	A	91					
	B	101					
	C	98					
	D	90					
95.2	A	112					
	B	97					
	C	92					
	D	98					✓

Comments:

Reviewed by: JGW Date Reviewed: May 24/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	29-Apr-16 @ 1445h
WO#:	16481	Termination Date:	02-May-16 @ 1445h
Sample ID:	LC_DC1_WS_2016-04-26_N		
		Initial Cell Density:	9545 cell/mL

									210000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	31				31	30.0	mean	31.7
	B	38				38	37.0	SD	2.503569
	C	30				30	29.0	CV	7.905061
	D	31				31	30.0		
	E	32				32	31.0		
	F	34				34	33.0		
	G	32				32	31.0		
	H	33				33	32.0		
1.5	A	30				30	29.0		
	B	33				33	32.0		
	C	32				32	31.0		
	D	36				36	35.0		
3	A	36				36	35.0		
	B	35				35	34.0		
	C	38				38	37.0		
	D	34				34	33.0		
6	A	48				48	47.0		
	B	42				42	41.0		
	C	45				45	44.0		
	D	50				50	49.0		
11.9	A	55				55	54.0		
	B	57				57	56.0		
	C	64				64	63.0		
	D	61				61	60.0		
23.8	A	77				77	76.0		
	B	74				74	73.0		
	C	71				71	70.0		
	D	76				76	75.0		
47.6	A	91				91	90.0		
	B	101				101	100.0		
	C	98				98	97.0		
	D	90				90	89.0		
95.2	A	112				112	111.0		
	B	97				97	96.0		
	C	92				92	91.0		
	D	98				98	97.0		

JGH
May 24/16

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-4845-6960	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-16 16:34	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-1304-8365	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	29 Apr-16 14:45	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	02 May-16 14:45	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	00-8128-9240	**Code:**	4D86018	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:30	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	54h (7.5 °C)	**Station:**	LC_DC1_WS_2016-04-26_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1236400	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5540	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	31.63	29	37	0.8851	2.504	7.92%	0.0%
1.5		4	31.75	29	35	1.25	2.5	7.87%	-0.4%
3		4	34.75	33	37	0.8539	1.708	4.92%	-9.88%
6		4	45.25	41	49	1.75	3.5	7.74%	-43.08%
11.9		4	58.25	54	63	2.016	4.031	6.92%	-84.19%
23.8		4	73.5	70	76	1.323	2.646	3.6%	-132.4%
47.6		4	94	89	100	2.677	5.354	5.7%	-197.2%
95.2		4	98.75	91	111	4.289	8.578	8.69%	-212.3%

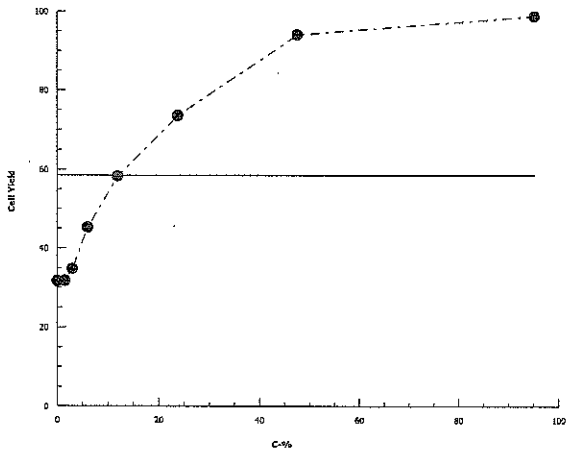
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	37	29	30	31	33	31	32
1.5		29	32	31	35				
3		35	34	37	33				
6		47	41	44	49				
11.9		54	56	63	60				
23.8		76	73	70	75				
47.6		90	100	97	89				
95.2		111	96	91	97				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	12-4845-6960	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-16 16:34	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	20-4183-5385	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-16 16:34	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	15-1304-8365	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	29 Apr-16 14:45	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	02 May-16 14:45	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	00-8128-9240	**Code:**	4D86018	**Client:**	Teck Coal
Sample Date:	27 Apr-16 08:30	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	54h (7.5 °C)	**Station:**	LC_DC1_WS_2016-04-26_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	20.4%	3	6	4.243	33.33

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.04906	2.526	6.436	10	0.9173	CDF	Non-Significant Effect
		3	1.227	2.526	6.436	10	0.4373	CDF	Non-Significant Effect
		6*	5.348	2.526	6.436	10	<0.0001	CDF	Significant Effect
		11.9*	10.45	2.526	6.436	10	<0.0001	CDF	Significant Effect
		23.8*	16.44	2.526	6.436	10	<0.0001	CDF	Significant Effect
		47.6*	24.48	2.526	6.436	10	<0.0001	CDF	Significant Effect
		95.2*	26.35	2.526	6.436	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5540	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	23696.38	3385.197	7	195.6	<0.0001	Significant Effect
Error	484.625	17.30803	28			
Total	24181		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.18	18.48	0.0948	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9539	0.9166	0.1386	Normal Distribution

Cell Yield Summary

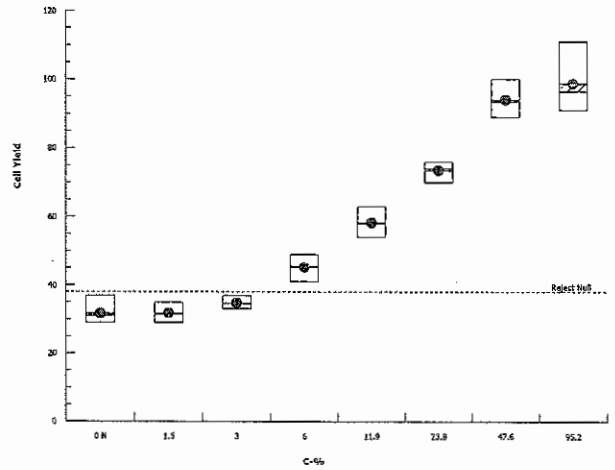
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	31.63	29.53	33.72	31	29	37	0.8851	7.92%	0.0%
1.5		4	31.75	27.77	35.73	31.5	29	35	1.25	7.87%	-0.4%
3		4	34.75	32.03	37.47	34.5	33	37	0.8539	4.92%	-9.88%
6		4	45.25	39.68	50.82	45.5	41	49	1.75	7.74%	-43.08%
11.9		4	58.25	51.84	64.66	58	54	63	2.016	6.92%	-84.19%
23.8		4	73.5	69.29	77.71	74	70	76	1.323	3.6%	-132.4%
47.6		4	94	85.48	102.5	93.5	89	100	2.677	5.7%	-197.2%
95.2		4	98.75	85.1	112.4	96.5	91	111	4.289	8.69%	-212.3%

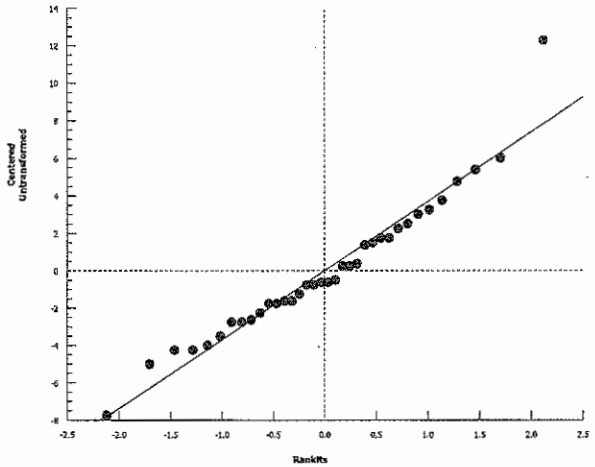
Analysis ID:	20-4183-5385	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-16 16:34	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	37	29	30	31	33	31	32
1.5		29	32	31	35				
3		35	34	37	33				
6		47	41	44	49				
11.9		54	56	63	60				
23.8		76	73	70	75				
47.6		90	100	97	89				
95.2		111	96	91	97				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 16481

Start Date: Apr 29/16
Set up by: MLT

Sample Information:

Sample ID: LC FRDSDC WS 2016-04-26 N
Sample Date: Apr 27/16
Date Received: Apr 28/16
Sample Volume: 5X20L

Test Organism Information:

Culture Date: Apr 22/16
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC141
Stock Solution ID: 15Zn03
Date Initiated: Apr 26/16

72-h IC50 (95% CL): 34.0 (31.2 - 36.6) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.5 (17.4 - 53.5) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGL

Date reviewed: May 24/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck Coal **Setup by:** MLT

Sample ID: LC MLT FRDSDC WS 2016-04-26 N **Test Date/Time:** April 29/16 @ 1450h

Work Order No.: 16481 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: April 22/16 **Age of Culture:** 7d **Culture Health:** Good

Culture Count: 1 555 2 535 **Average:** 545 **Culture Cell Density (c1):** 545 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 545 x 10⁴ cells/ml = 4.04mL

Time Zero Counts: 1 20 2 22 **Average:** 21

No. of Cells/mL: 21 x 10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.3	23.0					✓	✓	✓	✓
6.0	7.4	23.0					✓	✓	✓	✓
11.9	7.4	23.0					✓	✓	✓	✓
23.8	7.6	23.0					✓	✓	✓	✓
47.6	7.8	23.0					✓	✓	✓	✓
95.2	8.2	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	"	"	MLT	MLT	"	"	MLT

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 6.8 Well 2: 6.8

Light intensity (lux): 3940 **Date measured:** April 29/16

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear, colourless, some debris, odourless

Comments:

Reviewed: JGw **Date reviewed:** May 24/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: Apr 29/16 @ 1450h

Work Order #: 16481 Termination Date: May 2/16 @ 1450h

Sample ID: ~~LC-FRDSDC WS 2016-04~~ MG Test set up by: ML

%(v/v) LC FRDSDC WS 2016-04-26 N

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	31					ML
	B	35					
	C	30					
	D	33					
	E	29					
	F	31					
	G	36					
	H	35					
1.5	A	35					
	B	34					
	C	38					
	D	33					
3.0	A	45					
	B	42					
	C	53					
	D	47					
6.0	A	70					
	B	61					
	C	63					
	D	67					
11.9	A	72					
	B	74					
	C	82					
	D	80					
23.8	A	86					
	B	90					
	C	84					
	D	80					
47.6	A	90					
	B	88					
	C	102					
	D	94					
95.2	A	92					
	B	83					
	C	90					
	D	86					

Comments:

Reviewed by: JCL Date Reviewed: May 24/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	29-Apr-16 @ 1450h
WO#:	16481	Termination Date:	02-May-16 @ 1450h
Sample ID:	LC FRDSDC WS 2016-04-26 N		
		Initial Cell Density:	9545 cell/mL

									210000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	31				31	30.0	mean	31.5
	B	35				35	34.0	SD	2.618615
	C	30				30	29.0	CV	8.301084
	D	33				33	32.0		
	E	29				29	28.0		
	F	31				31	30.0		
	G	36				36	35.0		
	H	35				35	34.0		
1.5	A	35				35	34.0		
	B	34				34	33.0		
	C	38				38	37.0		
	D	33				33	32.0		
3	A	45				45	44.0		
	B	42				42	41.0		
	C	53				53	52.0		
	D	47				47	46.0		
6	A	70				70	69.0		
	B	61				61	60.0		
	C	63				63	62.0		
	D	67				67	66.0		
11.9	A	72				72	71.0		
	B	74				74	73.0		
	C	82				82	81.0		
	D	80				80	79.0		
23.8	A	86				86	85.0		
	B	90				90	89.0		
	C	84				84	83.0		
	D	80				80	79.0		
47.6	A	90				90	89.0		
	B	88				88	87.0		
	C	102				102	101.0		
	D	94				94	93.0		
95.2	A	92				92	91.0		
	B	83				83	82.0		
	C	90				90	89.0		
	D	86				86	85.0		

JGH
May 24/16

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-8232-9799	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 10:20	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	12-2121-6828	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	29 Apr-16 14:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	02 May-16 14:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	07-5438-7274	**Code:**	2CF7094A	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:04	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	54h (8 °C)	**Station:**	LC FRDSDC WS 2016-04-26 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1791725	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7232	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	31.5	28	35	0.9258	2.619	8.31%	0.0%
1.5		4	34	32	37	1.08	2.16	6.35%	-7.94%
3		4	45.75	41	52	2.323	4.646	10.15%	-45.24%
6		4	64.25	60	69	2.016	4.031	6.27%	-104.0%
11.9		4	76	71	81	2.38	4.761	6.26%	-141.3%
23.8		4	84	79	89	2.082	4.163	4.96%	-166.7%
47.6		4	92.5	87	101	3.096	6.191	6.69%	-193.7%
95.2		4	86.75	82	91	2.016	4.031	4.65%	-175.4%

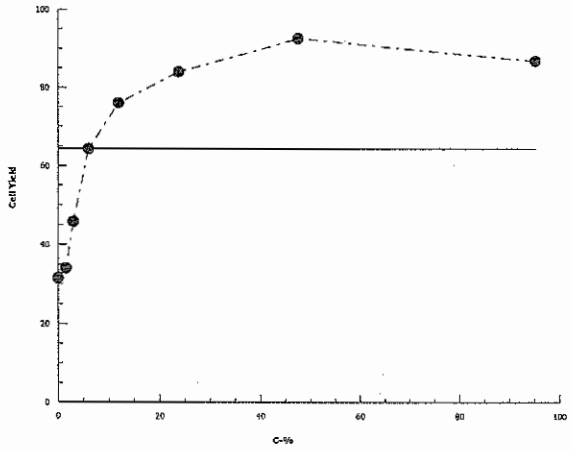
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	34	29	32	28	30	35	34
1.5		34	33	37	32				
3		44	41	52	46				
6		69	60	62	66				
11.9		71	73	81	79				
23.8		85	89	83	79				
47.6		89	87	101	93				
95.2		91	82	89	85				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	12-8232-9799	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 10:20	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-7659-1513	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 10:20	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	12-2121-6828	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	29 Apr-16 14:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	02 May-16 14:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	07-5438-7274	**Code:**	2CF7094A	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:04	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	54h (8 °C)	**Station:**	LC FRDSDC WS 2016-04-26 N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	19.9%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.008	2.526	6.265	10	0.5472	CDF	Non-Significant Effect
		3*	5.746	2.526	6.265	10	<0.0001	CDF	Significant Effect
		6*	13.21	2.526	6.265	10	<0.0001	CDF	Significant Effect
		11.9*	17.94	2.526	6.265	10	<0.0001	CDF	Significant Effect
		23.8*	21.17	2.526	6.265	10	<0.0001	CDF	Significant Effect
		47.6*	24.6	2.526	6.265	10	<0.0001	CDF	Significant Effect
		95.2*	22.28	2.526	6.265	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7232	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	20484.39	2926.341	7	178.4	<0.0001	Significant Effect
Error	459.25	16.40178	28			
Total	20943.64		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.86	18.48	0.6771	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.964	0.9166	0.2840	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	31.5	29.31	33.69	31	28	35	0.9258	8.31%	0.0%
1.5		4	34	30.56	37.44	33.5	32	37	1.08	6.35%	-7.94%
3		4	45.75	38.36	53.14	45	41	52	2.323	10.15%	-45.24%
6		4	64.25	57.84	70.66	64	60	69	2.016	6.27%	-104.0%
11.9		4	76	68.42	83.58	76	71	81	2.38	6.26%	-141.3%
23.8		4	84	77.38	90.62	84	79	89	2.082	4.96%	-166.7%
47.6		4	92.5	82.65	102.4	91	87	101	3.096	6.69%	-193.7%
95.2		4	86.75	80.34	93.16	87	82	91	2.016	4.65%	-175.4%

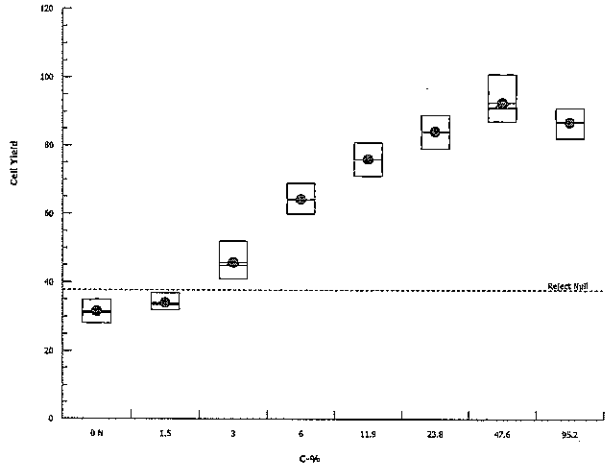
EC Alga Growth Inhibition Test **Nautilus Environmental**

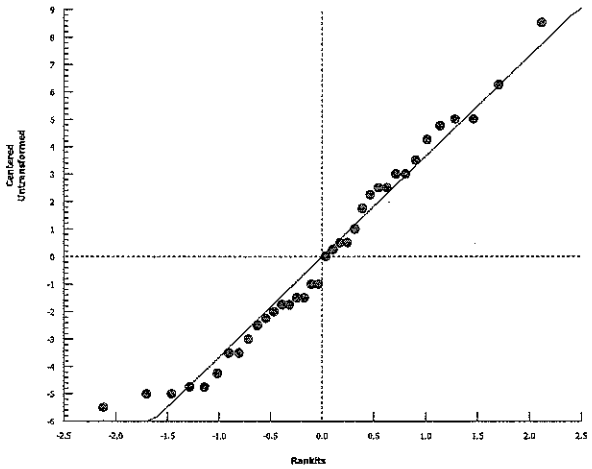
Analysis ID:	06-7659-1513	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 10:20	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	34	29	32	28	30	35	34
1.5		34	33	37	32				
3		44	41	52	46				
6		69	60	62	66				
11.9		71	73	81	79				
23.8		85	89	83	79				
47.6		89	87	101	93				
95.2		91	82	89	85				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 16481

Start Date: Apr 29/16
Set up by: MLT

Sample Information:

Sample ID: LC DCDS WS 2016-04-26 N
Sample Date: Apr 27/16
Date Received: Apr 28/16
Sample Volume: 5x20L.

Test Organism Information:

Culture Date: Apr 22/16
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC141
Stock Solution ID: 15Zn03
Date Initiated: Apr 26/16

72-h IC50 (95% CL): 34.0 (31.2 - 36.6) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.5 (17.4 - 53.5) mg/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGu

Date reviewed: May 29/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT

Sample ID: ~~LC~~ DCDS WS 2016-04-26.N | Test Date/Time: Apr 29/16 @ 1500h

Work Order No.: 16481 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Apr 22/16 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 555 2 535 | Average: 545 | Culture Cell Density (c1): 545 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 545 x 10⁴ cells/ml = 4.04mL

Time Zero Counts: 1 20 2 22 | Average: 21

No. of Cells/mL: 21 x 10⁴ | Initial Density: # cells/mL + 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.3	23.0					✓	✓	✓	✓
6.0	7.3	23.0					✓	✓	✓	✓
11.9	7.4	23.0					✓	✓	✓	✓
23.8	7.5	23.0					✓	✓	✓	✓
47.6	7.7	23.0					✓	✓	✓	✓
95.2	7.9	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	"	"	MLT	MLT	"	"	MLT

Initial control pH: Well 1: 7.0 | Well 2: 7.0

Final control pH: Well 1: 6.8 | Well 2: 6.8

Light intensity (lux): 3890 | Date measured: Apr 29/16

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear, colourless, some debris, odourless

Comments:

Reviewed: Joe | Date reviewed: May 29/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: Apr 29/16 @ 1500h
Work Order #: 16481 Termination Date: May 2/16 @ 1500h
Sample ID: LC/DCDS WS 2016-04-26 N Test set up by: MLT
%(v/v) 2019

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	39					MLT
	B	32					
	C	30					
	D	31					
	E	34					
	F	30					
	G	32					
	H	35					
1.5	A	38					
	B	35					
	C	35					
	D	40					
3.0	A	45					
	B	43					
	C	40					
	D	45					
6.0	A	54					
	B	50					
	C	58					
	D	49					
11.9	A	63					
	B	55					
	C	64					
	D	61					
23.8	A	97					
	B	90					
	C	92					
	D	90					
47.6	A	98					
	B	112					
	C	120					
	D	116					
95.2	A	116					
	B	110					
	C	128					
	D	124					

Comments:

Reviewed by: JGL Date Reviewed: May 24/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	29-Apr-16 @ 1500h
WO#:	16481	Termination Date:	02-May-16 @ 1500h
Sample ID:	LC DCDS WS 2016-04-26 N		
		Initial Cell Density:	9545 cell/mL

									210000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	39				39	38.0	mean	31.9
	B	32				32	31.0	SD	3.044316
	C	30				30	29.0	CV	9.537194
	D	31				31	30.0		
	E	34				34	33.0		
	F	30				30	29.0		
	G	32				32	31.0		
	H	35				35	34.0		
1.5	A	38				38	37.0		
	B	35				35	34.0		
	C	35				35	34.0		
	D	40				40	39.0		
3	A	45				45	44.0		
	B	43				43	42.0		
	C	40				40	39.0		
	D	45				45	44.0		
6	A	54				54	53.0		
	B	50				50	49.0		
	C	58				58	57.0		
	D	49				49	48.0		
11.9	A	63				63	62.0		
	B	55				55	54.0		
	C	64				64	63.0		
	D	61				61	60.0		
23.8	A	97				97	96.0		
	B	90				90	89.0		
	C	92				92	91.0		
	D	90				90	89.0		
47.6	A	98				98	97.0		
	B	112				112	111.0		
	C	120				120	119.0		
	D	116				116	115.0		
95.2	A	116				116	115.0		
	B	110				110	109.0		
	C	128				128	127.0		
	D	124				124	123.0		

JGe
May 24/16

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	03-6490-0139	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 10:16	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-0367-9767	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	29 Apr-16 15:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	02 May-16 15:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	13-8345-2068	**Code:**	5275CDA4	**Client:**	Teck Coal
Sample Date:	27 Apr-16 07:58	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	55h (6 °C)	**Station:**	LC DCDS WS 2016-04-26 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1740523	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9061	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	31.88	29	38	1.076	3.044	9.55%	0.0%
1.5		4	36	34	39	1.225	2.449	6.8%	-12.94%
3		4	42.25	39	44	1.181	2.363	5.59%	-32.55%
6		4	51.75	48	57	2.056	4.113	7.95%	-62.35%
11.9		4	59.75	54	63	2.016	4.031	6.75%	-87.45%
23.8		4	91.25	89	96	1.652	3.304	3.62%	-186.3%
47.6		4	110.5	97	119	4.787	9.574	8.66%	-246.7%
95.2		4	118.5	109	127	4.031	8.062	6.8%	-271.8%

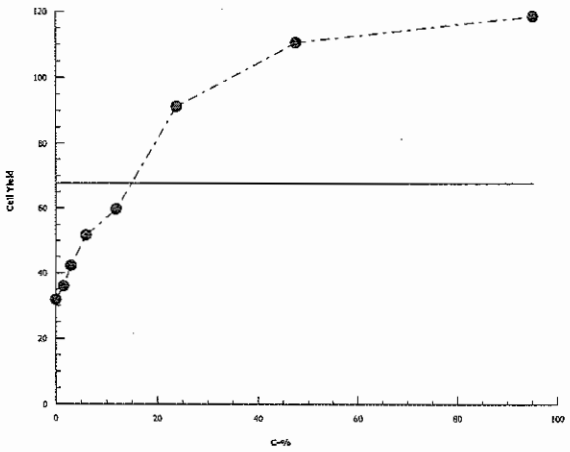
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	38	31	29	30	33	29	31	34
1.5		37	34	34	39				
3		44	42	39	44				
6		53	49	57	48				
11.9		62	54	63	60				
23.8		96	89	91	89				
47.6		97	111	119	115				
95.2		115	109	127	123				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	03-6490-0139	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 10:16	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-9746-8591	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 10:16	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	11-0367-9767	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	29 Apr-16 15:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	02 May-16 15:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	13-8345-2068	**Code:**	5275CDA4	**Client:**	Teck Coal
Sample Date:	27 Apr-16 07:58	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	55h (6 °C)	**Station:**	LC DCDS WS 2016-04-26 N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	24.3%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.345	2.526	7.745	10	0.3801	CDF	Non-Significant Effect
		3*	3.384	2.526	7.745	10	0.0068	CDF	Significant Effect
		6*	6.482	2.526	7.745	10	<0.0001	CDF	Significant Effect
		11.9*	9.092	2.526	7.745	10	<0.0001	CDF	Significant Effect
		23.8*	19.37	2.526	7.745	10	<0.0001	CDF	Significant Effect
		47.6*	25.64	2.526	7.745	10	<0.0001	CDF	Significant Effect
		95.2*	28.25	2.526	7.745	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9061	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	37454.88	5350.696	7	213.5	<0.0001	Significant Effect
Error	701.875	25.06697	28			
Total	38156.75		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.53	18.48	0.0844	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.958	0.9166	0.1860	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	31.88	29.33	34.42	31	29	38	1.076	9.55%	0.0%
1.5		4	36	32.1	39.9	35.5	34	39	1.225	6.8%	-12.94%
3		4	42.25	38.49	46.01	43	39	44	1.181	5.59%	-32.55%
6		4	51.75	45.21	58.29	51	48	57	2.056	7.95%	-62.35%
11.9		4	59.75	53.34	66.16	61	54	63	2.016	6.75%	-87.45%
23.8		4	91.25	85.99	96.51	90	89	96	1.652	3.62%	-186.3%
47.6		4	110.5	95.27	125.7	113	97	119	4.787	8.66%	-246.7%
95.2		4	118.5	105.7	131.3	119	109	127	4.031	6.8%	-271.8%

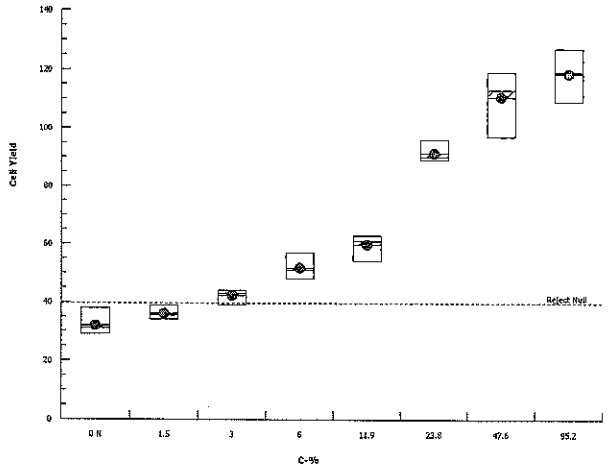
EC Alga Growth Inhibition Test — **Nautilus Environmental**

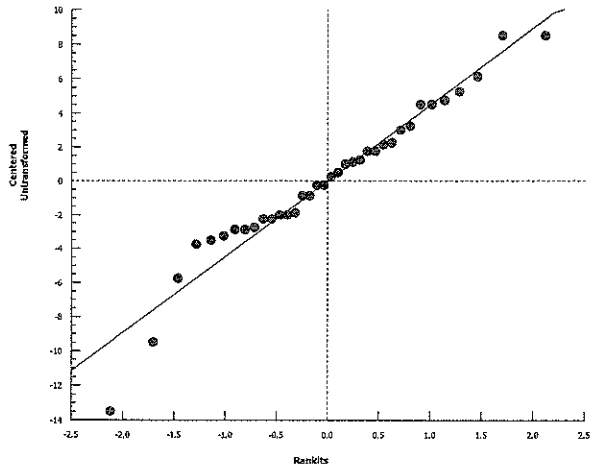
Analysis ID:	02-9746-8591	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 10:16	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	38	31	29	30	33	29	31	34
1.5		37	34	34	39				
3		44	42	39	44				
6		53	49	57	48				
11.9		62	54	63	60				
23.8		96	89	91	89				
47.6		97	111	119	115				
95.2		115	109	127	123				

Graphics





Analyst:_____ QA: JOH May 24/16

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 16481

Start Date: Apr 29/16
Set up by: MLT

Sample Information:

Sample ID: LC-LC5_WS_2016-04-25_N
Sample Date: April 27/16
Date Received: April 28/16
Sample Volume: 5x20L

Test Organism Information:

Culture Date: April 22/16
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC141
Stock Solution ID: 15Zn03
Date Initiated: April 26/16

72-h IC50 (95% CL): 34.0 (31.2 - 36.6) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.5 (17.4 - 53.5) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGL

Date reviewed: May 24/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MLT

Sample ID: LC-LC5-WS-2016-04-25-N **Test Date/Time:** April 29/16 @ 1505h

Work Order No.: 16481 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: April 22/16 **Age of Culture:** 7d **Culture Health:** Good

Culture Count: 1 555 2 535 **Average:** 545 **Culture Cell Density (c1):** 545 x 10⁴ cells/mL.

$$v1 = \frac{220{,}000 \text{ cells/ml} \times 100 \text{ ml}}{(c1)\ 545 \times 10^4 \text{ cells/ml}} = 4.04 \text{mL}$$

Time Zero Counts: 1 20 2 22 **Average:** 21

No. of Cells/mL: 21 x 10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.3	23.0					✓	✓	✓	✓
6.0	7.3	23.0					✓	✓	✓	✓
11.9	7.4	23.0					✓	✓	✓	✓
23.8	7.6	23.0					✓	✓	✓	✓
47.6	7.8	23.0					✓	✓	✓	✓
95.2	8.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	~	~	MLT	MLT	~	~	MLT

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 6.8 Well 2: 6.8

Light intensity (lux): 3680 **Date measured:** April 29/16

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear, colourless, some debris, odourless

Comments:

Reviewed: JGL **Date reviewed:** May 24/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: April 29/16 @ 1505h
Work Order #: 16481 — Termination Date: May 2/16 @ 1505h
Sample ID: LC_LC5_WS_2016-04-25_N — Test set up by: ML

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	36					ML
	B	32					
	C	34					
	D	30					
	E	32					
	F	31					
	G	31					
	H	36					
1.5	A	41					
	B	49					
	C	47					
	D	49					
3.0	A	65					
	B	57					
	C	68					
	D	54					
6.0	A	66					
	B	67					
	C	72					
	D	62					
11.9	A	76					
	B	88					
	C	90					
	D	86					
23.8	A	90					
	B	102					
	C	95					
	D	92					
47.6	A	95					
	B	93					
	C	97					
	D	101					
95.2	A	81					
	B	94					
	C	86					
	D	84					

Comments:

Reviewed by: JGe — Date Reviewed: May 24/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	29-Apr-16 @ 1505h		
WO#:	16481	Termination Date:	02-May-16 @ 1505h		
Sample ID:	LC_LC5_WS_2016-04-25_N				
		Initial Cell Density:	9545 cell/mL		210000
					0.22
					0.01
					9545.455

Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		
Control	A	36				36	35.0	mean	31.8
	B	32				32	31.0	SD	2.31455
	C	34				34	33.0	CV	7.2795
	D	30				30	29.0		
	E	32				32	31.0		
	F	31				31	30.0		
	G	31				31	30.0		
	H	36				36	35.0		
1.5	A	41				41	40.0		
	B	49				49	48.0		
	C	47				47	46.0		
	D	49				49	48.0		
3	A	65				65	64.0		
	B	57				57	56.0		
	C	68				68	67.0		
	D	54				54	53.0		
6	A	66				66	65.0		
	B	67				67	66.0		
	C	72				72	71.0		
	D	62				62	61.0		
11.9	A	76				76	75.0		
	B	88				88	87.0		
	C	90				90	89.0		
	D	86				86	85.0		
23.8	A	90				90	89.0		
	B	102				102	101.0		
	C	95				95	94.0		
	D	92				92	91.0		
47.6	A	95				95	94.0		
	B	93				93	92.0		
	C	97				97	96.0		
	D	101				101	100.0		
95.2	A	81				81	80.0		
	B	94				94	93.0		
	C	86				86	85.0		
	D	84				84	83.0		

JGH
May 24/16

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-9666-5271	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-16 16:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	17-8192-7362	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	29 Apr-16 15:05	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	02 May-16 15:05	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	18-5443-1080	**Code:**	6E885F68	**Client:**	Teck Coal
Sample Date:	27 Apr-16 06:50	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	56h (6.6 °C)	**Station:**	LC_LC5_WS_2016-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	199506	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.4188	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	31.75	29	35	0.8183	2.315	7.29%	0.0%
1.5		4	45.5	40	48	1.893	3.786	8.32%	-43.31%
3		4	60	53	67	3.291	6.583	10.97%	-88.98%
6		4	65.75	61	71	2.056	4.113	6.26%	-107.1%
11.9		4	84	75	89	3.109	6.218	7.4%	-164.6%
23.8		4	93.75	89	101	2.626	5.252	5.6%	-195.3%
47.6		4	95.5	92	100	1.708	3.416	3.58%	-200.8%
95.2		4	85.25	80	93	2.78	5.56	6.52%	-168.5%

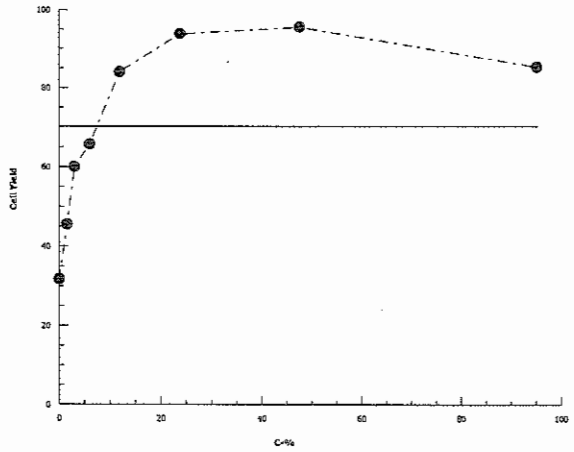
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	35	31	33	29	31	30	30	35
1.5		40	48	46	48				
3		64	56	67	53				
6		65	66	71	61				
11.9		75	87	89	85				
23.8		89	101	94	91				
47.6		94	92	96	100				
95.2		80	93	85	83				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-9666-5271	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-16 16:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	20-9709-2805	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-16 16:26	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-8192-7362	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	29 Apr-16 15:05	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	02 May-16 15:05	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	18-5443-1080	**Code:**	6E885F68	**Client:**	Teck Coal
Sample Date:	27 Apr-16 06:50	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	56h (6.6 °C)	**Station:**	LC_LC5_WS_2016-04-25_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	22.3%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	4.901	2.526	7.088	10	0.0001	CDF	Significant Effect
		3*	10.07	2.526	7.088	10	<0.0001	CDF	Significant Effect
		6*	12.12	2.526	7.088	10	<0.0001	CDF	Significant Effect
		11.9*	18.62	2.526	7.088	10	<0.0001	CDF	Significant Effect
		23.8*	22.1	2.526	7.088	10	<0.0001	CDF	Significant Effect
		47.6*	22.72	2.526	7.088	10	<0.0001	CDF	Significant Effect
		95.2*	19.07	2.526	7.088	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.4188	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	20549	2935.572	7	139.8	<0.0001	Significant Effect
Error	587.75	20.99107	28			
Total	21136.75		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.384	18.48	0.4957	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9876	0.9166	0.9512	Normal Distribution

Cell Yield Summary

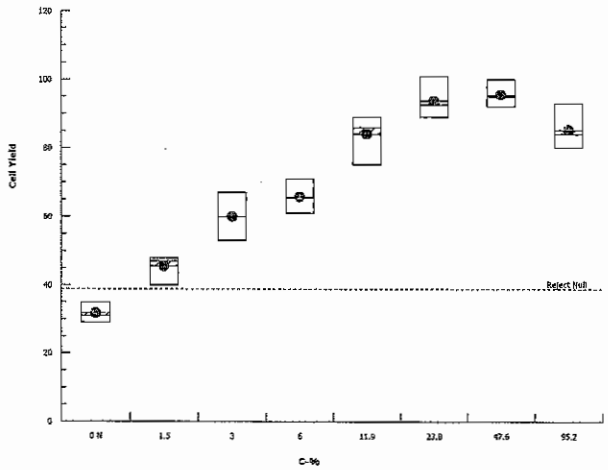
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	31.75	29.81	33.69	31	29	35	0.8183	7.29%	0.0%
1.5		4	45.5	39.48	51.52	47	40	48	1.893	8.32%	-43.31%
3		4	60	49.53	70.47	60	53	67	3.291	10.97%	-88.98%
6		4	65.75	59.21	72.29	65.5	61	71	2.056	6.26%	-107.1%
11.9		4	84	74.11	93.89	86	75	89	3.109	7.4%	-164.6%
23.8		4	93.75	85.39	102.1	92.5	89	101	2.626	5.6%	-195.3%
47.6		4	95.5	90.06	100.9	95	92	100	1.708	3.58%	-200.8%
95.2		4	85.25	76.4	94.1	84	80	93	2.78	6.52%	-168.5%

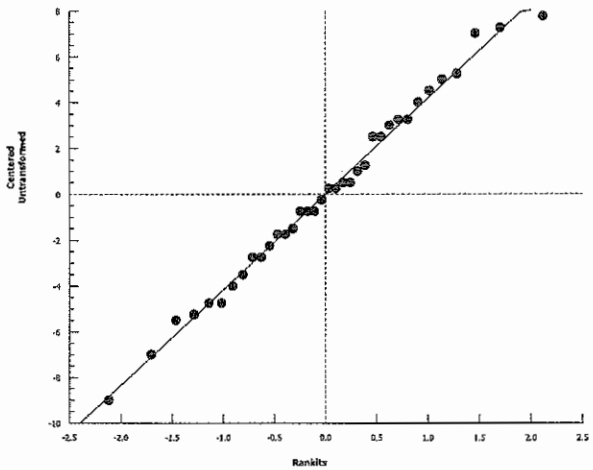
Analysis ID:	20-9709-2805	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-16 16:26	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	35	31	33	29	31	30	30	35
1.5		40	48	46	48				
3		64	56	67	53				
6		65	66	71	61				
11.9		75	87	89	85				
23.8		89	101	94	91				
47.6		94	92	96	100				
95.2		80	93	85	83				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 16481

Start Date: Apr 29/16
Set up by: MLT

Sample Information:

Sample ID: LC-WTP_OUT_WS_20160427_N
Sample Date: Apr 27/16
Date Received: Apr 28/16
Sample Volume: 5X20L

Test Organism Information:

Culture Date: Apr 22/16
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC141
Stock Solution ID: 15Zn03
Date Initiated: Apr 26/16

72-h IC50 (95% CL): 34.0 (31.2 - 36.6) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.5 (17.4 - 53.5) ug/L Zn CV (%): 32

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	72.7 (64.9 - 82.6)
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGL

Date reviewed: May 24/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MH

Sample ID: LC_WTF_OUT_WS_20160427_N | Test Date/Time: April 29/16 @ 1515h

Work Order No.: 16481 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: April 22/16 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 555 2 535 | Average: 545 | Culture Cell Density (c1): 545 X104 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 545 X10⁴ cells/ml = 4.04mL

Time Zero Counts: 1 20 2 22 | Average: 21

No. of Cells/mL: 21 X10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL.

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.4	23.0					✓	✓	✓	✓
6.0	7.5	23.0					✓	✓	✓	✓
11.9	7.8	23.0					✓	✓	✓	✓
23.8	8.0	23.0					✓	✓	✓	✓
47.6	8.2	23.0					✓	✓	✓	✓
95.2	8.3	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MH	MH	MH	A	MH	MH	MH	A	A	MH

Initial control pH: Well 1: 7.0 | Well 2: 7.0

Final control pH: Well 1: 6.8 | Well 2: 6.8

Light intensity (lux): 3770 | Date measured: April 22/16

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear, colourless, some brown debris, hydrocarbon smell

Comments:

Reviewed: JGL | Date reviewed: May 24/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: April 29/16 @ 1515h
Work Order #: 16481 Termination Date: May 2/16 @ 1515h
Sample ID: LC_WTF_OUT_WS_20160427_N Test set up by: ML
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	34					ML
	B	33					
	C	31					
	D	32					
	E	37					
	F	32					
	G	36					
	H	33					
1.5	A	76					
	B	71					
	C	74					
	D	73					
3.0	A	74					
	B	79					
	C	89					
	D	80					
6.0	A	94					
	B	82					
	C	100					
	D	98					
11.9	A	113					
	B	106					
	C	111					
	D	100					
23.8	A	88					
	B	85					
	C	93					
	D	86					
47.6	A	73					
	B	77					
	C	75					
	D	71					
95.2	A	23					
	B	20					
	C	19					
	D	20					

Comments:

Reviewed by: JGu Date Reviewed: May 24/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	29-Apr-16 @ 1515h
WO#:	16481	Termination Date:	02-May-16 @ 1515h
Sample ID:	LC_WTF_OUT_WS_20160427_N		
		Initial Cell Density:	9545 cell/mL

									210000
									0.22
									0.01
Concentration % v/v	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	34				34	33.0	mean	32.5
	B	33				33	32.0	SD	2.070197
	C	31				31	30.0	CV	6.36094
	D	32				32	31.0		
	E	37				37	36.0		
	F	32				32	31.0		
	G	36				36	35.0		
	H	33				33	32.0		
1.5	A	76				76	75.0		
	B	71				71	70.0		
	C	74				74	73.0		
	D	73				73	72.0		
3	A	74				74	73.0		
	B	79				79	78.0		
	C	89				89	88.0		
	D	80				80	79.0		
6	A	94				94	93.0		
	B	82				82	81.0		
	C	100				100	99.0		
	D	98				98	97.0		
11.9	A	113				113	112.0		
	B	106				106	105.0		
	C	111				111	110.0		
	D	100				100	99.0		
23.8	A	88				88	87.0		
	B	85				85	84.0		
	C	93				93	92.0		
	D	86				86	85.0		
47.6	A	73				73	72.0		
	B	77				77	76.0		
	C	75				75	74.0		
	D	71				71	70.0		
95.2	A	23				23	22.0		
	B	20				20	19.0		
	C	19				19	18.0		
	D	20				20	19.0		

JCH
May 24/16

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	11-3238-2829	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 10:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-6046-3108	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	29 Apr-16 15:15	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	02 May-16 15:15	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	05-4497-8051	**Code:**	207BB483	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	54h (10.2 °C)	**Station:**	LC_WTF_OUT_WS_20160427_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1464867	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			1.0000	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	39.36	29.75	53.71	2.541	1.862	3.361
IC10	49.13	45.07	51.66	2.036	1.936	2.219
IC15	51.7	48.99	54.11	1.934	1.848	2.041
IC20	54.4	51.81	56.73	1.838	1.763	1.93
IC25	57.25	54.82	59.64	1.747	1.677	1.824
IC40	66.68	64.74	68.9	1.5	1.451	1.545
IC50	73.81	71.72	76.33	1.355	1.31	1.394

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	32.5	30	36	0.7319	2.07	6.37%	0.0%
1.5		4	72.5	70	75	1.041	2.082	2.87%	-123.1%
3		4	79.5	73	88	3.122	6.245	7.86%	-144.6%
6		4	92.5	81	99	4.031	8.062	8.72%	-184.6%
11.9		4	106.5	99	112	2.901	5.802	5.45%	-227.7%
23.8		4	87	84	92	1.78	3.559	4.09%	-167.7%
47.6		4	73	70	76	1.291	2.582	3.54%	-124.6%
95.2		4	19.5	18	22	0.866	1.732	8.88%	40.0%

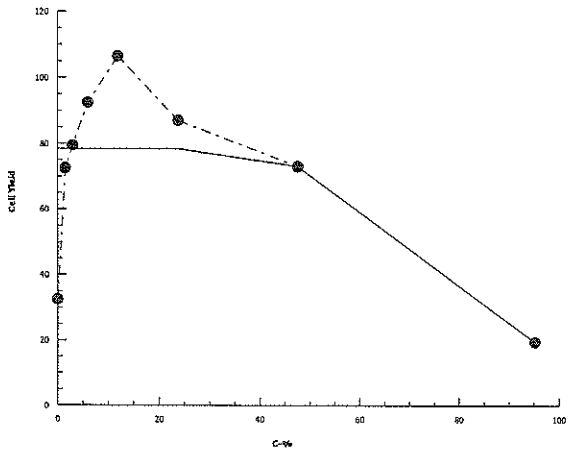
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	33	32	30	31	36	31	35	32
1.5		75	70	73	72				
3		73	78	88	79				
6		93	81	99	97				
11.9		112	105	110	99				
23.8		87	84	92	85				
47.6		72	76	74	70				
95.2		22	19	18	19				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	11-3238-2829	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 10:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: JGL May 24/16

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-6106-1758	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 10:28	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-5692-5427	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	29 Apr-16 15:15	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	02 May-16 15:15	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	7d
Sample ID:	05-4497-8051	**Code:**	207BB483	**Client:**	Teck Coal
Sample Date:	27 Apr-16 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	28 Apr-16 10:50	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	54h (10.2 °C)	**Station:**	LC_WTF_OUT_WS_20160427_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1056879	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			1.0000	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	50.68	N/A	53.54	1.973	1.868	NA
IC10	55.48	48.37	59.72	1.803	1.674	2.067
IC15	60.72	53.85	66.74	1.647	1.498	1.857
IC20	66.45	59.58	74.27	1.505	1.346	1.678
IC25	72.71	64.87	82.61	1.375	1.211	1.542
IC40	95.2	84.85	N/A	1.05	NA	1.179
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	32.5	30	36	0.7319	2.07	6.37%	0.0%
1.5		4	32	32	32	0	0	0.0%	1.54%
3		4	32	32	32	0	0	0.0%	1.54%
6		4	32	32	32	0	0	0.0%	1.54%
11.9		4	32	32	32	0	0	0.0%	1.54%
23.8		4	32	32	32	0	0	0.0%	1.54%
47.6		4	32	32	32	0	0	0.0%	1.54%
95.2		4	19.5	18	22	0.866	1.732	8.88%	40.0%

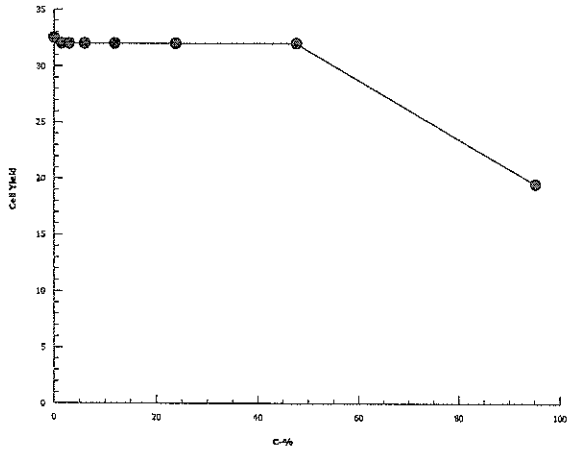
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	33	32	30	31	36	31	35	32
1.5		32	32	32	32				
3		32	32	32	32				
6		32	32	32	32				
11.9		32	32	32	32				
23.8		32	32	32	32				
47.6		32	32	32	32				
95.2		22	19	18	19				

EC Alga Growth Inhibition Test | **Nautilus Environmental**

Analysis ID:	00-6106-1758	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-16 10:28	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



APPENDIX E – Analytical Chemistry

All analytical chemistry for Q2 chronic toxicity has been uploaded to EMS.

APPENDIX F – Chain-of-Custody Forms

Teck

COC ID:	20160427-0941	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Krysta Pearcy			Email 1:	jay.jones@teck.com	x	x	
Email	jay.jones@teck.com			Email	Krysta@NautilusEnvironmental.ca			Email 2:	tim.chala@teck.com	x	x	
Address	Box 2003			Address	8664 commerce Court			Email 3:	teckcoal@equisonline.com			x
	15km North Hwy 43							Email 4:	cait.good@teck.com	x	x	x
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number				
Phone Number	250-425-6111			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	7-d C. dubia dilution series (16479)	72-h P. subcapitata dilution series (16481)	7-d L. minor plant growth dilution series (16482)	7-d O. mykiss development dilution series (16474)	30-d O. mykiss embryo-alevin (semi-annual) pass/fail (16473)							
LC_LC5_WS_2016-04-25_N ① 5x20L	LC_LC5	WS	N	2016/04/27	06:50	G	5	X	X	X	X								6.6
LC_LCDSSLCC_WS_2016-04-25_N ① 8x20L	LC_LCDSSLCC	WS	N	2016/04/27	08:18	G	8	X	X	X	X	X							8.0
LC_DC1_WS_2016-04-26_N ① 5x20L	LC_DC1	WS	N	2016/04/27	08:30	G	5	X	X	X	X								7.5
LC_DCDS_WS_2016-04-26_N ① 5x20L	LC_DCDS	WS	N	2016/04/27	07:58	G	5	X	X	X	X								6.0
LC_FRDSDC_WS_2016-04-26_N ① 5x20L	LC_FRDSDC	WS	N	2016/04/27	09:04	G	5	X	X	X	X								8.0

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	T. Phillips/ Nupqu	April 27, 2016	Nautilus	Apr 28/16 @ 10:50.
	G.Abott/ Nupqu		NY - Nan Yamamoto.	
	J. Jones/ Teck			

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	T. Phillips/ G. Abbott/ J. Jones	Mobile #	(250) 919-0965
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	April 27, 2016
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

sample description
① clear, colourless, some debris, odourless

Teck

COC ID:	20160427-Chronic Toxicity	TURNAROUND TIME:	REGULAR	RUSH:	No

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	WLC AWTF			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF
Project Manager	Thomas Davidson			Lab Contact	Krysta Pearcy			Email 1:	thomas.davidson@teck.com	x	x
Email	Thomas.Davidson@gmail.com			Email	Krysta@NautilusEnvironmental.com			Email 2:	teckcoal@equisonline.com		
Address	15 Km North HWY 43			Address	8664 commerce Court			Email 3:	tmckenna@epcor.com	x	x
								Email 4:	greg.ross@teck.com	x	x
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	Colin.Lynch@teck.com		
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada				
Phone Number	250.603.9417			Phone Number	604-420-8773			PO 411634			

SAMPLE DETAILS								ANALYSIS REQUESTED												Filtered - F: Field, L: Lab, FL: Field & Lab, N: None
								FIL	N	N										
								PRESERV	N	N										
Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	NAUT_Chronic Toxicity Test	7-d C.dubia dilution	72-h P.subcapitata dilution	7-d Lemna dilution	7-d embryo dilution							
LC_WTF_OUT_WS_20160427_N (1)	LC_WTF_OUT	WS	N	27-Apr-16	0900	G	5		X	X	X	X	X							10.2 °C
										WO# 164479	164481	164482	164474							

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Nautilus NY - Nan Yamamoto	Apr 28/16 @ 10:50

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Jocelyn Traverse	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature	Jocelyn Traverse	Date/Time	27-April-16
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Sample description: (1) clear, colourless, some brown debris, hydrocarbon smell

~~clear, no precipitate, no particulate, odourless~~

Teck

COC ID:	Dec Monthly East	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Krysta Pearcy			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commence Court				Yes PDF	Yes Excel	
					Imperial Square Lake City			Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	jim.thorner@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	Zahir.jina@teck.com		
Phone Number	250 865 3274			Phone Number				PO number	359182		

SAMPLE DETAILS / ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	96 hr Rainbow trout (pass/fail) #N/A	48 hr daphnia (pass/fial) #N/A	48 hr daphnia @ 10 deg C (pass/fial) #N/A	7 day C dubia pass fail #N/A	7day embryo (pass Fail) #N/A	72 hr P Subcapitata pass fail #N/A	30 day RT early life stage pass fail #N/A	28 day H azteca P/F #N/A	30-d FHM pf conducted in Calgary #N/A	#N/A	#N/A	Temp #N/A
X20L GH_ER2_WS_2016_04_27_N (2)	GH_ER2	WS	N	27-Apr		G	6				X	X	X	X					8.0
X20L GH_FR1_WS_2016_04_27_N (1)	GH_FR1	WS	N	27-Apr	14:06	G	4				X		X	X	X	X			7.8 EL
X20L GH_ERC_WS_2016_04_27_N (1)	GH_ERC	WS	N	27-Apr		G	3				X		X	X					8.0
										WO #	16478	16475	16480	16473	16476	16477			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
	Jevin Wolchuk	April 27/16	14:30	Nautilus NY - Wan Yamamoto	Apr 28/16	10:50

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Jevin Wolchuk	Mobile #	250.425.5132
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	[signature]	Date/Time	April 27/16 14:30
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Sample description

(2) ~~(1)~~ clear, no precipitate or particulate, odourless, colourless

(1) ~~(2)~~ clear, no precipitate, some particulate, odourless, colourless

Toxicity testing on Line Creek Operations samples with *Ceriodaphnia dubia*, *Oncorhynchus mykiss*, *Lemna minor* and *Pseudokirchneriella subcapitata*

Fourth Quarter 2016 Results

Final Report

March 29, 2017

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

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SIGNATURE PAGE



Report By:
Krysta Pearcy, R.P. Bio.
Laboratory Coordinator



Reviewed By:
James Elphick, R.P. Bio.
Environmental Toxicologist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

SUMMARY

Summaries of sample information and test results from the toxicity tests conducted on samples collected from the Line Creek Operations to meet requirements of the semi-annual toxicity testing program required under BC Ministry of Environment permit number 106970 in the fourth quarter of 2016 are provided in the tables below.

Sample and Test Type Information

Sample IDs	GH_ER2*, LC_LCDSSLCC, LC_DC1, LC_FRDSDC, LC_DCDS, LC_LC5, WL_BFWB_OUT_SP21
Sample collection dates	October 17 and 18, 2016
Sample receipt dates	October 18 and 19, 2016
Sample receipt temperatures	Ranged from 2.5 to 8.3°C
Test types	*Ceriodaphnia dubia* survival and reproduction 7-d rainbow trout *(Oncorhynchus mykiss)* embryo viability 7-d *Lemna minor* growth inhibition 72-h *Pseudokirchneriella subcapitata* growth inhibition

*Reference site; conducted as a single concentration toxicity test for *C. dubia*, *O. mykiss* and *P. subcapitata*

Summary of Results

Endpoint	Point Estimate with 95% CL					
	LC_LCDSSCLCC	**LC_DC1**	**LC_FRDSDC**	**LC_DCDS**	**LC_LC5**	**WL_BFWB_OUT_SP21**
Ceriodaphnia dubia						
Survival LC50	>100	>100	>100	>100	>100	>100
Reproduction IC25	>100	90.3 (45.1 – 100)	>100	29.0 (21.1 – 38.0)	>100	62.3 (51.1 – 67.9)
Reproduction IC50	>100	>100	>100	65.3 (51.7 – 82.5)	>100	82.8 (70.8 – N/A)
Oncorhynchus mykiss						
Embryo viability EC25	>100	>100	>100	>100	>100	43.0 (35.8 – 51.7)
Embryo viability EC50	>100	>100	>100	>100	>100	>100
Lemna minor						
Frond count IC25	69.7 (52.6 – 83.6)	7.4 (2.7 – 11.0)	66.4 (53.5 – 71.9)	2.5 (0.1 – 87.1)	75.7 (19.3 – N/A)	10.1 (2.6 – 18.0)
Frond count IC50	>97	>97	96.1 (85.3 – N/A)	>97	>97	81.2 (28.2 – N/A)
Dry weight IC25	75.0 (58.9 – 90.5)	8.4 (1.9 – 13.3)	>97	55.9 (N/A – N/A)	>97	11.7 (2.1 – N/A)
Dry weight IC50	>97	>97	>97	>97	>97	>97
Pseudokirchneriella subcapitata						
Growth IC25	>95.2	>95.2	>95.2	>95.2	>95.2	>95.2
Growth IC50	>95.2	>95.2	>95.2	>95.2	>95.2	>95.2

CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effective Concentration, N/A = Not Available

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on six samples collected from the Line Creek Operations as part of a toxicity testing program required under BC Ministry of Environment permit number 106970, Section 5.2. Test types included survival and reproduction of a cladoceran (*Ceriodaphnia dubia*), embryo development of rainbow trout (*Oncorhynchus mykiss*), growth of a freshwater plant (*Lemna minor*) and population growth of a unicellular green alga (*Pseudokirchneriella subcapitata*). The samples from Line Creek Operations were tested using serial dilutions of the sample using laboratory control water.

In addition to the Line Creek samples, a sample collected from GH_ER2 was tested at full strength as a site reference water. GH_ER2 is an upstream Elk River reference location that is not required as part of the Line Creek Operations testing program, but the data for this sample were included here as a basis for comparison to Line Creek Operations mine-influenced samples. This sample was tested with all of the species except for *L. minor*.

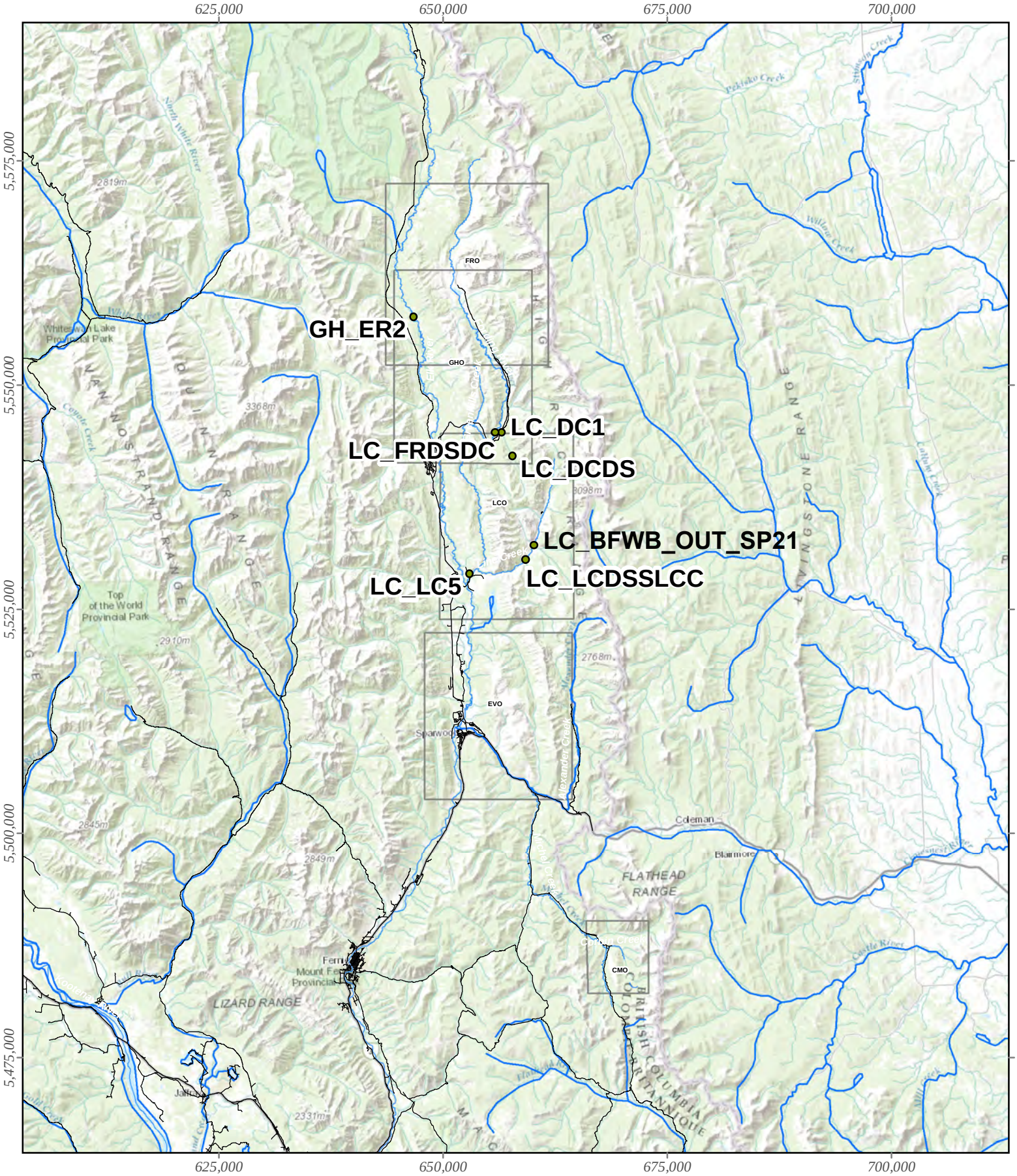
The toxicity tests that were conducted on the samples are summarized in Table 1 and the locations of sample sites are shown in Figure 1. Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 2.5 to 8.3°C and were stored in the dark at 4 ± 2°C prior to testing.

This report describes the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. Results of analytical chemistry that was performed on the samples tested in this program have been uploaded to the BC Ministry of Environment web reporting system (EMS). Samples for water chemistry analysis were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix E.

Table 1. Summary of toxicity testing program.

Sample ID	EMS #	Location Description	Species Tested	Sample Collection Date
GH_ER2*	200389	Elk River upstream of Greenhill Operations	*C. dubia*, *O. mykiss*, and *P. subcapitata*	October 17, 2016
LC_LCDSSLCC	297110	Line Creek downstream of South Line Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 17, 2016
LC_DC1	E288270	Dry Creek near mouth	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 17, 2016
LC_FRDSDC	E288272	Fording River downstream of Dry Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 17, 2016
LC_DCDS	E295210	Dry Creek downstream of sedimentation ponds	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 18, 2016
LC_LC5	200028	Lower Fording River (downstream of Line Creek)	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 17, 2016
WL_BFWB_OUT_SP21	E291569	West Line Creek Active Water Treatment Facility Effluent Outfall	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 17, 2016

*Reference site, tested as a single concentration toxicity test.



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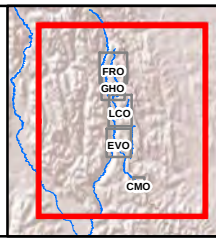

Line Creek Chronic Toxicity Monitoring Locations

- Monitoring Locations
- Roads
- Rivers

N

0 2.5 5 10 15 Kilometers

DATE:	MINE OPERATION:
1/26/2017	Elk Valley
SCALE:	COORDINATE SYSTEM:
1:550,000	NAD 1983 UTM Zone 11N

Document Path: \\teckcominco.loc\CGO\Groups\TCGIS\Data\Operations\SPO\Dan_Vasiga\LCO Chronic Toxicity Monitoring Locations.mxd

2.0 METHODS

Methods for the toxicity tests are summarized in Tables 2 through 5. Testing was conducted according to procedures described by Environment Canada protocols (2007a, 2007b and 2007c). The rainbow trout embryo viability test followed modified procedures described by Environment Canada (1998) and Canaria et al. (1999). Statistical analyses for the tests were performed using CETIS (Tidepool Scientific Software, 2013).

Table 2. Test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test species	*Ceriodaphnia dubia*
Organism source	In-house culture
Organism age	<24 hour old neonates, produced within a 12 hour window
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20-mL glass test tube
Test volume	15 mL
Test solution depth	10 cm
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	10 per treatment
Number of organisms	1 per replicate
Control/dilution water	20% Perrier water and 80% deionized water + 5 µg/L Se and 2
Test solution renewal	Daily (100% renewal)
Test temperature	25 ± 1°C
Feeding	Daily with *Pseudokirchneriella subcapitata* and YCT (3:1 ratio)
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured
Test protocol	Environment Canada (2007a), EPS 1/RM/21
Statistical software	CETIS Version 1.8.7
Test endpoints	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods; no ephippia present
Reference toxicant	Sodium chloride (NaCl)

Table 3 . Test conditions: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Test species	*Oncorhynchus mykiss*
Organism source	Vancouver Island Trout Hatchery, Duncan, BC
Organism age	<30 minutes post fertilization, <24 hour old gametes
Test type	Static-renewal
Test duration	7 days
Test vessel	2-L plastic container
Test volume	2 L
Test solution depth	17 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	4 per treatment
Number of organisms	30 eggs per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tapwater
Test solution renewal	Daily (80% renewal)
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark
Aeration	Continuous gentle aeration
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival checked daily
Test protocol	Environment Canada (1998), EPS 1/RM/28; Canaria et al. (1999)
Statistical software	CETIS Version 1.8.7
Test endpoints	Embryo viability
Test acceptability criteria for controls	Embryo viability ≥70%
Reference toxicant	Sodium dodecyl sulphate (SDS)

Table 4. Test conditions: *Lemna minor* growth inhibition test.

Test species	*Lemna minor*, strain CPCC# 490
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Wainfleet, Stinking Barn, Niagara Peninsula, Ontario, Canada
Organism age	7- to 10-day old culture
Test type	Static
Test duration	7 days
Test vessel	250-mL glass container
Test volume	100 mL
Test solution depth	4 cm
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	4 per treatment
Number of organisms	Two 3-frond plants per replicate
Control/dilution water	Modified APHA media (deionized water plus 1% of each APHA stock solution A, B and C)
Test solution renewal	None
Test temperature	25 ± 2°C
Feeding	None
Light intensity	4000 to 5600 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature, pH and conductivity measured in all concentrations at test initiation; dissolved oxygen of highest concentration measured at test initiation; temperature and pH measured at test termination
Test protocol	Environment Canada (2007b), EPS 1/RM/37
Statistical software	CETIS Version 1.8.7
Test endpoints	Number of fronds and dry weight
Test acceptability criteria for controls	≥ 8-fold increase in number of fronds
Reference toxicant	Potassium chloride (KCl)

Table 5. Test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test species	*Pseudokirchneriella subcapitata*, strain UTCC# 37
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Center, and originally isolated from Nivelta River, Norway.
Organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	4 per treatment; 8 for laboratory control
Number of organisms	10,000 cells/mL
Control/dilution water	Deionized water supplemented with nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature and pH measured at test initiation; pH of two control wells measured at test termination
Test protocol	Environment Canada (2007c), EPS 1/RM/25
Statistical software	CETIS Version 1.8.7
Test endpoints	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤ 20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc (added as $ZnCl_2$)

3.0 RESULTS

The results of the toxicity tests and associated statistical analyses are provided in Appendices A through D, with the exception of data for GH_ER2 (the site reference water) for *C. dubia* and *P. subcapitata*, which are reproduced here, but the raw data have been provided in a separate report (Nautilus Environmental, 2017). The statistical analyses for sample GH_ER2 involved a comparison of performance in the site water with the control using a hypothesis test, since there were no dilutions tested for this sample. The results for all of the other samples are presented here on the basis of point estimates (e.g., IC25), since the data available for a range of test concentrations in these samples enabled statistical fitting of dose-response relationships. This approach is considered preferable to hypothesis testing in cases where the data allow. Hypothesis tests were conducted for all samples in the *P. subcapitata* test to identify stimulation in cell growth relative to the control, as specified in the test method for this species.

Results of the toxicity tests using *C. dubia* are provided in Table 6. There were no statistically significant differences between the results of the control and the site reference water, GH_ER2. There was no adverse effect on survival in the samples; the LC50 values were all >100%. An adverse effect on reproduction was observed in three of the six samples. The IC25 values for LC_DC1, LC_DCDS and WL_BFWB_OUT_SP21 were 90.3, 29.0 and 62.3, respectively, relative to the laboratory water control.

Results of the toxicity tests using *O. mykiss* are provided in Table 7. There was no adverse effect in the site reference water (GH_ER2) compared to the laboratory control. An adverse effect on embryo viability was observed in sample WL_BFWB_OUT_SP21; the EC25 value was 43.0 %. There were no adverse effects on this species in the other samples.

Results of the toxicity tests using *L. minor* are provided in Table 8; the highest test concentration was 97% as a result of dilution associated with addition of nutrients, as required in the method. An adverse effect on *L. minor* frond count was observed in all six samples; the IC25 values ranged from 2.5 to 75.7%. An adverse effect on dry weight was observed in four samples; the IC25 values were 75.0, 8.4, 55.9 and 11.7% for LC_LCDSSLCC, LC_DC1, LC_DCDS and WL_BFWB_OUT_SP21, respectively.

Results of the toxicity tests using *P. subcapitata* are provided in Table 9; the highest test concentration was 95.2% as a result of dilution associated with addition of nutrients. The algae exhibited growth enhancement in all samples, including in the site reference water GH_ER2, compared to the laboratory control waters. This finding is not unusual, since the higher ionic strength associated with the site waters would be expected to stimulate cell growth of this

species relative to the very low ionic strength associated with the laboratory control water. The IC25 values for cell yield were >95.2% in all of the samples relative to the laboratory control.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	GH_ER2		LC_LCDSSLCC		LC_DC1	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	22.5 ± 2.7	100	19.3 ± 5.7	100	20.8 ± 3.6
1.56	NT	NT	90	19.9 ± 7.8	100	20.2 ± 4.3
3.12	NT	NT	100	22.7 ± 4.3	100	21.8 ± 5.2
6.25	NT	NT	100	24.1 ± 3.6	100	23.1 ± 3.9
12.5	NT	NT	100	22.2 ± 5.8	100	22.4 ± 3.9
25	NT	NT	100	24.0 ± 4.0	100	18.7 ± 7.1
50	NT	NT	100	20.0 ± 5.6	100	15.7 ± 4.7
100	100	21.3 ± 3.9	100	18.7 ± 4.9	100	16.0 ± 4.5
Test endpoint (% v/v) [with 95% CL]						
LC50	--	--	>100	--	>100	--
IC25	--	--	--	>100	--	90.3 (45.1 – 100)
IC50	--	--	--	>100	--	>100

NT = Not Tested, SD = Standard Deviation, CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration

Table 6 (continued). Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5		WL_BFWB_OUT_SP21	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	21.5 ± 3.4	100	21.9 ± 3.5	90	21.1 ± 7.2	90	20.6 ± 6.4
1.56	100	20.6 ± 4.8	100	23.4 ± 3.6	100	24.4 ± 2.4	100	19.0 ± 6.5
3.12	100	23.0 ± 3.7	100	21.2 ± 5.4	100	24.0 ± 3.6	100	20.1 ± 5.1
6.25	100	25.5 ± 1.4	100	23.3 ± 3.8	100	20.9 ± 5.1	100	24.0 ± 6.0
12.5	100	23.2 ± 4.8	100	20.0 ± 4.8	90	22.5 ± 7.9	100	19.3 ± 6.3
25	100	24.5 ± 3.4	100	18.4 ± 5.0	100	25.7 ± 2.2	100	21.0 ± 3.9
50	100	22.0 ± 4.7	100	12.4 ± 3.7	100	22.1 ± 5.6	100	19.7 ± 4.6
100	100	20.3 ± 4.9	100	8.6 ± 2.6	100	20.4 ± 4.7	80	7.0 ± 6.9
Test endpoint (% v/v) [with 95% CL]								
LC50	>100	--	>100	--	>100	--	>100	--
IC25	--	>100	--	29.0 (21.2 – 38.0)	--	>100	--	62.3 (51.1 – 67.9)
IC50	--	>100	--	65.3 (51.7 – 82.5)	--	>100	--	82.8 (70.8 – N/A)

SD = Standard Deviation, CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration, N/A = Not Available

Table 7. Results: rainbow trout embryo (*Oncorhynchus mykiss*) viability test.

Concentration (% v/v)	Embryo Viability (%) (Mean ± SD)						
	GH_ER2	LC_LCDSSCLCC	LC_DC1	LC_FRDSDC	LC_DCDS	LC_LC5	WL_BFWB_OUT_SP21
Control	95.8 ± 1.7	95.8 ± 3.2	98.3 ± 1.9	98.3 ± 1.9	96.7 ± 2.7	97.5 ± 3.2	98.3 ± 1.9
6.25	NT	97.5 ± 3.2	95.8 ± 1.7	97.5 ± 1.7	99.2 ± 1.7	99.2 ± 1.7	98.3 ± 1.9
12.5	NT	98.3 ± 1.9	97.5 ± 1.7	96.7 ± 2.7	97.5 ± 1.7	98.3 ± 1.9	95.0 ± 3.3
25	NT	99.2 ± 1.7	95.0 ± 4.3	94.2 ± 1.7	97.5 ± 3.2	98.3 ± 2.0	90.0 ± 11.9
50	NT	96.7 ± 2.7	95.8 ± 3.2	92.5 ± 7.4	85.0 ± 8.8	92.4 ± 4.2	63.3 ± 7.2
100	93.3 ± 2.9	75.0 ± 5.8	90.1 ± 4.7	84.2 ± 5.7	79.2 ± 10.3	79.2 ± 5.7	53.3 ± 11.9
Test endpoint (% v/v) [with 95% CL]							
EC25	--	>100	>100	>100	>100	>100	43.0 (35.8 – 51.7)
EC50	--	>100	>100	>100	>100	>100	>100

NT = Not Tested, SD = Standard Deviation, CL = Confidence Limits, EC = Effective Concentration

Table 8. Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_LCDSSLCC		LC_DC1		LC_FRDSDC	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	102.8 ± 12.6	8.3 ± 1.0	101.8 ± 7.8	8.0 ± 0.5	102.8 ± 13.5	8.4 ± 1.2
1.5	98.0 ± 15.8	8.2 ± 1.3	90.0 ± 10.3	7.2 ± 1.0	98.5 ± 9.1	8.0 ± 0.9
3.0	89.5 ± 8.3	7.7 ± 0.8	87.5 ± 7.6	6.8 ± 0.5	104.0 ± 10.7	8.4 ± 0.8
6.1	105.0 ± 5.3	9.1 ± 0.7	80.2 ± 13.1	6.3 ± 0.9	99.8 ± 12.0	8.4 ± 1.0
12.1	87.0 ± 3.7	7.7 ± 0.3	62.5 ± 3.7	5.3 ± 0.2	95.2 ± 11.4	8.4 ± 1.1
24.2	96.0 ± 13.6	8.6 ± 1.4	60.8 ± 8.5	5.1 ± 0.4	97.8 ± 8.7	8.5 ± 0.6
48.5	87.0 ± 12.7	7.5 ± 1.0	75.8 ± 3.8	6.4 ± 0.4	103.5 ± 13.5	8.7 ± 1.2
97	48.5 ± 3.4	4.9 ± 0.5	66.0 ± 4.2	5.9 ± 0.2	50.8 ± 3.4	5.6 ± 0.4
Test endpoint (% v/v) [with 95% CL]						
IC25	69.7 (52.6 – 83.6)	75.0 (58.9 – 90.5)	7.4 (2.7 – 11.0)	8.4 (1.9 – 13.3)	66.4 (53.5 – 71.9)	>97
IC50	>97	>97	>97	>97	96.1 (85.3 – N/A)	>97

SD = Standard Deviation, CL = Confidence Limits, IC = Inhibition Concentration, N/A = Not Available

Table 8 (continued). Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_DCDS		LC_LC5		WL_BFWB_OUT_SP21	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	101.3 ± 8.3	9.0 ± 0.8	83.5 ± 5.9	7.7 ± 0.4	96.0 ± 11.8	8.5 ± 1.2
1.5	84.8 ± 23.2	7.7 ± 1.9	80.8 ± 7.6	7.3 ± 0.7	101.8 ± 7.5	9.0 ± 0.4
3.0	66.8 ± 10.3	6.3 ± 1.0	88.0 ± 23.2 †	8.5 ± 1.5 †	101.8 ± 5.1	9.0 ± 0.3
6.1	72.0 ± 14.3	6.6 ± 0.9	92.8 ± 15.9 †	8.4 ± 1.1 †	87.0 ± 21.9	7.9 ± 1.8
12.1	60.8 ± 12.3	6.0 ± 1.2	105.0 ± 23.0 †	9.7 ± 2.0 †	70.2 ± 6.6	6.4 ± 0.4
24.2	88.5 ± 13.9	8.1 ± 0.7	95.5 ± 12.4 †	8.9 ± 0.8 †	68.2 ± 5.9	6.7 ± 0.8
48.5	75.0 ± 6.9	7.4 ± 0.9	71.8 ± 14.9	7.4 ± 0.8	54.0 ± 5.2	6.5 ± 0.9
97	60.5 ± 11.1	6.4 ± 0.8	57.5 ± 9.7	6.5 ± 0.7	48.5 ± 4.4	6.7 ± 0.7
Test endpoint (% v/v) [with 95% CL]						
IC25	2.5 (0.1 – 87.1)	55.9 (N/A – N/A)	75.7 (19.3 – N/A)	>97	10.1 (2.6 – 18.0)	11.7 (2.1 – N/A)
IC50	>97	>97	>97	>97	81.2 (28.2 – N/A)	>97

SD = Standard Deviation, CL = Confidence Limits, IC = Inhibition Concentration, N/A = Not Available

† The data did not fit the hormesis regression model, therefore the number of fronds/ dry weight was adjusted to that of the control value and analyzed using linear interpolation

Table 9. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	GH_ER2		LC_LCDSSLCC		LC_DC1	
	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)
Laboratory Control	30.9 ± 1.5	--	32.9 ± 2.6	--	33.6 ± 2.2	--
1.5	NT	NT	33.0 ± 1.4	0.4	38.8 ± 2.5	15.2
3.0	NT	NT	41.0 ± 3.2	24.7	41.0 ± 1.8 *	21.9
6.0	NT	NT	71.0 ± 6.2 *	116.0	50.2 ± 3.8 *	49.4
11.9	NT	NT	105.8 ± 6.7 *	221.7	70.8 ± 4.0 *	110.4
23.8	NT	NT	173.3 ± 5.1 *	427.0	130.5 ± 7.8 *	288.1
47.6	NT	NT	178.0 ± 13.6 *	441.4	188.3 ± 7.1 *	459.9
95.2	152.0 ± 8.1 *	392.3	154.8 ± 8.2 *	370.7	179.3 ± 4.1 *	433.1
Test endpoint (% v/v)						
IC25	--	--	>95.2	--	>95.2	--
IC50	--	--	>95.2	--	>95.2	--

NT = Not Tested, SD = Standard Deviation, IC = Inhibition Concentration
*Result was significantly greater than the laboratory control

Table 9 (continued). Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5		WL_BFWB_OUT_SP21	
	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)
Laboratory Control	32.6 ± 1.6	--	33.2 ± 2.7	--	33.9 ± 1.9	--	32.0 ± 1.6	--
1.5	40.0 ± 2.9	22.6	34.5 ± 2.4	3.8	38.5 ± 3.0	13.6	47.0 ± 2.6 *	46.9
3.0	43.0 ± 2.2	31.8	40.0 ± 3.7 *	20.3	42.0 ± 2.2 *	24.0	82.8 ± 5.0 *	158.6
6.0	66.5 ± 2.6 *	103.8	43.5 ± 2.1 *	30.8	63.0 ± 2.7 *	86.0	98.5 ± 4.4 *	207.8
11.9	110.5 ± 8.2 *	238.7	58.8 ± 3.0 *	76.7	117.8 ± 5.4 *	247.6	129.5 ± 5.3 *	304.7
23.8	155.8 ± 6.3 *	377.4	92.2 ± 6.1 *	177.4	169.5 ± 3.7 *	400.4	171.5 ± 7.9 *	435.9
47.6	187.5 ± 15.2 *	474.7	155.3 ± 6.9 *	366.9	193.0 ± 9.8 *	469.7	172.8 ± 6.7 *	439.8
95.2	173.5 ± 8.1 *	431.8	183.5 ± 6.6 *	451.9	186.0 ± 7.6 *	449.1	132.3 ± 5.4 *	313.3
Test endpoint (% v/v)								
IC25	>95.2	--	>95.2	--	>95.2	--	>95.2	--
IC50	>95.2	--	>95.2	--	>95.2	--	>95.2	--

SD = Standard Deviation, IC = Inhibition Concentration
*Result was significantly greater than the laboratory control

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within ranges specified in the protocols throughout the tests. Uncertainty associated with these tests is best described by the standard deviations around the mean and/or the confidence limits around the point estimates.

The milt that was used to fertilize the rainbow trout eggs was pooled from two male fish rather than from four male fish, as specified in the test method, as a result of poor motility in the remaining samples of milt. However, the controls met the acceptability criterion for these tests indicating that the eggs were successfully fertilized and, therefore, this minor deviation would not be expected to have affected the results of the tests. There were no other deviations from the test methodologies.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate. The reference toxicant test was performed under the same conditions as those used for the sample.

Table 10. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.0 g/L NaCl	2.0 (1.8–2.2)	5	October 13, 2016
	Reproduction (IC50): 1.4 g/L NaCl	1.6 (1.2–2.0)	13	
O. mykiss	Viability (EC50): 3.8 mg/L SDS	4.0 (2.0 – 7.8)	40	October 18, 2016
L. minor	Number of fronds (IC50): 3.5 g/L KCl	3.9 (3.2–4.9)	11	October 13, 2016
P. subcapitata	Growth (IC50): 36.9 µg/L Zn	32.6 (24.0–44.3)	16	October 14, 2016

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effect Concentration

5.0 REFERENCES

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Tidepool Scientific Software. 2013. CETIS comprehensive environmental toxicity information system, version 1.8.7.16 Tidepool Scientific Software, McKinleyville, CA. 222 pp.

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 161122

Start Date/Time: Oct ~~19~~ 20/16 @ 1430h
Set up by: EMM/JS

Sample Information:

Sample ID: LCLCDSSLCCWS2016-10-17-N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 9x2CL

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 101216BD
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 21
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day 23,24,25,27,29,37

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd150
Stock Solution ID: 16Na02
Date Initiated: Oct 13/16

7-d LC50 (95% CL): 2.0 (1.9 - 2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.2-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0(1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6(1.2-2.0) g/L NaCL CV (%): 13

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JGL

Date reviewed: Nov. 29/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LC_LCDSSLCC_WS2016047FN
Work Order #: 161122
Start Date & Time: Oct 20/16 @ 1430
Stop Date & Time: Oct 26/16 @ 1450
Test Species: *Ceriodaphnia dubia*

Concentration: control	Days											final		
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	7.4	8.1	7.5	8.0	7.9	8.2	7.6	8.2	7.6	8.0	7.5		
pH 7.9	~~8.2~~	7.7	8.0	7.9	8.0	8.2	8.2	7.8	7.9	7.7	8.0	7.7		
Cond. (µS/cm)	219	214		224		220		227		221		220		
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM		

(v/v) Concentration: 1.5%	Days											final		
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.6	8.1	7.5	8.0	7.8	8.0	7.6	8.2	7.6	8.2	7.5		
pH	8.0	7.8	8.0	7.9	8.0	8.2	7.9	7.8	7.8	7.7	7.9	7.7		
Cond. (µS/cm)	226	229		236		242		231		230		231		
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM		

(v/v) Concentration: 12.5%	Days											final		
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.6	8.0	7.5	8.0	7.8	8.1	7.6	8.2	7.6	8.2	7.5		
pH	8.0	7.8	8.0	7.9	8.0	8.2	7.9	7.8	7.8	7.7	7.9	7.7		
Cond. (µS/cm)	286	284		297		296		293		295		294		
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM		

(v/v) Concentration: 100%	Days											final		
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.6	8.0	7.5	8.0	7.7	8.2	7.6	8.2	7.8	8.2	7.6		
pH	8.1	7.8	8.1	8.0	8.1	8.4	8.2	7.8	7.9	7.8	7.9	7.9		
Cond. (µS/cm)	708	716		707		705		715		710		709		
Initials	JS	EMM		MLT		JW		JS		EMM		EMM		

Thermometer: 4 **DO meter:** 1/2 **pH meter:** 1/2 **Conductivity meter:** 1/2

	Control	100% (v/v)		
Hardness*	100	870		
Alkalinity*	98	182		

* mg/L as CaCO3

Analysts: EMM, JS, MLT, AWD, JDL
Reviewed by: JDL
Date reviewed: Nov. 29/16

Sample Description: clear, colourless, odourless, no particulates

Comments: **Broodboard Used:** 101216BD (23, 24, 25, 27, 29, 30, 31, 32, 33, 34, 35, 36, 37)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck coal
Sample ID: LC-LCRSSLCC-WS-2016-10-17-N
Work Order: 16112-2

Start Date & Time: Oct 20 16 @ 1430h
Stop Date & Time: Oct 26 16 @ 1450h
Set up by: EMM/JS

% (v/v)

Concentration: control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	✓	4	3	4	✓	4	✓	✓	✓	✓	JW
4	3	✓	✓	✓	4	✓	4	4	3	3	EMM
5	7	6	6	8	9	8	6	6	7	8	EMM
6	✓	11	13	14	✓	11	12	12	13	✓	EMM
7											
8											
Total	10	21	22	26	13	23	22	22	23	11	EMM

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	3	4	✓	4	✓	4	4X	✓	✓	✓	JW
4	✓	✓	5	✓	3	✓	|	4	4	3	EMM
5	9	8	8	9	6	6	|	8	10	8	EMM
6	13	14	✓	13	14	10	|	13	12	✓	EMM
7											
8											
Total	25	26	13	26	23	20	4X	25	26	11	EMM

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	4	4	✓	4	✓	✓	✓	✓	✓	✓	JW
4	✓	✓	4	✓	3	3	3	4	4	5	EMM
5	8	9	8	9	10	10	✓	9	✓	✓	EMM
6	13	11	12	12	14	14	13	12	12	13	EMM
7											
8											
Total	25	24	24	25	27	27	26	25	26	18	EMM

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	4	✓	✓	4	✓	✓	✓	4	4	✓	JW
4	✓	4	3	✓	3	3	4	✓	✓	3	EMM
5	8	✓	8	9	10	8	9	8	8	8	EMM
6	14	10	14	13	13	13	12	13	14	13	EMM
7											
8											
Total	26	14	25	26	26	24	25	25	26	24	EMM

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	4	4	4	✓	✓	4	4	✓	✓	✓	JW
4	✓	✓	✓	3	4	✓	✓	4	3	4	EMM
5	✓	10	9	9	9	8	11	10	9	✓	EMM
6	12	14	10	9	13	14	14	✓	✓	14	EMM
7											
8											
Total	25	28	23	21	26	26	29	14	12	18	EMM

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	3	✓	✓	✓	✓	3	4	✓	4	✓	JW
4	✓	4	3	3	4	✓	✓	3	✓	4	EMM
5	8	10	10	✓	8	9	8	8	9	10	EMM
6	14	12	14	10	14	13	13	12	12	11	EMM
7											
8											
Total	25	26	27	13	26	25	25	23	25	25	EMM

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	4	4	3	✓	✓	✓	✓	✓	✓	2	JW
4	✓	✓	✓	4	5	4	4	3	3	✓	EMM
5	8	8	9	✓	✓	✓	✓	9	6	8	EMM
6	14	13	12	10	14	13	14	12	✓	14	EMM
7											
8											
Total	26	25	24	14	19	17	18	14	9	24	EMM

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	4	✓	✓	✓	2	4	✓	✓	✓	✓	JW
4	✓	4	4	3	✓	✓	3	3	4	3	EMM
5	10	✓	9	✓	8	9					EMM
6	14	13	✓	12	13	12	12	14	14	13	EMM
7											
8											
Total	28	17	13	15	23	25	15	17	18	16	EMM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See water quality page
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JSh

Date reviewed: Nov. 22/16

CETIS Analytical Report

Test Code: 161122a | 12-6025-0135

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-6343-4843	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-4382-0647	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	20 Oct-16 14:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	26 Oct-16 19:50	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 5h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	02-2496-3209	**Code:**	D68AA89	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	86h (3.5 °C)	**Station:**	LC_LCDSSLCC_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2070713	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	0	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

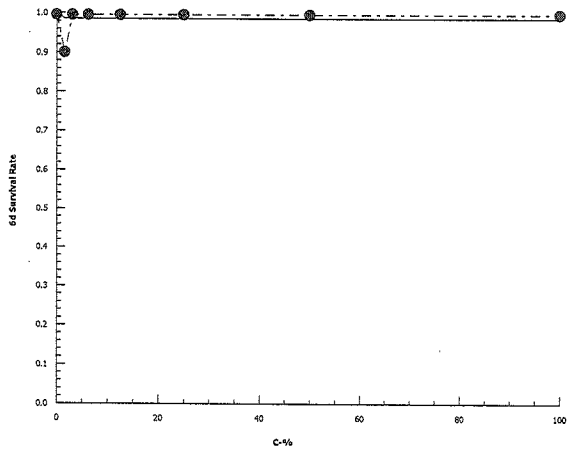
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-6343-4843	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-8262-8630	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-4382-0647	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	20 Oct-16 14:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	26 Oct-16 19:50	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 5h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	02-2496-3209	**Code:**	D68AA89	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	86h (3.5 °C)	**Station:**	LC_LCDSSLCC_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1948372	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	36.45	27.97	N/A	2.743	NA	3.575
IC10	54.77	33.41	N/A	1.826	NA	2.993
IC15	98.51	40.59	N/A	1.015	NA	2.464
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

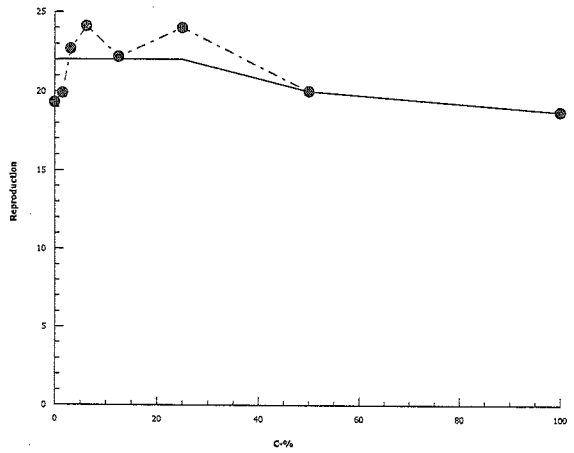
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	19.3	10	26	1.802	5.697	29.52%	0.0%
1.56		10	19.9	4	26	2.479	7.838	39.39%	-3.11%
3.12		10	22.7	16	27	1.367	4.322	19.04%	-17.62%
6.25		10	24.1	14	26	1.149	3.635	15.08%	-24.87%
12.5		10	22.2	12	29	1.849	5.846	26.33%	-15.03%
25		10	24	13	27	1.265	4	16.67%	-24.35%
50		10	20	9	26	1.764	5.578	27.89%	-3.63%
100		10	18.7	13	28	1.557	4.923	26.32%	3.11%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	10	21	22	26	13	23	22	22	23	11
1.56		25	26	13	26	23	20	4	25	26	11
3.12		25	24	24	25	27	27	16	25	16	18
6.25		26	14	25	26	26	24	25	25	26	24
12.5		25	28	23	21	26	26	29	14	12	18
25		25	26	27	13	26	25	25	23	25	25
50		26	25	24	14	19	17	18	24	9	24
100		28	17	13	15	23	25	15	17	18	16

Analysis ID:	11-8262-8630	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 161122

Start Date/Time: 20 Oct 2016 @ 1400
Set up by: EMM/JS

Sample Information:

Sample ID: LC-OCT-WS-20161017N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 6x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 100616B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 46
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: (21-30)

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd150
Stock Solution ID: 16Na02
Date Initiated: Oct 13/16

7-d LC50 (95% CL): 2.0 (1.9 - 2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.2-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.2-2.0) g/L NaCL CV (%): 13

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		90.3 (45.1 - 100.0)
IC50 % (v/v) (95% CL)		>100

Reviewed by: JOL
Date reviewed: Nov. 28/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LC-DC1 WS-296-107-N
Work Order #: 161122

Start Date & Time: Oct 26/16 @ 1400
Stop Date & Time: Oct 26/16 @ 1800
Test Species: *Ceriodaphnia dubia*

Concentration: control	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0			
DO (mg/L)	8.2	7.3	8.0	7.4	8.0	7.9	8.2	7.5	8.2	7.6	8.0	7.6			
pH	7.9	7.8	7.9	7.7	8.0	8.2	8.2	7.6	7.9	7.7	8.0	7.7			
Cond. (µS/cm)	219	219		224		220		222		221		232			
Initials	EMM	JS		MLT		JW		JS		EMM		EMM			

Concentration: (v/v) 1.5%	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0			
DO (mg/L)	8.2	7.6	8.1	7.5	8.0	7.8	8.1	7.5	8.2	7.6	8.2	7.6			
pH	7.9	7.8	8.0	7.8	7.9	~~7.9~~	7.9	7.6	8.1	7.8	8.0	7.7			
Cond. (µS/cm)	215	216		218		8.2 ~~222~~		223		221		228			
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM			

Concentration: (v/v) 12.5%	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0			
DO (mg/L)	8.1	7.6	8.1	7.5	8.0	7.8	8.1	7.5	8.2	7.6	8.2	7.5			
pH	7.9	7.8	7.9	7.9	7.9	~~7.9~~	7.9	7.6	7.8	7.7	7.9	7.6			
Cond. (µS/cm)	226	223		231		8.2 238		233		230		231			
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM			

Concentration: (v/v) 100%	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0			
DO (mg/L)	8.1	7.6	8.0	7.6	8.0	7.8	8.1	7.5	8.2	7.6	8.2	7.6			
pH	7.9	7.8	7.9	7.9	7.9	~~7.9~~	7.9	7.9	7.8	7.9	7.8	7.8			
Cond. (µS/cm)	304	308		306		8.4 310		310		309		312			
Initials	JS	EMM		MLT		JW		JS		EMM		EMM			

Thermometer: 4 **DO meter:** 1/2 **pH meter:** 1/2 **Conductivity meter:** 1/2

	Control	100% (v/v)		
Hardness*	100	182		
Alkalinity*	98	150		

* mg/L as CaCO3

Analysts: EMM, JS, MLT, AWD/JW
Reviewed by: JOL
Date reviewed: Nov-28/16

Sample Description: slightly turbid, yellow, odourless, black particulates
MLT ~~clear, colourless, odourless, no particulates~~

Comments: **Broodboard Used:** 100616B C21730)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC-DCF-WS 2016-1617-N
Work Order: 161122

Start Date & Time: Oct 20/16 @ 1400h
Stop Date & Time: Oct 26/16 @ 1800h
Set up by: EMM/JS

% (v/v)

Days	Concentration: control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	4	✓	✓	✓	5	✓	✓	✓	4	4	JW
4	✓	4	4	5	✓	4	6	3	✓	✓	JS
5	8	7	6	6	8	9	6	7	8	7	EMM
6	8	9	10	10	12	10	✓	11	12	11	EMM
7											
8											
Total	20	20	20	21	25	23	12	21	24	22	EMM

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	3	✓	4	4	3	3	4	2	5	✓	JW
4	✓	4	✓	✓	✓	✓	✓	✓	✓	5	JS
5	8	✓	9	8	8	6	6	6	8	7	EMM
6	11	10	12	12	9	12	13	10	10	✓	EMM
7											
8											
Total	22	14	25	24	20	21	23	18	23	12	EMM

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	3	4	3	4	4	✓	4	4	4	✓	JW
4	✓	✓	✓	✓	✓	5	✓	✓	✓	3	JS
5	7	8	8	10	9	9	6	8	8	6	EMM
6	11	10	9	12	13	13	10	10	13	✓	EMM
7											
8											
Total	21	22	20	26	26	27	20	22	25	9	EMM

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	✓	✓	3	3	5	5	6	4	3	4	JW
4	5	6	✓	✓	✓	✓	✓	✓	✓	✓	JS
5	✓	✓	9	8	8	10	9	8	8	6	EMM
6	11	13	13	9	14	14	10	13	12	12	EMM
7											
8											
Total	16	19	25	20	27	29	25	25	23	22	EMM

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	✓	3	4	✓	✓	✓	3	4	4	✓	JW
4	5	✓	✓	4	4	4	✓	✓	✓	4	JS
5	✓	9	9	6	8	8	10	9	8	9	EMM
6	11	8	14	7	10	11	14	13	12	9	EMM
7											
8											
Total	16	20	27	17	22	23	27	26	24	22	EMM

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	4	✓	4	✓	✓	✓	✓	✓	✓	✓	JW
4	✓	4	✓	5	3	4	3	5	2	4	JS
5	9	10	8	✓	8	6	✓	✓	6	9	EMM
6	15	14	13	13	12	9	9	8	✓	✓	EMM
7											
8											
Total	28	28	25	18	23	19	12	13	8	13	EMM

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	✓	✓	✓	✓	✓	3	✓	✓	✓	✓	JW
4	6	5	4	4	5	1	4	3	3	5	JS
5	✓	✓	8	✓	✓	11	✓	✓	10	✓	EMM
6	11	9	12	10	8	10	8	8	✓	10	EMM
7											
8											
Total	17	14	24	14	13	24	12	11	13	15	EMM

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	—	—	—	—	—	—	—	—	—	—	A
3	✓	✓	✓	✓	✓	4	✓	✓	✓	✓	JW
4	5	4	5	3	2	✓	5	2	4	6	JS
5	✓	✓	✓	8	6	9	✓	8	✓	✓	EMM
6	9	8	10	11	13	10	8	✓	10	10	EMM
7											
8											
Total	14	12	15	22	21	23	13	10	14	16	EMM

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											JW
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See water quality page
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JW

Date reviewed: Nov. 23/16

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	05-6420-0760	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-4090-7294	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	20 Oct-16 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	26 Oct-16 18:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 4h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	00-8911-1788	**Code:**	54FBCEC	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	86h (2.5 °C)	**Station:**	LC_DC1_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1961052	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

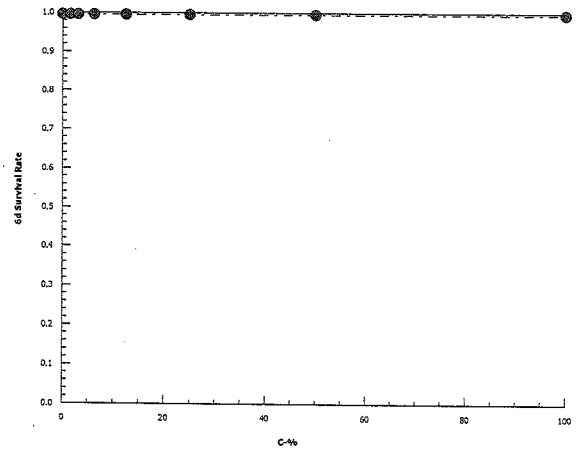
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 05-6420-0760 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 16 Nov-16 11:56 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	06-9995-4088	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:58	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	18-4090-7294	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	20 Oct-16 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	26 Oct-16 18:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 4h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	00-8911-1788	**Code:**	54FBCEC	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	86h (2.5 °C)	**Station:**	LC_DC1_WS_2016-10-17_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
71	-162.6	333.7	342.7	0.1841	Yes	0.9168	2.499	0.4590	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	28.07	N/A	48.25	3.562	2.073	NA
IC10	37.64	22.52	61.45	2.657	1.627	4.44
IC15	50.12	30.75	82.27	1.995	1.215	3.252
IC20	66.92	38.4	121	1.494	0.8264	2.604
IC25	90.27	45.08	197.8	1.108	0.5055	2.218
IC40	249.9	66.63	N/A	0.4002	NA	1.501
IC50	~~578.9~~	92.91	N/A	0.1727	NA	1.076

>100% (v/v) em

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	20.13	1.436	17.32	22.95	14.02	<0.0001	Significant Parameter
C	1.21	0.08983	1.033	1.386	13.46	<0.0001	Significant Parameter
D	578.9	723.8	-839.7	1998	0.7999	0.4263	Non-Significant Parameter
E	0.1166	0.1526	-0.1824	0.4156	0.7644	0.4470	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	469.5549	469.5549	1	20.83	<0.0001	Significant
Lack of Fit	83.03262	20.75816	4	0.9168	0.4590	Non-Significant
Pure Error	1630.3	22.64305	72			
Residual	1713.333	22.54385	76			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	6.549	14.07	0.4773	Equal Variances
	Mod Levene Equality of Variance	1.193	2.14	0.3179	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9833	0.9691	0.3801	Normal Distribution
	Anderson-Darling A2 Normality	0.2805	2.492	0.6719	Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	06-9995-4088	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:58	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

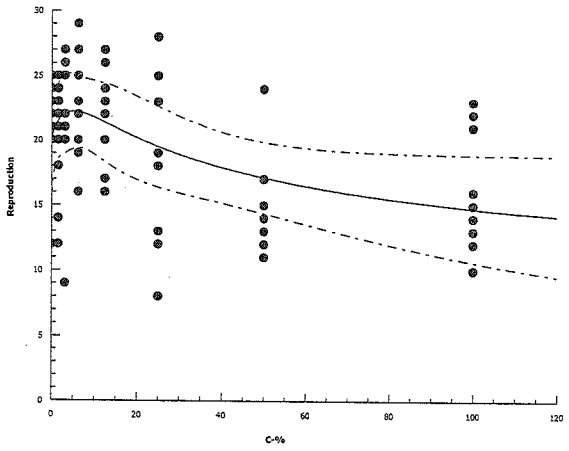
Reproduction Summary

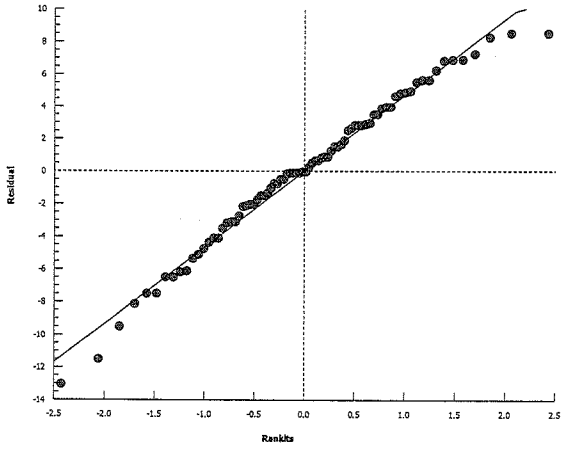
			Calculated Variate						
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	Negative Control	10	20.8	12	25	1.123	3.553	17.08%	0.0%
1.56		10	20.2	12	25	1.365	4.315	21.36%	2.89%
3.12		10	21.8	9	27	1.645	5.203	23.86%	-4.81%
6.25		10	23.1	16	29	1.242	3.929	17.01%	-11.06%
12.5		10	22.4	16	27	1.222	3.864	17.25%	-7.69%
25		10	18.7	8	28	2.251	7.119	38.07%	10.1%
50		10	15.7	11	24	1.476	4.668	29.73%	24.52%
100		10	16	10	23	1.414	4.472	27.95%	23.08%

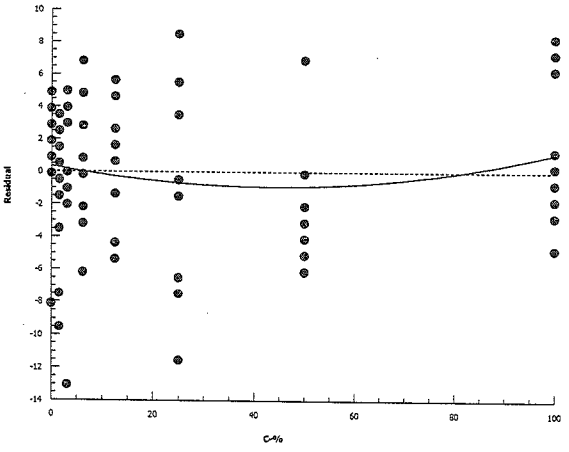
Reproduction Detail

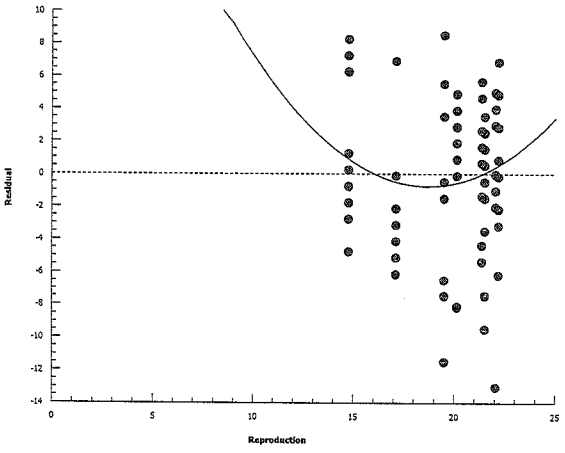
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	20	20	20	21	25	23	12	21	24	22
1.56		22	14	25	24	20	21	23	18	23	12
3.12		21	22	20	26	26	27	20	22	25	9
6.25		16	19	25	20	27	29	25	25	23	22
12.5		16	20	27	17	22	23	27	26	24	22
25		28	28	25	18	23	19	12	13	8	13
50		17	14	24	14	13	24	12	11	13	15
100		14	12	15	22	21	23	13	10	14	16

Graphics 4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]









Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 161122

Start Date/Time: 20 Oct 2016 @ 1445h
Set up by: EMM/JS

Sample Information:

Sample ID: LC_FRDSDC_WS_20161017EN
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 6x2L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 100616B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 0
Mortality (%) in previous 7 d: 47
Individual female # used ≥8 young on test day: 31-40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd150
Stock Solution ID: 16Na02
Date Initiated: Oct 13/16

7-d LC50 (95% CL): 2.0 (1.9 - 2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.2-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.2-2.0) g/L NaCL CV (%): 13

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JOK
Date reviewed: Nov. 29/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LC_FRDSDC_WS2016-1042N
Work Order #: 161180
Start Date & Time: OCT 20/16 @ 1415
Stop Date & Time: OCT 26/16 @ 1420
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0			
DO (mg/L)	8.2	7.8	8.1	7.5	8.0	7.9	8.2	7.6	8.2	7.7	8.0	7.5			
pH	7.9	7.8	8.0	7.9	8.0	8.2	8.2	7.8	7.9	7.8	8.0	7.7			
Cond. (µS/cm)	219	219		224		220		222		221		219			
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM			

Concentration: (v/v) 1.5%

	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0			
DO (mg/L)	8.2	7.8	8.1	7.9	7.9	7.8	8.0	7.6	8.2	7.7	7.9	7.5			
pH	7.9	7.8	8.0	7.9	7.8	8.2	7.9	7.8	7.9	7.8	8.0	7.7			
Cond. (µS/cm)	224	223		229		224		230		229		228			
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM			

Concentration: (v/v) 12.5%

	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0			
DO (mg/L)	8.1	7.8	8.1	7.9	7.9	7.8	8.0	7.6	8.2	7.7	7.9	7.5			
pH	7.9	7.8	7.9	7.9	7.9	8.2	7.9	7.8	7.9	7.7	8.0	7.7			
Cond. (µS/cm)	275	270		277		283		285		284		284			
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM			

Concentration: (v/v) 100%

	Days														
	0	1		2		3		4		5		final 6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0			
DO (mg/L)	8.1	7.8	8.1	7.9	7.9	7.7	8.0	7.6	8.2	7.7	7.9	7.6			
pH	7.9	8.1	7.9	7.9	7.9	8.4	8.0	7.8	7.9	7.7	7.9	7.7			
Cond. (µS/cm)	663	676		673		671		676		669		669			
Initials	JS	EMM		MLT		JW		JS		EMM		EMM			

Thermometer: 4 **DO meter:** 1/2 **pH meter:** 1/2 **Conductivity meter:** 1/2

	Control	100% (v/v)		
Hardness*	100	334		
Alkalinity*	98	184		

* mg/L as CaCO3

Analysts: EMM, JS, MLT, AWD, JW
Reviewed by: JGR
Date reviewed: Nov. 29/16

Sample Description: clear, colourless, odourless, no particulates

Comments: **Broodboard Used:** 100616B (3140)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC – FRDSDC – WS 2016-1017-N
Work Order: 161122

Start Date & Time: Oct 20/16 @ 1415 h
Stop Date & Time: Oct 28/16 @ 1920 h
Set up by: EMM/JS

% (v/v)

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	4	4	3	4	✓	✓	✓	✓	✓	✓	JW
4	✓	✓	✓	✓	3	4	3	4	4	5	EMM
5	6	8	7	7	6	7	8	✓	8	✓	EMM
6	13	12	14	12	10	12	10	12	14	11	EMM
7											
8											
Total	23	24	24	23	19	23	21	16	26	16	EMM

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	4	4	3	✓	✓	4	✓	3	✓	✓	JW
4	✓	✓	✓	4	5	✓	4	✓	3	3	EMM
5	6	7	9	8	9	8	✓	9	9	✓	EMM
6	12	10	10	✓	13	13	11	12	10	13	EMM
7											
8											
Total	22	21	22	12	27	25	15	24	22	16	EMM

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	✓	✓	4	✓	✓	4	✓	✓	✓	✓	JW
4	3	4	✓	3	3	✓	5	4	4	3	EMM
5	10	8	9	✓	9	10	8	9	✓	9	EMM
6	10	13	13	12	11	9	12	13	14	14	EMM
7											
8											
Total	23	25	26	15	23	23	25	26	18	26	EMM

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	4	✓	3	2	✓	4	4	✓	✓	✓	JW
4	✓	4	✓	✓	9	✓	✓	5	4	9	EMM
5	9	8	9	8	11	9	9	8	8	10	EMM
6	12	12	15	14	12	14	12	11	13	13	EMM
7											
8		24									
Total	25	25 EMM	27	24	27	27	25	24	25	27	EMM

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	✓	4	✓	✓	✓	✓	✓	✓	✓	✓	JW
4	4	✓	3	3	3	4	4	4	4	5	EMM
5	8	9	6	8	8	9	10	✓	✓	9	EMM
6	11	13	14	14	15	14	13	10	11	12	EMM
7											
8											
Total	23	26	23	25	26	27	27	14	15	26	EMM

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	4	✓	✓	✓	4	3	✓	✓	5	✓	JW
4	✓	5	4	4	✓	✓	3	4	✓	4	EMM
5	6	✓	8	8	9	10	9	10	10	8	EMM
6	13	11	13	14	12	13	13	12	14	12	EMM
7											
8											
Total	23	16	25	26	25	26	25	26	29	24	EMM

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	4	✓	✓	3	✓	✓	2	✓	3	✓	JW
4	✓	3	4	✓	4	4	✓	5	✓	3	EMM
5	8	9	✓	8	8	6	7	8	9	✓	EMM
6	13	12	10	12	14	14	12	13	12	10	EMM
7											
8											
Total	25	24	14	23	26	24	21	26	24	13	EMM

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MLT
3	4	4	✓	✓	2	✓	✓	✓	2	✓	JW
4	✓	✓	3	4	✓	5	4	4	✓	3	EMM
5	9	8	✓	✓	6	8	8	✓	7	✓	EMM
6	12	11	10	12	14	14	13	12	12	12	EMM
7											
8											
Total	25	23	13	16	22	27	25	16	21	15	EMM

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See water quality page
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JGw

Date reviewed: Nov-23/16

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-9533-9607	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:49	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-3185-6985	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	20 Oct-16 14:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	26 Nov-16 19:20	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	37d 5h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	19-9543-8291	**Code:**	76EFF8D3	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	86h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	153999	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

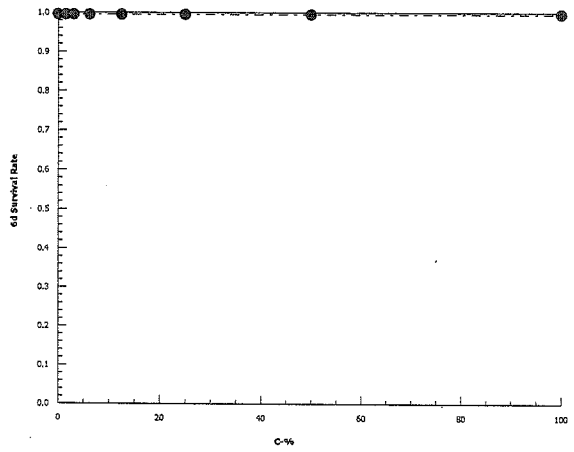
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-9533-9607	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:49	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-5736-3533	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-3185-6985	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	20 Oct-16 14:15	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	26 Nov-16 19:20	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	37d 5h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	19-9543-8291	**Code:**	76EFF8D3	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	86h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1246149	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	52.15	27.21	N/A	1.918	NA	3.675
IC10	83.46	37.24	N/A	1.198	NA	2.685
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

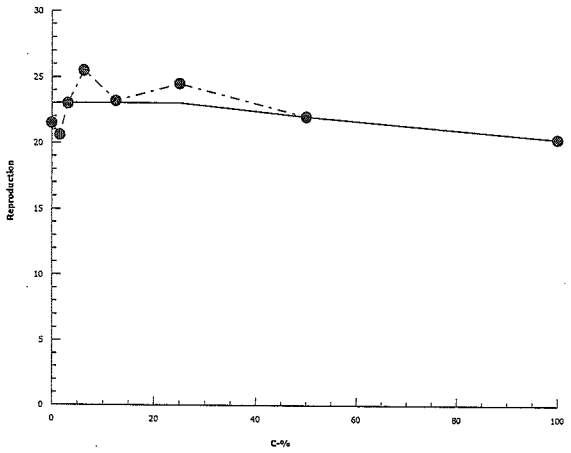
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	21.5	16	26	1.088	3.44	16.0%	0.0%
1.56		10	20.6	12	27	1.507	4.766	23.13%	4.19%
3.12		10	23	15	26	1.174	3.712	16.14%	-6.98%
6.25		10	25.5	24	27	0.4282	1.354	5.31%	-18.6%
12.5		10	23.2	14	27	1.519	4.803	20.7%	-7.91%
25		10	24.5	16	29	1.067	3.375	13.77%	-13.95%
50		10	22	13	26	1.491	4.714	21.43%	-2.33%
100		10	20.3	13	27	1.557	4.923	24.25%	5.58%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	24	24	23	19	23	21	16	26	16
1.56		22	21	22	12	27	25	15	24	22	16
3.12		23	25	26	15	23	23	25	26	18	26
6.25		25	24	27	24	27	27	25	24	25	27
12.5		23	26	23	25	26	27	27	14	15	26
25		23	16	25	26	25	26	25	26	29	24
50		25	24	14	23	26	24	21	26	24	13
100		25	23	13	16	22	27	25	16	21	15

Analysis ID:	10-5736-3533	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 161122

Start Date/Time: Oct 20/16 @1600h
Set up by: EMM/JS

Sample Information:

Sample ID: LC_DCDS_WS_20161018_2N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 6x2L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 1006168
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 47
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 31 → 40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd150
Stock Solution ID: 16Na02
Date Initiated: Oct 13/16

7-d LC50 (95% CL): 2.0 (1.9 - 2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.2-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.2-2.0) g/L NaCL CV (%): 13

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		29.0 (21.1 - 38.0)
IC50 % (v/v) (95% CL)		65.3 (51.7 - 82.5)

Reviewed by: JOL
Date reviewed: Nov. 29/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LC_DCDS_WS_20161018_N
Work Order #: 16122
Start Date & Time: Oct 20/16 @ 1600
Stop Date & Time: Oct 26/16 @ 1430
Test Species: *Ceriodaphnia dubia*

Concentration: control	Days														
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	7.6	8.0	7.9	8.0	7.8	8.2	7.5	8.2	7.6	8.0	7.5		
pH	7.9	7.8	8.0	7.7	8.0	7.8	8.2	7.7	7.9	7.7	8.0	7.7		
Cond. (µS/cm)	219	219		224		220		222		221		224		
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM		

Concentration: (v/v) 1.56 %	Days														
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.0	7.6	8.2	7.5	8.0	7.8	8.1	7.4	8.2	7.6	8.1	7.5		
pH	7.9	7.8	7.9	7.7	7.9	~~7.7~~ 7.7		7.7	7.8	7.7	8.0	7.7		
Cond. (µS/cm)	214	220		222		7.8 230		222		223		224		
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM		

Concentration: (v/v) 12.5%	Days														
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.0	7.7	8.2	7.9	8.0	7.6	8.1	7.4	8.2	7.6	8.1	7.5		
pH	8.0	7.8	7.9	7.8	7.9	~~7.8~~ 7.8		7.7	7.8	7.8	7.9	7.7		
Cond. (µS/cm)	224	229		228		7.8 234		228		229		229		
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM		

Concentration: (v/v) 100%	Days														
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	25.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.0	7.7	8.0	7.5	8.0	7.6	8.2	7.4	8.2	7.6	8.1	7.4		
pH	7.9	7.9	7.9	7.9	7.9	~~7.9~~ 7.9		7.6	7.7	7.8	7.8	7.9		
Cond. (µS/cm)	271	273		271		7.9 270		273		273		278		
Initials	JS	EMM		MLT		JW		JS		EMM		EMM		

Thermometer: 4 **DO meter:** 1/2 **pH meter:** 1/2 **Conductivity meter:** 1/2

	Control	100% (v/v)		
Hardness*	100	140		
Alkalinity*	98	114		

* mg/L as CaCO3

Analysts: EMM, JS, MLT, AWD, JW
Reviewed by: JW
Date reviewed: Nov-29/16

Sample Description: clear, colorless, odourless, no particulates

Comments: **Broodboard Used:** 100616B (31→40)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC-DRP-WS-2016-10-18-N
Work Order: 161122

Start Date & Time: Oct 20 16 @ 1600h
Stop Date & Time: Oct 26 16 @ 1930h
Set up by: EMM/JS

% (v/v)

Concentration: control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	5	✓	4	✓	✓	✓	3	✓	4	✓	JW
4	✓	5	✓	4	4	3	✓	5	✓	4	EMM
5	8	✓	6	6	7	8	8	✓	9	10	EMM
6	10	9	13	13	12	14	13	12	11	9	EMM
7											
8											
Total	23	14	23	23	23	25	24	17	24	23	EMM

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	3	3	2	4	✓	✓	4	4	✓	3	JW
4	✓	✓	✓	✓	5	4	✓	✓	3	✓	EMM
5	8	7	8	8	9	✓	8	6	9	8	EMM
6	14	10	13	13	12	10	14	14	11	15	EMM
7											
8											
Total	25	22	23	25	26	14	26	24	23	26	EMM

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	✓	✓	4	4	4	3	✓	4	2	✓	JW
4	3	3	✓	✓	✓	✓	4	✓	✓	5	EMM
5	✓	8	7	10	10	9	✓	8	8	9	EMM
6	8	10	11	14	11	13	9	10	10	11	EMM
7											
8											
Total	11	21	22	28	25	25	13	22	20	25	EMM

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	4	✓	✓	✓	2	✓	3	2	4	4	JW
4	✓	5	4	4	✓	5	✓	✓	✓	✓	EMM
5	8	9	✓	✓	9	9	8	8	9	10	EMM
6	11	10	14	12	14	13	13	12	13	14	EMM
7											
8											
Total	23	24	18	16	25	27	24	22	26	28	EMM

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	✓	4	✓	4	✓	3	✓	3	✓	2	JW
4	5	✓	5	✓	7	✓	5	✓	5	✓	EMM
5	✓	9	✓	9	6	6	9	9	✓	8	EMM
6	7	10	10	11	12	10	13	12	10	9	EMM
7											
8					4	19	27	24	15	19	EMM
Total	12	23	15	24	22	19	27	24	15	19	EMM

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JW
4	4	4	5	5	4	3	3	4	3	5	EMM
5	10	✓	✓	✓	✓	8	✓	9	6	✓	EMM
6	11	11	12	10	12	13	9	13	11	9	EMM
7											
8											
Total	25	15	17	15	16	24	12	26	20	14	EMM

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JW
4	5	4	4	4	5	3	3	4	4	4	EMM
5	6	7	✓	✓	✓	8	6	✓	7	✓	EMM
6	11	✓	6	9	8	✓	✓	10	✓	6	EMM
7											
8											
Total	22	11	10	13	13	11	9	14	11	10	EMM

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JW
4	4	3	3	2	2	3	2	3	3	✓	EMM
5	✓	✓	6	7	7	7	✓	✓	✓	4	EMM
6	9	6	✓	✓	✓	✓	4	8	3	✓	EMM
7											
8											
Total	13	9	9	9	9	10	6	11	6	4	EMM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See water quality page

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JGL

Date reviewed: Nov. 23/16

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	07-7158-6127	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 12:02	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-4653-2360	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	20 Oct-16 16:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	26 Oct-16 19:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 4h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	18-7594-5243	**Code:**	6FD0A71B	**Client:**	Teck Coal
Sample Date:	18 Oct-16 12:30	**Material:**	Water Sample	**Project:**	
Receive Date:	19 Oct-16 11:44	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	51h (8.3 °C)	**Station:**	LC_DCDS_WS_2016-10-18_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1406982	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

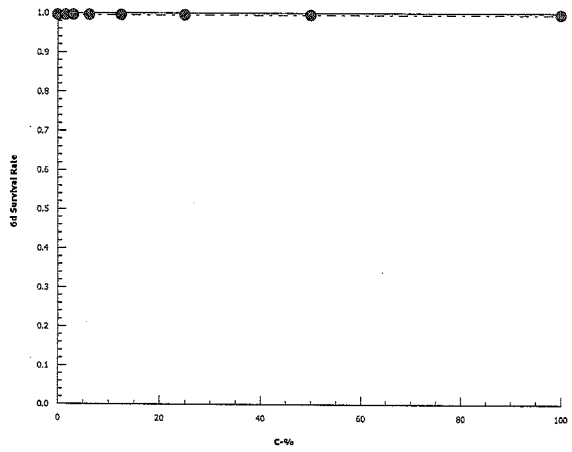
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 07-7158-6127 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 16 Nov-16 12:02 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-7097-2390	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 12:03	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	06-4653-2360	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	20 Oct-16 16:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	26 Oct-16 19:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 4h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	18-7594-5243	**Code:**	6FD0A71B	**Client:**	Teck Coal
Sample Date:	18 Oct-16 12:30	**Material:**	Water Sample	**Project:**	
Receive Date:	19 Oct-16 11:44	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	51h (8.3 °C)	**Station:**	LC_DCDS_WS_2016-10-18_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
7	-151.7	309.7	316.6	0.5910	Yes	0.7151	2.342	0.6141	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	9.045	N/A	14.47	11.06	6.911	NA
IC10	14	6.993	20.59	7.145	4.856	14.3
IC15	18.79	11.5	26.42	5.322	3.786	8.693
IC20	23.75	16.13	32.14	4.211	3.112	6.199
IC25	29.03	21.11	38.01	3.445	2.631	4.738
IC40	48.15	38.45	59.69	2.077	1.675	2.601
IC50	65.29	51.68	82.49	1.532	1.212	1.935

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	22.53	0.734	21.09	23.97	30.69	<0.0001	Significant Parameter
C	1.202	0.2341	0.7429	1.661	5.133	<0.0001	Significant Parameter
D	65.29	8.445	48.74	81.84	7.731	<0.0001	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	1970.211	1970.211	1	116.2	<0.0001	Significant
Lack of Fit	61.78933	12.35787	5	0.7151	0.6141	Non-Significant
Pure Error	1244.2	17.28056	72			
Residual	1305.989	16.9609	77			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	6.39	14.07	0.4950	Equal Variances
	Mod Levene Equality of Variance	1.036	2.14	0.4139	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9776	0.9691	0.1741	Normal Distribution
	Anderson-Darling A2 Normality	0.6702	2.492	0.0803	Normal Distribution

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 03-7097-2390 **Endpoint:** Reproduction **CETIS Version:** CETISv1.8.7
Analyzed: 16 Nov-16 12:03 **Analysis:** Nonlinear Regression **Official Results:** Yes

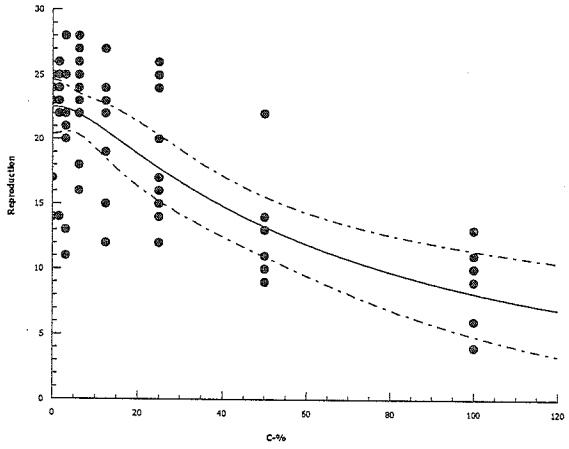
Reproduction Summary

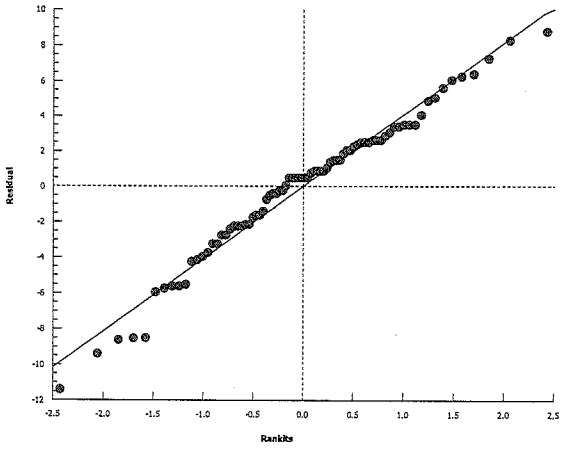
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	21.9	14	25	1.11	3.51	16.03%	0.0%
1.56		10	23.4	14	26	1.137	3.596	15.37%	-6.85%
3.12		10	21.2	11	28	1.711	5.412	25.53%	3.2%
6.25		10	23.3	16	28	1.202	3.802	16.32%	-6.39%
12.5		10	20	12	27	1.528	4.83	24.15%	8.68%
25		10	18.4	12	26	1.586	5.016	27.26%	15.98%
50		10	12.4	9	22	1.176	3.718	29.98%	43.38%
100		10	8.6	4	13	0.8327	2.633	30.62%	60.73%

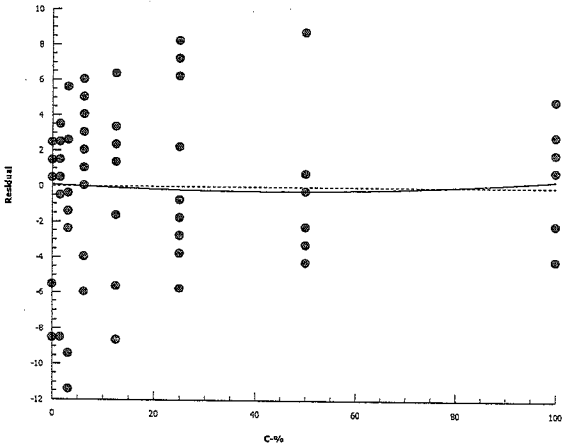
Reproduction Detail

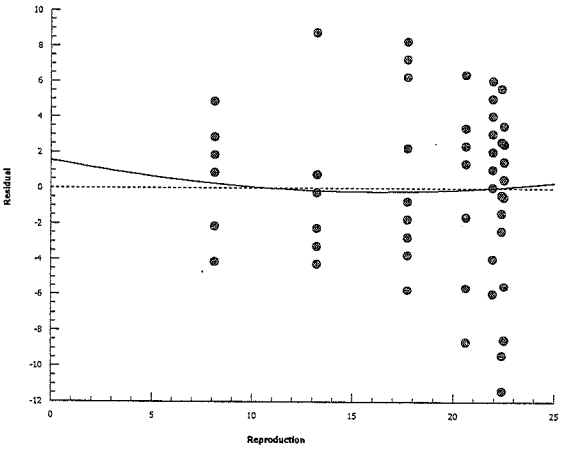
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	14	23	23	23	25	24	17	24	23
1.56		25	22	23	25	26	14	26	24	23	26
3.12		11	21	22	28	25	25	13	22	20	25
6.25		23	24	18	16	25	27	24	22	26	28
12.5		12	23	15	24	22	19	27	24	15	19
25		25	15	17	15	16	24	12	26	20	14
50		22	11	10	13	13	11	9	14	11	10
100		13	9	9	9	9	10	6	11	6	4

Graphics 3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]









Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 16122

Start Date/Time: 20 Oct 2016 @ 1540h
Set up by: EMM/JS

Sample Information:

Sample ID: LC-LC5 WS-2016-10-17-N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 6x2L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 100616B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 46
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day (21→30)

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd150
Stock Solution ID: 16Na02
Date Initiated: Oct 13/16

7-d LC50 (95% CL): 2.0 (1.9 - 2.3) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.2-1.7) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.2-2.0) g/L NaCL CV (%): 13

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: JGe

Date reviewed: Nov. 29/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LC_LCS_WB-2016-1017-N
Work Order #: 161122

Start Date & Time: OCT 20/16 @ 1540h
Stop Date & Time: OCT 26/16 @ 2130h
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days														
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	7.7	8.1	7.5	8.0	7.9	8.2	7.5	8.2	7.4	8.0	7.5		
pH	7.9	7.8	8.0	7.9	8.0	8.2	8.2	7.6	7.9	7.7	8.0	7.7		
Cond. (µS/cm)	219	219		224		220		222		221		229		
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM		

Concentration: (v/v) 1.56%

	Days														
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.0	7.7	8.0	7.5	8.0	8.0	8.1	7.5	8.2	7.4	8.1	7.5		
pH	7.9	7.8	8.0	7.9	7.9	8.2	7.9	7.6	7.8	7.7	7.9	7.7		
Cond. (µS/cm)	222	221		223		228		230		231		241		
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM		

Concentration: (v/v) 12.5%

	Days														
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.0	7.7	8.1	7.5	8.0	7.9	8.0	7.5	8.2	7.4	8.1	7.5		
pH	8.0	7.8	8.0	7.9	7.9	8.2	7.9	7.6	7.8	7.7	7.9	7.7		
Cond. (µS/cm)	JS 278	280		285		291		285		289		280		
Initials	EMM	EMM		MLT		JW		JS		EMM		EMM		

Concentration: (v/v) 100%

	Days														
	0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.0	7.7	8.1	7.5	8.2	7.9	8.1	7.5	8.2	7.3	8.1	7.5		
pH	7.9	8.0	7.9	8.0	7.9	8.4	7.9	7.6	7.9	7.8	7.9	7.8		
Cond. (µS/cm)	660	663		667		663		666		664		649		
Initials	JS	EMM		MLT		JW		JS (07.9)		EMM		EMM		

Thermometer: 4 DO meter: 1/2 pH meter: 1/2 Conductivity meter: 1/2

	Control	100% (v/v)		
Hardness*	100	300		
Alkalinity*	98	176		

* mg/L as CaCO3

Analysts: EMM, JS, MLT, AWD, JW
Reviewed by: JSW
Date reviewed: Nov. 29/16

Sample Description: clear, colourless, odourless, no particulates

Comments: **Broodboard Used:** 100616BC21 (>30)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC-LCS_WS-2016-07-IN
Work Order: 161122

Start Date & Time: Oct 20/16 1540h
Stop Date & Time: Oct 26/16 2130h
Set up by: EMM/JS

% (v/v)

Days	Concentration: control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	4	✓	4	6	✓	2	✓	✓	✓	4	JW
4	X	4	✓	✓	5	✓	5	5	5	✓	JS
5	|	7	8	8	9	6	6	9	9	8	EMM
6	|	10	11	13	✓	13	12	12	14	12	EMM
7	|										
8	|										
Total	4X	21	23	27	14	21	23	26	28	24	EMM

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	5	3	4	4	4	4	2	5	3	4	JW
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
5	9	9	8	8	10	7	6	9	9	8	EMM
6	14	12	13	13	13	13	12	12	11	10	EMM
7											
8							20				
Total	28	24	25	25	27	24	17 MG	26	23	22	EMM

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	4	4	✓	✓	✓	4	3	4	2	✓	JW
4	✓	✓	5	5	4	✓	✓	✓	✓	2	JS
5	8	9	✓	8	10	8	9	9	8	9	EMM
6	13	13	10	14	13	12	13	13	12	12	EMM
7											
8											
Total	25	26	15	27	27	24	25	26	22	23	EMM

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	4	✓	4	✓	✓	✓	✓	✓	4	✓	JW
4	✓	5	✓	5	4	6	5	4	✓	2	JS
5	9	✓	9	8	✓	✓	✓	✓	10	9	EMM
6	12	10	14	12	13	10	10	14	13	13	EMM
7											
8											
Total	25	15	27	25	17	16	15	18	27	24	EMM

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	4	5	✓	✓	2*	3	4	✓	4	2	JW
4	✓	✓	4	5	|	✓	✓	2	✓	✓	JS
5	8	10	✓	8	|	10	10	9	9	7	EMM
6	12	13	14	15	|	14	13	13	13	12	EMM
7											
8											
Total	24	28	18	28	2X	27	27	29	26	21	EMM

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	✓	4	~~4~~	~~4~~	✓	✓	✓	3	✓	5	JW
4	5	✓	~~✓~~	~~✓~~	4	5	2	✓	4	✓	JS
5	9	9	8	10	10	9	9	8	9	8	EMM
6	13	12	12	14	13	10	12	14	10	14	EMM
7											
8								25			
Total	27	25	26	30	27	24	23	~~26~~ 25 MG	23	27	EMM

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	3	✓	✓	✓	3	✓	✓	4	✓	4	JW
4	✓	5	5	5	✓	3	4	✓	4	✓	JS
5	9	✓	8	9	9	10	8	8	9	8	EMM
6	10	13	12	14	14	✓	15	13	✓	14	EMM
7											
8											
Total	22	17	25	27	26	13	27	25	13	26	EMM

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	MG
3	✓	✓	5	✓	2	✓	4	✓	3	3	JW
4	4	5	✓	4	✓	4	✓	5	✓	✓	JS
5	8	✓	9	8	6	✓	9	✓	7	6	EMM
6	✓	13	14	10	12	13	13	12	12	13	EMM
7											
8											
Total	12	18	28	22	20	17	26	17	22	22	EMM

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See water quality page

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JGu

Date reviewed: Nov-23/16

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	11-6061-8487	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:43	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-8563-8778	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	20 Oct-16 15:40	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	26 Oct-16 21:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 6h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	00-1942-5937	**Code:**	1286A91	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	88h (4.5°C)	**Station:**	LC_LC5_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	856468	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	1	1	1	0	0	0.0%	-11.11%	10	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	0	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	0	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

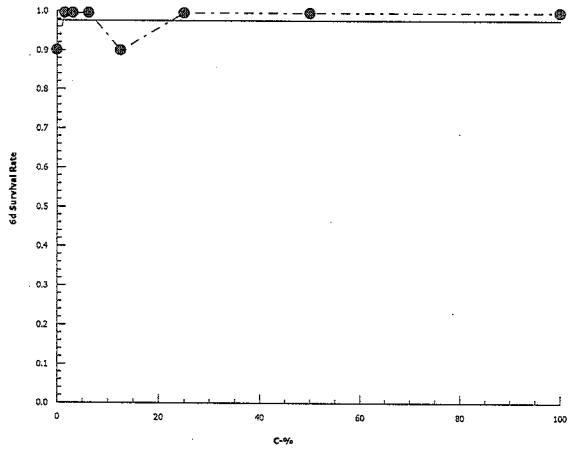
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 11-6061-8487 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 16 Nov-16 11:43 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	12-4491-0470	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:43	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-8563-8778	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	20 Oct-16 15:40	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	26 Oct-16 21:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 6h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	00-1942-5937	**Code:**	1286A91	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	88h (4.5°C)	**Station:**	LC_LC5_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1494340	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	51.91	3.699	N/A	1.926	NA	27.03
IC10	83.29	31.62	N/A	1.201	NA	3.163
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

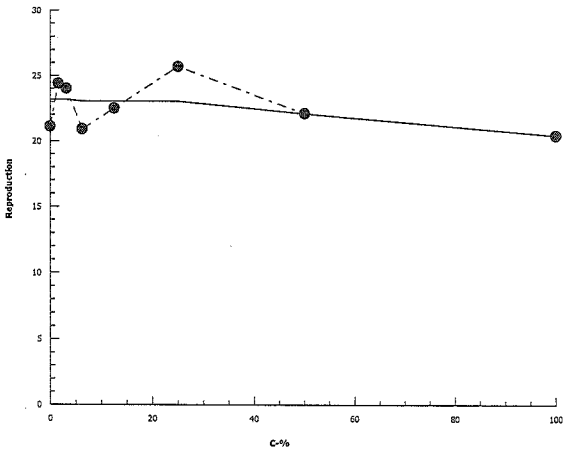
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	21.1	4	28	2.273	7.187	34.06%	0.0%
1.56		10	24.4	20	28	0.7483	2.366	9.7%	-15.64%
3.12		10	24	15	27	1.125	3.559	14.83%	-13.74%
6.25		10	20.9	15	27	1.616	5.109	24.44%	0.95%
12.5		10	22.5	2	28	2.496	7.892	35.07%	-6.64%
25		10	25.7	23	30	0.6839	2.163	8.42%	-21.8%
50		10	22.1	13	27	1.785	5.646	25.55%	-4.74%
100		10	20.4	12	28	1.477	4.671	22.9%	3.32%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	4	21	23	27	14	21	23	26	28	24
1.56		28	24	25	25	27	24	20	26	23	22
3.12		25	26	15	27	27	24	25	26	22	23
6.25		25	15	27	25	17	16	15	18	27	24
12.5		24	28	18	28	2	27	27	24	26	21
25		27	25	26	30	27	24	23	25	23	27
50		22	17	25	27	26	13	27	25	13	26
100		12	18	28	22	20	17	26	17	22	22

Analysis ID:	12-4491-0470	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 11:43	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 161122

Start Date/Time: Oct 19/16 @ 1400h
Set up by: EMM / JS

Sample Information:

Sample ID: WL-BFWB_CUT_SP21_20161017
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 10 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 101216AC
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 22
Mortality (%) in previous 7 d: 9
Individual female # used ≥8 young on test day: 2,3,5,6,8,11,12,13

NaCl Reference Toxicant Results:

Reference Toxicant ID: cd150
Stock Solution ID: 16De07
Date Initiated: Oct 13/16

7-d LC50 (95% CL): 2.0 (1.9-2.3) g/L NaCl
7-d IC50 (95% CL): 1.4 (1.2-1.7) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCl CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.2-2.0) g/L NaCl CV (%): 13

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		62.3 (51.1-67.9)
IC50 % (v/v) (95% CL)		82.8 (70.8-n/a)

Reviewed by: JGL
Date reviewed: Nov. 29/16

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: ~~LC-WTT-OUT~~ OUT-SP2L
Work Order #: 161122
Start Date & Time: Oct 19/16 @ 1400h
Stop Date & Time: Oct 25/16 @ 1730h
Test Species: *Ceriodaphnia dubia*

Concentration control	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.0	7.7	8.2	7.6	8.1	7.4	8.0	7.9	8.2	7.7	8.2	7.8		
pH	8.0	7.6	7.9	7.7	8.0	7.7	8.0	8.1	8.2	7.7 JS	7.9	7.4		
Cond. (µS/cm)	222	219		219		224		220		222		225		
Initials	EMM	JS		EMM		MLT		JW		JS		JW		

(v/v) Concentration 1.56%	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.7	8.0	7.6	8.0	7.5	8.0	7.9	8.0	7.7	8.2	7.8		
pH	7.9	7.6	7.9	7.7	7.9	7.7	7.9	① ~~7.7~~	7.8	7.7	7.8	7.4		
Cond. (µS/cm)	240	250		242		250		248		260		260		
Initials	EMM	JS		EMM		MLT		JW		JS		JW		

① 8.1

(v/v) Concentration 12.5%	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	7.7	8.0	7.6	8.0	7.5	8.0	7.8	8.1	7.8	8.2	7.7		
pH	7.9	7.7	7.8	7.7	7.7	7.7	7.8	~~7.8~~	7.8	7.7	7.8	7.6		
Cond. (µS/cm)	① ~~240~~	472		479		468		8.1 472		473		494		
Initials	EMM	JS ~~4~~ JS		EMM		MLT		JW		JS		JW		

① 469 emm

(v/v) Concentration 100%	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.5		
DO (mg/L)	8.1	7.7	8.0	7.6	8.0	7.5	8.0	7.8	8.2	7.7	8.2	7.8		
pH	7.8	7.9	7.6	7.9	7.5	7.9	7.5	~~7.9~~	7.9	7.7	7.6	7.7		
Cond. (µS/cm)	1808	1821		1837		1831		8.1 1823		1837		1772		
Initials	EMM	JS		EMM		MLT		JW		JS		JW		

Thermometer: 4 **DO meter:** 1/2 **pH meter:** 1/2 **Conductivity meter:** 1/2

	Control	100% (v/v)		
Hardness*	100	1040		
Alkalinity*	98	290		

* mg/L as CaCO3

Analysts: EMM, JS, MLT, AWD, JW
Reviewed by: [illegible]
Date reviewed: Nov. 29/16

Sample Description: clear, colourless, odourless, no particulates

Comments: **Broodboard Used:** 101216 AC (2,3,5,6,8,11,12,13)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: ~~05-16-WTP-Oct~~ WL_BFWB_OUT_SP21_20161017_N
Work Order: 161122

Start Date & Time: Oct 19/16 @ 1400h
Stop Date & Time: Oct 25/16 @ 1730h
Set up by: EMM/JS

% (v/v)

Concentration: control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	3	2	✓	✓	3	3	2	2	3	/	A
4	✓	4	5	7	✓	✓	✓	✓	✓	7	JW
5	8	9	9	10	7	7	6	7	8	X	EMM
6	18	13	✓	✓	12	15	12	14	12	/	JW
7											
8											
Total	29	26	14	17	22	25	20	23	23	7+	EMM

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	/	2	2	3	-	✓	3	2	2	2	A
4	7	✓	✓	✓	8	✓	✓	3	6	7	JW
5	10	9	9	11	9	9	8	✓	✓	✓	EMM
6	✓	14	14	15	✓	14	✓	10	11	✓	JW
7											
8											
Total	17	25	25	29	17	23	11	15	19	9	EMM

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	/	-	/	/	3	2	-	3	2	-	A
4	4	5	6	4	✓	6	7	✓	✓	8	JW
5	8	10	10	9	8	✓	8	9	8	8	EMM
6	✓	✓	8	10	14	13	✓	14	14	✓	JW
7											
8											
Total	12	15	24	23	25	21	15	26	24	16	EMM

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	3	/	/	3	2	3	-	3	2	A
4	4	5	6	4	✓	6	7				JW
5	8	✓	7	8	✓	✓	✓	7	✓	✓	JW
6	6	9	10	9	8	8	7	6	8	7	EMM
7	15	11	✓	12	12	13	24	✓	14	15	JW
8											
Total	29	23	17	29	23	23	34	13	25	24	EMM

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	3	3	/	/	3	2	/	/	/	3	A
4	✓	✓	5	6	✓	6	✓	7	7	✓	JW
5	8	9	8	10	9	✓	7	9	10	9	EMM
6	16	13	✓	✓	14	✓	15	✓	✓	11	JW
7											
8											
Total	27	25	13	16	26	8	22	16	17	23	EMM

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	2	/	/	/	3	/	/	3	2	/	A
4	✓	8	✓	✓	✓	6	6	✓	✓	7	JW
5	8	9	9	6	8	9	10	8	8	8	EMM
6	14	✓	12	14	14	11	✓	13	11	✓	JW
7					11						
8					JW						
Total	24	17	25	20	22	26	16	24	21	15	EMM

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	/	EMM
3	2	/	/	/	/	/	2	/	2	2	A
4	✓	5	✓	4	✓	5	✓	4	✓	✓	JW
5	8	9	9	10	7	11	8	7	8	9	EMM
6	14	✓	15	✓	7	✓	12	11	12	14	JW
7											
8											
Total	24	14	24	14	14	16	22	22	22	25	EMM

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	-	-	-	-	-	-	-	-	-	/	A
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	X	JW
5	X	6	5	5	✓	4	5	6	4	/	EMM
6	/	11	✓	✓	✓	12	2	10	✓	/	JW
7											
8											
Total	0X	17	5	5	0	16	7	16	4	0X	EMM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See water quality page

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: JGh

Date reviewed: Nov-23/16

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	08-9422-4045	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Oct-16 19:49	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-5156-6290	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	19 Oct-16 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	25 Oct-16 17:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	03-9695-5433	**Code:**	17A90F29	**Client:**	Teck Coal
Sample Date:	17 Oct-16 09:00	**Material:**	Effluent	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	53h (5.5 °C)	**Station:**	WL_BFWB_OUT_SP21_20161017_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	418810	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	60.14	53.66	N/A	1.663	NA	1.864
EC10	72.3	57.59	N/A	1.383	NA	1.737
EC15	86.87	61.79	N/A	1.151	NA	1.618
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	1	1	1	0	0	0.0%	-11.11%	10	10
100		10	0.8	0	1	0.1333	0.4216	52.7%	11.11%	8	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	0
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		0	1	1	1	1	1	1	1	1	0

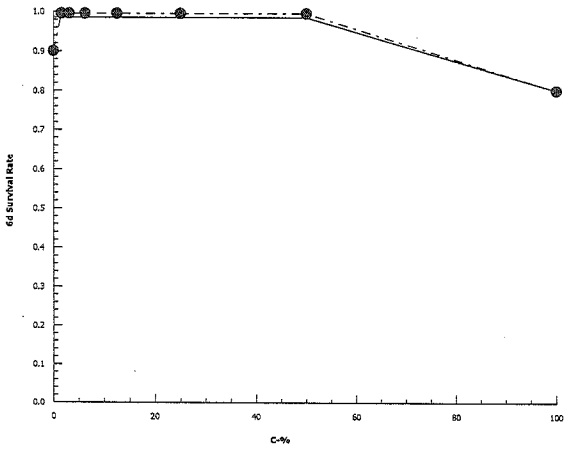
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 08-9422-4045 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 25 Oct-16 19:49 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-6959-1691	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Oct-16 19:51	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-5156-6290	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Emma Marus
Start Date:	19 Oct-16 14:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	25 Oct-16 17:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	03-9695-5433	**Code:**	17A90F29	**Client:**	Teck Coal
Sample Date:	17 Oct-16 09:00	**Material:**	Effluent	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	53h (5.5 °C)	**Station:**	WL_BFWB_OUT_SP21_20161017_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	807454	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	38.03	0.4428	52.91	2.63	1.89	225.8
IC10	52.44	1.082	55.98	1.907	1.786	92.44
IC15	55.53	9.561	59.22	1.801	1.689	10.46
IC20	58.8	33.83	62.75	1.701	1.594	2.956
IC25	62.27	51.08	67.93	1.606	1.472	1.958
IC40	73.91	63.02	87.26	1.353	1.146	1.587
IC50	82.83	70.77	N/A	1.207	NA	1.413

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	20.6	7	29	2.04	6.45	31.31%	0.0%
1.56		10	19	9	29	2.044	6.464	34.02%	7.77%
3.12		10	20.1	12	26	1.609	5.087	25.31%	2.43%
6.25		10	24	13	34	1.897	6	25.0%	-16.5%
12.5		10	19.3	8	27	1.978	6.255	32.41%	6.31%
25		10	21	15	26	1.238	3.916	18.65%	-1.94%
50		10	19.7	14	25	1.461	4.62	23.45%	4.37%
100		10	7	0	17	2.176	6.88	98.28%	66.02%

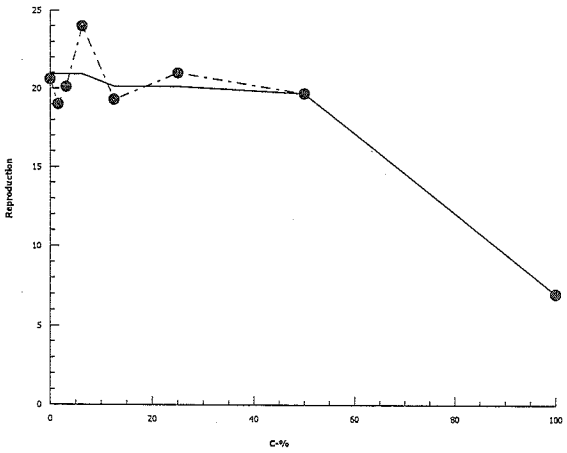
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	29	26	14	17	22	25	20	23	23	7
1.56		17	25	25	29	17	23	11	15	19	9
3.12		12	15	24	23	25	21	15	26	24	16
6.25		29	23	17	29	23	23	34	13	25	24
12.5		27	25	13	16	26	8	22	16	17	23
25		24	17	25	20	22	26	16	24	21	15
50		24	14	24	14	14	16	22	22	22	25
100		0	17	5	5	0	16	7	16	4	0

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-6959-1691	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	25 Oct-16 19:51	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: JCu 23/11

Client: Teck Coal

W.O.#: 161122

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
LC_LCDSSLCC_WS_2016_10_17_N	OCT 19/16	OCT-19/16	50	9.3	9.5	182	10 ①	~~0.987~~	870	KL/JS
LC_LC5_WS_2016_10_17_N				9.1	9.4	176	50	15.0	300	
LC_FRDSDC_WS_2016_10_17_N				9.3	~~7.7~~ 9.4	184		16.7	334	
LC_OCLWS_2016_10_17_N				7.6	~~6.1~~ 7.7	150		9.1	182	
LC_DCDS_WS_2016_10_18_N				5.9	6.1	114		7.0	140	
GH_FR2_WS_2016_10_17_N				7.4	7.5	146		8.5	170	
WL_BFUBOUTSPL_2016_10_17_N				14.7	14.9	290	100	16.4	1040	
20% Permir lab Ctrl				5.0	5.1	98	50	5.0	100	EMM

Notes: ① Diluted sample to 100mL w/ D.I water

Reviewed by: JCH Date Reviewed: Nov. 29/16

APPENDIX B – Rainbow Trout Embryo *(Oncorhynchus mykiss)* Toxicity Test Data

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 18 16 @ 1735h

Work Order No.: 161126

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: CH-ER2_WS_2016-10-17_N
Sample Date: Oct 17 16
Date Received: Oct 18 16
Sample Volume: 7x20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 9
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 10816
Source: Vancouver Island Trout Hatchery
Loading Density: 1.06 g/L

Number of male broodstock used: 2
Number of female broodstock used: 5
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE 87
Stock Solution ID: 16502 (1000mg/L SDS)
Date Initiated: Oct 18 16
7-d EC50 (95% CL): 3.8 (3.6 - 3.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.0 - 7.8) mg/L SDS
Reference Toxicant CV (%): 40

Test Results:

Embryo viability (mean ± SD)

	Sample ID		
	Control	CH-ER2_WS_2016-10-17_N	
EC25 % (v/v) (95% CL)	95.8 ± 1.7	93.3 ± 2.9	
EC50 % (v/v) (95% CL)			

Reviewed by: [signature]

Date reviewed: Nov. 2, 2016

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: AH_ER2_WS_2016-10-17_N
Work Order #: 161128

Start Date & Time: Oct 18/16 @ 1735h
Stop Date & Time: Oct 25/16 @ 1000h
Test Species: *Oncorhynchus mykiss*

%(v/v) Concentration: control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.6	14.0	14.5	14.0	14.0
DO (mg/L)	10.0	10.0	10.1	10.1	9.9	10.0	10.0	9.8	9.9	9.8	9.9	10.0	10.0	10.0
pH	7.0	7.0	7.02 1440	7.0	7.2	6.8	7.1	6.8	7.1	6.8	7.1	7.0	7.0	7.1
Cond. (µS/cm)	32	29		32		29		30		30		28		29
Initials	KL	KL		KL		KL		A		A		KL		KL

Concentration: 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	13.0	14.0	14.0	14.0	14.0	14.0	14.6	14.0	14.6	14.0	14.0	14.0	14.0
DO (mg/L)	10.4	10.3	10.1	10.0	9.9	10.1	10.1	9.9	9.9	9.8	9.9	10.1	10.0	10.1
pH	8.1	8.1	8.2	8.1	8.3	8.2	8.4	8.1	8.4	8.3	8.3	8.2	8.5	8.3
Cond. (µS/cm)	305	303		309		306		306		305 ↑		317		312
Initials	KL	KL		KL		KL		A		A		KL		KL

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: Temp-3 **DO meter:** DO-2 **pH meter:** pH-2 **Conductivity meter:** C-2

	Control	100%		
Hardness*	9	170		
Alkalinity*	5	146		

* mg/L as CaCO3

Analysts: AWD, KL

Reviewed by:

Date reviewed: NOV. 2, 2016

Sample Description: clear, colourless, odourless, no particulates

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: GH_ER2_WS_2016-10-17_N
Work Order #: 16115

Start Date & Time: Oct 18/16 @ 1735h
Stop Date & Time: Oct 25/16 @ 1000h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	1	29	30
	2	↓	↓	↓	↓	↓	↓	↓	↓	1	29	30
	3	↓	↓	↓	↓	↓	↓	↓	↓	2	28	30
	4	↓	↓	↓	↓	↓	↓	↓	↓	1	29	30
100	1	↓	↓	↓	1	↓	↓	1	↓	3	26	29
	2	↓	↓	↓	1	↓	↓	0	1	1	29	KR ~~30~~ 31
	3	↓	↓	↓	0	↓	↓	0	0	1	29	30
	4	↓	↓	↓	0	↓	↓	0	0	2	28	30
	1											
	2											
	3											
	4											
	1											
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Tech Initials		KR	KR	KR	A	A	KR	KR	KR	KR	KR	KR

Comments: _____

Reviewed by: _____ **Date reviewed:** Nov 2, 2016

CETIS Summary Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Batch ID:	18-7676-7282	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	18 Oct-16 17:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	25 Oct-16 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 16h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	11-6624-2441	**Code:**	45837289	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	42h (5.5 °C)	**Station:**	GH_ER2_WS_2016-10-17_N		

Comparison Summary

Analysis ID	Endpoint	NOEL	LOEL	TOEL	PMSD	TU	Method
07-1457-3146	Proportion Normal	100	>100	NA	NA	1	Fisher Exact Test

Proportion Normal Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	0.9583	0.9318	0.9849	0.9333	0.9667	0.008333	0.01667	1.74%	0.0%
100		4	0.933	0.8874	0.9787	0.8966	0.9667	0.01434	0.02868	3.07%	2.64%

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9667	0.9667	0.9333	0.9667
100		0.8966	0.9355	0.9667	0.9333

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	29/30	29/30	28/30	29/30
100		26/29	29/31	29/30	28/30

Nov 2/16

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	07-1457-3146	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Oct-16 8:04	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	18-7676-7282	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	18 Oct-16 17:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	25 Oct-16 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 16h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	11-6624-2441	**Code:**	45837289	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	42h (5.5 °C)	**Station:**	GH_ER2_WS_2016-10-17_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	Passes proportion normal

Fisher Exact Test

Control	vs	C-%	Test Stat	P-Value	P-Type	Decision(α:5%)
Negative Control		100	0.2851	0.2851	Exact	Non-Significant Effect

Data Summary

C-%	Control Type	NR	R	NR + R	Prop NR	Prop R	%Effect
0	Negative Contr	115	5	120	0.9583	0.04167	0.0%
100		112	8	120	0.9333	0.06667	2.61%

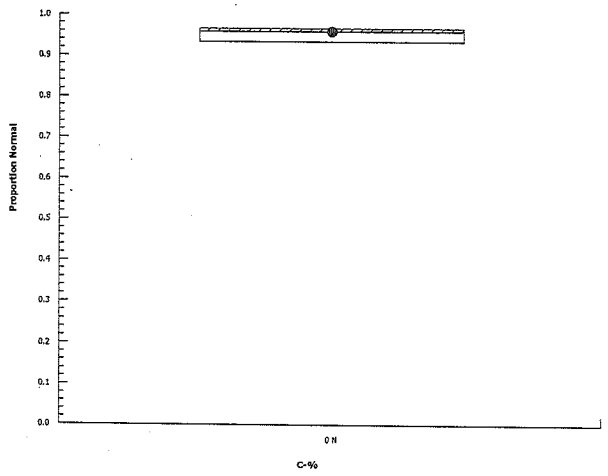
Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9667	0.9667	0.9333	0.9667
100		0.8966	0.9355	0.9667	0.9333

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	29/30	29/30	28/30	29/30
100		26/29	29/31	29/30	28/30

Graphics



NN-2 /16

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 18/16 @ 1735h

Work Order No.: 161125

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2016-10-17_N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 9 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 9
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 101816
Source: Vancouver Island Trout Hatchery
Loading Density: 1.06 g/L

Number of male broodstock used: 2
Number of female broodstock used: 5
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE87
Stock Solution ID: 16502 (1000 mg/L SDS)
Date Initiated: Oct 18/16
7-d EC50 (95% CL): 3.8 (3.6 - 3.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.0 - 7.8) mg/L SDS
Reference Toxicant CV (%): 40

Test Results:

	Sample ID		
	LC_LCDSSLCC_WS_2016-10-17_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: [signature]

Date reviewed: Oct 31, 2016

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_LCOSSLCC_WS_2016-10-17_N
Work Order #: 161125

Start Date & Time: Oct 18 /16 @ 1735h
Stop Date & Time: Oct 25 /16 @ 0900h
Test Species: *Oncorhynchus mykiss*

%(v/v) Concentration Control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5
DO (mg/L)	10.0	10.0	10.1	10.1	9.8	10.0	9.9	9.8	9.8	9.8	9.9	10.0	10.0	10.0
pH	7.0	7.0	7.0	7.0	7.1	6.8	7.1	6.8	7.0	6.8	7.1	7.0	7.0	7.0
Cond. (µS/cm)	32	29		32		29		30		30		28		29
Initials	KL	KL		KL		KL		AW		AW		KL		KL

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	14.5	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.0	14.0	14.0
DO (mg/L)	9.8	10.1	10.1	9.9	9.8	10.0	10.0	9.9	9.9	9.9	9.9	10.0	10.0	10.0
pH	7.2	7.2	7.2	7.4	7.3	7.3	7.3	7.2	7.1	7.4	7.6	7.5	7.5	7.2
Cond. (µS/cm)	84	72		79		KL 795		80		83		81		84
Initials	KL	KL		KL		KL		AW		AW		KL		KL

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	KL 15.0	14.0	14.5	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.1	10.0	9.8	10.0	10.0	9.9	9.8	10.0	9.8	10.0	10.0	10.0
pH	7.8	7.9	7.7	8.0	7.8	7.8	7.8	7.7	7.9	7.6	7.9	7.7	7.5	7.7
Cond. (µS/cm)	228	212		223		226		234		231		KL 230		232
Initials	KL	KL		KL		KL		AW		AW		KL		KL

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.0	14.0	14.5	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	KL 10.13	10.2	10.0	9.8	10.1	10.0	10.0	9.8	10.0	9.8	10.1	10.0	10.0
pH	8.1	8.1	8.3	8.2	8.4	8.2	8.4	8.1	8.4	8.2	8.3	8.3	8.5	8.3
Cond. (µS/cm)	714	716		715		719		716		715		723		724
Initials	KL	KL		KL		KL		AW		AW		KL		KL

Thermometer: Temp-3 **DO meter:** DO-2 **pH meter:** pH-1 **Conductivity meter:** C-2

	Control	100%		
Hardness*	9	870		
Alkalinity*	5	182		

* mg/L as CaCO3

Analysts: AWD, KL

Reviewed by: [signature]

Date reviewed: Oct 31, 2016

Sample Description: Clear, colourless, odourless, no particulates.

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_LCOSSLCC_WS_2016-10-17_N
Work Order #: 161125

Start Date & Time: Oct 18 /16 @ 1735h
Stop Date & Time: Oct 25/16 @ 0900h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	2	28	30
	2									1	29	30
	3									0	30	30
	4									2	28	30
6.25	1									2	28	30
	2									1	29	30
	3									0	30	30
	4									0	30	30
12.5	1									0	30	30
	2							↓	↓	0	30	30
	3							1	1	0	29	30
	4							0	0	1	29	30
25	1									1	29	30
	2									0	30	30
	3									0	30	30
	4									0	30	30
50	1									2	28	30
	2							↓	↓	0	30	30
	3							1	1	0	29	30
	4						↓	0	0	1	29	30
100	1						1	0	1	5	24	30
	2				1		1	1	2	7	21	30
	3				1		1	0	2	4	24	30
	4	↓	↓	↓	0	↓	0	0	0	9	21	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: [signature]
Date reviewed: Oct. 31, 2016

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	18-8537-7607	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Oct-16 7:43	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-3617-3203	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	18 Oct-16 17:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	25 Oct-16 09:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 15h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	02-2496-3209	**Code:**	D68AA89	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	42h (3.5 °C)	**Station:**	LC_LCDSSLCC_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1501256	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	56.57	49.98	61.43	1.768	1.628	2.001
EC10	66.16	58.11	76.31	1.511	1.31	1.721
EC15	77.35	66.79	94.73	1.293	1.056	1.497
EC20	90.4	76.08	N/A	1.106	NA	1.314
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9583	0.9333	1	0.01596	0.03191	3.33%	0.0%	115	120
6.25		4	0.975	0.9333	1	0.01596	0.03191	3.27%	-1.74%	117	120
12.5		4	0.9833	0.9667	1	0.009622	0.01924	1.96%	-2.61%	118	120
25		4	0.9917	0.9667	1	0.008333	0.01667	1.68%	-3.48%	119	120
50		4	0.9667	0.9333	1	0.01361	0.02722	2.82%	-0.87%	116	120
100		4	0.75	0.7	0.8	0.02887	0.05774	7.7%	21.74%	90	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9333	0.9667	1	0.9333
6.25		0.9333	0.9667	1	1
12.5		1	1	0.9667	0.9667
25		0.9667	1	1	1
50		0.9333	1	0.9667	0.9667
100		0.8	0.7	0.8	0.7

Proportion Normal Binomials

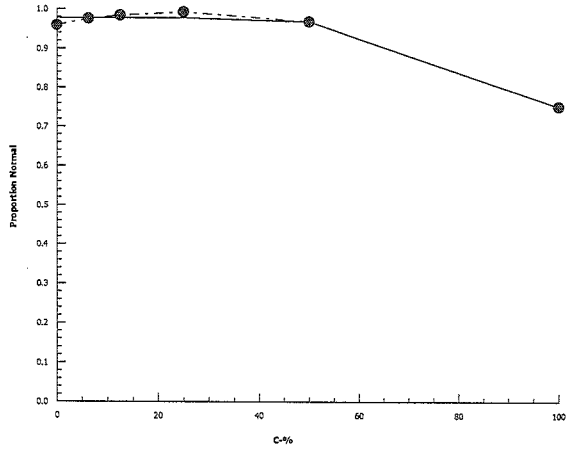
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	28/30	29/30	30/30	28/30
6.25		28/30	29/30	30/30	30/30
12.5		30/30	30/30	29/30	29/30
25		29/30	30/30	30/30	30/30
50		28/30	30/30	29/30	29/30
100		24/30	21/30	24/30	21/30

Oct-31/16

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	18-8537-7607	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Oct-16 7:43	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA:_____ Oct-31/16

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 18/16 @ 1735h

Work Order No.: 161125

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_OC1_WS_2016-10-17_N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 6X20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 9
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 101816
Source: Vancouver Island Trout Hatchery
Loading Density: 1.06 g/L

Number of male broodstock used: 2
Number of female broodstock used: 5
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE87
Stock Solution ID: 16502 (1000 mg/L SDS)
Date Initiated: Oct 18/16
7-d EC50 (95% CL): 3.8 (3.6-3.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.0-7.8) mg/L SDS
Reference Toxicant CV (%): 40

Test Results:

	Sample ID		
	LC_OC1_WS_2016-10-17_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: [signature]

Date reviewed: Oct. 31, 2016

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_DC1-WS_2016-10-12_N
Work Order #: 161125

Start Date & Time: Oct 18 /16 @ 1735h
Stop Date & Time: Oct 25 /16 @ 0930h
Test Species: *Oncorhynchus mykiss*

%(v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.0
DO (mg/L)	10.0	10.0	10.1	10.1	9.9	10.0	9.9	9.8	9.8	9.8	9.8	10.0	10.1	10.0
pH	7.0	7.0	7.0	7.0	7.2	6.8	7.1	6.8	7.1	6.8	7.2	7.0	7.0	7.1
Cond. (µS/cm)	32	29		32		29		30		30		28		29
Initials	KL	KL		KL		KL		A		A		KL		KL

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	14.5	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5 KL	14.0	14.0
DO (mg/L)	10.1	10.0	10.1	10.0	9.9	10.2	10.0	9.9	9.8	9.9	9.9	10.0	10.1	10.0
pH	7.2	7.1	7.1	7.2	7.3	7.1	7.3	7.2	7.4	7.1	7.3	7.4	7.4	7.3
Cond. (µS/cm)	47	45		43		41		42		44		51		49
Initials	KL	KL		KL		KL		A		A		KL		KL

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	14.5	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.0
DO (mg/L)	10.1	10.1	10.1	10.0	9.9	10.1	10.0	10.0	9.9	10.1	9.8	10.0	10.1	10.0
pH	7.7	7.7	7.6	7.7 KL	7.7	7.7	7.7	7.8	7.8	7.8	7.7	7.6	7.7	7.5
Cond. (µS/cm)	~~83~~ KL 103	102		102		102		103		104		107		106
Initials	KL	KL		KL		KL		A		A		KL		KL

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	~~14.5~~ KL DS	14.0	14.5	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.0
DO (mg/L)	10.2	10.1	10.1	10.0	9.9	10.1	10.0	10.1	9.8	10.1	9.9	10.0	10.1	10.0
pH	8.2	8.1	8.2	8.2	8.2	8.2	8.3	8.1	8.2	8.0	8.3	8.2	8.4	8.2
Cond. (µS/cm)	306	306		307		307		308		309		311		310
Initials	KL	KL		KL		KL		A		A		KL		KL

Thermometer: Temp-3 **DO meter:** DO-2 **pH meter:** pH-1 **Conductivity meter:** C-2

	Control	100%		
Hardness*	9	182		
Alkalinity*	5	150		

* mg/L as CaCO3

Analysts: AWD, KL

Reviewed by: [signature]
Date reviewed: Oct. 31, 2016

Sample Description: slightly turbid, yellow, odourless, black ~~par~~ KL particulates.

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_DCI_WS_2016-10-17_N
Work Order #: 16425

Start Date & Time: Oct 18 /16 @ 1735h
Stop Date & Time: Oct 25 /16 @ 0930h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	0	30	30
	2									0	30	30
	3									1	29	30
	4									1	29	30
6.25	1									1	29	30
	2									1	29	30
	3									1	29	30
	4									2	28	30
12.5	1									1	29	30
	2									1	29	30
	3									0	30	30
	4									1	29	30
25	1			↓					↓	2	28	30
	2			1			↓		1	0	29	30
	3			0			2		2	1	27	30
	4			0		↓	0		0	0	30	30
50	1			0		1	0		1	1	28	30
	2			0		1			1	0	29	30
	3			1		0			1	1	28	30
	4			0		0			0	0	30	30
100	1		R=1	0		0			1	2	28	31
	2		R=0	1		2			3	2	25	30
	3			0		2			2	0	28	30
	4	↓	↓	1		0	↓	↓	1	1	28	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: [signature]

Date reviewed: Oct. 31, 2016

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	01-3161-7842	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Oct-16 7:51	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes
Batch ID:	15-8759-5046	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	18 Oct-16 17:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	25 Oct-16 09:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 16h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	00-8911-1788	**Code:**	54FBCEC	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	42h (2.5 °C)	**Station:**	LC_DC1_WS_2016-10-17_N		

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Gompertz [log(-log(1-P)=A+B*log(X)]	Control Threshold	0.0166667	Yes	No	No	Yes

Regression Summary

Iters	LL	AICc	BIC	Mu	Sigma	Adj R2	F Stat	Critical	P-Value	Decision(α:5%)
39	-129.8	266.8	269.1	3.279		0.3753	0.9904	3.16	0.4196	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	68.3	N/A	N/A	1.464	NA	NA
EC10	152.9	N/A	N/A	0.6538	NA	NA
EC15	248.5	N/A	N/A	0.4024	NA	NA
EC20	354.4	N/A	N/A	0.2821	NA	NA
EC25	471.1	N/A	N/A	0.2123	NA	NA
EC40	896.2	N/A	N/A	0.1116	NA	NA
EC50	1261	N/A	N/A	0.07928	NA	NA

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
Threshold	0.02199	0.01232	-0.002154	0.04613	1.785	0.0887	Non-Significant Parameter
Slope	2.056	1.468	-0.8209	4.933	1.401	0.1759	Non-Significant Parameter
Intercept	-6.741	2.683	-12	-1.482	-2.512	0.0202	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	10.2953	10.2953	1	15.82	0.0007	Significant
Lack of Fit	1.936407	0.645469	3	0.9904	0.4196	Non-Significant
Pure Error	11.73142	0.6517456	18			
Residual	13.66783	0.650849	21			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF	13.67	32.67	0.8834	Non-Significant Heterogenity
	Likelihood Ratio GOF	17.49	32.67	0.6811	Non-Significant Heterogenity
Variances	Bartlett Equality of Variance	2.561	11.07	0.7673	Equal Variances
	Mod Levene Equality of Variance	1.002	2.773	0.4446	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9542	0.9169	0.3327	Normal Distribution
	Anderson-Darling A2 Normality	0.5214	2.492	0.1886	Normal Distribution

Oct-31/16

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID: 01-3161-7842 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.8.7
Analyzed: 28 Oct-16 7:51 **Analysis:** Linear Regression (MLE) **Official Results:** Yes

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9833	0.9667	1	0.009622	0.01924	1.96%	0.0%	118	120
6.25		4	0.9583	0.9333	0.9667	0.008333	0.01667	1.74%	2.54%	115	120
12.5		4	0.975	0.9667	1	0.008333	0.01667	1.71%	0.85%	117	120
25		4	0.95	0.9	1	0.02152	0.04303	4.53%	3.39%	114	120
50		4	0.9583	0.9333	1	0.01596	0.03191	3.33%	2.54%	115	120
100		4	0.9008	0.8333	0.9333	0.02358	0.04717	5.24%	8.39%	109	121

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	0.9667	0.9667
6.25		0.9667	0.9667	0.9667	0.9333
12.5		0.9667	0.9667	1	0.9667
25		0.9333	0.9667	0.9	1
50		0.9333	0.9667	0.9333	1
100		0.9032	0.8333	0.9333	0.9333

Proportion Normal Binomials

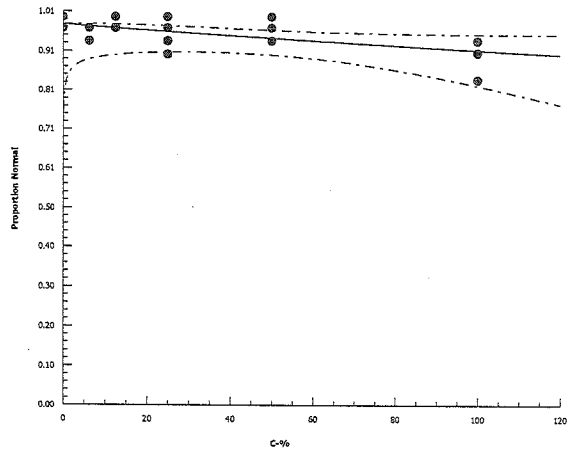
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	30/30	29/30	29/30
6.25		29/30	29/30	29/30	28/30
12.5		29/30	29/30	30/30	29/30
25		28/30	29/30	27/30	30/30
50		28/30	29/30	28/30	30/30
100		28/31	25/30	28/30	28/30

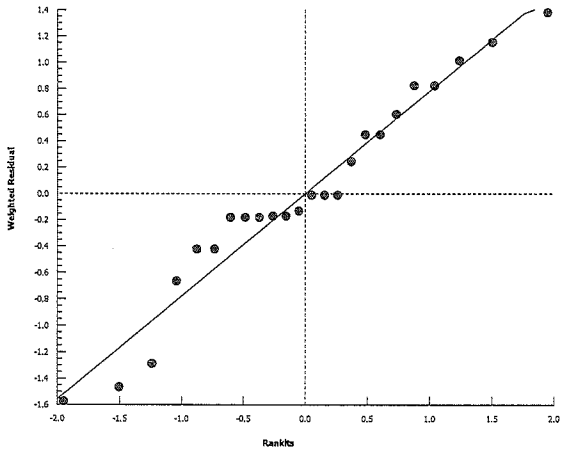
Analyst:_____ QA:_____

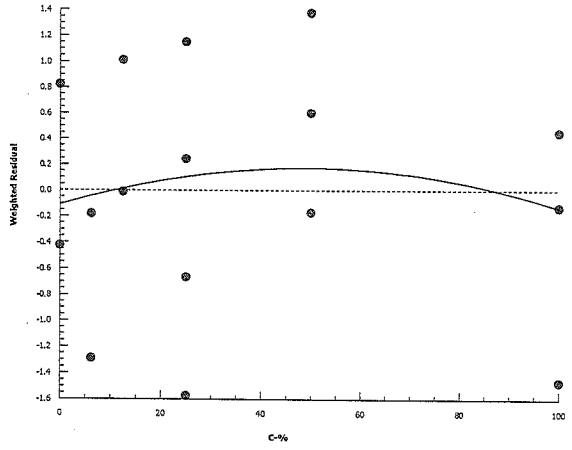
10-31-16

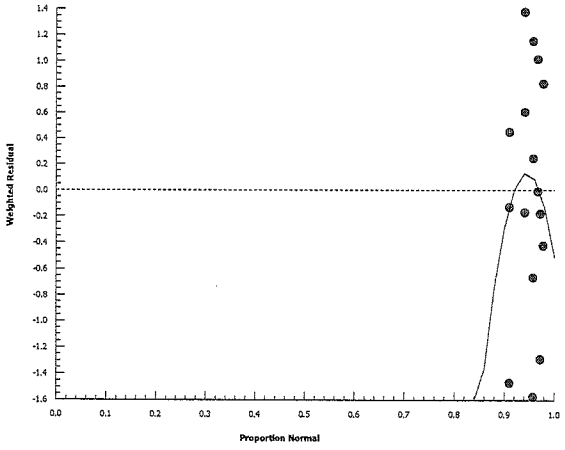
Analysis ID:	01-3161-7842	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Oct-16 7:51	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes

Graphics — Log-Gompertz [log(-log(1-P)=A+B*log(X)]









Analyst:_____ QA:_____ Dec-31/16

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 18/16 @ 1735h

Work Order No.: 161125

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_RBDSDC_WS_2016-10-17_N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 6X20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 9
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 101816
Source: Vancouver Island Trout Hatchery
Loading Density: 1.06 g/L fw

Number of male broodstock used: 2
Number of female broodstock used: 5
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE87
Stock Solution ID: 16502 (1000 mg/L SDS)
Date Initiated: Oct 18/16
7-d EC50 (95% CL): 3.8 (3.6-3.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.0-7.8) mg/L SDS
Reference Toxicant CV (%): 40

Test Results:

	Sample ID		
	LC_RBDSDC_WS-2016-10-17_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: [signature]

Date reviewed: Oct. 31, 2016

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-FROSDC-WS-2016-10-17_N
Work Order #: 161125

Start Date & Time: Oct 18 /16 @ 1735h
Stop Date & Time: Oct 25 /16 @ 0945h
Test Species: *Oncorhynchus mykiss*

%(v/v) Concentration Control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.5	14.5	14.0	14.0
DO (mg/L)	10.0	10.0	10.1	10.1	9.9	10.0	10.0	9.8	9.9	9.8	9.9	10.0	10.0	10.0
pH	7.0	7.0	7.0	7.0	7.2	6.8	7.1	6.8	7.1	6.8	7.1	7.0	7.0	7.1
Cond. (µS/cm)	32	29		32		29		30		20		28		29
Initials	KL	KL		KL		KL		AP		AP		KL		KL

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	14.5	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.0
DO (mg/L)	10.1	10.2	10.1	10.1	9.9	10.0	10.0	9.9	9.8	10.0	9.9	10.0	10.0	10.0
pH	7.3	7.2	7.2	7.4	7.3	7.4	7.3	7.3	7.4	7.4	7.5	7.4	7.4	7.3
Cond. (µS/cm)	74	68		70		63		73		75		74		73
Initials	KL	KL		KL		KL		AP		AP		KL		KL

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	14.5	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.0
DO (mg/L)	10.1	10.2	10.1	10.1	9.9	10.0	10.0	10.0	9.9	10.1	9.8	10.0	10.0	10.0
pH	7.8	7.9	7.6	8.0	7.8	7.8	7.8	7.7	7.9	7.8	7.9	7.8	7.9	7.7
Cond. (µS/cm)	209	206		KL 22 213		204		216		211		214		214
Initials	KL	KL		KL		KL		AP		AP		KL		KL

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.2	10.1	10.1	9.9	10.1	10.0	9.9	9.8	10.1	9.9	10.0	10.0	10.0
pH	8.1	8.1	8.3	8.2	8.4	8.2	8.4	8.1	8.4	8.2	8.3	8.3	8.4	8.3
Cond. (µS/cm)	673	671		673		676		677		676		682		681
Initials	KL	KL		KL		KL		AP		AP		KL		KL

Thermometer: Temp-3 **DO meter:** DO-2 **pH meter:** pH-1 **Conductivity meter:** C-2

	Control	100%		
Hardness*	9	334		
Alkalinity*	5	184		

* mg/L as CaCO3

Analysts: AWD, KL

Reviewed by:

Date reviewed: Oct. 31, 2016

Sample Description: clear, colourless, odourless, no particulates.

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_FRDSDC_WS_2016-10-17_N
Work Order #: 161125

Start Date & Time: Oct 18 /16 @ 1735h
Stop Date & Time: Oct 25/16 @ 0945h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
control	1	0	0	0	0	0	0	0	0	1	29	30
	2									1	29	30
	3									0	30	30
	4									0	30	30
6.25	1									0	30	30
	2									1	29	30
	3				1				1	0	29	30
	4				0				0	1	29	30
12.5	1								0	1	29	30
	2								0	0	30	30
	3						1		1	0	29	30
	4						0		0	2	28	30
25	1			1			0		1	0	29	30
	2			0			0		0	2	28	30
	3						1		1	1	28	30
	4						0		0	2	28	30
50	1						0		0	0	30	30
	2						0		0	3	27	30
	3			1		1	2	1	5	0	25	30
	4			0		0	0	0	0	1	29	30
100	1			0		0	0	0	0	4	26	30
	2			1		1	0	0	2	1	27	30
	3			0		1	0	1	2	5	23	30
	4			0		2	1	0	3	2	25	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments:

Reviewed by: [signature]

Date reviewed: Oct-31, 2016

Version 1.0 Issued June 26, 2006

Nautilus Environmental Company Inc.

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	16-7923-5681	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Oct-16 7:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-6341-6593	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	18 Oct-16 17:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	25 Oct-16 09:45	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 16h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	19-9543-8291	**Code:**	76EFF8D3	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	42h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1965071	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	34.21	7.851	80.09	2.923	1.249	12.74
EC10	69.8	21.22	N/A	1.433	NA	4.712
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9833	0.9667	1	0.009622	0.01924	1.96%	0.0%	118	120
6.25		4	0.975	0.9667	1	0.008333	0.01667	1.71%	0.85%	117	120
12.5		4	0.9667	0.9333	1	0.01361	0.02722	2.82%	1.7%	116	120
25		4	0.9417	0.9333	0.9667	0.008333	0.01667	1.77%	4.24%	113	120
50		4	0.925	0.8333	1	0.03696	0.07391	7.99%	5.93%	111	120
100		4	0.8417	0.7667	0.9	0.02846	0.05693	6.76%	14.41%	101	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9667	0.9667	1	1
6.25		1	0.9667	0.9667	0.9667
12.5		0.9667	1	0.9667	0.9333
25		0.9667	0.9333	0.9333	0.9333
50		1	0.9	0.8333	0.9667
100		0.8667	0.9	0.7667	0.8333

Proportion Normal Binomials

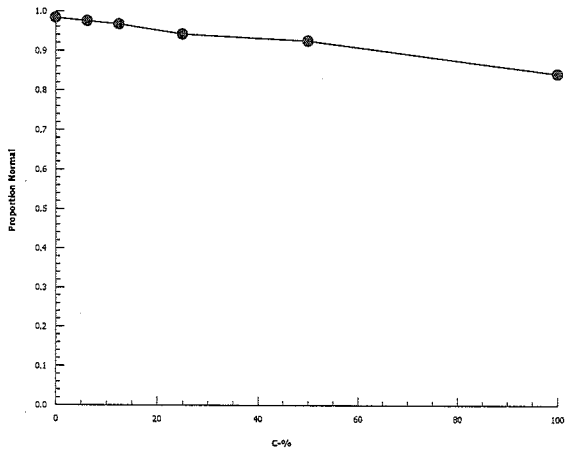
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	29/30	29/30	30/30	30/30
6.25		30/30	29/30	29/30	29/30
12.5		29/30	30/30	29/30	28/30
25		29/30	28/30	28/30	28/30
50		30/30	27/30	25/30	29/30
100		26/30	27/30	23/30	25/30

Oct-31/16

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	16-7923-5681	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Oct-16 7:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Oct-31/16

Analyst:_____ QA:_____

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 19 16 @ 1300h

Work Order No.: 161125

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DCDS_WS_2016-10-18_N
Sample Date: Oct 18 16
Date Received: Oct 19 16
Sample Volume: 6x20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 9
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 101816
Source: Vancouver Island Trout Hatchery
Loading Density: 1.17 g/L

Number of male broodstock used: 2
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE88
Stock Solution ID: 16502 (10000mg/L SDS)
Date Initiated: Oct 19 16
7-d EC50 (95% CL): 3.9 (3.7 – 4.2) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.1 – 7.7) mg/L SDS
Reference Toxicant CV (%): 38

Test Results:

	Sample ID		
	LC_DCDS_WS_2016-10-17_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: [signature]

Date reviewed: Nov 2, 2016

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-DCDS_WS_2016-10-18_N
Work Order #: 161125

Start Date & Time: Oct 18 / 16 @ 1300h
Stop Date & Time: Oct 26 / 16 @ 1100h
Test Species: *Oncorhynchus mykiss*

%(v/v) Concentration (Control)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.0	10.0	9.8	10.0	9.9	9.8	9.9	9.8	9.9	10.0	10.0	9.9	9.9	9.9
pH	7.0	7.0	7.0	6.9	7.0	6.8	7.0	6.8	7.1	6.8	6.8	6.8	6.9	7.0
Cond. (µS/cm)	32	29		28		29		29		28		28		29
Initials	KL	KL		KL		AS		AS		KL		KL		KL

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.1	10.0	9.8	10.0	9.9	9.8	9.8	9.9	9.9	9.9	10.0	9.9	9.9	10.0
pH	7.2	7.2	7.2	7.2	7.2	7.2	7.1	7.3	7.2	7.1	7.1	7.0	7.0	7.1
Cond. (µS/cm)	43	46		46		45		47		41		46		47
Initials	KL	KL		KL		AS		AS		KL		KL		KL

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5
DO (mg/L)	10.2	10.0	9.8	10.0	9.9	9.9	9.9	9.8	9.8	9.9	9.9	9.9	9.9	10.0
pH	7.6	7.5	7.5	7.5	7.5	7.4	7.3	7.5	7.6	7.2	7.4	7.3	7.2	7.3
Cond. (µS/cm)	87	93		96		97		96		92		104		99
Initials	KL	KL		KL		AS		AS		KL		KL		KL

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	14.5	15.0	14.5	14.5
DO (mg/L)	10.4	10.0	9.8	10.0	9.9	9.9	9.8	10.0	9.9	9.9	10.0	9.9	9.9	10.0
pH	AD	8.0	8.0	8.1	8.1	8.0	7.9	8.1	8.1	8.0	8.1	7.8	8.0	8.0
Cond. (µS/cm)	270	261		270		272		270		277		275		275
Initials	KL	KL		KL		AS		AS		KL		KL		KL

Thermometer: Temp-3 **DO meter:** DO-2 **pH meter:** pH-1 **Conductivity meter:** C-2

	Control	100%		
Hardness*	9	140		
Alkalinity*	5	114		

* mg/L as CaCO3

Analysts: AWD, KL

Reviewed by:

Date reviewed: NOV. 1, 2016

Sample Description: slightly turbid, dark yellow, odourless, particulates present

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: CC_DCDS_WS_2016-10-18_N
Work Order #: 161125

Start Date & Time: Oct 19 16 @ 1300h
Stop Date & Time: Oct 26 16 @ 1100h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
control	1	0	0	0	0	0	0	1	1	1	28	30
	2							0	0	1	29	30
	3									0	30	30
	4									1	29	30
6.25	1									0	30	30
	2									1	29	30
	3									0	30	30
	4									0	30	30
12.5	1						1		1	0	29	30
	2						0		0	1	29	30
	3									0	30	30
	4									1	29	30
25	1									1	29	30
	2							1	1	1	28	30
	3							0	0	0	30	30
	4							0	0	0	30	30
50	1			2	2			1	5	1	24	30
	2		1	0	2	3		1	6	1	23	30
	3		1	0	1	1		1	4	0	26	30
	4		0	0	1	0		0	1	0	29	30
100	1		1	2	2	1		0	6	0	24	30
	2		~~3~~ 2	0	0	0		0	2	0	28	30
	3		2	4	1	1		0	~~7~~ 8	1	21	30
	4		3	3	0	0	1	0	7	1	22	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		[illegible]	EL	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments:

Reviewed by: [signature]

Date reviewed: Nov. 1, 2016

Version 1.0 Issued June 26, 2006

Nautilus Environmental Company Inc.

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	19-3617-7838	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Oct-16 8:36	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes
Batch ID:	11-5310-6684	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	19 Oct-16 13:00	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	26 Oct-16 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 22h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	18-7594-5243	**Code:**	6FD0A71B	**Client:**	Teck Coal
Sample Date:	18 Oct-16 12:30	**Material:**	Water Sample	**Project:**	
Receive Date:	19 Oct-16 11:44	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	24h (8.3 °C)	**Station:**	LC_DCDS_WS_2016-10-18_N		

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Angle [Asin(P^0.5)=A+B*log(X)]	Control Threshold	0.0333333	Yes	No	No	Yes

Regression Summary

Iters	LL	AICc	BIC	Mu	Sigma	Adj R2	F Stat	Critical	P-Value	Decision(α:5%)
10	-165.9	339	341.3	1.153		0.684	1.088	3.16	0.3795	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	35.39	19.52	47.27	2.826	2.115	5.123
EC10	52.23	36.61	68.55	1.915	1.459	2.731
EC15	71.01	54.19	~~102~~ >100	1.408	0.98	1.845
EC20	92.72	70.42	~~155.9~~	1.079	0.6415	1.42
EC25	118.2	86.31	237.3	0.8463	0.4215	1.159
EC40	226.7	140.5	778.2	>100 0.4411	0.1285	0.7115
EC50	~~340.7~~	187.6	1660	0.2935	0.06022	0.5329

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
Threshold	0.02117	0.007561	0.006354	0.03599	2.8	0.0107	Significant Parameter
Slope	0.5693	0.1369	0.301	0.8376	4.159	0.0004	Significant Parameter
Intercept	-0.6562	0.2431	-1.133	-0.1798	-2.7	0.0134	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	61.70533	61.70533	1	51.79	<0.0001	Significant
Lack of Fit	3.840177	1.280059	3	1.088	0.3795	Non-Significant
Pure Error	21.18122	1.176735	18			
Residual	25.0214	1.191495	21			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF	25.02	32.67	0.2462	Non-Significant Heterogenity
	Likelihood Ratio GOF	29.9	32.67	0.0939	Non-Significant Heterogenity
Variances	Bartlett Equality of Variance	3.452	11.07	0.6307	Equal Variances
	Mod Levene Equality of Variance	0.9569	2.773	0.4694	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9545	0.9169	0.3382	Normal Distribution
	Anderson-Darling A2 Normality	0.6896	2.492	0.0717	Normal Distribution

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID: 19-3617-7838 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.8.7
Analyzed: 28 Oct-16 8:36 **Analysis:** Linear Regression (MLE) **Official Results:** Yes

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9667	0.9333	1	0.01361	0.02722	2.82%	0.0%	116	120
6.25		4	0.9917	0.9667	1	0.008333	0.01667	1.68%	-2.59%	119	120
12.5		4	0.975	0.9667	1	0.008333	0.01667	1.71%	-0.86%	117	120
25		4	0.975	0.9333	1	0.01596	0.03191	3.27%	-0.86%	117	120
50		4	0.85	0.7667	0.9667	0.0441	0.08819	10.38%	12.07%	102	120
100		4	0.7917	0.7	0.9333	0.05159	0.1032	13.03%	18.1%	95	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9333	0.9667	1	0.9667
6.25		1	0.9667	1	1
12.5		0.9667	0.9667	1	0.9667
25		0.9667	0.9333	1	1
50		0.8	0.7667	0.8667	0.9667
100		0.8	0.9333	0.7	0.7333

Proportion Normal Binomials

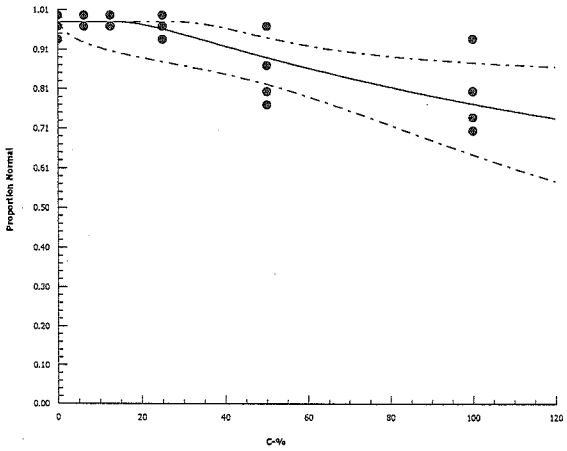
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	28/30	29/30	30/30	29/30
6.25		30/30	29/30	30/30	30/30
12.5		29/30	29/30	30/30	29/30
25		29/30	28/30	30/30	30/30
50		24/30	23/30	26/30	29/30
100		24/30	28/30	21/30	22/30

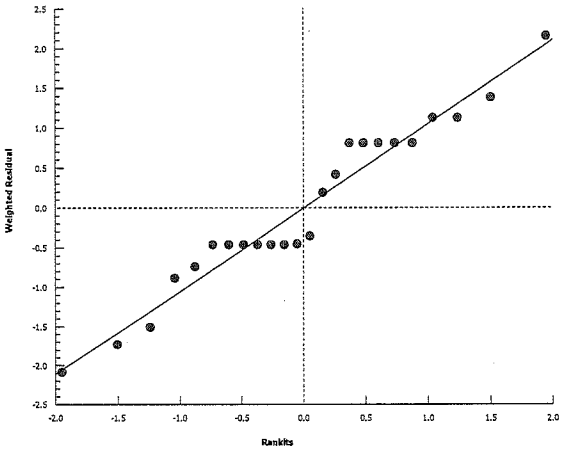
NW 1/16

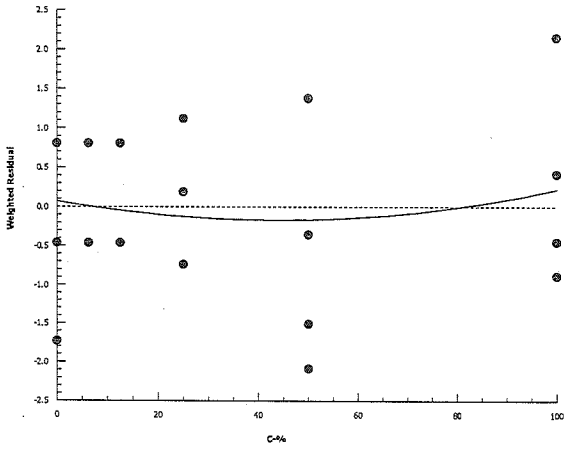
Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

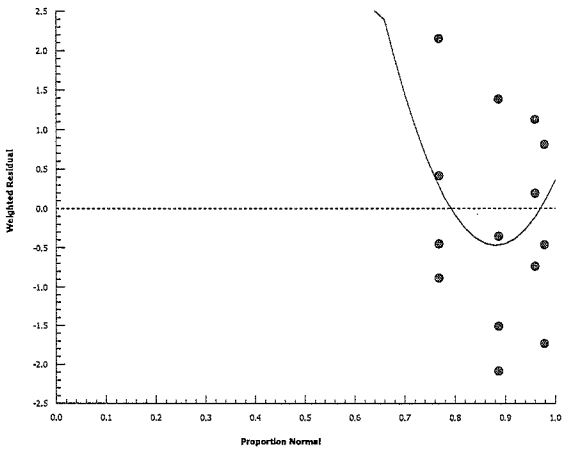
Analysis ID:	19-3617-7838	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Oct-16 8:36	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes

Graphics Log-Angle [Asin(P^0.5)=A+B*log(X)]









NN. 11/16

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 18 16 @ 1735h

Work Order No.: 161125

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCS_WS_2016-10-17_N
Sample Date: Oct 17 16
Date Received: Oct 18 16
Sample Volume: 6X20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 9
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 101816
Source: Vancouver Island Trout Hatchery
Loading Density: 1.06g/L

Number of male broodstock used: 2
Number of female broodstock used: 5
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE87
Stock Solution ID: 16502 (1000mg/L SDS)
Date Initiated: Oct 18 16
7-d EC50 (95% CL): 3.8 (3.6-3.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.0 - 7.8) mg/L SDS
Reference Toxicant CV (%): 40

Test Results:

	Sample ID		
	~~Control~~	LC_LCS_WS_2016-10-17_N	
EC25 % (v/v) (95% CL)	>100	>100	
EC50 % (v/v) (95% CL)	>100	>100	

Reviewed by:

Date reviewed: Oct. 31, 2016

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_LCS_WS_2016-10-17_N
Work Order #: 161125

Start Date & Time: Oct 18 /16 @ 1735h
Stop Date & Time: Oct 25 /16 @ 1015h
Test Species: *Oncorhynchus mykiss*

%(v/v) Concentration (Control)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.0
DO (mg/L)	10.0	10.0	10.1	10.1	9.9	10.1	10.1	9.8	9.8	9.8	9.8	10.0	10.0	10.0
pH	7.0	7.0	7.0	7.0	7.2	6.8	7.1	6.8	7.1	6.8	7.1	7.0	7.0	7.1
Cond. (µS/cm)	32	29		32		29		30		30		28		29
Initials	KL	KL		KL		KL		A		A		KL		KL

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	14.5	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.0
DO (mg/L)	10.2	10.1	10.1	10.0	9.9	10.1	10.1	9.9	9.9	9.8	9.8	10.0	10.0	10.1
pH	7.2	7.2	7.3	7.5	7.4	7.5	7.3	7.3	7.5	7.4	7.6	7.5	7.5	7.2
Cond. (µS/cm)	76	71		73		64		71		70		72		72
Initials	KL	KL		KL		KL		A		A		KL		KL

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.0
DO (mg/L)	10.1	10.3	10.1	10.0	9.9	10.1	10.1	9.9	9.9	9.8	9.9	10.0	10.0	10.0
pH	7.9	7.8	7.8	8.0	7.8	7.8	7.7	7.8	8.1	7.7	7.8	7.8	7.8	7.6
Cond. (µS/cm)	206	199		204		184		210		207		200		202
Initials	KL	KL		KL		KL		A		A		KL		KL

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	15.0	14.0	14.0
DO (mg/L)	10.1	10.3	10.1	10.0	9.9	10.1	10.1	10.0	9.8	10.1	9.8	10.0	10.0	10.0
pH	8.2	8.2	8.3	8.2	8.4	8.2	8.4	8.2	8.4	8.2	8.5	8.2	8.5	8.3
Cond. (µS/cm)	660	658		661		664		667		662		666		669
Initials	KL	KL		KL		KL		A		A		KL		KL

Thermometer: Temp-3 **DO meter:** DO-2 **pH meter:** pH-1 **Conductivity meter:** C-2

	Control	100%		
Hardness*	9	300		
Alkalinity*	5	196		

* mg/L as CaCO3

Analysts: AWO, KL

Reviewed by: [redacted]
Date reviewed: Oct-31, 2016

Sample Description: clear, colourless, odourless, no particulates

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_LCS-WS_2016-10-17_N
Work Order #: L6125

Start Date & Time: Oct 18 /16 @ 1735h
Stop Date & Time: Oct 25 /16 @ 1015h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	2	28	30
	2	↓	↓	↓	↓	↓	↓	↓	↓	0	29	29
	3									0	30	30
	4									1	29	30
6.25	1									0	~~29~~ 30	30
	2							↓	↓	0	30	30
	3							1	1	0	29	30
	4							0	0	0	30	30
12.5	1						↓		0	1	29	30
	2						1		1	0	29	30
	3						0		0	0	30	30
	4									0	30	30
25	1									1	29	30
	2									0	30	30
	3									0	30	30
	4		↓			↓				1	27	28
50	1		0			0	↓		↓	2	26	28
	2		0			1	3		4	0	26	30
	3		0	↓		1	0	↓	1	0	29	30
	4		0			0		1	1	1	28	30
100	1		0	0		0		0	0	7	23	30
	2		~~20~~	1		0		0	1	5	24	30
	3		~~40~~	2		2		0	4	4	22	30
	4	↓	0	0	↓	1	↓	1	2	2	26	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	KL	AS	AS	KL	KL	KL	KL	KL	KL

Comments:

Reviewed by: [signature] **Date reviewed:** Oct. 31, 2016

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	07-2074-5752	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Oct-16 8:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	19-4903-3443	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	18 Oct-16 17:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	25 Oct-16 10:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 17h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	07-1486-8844	**Code:**	2A9C086C	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	42h (4.5 °C)	**Station:**	LC_LC5_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1362995	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	44.33	26.59	61.39	2.256	1.629	3.76
EC10	61.34	42.2	76.32	1.63	1.31	2.37
EC15	79.39	59.23	N/A	1.26	NA	1.688
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.975	0.9333	1	0.01596	0.03191	3.27%	0.0%	116	119
6.25		4	0.9917	0.9667	1	0.008333	0.01667	1.68%	-1.71%	119	120
12.5		4	0.9833	0.9667	1	0.009622	0.01924	1.96%	-0.85%	118	120
25		4	0.9827	0.9643	1	0.009978	0.01996	2.03%	-0.79%	116	118
50		4	0.9238	0.8667	0.9667	0.02085	0.04169	4.51%	5.25%	109	118
100		4	0.7917	0.7333	0.8667	0.02846	0.05693	7.19%	18.8%	95	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9333	1	1	0.9667
6.25		1	1	0.9667	1
12.5		0.9667	0.9667	1	1
25		0.9667	1	1	0.9643
50		0.9286	0.8667	0.9667	0.9333
100		0.7667	0.8	0.7333	0.8667

Proportion Normal Binomials

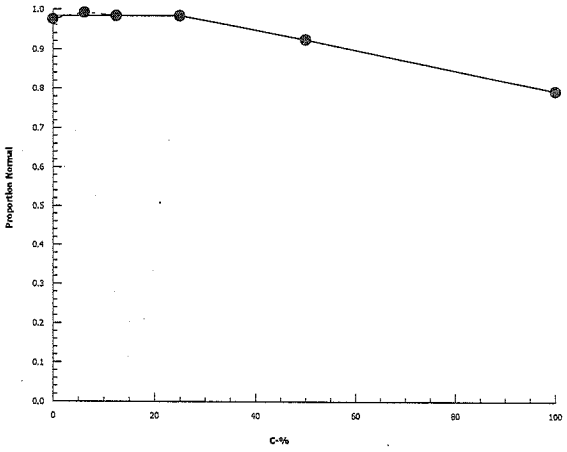
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	28/30	29/29	30/30	29/30
6.25		30/30	30/30	29/30	30/30
12.5		29/30	29/30	30/30	30/30
25		29/30	30/30	30/30	27/28
50		26/28	26/30	29/30	28/30
100		23/30	24/30	22/30	26/30

Oct-31/16

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	07-2074-5752	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	28 Oct-16 8:12	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



OCT 31/16

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 18/16 @ 1735h

Work Order No.: 161125

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: WL_BFWB_OUT_SP21_20161017_N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 10 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 9
Alkalinity (mg/L $CaCO_3$): 5

Test Organism Information:

Batch No.: 101816
Source: Vancouver ~~Is~~ Island Trout Hatchery
Loading Density: 1.06g/L

Number of male broodstock used: 2
Number of female broodstock used: 5
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE-87
Stock Solution ID: 16502 (1000 mg/L SDS)
Date Initiated: Oct 18/16
7-d EC50 (95% CL): 3.8 (3.6-3.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (2.0-7.8) mg/L SDS
Reference Toxicant CV (%): 40

Test Results:

	Sample ID		
	WL-BFWB_OUT_SP21_20161017_N		
EC25 % (v/v) (95% CL)	43.0 (35.8-51.7)		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: [signature]

Date reviewed: Oct. 31, 2016

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: KL ~~WLC = AWTF Effluent~~ WL_BFWB_OUT_SP21_20161017_N
Work Order #: 161125

Start Date & Time: Oct 18/16 @ 1735h
Stop Date & Time: Oct 25/16 @ 1030h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.0
DO (mg/L)	10.0	10.0	10.1	10.1	9.9	10.1	10.0	9.8	9.9	9.8	9.8	10.0	10.0	10.0
pH	7.0	7.0	7.0	7.0	7.1	6.8	7.1	6.8	7.1	6.8	7.1	7.0	7.0	7.1
Cond. (µS/cm)	32	29		32		29		30		30		28		29
Initials	KL	KL		KL		KL		A		A		KL		KL

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.0
DO (mg/L)	10.2	9.9	10.1	9.9	9.9	10.1	10.0	9.9	9.8	10.0	9.9	10.0	10.0	10.0
pH	7.3	7.4	7.4	7.6	7.5	7.5	7.5	7.4	7.4	7.3	7.5	7.7	7.8	7.5
Cond. (µS/cm)	174	168		161		171		173		172		172		172
Initials	KL	KL		KL		KL		A		A		KL		KL

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.5	14.0	14.0
DO (mg/L)	10.2	10.0	10.1	10.0	9.9	10.1	10.0	10.0	9.9	9.8	9.9	10.0	10.0	10.0
pH	7.7	7.7	8.0	8.0	8.0	7.8	8.0	7.7	7.9	7.6	7.7	8.1	8.0	7.9
Cond. (µS/cm)	592	523 ①		① 574		504		511		513		563		562
Initials	KL	KL		KL		KL		A		A		KL		KL

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	10.1	10.0	9.9	10.1	10.0	10.0	9.8	9.8	9.9	10.0	10.0	10.0
pH	7.8	7.8	8.4	7.9	8.5	8.0	8.5	8.1	8.4	8.0	8.3	8.0	8.6	8.4
Cond. (µS/cm)	1846	1848		1849		1851		1846		1850		1869		1797
Initials	KL	KL		KL		KL		A		A		KL		KL

Thermometer: Temp-3 **DO meter:** DO-2 **pH meter:** PH-1 **Conductivity meter:** C-2

	Control	100%		
Hardness*	9	1040		
Alkalinity*	5	290		

* mg/L as CaCO3

Analysts: AWD, KL

Reviewed by: [signature]
Date reviewed: Oct. 31, 2016

Sample Description: Clear, colourless, no particulate, hydrocarbon odour

Comments: ① confirmed w/ another meter

Embryo Toxicity Test
Daily Mortality

Client: Teck
Start Date & Time: Oct 18 /16 @ 1735h
Sample ID: ~~WL-AWTF Effluent~~ WL_BFWB_OUT_SPL_20161018_N
Stop Date & Time: Oct 25/16 @ 1130h
Work Order #: 161125
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	0	30	30
	2	↓	↓	↓	↓	↓	↓	↓	↓	0	30	30
	3	↓	↓	↓	↓	↓	↓	↓	↓	1	29	30
	4	↓	↓	↓	↓	↓	↓	↓	↓	1	29	30
6.25	1	↓	↓	↓	↓	↓	↓	↓	↓	1	29	30
	2	↓	↓	↓	↓	↓	↓	↓	↓	0	30	30
	3	↓	↓	↓	↓	↓	↓	1	1	0	29	30
	4	↓	↓	↓	↓	↓	↓	0	0	0	30	30
12.5	1	↓	↓	↓	↓	↓	↓	↓	↓	2	28	30
	2	↓	↓	↓	↓	↓	↓	↓	↓	2	28	30
	3	↓	↓	↓	1	↓	↓	↓	↓	0	30	30
	4	↓	↓	↓	1	↓	↓	↓	1	1	28	30
25	1	↓	↓	↓	1	↓	w/23	↓	4	4	22	30
	2	↓	↓	↓	0	↓	0	↓	0	3	27	30
	3	↓	↓	↓	↓	↓	0	↓	0	0	30	30
	4	↓	↓	↓	↓	~	0	↓	0	1	29	30
50	1	↓	↓	↓	↓	2	2	2	6	7	17	30
	2	↓	↓	↓	↓	0	1	1	2	9	19	30
	3	↓	↓	↓	↓	1	1	1	3	9	18	30
	4	↓	↓	w/3	↓	0	0	0	3	5	12 5w	30
100	1	↓	↓	w/0	↓	1	4	0	5	7	18	30
	2	↓	↓	↓	↓	3	2	↓	5	9	16	30
	3	↓	↓	↓	↓	2	1	↓	3	8	19	30
	4	↓	↓	↓	~	0	4	↓	4	15	11	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: _____ **Date reviewed:** Oct-31, 2016

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	20-9474-9120	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Nov-16 10:28	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes
Batch ID:	06-3472-7859	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	18 Oct-16 17:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	25 Oct-16 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 17h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	03-9695-5433	**Code:**	17A90F29	**Client:**	Teck Coal
Sample Date:	17 Oct-16 09:00	**Material:**	Effluent	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	33h (5.5 °C)	**Station:**	WL_BFWB_OUT_SP21_20161017_N		

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Angle [Asin(P^0.5)=A+B*log(X)]	Control Threshold	0.0166667	Yes	No	No	Yes

Regression Summary

Iters	LL	AICc	BIC	Mu	Sigma	Adj R2	F Stat	Critical	P-Value	Decision(α:5%)
6	-247.3	501.9	504.2	0.858		0.8312	0.3269	3.16	0.8059	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	15.56	10.76	20.03	6.427	4.992	9.294
EC10	21.6	16.17	26.68	4.629	3.748	6.186
EC15	27.99	22.08	33.78	3.573	2.961	4.53
EC20	35.05	28.61	41.93	2.853	2.385	3.495
EC25	43	35.76	51.68	2.326	1.935	2.796
EC40	74.49	61.2	96.47	1.342	1.037	1.634
EC50	~~105~~	~~83.04~~	~~146.9~~	~~0.9523~~	~~0.6806~~	~~1.204~~ >100

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
Threshold	0.01704	0.008286	0.0008007	0.03328	2.057	0.0524	Non-Significant Parameter
Slope	0.6752	0.07993	0.5185	0.8318	8.447	<0.0001	Significant Parameter
Intercept	-0.5793	0.1307	-0.8355	-0.3231	-4.432	0.0002	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	158.2402	158.2402	1	115.2	<0.0001	Significant
Lack of Fit	1.489847	0.4966157	3	0.3269	0.8059	Non-Significant
Pure Error	27.34599	1.519222	18			
Residual	28.83584	1.373135	21			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF	28.84	32.67	0.1180	Non-Significant Heterogenity
	Likelihood Ratio GOF	36.09	32.67	0.0213	Significant Heterogenity
Variances	Bartlett Equality of Variance	3.481	11.07	0.6263	Equal Variances
	Mod Levene Equality of Variance	0.624	2.773	0.6835	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9467	0.9169	0.2293	Normal Distribution
	Anderson-Darling A2 Normality	0.7614	2.492	0.0474	Non-normal Distribution

Dec-31/16

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID: 20-9474-9120 **Endpoint:** Proportion Normal **CETIS Version:** CETISv1.8.7
Analyzed: 02 Nov-16 10:28 **Analysis:** Linear Regression (MLE) **Official Results:** Yes

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9833	0.9667	1	0.009622	0.01924	1.96%	0.0%	118	120
6.25		4	0.9833	0.9667	1	0.009622	0.01924	1.96%	0.0%	118	120
12.5		4	0.95	0.9333	1	0.01667	0.03333	3.51%	3.39%	114	120
25		4	0.9	0.7333	1	0.05932	0.1186	13.18%	8.48%	108	120
50		4	0.6333	0.5667	0.7333	0.036	0.07201	11.37%	35.59%	76	120
100		4	0.5333	0.3667	0.6333	0.05932	0.1186	22.24%	45.76%	64	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	0.9667	0.9667
6.25		0.9667	1	0.9667	1
12.5		0.9333	0.9333	1	0.9333
25		0.7333	0.9	1	0.9667
50		0.5667	0.6333	0.6	0.7333
100		0.6	0.5333	0.6333	0.3667

Proportion Normal Binomials

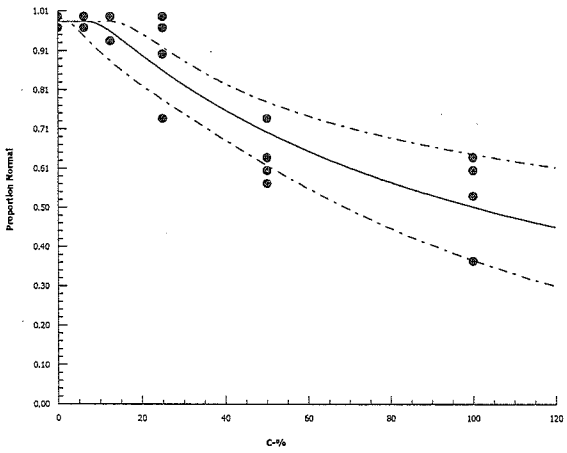
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	30/30	29/30	29/30
6.25		29/30	30/30	29/30	30/30
12.5		28/30	28/30	30/30	28/30
25		22/30	27/30	30/30	29/30
50		17/30	19/30	18/30	22/30
100		18/30	16/30	19/30	11/30

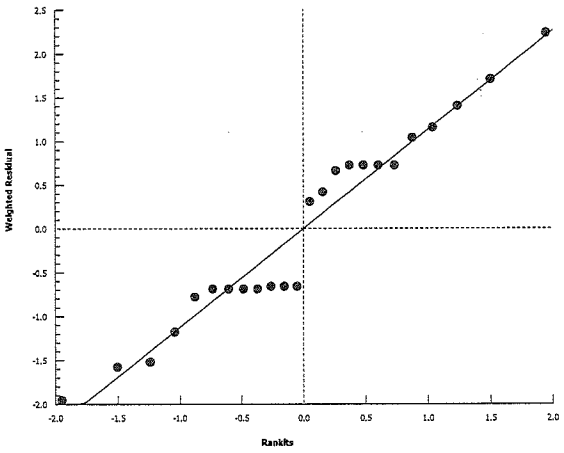
10/31/16

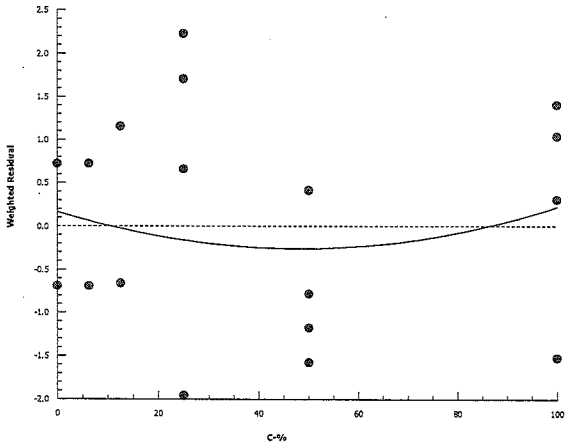
Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

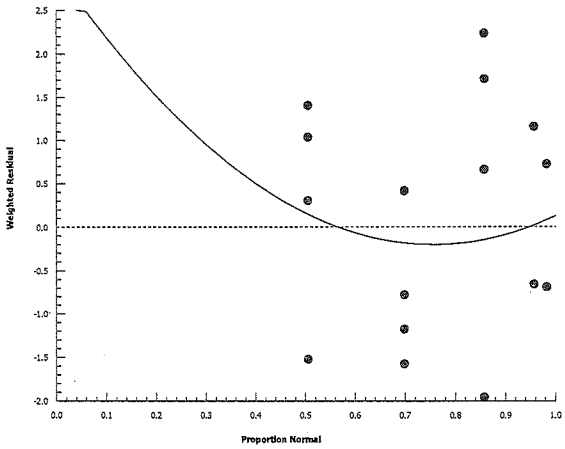
Analysis ID:	20-9474-9120	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Nov-16 10:28	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes

Graphics — Log-Angle [Asin(P^0.5)=A+B*log(X)]









10-31-16

Client: Teck

W.O.#: 161125

Hardness and Alkalinity Datasheet

	Alkalinity							Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Dechlor	Oct18/16	Oct18/16	100	0.6	0.7	5		100	0.9	9	KL
LC_LCOSSLCC_WS_2016-	Oct17/16	Oct18/16	50	9.3	9.5	182		10①	8.7	870	JS
10-17_N	↓										
LC_LCS_WS_2016-10-17_N		Oct18/16	50	9.1	9.4	176		50	15.0	300	KL
LC_FRDSR_WS_2016-10-17_N		Oct18/16	50	9.3	9.4	184		50	KL ~~15.0~~ 16.7	334	↓
LC_DC1_WS_2016-10-17_N	↓	Oct18/16	50	~~7.7~~ 7.6	7.7	150		50	9.1	182	
LC_DCDS_WS_2016-10-18_N	Oct18/16	Oct19/16	50	5.9	6.1	114		50	7.0	140	
GH_ER2_WS_2016-10-17_N	Oct17/16	Oct18/16	50	7.4	7.5	146		50	8.5	170	
WL_BFWB_OUT_SP21_	Oct17/16	Oct18/16	50	14.7	14.9	290		KL ~~50~~ 10①	10.4	1040	↓
20161017_N											

Notes: ① Sample diluted w/ DI water up to 100mL

Reviewed by: [signature]

Date Reviewed: Oct. 31, 2016

APPENDIX C – *Lemna minor* Toxicity Test Data

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 161124

Start Date: October 20 , 2016
Set up by: JW

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2016-10-17_N
Sample Date: October 17 , 2016
Date Received: October 18 , 2016
Sample Volume: 9 x 20L

Test Organism Information:

Culture Date: 101316
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (45 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 138
Date Initiated: October 13 , 2016

7-d No. of Fronds IC50 (95% CL): 3.5 (3.2 - 3.9) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.9 (3.2 - 4.9) g/L KCl CV (%): 11

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	69.7 (52.6 - 83.6)	75.0 (58.9 - 90.5)
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JW

Date reviewed: Nov. 18/16

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck | **Setup by:** JW

Sample ID: LC-LCDSSLCC-WS-2016-10-17-N | **Test Date:** October 20, 2016

Work Order No.: 161124 | **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 7 days | **> 8X Growth? (Y/N):** Y (45 fronds)

Light Intensity Range: 4200 - 4790 lux | **Date Measured:** October 19, 2016

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.5	25.0	25.0	26.0	25.5	25.0	26.0
Initials	JW	JW	A	A	MLT	JW	JW	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	25.0	Aeration?: 20 min	25.0
DO (mg/L)	9.5	Nutrients added?[1]: Y →	8.4
pH	8.0		8.0
Conductivity (µS)	723		1467

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	25.0	26.0	8.3	8.4	892
1.5	25.0	26.0	8.0	8.4	896
3	25.0	26.0	8.0	8.4	918
6.1	25.0	26.0	8.1	8.6	934
12.1	25.0	26.0	8.1	8.8	974
24.2	25.0	26.0	8.1	8.8	1049
48.5	25.0	26.0	8.1	8.9	1189
97	25.0	26.0	8.0	8.9	1467
Initials	JW	JW	JW	JW	JW

Thermometer: 4 **Cond. Meter:** 1 **pH meter:** 1 **Light meter:** 1

Sample Description: clear, colorless, odorless, no particulates present.

Comments:

Reviewed: JCL **Date Reviewed:** Nov. 18/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - LCDSSLCC - WS - 2016-10-17 - N
Work Order #: 161124

Start Date: October 20, 2016
Termination Date: October 27, 2016
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	116										JW
	B	6	109										
	C	6	91										
	D	6	119										
1.5	A	6	108										
	B	6	123										
	C	6	85										
	D	6	100										
3.0	A	6	106										
	B	6	91										
	C	6	98										
	D	6	87										
6.1	A	6	112										
	B	6	106										
	C	6	108										
	D	6	118										
12.1	A	6	97										
	B	6	88										
	C	6	93										
	D	6	94										
24.2	A	6	90										
	B	6	93										
	C	6	120										
	D	6	105										↓

Comments:

Reviewed by: JGL

Date Reviewed: Nov. 18/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC_LCDSSLCC-WS-2016-10-17-N
Work Order #: 161124

Start Date: October 20, 2016
Termination Date: October 27, 2016
Test set up by: JW

Concentration %(v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	92										JW
	B	6	76			X							
	C	6	98										
	D	6	106										
97	A	6	53										
	B	6	59										
	C	6	55										
	D	6	51										↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGL

Date Reviewed: Nov. 18/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC-LCDSSLCC-WS-2016-10-17-N
WO #: 161124

Start Date: October 20, 2016
Termination Date: October 27, 2016
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCO Blue			
control	A	1	1003.84	1012.90	JAB/ JW
	B	2	1001.14	1009.57	
	C	3	1000.26	1007.08	
	D	4	1020.04	1028.84	
1.5	A	5	1020.06	1028.56	
	B	6	989.00	998.94	
	C	7	1022.92	1029.91	
	D	8	1017.43	1024.97	
3.0	A	9	1029.86	1038.64	
	B	10	1015.05	1022.49	
	C	11	1016.40	1023.98	
	D	12	1006.15	1013.04	
6.1	A	13	1014.24	1022.88	
	B	14	1007.70	1017.09	
	C	15	1003.47	1011.88	
	D	16	1009.14	1019.11	
12.1	A	17	1014.40	1022.38	
	B	18	1014.79	1022.07	
	C	19	1022.03	1029.98	
	D	20	1017.36	1024.94	
24.2	A	21	1012.93	1020.52	
	B	22	996.25	1003.67	
	C	23	1018.40	1028.91	
	D	24	1031.44	1040.12	
48.5	A	25	1033.12	1040.64	
	B	26	1007.34	1013.51	
	C	27	1020.64	1028.79	
	D	28	1014.68	1022.95	↓

Comments: 10 % Re-weigh (mg): # 3. 1007.05 # 23. 1028.78
12. 1013.01 # 32. 1034.67

Reviewed by: JCh

Date Reviewed: Nov-18/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_LCDSSLCC_WS_2016-10-17 N
WO #: 161124

Start Date: October 20, 2016
Termination Date: October 27, 2016
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	999.80	1004.44	JAB/ JW
	B	30	1016.08	1021.75	↓
97	C	31	1028.43	1033.29	↓
	D	32	1030.22	1034.80	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JCL

Date Reviewed: Nov. 18/16

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-3663-5756	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 17:50	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	19-7071-9469	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	20 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	27 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	02-2496-3209	**Code:**	D68AA89	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	72h (3.5 °C)	**Station:**	LC_LCDSSLCC_WS_2016-10-17_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
11	-91.73	190.3	193.9	0.6628	Yes	1.817	2.621	0.1476	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	36.29	N/A	52.14	2.756	1.918	NA
IC10	47.65	N/A	64.09	2.099	1.56	NA
IC15	56.15	29.45	72.21	1.781	1.385	3.396
IC20	63.3	42.5	78.44	1.58	1.275	2.353
IC25	69.69	52.62	83.6	1.435	1.196	1.9
IC40	86.61	75.36	97.45	1.155	1.026	1.327
IC50	~~97.22~~	~~85.12~~	~~109.6~~	~~1.029~~	~~0.9123~~	~~1.175~~

JW > 97 % (V/V)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	96.76	2.456	91.94	101.6	39.4	<0.0001	Significant Parameter
C	2.642	0.9164	0.8457	4.438	2.883	0.0073	Significant Parameter
D	97.22	6.282	84.91	109.5	15.48	<0.0001	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	7894.036	7894.036	1	62.94	<0.0001	Significant
Lack of Fit	998.6832	199.7366	5	1.817	0.1476	Non-Significant
Pure Error	2638.75	109.9479	24			
Residual	3637.433	125.4287	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	10.75	14.07	0.1498	Equal Variances
	Mod Levene Equality of Variance	1.401	2.423	0.2506	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9659	0.9338	0.3949	Normal Distribution
	Anderson-Darling A2 Normality	0.3131	2.492	0.5740	Normal Distribution

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 07-3663-5756 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 07 Nov-16 17:50 **Analysis:** Nonlinear Regression **Official Results:** Yes

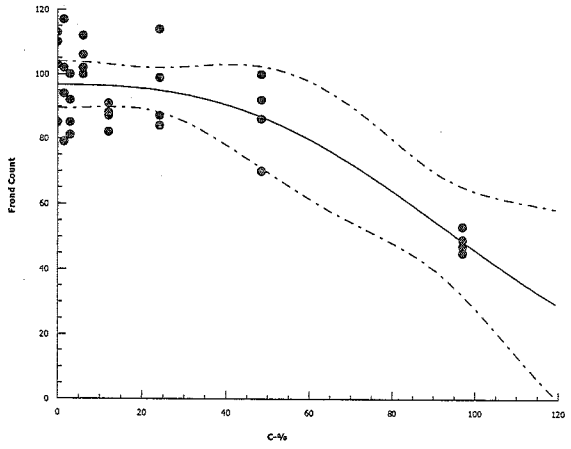
Frond Count Summary

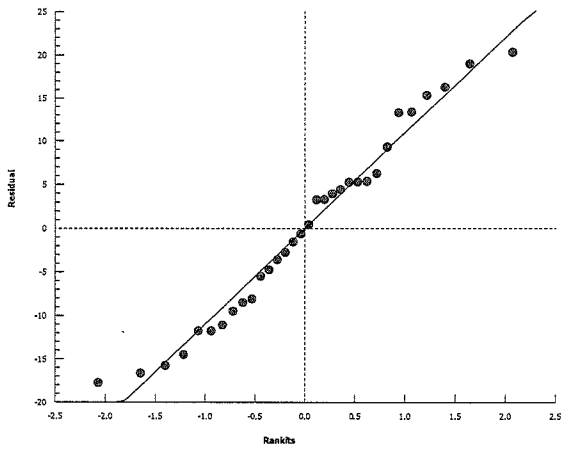
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	102.8	85	113	6.277	12.55	12.22%	0.0%
1.5		4	98	79	117	7.927	15.85	16.18%	4.62%
3		4	89.5	81	100	4.173	8.347	9.33%	12.9%
6.1		4	105	100	112	2.646	5.292	5.04%	-2.19%
12.1		4	87	82	91	1.871	3.742	4.3%	15.33%
24.2		4	96	84	114	6.819	13.64	14.21%	6.57%
48.5		4	87	70	100	6.351	12.7	14.6%	15.33%
97		4	48.5	45	53	1.708	3.416	7.04%	52.8%

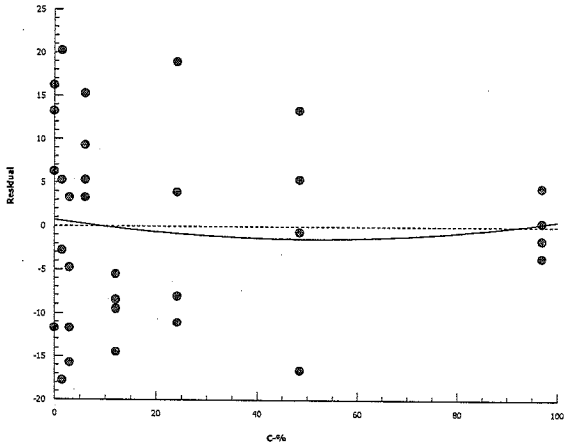
Frond Count Detail

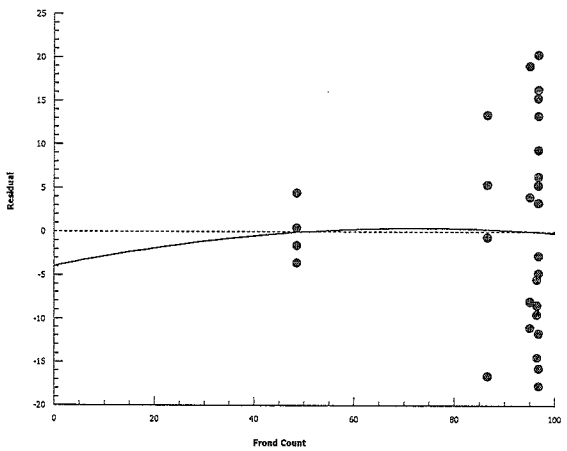
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	110	103	85	113
1.5		102	117	79	94
3		100	85	92	81
6.1		106	100	102	112
12.1		91	82	87	88
24.2		84	87	114	99
48.5		86	70	92	100
97		47	53	49	45

Graphics 3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]









CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-6022-6993	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 17:50	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	19-7071-9469	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	20 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	27 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	02-2496-3209	**Code:**	D68AA89	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	72h (3.5 °C)	**Station:**	LC_LCDSSLCC_WS_2016-10-17_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
10	-13.49	33.83	37.37	0.5519	Yes	1.334	2.621	0.2840	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	41.92	N/A	59.53	2.385	1.68	NA
IC10	52.12	N/A	70.7	1.919	1.414	NA
IC15	60.36	34.88	78.44	1.657	1.275	2.867
IC20	67.83	48.64	84.69	1.474	1.181	2.056
IC25	74.98	58.89	90.52	1.334	1.105	1.698
IC40	96.5	80.04	114.7	1.036	0.8717	1.249
IC50	~~112.3~~	~~87.99~~	~~143.4~~	~~0.8904~~	~~0.6976~~	~~1.136~~

JW
> 97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	8.256	0.2043	7.855	8.656	40.42	<0.0001	Significant Parameter
C	0.5991	0.2268	0.1545	1.044	2.641	0.0132	Significant Parameter
D	112.3	13.5	85.84	138.8	8.317	<0.0001	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	37.88791	37.88791	1	40.18	<0.0001	Significant
Lack of Fit	5.945978	1.189196	5	1.334	0.2840	Non-Significant
Pure Error	21.40228	0.8917615	24			
Residual	27.34825	0.9430432	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	7.04	14.07	0.4247	Equal Variances
	Mod Levene Equality of Variance	0.8581	2.423	0.5523	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9654	0.9338	0.3825	Normal Distribution
	Anderson-Darling A2 Normality	0.3196	2.492	0.5559	Normal Distribution

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 02-6022-6993 **Endpoint:** Total Dry Weight-mg **CETIS Version:** CETISv1.8.7
Analyzed: 07 Nov-16 17:50 **Analysis:** Nonlinear Regression **Official Results:** Yes

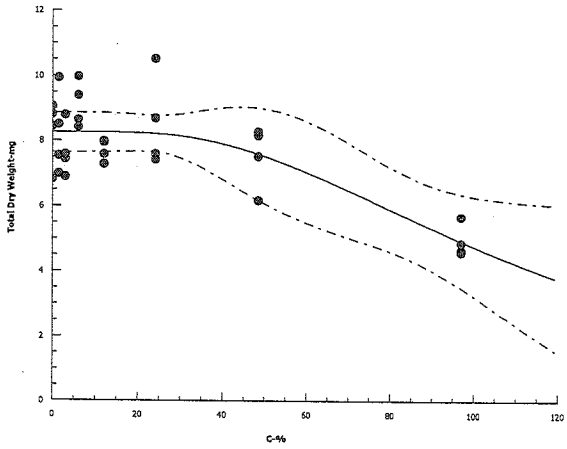
Total Dry Weight-mg Summary

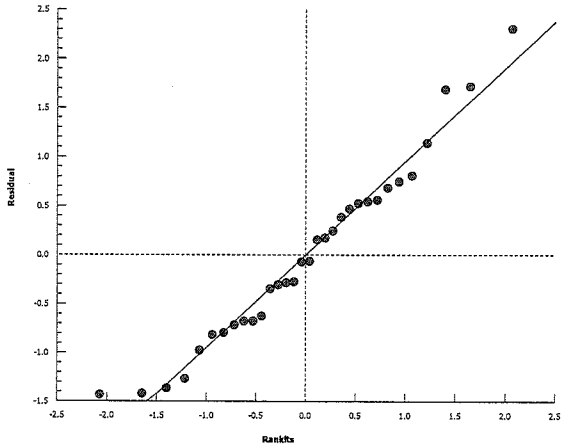
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	8.277	6.82	9.06	0.5027	1.005	12.15%	0.0%
1.5		4	8.243	6.99	9.94	0.6461	1.292	15.68%	0.42%
3		4	7.672	6.89	8.78	0.3981	0.7962	10.38%	7.31%
6.1		4	9.103	8.41	9.97	0.3569	0.7138	7.84%	-9.97%
12.1		4	7.697	7.28	7.98	0.1662	0.3325	4.32%	7.01%
24.2		4	8.55	7.42	10.51	0.7105	1.421	16.62%	-3.29%
48.5		4	7.528	6.17	8.27	0.4815	0.9629	12.79%	9.06%
97		4	4.938	4.58	5.67	0.2515	0.5029	10.19%	40.35%

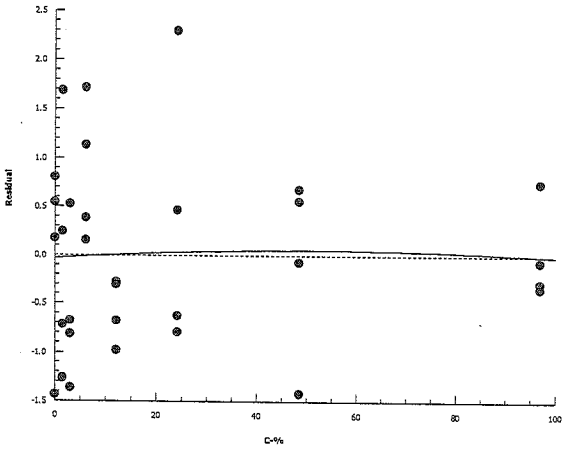
Total Dry Weight-mg Detail

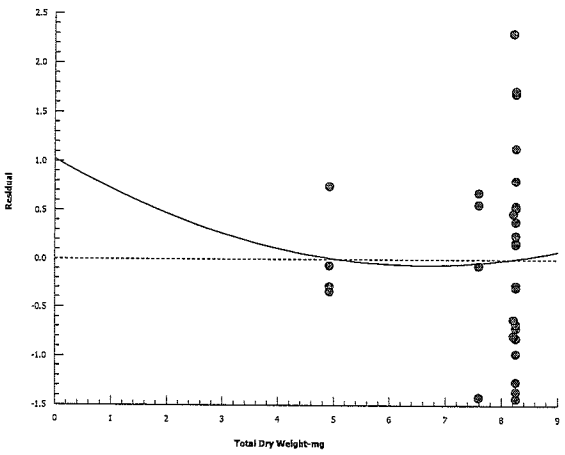
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	9.06	8.43	6.82	8.8
1.5		8.5	9.94	6.99	7.54
3		8.78	7.44	7.58	6.89
6.1		8.64	9.39	8.41	9.97
12.1		7.98	7.28	7.95	7.58
24.2		7.59	7.42	10.51	8.68
48.5		7.52	6.17	8.15	8.27
97		4.64	5.67	4.86	4.58

Graphics 3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]









Lemna minor Summary Sheet

Client: Teck
Work Order No.: K- 161124
JW

Start Date: October 20 , 2016
Set up by: JW

Sample Information:

Sample ID: LC_DCL-WS-2016-10-17-N
Sample Date: October 17 , 2016
Date Received: October 18 , 2016
Sample Volume: 6 x 20L

Test Organism Information:

Culture Date: 101316
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (45 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 138
Date Initiated: October 13 , 2016

7-d No. of Fronds IC50 (95% CL): 3.5 (3.2 - 3.9) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.9 (3.2 - 4.9) g/L KCl CV (%): 11

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	7.4 (2.7 - 11.0)	8.4 (1.9 - 13.3)
IC50 %(v/v) (95% CL)	> 97	> 97

Reviewed by: JGh

Date reviewed: Nov. 18/16

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck — **Setup by:** JW

Sample ID: JW 1 LC_DCB_WS-2016-10-17_N — **Test Date:** October 20, 2016

Work Order No.: 161124 — **Test Species:** *Lemna minor*

Culture Source: CPCC #490

Test Culture Age: 7 days — **> 8X Growth? (Y/N):** Y (45 fronds)

Light Intensity Range: 4290 - 4760 lux — **Date Measured:** October 19, 2016

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.5	25.0	25.0	26.0	25.5	25.0	26.0
Initials	JW	JW	AS	AS	MLJ	JW	JW	JW

Sample Characteristics: Initial Water Quality

	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	25.0	Aeration?: 20 min	25.0
DO (mg/L)	9.6	Nutrients added?[1]: Y	8.5
pH	8.1	→	8.0
Conductivity (µS)	312		1126

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	25.0	26.0	8.3	8.0	892
1.5	25.0	26.0	8.0	8.4	889
3	25.0	26.0	8.0	8.5	902
6.1	25.0	26.0	8.1	8.5	909
12.1	25.0	26.0	8.1	8.7	JW 916 923
24.2	25.0	26.0	8.1	8.7	952
48.5	25.0	26.0	8.1	8.7	1008
97	25.0	26.0	8.0	8.9	1126
Initials	JW	JW	JW	JW	JW

Thermometer: 4 **Cond. Meter:** 1 **pH meter:** 1 **Light meter:** 1

Sample Description: slightly turbid, yellow, odorless, black particulates present

Comments:

Reviewed: JBh — **Date Reviewed:** Nov. 18/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - DCL - WS - 2016 - 10 - 17 _ N
Work Order #: 161124

Start Date: October 20, 2016
Termination Date: October 27, 2016
Test set up by: JW

Concentration %/o (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	118										JW
	B	6	104										
	C	6	100										
	D	6	109										
1.5	A	6	84										
	B	6	94										
	C	6	109										
	D	6	97										
3.0	A	6	99										
	B	6	86										
	C	6	88										
	D	6	101										
6.1	A	6	93										
	B	6	100										
	C	6	70										
	D	6	82										
12.1	A	6	73			X							
	B	6	64			X							
	C	6	68			X							
	D	6	69			X							
24.2	A	6	75										
	B	6	64										
	C	6	56										
	D	6	72										↓

Comments:

Reviewed by: JOL

Date Reviewed: Nov-18/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-DC1-WS-2016-10-17-N
Work Order #: 161124

20 JW
Start Date: October 19, 2016
Termination Date: October 27, 2016
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	81										JW
	B	6	87										
	C	6	81										
	D	6	78										
97	A	6	77										
	B	6	69										
	C	6	68										
	D	6	74										↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JOH

Date Reviewed: Nov. 18/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - DC1 - INS - 2016 - 10 - 17 - N
WO #: 161124

Start Date: October 19 (20 JW), 2016
Termination Date: October 26 (JW), 2016
Balance ID: Bal - 1 27

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCO Red			
control	A	1	1010.75	1019.40	JAB/ JW
	B	2	1007.88	1015.91	
	C	3	999.86	1007.25	
	D	4	1006.23	1014.29 JW	
1.5	A	5	1009.39	1015.26	
	B	6	1000.43	1008.10	
	C	7	1008.91	1017.03	
	D	8	1013.51	1020.70	
3.0	A	9	1024.75	1032.05	
	B	10	1000.38	1006.67	
	C	11	998.36	1004.84	
	D	12	1007.72	1014.98	
6.1	A	13	1003.26	1009.92	
	B	14	997.91	1005.15	
	C	15	997.45	1002.68	
	D	16	1029.60	1035.76	
12.1	A	17	1012.45	1017.64	
	B	18	1010.62	1016.12	
	C	19	1019.80	1024.86	
	D	20	999.89	1005.46	
24.2	A	21	1004.94	1010.38	
	B	22	1014.06	1019.00	
	C	23	1011.51	1015.99	
	D	24	1006.86	1012.24	
48.5	A	25	1018.67	1024.67	
	B	26	1019.19	1025.95	
	C	27	1001.07	1007.27	
	D	28	1008.13	1014.87	↓

Comments: 10 % Re-weigh (mg): # 3. 1007.08 # 27. 1007.10 # 16. 1035.61 # 32. 1029.43

Reviewed by: JCH

Date Reviewed: Nov. 18/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - OC1 - WS - 2016 - 10 - 17 - N
WO #: 161124

Start Date: 20 JW October 19, 2016
Termination Date: October 26, JW 2016
Balance ID: Bal - 1 27

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCO Red			
	A	29	999.65	1005.69	/ JW
	B	30	1015.79	1021.39	↓
97	C	31	1017.62	1023.60	↓
	D	32	1023.57	1029.62	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JCH

Date Reviewed: Nov. 18/16

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-8359-0300	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 18:02	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	19-7071-9469	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	20 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	27 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	00-8911-1788	**Code:**	54FBCEC	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	72h (2.5 °C)	**Station:**	LC_DC1_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	465771	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.487	0.1251	3.343	205.4	29.91	799.1
IC10	1.211	0.2169	5.789	82.57	17.27	461.1
IC15	3.334	N/A	8.639	30	11.57	NA
IC20	5.482	N/A	9.528	18.24	10.5	NA
IC25	7.443	2.676	11.05	13.43	9.051	37.37
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	101.8	94	112	3.881	7.762	7.63%	0.0%
1.5		4	90	78	103	5.148	10.3	11.44%	11.55%
3		4	87.5	80	95	3.797	7.594	8.68%	14.0%
6.1		4	80.25	64	94	6.562	13.12	16.35%	21.13%
12.1		4	62.5	58	67	1.848	3.697	5.92%	38.57%
24.2		4	60.75	50	69	4.27	8.539	14.06%	40.29%
48.5		4	75.75	72	81	1.887	3.775	4.98%	25.55%
97		4	66	62	71	2.121	4.243	6.43%	35.14%

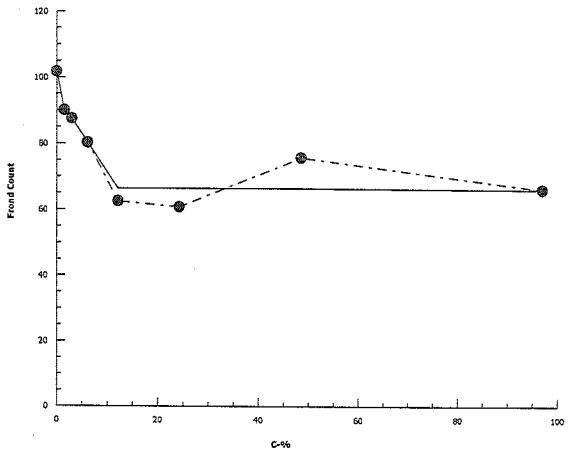
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	112	98	94	103
1.5		78	88	103	91
3		93	80	82	95
6.1		87	94	64	76
12.1		67	58	62	63
24.2		69	58	50	66
48.5		75	81	75	72
97		71	63	62	68

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-8359-0300	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 18:02	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-2642-8713	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 18:02	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	19-7071-9469	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	20 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	27 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	00-8911-1788	**Code:**	54FBCEC	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	72h (2.5 °C)	**Station:**	LC_DC1_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1392249	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.5664	0.09489	3.058	176.5	32.7	1054
IC10	1.454	0.1154	5.141	68.79	19.45	866.5
IC15	3.022	N/A	9.631	33.09	10.38	NA
IC20	5.32	0.6926	11.07	18.8	9.037	144.4
IC25	8.447	1.915	13.34	11.84	7.496	52.22
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

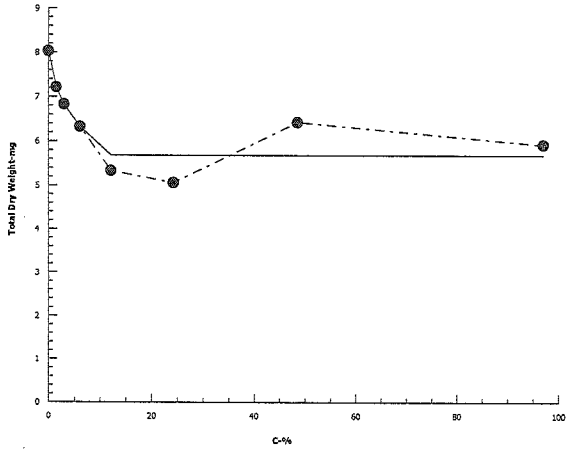
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	8.033	7.39	8.65	0.2574	0.5147	6.41%	0.0%
1.5		4	7.213	5.87	8.12	0.4861	0.9722	13.48%	10.21%
3		4	6.833	6.29	7.3	0.2614	0.5228	7.65%	14.94%
6.1		4	6.323	5.23	7.24	0.4258	0.8516	13.47%	21.29%
12.1		4	5.33	5.06	5.57	0.1221	0.2443	4.58%	33.64%
24.2		4	5.06	4.48	5.44	0.2232	0.4463	8.82%	37.01%
48.5		4	6.425	6	6.76	0.1921	0.3841	5.98%	20.01%
97		4	5.917	5.6	6.05	0.1069	0.2139	3.61%	26.33%

Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	8.65	8.03	7.39	8.06
1.5		5.87	7.67	8.12	7.19
3		7.3	6.29	6.48	7.26
6.1		6.66	7.24	5.23	6.16
12.1		5.19	5.5	5.06	5.57
24.2		5.44	4.94	4.48	5.38
48.5		6	6.76	6.2	6.74
97		6.04	5.6	5.98	6.05

Analysis ID:	05-2642-8713	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 18:02	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Lemna minor Summary Sheet

Client: Teck
Work Order No.: 161124

Start Date: October 19 , 2016
Set up by: JW

Sample Information:

Sample ID: LC-FROSDC-WS-2016-10-17-N
Sample Date: October 17 , 2016
Date Received: October 18 , 2016
Sample Volume: 6 x 20L

Test Organism Information:

Culture Date: 101216
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (45 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 138
Date Initiated: October 13 , 2016

7-d No. of Fronds IC50 (95% CL): 3.5 (3.2 - 3.9) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.9 (3.2 - 4.9) g/L KCl CV (%): 11

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	66.4 (53.5 - 71.9)	>97
IC50 %(v/v) (95% CL)	96.1 (85.3 - n/a)	>97

Reviewed by: JW

Date reviewed: Nov. 18/16

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck	**Setup by:**	JW
Sample ID:	LC-FRDSDC-WS-2016-10-19-N	**Test Date:**	October 19, 2016
Work Order No.:	161124	**Test Species:**	*Lemna minor*
Culture Source:	CPCC # 490		
Test Culture Age:	7 days	**> 8X Growth? (Y/N):**	Y (45 fronds)
Light Intensity Range:	4400 - 5200 lux	**Date Measured:**	October 19, 2016

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	25.5	25.0	25.0	26.0	25.5	25.0
Initials	JW	JW	JW	A	A	MLT	JW	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	25.0	Aeration?: 20 min	25.0
DO (mg/L)	9.1	Nutrients added?[1]: Y →	8.4
pH	8.0		7.9
Conductivity (µS)	681		1446

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.5	26.0	8.3	8.3	908
1.5	25.0	26.0	7.9	8.4	916
3.0	25.0	26.0	7.9	8.5	931
6.1	25.0	26.0	8.0	8.6	948
12.1	25.0	26.0	8.0	8.4	985
24.2	25.0	26.0	8.0	8.5	1056
48.5	25.0	26.0	7.9	8.6	1192
97	25.0	26.0	7.9	8.6	1446
Initials	JW	JW	JW	JW	JW

Thermometer: 4 **Cond. Meter:** 3 **pH meter:** 3 **Light meter:** 1

Sample Description: clear, colorless, odorless, no particulates

Comments:

Reviewed: [signature] **Date Reviewed:** Nov. 18/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - FRDSDC - WS - 2016 - 10 - 17 - N
Work Order #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	113										JW
	B	6	90										
	C	6	122										
	D	6	110										
1.5	A	6	113										
	B	6	109										
	C	6	104										
	D	6	92										
3.0	A	6	116										
	B	6	115										
	C	6	115										
	D	6	94										
6.1	A	6	93										
	B	6	117										
	C	6	115										
	D	6	98										
12.1	A	6	116										
	B	6	104										
	C	6	95										
	D	6	90										
24.2	A	6	108										
	B	6	97										
	C	6	96										
	D	6	114										✓

Comments:

Reviewed by: JW

Date Reviewed: Nov. 18/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-FRDSDC-WS-2016-10-17-N
Work Order #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	126										JW
	B	6	114										↓
	C	6	103										
	D	6	95										
97	A	6	58			X							
	B	6	52			X							
	C	6	60			X							
	D	6	57			X							↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGh

Date Reviewed: Nov. 18/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - FRDSDC - WS - 2016 - 10 - 17 - N
WO #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCO Black			
	A	1	1020.51	1029.53	JAB/JAB
control	B	2	1017.61	1024.39	
	C	3	1011.13	1020.60	
	D	4	1005.37	1013.77	
	A	5	1030.36	1039.39	
1.5	B	6	1006.22	1013.93	
	C	7	1040.34	1048.47	
	D	8	1020.95	1027.92	
	A	9	1010.14	1019.52	
3.0	B	10	1033.38	1041.66	
	C	11	1013.51	1022.01	
	D	12	1031.22	1038.65	
	A	13	1026.49	1033.65	
6.1	B	14	1006.11	1015.42	
	C	15	1024.29	1033.43	
	D	16	1032.04	1039.96	
	A	17	1006.49	1016.32	
12.1	B	18	1012.74	1021.08	
	C	19	1019.43	1027.39	
	D	20	1015.88	1023.22	
	A	21	1014.72	1023.24	
24.2	B	22	1005.64	1013.96	
	C	23	1014.76	1022.57	
	D	24	1008.91	1018.15	
	A	25	1020.19	1030.71	
48.5	B	26	1013.13	1021.56	
	C	27	1030.30	1038.70	
	D	28	1019.33	1026.93	↓

Comments: 10 % Re-weigh : # 5 : 1039.36 # 24 : 1018.00
16 : 1039.95 # 32 : 1036.88

Reviewed by: JGu

Date Reviewed: Nov. 18/16

7-d *Lemna minor* Weight Data Sheet

Client: TECK
Sample ID: LC - FRDSDC - WS - 2016 - 10 - 17 - N
WO #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCO BLOCK			
	A	29	1005.20	1010.70	JAB / JAB
	B	30	1008.19	1013.17	↓
97	C	31	1024.85	1030.82	
	D	32	1030.94	1036.81	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JCL

Date Reviewed: Nov. 18/16

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-7092-8065	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 17:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-1640-6927	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	19 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	26 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	19-9543-8291	**Code:**	76EFF8D3	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1511013	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	49.37	N/A	53.83	2.026	1.858	NA
IC10	53.18	N/A	57.82	1.88	1.73	NA
IC15	57.28	43.68	62.1	1.746	1.61	2.289
IC20	61.69	48.18	66.73	1.621	1.499	2.076
IC25	66.44	53.48	71.93	1.505	1.39	1.87
IC40	82.94	71.05	89.75	1.206	1.114	1.408
IC50	96.13	85.27	N/A	1.04	NA	1.173

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	102.8	84	116	6.75	13.5	13.14%	0.0%
1.5		4	98.5	86	107	4.555	9.11	9.25%	4.14%
3		4	104	88	110	5.339	10.68	10.27%	-1.22%
6.1		4	99.75	87	111	6.019	12.04	12.07%	2.92%
12.1		4	95.25	84	110	5.706	11.41	11.98%	7.3%
24.2		4	97.75	90	108	4.366	8.732	8.93%	4.87%
48.5		4	103.5	89	120	6.739	13.48	13.02%	-0.73%
97		4	50.75	46	54	1.702	3.403	6.71%	50.61%

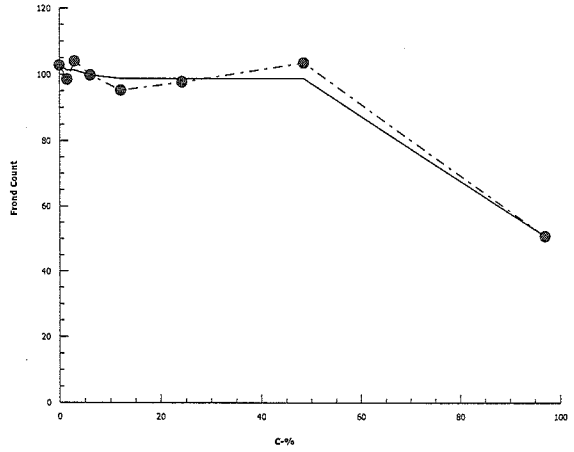
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	107	84	116	104
1.5		107	103	98	86
3		110	109	109	88
6.1		87	111	109	92
12.1		110	98	89	84
24.2		102	91	90	108
48.5		120	108	97	89
97		52	46	54	51

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	12-7092-8065	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 17:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	09-8914-0020	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 17:26	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	02-1640-6927	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	19 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	26 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	19-9543-8291	**Code:**	76EFF8D3	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2016-10-17_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
5	-16.67	37.76	40.28	0.3108	Yes	2.316	2.508	0.0661	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	17.37	2.35	33.08	5.758	3.023	42.55
IC10	35.68	18.15	54.16	2.803	1.846	5.51
IC15	55.03	30.5	81.48	1.817	1.227	3.279
IC20	75.56	41.93	112.9	1.323	0.8857	2.385
IC25	97.41	53.62	147.7	1.027	0.6769	1.865
IC40	173	94.71	274.9	0.5781	0.3637	1.056
IC50	~~234.7~~	130.2	386.6	0.4261	0.2586	0.768

JW } > 97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	8.598	0.242	8.124	9.072	35.53	<0.0001	Significant Parameter
D	234.7	67.42	102.6	366.8	3.482	0.0016	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	16.66706	16.66706	1	14.98	0.0005	Significant
Lack of Fit	12.23833	2.039721	6	2.316	0.0661	Non-Significant
Pure Error	21.1341	0.8805875	24			
Residual	33.37243	1.112414	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	3.868	14.07	0.7949	Equal Variances
	Mod Levene Equality of Variance	0.3914	2.423	0.8982	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9675	0.9338	0.4339	Normal Distribution
	Anderson-Darling A2 Normality	0.2423	2.492	0.7967	Normal Distribution

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	8.418	6.78	9.47	0.5882	1.176	13.98%	0.0%
1.5		4	7.96	6.97	9.03	0.4298	0.8595	10.8%	5.44%
3		4	8.398	7.43	9.38	0.4006	0.8012	9.54%	0.24%
6.1		4	8.382	7.16	9.31	0.5117	1.023	12.21%	0.42%
12.1		4	8.368	7.34	9.83	0.5293	1.059	12.65%	0.59%
24.2		4	8.473	7.81	9.24	0.2963	0.5926	6.99%	-0.65%
48.5		4	8.737	7.6	10.52	0.6245	1.249	14.29%	-3.8%
97		4	5.58	4.98	5.97	0.2241	0.4482	8.03%	33.71%

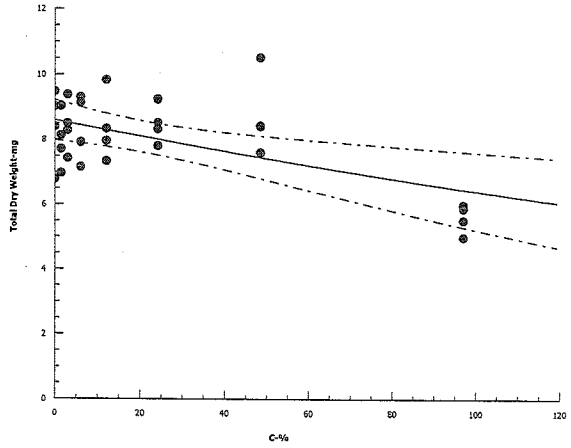
Lemna Growth Inhibition Test — **Nautilus Environmental**

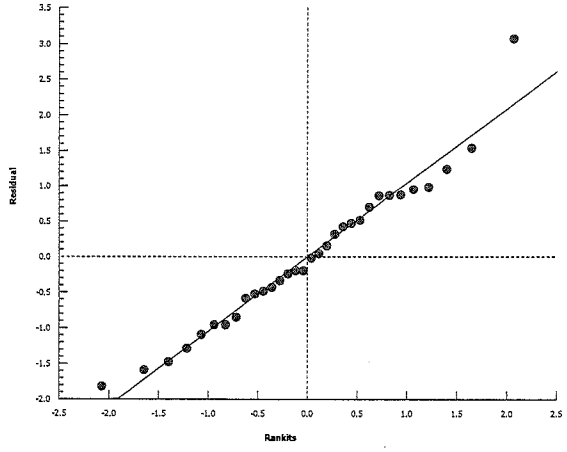
Analysis ID:	09-8914-0020	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 17:26	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

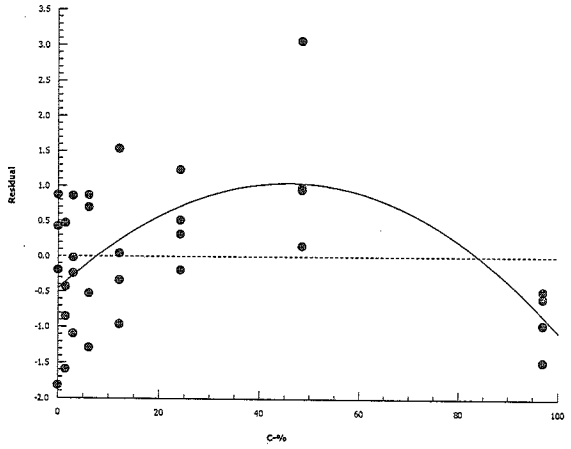
Total Dry Weight-mg Detail

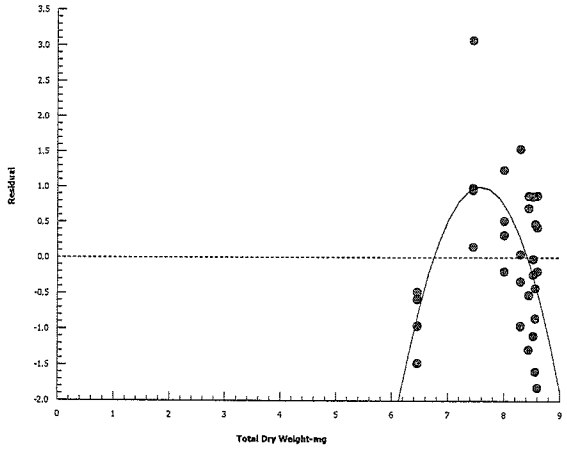
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	9.02	6.78	9.47	8.4
1.5		9.03	7.71	8.13	6.97
3		9.38	8.28	8.5	7.43
6.1		7.16	9.31	9.14	7.92
12.1		9.83	8.34	7.96	7.34
24.2		8.52	8.32	7.81	9.24
48.5		10.52	8.43	8.4	7.6
97		5.5	4.98	5.97	5.87

Graphics — 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









Lemna minor Summary Sheet

Client: Teck
Work Order No.: 161124

Start Date: October 19 , 2016
Set up by: JW

Sample Information:

Sample ID: LC - DCDS - WS - 2016 - 10 - 18 - N
Sample Date: October 18 , 2016
Date Received: October 19 , 2016
Sample Volume: 6 x 20L

Test Organism Information:

Culture Date: 101216
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (45 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 138
Date Initiated: October 13 , 2016

7-d No. of Fronds IC50 (95% CL): 3.5 (3.2 - 3.9) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.9 (3.2 - 4.9) g/L KCl CV (%): 11

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	2.5 (~~1.5~~ JW 0.1 - 87.1)	55.9 (n/a - n/a)
IC50 %(v/v) (95% CL)	> 97	> 97

Reviewed by: JGK

Date reviewed: Nov - 18/16

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck	**Setup by:**	JW
Sample ID:	LC_DCDS_WS_2016_10_18_N	**Test Date:**	October 19, 2016
Work Order No.:	161124	**Test Species:**	*Lemna minor*
Culture Source:	CPCC # 490		
Test Culture Age:	7 days	**> 8X Growth? (Y/N):**	Y (45 fronds)
Light Intensity Range:	4500 - 5300 lux	**Date Measured:**	October 19, 2016

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	25.5	25.0	25.0	26.0	25.5	25.0
Initials	JW	JW	JW	~	~	MLT	JW	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	25.0	Aeration?: 20 min	25.0
DO (mg/L)	9.1	Nutrients	8.4
pH	7.8	added?[1]: Y →	7.8
Conductivity (µS)	274		1102

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.5	25.5	8.3	8.6	908
1.5	24.5	25.5	8.1	8.8	924
3.0	24.5	25.5	8.1	8.6	930
6.1	24.5	25.5	8.1	8.8	935
12.1	24.5	25.5	8.1	8.8	946
24.2	25.0	25.5	8.0	8.8	968
48.5	25.0	25.5	7.9	8.9	1014
97	25.0	25.2	7.8	8.8	1102
Initials	JW	JW	JW	JW	JW

Thermometer: 4 **Cond. Meter:** 3 **pH meter:** 3 **Light meter:** 1

Sample Description: Slightly turbid, dark yellow, odorless, particulates present

Comments:

Reviewed: JW **Date Reviewed:** Nov. 18/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck DCDS
Sample ID: LC - DET - INS - 2016 - 10 - 18 - N
Work Order #: 161124 JW

Start Date: October 19, 2016
Termination Date: October 26, 2016
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	105										JW
	B	6	118										
	C	6	108										
	D	6	98										
1.5	A	6	88										
	B	6 JW	6861										
	C	6	97										
	D	6	117										
3.0	A	6	64										
	B	6	79										
	C	6	64										
	D	6	84										
6.1	A	6	60										
	B	6	83										
	C	6	94										
	D	6	75										
12.1	A	6	54										
	B	6	68										
	C	6	62										
	D	6	83										
24.2	A	6	94										
	B	6	112										
	C	6	78										
	D	6	94										↓

Comments:

Reviewed by: JW

Date Reviewed: Nov. 18/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - DCDS - WS - 2016 - 10 - 18 - N
Work Order #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Test set up by: JW

Concentration %v (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	87										JW
	B	6	71										
	C	6	83										
	D	6	83										
97	A	6	70		X								
	B	6	80			X							
	C	6	62			X							
	D	6	54			X							↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JCh

Date Reviewed: Nov. 18/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_DCDS_WS_2016-10-18_N
WO #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCO Orange			
	A	1	1018.27	1027.16	JAB/ JAB
control	B	2	1014.61	1024.67	
	C	3	1005.41	1014.45	
	D	4	1016.17	1024.38	
	A	5	1002.52	1010.29	
	B	6	1034.63	1039.75	
1.5	C	7	983.95	992.12	
	D	8	1014.56	1024.17	
	A	9	1019.63	1025.10	
	B	10	1018.64	1024.96	
3.0	C	11	1028.97	1034.73	
	D	12	1025.97	1033.62	
	A	13	1022.56	1028.10	
	B	14	1020.02	1026.61	
6.1	C	15	1016.48	1024.27	
	D	16	1019.85	1026.36	
	A	17	1017.91	1023.14	
	B	18	1022.19	1028.15	
12.1	C	19	1023.98	1029.05	
	D	20	1026.15	1033.90	
	A	21	1014.05	1022.40	
	B	22	1014.92	1023.84	
24.2	C	23	1019.64	1026.93	
	D	24	1012.67	1020.62	
	A	25	990.07	998.17	
	B	26	992.59	998.68	
48.5	C	27	1002.14	1009.60	
	D	28	1013.23	1021.08	↓

Comments: 10% Re-weigh: # 1 : 1027.26 # 23. 1026.85
11 : 1034.82 # 32. 1016.00

Reviewed by: JGH Date Reviewed: Nov. 18/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_DCDS_WS_2016-10-18_N
WO #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCO orange			
	A	29	1014.96	1022.14	JAB/JAB
	B	30	999.58	1006.51	↓
97	C	31	1020.92	1026.94	
	D	32	1010.55	1016.09	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JGH

Date Reviewed: Nov. 18/16

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-2679-9376	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 17:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-1640-6927	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	19 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	26 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	18-7594-5243	**Code:**	6FD0A71B	**Client:**	Teck Coal
Sample Date:	18 Oct-16 12:30	**Material:**	Water Sample	**Project:**	
Receive Date:	19 Oct-16 11:44	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	11h (8.3 °C)	**Station:**	LC_DCDS_WS_2016-10-18_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	951232	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.3246	0.04558	2.582	308	38.72	2194
IC10	0.7546	0.06403	2.737	132.5	36.53	1562
IC15	1.324	0.04025	2.85	75.51	35.09	2484
IC20	1.89	0.06641	3.257	52.9	30.7	1506
IC25	2.516	0.112	87.09	39.75	1.148	893.1
IC40	95.63	43.93	N/A	1.046	NA	2.276
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	101.3	92	112	4.151	8.302	8.2%	0.0%
1.5		4	84.75	55	111	11.62	23.24	27.43%	16.3%
3		4	66.75	58	78	5.154	10.31	15.44%	34.07%
6.1		4	72	54	88	7.153	14.31	19.87%	28.89%
12.1		4	60.75	48	77	6.129	12.26	20.18%	40.0%
24.2		4	88.5	72	106	6.946	13.89	15.7%	12.59%
48.5		4	75	65	81	3.464	6.928	9.24%	25.93%
97		4	60.5	48	74	5.56	11.12	18.38%	40.25%

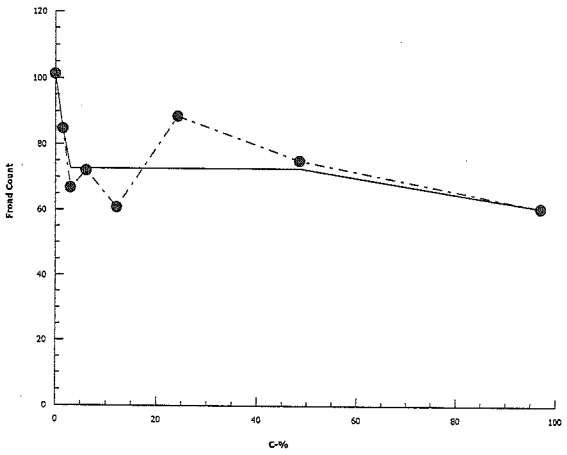
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	99	112	102	92
1.5		82	55	91	111
3		58	73	58	78
6.1		54	77	88	69
12.1		48	62	56	77
24.2		88	106	72	88
48.5		81	65	77	77
97		64	74	56	48

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-2679-9376	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 17:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-0965-9959	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 17:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-1640-6927	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	19 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	26 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	18-7594-5243	**Code:**	6FD0A71B	**Client:**	Teck Coal
Sample Date:	18 Oct-16 12:30	**Material:**	Water Sample	**Project:**	
Receive Date:	19 Oct-16 11:44	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	11h (8.3 °C)	**Station:**	LC_DCDS_WS_2016-10-18_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	405608	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.3497	0.06177	2.661	285.9	37.58	1619
IC10	0.8218	0.09625	2.93	121.7	34.13	1039
IC15	1.459	0.08562	3.363	68.55	29.74	1168
IC20	2.229	0.05815	96.16	44.86	1.04	1720
IC25	55.91	N/A	N/A	1.789	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

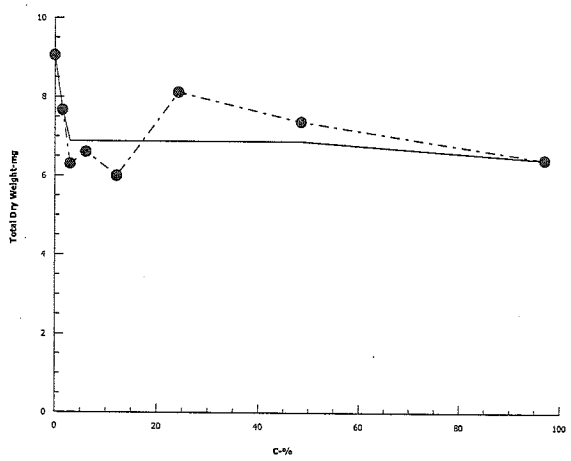
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	9.05	8.21	10.06	0.382	0.7641	8.44%	0.0%
1.5		4	7.667	5.12	9.61	0.9366	1.873	24.43%	15.28%
3		4	6.3	5.47	7.65	0.4833	0.9667	15.34%	30.39%
6.1		4	6.607	5.54	7.79	0.4608	0.9216	13.95%	26.99%
12.1		4	6.003	5.07	7.75	0.6138	1.228	20.45%	33.67%
24.2		4	8.128	7.29	8.92	0.3428	0.6857	8.44%	10.19%
48.5		4	7.375	6.09	8.1	0.4481	0.8962	12.15%	18.51%
97		4	6.417	5.54	7.18	0.3843	0.7686	11.98%	29.09%

Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	8.89	10.06	9.04	8.21
1.5		7.77	5.12	8.17	9.61
3		5.47	6.32	5.76	7.65
6.1		5.54	6.59	7.79	6.51
12.1		5.23	5.96	5.07	7.75
24.2		8.35	8.92	7.29	7.95
48.5		8.1	6.09	7.46	7.85
97		7.18	6.93	6.02	5.54

Analysis ID:	11-0965-9959	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 17:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Lemna minor Summary Sheet

Client: Teck
Work Order No.: 161124

Start Date: October 19, 2016
Set up by: JW

Sample Information:

Sample ID: LC - LCS - WS - 2016 - 10 - 17 - N
Sample Date: October 17, 2016
Date Received: October 18, 2016
Sample Volume: 6 x 20L

Test Organism Information:

Culture Date: 101216
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (45 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 138
Date Initiated: October 13, 2016

7-d No. of Fronds IC50 (95% CL): 3.5 (3.2 - 3.9) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.9 (3.2 - 4.9) g/L KCl CV (%): 11

Test Results:	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	75.7 (19.3 - n/a)	> 97
IC50 %(v/v) (95% CL)	> 97	> 97

Reviewed by: JGh

Date reviewed: Nov. 18/16

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck | **Setup by:** JW

Sample ID: LC_LCS_WS_2016-10-19_N | **Test Date:** October 19, 2016

Work Order No.: 161124 | **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 7 days | **> 8X Growth? (Y/N):** Y (45 fronds)

Light Intensity Range: 4200 - 5100 lux | **Date Measured:** October 19, 2016

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	25.5	25.0	25.0	26.0	25.5	25.0
Initials	JW	JW	JW	[illegible]	[illegible]	MG	JW	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	25.0	Aeration?: 20 min	25.0
DO (mg/L)	8.9	Nutrients added?[1]: Y	8.3
pH	8.0	→	7.9
Conductivity (µS)	677		1436

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.5	26.0	8.3	8.4	908
1.5	24.5	26.0	7.8	8.3	909
3.0	24.5	26.0	7.8	8.5	JW ~~942~~ 923
6.1	25.0	26.0	7.8	8.4	JW ~~975~~ 942
12.1	25.0	26.0	7.9	8.4	975
24.2	25.0	26.0	7.9	8.6	1045
48.5	25.0	26.0	7.9	8.6	1177
97	25.0	26.0	7.9	8.6	1436
Initials	JW	JW	JW	JW	JW

Thermometer: 4 **Cond. Meter:** 3 **pH meter:** 3 **Light meter:** 1

Sample Description: clear, colorless, odorless, no particulates

Comments:

Reviewed: JW | **Date Reviewed:** Nov. 18/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LC5-WS-2016-10-17-N
Work Order #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Test set up by: JW

Concentration %/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	83										JW
	B	6	86										
	C	6	95										
	D	6	94										
1.5	A	6	80										
	B	6	96										
	C	6	81										
	D	6	90										
3.0	A	6	116										
	B	6	75										
	C	6	112										
	D	6	73										
6.1	A	6	104										
	B	6	113										
	C	6	76										
	D	6	102										
12.1	A	6	98										
	B	6	140										
	C	6	88										
	D	6	118										
24.2	A	6	110										
	B	6	99										
	C	6	112										
	D	6	85										

Comments:

Reviewed by: JW

Date Reviewed: Nov. 18/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LC5-WS-2016-10-17-N
Work Order #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Test set up by: JW

Concentration %(v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	68										JW
	B	6	95										
	C	6	85										
	D	6	63										
97	A	6	54										
	B	6	75										
	C	6	68										
	D	6	57										↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGh

Date Reviewed: Nov. 18/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - LC5 - WS - 2016 - 10 - 17 - N
WO #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Balance ID: Bal - L

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCO Purple			
control	A	1	1015.62	1023.38	JAB / JAB
	B	2	1015.74	1023.00	
	C	3	1018.39	1026.50	
	D	4	1011.51	1019.28	
1.5	A	5	1021.96	1028.41	
	B	6	1003.68	1011.31	
	C	7	1002.80	1009.84	
	D	8	1002.78	1010.74	
3.0	A	9	1001.89	1011.70	
	B	10	1025.65	1033.38	
	C	11	1005.28	1014.97	
	D	12	988.02	994.75	
6.1	A	13	995.02	1003.24	
	B	14	1006.75	1016.50	
	C	15	995.86	1002.90	
	D	16	1001.83	1010.45	
12.1	A	17	1012.41	1021.00	
	B	18	995.80	1007.80	
	C	19	996.32	1003.90	
	D	20	1000.42	1010.93	
24.2	A	21	1020.08	1029.33	
	B	22	1013.21	1021.88	
	C	23	1030.01	1040.34	
	D	24	1007.28	1015.23	
48.5	A	25	1008.58	1015.54	
	B	26	1004.32	1012.58	
	C	27	1015.58	1023.36	
	D	28	1010.60	1017.05	↓

Comments: 10 % Re-weigh : # 3 . 1026.51 # 24 . 1015.28
14 . 1016.59 # 32 . 1019.06

Reviewed by: JCh Date Reviewed: Nov - 18/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC-LC5-WS-2016-ID-17-N
WO #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Balance ID: Bal - L

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCO Purple			
	A	29	1008.83	1015.09	JAB / JAB
	B	30	1008.49	1015.88	↓
97	C	31	1024.95	1031.64	
	D	32	1013.19	1018.99	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JGa

Date Reviewed: Nov. 18/16

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	09-0305-4852	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 16:51	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-1640-6927	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	19 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	26 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	07-1486-8844	**Code:**	2A9C086C	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (4.5 °C)	**Station:**	LC_LC5_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1632584	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	28.58	12.01	40.27	3.499	2.483	8.326
IC10	33.71	22.21	59.98	2.966	1.667	4.503
IC15	39.74	27.52	68.51	2.516	1.46	3.633
IC20	46.81	29.59	80.19	2.136	1.247	3.379
IC25	57.72	29.36	92.43	1.733	1.082	3.406
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

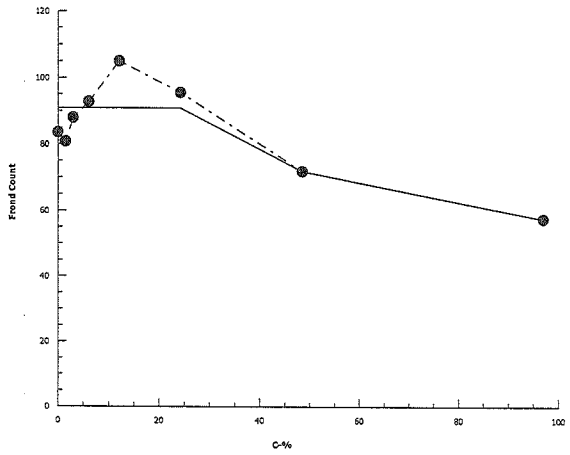
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	83.5	77	89	2.958	5.916	7.09%	0.0%
1.5		4	80.75	74	90	3.816	7.632	9.45%	3.29%
3		4	88	67	110	11.58	23.17	26.33%	-5.39%
6.1		4	92.75	70	107	7.952	15.9	17.15%	-11.08%
12.1		4	105	82	134	11.5	23.01	21.91%	-25.75%
24.2		4	95.5	79	106	6.198	12.4	12.98%	-14.37%
48.5		4	71.75	57	89	7.432	14.86	20.72%	14.07%
97		4	57.5	48	69	4.873	9.747	16.95%	31.14%

Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	77	80	89	88
1.5		74	90	75	84
3		110	69	106	67
6.1		98	107	70	96
12.1		92	134	82	112
24.2		104	93	106	79
48.5		62	89	79	57
97		48	69	62	51

Analysis ID:	09-0305-4852	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 16:51	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-7834-7411	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Nov-16 15:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-9288-3267	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	19 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	26 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	
Sample ID:	00-1942-5937	**Code:**	1286A91	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h	**Station:**	LC_LC5_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1688818	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	30.35	N/A	67.23	3.294	1.487	NA
IC10	39.33	18.91	72.88	2.543	1.372	5.288
IC15	50.37	19.47	84.85	1.985	1.179	5.136
IC20	61.75	19.6	97.1	1.619	1.03	5.101
IC25	75.66	19.32	N/A	1.322	NA	5.176
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	83.5	77	89	2.958	5.916	7.09%	0.0%
1.5		4	80.75	74	90	3.816	7.632	9.45%	3.29%
3		4	83.5	77	89	2.958	5.916	7.09%	0.0%
6.1		4	83.5	77	89	2.958	5.916	7.09%	0.0%
12.1		4	83.5	77	89	2.958	5.916	7.09%	0.0%
24.2		4	83.5	77	89	2.958	5.916	7.09%	0.0%
48.5		4	71.75	57	89	7.432	14.86	20.72%	14.07%
97		4	57.5	48	69	4.873	9.747	16.95%	31.14%

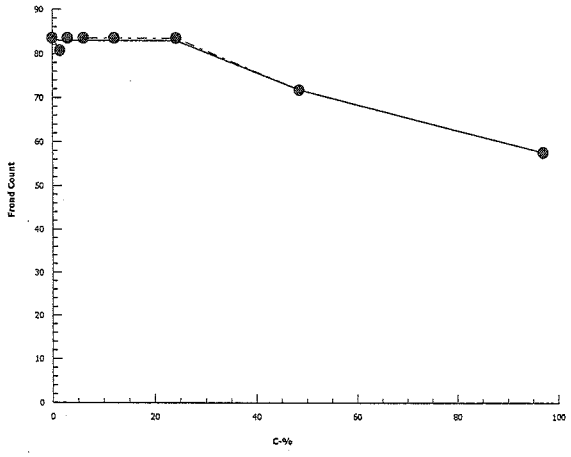
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	77	80	89	88
1.5		74	90	75	84
3		77	80	89	88
6.1		77	80	89	88
12.1		77	80	89	88
24.2		77	80	89	88
48.5		62	89	79	57
97		48	69	62	51

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-7834-7411	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Nov-16 15:47	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-2521-8773	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 16:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-1640-6927	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	19 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	26 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	07-1486-8844	**Code:**	2A9C086C	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (4.5 °C)	**Station:**	LC_LC5_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1968390	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	32.04	26.38	60.72	3.121	1.647	3.791
IC10	42.32	28.5	79.2	2.363	1.263	3.509
IC15	58.05	28.97	N/A	1.723	NA	3.452
IC20	82.55	25.71	N/A	1.211	NA	3.89
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	7.725	7.26	8.11	0.175	0.3501	4.53%	0.0%
1.5		4	7.27	6.45	7.96	0.333	0.6661	9.16%	5.89%
3		4	8.49	6.73	9.81	0.756	1.512	17.81%	-9.9%
6.1		4	8.408	7.04	9.75	0.5592	1.118	13.3%	-8.84%
12.1		4	9.67	7.58	12	0.9861	1.972	20.4%	-25.18%
24.2		4	8.9	7.95	9.73	0.3837	0.7674	8.62%	-15.21%
48.5		4	7.362	6.45	8.26	0.4056	0.8113	11.02%	4.69%
97		4	6.535	5.8	7.39	0.338	0.676	10.34%	15.4%

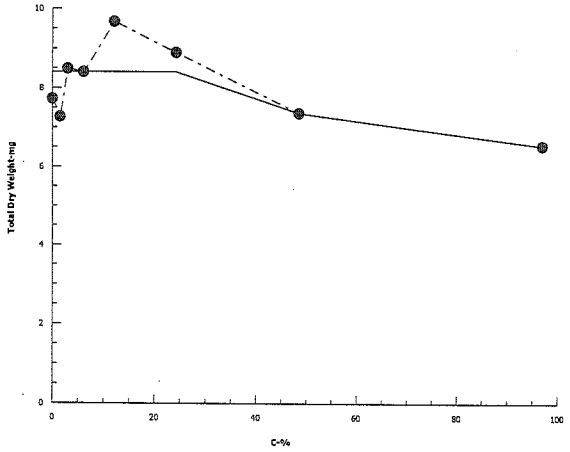
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.76	7.26	8.11	7.77
1.5		6.45	7.63	7.04	7.96
3		9.81	7.73	9.69	6.73
6.1		8.22	9.75	7.04	8.62
12.1		8.59	12	7.58	10.51
24.2		9.25	8.67	9.73	7.95
48.5		6.96	8.26	7.78	6.45
97		6.26	7.39	6.69	5.8

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	11-2521-8773	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 16:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	17-7848-5954	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Nov-16 15:46	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-9288-3267	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	19 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	26 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	
Sample ID:	00-1942-5937	**Code:**	1286A91	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h	**Station:**	LC_LC5_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2040634	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	49.48	N/A	71.75	2.021	1.394	NA
IC10	68.43	15.99	N/A	1.461	NA	6.255
IC15	94.51	37.89	N/A	1.058	NA	2.64
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	7.725	7.26	8.11	0.175	0.3501	4.53%	0.0%
1.5		4	7.27	6.45	7.96	0.333	0.6661	9.16%	5.89%
3		4	7.725	7.26	8.11	0.175	0.3501	4.53%	0.0%
6.1		4	7.725	7.26	8.11	0.175	0.3501	4.53%	0.0%
12.1		4	7.725	7.26	8.11	0.175	0.3501	4.53%	0.0%
24.2		4	7.725	7.26	8.11	0.175	0.3501	4.53%	0.0%
48.5		4	7.362	6.45	8.26	0.4056	0.8113	11.02%	4.69%
97		4	6.535	5.8	7.39	0.338	0.676	10.34%	15.4%

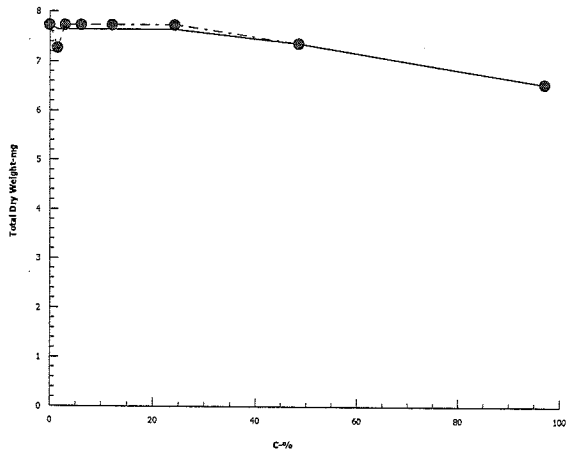
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.76	7.26	8.11	7.77
1.5		6.45	7.63	7.04	7.96
3		7.76	7.26	8.11	7.77
6.1		7.76	7.26	8.11	7.77
12.1		7.76	7.26	8.11	7.77
24.2		7.76	7.26	8.11	7.77
48.5		6.96	8.26	7.78	6.45
97		6.26	7.39	6.69	5.8

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	17-7848-5954	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	18 Nov-16 15:46	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Lemna minor Summary Sheet

Client: Teck
Work Order No.: 161124

Start Date: October 19 , 2016
Set up by: JW

Sample Information:

Sample ID: WL - BFNB_OUT - SP21_20161017-N
Sample Date: October 17 , 2016
Date Received: October 18 , 2016
Sample Volume: 10 x 20 L

Test Organism Information:

Culture Date: 101216
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (45 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 138
Date Initiated: October 13 , 2016

7-d No. of Fronds IC50 (95% CL): 3.5 (3.2 - 3.9) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.9 (3.2 - 4.9) g/L KCl CV (%): 11

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	10.1 (2.6 - 18.0)	11.7 (2.1 - n/a)
IC50 %(v/v) (95% CL)	81.2 (28.2 - n/a)	>97

Reviewed by: JCL

Date reviewed: Nov-18/16

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck | **Setup by:** JW

Sample ID: WL-BFWB-OUT-SP21-20161017_N | **Test Date:** October 19, 2016

Work Order No.: 161124 | **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 7 days | **> 8X Growth? (Y/N):** Y (45 fronds)

Light Intensity Range: 4300 - 5000 lux | **Date Measured:** October 19, 2016

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	25.5	25.0	25.0	26.0	25.5	25.0
Initials	JW	JW	JW	[illegible]	[illegible]	MLT	JW	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	25.0	Aeration?: 20 min	25.0
DO (mg/L)	8.9	Nutrients added?[1]: Y →	8.4
pH	7.8		7.8
Conductivity (µS)	1889		2510

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration	Temperature (°C)		pH		Conductivity (µS)
% (v/v)	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.5	25.5	8.3	8.4	908
1.5	24.5	25.5	7.8	9.4	935
3.0	24.5	26.0	7.8	9.4	969
6.1	24.5	26.0	7.8	9.5	1029
12.1	24.5	26.0	7.8	9.4	1147
24.2	25.0	26.0	7.9	9.4	1369
48.5	25.0	26.0	7.9	9.8	1783
97	25.0	26.0	7.8	9.6	2510
Initials	JW	JW	JW	JW	JW

Thermometer: 4 **Cond. Meter:** 3 **pH meter:** 3 **Light meter:** 1

Sample Description: clear, colorless, odorless, no particulates.

Comments:

Reviewed: JOL | **Date Reviewed:** Nov. 18/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: WL - BFNB - OUT - SP21 - 20161017 - N
Work Order #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Test set up by: JW

Concentration %/o (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	110										JW
	B	6	103										
	C	6	110										
	D	6	85										
1.5	A	6	104										
	B	6	114										
	C	6	114										
	D	6	99										
3.0	A	6	105										
	B	6	113										
	C	6	111										
	D	6	102										
6.1	A	6	106										
	B	6	116										
	C	6	68										
	D	6	82										
12.1	A	6	74										
	B	6	73										
	C	6	86										
	D	6	72										
24.2	A	6	75			x							
	B	6	68			x							
	C	6	82			x							
	D	6	72			x							↓

Comments:

Reviewed by: JCL

Date Reviewed: Nov. 18/16

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: WL - BFWB - OUT - SP21 - 20161017 - N
Work Order #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Test set up by: JW

Concentration %(v/v)	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
48.5	A	6	61		X	X							JW
	B	6	56		X	X							
	C	6	67		X	X							
	D	6	56		X	X							
97	A	6	59		X								
	B	6	57		X								
	C	6	53		X								
	D	6	49		X								
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGL

Date Reviewed: Nov. 18/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: WL - BFWB - OUT - SP21 - 2016 1017 - N
WO #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Balance ID: Bal - L

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCO Brown			
	A	29	1008.36	1015.14	JAB/
	B	30	1009.36	1017.03	↓
97	C	31	1012.78	1019.23	↓
	D	32	1020.45	1026.43	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JCh

Date Reviewed: Nov. 18/16

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: WL-BFWB-OUT-SP21-20161017-N
WO #: 161124

Start Date: October 19, 2016
Termination Date: October 26, 2016
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)		LCO Brown			
	A	1	1012.61	1021.89	JAB / JAB
control	B	2	1004.47	1012.81	
	C	3	1006.40	1015.84	
	D	4	1012.68	1019.57	
	A	5	1006.27	1015.28	
1.5	B	6	1010.30	1019.88	
	C	7	1012.84	1021.65	
	D	8	1010.59	1019.39	
	A	9	1017.69	1026.35	
3.0	B	10	1024.38	1033.45	
	C	11	1019.09	1028.36	
	D	12	1017.80	1026.80	
	A	13	1007.90	1016.49	
6.1	B	14	1036.98	1046.85	
	C	15	1021.21	1026.77	
	D	16	1020.38	1027.79	
	A	17	988.27	994.61	
12.1	B	18	1027.32	1033.64	
	C	19	1020.63	1027.67	
	D	20	1024.91	1030.95	
	A	21	1025.30	1032.55	
24.2	B	22	1019.49	1025.22	
	C	23	1027.16	1034.61	
	D	24	1022.14	1028.35	
	A	25	1019.63	1026.60	
48.5	B	26	1008.24	1014.75	
	C	27	1011.72	1018.99	
	D	28	1009.38	1014.54	↓

Comments: 10 % Re-weigh (mg) = # 1. 1021.81 # 24. 1028.30 # 11. 1028.37 # 31. 1019.17

Reviewed by: JGH

Date Reviewed: Nov. 18/16

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-5269-6973	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 17:35	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-1640-6927	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	19 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	26 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	03-9695-5433	**Code:**	17A90F29	**Client:**	Teck Coal
Sample Date:	17 Oct-16 09:00	**Material:**	Effluent	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	39h (5.5 °C)	**Station:**	WL_BFWB_OUT_SP21_20161017_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	120872	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	4	2.453	8.641	25	11.57	40.76
IC10	5.251	2.674	9.316	19.05	10.73	37.4
IC15	6.678	2.668	10.32	14.97	9.689	37.49
IC20	8.216	2.679	11.65	12.17	8.587	37.32
IC25	10.06	2.561	17.97	9.939	5.565	39.04
IC40	36.43	23.67	49.91	2.745	2.003	4.225
IC50	81.19	28.2	N/A	1.232	NA	3.546

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	96	79	104	5.902	11.8	12.3%	0.0%
1.5		4	101.8	93	108	3.75	7.5	7.37%	-5.99%
3		4	101.8	96	107	2.562	5.123	5.04%	-5.99%
6.1		4	87	62	110	10.97	21.94	25.22%	9.38%
12.1		4	70.25	66	80	3.276	6.551	9.33%	26.82%
24.2		4	68.25	62	76	2.955	5.909	8.66%	28.91%
48.5		4	54	50	61	2.614	5.228	9.68%	43.75%
97		4	48.5	43	53	2.217	4.435	9.14%	49.48%

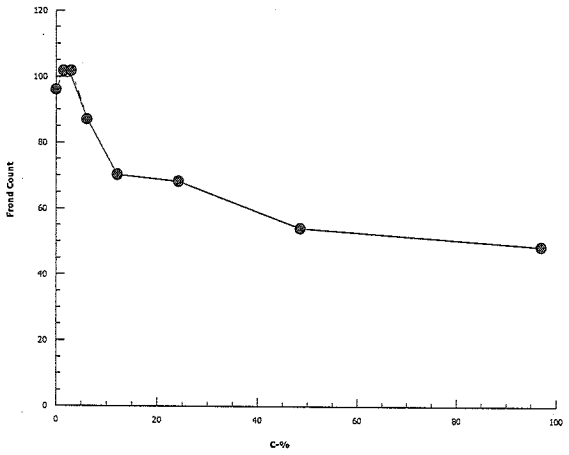
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	104	97	104	79
1.5		98	108	108	93
3		99	107	105	96
6.1		100	110	62	76
12.1		68	67	80	66
24.2		69	62	76	66
48.5		55	50	61	50
97		53	51	47	43

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-5269-6973	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 17:35	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-4948-9727	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 17:35	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-1640-6927	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	19 Oct-16	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	26 Oct-16	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	03-9695-5433	**Code:**	17A90F29	**Client:**	Teck Coal
Sample Date:	17 Oct-16 09:00	**Material:**	Effluent	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	39h (5.5 °C)	**Station:**	WL_BFWB_OUT_SP21_20161017_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1455161	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	4.171	2.68	8.973	23.97	11.14	37.31
IC10	5.685	2.862	10.08	17.59	9.919	34.94
IC15	7.344	2.728	11.39	13.62	8.78	36.65
IC20	9.303	2.507	13.61	10.75	7.348	39.9
IC25	11.72	2.119	N/A	8.53	NA	47.19
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	8.488	6.89	9.44	0.5852	1.17	13.79%	0.0%
1.5		4	9.05	8.8	9.58	0.1832	0.3663	4.05%	-6.63%
3		4	9	8.66	9.27	0.1269	0.2539	2.82%	-6.04%
6.1		4	7.857	5.56	9.87	0.9159	1.832	23.31%	7.42%
12.1		4	6.435	6.04	7.04	0.213	0.426	6.62%	24.18%
24.2		4	6.66	5.73	7.45	0.4123	0.8245	12.38%	21.53%
48.5		4	6.477	5.16	7.27	0.4661	0.9323	14.39%	23.68%
97		4	6.72	5.98	7.67	0.3567	0.7134	10.62%	20.82%

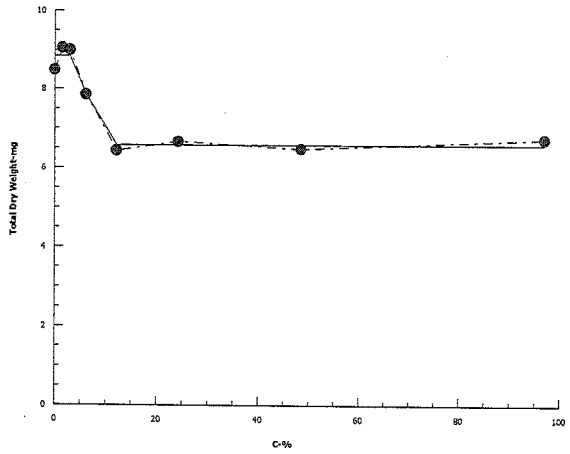
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	9.28	8.34	9.44	6.89
1.5		9.01	9.58	8.81	8.8
3		8.66	9.07	9.27	9
6.1		8.59	9.87	5.56	7.41
12.1		6.34	6.32	7.04	6.04
24.2		7.25	5.73	7.45	6.21
48.5		6.97	6.51	7.27	5.16
97		6.78	7.67	6.45	5.98

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-4948-9727	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	08 Nov-16 17:35	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



APPENDIX D – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 161123

Start Date: Oct 18/16
Set up by: ML

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2016-10-17_N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 9x20L

Test Organism Information:

Culture Date: Oct 14/16
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC150
Stock Solution ID: 162n01
Date Initiated: Oct 14/16

72-h IC50 (95% CL): 36.9 (31.6-41.0) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 32.6 (24.0-44.3) ug/L Zn CV (%): 16

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGL

Date reviewed: Nov. 16/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MLT

Sample ID: EC-LCDSSLCC_WS_2016-10-17_N | Test Date/Time: Oct 18/16 @ 1350h

Work Order No.: 161123 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 14/16 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 270 2 300 | Average: 285 | Culture Cell Density (c1): 285 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 285 x 10⁴ cells/ml = 7.75mL

Time Zero Counts: 1 24 2 23 | Average: 23.5

No. of Cells/mL: 23.5 x 10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10682 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.9	23.5	24.5	25.0	25.0	25.0	✓	✓	✓	✓
1.5	6.9	23.5	↓	↓	↓	↓	✓	✓	✓	✓
3.0	6.9	23.5					✓	✓	✓	✓
6.0	7.1	23.5					✓	✓	✓	✓
11.9	7.4	23.5					✓	✓	✓	✓
23.8	7.6	23.5					✓	✓	✓	✓
47.6	7.8	23.5					✓	✓	✓	✓
95.2	8.1	23.5					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 Well 2: 6.9

Final control pH: Well 1: 6.6 Well 2: 6.6

Light intensity (lux): 4070 Date measured: Oct 18/16

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear, colourless, odourless, no particulates

Comments:

Reviewed: JOL Date reviewed: Nov. 16/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: Oct 18/16 @ 1350h

Work Order #: 161123 Termination Date: Oct 21/16 @ 1350h

Sample ID: LC-LFDSSLCC_WS_2016-10-17_N Test set up by: ML

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	31					ML
	B	32					
	C	37					
	D	38					
	E	34					
	F	33					
	G	35					
	H	31					
1.5	A	33					
	B	34					
	C	36					
	D	33					
3.0	A	44					
	B	38					
	C	41					
	D	45					
6.0	A	65					
	B	69					
	C	79					
	D	75					
11.9	A	97					
	B	110					
	C	108					
	D	112					
23.8	A	177					
	B	169					
	C	171					
	D	180					
47.6	A	161					
	B	176					
	C	190					
	D	189					
95.2	A	151					
	B	165					
	C	160					
	D	147					

Comments:

Reviewed by: JDL Date Reviewed: Nov. 16/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	18-Oct-16 @ 1350h
WO#:	161123	Termination Date/Time	21-Oct-16 @ 1350h
Sample ID:	LC_LCDSSLCC_WS_2016-10-17_N		
		Initial Cell Density:	10682 cell/mL

									235000
									0.22
									0.01
Concentration % (v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10681.82
Control	A	31				31	29.9	mean	32.8
	B	32				32	30.9	SD	2.642374
	C	37				37	35.9	CV	8.054345
	D	38				38	36.9		
	E	34				34	32.9		
	F	33				33	31.9		
	G	35				35	33.9		
	H	31				31	29.9		
1.5	A	33				33	31.9		
	B	34				34	32.9		
	C	36				36	34.9		
	D	33				33	31.9		
3	A	44				44	42.9		
	B	38				38	36.9		
	C	41				41	39.9		
	D	45				45	43.9		
6	A	65				65	63.9		
	B	69				69	67.9		
	C	79				79	77.9		
	D	75				75	73.9		
11.9	A	97				97	95.9		
	B	110				110	108.9		
	C	108				108	106.9		
	D	112				112	110.9		
23.8	A	177				177	175.9		
	B	169				169	167.9		
	C	171				171	169.9		
	D	180				180	178.9		
47.6	A	161				161	159.9		
	B	176				176	174.9		
	C	190				190	188.9		
	D	189				189	187.9		
95.2	A	151				151	149.9		
	B	165				165	163.9		
	C	160				160	158.9		
	D	147				147	145.9		

Reviewed by: JGh

Date reviewed: Nov. 16/16

CETIS Analytical Report

Test Code: 161123a | 06-3010-4375

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-3959-9024	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:17	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-9137-8021	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	18 Oct-16 13:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	21 Oct-16 13:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	02-2496-3209	**Code:**	D68AA89	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	38h (3.5 °C)	**Station:**	LC_LCDSSLCC_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1102366	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			1.0000	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	32.88	30	37	0.9342	2.642	8.04%	0.0%
1.5		4	33	32	35	0.7071	1.414	4.29%	-0.38%
3		4	41	37	44	1.581	3.162	7.71%	-24.71%
6		4	71	64	78	3.109	6.218	8.76%	-116.0%
11.9		4	105.8	96	111	3.351	6.702	6.34%	-221.7%
23.8		4	173.3	168	179	2.562	5.123	2.96%	-427.0%
47.6		4	178	160	189	6.795	13.59	7.63%	-441.4%
95.2		4	154.8	146	164	4.11	8.221	5.31%	-370.7%

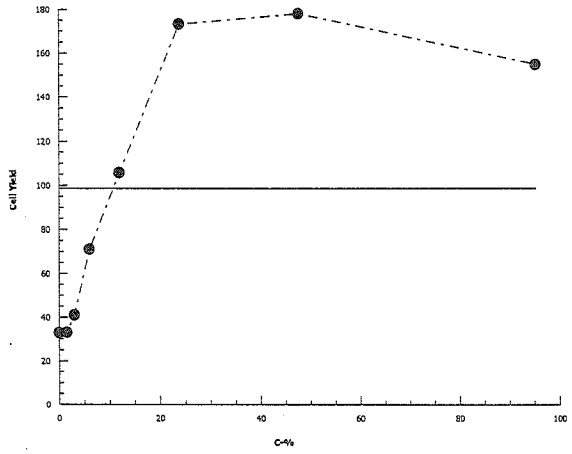
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	31	36	37	33	32	34	30
1.5		32	33	35	32				
3		43	37	40	44				
6		64	68	78	74				
11.9		96	109	107	111				
23.8		176	168	170	179				
47.6		160	175	189	188				
95.2		150	164	159	146				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-3959-9024	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:17	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-5911-4078	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 15:17	**Analysis:**	Parametric-Multiple Comparison	**Official Results:**	Yes
Batch ID:	04-9137-8021	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	18 Oct-16 13:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	21 Oct-16 13:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	02-2496-3209	**Code:**	D68AA89	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	38h (3.5 °C)	**Station:**	LC_LCDSSLCC_WS_2016-10-17_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	31.4%	3	6	4.243	33.33

Dunn-Šidák Adj t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.03156	2.603	10.31	10	0.9907	CDF	Non-Significant Effect
		3	2.052	2.603	10.31	10	0.1614	CDF	Non-Significant Effect
		6*	9.627	2.603	10.31	10	<0.0001	CDF	Significant Effect
		11.9*	18.4	2.603	10.31	10	<0.0001	CDF	Significant Effect
		23.8*	35.44	2.603	10.31	10	<0.0001	CDF	Significant Effect
		47.6*	36.64	2.603	10.31	10	<0.0001	CDF	Significant Effect
		95.2*	30.77	2.603	10.31	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			1.0000	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	126541.4	18077.35	7	432.2	<0.0001	Significant Effect
Error	1171.125	41.82589	28			
Total	127712.6		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	19.23	18.48	0.0075	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9653	0.9166	0.3106	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	32.88	30.67	35.08	32.5	30	37	0.9342	8.04%	0.0%
1.5		4	33	30.75	35.25	32.5	32	35	0.7071	4.29%	-0.38%
3		4	41	35.97	46.03	41.5	37	44	1.581	7.71%	-24.71%
6		4	71	61.11	80.89	71	64	78	3.109	8.76%	-116.0%
11.9		4	105.8	95.09	116.4	108	96	111	3.351	6.34%	-221.7%
23.8		4	173.3	165.1	181.4	173	168	179	2.562	2.96%	-427.0%
47.6		4	178	156.4	199.6	181.5	160	189	6.795	7.63%	-441.4%
95.2		4	154.8	141.7	167.8	154.5	146	164	4.11	5.31%	-370.7%

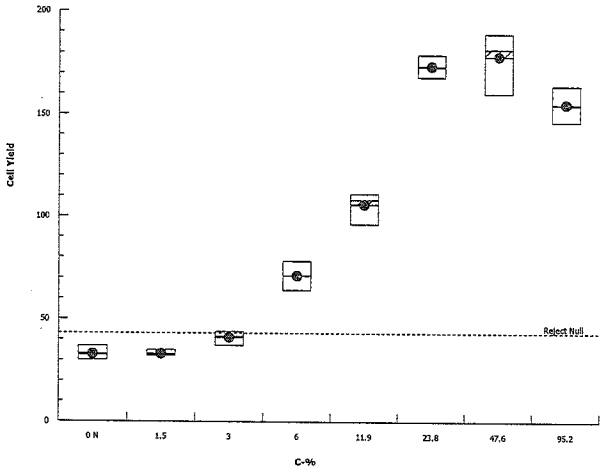
EC Alga Growth Inhibition Test — **Nautilus Environmental**

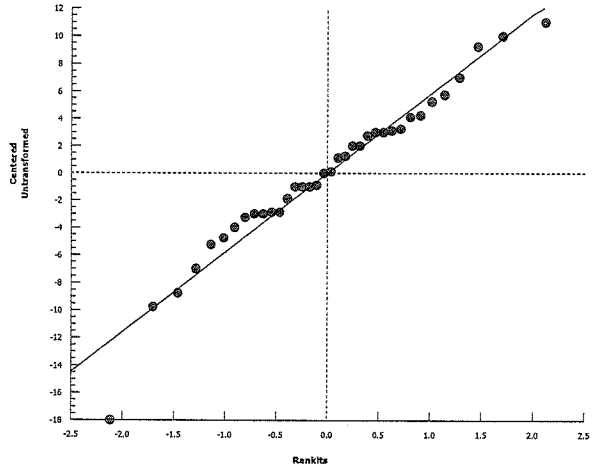
Analysis ID: 00-5911-4078 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 16 Nov-16 15:17 **Analysis:** Parametric-Multiple Comparison **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	31	36	37	33	32	34	30
1.5		32	33	35	32				
3		43	37	40	44				
6		64	68	78	74				
11.9		96	109	107	111				
23.8		176	168	170	179				
47.6		160	175	189	188				
95.2		150	164	159	146				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 161123
Start Date: Oct 18/16
Set up by: ML

Sample Information:

Sample ID: LC-DCL_WS_2016-10-17_N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 6x20L

Test Organism Information:

Culture Date: Oct 14/16
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC150
Stock Solution ID: 162n01
Date Initiated: Oct 14/16

72-h IC50 (95% CL): 36.9 (31.6–41.0) µg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 32.6 (24.0–44.3) µg/L Zn CV (%): 16

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGh
Date reviewed: Nov. 17/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT

Sample ID: LC-DC1_WS_2016-10-17_N | Test Date/Time: Oct 18/16 @ 1355h

Work Order No.: 161123 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 14/16 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 270 2 300 | Average: 285 | Culture Cell Density (c1): 285x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 285x10⁴ cells/ml = 7.75mL

Time Zero Counts: 1 24 2 23 | Average: 23.5

No. of Cells/mL: 23.5x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10682 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.9	23.5	24.5	25.0	25.2	25.0	✓	✓	✓	✓
1.5	6.9	23.5	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	23.5					✓	✓	✓	✓
6.0	7.1	23.5					✓	✓	✓	✓
11.9	7.2	23.5					✓	✓	✓	✓
23.8	7.4	23.5					✓	✓	✓	✓
47.6	7.6	23.5					✓	✓	✓	✓
95.2	8.0	23.5					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 Well 2: 6.9

Final control pH: Well 1: 6.6 Well 2: 6.6

Light intensity (lux): 2920 Date measured: Oct 18/16

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: Slightly turbid, ~~clear~~ yellow (MLT), odourless, some ~~brown~~ black (MLT) particulates

Comments:

Reviewed: JGL Date reviewed: Nov. 17/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: Oct 18/16 @ 1355h

Work Order #: 161123 — Termination Date: Oct 21/16 @ 1355h

Sample ID: LC_DCL_WS_2016-10-17_N — Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	31					MLT
	B	34					
	C	37					
	D	35					
	E	38					
	F	34					
	G	33					
	H	35					
1.5	A	43					
	B	39					
	C	40					
	D	37					
3.0	A	40					
	B	41					
	C	44					
	D	43					
6.0	A	55					
	B	46					
	C	52					
	D	52					
11.9	A	66					
	B	74					
	C	72					
	D	75					
23.8	A	129					
	B	135					
	C	140					
	D	122					
47.6	A	186					
	B	181					
	C	197					
	D	193					
95.2	A	175					
	B	180					
	C	185					
	D	181					

Comments:

Reviewed by: JCL — Date Reviewed: Nov-17/16

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 161123
Sample ID: LC_DC1_WS_2016-10-17_N

Start Date/Time: 18-Oct-16 @ 1355h
Termination Date/Time: 21-Oct-16 @ 1355h

Initial Cell Density: 10682 cell/mL

									235000
									0.22
									0.01
Concentration % (v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10681.82
Control	A	31				31	29.9	mean	33.6
	B	34				34	32.9	SD	2.199838
	C	37				37	35.9	CV	6.555561
	D	35				35	33.9		
	E	38				38	36.9		
	F	34				34	32.9		
	G	33				33	31.9		
	H	35				35	33.9		
1.5	A	43				43	41.9		
	B	39				39	37.9		
	C	40				40	38.9		
	D	37				37	35.9		
3	A	40				40	38.9		
	B	41				41	39.9		
	C	44				44	42.9		
	D	43				43	41.9		
6	A	55				55	53.9		
	B	46				46	44.9		
	C	52				52	50.9		
	D	52				52	50.9		
11.9	A	66				66	64.9		
	B	74				74	72.9		
	C	72				72	70.9		
	D	75				75	73.9		
23.8	A	129				129	127.9		
	B	135				135	133.9		
	C	140				140	138.9		
	D	122				122	120.9		
47.6	A	186				186	184.9		
	B	181				181	179.9		
	C	197				197	195.9		
	D	193				193	191.9		
95.2	A	175				175	173.9		
	B	180				180	178.9		
	C	185				185	183.9		
	D	181				181	179.9		

Reviewed by: JOH

Date reviewed: Nov. 17/16

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	08-3279-4988	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-1317-7919	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	18 Oct-16 13:55	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	21 Oct-16 13:55	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	00-8911-1788	**Code:**	54FBCEC	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	38h (2.5 °C)	**Station:**	LC_DC1_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1728142	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9061	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	33.63	30	37	0.7778	2.2	6.54%	0.0%
1.5		4	38.75	36	42	1.25	2.5	6.45%	-15.24%
3		4	41	39	43	0.9129	1.826	4.45%	-21.93%
6		4	50.25	45	54	1.887	3.775	7.51%	-49.44%
11.9		4	70.75	65	74	2.016	4.031	5.7%	-110.4%
23.8		4	130.5	121	139	3.884	7.767	5.95%	-288.1%
47.6		4	188.3	180	196	3.568	7.136	3.79%	-459.9%
95.2		4	179.3	174	184	2.056	4.113	2.3%	-433.1%

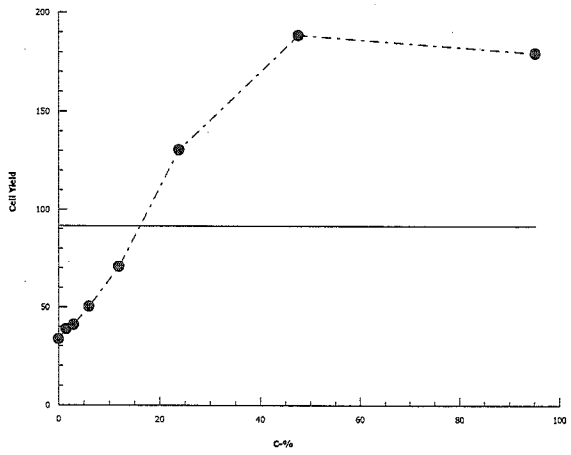
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	33	36	34	37	33	32	34
1.5		42	38	39	36				
3		39	40	43	42				
6		54	45	51	51				
11.9		65	73	71	74				
23.8		128	134	139	121				
47.6		185	180	196	192				
95.2		174	179	184	180				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	08-3279-4988	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-8517-4971	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:30	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-1317-7919	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	18 Oct-16 13:55	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	21 Oct-16 13:55	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	00-8911-1788	**Code:**	54FBCEC	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	38h (2.5 °C)	**Station:**	LC_DC1_WS_2016-10-17_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	20.2%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.908	2.526	6.785	10	0.1652	CDF	Non-Significant Effect
		3*	2.746	2.526	6.785	10	0.0309	CDF	Significant Effect
		6*	6.19	2.526	6.785	10	<0.0001	CDF	Significant Effect
		11.9*	13.82	2.526	6.785	10	<0.0001	CDF	Significant Effect
		23.8*	36.07	2.526	6.785	10	<0.0001	CDF	Significant Effect
		47.6*	57.57	2.526	6.785	10	<0.0001	CDF	Significant Effect
		95.2*	54.22	2.526	6.785	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9061	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	129512.9	18501.85	7	961.8	<0.0001	Significant Effect
Error	538.625	19.23661	28			
Total	130051.6		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.3	18.48	0.0910	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9777	0.9166	0.6658	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	33.63	31.79	35.46	33.5	30	37	0.7778	6.54%	0.0%
1.5		4	38.75	34.77	42.73	38.5	36	42	1.25	6.45%	-15.24%
3		4	41	38.09	43.91	41	39	43	0.9129	4.45%	-21.93%
6		4	50.25	44.24	56.26	51	45	54	1.887	7.51%	-49.44%
11.9		4	70.75	64.34	77.16	72	65	74	2.016	5.7%	-110.4%
23.8		4	130.5	118.1	142.9	131	121	139	3.884	5.95%	-288.1%
47.6		4	188.3	176.9	199.6	188.5	180	196	3.568	3.79%	-459.9%
95.2		4	179.3	172.7	185.8	179.5	174	184	2.056	2.3%	-433.1%

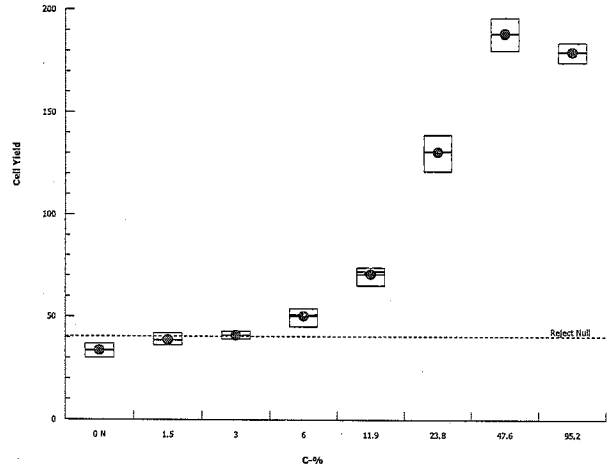
EC Alga Growth Inhibition Test — **Nautilus Environmental**

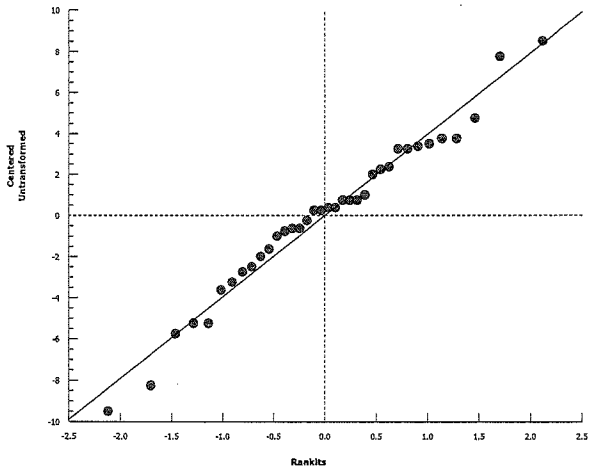
Analysis ID:	16-8517-4971	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:30	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	33	36	34	37	33	32	34
1.5		42	38	39	36				
3		39	40	43	42				
6		54	45	51	51				
11.9		65	73	71	74				
23.8		128	134	139	121				
47.6		185	180	196	192				
95.2		174	179	184	180				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 161123

Start Date: Oct 18/16
Set up by: ML

Sample Information:

Sample ID: LC_FRDSDC_WS_2016-10-17_N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 6x20L

Test Organism Information:

Culture Date: Oct 14/16
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC150
Stock Solution ID: 162n01
Date Initiated: Oct 14/16

72-h IC50 (95% CL): 36.9 (31.6–41.0) µg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 32.6 (24.0–44.3) µg/L Zn CV (%): 16

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JOL

Date reviewed: Nov. 17/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT

Sample ID: LC-FRDSDC_WS_2016-10-17_N | Test Date/Time: Oct 18/16 @ 1400h

Work Order No.: 161123 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 14/16 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 270 2 ~~260~~ MLT 300 | Average: 285 | Culture Cell Density (c1): 285 x 10^4 cells/mL

v1 = 220,000 cells/ml x 10 ml / (c1) 285 x 10^4 cells/ml = 7.75mL

Time Zero Counts: 1 24 2 23 | Average: 23.5

No. of Cells/mL: 23.5 x 10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10682 cells/mL.

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.9	23.5	24.5	25.0	25.0	25.0	✓	✓	✓	✓
1.5	6.9	23.5	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	23.5					✓	✓	✓	✓
6.0	7.2	23.5					✓	✓	✓	✓
11.9	7.4	23.5					✓	✓	✓	✓
23.8	7.6	23.5					✓	✓	✓	✓
47.6	7.8	23.5					✓	✓	✓	✓
95.2	8.1	23.5					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 Well 2: 6.9

Final control pH: Well 1: 6.6 Well 2: 6.6

Light intensity (lux): 4210 Date measured: Oct 18/16

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: clear, colourless, odourless, no particulates

Comments:

Reviewed: JCL Date reviewed: Nov. 17/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: Oct 18/16 @ 1400h

Work Order #: 161123 — Termination Date: Oct 21/16 @ 1400h

Sample ID: LC_FRDSDC_WS_2016-10-17_N — Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	33					MLT
	B	34					
	C	35					
	D	31					
	E	34					
	F	32					
	G	36					
	H	34					
1.5	A	39					
	B	44					
	C	43					
	D	38					
3.0	A	47					
	B	42					
	C	44					
	D	43					
6.0	A	66					
	B	71					
	C	68					
	D	65					
11.9	A	109					
	B	101					
	C	119					
	D	117					
23.8	A	153					
	B	164					
	C	160					
	D	151					
47.6	A	191					
	B	208					
	C	183					
	D	177					
95.2	A	186					
	B	174					
	C	168					
	D	170					

Comments:

Reviewed by: JGH — Date Reviewed: Nov. 17/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	18-Oct-16 @ 1400h		
WO#:	161123	Termination Date/Time	21-Oct-16 @ 1400h		
Sample ID:	LC_FRDSDC_WS_2016-10-17_N				
		Initial Cell Density:	10682 cell/mL		235000
					0.22
					0.01

Concentration % (v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		
Control	A	33				33	31.9	mean	32.6
	B	34				34	32.9	SD	1.59799
	C	35				35	33.9	CV	4.908311
	D	31				31	29.9		
	E	34				34	32.9		
	F	32				32	30.9		
	G	36				36	34.9		
	H	34				34	32.9		
1.5	A	39				39	37.9		
	B	44				44	42.9		
	C	43				43	41.9		
	D	38				38	36.9		
3	A	47				47	45.9		
	B	42				42	40.9		
	C	44				44	42.9		
	D	43				43	41.9		
6	A	66				66	64.9		
	B	71				71	69.9		
	C	68				68	66.9		
	D	65				65	63.9		
11.9	A	109				109	107.9		
	B	101				101	99.9		
	C	119				119	117.9		
	D	117				117	115.9		
23.8	A	152				152	150.9		
	B	164				164	162.9		
	C	160				160	158.9		
	D	151				151	149.9		
47.6	A	191				191	189.9		
	B	208				208	206.9		
	C	183				183	181.9		
	D	172				172	170.9		
95.2	A	186				186	184.9		
	B	174				174	172.9		
	C	168				168	166.9		
	D	170				170	168.9		

Reviewed by: JGL

Date reviewed: Nov. 17/16

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-7396-8165	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-9923-3029	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	18 Oct-16 14:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	21 Oct-16 14:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	19-9543-8291	**Code:**	76EFF8D3	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	38h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	447729	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9083	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	32.63	30	35	0.565	1.598	4.9%	0.0%
1.5		4	40	37	43	1.472	2.944	7.36%	-22.61%
3		4	43	41	46	1.08	2.16	5.02%	-31.8%
6		4	66.5	64	70	1.323	2.646	3.98%	-103.8%
11.9		4	110.5	100	118	4.113	8.226	7.44%	-238.7%
23.8		4	155.8	150	163	3.146	6.292	4.04%	-377.4%
47.6		4	187.5	171	207	7.577	15.15	8.08%	-474.7%
95.2		4	173.5	167	185	4.031	8.062	4.65%	-431.8%

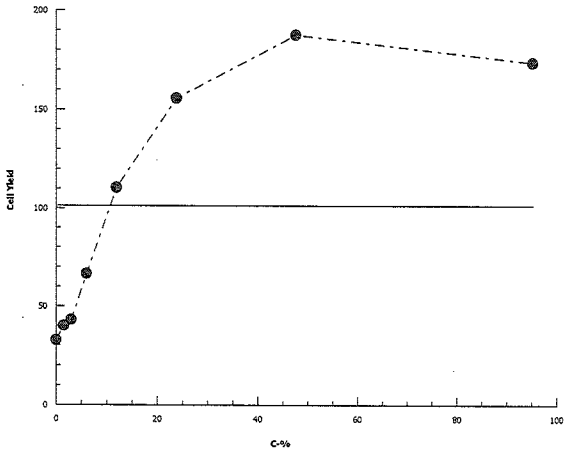
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	32	33	34	30	33	31	35	33
1.5		38	43	42	37				
3		46	41	43	42				
6		65	70	67	64				
11.9		108	100	118	116				
23.8		151	163	159	150				
47.6		190	207	182	171				
95.2		185	173	167	169				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-7396-8165	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Test Code: 161123c | 12-1531-6098

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-2199-0065	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 Nov-16 15:21	**Analysis:**	Parametric-Multiple Comparison	**Official Results:**	Yes
Batch ID:	07-9923-3029	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	18 Oct-16 14:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	21 Oct-16 14:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	19-9543-8291	**Code:**	76EFF8D3	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	38h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2016-10-17_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	33.1%	3	6	4.243	33.33

Dunn-Šidák Adj t Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.778	2.603	10.8	10	0.2655	CDF	Non-Significant Effect
		3	2.501	2.603	10.8	10	0.0630	CDF	Non-Significant Effect
		6*	8.167	2.603	10.8	10	<0.0001	CDF	Significant Effect
		11.9*	18.77	2.603	10.8	10	<0.0001	CDF	Significant Effect
		23.8*	29.68	2.603	10.8	10	<0.0001	CDF	Significant Effect
		47.6*	37.34	2.603	10.8	10	<0.0001	CDF	Significant Effect
		95.2*	33.96	2.603	10.8	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9083	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	131812.3	18830.32	7	410.4	<0.0001	Significant Effect
Error	1284.625	45.87946	28			
Total	133096.9		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	27.88	18.48	0.0002	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9329	0.9166	0.0306	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	32.63	31.29	33.96	33	30	35	0.565	4.9%	0.0%
1.5		4	40	35.32	44.68	40	37	43	1.472	7.36%	-22.61%
3		4	43	39.56	46.44	42.5	41	46	1.08	5.02%	-31.8%
6		4	66.5	62.29	70.71	66	64	70	1.323	3.98%	-103.8%
11.9		4	110.5	97.41	123.6	112	100	118	4.113	7.44%	-238.7%
23.8		4	155.8	145.7	165.8	155	150	163	3.146	4.04%	-377.4%
47.6		4	187.5	163.4	211.6	186	171	207	7.577	8.08%	-474.7%
95.2		4	173.5	160.7	186.3	171	167	185	4.031	4.65%	-431.8%

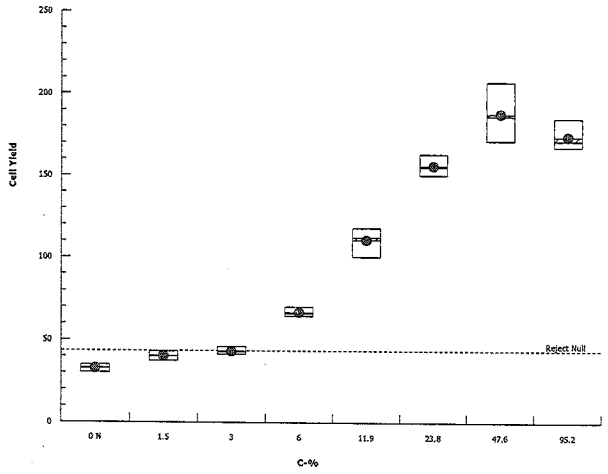
EC Alga Growth Inhibition Test — **Nautilus Environmental**

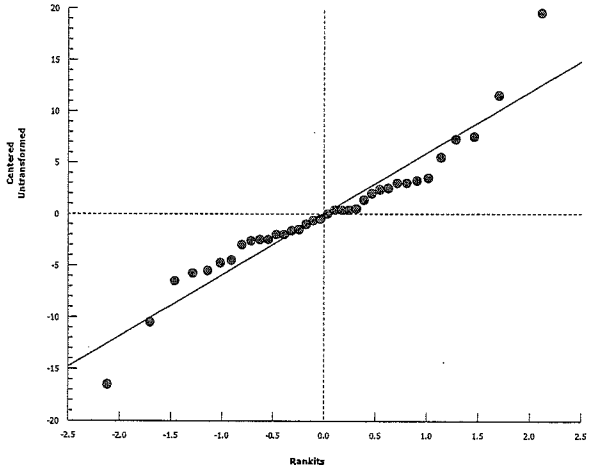
Analysis ID: 03-2199-0065 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 16 Nov-16 15:21 **Analysis:** Parametric-Multiple Comparison **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	32	33	34	30	33	31	35	33
1.5		38	43	42	37				
3		46	41	43	42				
6		65	70	67	64				
11.9		108	100	118	116				
23.8		151	163	159	150				
47.6		190	207	182	171				
95.2		185	173	167	169				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 161123

Start Date: Oct 19/16
Set up by: MLT

Sample Information:

Sample ID: LC_DCDS_WS_2016-10-18_N
Sample Date: Oct 18/16
Date Received: Oct 19/16
Sample Volume: 6x20L

Test Organism Information:

Culture Date: Oct 14/16
Age of culture (Day 0): 5d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC150
Stock Solution ID: 162n01
Date Initiated: Oct 14/16

72-h IC50 (95% CL): 36.9 (31.6–41.0) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 32.6 (24.0–44.3) ug/L Zn CV (%): 16

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JCh

Date reviewed: Nov. 17/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT

Sample ID: LC_PCDS_WS_2016-10-18_N | Test Date/Time: Oct 19/16 @ 1400h

Work Order No.: 161173 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 14/16 | Age of Culture: 5d | Culture Health: Good

Culture Count: 1 380 2 395 | Average: 387.5 | Culture Cell Density (c1): 387.5 x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 387.5 x10⁴ cells/ml = 5.68 mL

Time Zero Counts: 1 23 2 23 | Average: 23

No. of Cells/mL: 23x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10455 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.0	23.0	|	|	|	|	✓	✓	✓	✓
3.0	7.1	23.0	|	|	|	|	✓	✓	✓	✓
6.0	7.2	23.0	|	|	|	|	✓	✓	✓	✓
11.9	7.3	23.0	|	|	|	|	✓	✓	✓	✓
23.8	7.5	23.0	|	|	|	|	✓	✓	✓	✓
47.6	7.7	23.0	|	|	|	|	✓	✓	✓	✓
95.2	7.9	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 6.8 Well 2: 6.8

Light intensity (lux): 3890 Date measured: Oct 14/16

Instruments: Thermometer 4 pH meter 2 Light meter 1

Sample Description: slightly turbid, dark yellow, odourless, particulates present.

Comments:

Reviewed: Date reviewed:

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: Oct 19/16 @ 1400h

Work Order #: 161123 Termination Date: Oct 22/16 @ 1400h

Sample ID: LC_DCDS_WS_2016-10-18_N Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	32					MLT
	B	34					
	C	32					
	D	38					
	E	31					
	F	34					
	G	35					
	H	38					
1.5	A	38					
	B	33					
	C	37					
	D	34					
3.0	A	39					
	B	37					
	C	45					
	D	43					
6.0	A	44					
	B	42					
	C	45					
	D	47					
11.9	A	59					
	B	61					
	C	63					
	D	56					
23.8	A	86					
	B	91					
	C	100					
	D	96					
47.6	A	161					
	B	158					
	C	146					
	D	160					
95.2	A	186					
	B	178					
	C	181					
	D	193					

Comments:

Reviewed by: JGh Date Reviewed: Nov. 17/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	19-Oct-16 @ 1400h
WO#:	161123	Termination Date/Time	22-Oct-16 @ 1400h
Sample ID:	LC_DCDS_WS_2016-10-18_N		
		Initial Cell Density:	10455 cell/mL

									230000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10454.55
Control	A	32				32	31.0	mean	33.2
	B	34				34	33.0	SD	2.659216
	C	32				32	31.0	CV	8.00859
	D	38				38	37.0		
	E	31				31	30.0		
	F	34				34	33.0		
	G	35				35	34.0		
	H	38				38	37.0		
1.5	A	38				38	37.0		
	B	33				33	32.0		
	C	37				37	36.0		
	D	34				34	33.0		
3	A	39				39	38.0		
	B	37				37	36.0		
	C	45				45	44.0		
	D	43				43	42.0		
6	A	44				44	43.0		
	B	42				42	41.0		
	C	45				45	44.0		
	D	47				47	46.0		
11.9	A	59				59	58.0		
	B	61				61	60.0		
	C	63				63	62.0		
	D	56				56	55.0		
23.8	A	86				86	85.0		
	B	91				91	90.0		
	C	100				100	99.0		
	D	96				96	95.0		
47.6	A	161				161	160.0		
	B	158				158	157.0		
	C	146				146	145.0		
	D	160				160	159.0		
95.2	A	186				186	185.0		
	B	178				178	177.0		
	C	181				181	180.0		
	D	193				193	192.0		

Reviewed by: JGh

Date reviewed: Nov. 17/16

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-7999-9999	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-0665-8594	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	19 Oct-16 14:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	22 Oct-16 14:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	18-7594-5243	**Code:**	6FD0A71B	**Client:**	Teck Coal
Sample Date:	18 Oct-16 12:30	**Material:**	Water Sample	**Project:**	
Receive Date:	19 Oct-16 11:44	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	26h (8.3 °C)	**Station:**	LC_DCDS_WS_2016-10-18_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	457276	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.4188	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	33.25	30	37	0.9402	2.659	8.0%	0.0%
1.5		4	34.5	32	37	1.19	2.38	6.9%	-3.76%
3		4	40	36	44	1.826	3.651	9.13%	-20.3%
6		4	43.5	41	46	1.041	2.082	4.79%	-30.83%
11.9		4	58.75	55	62	1.493	2.986	5.08%	-76.69%
23.8		4	92.25	85	99	3.038	6.076	6.59%	-177.4%
47.6		4	155.3	145	160	3.473	6.946	4.47%	-366.9%
95.2		4	183.5	177	192	3.279	6.557	3.57%	-451.9%

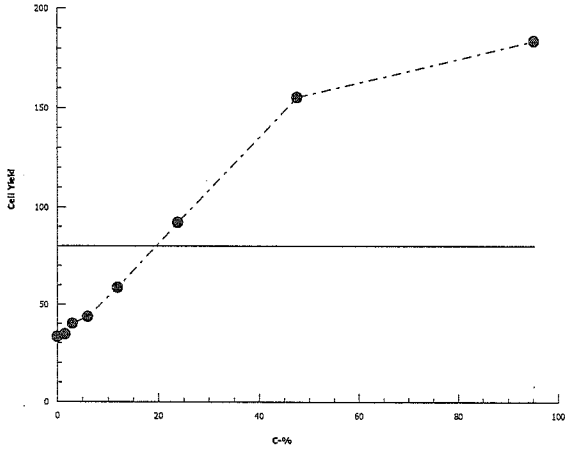
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	31	33	31	37	30	33	34	37
1.5		37	32	36	33				
3		38	36	44	42				
6		43	41	44	46				
11.9		58	60	62	55				
23.8		85	90	99	95				
47.6		160	157	145	159				
95.2		185	177	180	192				

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	07-7999-9999	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:36	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-1147-7803	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:36	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	05-0665-8594	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	19 Oct-16 14:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	22 Oct-16 14:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	18-7594-5243	**Code:**	6FD0A71B	**Client:**	Teck Coal
Sample Date:	18 Oct-16 12:30	**Material:**	Water Sample	**Project:**	
Receive Date:	19 Oct-16 11:44	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	26h (8.3 °C)	**Station:**	LC_DCDS_WS_2016-10-18_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	20.3%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.4688	2.526	6.735	10	0.7951	CDF	Non-Significant Effect
		3*	2.532	2.526	6.735	10	0.0494	CDF	Significant Effect
		6*	3.845	2.526	6.735	10	0.0021	CDF	Significant Effect
		11.9*	9.564	2.526	6.735	10	<0.0001	CDF	Significant Effect
		23.8*	22.13	2.526	6.735	10	<0.0001	CDF	Significant Effect
		47.6*	45.76	2.526	6.735	10	<0.0001	CDF	Significant Effect
		95.2*	56.36	2.526	6.735	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.4188	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	104470	14924.29	7	787.3	<0.0001	Significant Effect
Error	530.75	18.95536	28			
Total	105000.8		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	9.864	18.48	0.1964	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9831	0.9166	0.8429	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	33.25	31.03	35.47	33	30	37	0.9402	8.0%	0.0%
1.5		4	34.5	30.71	38.29	34.5	32	37	1.19	6.9%	-3.76%
3		4	40	34.19	45.81	40	36	44	1.826	9.13%	-20.3%
6		4	43.5	40.19	46.81	43.5	41	46	1.041	4.79%	-30.83%
11.9		4	58.75	54	63.5	59	55	62	1.493	5.08%	-76.69%
23.8		4	92.25	82.58	101.9	92.5	85	99	3.038	6.59%	-177.4%
47.6		4	155.3	144.2	166.3	158	145	160	3.473	4.47%	-366.9%
95.2		4	183.5	173.1	193.9	182.5	177	192	3.279	3.57%	-451.9%

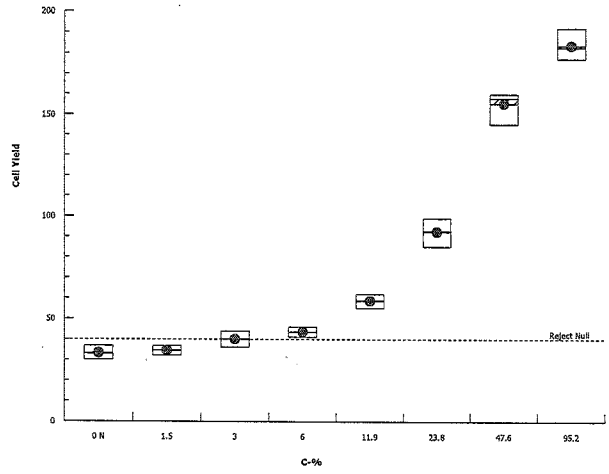
EC Alga Growth Inhibition Test — **Nautilus Environmental**

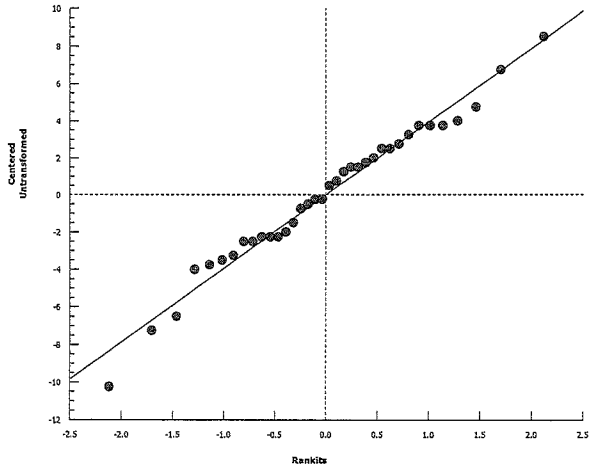
Analysis ID: 06-1147-7803 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 07 Nov-16 15:36 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	31	33	31	37	30	33	34	37
1.5		37	32	36	33				
3		38	36	44	42				
6		43	41	44	46				
11.9		58	60	62	55				
23.8		85	90	99	95				
47.6		160	157	145	159				
95.2		185	177	180	192				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 161123

Start Date: Oct 18/16
Set up by: ML

Sample Information:

Sample ID: LC_LC5_WS_2016-10-17_N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 6x20L

Test Organism Information:

Culture Date: Oct 14/16
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC150
Stock Solution ID: 162n01
Date Initiated: Oct 14/16

72-h IC50 (95% CL): 36.9 (31.6–41.0) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 32.6 (24.0–44.3) ug/L Zn CV (%): 16

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGL

Date reviewed: Nov. 16/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT

Sample ID: LC-LC5_WS_2016-10-17_N | Test Date/Time: Oct 18/16 @ 1410h

Work Order No.: 16123 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 14/16 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 270 2 300 | Average: 285 | Culture Cell Density (c1): 285 x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 285X10⁴ cells/ml =

Time Zero Counts: 1 24 2 23 | Average: MLT ~~Good~~ 23.5

No. of Cells/mL: 23.5 x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL =

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.9	23.5	24.5	25.0	25.0	25.0	✓	✓	✓	✓
1.5	6.9	23.5	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	23.5					✓	✓	✓	✓
6.0	7.1	23.5					✓	✓	✓	✓
11.9	7.3	23.5					✓	✓	✓	✓
23.8	7.5	23.5					✓	✓	✓	✓
47.6	7.8	23.5					✓	✓	✓	✓
95.2	8.1	23.5					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 Well 2: 6.9

Final control pH: Well 1: 6.6 Well 2: 6.6

Light intensity (lux): 4330 | Date measured: Oct 18/16

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear, colourless, odourless, no particulates

Comments:

Reviewed: JCL | Date reviewed: Nov-16/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal — Start Date/Time: Oct 18/16 @ 1410h

Work Order #: 161123 — Termination Date: Oct 21/16 @ 1410h

Sample ID: LC-LC5_WS_2016-10-17_N — Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	38					MLT
	B	33					
	C	36					
	D	35					
	E	32					
	F	35					
	G	34					
	H	36					
1.5	A	41					
	B	37					
	C	43					
	D	37					
3.0	A	42					
	B	46					
	C	43					
	D	41					
6.0	A	68					
	B	63					
	C	63					
	D	62					
11.9	A	112					
	B	120					
	C	118					
	D	125					
23.8	A	175					
	B	168					
	C	172					
	D	167					
47.6	A	197					
	B	196					
	C	180					
	D	203					
95.2	A	186					
	B	195					
	C	190					
	D	177					

Comments:

Reviewed by: JGK — Date Reviewed: Nov. 16/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	18-Oct-16 @ 1410h
WO#:	161123	Termination Date/Time	21-Oct-16 @ 1410h
Sample ID:	LC_LC5_WS_2016-10-17_N		
		Initial Cell Density:	10682 cell/mL

									235000
									0.22
									0.01
Concentration % (v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10681.82
Control	A	38				38	36.9	mean	33.8
	B	33				33	31.9	SD	1.885092
	C	36				36	34.9	CV	5.57607
	D	35				35	33.9		
	E	32				32	30.9		
	F	35				35	33.9		
	G	34				34	32.9		
	H	36				36	34.9		
1.5	A	41				41	39.9		
	B	37				37	35.9		
	C	43				43	41.9		
	D	37				37	35.9		
3	A	42				42	40.9		
	B	46				46	44.9		
	C	43				43	41.9		
	D	41				41	39.9		
6	A	68				68	66.9		
	B	63				63	61.9		
	C	63				63	61.9		
	D	62				62	60.9		
11.9	A	112				112	110.9		
	B	120				120	118.9		
	C	118				118	116.9		
	D	125				125	123.9		
23.8	A	175				175	173.9		
	B	168				168	166.9		
	C	172				172	170.9		
	D	167				167	165.9		
47.6	A	197				197	195.9		
	B	196				196	194.9		
	C	180				180	178.9		
	D	203				203	201.9		
95.2	A	186				186	184.9		
	B	195				195	193.9		
	C	190				190	188.9		
	D	177				177	175.9		

Reviewed by: JCh

Date reviewed: Nov. 16/16

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-0916-8742	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:20	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-5760-2145	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	18 Oct-16 14:10	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	21 Oct-16 14:10	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	07-1486-8844	**Code:**	2A9C086C	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	38h (4.5 °C)	**Station:**	LC_LC5_WS_2016-10-17_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1807560	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5540	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	33.88	31	37	0.6665	1.885	5.57%	0.0%
1.5		4	38.5	36	42	1.5	3	7.79%	-13.65%
3		4	42	40	45	1.08	2.16	5.14%	-23.99%
6		4	63	61	67	1.354	2.708	4.3%	-85.98%
11.9		4	117.8	111	124	2.689	5.377	4.57%	-247.6%
23.8		4	169.5	166	174	1.848	3.697	2.18%	-400.4%
47.6		4	193	179	202	4.916	9.832	5.09%	-469.7%
95.2		4	186	176	194	3.808	7.616	4.1%	-449.1%

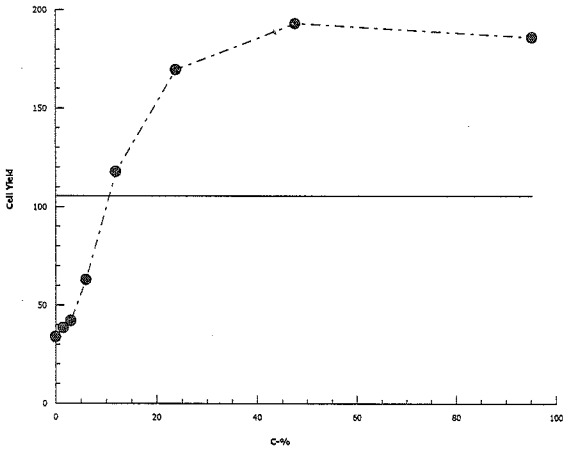
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	37	32	35	34	31	34	33	35
1.5		40	36	42	36				
3		41	45	42	40				
6		67	62	62	61				
11.9		111	119	117	124				
23.8		174	167	171	166				
47.6		196	195	179	202				
95.2		185	194	189	176				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-0916-8742	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:20	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-5214-3055	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:20	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	15-5760-2145	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	18 Oct-16 14:10	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	21 Oct-16 14:10	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	07-1486-8844	**Code:**	2A9C086C	**Client:**	Teck Coal
Sample Date:	17 Oct-16	**Material:**	Water Sample	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	38h (4.5 °C)	**Station:**	LC_LC5_WS_2016-10-17_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	22.5%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.533	2.526	7.622	10	0.2968	CDF	Non-Significant Effect
		3*	2.693	2.526	7.622	10	0.0348	CDF	Significant Effect
		6*	9.654	2.526	7.622	10	<0.0001	CDF	Significant Effect
		11.9*	27.8	2.526	7.622	10	<0.0001	CDF	Significant Effect
		23.8*	44.95	2.526	7.622	10	<0.0001	CDF	Significant Effect
		47.6*	52.74	2.526	7.622	10	<0.0001	CDF	Significant Effect
		95.2*	50.42	2.526	7.622	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5540	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	153577.4	21939.63	7	903.9	<0.0001	Significant Effect
Error	679.625	24.27232	28			
Total	154257		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	17.38	18.48	0.0151	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9323	0.9166	0.0294	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	33.88	32.3	35.45	34	31	37	0.6665	5.57%	0.0%
1.5		4	38.5	33.73	43.27	38	36	42	1.5	7.79%	-13.65%
3		4	42	38.56	45.44	41.5	40	45	1.08	5.14%	-23.99%
6		4	63	58.69	67.31	62	61	67	1.354	4.3%	-85.98%
11.9		4	117.8	109.2	126.3	118	111	124	2.689	4.57%	-247.6%
23.8		4	169.5	163.6	175.4	169	166	174	1.848	2.18%	-400.4%
47.6		4	193	177.4	208.6	195.5	179	202	4.916	5.09%	-469.7%
95.2		4	186	173.9	198.1	187	176	194	3.808	4.1%	-449.1%

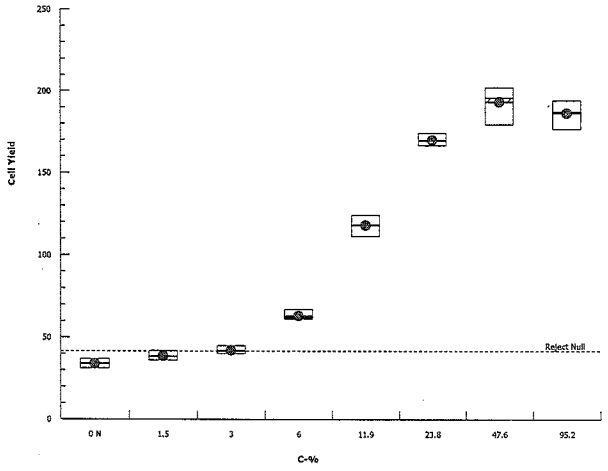
EC Alga Growth Inhibition Test — **Nautilus Environmental**

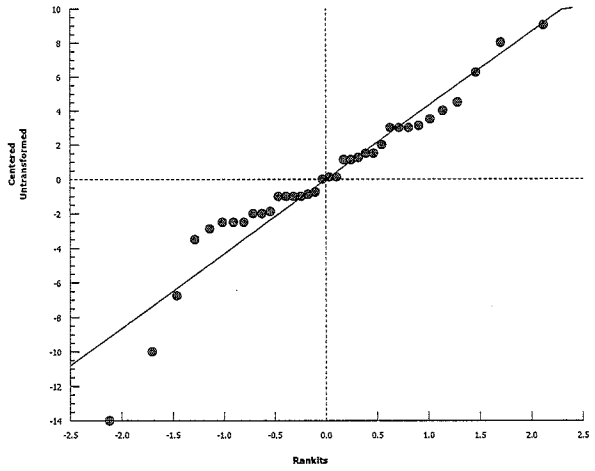
Analysis ID:	16-5214-3055	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:20	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	37	32	35	34	31	34	33	35
1.5		40	36	42	36				
3		41	45	42	40				
6		67	62	62	61				
11.9		111	119	117	124				
23.8		174	167	171	166				
47.6		196	195	179	202				
95.2		185	194	189	176				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 161123
Start Date: Oct 18/16
Set up by: ML

Sample Information:

Sample ID: WL-BFWB-OUT_SP21_20161017_N
Sample Date: Oct 17/16
Date Received: Oct 18/16
Sample Volume: 10X20L

Test Organism Information:

Culture Date: Oct 14/16
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC150
Stock Solution ID: 162n01
Date Initiated: Oct 14/16

72-h IC50 (95% CL): 36.9 (31.6-41.0) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 32.6 (24.0-44.3) ug/L Zn CV (%): 16

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGL
Date reviewed: Nov. 17/16

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT

Sample ID: WL-BFWB-OUT-SP31_20161017_N | Test Date/Time: Oct 18/16 @ 1420h

Work Order No.: 161123 | Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 14/16 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 270 2 300 | Average: 285 | Culture Cell Density (c1): 285 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 284 x 10^4 cells/ml = 7.75 mL

Time Zero Counts: 1 24 2 23 | Average: 23.5

No. of Cells/mL: 23.5 x 10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10682 cells/mL

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control	6.9	23.5	24.5	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.0	23.5					✓	✓	✓	✓
3.0	7.1	23.5					✓	✓	✓	✓
6.0	7.3	23.5					✓	✓	✓	✓
11.9	7.4	23.5					✓	✓	✓	✓
23.8	7.7	23.5					✓	✓	✓	✓
47.6	7.9	23.5					✓	✓	✓	✓
95.2	8.0	23.5	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MG	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.9 | Well 2: 6.9

Final control pH: Well 1: 6.6 | Well 2: 6.6

Light intensity (lux): 4080 | Date measured: Oct 18/16

Instruments: Thermometer 4 | pH meter 2 | Light meter 1

Sample Description: clear, colourless, ~~hydrocarbon odour~~ odourless MLT, no particulates

Comments:

Reviewed: JGL | Date reviewed: Nov. 17/16

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal
Start Date/Time: Oct 18/16 @ 1420h
Work Order #: 161123
Termination Date: Oct 21/16 @ 1420h
Sample ID: WL-BFWB-OUT-SP21
Test set up by: ML
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	31					ML
	B	32					
	C	34					
	D	33					
	E	36					
	F	32					
	G	34					
	H	32					
1.5	A	51					
	B	45					
	C	47					
	D	49					
3.0	A	89					
	B	80					
	C	87					
	D	79					
6.0	A	98					
	B	94					
	C	102					
	D	104					
11.9	A	130					
	B	128					
	C	138					
	D	126					
23.8	A	169					
	B	163					
	C	178					
	D	180					
47.6	A	170					
	B	183					
	C	174					
	D	168					
95.2	A	130					
	B	133					
	C	129					
	D	141					

Comments:

Reviewed by: JCh
Date Reviewed: Nov. 17/16

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	18-Oct-16 @ 1420h
WO#:	161123	Termination Date/Time	21-Oct-16 @ 1420h
Sample ID:	WL_BFWB_OUT_SP21_20161017_N		
		Initial Cell Density:	10682 cell/mL

									235000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10681.82
Control	A	31				31	29.9	mean	31.9
	B	32				32	30.9	SD	1.603567
	C	34				34	32.9	CV	5.021848
	D	33				33	31.9		
	E	36				36	34.9		
	F	32				32	30.9		
	G	34				34	32.9		
	H	32				32	30.9		
1.5	A	51				51	49.9		
	B	45				45	43.9		
	C	47				47	45.9		
	D	49				49	47.9		
3	A	89				89	87.9		
	B	80				80	78.9		
	C	87				87	85.9		
	D	79				79	77.9		
6	A	98				98	96.9		
	B	94				94	92.9		
	C	102				102	100.9		
	D	104				104	102.9		
11.9	A	130				130	128.9		
	B	128				128	126.9		
	C	138				138	136.9		
	D	126				126	124.9		
23.8	A	169				169	167.9		
	B	163				163	161.9		
	C	178				178	176.9		
	D	180				180	178.9		
47.6	A	170				170	168.9		
	B	183				183	181.9		
	C	174				174	172.9		
	D	168				168	166.9		
95.2	A	130				130	128.9		
	B	133				133	131.9		
	C	129				129	127.9		
	D	141				141	139.9		

Reviewed by: JGh

Date reviewed: Nov. 17/16

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-8360-4369	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	19-0814-2027	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	18 Oct-16 14:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	21 Oct-16 14:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	03-9695-5433	**Code:**	17A90F29	**Client:**	Teck Coal
Sample Date:	17 Oct-16 09:00	**Material:**	Effluent	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	29h (5.5 °C)	**Station:**	WL_BFWB_OUT_SP21_20161017_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	98098	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9122	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

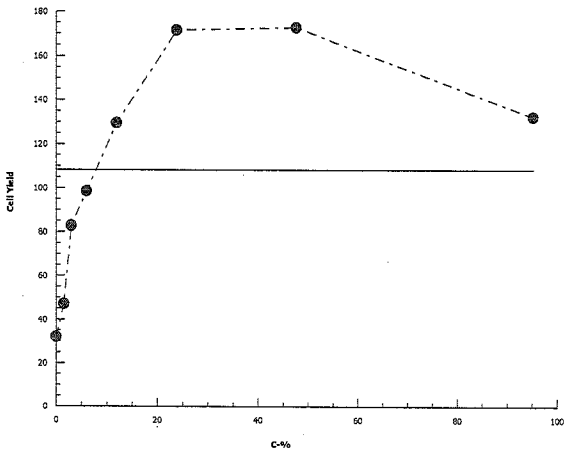
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	32	30	35	0.5669	1.604	5.01%	0.0%
1.5		4	47	44	50	1.291	2.582	5.49%	-46.87%
3		4	82.75	78	88	2.496	4.992	6.03%	-158.6%
6		4	98.5	93	103	2.217	4.435	4.5%	-207.8%
11.9		4	129.5	125	137	2.63	5.26	4.06%	-304.7%
23.8		4	171.5	162	179	3.969	7.937	4.63%	-435.9%
47.6		4	172.8	167	182	3.326	6.652	3.85%	-439.8%
95.2		4	132.3	128	140	2.72	5.439	4.11%	-313.3%

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	31	33	32	35	31	33	31
1.5		50	44	46	48				
3		88	79	86	78				
6		97	93	101	103				
11.9		129	127	137	125				
23.8		168	162	177	179				
47.6		169	182	173	167				
95.2		129	132	128	140				

Analysis ID:	16-8360-4369	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-5131-9651	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:33	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	19-0814-2027	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	18 Oct-16 14:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	21 Oct-16 14:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	03-9695-5433	**Code:**	17A90F29	**Client:**	Teck Coal
Sample Date:	17 Oct-16 09:00	**Material:**	Effluent	**Project:**	
Receive Date:	18 Oct-16 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	29h (5.5 °C)	**Station:**	WL_BFWB_OUT_SP21_20161017_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	23.6%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	5.025	2.526	7.54	10	<0.0001	CDF	Significant Effect
		3*	17	2.526	7.54	10	<0.0001	CDF	Significant Effect
		6*	22.28	2.526	7.54	10	<0.0001	CDF	Significant Effect
		11.9*	32.66	2.526	7.54	10	<0.0001	CDF	Significant Effect
		23.8*	46.74	2.526	7.54	10	<0.0001	CDF	Significant Effect
		47.6*	47.15	2.526	7.54	10	<0.0001	CDF	Significant Effect
		95.2*	33.59	2.526	7.54	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9122	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	98686.39	14098.06	7	593.4	<0.0001	Significant Effect
Error	665.25	23.75893	28			
Total	99351.64		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.45	18.48	0.0867	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9723	0.9166	0.4904	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	32	30.66	33.34	31.5	30	35	0.5669	5.01%	0.0%
1.5		4	47	42.89	51.11	47	44	50	1.291	5.49%	-46.87%
3		4	82.75	74.81	90.69	82.5	78	88	2.496	6.03%	-158.6%
6		4	98.5	91.44	105.6	99	93	103	2.217	4.5%	-207.8%
11.9		4	129.5	121.1	137.9	128	125	137	2.63	4.06%	-304.7%
23.8		4	171.5	158.9	184.1	172.5	162	179	3.969	4.63%	-435.9%
47.6		4	172.8	162.2	183.3	171	167	182	3.326	3.85%	-439.8%
95.2		4	132.3	123.6	140.9	130.5	128	140	2.72	4.11%	-313.3%

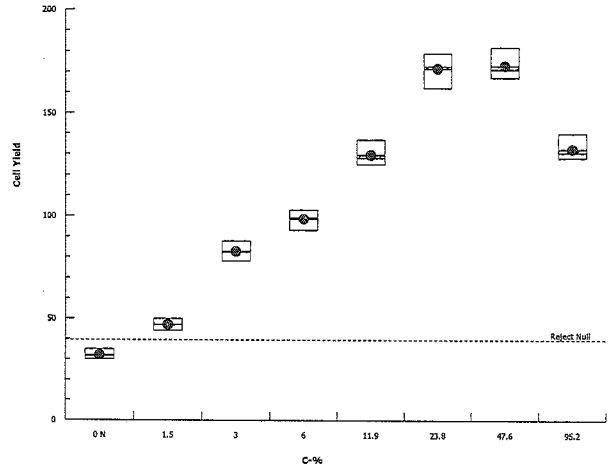
EC Alga Growth Inhibition Test — **Nautilus Environmental**

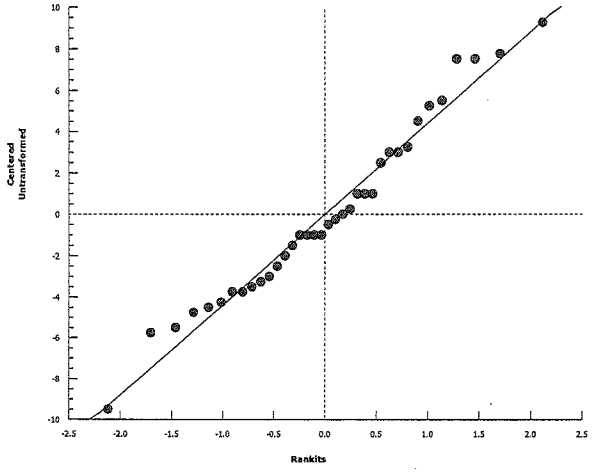
Analysis ID:	11-5131-9651	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	07 Nov-16 15:33	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	31	33	32	35	31	33	31
1.5		50	44	46	48				
3		88	79	86	78				
6		97	93	101	103				
11.9		129	127	137	125				
23.8		168	162	177	179				
47.6		169	182	173	167				
95.2		129	132	128	140				

Graphics





APPENDIX E – Chain-of-Custody Forms

Teck

COC ID: 20161017-1435 | **TURNAROUND TIME:** | **RUSH:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Krysta Pearcy			Email 1:	jay.jones@teck.com	x	x	
Email	jay.jones@teck.com			Email	Krysta@NautilusEnvironmental.ca			Email 2:	tim.chala@teck.com	x	x	
Address	Box 2003			Address	8664 commerce Court			Email 3:	teckcoal@equisonline.com	x	x	x
	15km North Hwy 43							Email 4:	cait.good@teck.com	x	x	
City	Sparwood	Province	BC	City	Burnaby	Province	BC					
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number	432106			
Phone Number	250-425-6111			Phone Number	604-420-8773							

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: Non)

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PRESERV.	FIL	72h P. subcapitata P/F	7d C.dubia P/F	30 d rainbow trout early life stage P/F	7 d Cdubia dilution series	72hr Psubcapitata dilution series	7d L minor plant growth dilution series	7 d O mykis development dilution series					Temp °C
(2)	LC_LCDSSLCC_WS_2016-10-17_N	LC_LCDSSLCC	WS	N	2016/10/17		G	9			X	X	X	X	X	X	X			9 x 20L		3.5
(3)	LC_LC5_WS_2016-10-17_N	LC_LC5	WS	N	2016/10/17		G	6						X	X	X	X			6 x 20L		4.5
(1)	~~LC_SPDC_WS_2016-10-17_N~~	~~LC_SPDC~~	~~WS~~	~~N~~	~~2016/10/17~~		~~G~~	~~6~~						~~X~~	~~X~~	~~X~~	~~X~~					
(4)	LC_FRDSDC_WS_2016-10-17_N	LC_FRDSDC	WS	N	2016/10/17		G	6						X	X	X	X			6 x 20L		3.5
(5)	LC_DC1_WS_2016-10-17_N	LC_DC1	WS	N	2016/10/17		G	6			161120	161119	161121	X	X	X	X			6 x 20L		2.5
													wo#	161122	161123	161124	161125					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	T Phillips/ NUPQU	October 17, 2016	Nautilus NY - Nan Yamamoto	Oct 18/16 @ 09:00

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Tyler Phillips	Mobile #	(250) 919-0965
Sampler's Signature		Date/Time	October 17, 2016

(1) KLP contacted Cait Good who said do not test this sample. They will collect the correct sample today and ship for arrival tomorrow, Oct 19/16. KLP discarded the sample. (LC_DC05)

Sample description: (2) clear, colourless, odourless, no particulates
(3) clear, colourless, odourless, no particulates
(4) clear, colourless, odourless, no particulates
(5) slightly turbid, yellow, odourless, black ~~precipitates~~ particulates.

Teck

COC ID: 20161018-1024 **TURNAROUND TIME:** **RUSH:**

PROJECT/CLIENT INFO

Facility Name / Job#	Line Creek Operation
Project Manager	Jay Jones
Email	jay.jones@teck.com
Address	Box 2003
	15km North Hwy 43
City	Sparwood
Province	BC
Postal Code	V0B 2G0
Country	Canada
Phone Number	250-425-6111

LABORATORY

Lab Name	Nautilus Environmental
Lab Contact	Krysta Pearcy
Email	Krysta@NautilusEnvironmental.ca
Address	8664 commerce Court
City	Burnaby
Province	BC
Postal Code	V5A 4N7
Country	Canada
Phone Number	604-420-8773

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	jay.jones@teck.com	x	x	
Email 2:	tim.chala@teck.com	x	x	
Email 3:	teckcoal@equisonline.com	x	x	x
Email 4:	cait.good@teck.com	x	x	
PO number	432106			

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F; Field, L; Lab, FL; Field & Lab, N; None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	PRESERV.	72h P. subcapitata P/F	7d C.dubia P/F	30 d rainbow trout early life stage P/F	7 d Cdubia dilution series	72hr Psubcapitata dilution series	7d L minor plant grown dilution series	7 d O mykis development dilution series	Temp °C
① LC_DCDS_WS_2016-10-18_N	LC_DCDS	WS	N	2016/10/18	12:30	G	6						X	X	X	X	8.3
WO #													1611122	1611123	1611124	1611125	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION

~~Jay Jones~~ Jeremy Epps

DATE/TIME

October 18, 2016 19:00

ACCEPTED BY/AFFILIATION

Nautilus NY - Nan Yamamoto

DATE/TIME

Oct 19/16 @ 11:44

6X20L

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	~~Jay Jones~~ T. Phillips	Mobile #	
Sampler's Signature		Date/Time	October 18, 2016

① Sample description:
Slightly turbid, dark yellow, odourless, particulates present.

120 L. 3 coolers + 1.

Teck

COC ID:	20161017-AcuteToxicity	TURNAROUND TIME:	REGULAR	RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	WLC AWTF		
Project Manager	Thomas Davidson		
Email	Thomas.Davidson@teck.com		
Address	15 Km North HWY 43		
City	Sparwood	Province	BC
Postal Code	V0B 2G0	Country	Canada
Phone Number	250.603.9417		

LABORATORY

Lab Name	Nautilus Environmental		
Lab Contact	Krysta Pearcy		
Email	Krysta@NautilusEnvironmental.ca		
Address	8664 Commerce Court		
City	Brunaby	Province	BC
Postal Code	V5A 4N7	Country	Canada
Phone Number	+1.604.420.8773		

OTHER INFO

Report Delivery Formats		Excel	PDF	EDD
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Email 2:	teckcoal@equisonline.com			X
Email 3:	teckwlclab@epcor.com	X	X	X
Email 4:	Chris.Stroich@teck.com	X	X	X
Email 5:	colin.lynch@teck.com			X

PO 411634

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	7 d Cdubia dilution series	72hr Psubcapitata dilution series	7d L minor plant growth dilution series	7 d O mykis development dilution series	96 Hr Trout, single concentration Toxicity	EXTRA Sample	Temp °C	
Filt.								N	N	N	N	N	N		
PRESERV.								N	N	N	N	N	N		
LC_WTF_IN_20161017_NP	LC_WTF_IN	WS	N	17-Oct-16	08:00	G	1					X		5.2	1x20L
WL_BFWB_OUT_SP21_20161017_N	WL_BFWB_OUT_SP21	WS	N	17-Oct-16	09:00	G	10	X	X	X	X	X	X	5.5	10x20L
WO #								161122	161123	161124	161125	161129			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
		Nautilus	Oct 18/16 @ 09:00
		NY - Nair Yamamoto	

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

Teck

COC ID: Oct 13 Q4 Tox Week 1 | **TURNAROUND TIME:** regular | **RUSH:**

PROJECT/CLIENT INFO

Facility Name	Greenhills Operations		
Project Manager	Leigh Stickney		
Email	leigh.stickney@teck.com		
Address	PO Box 5000		
City	Elkford	Province	BC
Postal Code	V0B 1H0	Country	Canada
Phone Number	250 865 3274		

LABORATORY

Lab Name	Nautilus Environmental		
Lab Contact	Krysta Pearcy		
Email			
Address	8664 Commence Court		
	Imperial Square Lake City		
City	Burnaby	Province	BC
Postal Code	V5A 4N7	Country	Can
Phone Number			

OTHER INFO

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Yes PDF *Yes* Excel
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Email 2: sean.beswick@teck.com
Email 3: jevin.wolchuk@teck.com
PO number: 359182

SAMPLE DETAILS / ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	96 hr Rainbow trout (pass/fail)	48 hr daphnia (pass/fail)	48 hr daphnia @ 10 deg C (pass/fial)	7 day C dubia pff	7day embryo (pass Fail)	72 hr P Subcapitata pff	30 day RT early life stage pff	28 day H azteca pff	32-d FHM pff (calgary)			
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A
(1) GH_FR1_WS_2016-10-17_N	GH_FR1	WS	N	17-Oct-16		G	5				X		X	X	X	X			5.0 5x2c
(2) GH_ERC_WS_2016-10-17_N	GH_ERC	WS	N	17-Oct-16		G	4				X		X	X					6.0 4x2c
(3) GH_ER2_WS_2016-10-17_N	GH_ER2	WS	N	17-Oct-16		G	7				X	X	X	X					5.5 7x2c
											161119	161126	161120	161121	161117	161118			
											wff								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION

Date	Time	Accepted By/Affiliation	Date	Time
		Nautilus	Oct 18/16	09:00
		NY - Nair Yamamoto		

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

(1) sample description: clear, colourless, odourless, no particulates

(2) clear; colourless, odourless, no particulates.

END OF REPORT

Toxicity testing on Line Creek Operations samples with *Ceriodaphnia dubia*, *Oncorhynchus mykiss*, *Lemna minor* and *Pseudokirchneriella subcapitata*

Second Quarter 2017 Results

Final Report

October 30, 2017

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

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SIGNATURE PAGE



Report By:
Krysta Pearcy, R.P. Bio.
Laboratory Coordinator



Reviewed By:
James Elphick, R.P. Bio.
Environmental Toxicologist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

SUMMARY

Summaries of sample information and test results from the toxicity tests conducted on samples collected from the Line Creek Operations to meet requirements of the semi-annual toxicity testing program required under BC Ministry of Environment and Sustainability permit number 106970 in the second quarter of 2017 are provided in the tables below.

Sample and Test Type Information

Sample IDs	FR_UFR1*, GH_ER2*, LC_LCDSSLCC, LC_DC1, LC_FRDSDC, LC_DCDS, LC_LC5, WL_BFWB_OUT_SP21
Sample collection dates	April 24, 2017
Sample receipt dates	April 25, 2017
Sample receipt temperatures	Ranged from 3.0 to 8.0°C
Test types	*Ceriodaphnia dubia* survival and reproduction 7-d rainbow trout *(Oncorhynchus mykiss)* embryo viability 7-d *Lemna minor* growth inhibition 72-h *Pseudokirchneriella subcapitata* growth inhibition

*Reference site; conducted as a single concentration toxicity test for *C. dubia*, *O. mykiss* and *P. subcapitata*

Summary of Results

Endpoint	Point Estimate with 95% CL					
	LC_LCDSSLCC	**LC_DC1**	**LC_FRDSDC**	**LC_DCDS**	**LC_LC5**	**WL_BFWB_OUT_SP21**
Ceriodaphnia dubia						
Survival LC50	>100	>100	>100	>100	>100	>100
Reproduction IC25	64.2 (2.6 – N/A)	>100	>100	>100	>100	50.3 (33.6 – 60.3)
Reproduction IC50	>100	>100	>100	>100	>100	75.7 (63.2 – 84.0)
Oncorhynchus mykiss						
Embryo viability EC25	>100	>100	>100	>100	>100	>100
Embryo viability EC50	>100	>100	>100	>100	>100	>100
Lemna minor						
Frond count IC25	38.8 (24.4 – 63.3)	>97	41.0 (N/A – 65.9)	63.1 (1.2 – 97)	58.9 (42.8 – 72.2)	30.6 (22.2 – 40.2)
Frond count IC50	>97	>97	>97	>97	>97	>97
Dry weight IC25	70.8 (33.3 – 97)	>97	71.5 (1.2 – N/A)	>97	89.2 (70.2 – 97)	>97
Dry weight IC50	>97	>97	>97	>97	>97	>97
Pseudokirchneriella subcapitata						
Growth IC25	>95.2	>95.2	>95.2	>95.2	>95.2	>95.2
Growth IC50	>95.2	>95.2	>95.2	>95.2	>95.2	>95.2

CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effective Concentration, N/A = Not Available

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on six samples collected from the Line Creek Operations as part of a toxicity testing program required under BC Ministry of Environment and Sustainability permit number 106970, Section 5.2. Test types included survival and reproduction of a cladoceran (*Ceriodaphnia dubia*), embryo development of rainbow trout (*Oncorhynchus mykiss*), growth of a freshwater plant (*Lemna minor*) and population growth of a unicellular green alga (*Pseudokirchneriella subcapitata*). The samples from Line Creek Operations were tested using serial dilutions of the sample using laboratory control water.

In addition to the Line Creek Operations samples, samples collected from FR_UFR1 and GH_ER2 were tested at full strength as site reference waters. FR_UFR1 and GH_ER2 are upstream reference locations that are not required as part of the Line Creek Operations testing program, but the data for these samples were included here as a basis for comparison to Line Creek Operations mine-influenced samples. These samples were tested with all of the species except for *L. minor*.

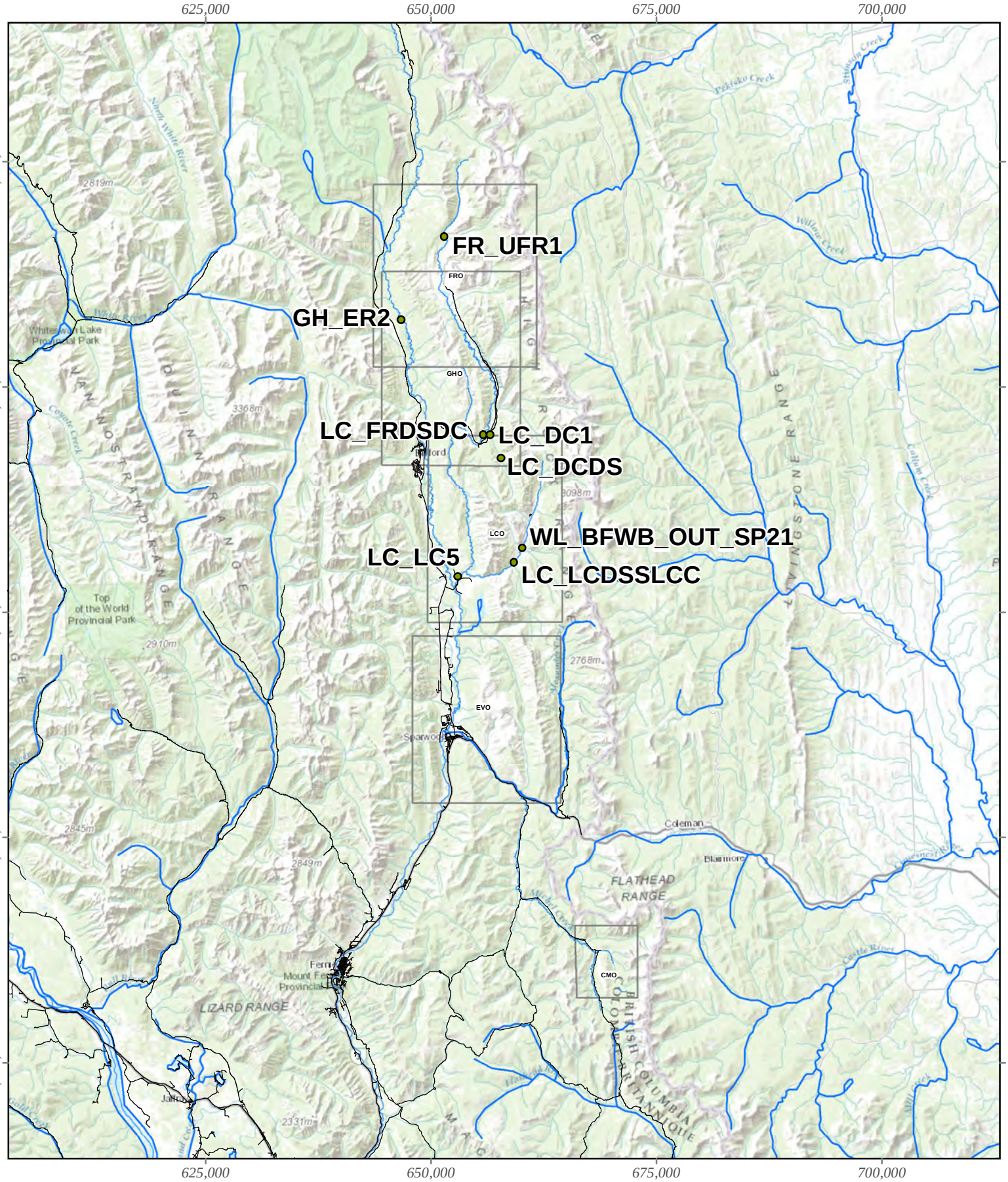
The toxicity tests that were conducted on the samples are summarized in Table 1. The locations of Line Creek Operations sample sites are shown in Figure 1. Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 3.0 to 8.0°C and were stored in the dark at 4 ± 2°C prior to testing.

This report describes the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. Results of analytical chemistry that was performed on the samples tested in this program have been uploaded to the BC Ministry of Environment and Sustainability web reporting system (EMS). Samples for water chemistry analysis were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix E.

Table 1. Summary of toxicity testing program.

Sample ID	EMS #	Location Description	Species Tested	Sample Collection Date
FR_UFR1*	216777	Fording River upstream of Henretta Creek	*C. dubia*, *O. mykiss*, and *P. subcapitata*	April 24, 2017
GH_ER2*	200389	Elk River upstream of Greenhill Operations	*C. dubia*, *O. mykiss*, and *P. subcapitata*	April 24, 2017
LC_LCDSSLCC	297110	Line Creek downstream of South Line Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 24, 2017
LC_DC1	288270	Dry Creek near mouth	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 24, 2017
LC_FRDSDC	288272	Fording River downstream of Dry Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 24, 2017
LC_DCDS	295210	Dry Creek downstream of sedimentation ponds	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 24, 2017
LC_LC5	200028	Lower Fording River (downstream of Line Creek)	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 24, 2017
WL_BFWB_OUT_SP21	291569	West Line Creek Active Water Treatment Facility Effluent Outfall	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 24, 2017

*Reference site, tested as a single concentration toxicity test.



Teck

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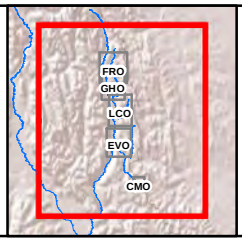

Line Creek Chronic Toxicity Monitoring Locations

- Monitoring Locations
- Roads
- Rivers

N

0 2.5 5 10 15 Kilometers

DATE:	MINE OPERATION:
10/25/2017	Elk Valley
SCALE:	COORDINATE SYSTEM:
1:550,000	NAD 1983 UTM Zone 11N

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2.0 METHODS

Methods for the toxicity tests are summarized in Tables 2 through 5. Testing was conducted according to procedures described by Environment Canada protocols (2007a, 2007b and 2007c). The rainbow trout embryo viability test followed modified procedures described by Environment Canada (1998) and Canaria et al. (1999). Statistical analyses for the tests were performed using CETIS (Tidepool Scientific Software, 2013).

Table 2. Test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test species	*Ceriodaphnia dubia*
Organism source	In-house culture
Organism age	<24 hour old neonates, produced within a 12 hour window
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20-mL glass test tube
Test volume	15 mL
Test solution depth	10 cm
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	10 per treatment
Number of organisms	1 per replicate
Control/dilution water	20% Perrier water and 80% deionized water + 5 µg/L Se and 2 µg/L vitamin B12
Test solution renewal	Daily (100% renewal)
Test temperature	25 ± 1°C
Feeding	Daily with *Pseudokirchneriella subcapitata* and YCT (3:1 ratio)
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival and reproduction checked daily
Test protocol	Environment Canada (2007a), EPS 1/RM/21
Statistical software	CETIS Version 1.8.7
Test endpoints	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods; no ephippia present
Reference toxicant	Sodium chloride (NaCl)

Table 3 . Test conditions: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Test species	*Oncorhynchus mykiss*
Organism source	Ted's Trout (Campbell Lake), Little Fort, BC
Organism age	<30 minutes post fertilization, <24 hour old gametes
Test type	Static-renewal
Test duration	7 days
Test vessel	2-L plastic container
Test volume	2 L
Test solution depth	17 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	4 per treatment
Number of organisms	30 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tap water
Test solution renewal	Daily (80% renewal)
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark
Aeration	Continuous gentle aeration
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival checked daily
Test protocol	Environment Canada (1998), EPS 1/RM/28; Canaria et al. (1999)
Statistical software	CETIS Version 1.8.7
Test endpoints	Embryo viability
Test acceptability criteria for controls	Embryo viability ≥70%
Reference toxicant	Sodium dodecyl sulphate (SDS)

Table 4. Test conditions: *Lemna minor* growth inhibition test.

Test species	*Lemna minor*, strain CPCC# 490
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Wainfleet, Stinking Barn, Niagara Peninsula, Ontario, Canada
Organism age	7- to 10-day old culture
Test type	Static
Test duration	7 days
Test vessel	250-mL glass container
Test volume	100 mL
Test solution depth	4 cm
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	4 per treatment
Number of organisms	Two 3-frond plants per replicate
Control/dilution water	Modified APHA media (deionized water plus 1% of each APHA stock solution A, B and C)
Test solution renewal	None
Test temperature	25 ± 2°C
Feeding	None
Light intensity	4000 to 5600 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature, pH and conductivity measured in all concentrations at test initiation; dissolved oxygen of highest concentration measured at test initiation; temperature and pH measured at test termination
Test protocol	Environment Canada (2007b), EPS 1/RM/37
Statistical software	CETIS Version 1.8.7
Test endpoints	Number of fronds and dry weight
Test acceptability criteria for controls	≥ 8-fold increase in number of fronds
Reference toxicant	Potassium chloride (KCl)

Table 5. Test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test species	*Pseudokirchneriella subcapitata*, strain CPCC# 37
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Center, and originally isolated from Nivelta River, Norway.
Organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	4 per treatment; 8 for laboratory control
Number of organisms	10,000 cells/mL
Control/dilution water	Deionized water supplemented with nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature and pH measured at test initiation; pH of two control wells measured at test termination
Test protocol	Environment Canada (2007c), EPS 1/RM/25
Statistical software	CETIS Version 1.8.7
Test endpoints	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤ 20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc (added as $ZnSO_4$)

3.0 RESULTS

Results of the toxicity tests and associated statistical analyses are provided in Appendices A through D, with the exception of data for FR_UFR1 and GH_ER2 (site reference waters) for *C. dubia* and *P. subcapitata*, which are reproduced here, but the raw data have been provided in a separate report (Nautilus Environmental, 2017). The statistical analyses for samples FR_UFR1 and GH_ER2 involved a comparison of performance in the site waters with the laboratory controls using a hypothesis test, since there were no dilutions tested for these samples. The results for all of the other samples are presented here on the basis of point estimates (e.g., IC25), since the data available for a range of test concentrations in these samples enabled statistical fitting of dose-response relationships. This approach is considered preferable to hypothesis testing in cases where the data allow. Hypothesis tests were conducted for all samples in the *P. subcapitata* test to identify stimulation in cell growth relative to the control, as specified in the test method for this species.

Results of the toxicity tests using *C. dubia* are provided in Table 6. There was no statistically significant difference in survival or reproduction for the site reference waters (FR_UFR1 and GH_ER2) relative to the laboratory control. There was no adverse effect on survival in the samples; the LC50 values were all >100%. An adverse effect on reproduction was observed in two samples; the IC25 values for LC_LCDSSLCC and WL_BFWB_OUT were 64.2 and 50.3%, respectively.

Results of the toxicity tests using *O. mykiss* are provided in Table 7. There was no statistically significant difference in embryo viability for the site reference waters (FR_UFR1 and GH_ER2) compared to the laboratory control. There was no adverse effects on embryo viability in the six samples; the EC25 values were all >100%.

Results of the toxicity tests using *L. minor* are provided in Table 8; the highest test concentration was 97% as a result of dilution associated with addition of nutrients, as required in the method. An adverse effect on frond count was observed in all samples except LC_DC1; the IC25 values for LC_LCDSSLCC, LC_FRDSDC, LC_DCDS, LC_LC5, and WL_BFWB_OUT_SP21 were 38.8, 41.0, 63.1, 58.9 and 30.6%, respectively. An adverse effect on dry weight was observed in three samples; the IC25 values were 70.8, 71.5, and 89.2% for LC_LCDSSLCC, LC_FRDSDC, and LC_LC5, respectively.

Results of the toxicity tests using *P. subcapitata* are provided in Table 9; the highest test concentration was 95.2% as a result of dilution associated with addition of nutrients, as required in the method. Growth enhancement was observed in all samples, including in the site reference waters (FR_UFR1 and GH_ER2); there was no statistically significant reduction in cell yield for the

site reference waters relative to the laboratory control and the IC25 values for cell yield in the samples were all >95.2%. This finding is not unusual, since the higher ionic strength associated with the site waters would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	FR_UFR1		GH_ER2		LC_LCDSSLCC		LC_DC1	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	20.8 ± 3.5	100	20.8 ± 3.5	100	26.4 ± 6.0	100	23.1 ± 9.5
1.56	NT	NT	NT	NT	100	23.6 ± 4.1	100	27.1 ± 6.2
3.12	NT	NT	NT	NT	100	21.5 ± 3.5	100	26.5 ± 3.3
6.25	NT	NT	NT	NT	90	20.3 ± 3.8	90	27.1 ± 4.4
12.5	NT	NT	NT	NT	100	22.4 ± 3.1	100	31.2 ± 3.7
25	NT	NT	NT	NT	100	23.8 ± 3.0	100	26.7 ± 2.1
50	NT	NT	NT	NT	100	21.2 ± 4.3	100	29.6 ± 6.3
100	100	21.7 ± 4.1	90	17.3 ± 4.7	80	17.3 ± 8.3	100	30.4 ± 5.6
Test endpoint (% v/v) [with 95% CL]								
LC50	--	--	--	--	>100	--	>100	--
IC25	--	--	--	--	--	64.2 (2.6 – N/A)	--	>100
IC50	--	--	--	--	--	>100	--	>100

NT = Not Tested, SD = Standard Deviation, CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration, N/A = Not Available

Table 6 (continued). Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5		WL_BFWB_OUT_SP21	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	22.9 ± 3.2	100	20.1 ± 7.2	80	17.4 ± 9.5	100	23.1 ± 2.7
1.56	100	23.6 ± 2.5	100	20.9 ± 4.6	100	21.2 ± 8.4 †	100	22.4 ± 2.2
3.12	100	20.6 ± 2.2	100	18.8 ± 7.0	100	19.4 ± 7.1 †	100	20.6 ± 3.0
6.25	90	18.0 ± 4.7	100	18.1 ± 7.9	100	21.2 ± 7.9 †	100	22.8 ± 3.9
12.5	90	18.9 ± 7.0	100	21.8 ± 3.7	100	20.7 ± 7.5 †	90	21.2 ± 6.4
25	100	24.9 ± 2.2	100	15.6 ± 8.9	100	20.7 ± 11.0 †	90	22.3 ± 4.6
50	100	22.0 ± 4.6	100	21.8 ± 3.2	100	24.2 ± 2.3 †	80	17.4 ± 6.3
100	100	25.6 ± 3.5	100	17.4 ± 8.0	90	14.3 ± 11.6	100	7.6 ± 2.7
Test endpoint (% v/v) [with 95% CL]								
LC50	>100	--	>100	--	>100	--	>100	--
IC25	--	>100	--	>100	--	>100	--	50.3 (33.6 – 60.3)
IC50	--	>100	--	>100	--	>100	--	75.7 (63.2 – 84.0)

SD = Standard Deviation, CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration

† The data did not fit the hormesis regression model, therefore the reproduction was adjusted to that of the control value and analyzed using linear interpolation

Table 7. Results: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Concentration (% v/v)	Embryo Viability (%) (Mean ± SD)							
	FR_UFR1	GH_ER2	LC_LCDSSCLCC	LC_DC1	LC_FRDSDC	LC_DCDS	LC_LC5	WL_BFWB_OUT_21
Laboratory Control	75.6 ± 26.9	75.6 ± 26.9	80.0 ± 15.3	74.4 ± 21.7	74.1 ± 19.8	77.1 ± 29.3	78.9 ± 21.7	71.1 ± 26.7
6.25	NT	NT	82.5 ± 12.3	75.6 ± 22.2	85.6 ± 19.2	75.6 ± 20.1	77.8 ± 25.5	75.7 ± 28.0
12.5	NT	NT	81.1 ± 16.8	76.7 ± 25.2	79.9 ± 24.2	76.7 ± 25.2	78.3 ± 22.6	64.4 ± 31.5
25	NT	NT	83.3 ± 8.8	77.8 ± 21.4	73.2 ± 21.0	72.2 ± 25.0	73.8 ± 28.8	72.2 ± 23.4
50	NT	NT	78.9 ± 19.0	77.8 ± 19.0	74.4 ± 28.7	67.8 ± 36.6	70.0 ± 27.3	70.0 ± 26.0
100	62.2 ± 37.9	67.4 ± 17.9	82.4 ± 21.6	76.7 ± 18.6	78.9 ± 15.8	66.7 ± 41.6	71.1 ± 34.2	65.6 ± 27.8
Test endpoint (% v/v)								
EC25	--	--	>100	>100	>100	>100	>100	>100
EC50	--	--	>100	>100	>100	>100	>100	>100

NT = Not Tested, SD = Standard Deviation, EC = Effective Concentration
Data for one of the four replicates (replicate A) was excluded for all samples due to non-viable eggs from the adult used to provide eggs for this replicate

Table 8. Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_LCDSSLCC		LC_DC1		LC_FRDSDC	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	67.5 ± 5.3	6.1 ± 0.5	58.2 ± 8.6	5.5 ± 0.4	69.8 ± 9.6	6.0 ± 0.9
1.5	69.5 ± 19.7	6.1 ± 1.4	68.5 ± 7.2	6.3 ± 0.5	74.0 ± 7.8	6.5 ± 0.5
3.0	76.2 ± 18.5	6.8 ± 1.7	60.0 ± 4.8	5.7 ± 0.6	63.5 ± 9.3	5.5 ± 0.7
6.1	71.5 ± 10.2	6.4 ± 0.3	56.0 ± 5.8	5.0 ± 0.6	77.5 ± 8.2	6.5 ± 0.5
12.1	63.5 ± 17.5	6.0 ± 1.2	50.2 ± 10.3	4.7 ± 0.6	58.5 ± 4.7	5.2 ± 0.3
24.2	58.5 ± 10.0	5.5 ± 1.0	60.5 ± 6.8	5.5 ± 0.7	57.5 ± 0.6	5.3 ± 0.1
48.5	49.2 ± 6.8	4.6 ± 0.5	55.8 ± 5.7	5.2 ± 0.2	52.8 ± 3.8	5.1 ± 0.3
97	36.8 ± 3.0	4.4 ± 0.6	47.2 ± 7.8	4.9 ± 0.9	42.0 ± 6.0	4.4 ± 0.8
Test endpoint (% v/v) [with 95% CL]						
IC25	38.8 (24.4 – 63.3)	70.8 (33.3 – 97)	>97	>97	41.0 (N/A – 65.9)	71.5 (1.2 – N/A)
IC50	>97	>97	>97	>97	>97	>97

SD = Standard Deviation, CL = Confidence Limits, IC = Inhibition Concentration, N/A = Not Available

Table 8 (continued). Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_DCDS		LC_LC5		WL_BFWB_OUT_SP21	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	73.0 ± 13.0	6.6 ± 1.2	92.5 ± 9.3	8.0 ± 0.7	78.8 ± 8.2	6.7 ± 0.6
1.5	63.8 ± 16.0	5.7 ± 1.2	80.5 ± 3.7	7.3 ± 0.7	78.0 ± 7.9	6.9 ± 0.6
3.0	60.0 ± 7.7	5.7 ± 0.5	89.8 ± 11.6	7.9 ± 1.3	73.5 ± 5.2	6.4 ± 0.3
6.1	53.0 ± 1.8	5.0 ± 0.4	84.8 ± 6.2	7.2 ± 0.7	69.5 ± 3.4	6.4 ± 0.3
12.1	54.0 ± 12.0	5.1 ± 1.1	82.2 ± 6.1	7.2 ± 0.7	66.2 ± 5.9	6.0 ± 0.4
24.2	58.2 ± 9.0	5.5 ± 0.9	75.8 ± 5.3	6.7 ± 0.4	68.2 ± 10.4	6.5 ± 1.1
48.5	56.8 ± 7.4	5.5 ± 0.6	80.2 ± 10.0	7.1 ± 1.1	48.2 ± 3.9	5.3 ± 0.4
97	54.5 ± 5.5	5.5 ± 0.2	47.0 ± 6.2	5.2 ± 0.7	41.5 ± 2.1	5.3 ± 0.7
Test endpoint (% v/v) [with 95% CL]						
IC25	63.1 (1.2 – 97)	>97	58.9 (42.8 – 72.2)	89.2 (70.2 – 97)	30.6 (22.2 – 40.2)	>97
IC50	>97	>97	>97	>97	>97	>97

SD = Standard Deviation, CL = Confidence Limits, IC = Inhibition Concentration

Table 9. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	FR_UFR1		GH_ER2		LC_LCDSSLCC		LC_DC1	
	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)
Laboratory Control	28.4 ± 1.8	--	28.4 ± 1.8	--	27.5 ± 2.3	--	27.1 ± 1.7	--
1.5	NT	NT	NT	NT	27.0 ± 0.8	--	26.8 ± 1.7	--
3.0	NT	NT	NT	NT	30.8 ± 2.5	11.8	32.0 ± 2.9	18.0
6.0	NT	NT	NT	NT	49.0 ± 2.9 *	78.2	32.2 ± 2.2 *	18.9
11.9	NT	NT	NT	NT	76.8 ± 6.3 *	179.1	41.2 ± 1.7 *	52.1
23.8	NT	NT	NT	NT	96.2 ± 7.0 *	250.0	72.8 ± 4.5 *	168.2
47.6	NT	NT	NT	NT	113.0 ± 5.0 *	310.9	115.5 ± 6.6 *	325.8
95.2	141.4 ± 5.4 *	398.2	147.5 ± 9.7 *	419.8	132.0 ± 5.5 *	380.0	138.0 ± 1.8 *	408.8
Test endpoint (% v/v)								
IC25	--	--	--	--	>95.2	--	>95.2	--
IC50	--	--	--	--	>95.2	--	>95.2	--

NT = Not Tested, SD = Standard Deviation, IC = Inhibition Concentration
*Result was significantly greater than the laboratory control

Table 9 (continued). Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5		WL_BFWB_OUT_SP21	
	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)
Laboratory Control	27.0 ± 1.9	--	27.4 ± 2.3	--	28.4 ± 1.9	--	28.9 ± 3.0	--
1.5	27.0 ± 2.2	--	28.2 ± 2.1	3.2	29.0 ± 2.6	2.2	34.0 ± 2.9	17.8
3.0	32.5 ± 2.6	20.4	29.2 ± 2.2	6.8	33.0 ± 2.2	16.3	45.2 ± 3.0 *	56.7
6.0	36.8 ± 2.8 *	36.1	36.0 ± 2.9 *	31.5	42.8 ± 3.3 *	50.7	69.5 ± 4.2 *	140.7
11.9	55.2 ± 3.6 *	104.6	41.5 ± 1.7 *	51.6	64.0 ± 4.5 *	125.6	109.5 ± 3.4 *	279.2
23.8	97.2 ± 5.9 *	260.2	76.2 ± 5.4 *	178.5	120.0 ± 6.2 *	322.9	120.0 ± 4.2 *	315.6
47.6	115.3 ± 4.9 *	326.9	115.5 ± 5.8 *	321.9	141.3 ± 5.9 *	397.8	128.8 ± 6.8 *	345.9
95.2	126.3 ± 6.7 *	367.6	140.5 ± 7.6 *	413.2	138.8 ± 5.0 *	389.0	109.0 ± 7.1 *	277.5
Test endpoint (% v/v)								
IC25	>95.2	--	>95.2	--	>95.2	--	>95.2	--
IC50	>95.2	--	>95.2	--	>95.2	--	>95.2	--

SD = Standard Deviation, IC = Inhibition Concentration
*Result was significantly greater than the laboratory control

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria specified in the protocols. Uncertainty associated with these tests is best described by the standard deviations around the mean and/or the confidence limits around the point estimates.

On days 6 and 7 of the 7-day rainbow trout embryo test, the temperature of some test solutions measured 12.5°C, which is slightly below the 13 to 15°C temperature range specified in the test method. The control met the acceptability criterion and this temperature is well within the tolerable range for this species; thus, this minor deviation would not be expected to affect the results of the test. All other water quality parameters remained within ranges specified in the protocols throughout the tests.

The eggs in the rainbow trout embryo test were exposed using a blocked design (i.e., eggs from one fish was used for replicate A of each test concentration, eggs from the second fish for replicate B, and so on); this approach deviates from the Environment Canada test method, which indicates that the eggs should be pooled prior to testing. This modification was considered appropriate because it reduces the risk of non-viable eggs affecting the test results, and allowed for exclusion of all data for Replicate A during statistical analysis, due to non-viable eggs in this replicate. There were no other deviations from the test methodologies.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate. The reference toxicant tests were performed under the same conditions as those used for the samples.

Table 10. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.1 g/L NaCl	2.0 (1.8 – 2.2)	5	May 3, 2017
	Reproduction (IC50): 1.2 g/L NaCl	1.6 (1.1 – 2.1)	17	
O. mykiss	Viability (EC50): 6.5 mg/L SDS	4.0 (1.9 – 8.5)	45	April 26, 2017
L. minor	Number of fronds (IC50): 3.9 g/L KCl	3.8 (3.2 – 4.6)	10	May 3, 2017
P. subcapitata	Growth (IC50): 31.7 µg/L Zn	33.6 (25.5 – 44.3)	15	April 25, 2017

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effect Concentration

5.0 REFERENCES

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Nautilus Environmental. 2017. Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia, Pseudokirchneriella subcapitata, Hyalella azteca, Pimephales promelas* and *Oncorhynchus mykiss*: Second Quarter 2016 results.

Tidepool Scientific Software. 2013. CETIS comprehensive environmental toxicity information system, version 1.8.7.16 Tidepool Scientific Software, McKinleyville, CA. 222 pp.

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 170365

Start Date/Time: April 25/17 @ 1300h
Set up by: EMM

Sample Information:

Sample ID: LC_LCDSSLCC_WS-2017-04-24_N
Sample Date: April 24 /17
Date Received: April 25 /17
Sample Volume: 8 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 041917 A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 23
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 1, 2, 4, 5, 6, 7, 9, 12-15, 17-20

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd 159
Stock Solution ID: 17 NaCl
Date Initiated: May 3 /17

7-d LC50 (95% CL): 2.1 (1.5 - 3.0) g/L NaCL
7-d IC50 (95% CL): 1.2 (0.8 - 1.9) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8 - 2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.1 - 2.1) g/L NaCL CV (%): 17

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		64.2 (~~25.7~~ 2.6 JW - n/a)
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: June 1, 2017

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LC_LCDSILCC_WS2017-04-24_N
Work Order #: 1703685 emm

Start Date & Time: April 25/17 @ 1300h
Stop Date & Time: ~~April~~ May 1/17 @ 1600h
Test Species: *Ceriodaphnia dubia*
@ May 2 emm

Concentration: Control	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	
DO (mg/L)	8.0	7.0	8.0	7.4	8.0	7.7	8.0	7.4	8.0	7.4	8.2	7.4	8.0	7.7	
pH	8.0	7.7	8.0	7.8	7.9	7.2	8.0	7.2	7.5	7.4	7.7	7.8	7.9	7.7	
Cond. (µS/cm)	218	216		218		216		215		215		216		220	
Initials	EMM	EMM		JS		EMM		EC		JS		EMM		EMM	

(v/v) Concentration: 1.56%	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	
DO (mg/L)	8.1	7.0	8.0	7.4	8.2	7.7	7.9	7.5	8.1	7.4	8.1	7.3	8.1	7.1	
pH	8.0	7.7	8.0	7.8	7.6	7.2	7.8	7.2	8.0	7.3	7.8	7.7	7.9	7.6	
Cond. (µS/cm)	220	219		238		220		225		233		230		229	
Initials	EMM	EMM		JS		EMM		EC		JS		EMM		EMM	

(v/v) Concentration: 12.5%	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	25.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	
DO (mg/L)	8.1	7.0	7.9	7.4	8.2	7.7	7.9	7.4	8.1	7.4	8.1	7.3	8.2	7.1	
pH	8.0	7.7	8.0	7.9	7.7	7.3	7.8	7.2	8.0	7.3	7.9	7.8	7.9	7.7	
Cond. (µS/cm)	303	300		320		310		312		315		311		312	
Initials	EMM	EMM		JS		EMM		EC		JS		EMM		EMM	

(v/v) Concentration: 100%	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.5	25.0	25.5	25.0	24.0	25.0	25.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	
DO (mg/L)	8.2	7.0	7.8	7.4	8.2	7.7	8.0	7.5	8.1	7.4	8.1	7.3	8.2	7.2	
pH	7.9	7.9	8.0	8.1	7.8	7.7	7.8	7.7	7.9	7.6	7.9	7.9	7.9	7.8	
Cond. (µS/cm)	907	927		934		929		924		928		924		920	
Initials	EMM	EMM		JS		EMM		EC		JS		EMM		EMM	

Thermometer: 4 **DO meter:** 2/1 **pH meter:** 4 **Conductivity meter:** 2/1

	Control	100% (v/v)		
Hardness*	106	540		
Alkalinity*	98	194		

* mg/L as CaCO3

Analysts: EMM, AWD, JS, EC
Reviewed by:
Date reviewed: May 31, 2017

Sample Description: clear, colorless, colorless, brown particulates present.

Comments: **Broodboard Used:** 041917A

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck coal
Sample ID: LC_LCDSSLCC_WS_2017-04-24_N
Work Order: 170365

Start Date & Time: April 25/17 @ 1300 h
Stop Date & Time: April 1/17 @ JW May 2/17 @ 1600h
Set up by: Emm

% (v/v)

Concentration: control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	6	✓	4	-	4	✓	✓	✓	✓	✓	EL
5	4	5	✓	6	✓	7	6	7	6	5	JS
6	9	9	8	8	8	9	12	12	12	9	JS
7	16	11	12	JS 12	13	12	14	15	11	10	JS
8											
Total	29	25	12	26	25	28	32	34	29	24	JW

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	✓	2	✓	4	2	✓	✓	✓	✓	✓	EL
5	5	✓	4	✓	✓	3	3	5	6	5	JS
6	9	6	6	8	8	6	6	9	13	12	JS
7	12	11	11	12	12	10	12	10	12	12	JS
8											
Total	26	19	21	24	22	19	21	24	31	29	JW

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	3	4	4	4	✓	✓	2	3	✓	✓	EL
5	✓	✓	✓	✓	5	3	✓	✓	5	6	JS
6	4	6	6	6	7	5	5	6	9	9	JS
7	11	11	12	9	10	11	10	14	13	12	JS
8					JW						
Total	18	21	22	19	24 → 22	19	17	23	29	29	JW

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	3	✓	4	2	✓	3	4	4	4	4	EL
5	✓	5	✓	✓	5	✓	✓	✓	✓	✓	JS
6	6	6	6	8	9	7	5	6	6	16	JS
7	5	11	9	9	11	12	14	12	13	X	JS
8											
Total	14	22	19	19	25	22	23	22	23	14X	JW

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	3	4	4	3	4	4	✓	2	4	✓	EL
5	✓	✓	✓	✓	✓	✓	4	✓	✓	5	JS
6	6	6	8	8	7	6	9	7	✓	9	JS
7	13	14	14	11	10	13	12	12	11	11	JS
8	JW										
Total	24 → 22	24	26	22	21	23	25	21	15	25	JW

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	✓	✓	✓	✓	4	✓	✓	4	✓	4	EL
5	5	6	6	6	✓	5	6	✓	6	✓	JS
6	8	8	✓	8	9	7	6	6	9	10	JS
7	10	11	10	12	11	13	13	12	11	12	JS
8						JW					
Total	23	25	16	26	24	27 → 25	25	22	26	26	JW

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	2	2	✓	-	3	✓	✓	✓	2	-	EL
5	✓	✓	5	6	✓	2	2	6	✓	5	JS
6	6	6	8	8	5	6	9	9	10	8	JS
7	9	12	13	12	8	11	11	12	11	4	JS
8											
Total	17	20	26	26	15	19	22	27	23	17	JW

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	✓	2	2	3X	X	✓	✓	-	-	-	EL
5	5	✓	✓	|	|	5	3	3	5	✓	6	JS
6	6	8	8	|	|	8	2X	6	7	8	8	JS
7	13	6	10	|	|	|	9	14	11	14	JS
8											
Total	24	16	20	3X	0 → 14 EL	5X	18	26	19	28	JW

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See water quality sheet

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: May 31, 2017

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	16-6830-4007	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 9:54	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes
Batch ID:	05-9125-6199	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	25 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-6359-5836	**Code:**	3F652F3C	**Client:**	Teck Coal
Sample Date:	24 Apr-17 15:20	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	22h (5 °C)	**Station:**	LC LCDSSLCC WS 2017-04-24 N		

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Angle [Asin(P^0.5)=A+B*log(X)]	Control Threshold	0.0000001	Yes	Yes	No	Yes

Regression Summary

Iters	LL	AICc	BIC	Mu	Sigma	Adj R2	F Stat	Critical	P-Value	Decision(α:5%)
11	-11.33	34.66	28.9	-0.1934		0.2194				Lack of Fit Not Tested

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	21.68	N/A	N/A	4.613	NA	NA
EC10	97.42	N/A	N/A	1.027	NA	NA
EC15	318.9	N/A	N/A	0.3135	NA	NA
EC20	893.2	N/A	N/A	0.112	NA	NA
EC25	2278	N/A	N/A	0.0439	NA	NA
EC40	28200	N/A	N/A	0.003547	NA	NA
EC50	135800	N/A	N/A	0.0007363	NA	NA

> 100 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
Threshold	7.77E-08	8.815E-05	-0.000173	0.0001728	0.0008815	0.9993	Non-Significant Parameter
Slope	0.1475	0.09922	-0.04702	0.3419	1.486	0.1974	Non-Significant Parameter
Intercept	0.02852	0.1241	-0.2148	0.2718	0.2297	0.8274	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	4.749628	4.749628	1	3.967	0.1030	Non-Significant
Residual	5.986303	1.197261	5			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF	5.986	11.07	0.3076	Non-Significant Heterogenity
	Likelihood Ratio GOF	6.152	11.07	0.2918	Non-Significant Heterogenity
Distribution	Shapiro-Wilk W Normality	0.8681	0.6805	0.1445	Normal Distribution
	Anderson-Darling A2 Normality	0.5578	2.492	0.1534	Normal Distribution

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	0.8	0	1	0.1333	0.4216	52.7%	20.0%	8	10

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 16-6830-4007 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 12 May-17 9:54 **Analysis:** Linear Regression (MLE) **Official Results:** Yes

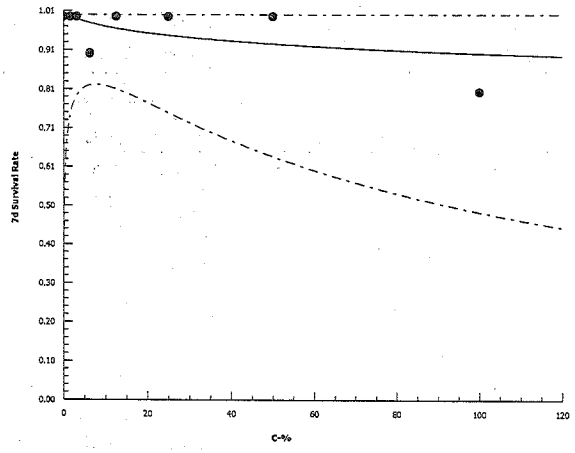
7d Survival Rate Detail

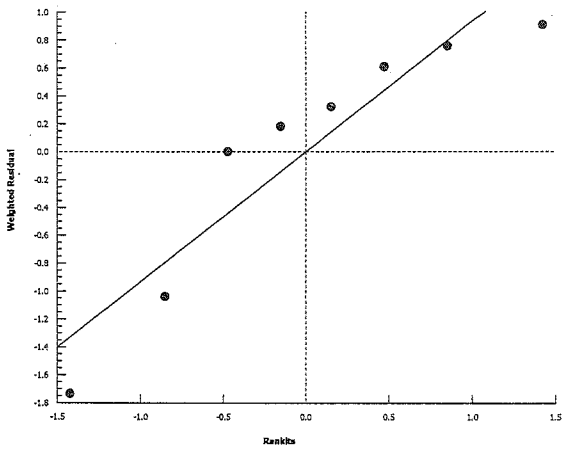
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	0
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	0	1	0	1	1	1	1

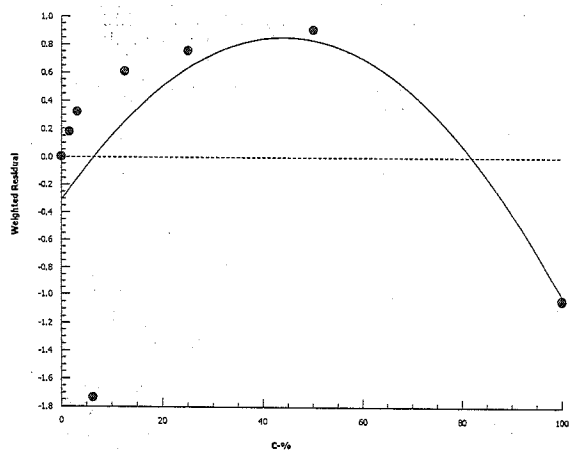
7d Survival Rate Binomials

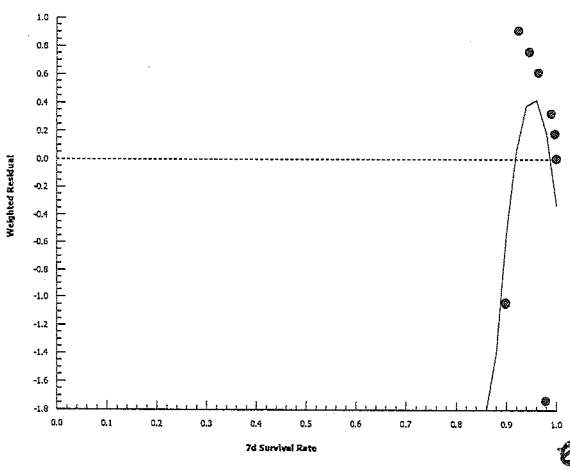
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	0/1	1/1	0/1	1/1	1/1	1/1	1/1

Graphics Log-Angle [Asin(P^0.5)=A+B*log(X)]









May 31/17

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	01-2862-5474	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jun-17 13:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-9125-6199	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	25 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-6359-5836	**Code:**	LC LCDSSLCC	**Client:**	Teck Coal
Sample Date:	24 Apr-17 15:20	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	22h (5 °C)	**Station:**	LC LCDSSLCC WS 2017-04-24 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	543001	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.5576	0.2393	4.733	179.3	21.13	417.9
IC10	1.426	0.5358	57.9	70.12	1.727	186.6
IC15	2.615	0.9033	76.72	38.25	1.304	110.7
IC20	50.72	1.359	N/A	1.972	NA	73.6
IC25	64.18	2.551	N/A	1.558	NA	39.2
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	26.4	12	34	1.893	5.985	22.67%	0.0%
1.56		10	23.6	19	31	1.284	4.061	17.21%	10.61%
3.12		10	21.5	17	27	1.098	3.472	16.15%	18.56%
6.25		10	20.3	14	25	1.193	3.773	18.58%	23.11%
12.5		10	22.4	15	26	0.9911	3.134	13.99%	15.15%
25		10	23.8	16	26	0.9638	3.048	12.81%	9.85%
50		10	21.2	15	27	1.348	4.264	20.11%	19.7%
100		10	17.3	3	28	2.612	8.26	47.75%	34.47%

Reproduction Detail

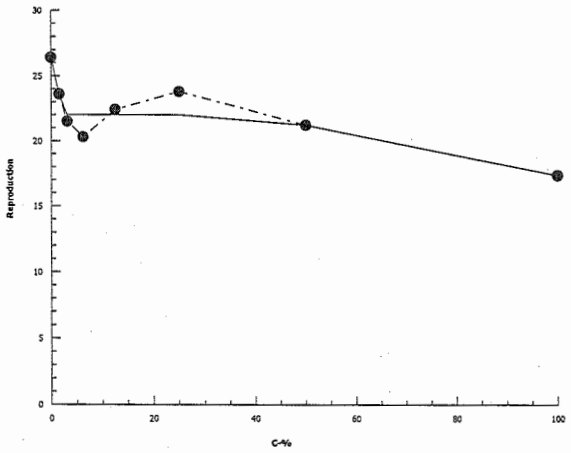
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	29	25	12	26	25	28	32	34	29	24
1.56		26	19	21	24	22	19	21	24	31	29
3.12		18	21	22	19	22	19	17	23	27	27
6.25		14	22	19	19	25	22	23	22	23	14
12.5		22	24	26	22	21	23	25	21	15	25
25		23	25	16	26	24	25	25	22	26	26
50		17	20	26	26	15	19	22	27	23	17
100		24	16	20	3	14	5	18	26	19	28

Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	01-2862-5474	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jun-17 13:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA:_____

6/1/17

Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 170365

Start Date/Time: April 25 / 17 @ 1300h
Set up by: Emm

Sample Information:

Sample ID: LC-LCS_WS_2017-04-24_N
Sample Date: April 24 / 17
Date Received: April 25 / 17
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 041917 A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 23
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 1, 2, 4, 5, 6, 7, 9, 12-15, 17-20

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd 159
Stock Solution ID: 17 NaCl
Date Initiated: May 3 / 17

7-d LC50 (95% CL): 2.1 (1.5 - 3.0) g/L NaCl
7-d IC50 (95% CL): 1.2 (0.8 - 1.9) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8 - 2.2) g/L NaCl CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.1 - 2.1) g/L NaCl CV (%): 17

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	> 100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]

Date reviewed: May 31, 2017

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LC_LC5_WS 2017-04-24_N
Work Order #: 170365

Start Date & Time: Apr 25/17 @ 1300h
Stop Date & Time: ~~April 1/17~~ May 2/17 @ 1100 h
Test Species: *Ceriodaphnia dubia*

Concentration: Control	Days													
	0	1		2 JS		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.1	8.0	7.4	8.0	7.5	8.0	7.3	8.0	7.3	8.2	7.0	8.0	7.3
pH	8.0	7.7	8.0	7.8	7.9	7.2	8.0	7.3	7.5	7.4	7.7	7.5	7.9	7.5
Cond. (µS/cm)	218	216		218		216		215		215		216		226
Initials	EMM	EMM		JS		EMM		EL		JS		EMM		JS

(v/v) Concentration: 1.56%	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.1	7.1	8.2	7.4	8.2	7.6	8.0	7.5	8.1	7.4	8.1	7.0	8.1	7.3
pH	7.9	7.8	8.0	7.8	7.9	7.5	8.0	7.3	8.1	7.3	7.7	7.5	7.9	7.3
Cond. (µS/cm)	220	219		232		220		225		232		229		236
Initials	EMM	EMM		JS		EMM		EL		JS		EMM		JS

(v/v) Concentration: 12.5%	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.1	7.1	8.1	7.3	8.2	7.7	7.9	7.5	8.1	7.4	8.1	7.2	8.2	7.3
pH	7.8	7.8	8.0	7.8	7.9	7.5	7.9	7.4	8.0	7.4	7.9	7.3	7.9	7.3
Cond. (µS/cm)	284	282		296		283		281		290		282		296
Initials	EMM	EMM		JS		EMM		EL		JS		EMM		JS

(v/v) Concentration: 100%	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.5	25.0	25.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.2	7.1	8.1	7.3	8.2	7.7	8.0	7.4	8.1	7.4	8.1	7.3	8.2	7.3
pH	8.1	7.8	8.0	8.1	7.9	7.7	8.0	7.7	8.0	7.6	8.1	7.4	8.0	7.6
Cond. (µS/cm)	729	729		737		729		725		724		729		733
Initials	EMM	EMM		JS		EMM		EL		JS		EMM		JS

Thermometer: 4 **DO meter:** 2/1 **pH meter:** 4 **Conductivity meter:** 3/1

	Control	100% (v/v)		
Hardness*	100	490		
Alkalinity*	98	196		

* mg/L as CaCO3

Analysts: EMM, AWD, JS, EC

Reviewed by:

Date reviewed: May 31, 2017

Sample Description: clear, colorless, odorless, brown particulates present.

Comments: **Broodboard Used:** 041917A

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck coal
Sample ID: LC-LC5-WS-2017-04-24-N
Work Order: 170365

Start Date & Time: April 25/17 @ 1300
Stop Date & Time: ~~April 1/17~~ May 7/17 @ 1600
Set up by: Emm

% (v/v)

Concentration: control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	X	/	EL
4	3	3	4	/	4	/	/	4	|	/	EL
5	/	/	/	2	/	3	6	/	|	/	JS
6	6	7	7	6	7	6	8	8	|	X	fmm
7	12	11	10	8	13	12	10	14	|	|	JS
8											
Total	21	21	21	16	24	21	24	26	0 X	0X	JW

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	3	/	/	3	–	2	/	/	/	1	FL
5	/	6	5	/	/	/	4	2	6	2	JS
6	9	7	7	9	/	6	6	6	7	7	fmm
7	15	11	14	15	/	16	12	6	14	12	JS
8				JW							
Total	27	24	26	~~29~~ 27	0	24	22	14	27	21	JW

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	3	4	2	3	3	/	/	4	4	/	EL
5	/	/	/	/	/	/	4	/	/	4	JS
6	8	3	6	7	7	/	6	8	8	6	fmm
7	9	12	12	11	8	/	11	13	11	12	JS
8											
Total	~~30~~ 20	24	20	21	18	0	21	25	23	22	JW

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	3	/	3	/	3	4	4	3	/	/	EL
5	/	/	/	4	/	/	/	/	8	8	JS
6	6	/	9	8	6	6	8	8	8	9	fmm
7	12	/	11	12	11	11	15	12	14	14	JS
8											
Total	21	0	23	24	20	21	27	23	26	27	JW

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	3	/	/	3	/	3	3	2	2	3	EL
5	/	5	/	/	3	/	/	2	/	/	JS
6	9	9	/	8	7	7	9	6	8	9	fmm
7	11	11	/	14	13	12	12	10	13	12	JS
8											
Total	23	25	0	25	23	22	24	18	23	24	JW

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	/	/	/	/	/	/	/	/	/	/	EL
5	5	4	4	2	2	3	4	6	/	/	JS
6	9	8	8	9	10	8	6	8	/	/	fmm
7	16	12	14	13	15	15	15	12	/	/	JS
8											
Total	30	24	26	24	27	25	25	26	0	0	JW

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	3	3	3	2	4	/	/	6	/	–	EL
5	/	/	/	/	/	4	5	3	3	5	JS
6	6	7	8	8	6	9	9	9	9	6	fmm
7	12	13	13	11	16	15	11	14	13	12	JS
8											
Total	21	23	24	21	26	28	25	26	25	23	JW

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	/	/	/	/	/	1	–	/	/	/	EL
5	2	3	/	/	3	2	4	4	4X	/	JS
6	9	6	/	/	8	6	8	9	|	/	fmm
7	15	14	/	/	12	12	10	12	|	/	JS
8											
Total	26	23	0	0	23	20	22	25	4X	0	JW

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: see water quality sheet
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]
Date reviewed: May 31, 2017

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	07-1533-1829	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 10:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-9125-6199	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	25 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	21-2395-9097	**Code:**	7E990B39	**Client:**	Teck Coal
Sample Date:	24 Apr-17 14:17	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h (4 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	951441	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	80.16	56.15	N/A	1.247	NA	1.781
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.8	0	1	0.1333	0.4216	52.7%	0.0%	8	10
1.56		10	1	1	1	0	0	0.0%	-25.0%	10	10
3.12		10	1	1	1	0	0	0.0%	-25.0%	10	10
6.25		10	1	1	1	0	0	0.0%	-25.0%	10	10
12.5		10	1	1	1	0	0	0.0%	-25.0%	10	10
25		10	1	1	1	0	0	0.0%	-25.0%	10	10
50		10	1	1	1	0	0	0.0%	-25.0%	10	10
100		10	0.9	0	1	0.1	0.3162	35.14%	-12.5%	9	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	0	0
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	0	1

May 31/17

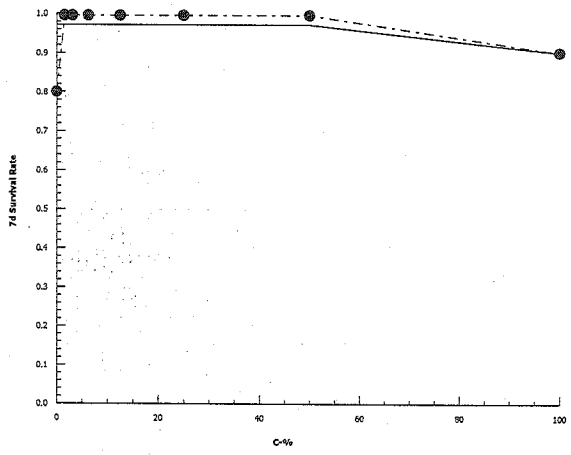
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	07-1533-1829	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 10:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1

Graphics



May 31/17

Analyst:_____ QA:_____

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	01-6997-0448	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 10:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-9125-6199	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	25 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	21-2395-9097	**Code:**	7E990B39	**Client:**	Teck Coal
Sample Date:	24 Apr-17 14:17	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h (4 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1239283	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	55.97	1.987	N/A	1.787	NA	50.33
IC10	62.64	3.097	N/A	1.597	NA	32.29
IC15	70.08	55.05	N/A	1.427	NA	1.816
IC20	78.4	61.25	N/A	1.275	NA	1.633
IC25	87.69	64.86	N/A	1.14	NA	1.542
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	17.4	0	26	3.019	9.548	54.87%	0.0%
1.56		10	21.2	0	27	2.67	8.443	39.83%	-21.84%
3.12		10	19.4	0	25	2.252	7.121	36.71%	-11.49%
6.25		10	21.2	0	27	2.485	7.857	37.06%	-21.84%
12.5		10	20.7	0	25	2.385	7.543	36.44%	-18.97%
25		10	20.7	0	30	3.493	11.05	53.36%	-18.97%
50		10	24.2	21	28	0.7118	2.251	9.3%	-39.08%
100		10	14.3	0	26	3.673	11.61	81.22%	17.82%

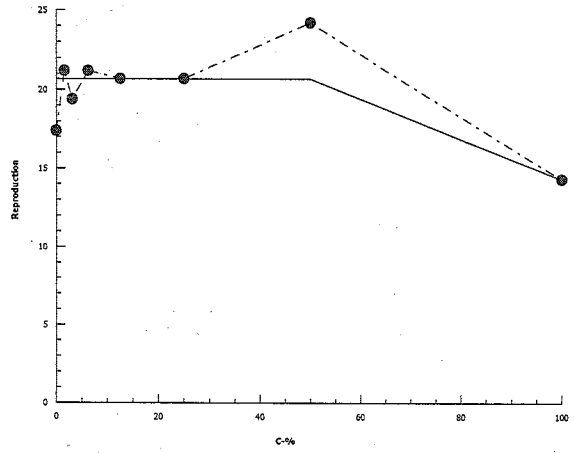
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	21	21	21	16	24	21	24	26	0	0
1.56		27	24	26	27	0	24	22	14	27	21
3.12		20	24	20	21	18	0	21	25	23	22
6.25		21	0	23	24	20	21	27	23	26	27
12.5		23	25	0	25	23	22	24	18	23	24
25		30	24	26	24	27	25	25	26	0	0
50		21	23	24	21	26	28	25	26	25	23
100		26	23	0	0	23	20	22	25	4	0

May 31/17

Analysis ID:	01-6997-0448	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 10:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA:_____ May31/17

CETIS Analytical Report

Test Code: 170365b Adj | 05-0250-8902

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	21-3944-3349	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 10:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-9125-6199	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	25 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	20-5589-7653	**Code:**	7A8A8235	**Client:**	Teck Coal
Sample Date:	24 Apr-17 14:17	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h	**Station:**	LC_LC5_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	520039	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	60.78	0.2812	N/A	1.645	NA	355.6
IC10	73.84	0.6415	N/A	1.354	NA	155.9
IC15	89.66	1.103	N/A	1.115	NA	90.65
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	Negative Control	10	17.4	0	26	3.019	9.548	54.87%	0.0%
1.56		10	17.4	0	26	3.019	9.548	54.87%	0.0%
3.12		10	17.4	0	26	3.019	9.548	54.87%	0.0%
6.25		10	17.4	0	26	3.019	9.548	54.87%	0.0%
12.5		10	17.4	0	26	3.019	9.548	54.87%	0.0%
25		10	17.4	0	26	3.019	9.548	54.87%	0.0%
50		10	17.4	0	26	3.019	9.548	54.87%	0.0%
100		10	14.3	0	26	3.673	11.61	81.22%	17.82%

Reproduction Detail

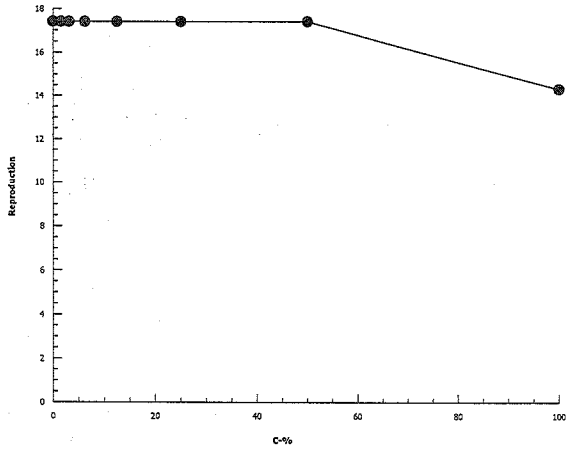
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	21	21	21	16	24	21	24	26	0	0
1.56		21	21	21	16	24	21	24	26	0	0
3.12		21	21	21	16	24	21	24	26	0	0
6.25		21	21	21	16	24	21	24	26	0	0
12.5		21	21	21	16	24	21	24	26	0	0
25		21	21	21	16	24	21	24	26	0	0
50		21	21	21	16	24	21	24	26	0	0
100		26	23	0	0	23	20	22	25	4	0

May 31/17

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental**

Analysis ID:	21-3944-3349	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 10:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



May 31/17

Analyst:_____ QA:_____

Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 170365

Start Date/Time: April 25/17 @ 1300h
Set up by: EMM

Sample Information:

Sample ID: LC-FRDSDC-WS-2017-04-25-N
Sample Date: April 24 /17
Date Received: April 25 /17
Sample Volume: 5 x 20 L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 041317 B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 39
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 21, 24, 25, 26, 35, 36, 40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd 159
Stock Solution ID: 17 NaCl
Date Initiated: May 3 /17

7-d LC50 (95% CL): 2.1 (1.5 - 3.0) g/L NaCL
7-d IC50 (95% CL): 1.2 (0.8 - 1.9) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8 - 2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.1 - 2.1) g/L NaCL CV (%): 17

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]

Date reviewed: May 31, 2017

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LC-FRO8DC_US 2017-0425-N
Work Order #: 1703625
Start Date & Time: April 25/17 @ 1300h
Stop Date & Time: ~~April 1/17~~ May 2/17 @ 1600h
Test Species: Ceriodaphnia dubia

Concentration: Control	Days ① 8.0													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.1	8.0	7.3	8.0	7.5	8.0	7.5	~~7.5~~ 7.50	7.4	8.2	7.4	8.1	7.1
pH	8.0	7.6	8.0	7.7	7.9	7.2	8.0	7.3	7.5	7.4	7.7	7.7	7.9	7.6
Cond. (µS/cm)	218	216		218		216		215		215		216		228
Initials	EMM	EMM		JS		EMM		EL		JS		EMM		JS

(v/v) Concentration: 1.56%	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.1	7.1	8.2	7.3	8.2	7.5	8.2	7.5	8.1	7.4	8.1	7.3	8.0	7.1
pH	8.0	7.7	8.0	7.9	7.9	7.2	8.0	7.3	8.0	7.4	7.7	7.7	7.9	7.6
Cond. (µS/cm)	219	220		231		229		235		231		220		250
Initials	EMM	EMM		JS		EMM		EL		JS		EMM		JS

(v/v) Concentration: 12.5%	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.1	7.0	8.0	7.3	8.2	7.6	8.1	7.4	8.1	7.4	8.1	7.3	8.1	7.2
pH	8.0	7.7	8.0	7.9	7.9	7.3	8.0	7.4	8.0	7.4	7.9	7.8	7.9	7.8
Cond. (µS/cm)	276	280		296		290		294		288		282		372
Initials	EMM	EMM		JS		EMM		EL		JS		EMM		JS

(v/v) Concentration: 100%	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.5	25.0	24.5	25.0	24.0	25.0	25.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.2	7.0	7.9	7.3	8.2	7.6	7.9	7.4	8.1	7.4	8.1	7.3	8.2	7.2
pH	8.0	7.9	8.0	8.1	7.9	7.6	7.9	7.6	8.0	~~7.7~~ 7.7	8.0	8.1	8.0	8.0
Cond. (µS/cm)	725	742		753		752		748		750		751		720
Initials	EMM	EMM		JS		EMM		EL		JS		EMM		JS

Thermometer: 4 DO meter: 2/1 pH meter: 4 Conductivity meter: 2/1

	Control	100% (MW)		
Hardness*	100	500		
Alkalinity*	98	202		

* mg/L as CaCO3

Analysts: EMM, AWD, JS, EC
Reviewed by: [signature]
Date reviewed: May 31, 2017

Sample Description: clear, colorless, odorless, brown particulates present

Comments: Broodboard Used: 041317B

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck coal
Sample ID: LC_FRDS.DC_WS_2017-04-25_N
Work Order: 170365

% (v/v)

Start Date & Time: April 24/17 @ 1300
Stop Date & Time: ~~April 1/17~~ May 2/17 @ 1600h
Set up by: Emm

Concentration: control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	3	/	/	/	/	/	/	3	3	3	EL
5	8	4	4	5	4	2	5	✓	✓	✓	JS
6	✓	8	8	9	9	2	8	7	9	9	JS
7	12	11	10	10	12	11	10	13	11	16	JS
8											
Total	23	23	22	24	25	15	23	23	23	28	JW

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	3	/	/	4	/	4	2	/	2	3	EL
5	6	4	5	✓	5	✓	✓	2	✓	✓	JS
6	✓	8	8	9	8	6	5	6	7	8	JS
7	11	12	11	13	16	12	16	15	12	13	JS
8											
Total	20	24	24	26	29	22	23	23	21	24	JW

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	/	3	/	/	/	/	/	/	/	/	EL
5	2	✓	4	2	2	2	3	4	3	3	JS
6	6	8	6	7	8	8	6	7	7	8	JS
7	9	11	12	9	12	9	10	11	11	13	JS
8											
Total	17	22	22	18	22	19	19	22	21	24	JW

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	/	/	2	/	2	/	/	/	/	/	EL
5	4	3	✓	3	✓	3	3	4	3	7	JS
6	6	6	6	✓	8	8	7	/	3		JS
7	11	10	13	10	11	9	12	12	14		JS
8											
Total	21	19	21	13	21	20	22	16	20	7X	JW

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	3	/	/	3	/	3	3	/	/	1	EL
5	/	3	4	/	X	✓	✓	2	2	✓	JS
6	7	8	10	6		6	3	3	8	8	JS
7	12	10	11	12		12	13	13	9	14	JS
8											
Total	22	21	25	21	0X	21	19	18	19	23	JW

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	/	2	3	/	4	/	3	/	/	/	EL
5	4	8	✓	5	✓	3	✓	7	3	5	JS
6	9	✓	8	8	9	8	9	10	9	8	JS
7	11	13	11	12	12	13	15	13	12	12	JS
8											
Total	24	23	22	25	25	24	27	30	24	25	JW

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	/	4	/	/	/	/	/	3	/	/	EL
5	6	/	5	5	2	2	4	✓	5	5	JS
6	6	8	8	9	8	7	8	9	9	10	JS
7	12	9	13	12	13	13	✓	14	11	9	JS
8											
Total	24	21	26	26	23	22	12	26	16	24	JW

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EL
4	/	/	2	/	/	/	/	/	/	/	EL
5	4	4	✓	2	6	4	4	4	6	2	JS
6	11	10	9	9	10	7	8	9	9	9	JS
7	13	13	13	8/5	16	12	13	12	13	14	JS
8											
Total	28	27	24	19	32	23	25	25	28	25	JW

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See water quality sheet
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: _____ Date reviewed: May 31, 2017

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	07-1655-8476	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 10:22	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-9125-6199	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	25 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	03-5831-0821	**Code:**	155B63A5	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:49	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	24h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1647906	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
12.5		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	0
12.5		1	1	1	1	0	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

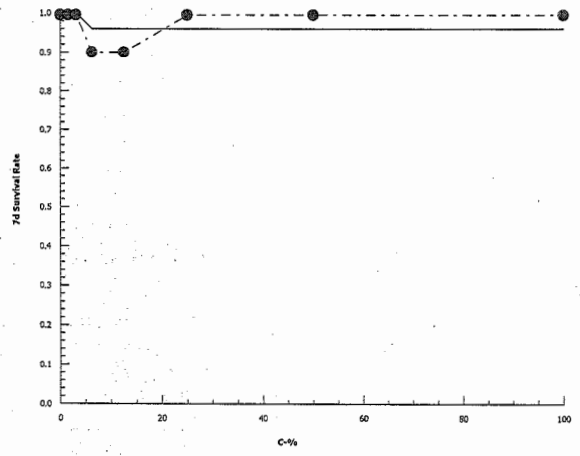
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 07-1655-8476 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 12 May-17 10:22 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
12.5		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst:_____ QA:_____

May 31/17

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	16-7634-9799	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 10:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-9125-6199	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	25 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	03-5831-0821	**Code:**	155B63A5	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:49	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	24h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1076581	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.631	1.135	N/A	38.02	NA	88.14
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

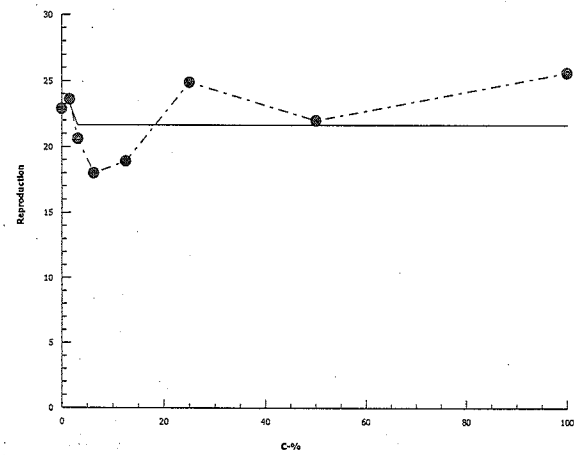
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	22.9	15	28	1.027	3.247	14.18%	0.0%
1.56		10	23.6	20	29	0.8055	2.547	10.79%	-3.06%
3.12		10	20.6	17	24	0.7024	2.221	10.78%	10.04%
6.25		10	18	7	22	1.498	4.738	26.32%	21.4%
12.5		10	18.9	0	25	2.198	6.951	36.78%	17.47%
25		10	24.9	22	30	0.7063	2.234	8.97%	-8.73%
50		10	22	12	26	1.468	4.643	21.1%	3.93%
100		10	25.6	19	32	1.097	3.471	13.56%	-11.79%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	23	22	24	25	15	23	23	23	28
1.56		20	24	24	26	29	22	23	23	21	24
3.12		17	22	22	18	22	19	19	22	21	24
6.25		21	19	21	13	21	20	22	16	20	7
12.5		22	21	25	21	0	21	19	18	19	23
25		24	23	22	25	25	24	27	30	24	25
50		24	21	26	26	23	22	12	26	16	24
100		28	27	24	19	32	23	25	25	28	25

Analysis ID:	16-7634-9799	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 10:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 170365

Start Date/Time: April 26/17 @ 1300h
Set up by: EMM

Sample Information:

Sample ID: LC-DCI-WS-2017-04-25-N
Sample Date: April 24/17
Date Received: April 25/17
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 041917 B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: ~~20~~ 22
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 21 – 30

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd 159
Stock Solution ID: 17 NaCl
Date Initiated: May 3/17

7-d LC50 (95% CL): 2.1 (1.5 - 3.0) g/L NaCL
7-d IC50 (95% CL): 1.2 (0.8 - 1.9) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8 - 2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.1 - 2.1) g/L NaCL CV (%): 17

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	> 100	
IC25 % (v/v) (95% CL)		> 100
IC50 % (v/v) (95% CL)		> 100

Reviewed by: [signature]
Date reviewed: June 1/17

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LCDC1 - INS - 2017 - 04 - 25 N
Work Order #: 170365

Start Date & Time: April 26th 2017 @ 1300h
Stop Date & Time: ~~April 1170~~ on May 3/17 @ 1600 h
Test Species: *Ceriodaphnia dubia*

Concentration Control	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.0	7.8	8.0	7.4	8.0	7.2	8.0	7.4	8.2	7.3	8.1	7.2	8.0	7.2
pH	8.0	7.6	7.9	7.0	8.0	7.2	7.5	7.3	7.7	7.7	7.9	7.5	7.9	7.4
Cond. (µS/cm)	218	218		216		215		215		216		216		215
Initials	EMM	JS		EMM		AL		JS		EMM		JS		EMM

(v/v) Concentration 1.56%	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.2	7.8	8.2	7.4	8.2	7.2	8.1	7.4	8.1	7.3	8.1	7.2	8.1	7.2
pH	8.0	7.9	8.0	7.2	8.0	7.2	8.0	7.2	7.8	7.7	7.9	7.6	7.9	7.4
Cond. (µS/cm)	220	223		217		221		233		221		212		213
Initials	EMM	JS		EMM		AL		JS		EMM		JS		EMM

(v/v) Concentration 12.5%	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.2	7.8	8.2	7.4	8.1	7.3	8.1	7.4	8.1	7.3	8.1	7.2	8.2	7.2
pH	7.9	7.9	8.0	7.3	8.0	7.3	8.0	7.3	7.9	7.8	7.9	7.7	7.9	7.5
Cond. (µS/cm)	228	224		227		226		224		223		216		220
Initials	EMM	JS		EMM		AL		JS		EMM		JS		EMM

(v/v) Concentration 100%	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.5	25.0	24.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.1	7.6	8.2	7.3	7.9	7.3	8.2	7.3	8.1	7.3	8.2	7.1	8.2	7.1
pH	7.6	7.7	7.8	7.3	7.7	7.3	7.8	7.3	7.9	7.8	7.9	7.7	7.9	7.5
Cond. (µS/cm)	250	262		251		249		245		248		246		239
Initials	EMM	JS		EMM		AL		JS		EMM		JS		EMM

Thermometer: 4 **DO meter:** 2/1 **pH meter:** 4 **Conductivity meter:** 2/1

	Control	100% C/W		
Hardness*	100	130		
Alkalinity*	98	JW ~~132~~ 320		

* mg/L as CaCO3

Analysts: EMM, AWD, JS, EC

Reviewed by: [signature]

Date reviewed: May 31, 2017

Sample Description: clear, colorless, odorless, brown particulates present.

Comments: **Broodboard Used:** 041917B (21>30)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck coal
Sample ID: LCDC1-INS-2017-04-25-N
Work Order: 170365

Start Date & Time: April 26/17 @ 1300
Stop Date & Time: ~~April 3/17 @ 1700 h~~ May 3/17 @ 1600h
Set up by: Emm JW JW

% (v/v)

Days	Concentration: control										
	A	B	C	D	E	F	G	H	I	J	Init
1											Emm
2											Emm
3											EL
4	3	5	5	4	4	5	4	4	✓	4	JS
5	✓	✓	✓	✓	✓	✓	✓	✓	2	✓	JJ
6	8	13	12	12	9	8	12	✓	6	11	JS
7	12	14	13	13	10	13	12	✓	✓	13	Emm
8											
Total	23	32	30	29	23	26	28	4	8	28	JW

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1											Emm
2											Emm
3											EL
4	4	5	5	4	3	5	4	5	4	5	JS
5	✓	13	7	✓	9	✓	3	✓	✓	✓	JJ
6	12	✓	6	14	12	11	11	14	8	13	JS
7	14	11	10	16	✓	13	✓	16	10	14	Emm
8											
Total	30	29	18	34	24	29	18	35	22	32	JW

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1											Emm
2											Emm
3											EL
4	4	4	5	4	2	5	3	5	3	4	JS
5	✓	✓	✓	✓	✓	✓	✓	✓	8	✓	JJ
6	13	12	10	10	8	8	11	11	12	9	JS
7	15	13	13	12	10	11	13	12	✓	12	Emm
8											
Total	32	29	28	26	20	24	27	29	25	25	JW

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1											Emm
2											Emm
3											EL
4	3	6	3	5	5	5	5	5	4	4	JS
5	✓	✓	✓	9	✓	✓	✓	✓	✓	8	JJ
6	10	13	12	12	13	12	12	12X	12	12	JS
7	13	14	14	✓	11	13	10	1	14	✓	Emm
8											
Total	26	33	29	26	29	30	27	17X	30	24	JW

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1											Emm
2											Emm
3											EL
4	3	3	6	2	5	5	2	5	4	4	JS
5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JJ
6	12	13	16	13	13	13	14	13	13	14	JS
7	14	14	17	18	12	16	16	13	8	12	Emm
8											
Total	29	30	39	33	29	34	32	31	25	30	JW

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1											Emm
2											Emm
3											EL
4	4	4	4	5	5	4	3	3	4	4	JS
5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JJ
6	13	11	11	10	11	8	11	13	12	8	JS
7	12	11	13	13	12	11	13	12	11	11	Emm
8											
Total	29	26	28	28	28	23	27	28	27	23	JW

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1											Emm
2											Emm
3											EL
4	3	4	4	4	5	5	5	2	4	6	JS
5	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JJ
6	13	15	10	14	15	12	13	12	11	14	JS
7	15	16	11	12	12	15	16	✓	13	15	Emm
8											
Total	31	35	25	30	32	32	34	14	28	35	JW

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1											Emm
2											Emm
3											EL
4	4	5	6	5	5	7	4	5	6	6	JS
5	✓	✓	✓	✓	✓	6	6	✓	✓	✓	JJ
6	8	14	14	10	13	12	14	15	13	13	JS
7	15	16	16	12	13	✓	✓	16	16	14	Emm
8						20					
Total	27	35	36	27	31	30	24	36	35	33	JW

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

JW

Notes: X = mortality.

Sample Description: See water quality sheet

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: May 31, 2017

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-2645-9445	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 9:32	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-8104-0761	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	05-2054-0776	**Code:**	1F06D268	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:29	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	49h (3 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2001983	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	0	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

May 31/17

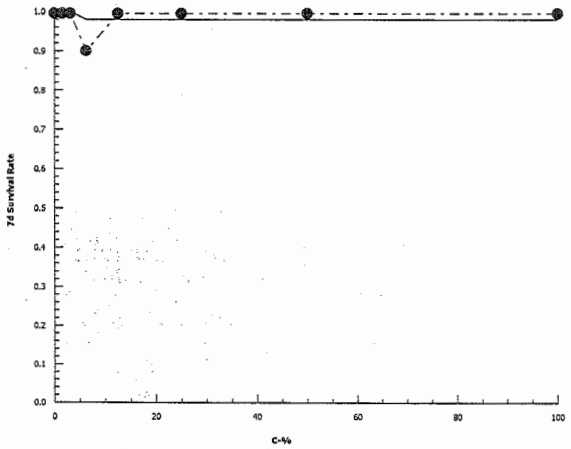
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 15-2645-9445 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 12 May-17 9:32 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



May 31/17

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	09-2959-1661	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jun-17 13:21	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-8104-0761	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	05-2054-0776	**Code:**	1F06D268	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:29	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	49h (3 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	905613	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	N/A	N/A	<1	NA	NA
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

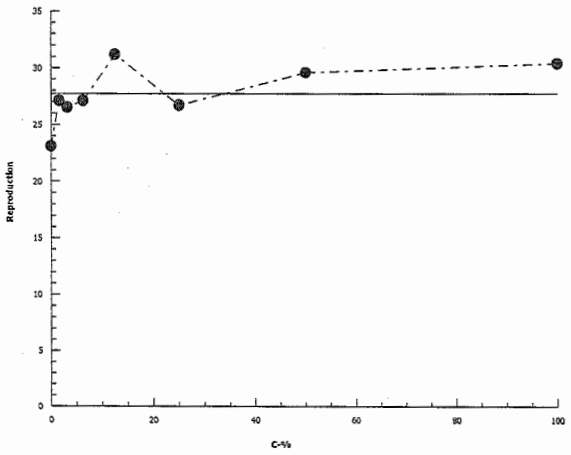
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	23.1	4	32	3.002	9.492	41.09%	0.0%
1.56		10	27.1	18	35	1.975	6.244	23.04%	-17.32%
3.12		10	26.5	20	32	1.046	3.308	12.48%	-14.72%
6.25		10	27.1	17	33	1.386	4.383	16.17%	-17.32%
12.5		10	31.2	25	39	1.172	3.706	11.88%	-35.06%
25		10	26.7	23	29	0.6675	2.111	7.91%	-15.58%
50		10	29.6	14	35	1.996	6.31	21.32%	-28.14%
100		10	30.4	20	36	1.778	5.621	18.49%	-31.6%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	32	30	29	23	26	28	4	8	28
1.56		30	29	18	34	24	29	18	35	22	32
3.12		32	29	28	26	20	24	27	29	25	25
6.25		26	33	29	26	29	30	27	17	30	24
12.5		29	30	39	33	29	34	32	31	25	30
25		29	26	28	28	28	23	27	28	27	23
50		31	35	25	30	32	32	34	14	28	35
100		27	35	36	27	31	20	24	36	35	33

Analysis ID:	09-2959-1661	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jun-17 13:21	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	07-3983-6561	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jun-17 13:21	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	06-8104-0761	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	03 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	05-2054-0776	**Code:**	1F06D268	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:29	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	49h (3 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	25.8%	100	>100	NA	1

Steel Many-One Rank Sum Test

Control	vs	C-%	Test Stat	Critical	Ties	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.56	92	74	3	18	0.4838	Asymp	Non-Significant Effect
		3.12	101	74	4	18	0.7828	Asymp	Non-Significant Effect
		6.25	93	74	3	18	0.5200	Asymp	Non-Significant Effect
		12.5*	70.5	74	3	18	0.0253	Asymp	Significant Effect
		25	103	74	4	18	0.8329	Asymp	Non-Significant Effect
		50	76.5	74	3	18	0.0766	Asymp	Non-Significant Effect
		100	80	74	0	18	0.1317	Asymp	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	474.6875	67.8125	7	2.18	0.0460	Significant Effect
Error	2239.7	31.10695	72			
Total	2714.387		79			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	23.63	18.48	0.0013	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9144	0.9579	<0.0001	Non-normal Distribution

Reproduction Summary

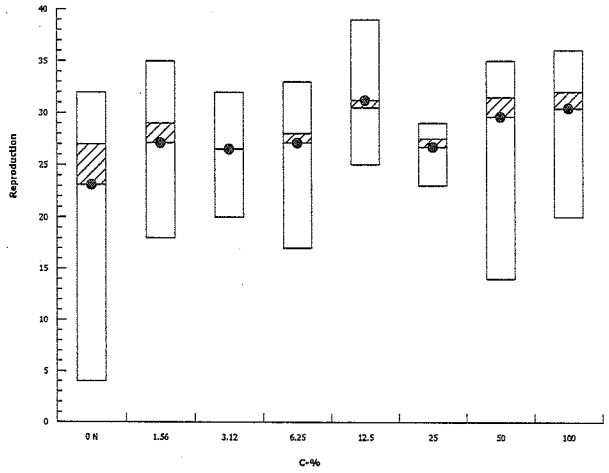
C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	10	23.1	16.31	29.89	27	4	32	3.002	41.09%	0.0%
1.56		10	27.1	22.63	31.57	29	18	35	1.975	23.04%	-17.32%
3.12		10	26.5	24.13	28.87	26.5	20	32	1.046	12.48%	-14.72%
6.25		10	27.1	23.96	30.24	28	17	33	1.386	16.17%	-17.32%
12.5		10	31.2	28.55	33.85	30.5	25	39	1.172	11.88%	-35.06%
25		10	26.7	25.19	28.21	27.5	23	29	0.6675	7.91%	-15.58%
50		10	29.6	25.09	34.11	31.5	14	35	1.996	21.32%	-28.14%
100		10	30.4	26.38	34.42	32	20	36	1.778	18.49%	-31.6%

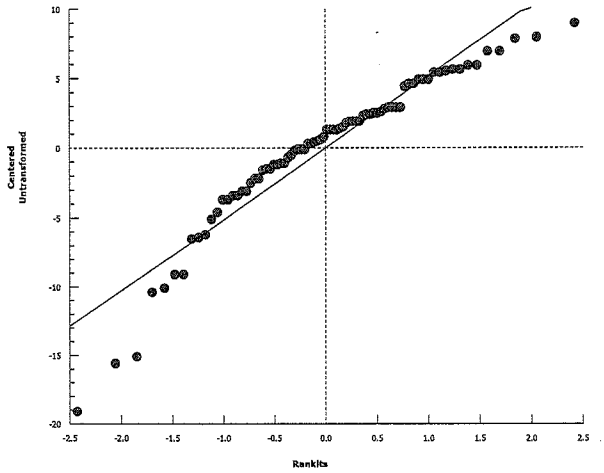
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	32	30	29	23	26	28	4	8	28
1.56		30	29	18	34	24	29	18	35	22	32
3.12		32	29	28	26	20	24	27	29	25	25
6.25		26	33	29	26	29	30	27	17	30	24
12.5		29	30	39	33	29	34	32	31	25	30
25		29	26	28	28	28	23	27	28	27	23
50		31	35	25	30	32	32	34	14	28	35
100		27	35	36	27	31	20	24	36	35	33

Analysis ID:	07-3983-6561	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jun-17 13:21	**Analysis:**	Nonparametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 170365

Start Date/Time: April 26/17 @ 1300h
Set up by: EMM

Sample Information:

Sample ID: LC_DCDS_INS_2017-04-25_N
Sample Date: April 24 /17
Date Received: April 25 /17
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 041917 B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 22
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 21 - 30

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd 159
Stock Solution ID: 17 NaCl
Date Initiated: May 3 /17

7-d LC50 (95% CL): 2.1 (1.5 - 3.0) g/L NaCL
7-d IC50 (95% CL): 1.2 (0.8 - 1.9) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8 - 2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.1 - 2.1) g/L NaCL CV (%): 17

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]

Date reviewed: May 31, 2017

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LC_DCOS-WS_2017-04-25_N
Work Order #: 170365

Start Date & Time: April 26 ~~25~~/17 @ 1300h
Stop Date & Time: ~~April /17 @~~ JS May 2/17 @ 1600h
Test Species: *Ceriodaphnia dubia*

Concentration Control	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	
DO (mg/L)	8.0	7.6	8.0	7.8	8.0	7.2	8.0	7.3	8.2	7.3	8.0	7.3	8.0	
pH	8.0	7.6	7.9	7.6	8.0	7.2	7.5	7.4	7.7	7.5	7.9	7.6	7.9	
Cond. (µS/cm)	218	218		216		215		215		216		226		
Initials	EMM	JS		EMM		EL		JS		EMM		JS		

(v/v) Concentration 1.56%	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	
DO (mg/L)	8.1	7.8	8.2	7.6	7.9	7.2	8.1	7.3	8.1	7.3	8.2	7.2	8.2	
pH	8.0	7.8	7.9	7.6	7.9	7.2	8.0	7.4	7.8	7.6	7.9	7.6	7.9	
Cond. (µS/cm)	218	222		~~220~~ 214		216		220		219		228		
Initials	EMM	JS		EMM		EL		JS		EMM		JS		

(v/v) Concentration ~12.5%	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	
DO (mg/L)	8.1	7.8	8.2	7.6	7.9	7.2	8.1	7.3	8.1	7.2	8.2	7.2	8.2	
pH	7.9	7.9	7.9	7.6	7.9	7.2	8.0	7.3	7.9	7.6	7.8	7.6	7.8	
Cond. (µS/cm)	214	219		213		212		218		217		228		
Initials	EMM	JS		EMM		EL		JS		EMM		JS		

(v/v) Concentration 100%	Days 0	1		2		3		4		5		final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.5	25.0	24.0	25.0	25.5	25.0	24.0	25.0	24.0	25.0	24.5	25.0	24.0	
DO (mg/L)	8.0	7.6	JS 8.2	7.6	8.0	7.2	8.1	7.2	8.1	7.2	8.1	7.1	8.2	
pH	7.5	7.8	~~8~~ 7.5	7.5	7.5	7.4	7.6	7.5	7.7	7.9	7.8	7.5	7.8	
Cond. (µS/cm)	201	207		205		208		199 EL		202		206		
Initials	EMM	JS		EMM		EL		JS		EMM		JS		

Thermometer: 4 **DO meter:** 2/1 **pH meter:** 4 **Conductivity meter:** 2/1

	Control	100% (v/v)		
Hardness*	100	110		
Alkalinity*	98	104		

* mg/L as CaCO3

Analysts: EMM, AWD, JS
Reviewed by: [signature]
Date reviewed: May 31, 2017

Sample Description: Slightly turbid, colorless, odorless, brown particulates present.

Comments: **Broodboard Used:** 041917B (21→30)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck coal
Sample ID: LCDCDS-WS-2017-04-25-N
Work Order: 170365

Start Date & Time: April 25/17 @ 1300
Stop Date & Time: ~~April 1/17~~ May 2/17 @ 1600h
Set up by: EMM

% (v/v)

Concentration: control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	3	4	4	4	3	3	✓	4	3	4	JS
5	6	8	6	8	6	6	✓	7	8	6	JS
6	14	11	14	11	11	13	✓	13	9	12	JS
7											
8											
Total	23	23	24	23	20	22	0	24	20	22	JW

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	✓	5	4	4	4	✓	4	2	3	✓	JS
5	3	8	6	8	8	4	7	6	9	7	JS
6	10	11	14	12	12	8	12	12	11	15	JS
7											
8											
Total	13	24	24	24	24	12	23	20	23	22	JW

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	4	4	2	4	2	3	5	4	5	✓	JS
5	8	8	6	6	7	8	7	8	8	✓	JS
6	11	10	9	9	10	10	10	8	12	✓	JS
7											
8			JW								
Total	23	22	~~18~~ 17	19	19	21	22	20	25	0	JW

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	5	3	3	2	3	✓	3	3	4	2	JS
5	✓	6	7	2	7	✓	7	9	6	6	JS
6	14	13	12	4	13	✓	15	10	11	11	JS
7											
8											
Total	19	22	22	8	23	0	25	22	21	19	JW

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	4	2	4	2	4	4	2	4	3	3	JS
5	8	6	3	8	8	8	6	6	5	✓	JS
6	14	18	12	11	14	13	13	10	9	14	JS
7											
8											
Total	26	26	19	21	26	25	21	20	17	17	JW

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	3	2	2	✓	4	5	5	4	3	✓	JS
5	7	8	5	✓	8	✓	6	6	6	✓	JS
6	13	8	9	✓	10	7	11	10	14	✓	JS
7											
8							JW				
Total	23	18	16	0	22	12	~~20~~ 22	20	23	0	JW

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	3	2	3	4	2	3	3	3	3	3	JS
5	9	6	9	7	5	5	6	7	6	✓	JS
6	15	10	12	9	15	16	14	12	13	13	JS
7											
8											
Total	27	18	24	20	22	24	23	22	22	16	JW

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
4	✓	3	3	8	2	3	✓	3	5	2	JS
5	8	7	6	5	4	4	✓	5	7	5	JS
6	11	12	13	11	13	✓	✓	9	14	11	JS
7											
8											
Total	19	22	22	24	19	7	0	17	26	18	JW

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See water quality sheet
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]
Date reviewed: May 31, 2017

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-5540-7003	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 9:48	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-3160-2624	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	07-7306-7951	**Code:**	2E1414AF	**Client:**	Teck Coal
Sample Date:	24 Apr-17 10:38	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	50h (3.5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	213655	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

May 31, 2017

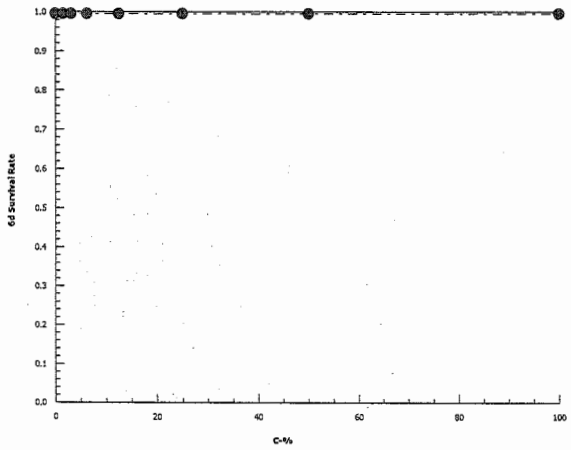
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-5540-7003	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 9:48	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



May 31, 2017

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-3408-7041	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 9:48	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-3160-2624	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	07-7306-7951	**Code:**	2E1414AF	**Client:**	Teck Coal
Sample Date:	24 Apr-17 10:38	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	50h (3.5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1648836	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	13.47	0.4532	N/A	7.424	NA	220.7
IC10	57.16	1.112	N/A	1.749	NA	89.96
IC15	98.68	2.106	N/A	1.013	NA	47.48
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	20.1	0	24	2.278	7.203	35.83%	0.0%
1.56		10	20.9	12	24	1.456	4.606	22.04%	-3.98%
3.12		10	18.8	0	25	2.21	6.989	37.17%	6.47%
6.25		10	18.1	0	25	2.488	7.866	43.46%	9.95%
12.5		10	21.8	17	26	1.162	3.676	16.86%	-8.46%
25		10	15.6	0	23	2.821	8.922	57.19%	22.39%
50		10	21.8	16	27	0.9978	3.155	14.47%	-8.46%
100		10	17.4	0	26	2.531	8.003	45.99%	13.43%

Reproduction Detail

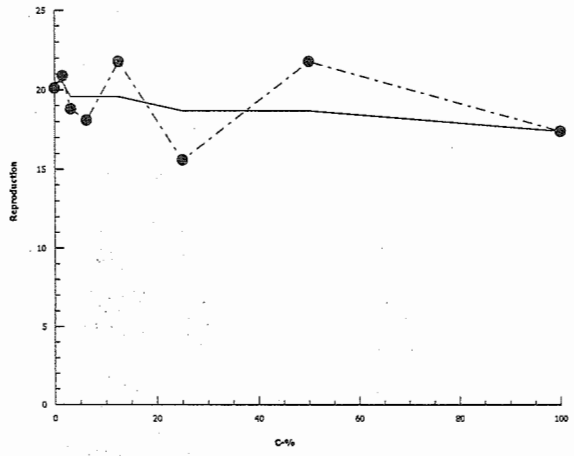
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	23	24	23	20	22	0	24	20	22
1.56		13	24	24	24	24	12	23	20	23	22
3.12		23	22	17	19	19	21	22	20	25	0
6.25		19	22	22	8	23	0	25	22	21	19
12.5		26	26	19	21	26	25	21	20	17	17
25		23	18	16	0	22	12	22	20	23	0
50		27	18	24	20	22	24	23	22	22	16
100		19	22	22	24	19	7	0	17	26	18

May 31/17

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-3408-7041	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 9:48	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: May 31/17

Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 170365

Start Date/Time: April 25/17 @ 1300h
Set up by: EMM

Sample Information:

Sample ID: WL-BFWB-OUT-SP21-20170424-N
Sample Date: April 24 /17
Date Received: April 25 /17
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 041917C
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 22
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 11 - 19

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd 159
Stock Solution ID: 17 NaCl
Date Initiated: May 3 /17

7-d LC50 (95% CL): 2.1 (1.5 - 3.0) g/L NaCL
7-d IC50 (95% CL): 1.2 (0.8 - 1.9) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8 - 2.2) g/L NaCL CV (%): 5
7-d IC50 Reference Toxicant Mean and Historical Range: 1.6 (1.1 - 2.1) g/L NaCL CV (%): 17

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	> 100	
IC25 % (v/v) (95% CL)		JW 50.03 (33.6 - 60.3)
IC50 % (v/v) (95% CL)		JW 75.47 ~~(63.0 - 84.3)~~ JW 63.2 - 84.0

Reviewed by: _____

Date reviewed: May 31, 2017

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: WL_BFNB_OUT_SP21_20170424_N
Work Order #: 1703655

Start Date & Time: April 25/17 @ 1300h
Stop Date & Time: ~~April 17 @ 13~~ May 2/17 @ 1600h
Test Species: Ceriodaphnia dubia

Concentration: Control	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	
DO (mg/L)	8.0	7.2	8.0	7.4	8.0	7.3	8.0	7.3	8.0	7.3	8.2	7.3	8.0	7.1	
pH	8.0	7.7	8.0	7.8	7.9	7.6	8.0	7.4	7.5	7.4	7.7	7.7	7.9	7.7	
Cond. (µS/cm)	218	216		218		214		215		215		216		228	
Initials	EMM	EMM		JS		EMM		EL		JS		EMM		JS	

(v/v) Concentration: 1.56%	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	
DO (mg/L)	8.1	7.2	8.2	7.4	8.2	7.2	8.1	7.2	8.2	7.3	8.0	7.3	8.2	7.1	
pH	8.0	7.7	8.0	7.8	8.0	7.6	8.0	7.4	8.2	7.4	7.8	7.7	7.9	7.7	
Cond. (µS/cm)	230	228		258		230		241		259		250		251	
Initials	EMM	EMM		JS		EMM		EL		JS		EMM		JS	

(v/v) Concentration: 12.5%	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	
DO (mg/L)	8.1	7.2	8.2	7.4	8.2	7.2	8.1	7.2	8.1	7.3	8.0	7.2	8.2	7.0	
pH	7.9	7.8	7.8	7.9	7.9	7.6	7.9	7.5	8.0	7.4	7.9	7.6	7.8	7.7	
Cond. (µS/cm)	455	450		477		462		467		472		473		492	
Initials	EMM	EMM		JS		EMM		EL		JS		EMM		JS	

(v/v) Concentration: 100%	Days														
	0	7.2 1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.5	25.0	24.5	25.0	24.0	25.0	24.5	25.0	24.0	25.0	24.0	25.0	24.0	25.0	
DO (mg/L)	8.2	7.2	7.9	7.5	8.2	7.2	8.0	7.2	8.1	7.2	8.0	7.2	8.2	6.9	
pH	7.6	8.0	7.6	7.9	7.6	7.6	7.6	7.5	7.7	7.5	7.7	7.6	7.7	7.6	
Cond. (µS/cm)	1803	1825		1864		1852		1841		1847		1841		1767	
Initials	EMM	EMM		JS		EMM		EL		JS		EMM		JS	

Thermometer: 4 DO meter: 2/1 pH meter: 4 Conductivity meter: 2/1

	Control	100 %(v/v)		
Hardness*	100	1260		
Alkalinity*	98	~~64~~ 320 JW		

* mg/L as CaCO3

Analysts: EMM, AWD, JS, EC
Reviewed by: [signature]
Date reviewed: May 31, 2017

Sample Description: clear, colorless, hydrocarbon odor, brown particulates present.

Comments: **Broodboard Used:** 041917C

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck coal
Sample ID: JW WLE WL-BFWB-OUT-SP21-20170424-N
Work Order: 170365

Start Date & Time: April 24/17 @ 1300h
Stop Date & Time: April 4/17 JS May 2/17 @ 1600h
Set up by: EMM

% (v/v)

Concentration: control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EMM
4	4	4	3	3	3	4	4	4	/	3	EL
5	/	/	/	/	/	/	/	/	2	/	JS
6	7	9	8	8	6	8	8	8	5	8	JS
7	9	13	12	12	12	13	14	13	11	13	JS
8								JW			
Total	20	26	23	23	21	25	26	~~26~~ 25	18	24	JW

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EMM
4	4	/	4	4	4	3	4	1	/	3	EL
5	/	3	/	/	/	/	/	/	3	/	JS
6	6	7	9	6	9	7	6	5	9	8	JS
7	12	12	13	10	11	12	11	13	11	14	JS
8									JW		
Total	22	22	26	20	24	22	21	19	~~25~~ 23	25	JW

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EMM
4	3	4	4	4	4	3	4	4	3	3	EL
5	/	/	/	/	8	/	/	/	/	/	JS
6	7	6	8	6	/	6	4	6	4	8	JS
7	12	11	11	10	10	11	10	11	7	14	JS
8											
Total	22	21	23	20	22	20	18	21	14	25	JW

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EMM
4	3	4	4	4	/	4	3	3	3	4	EL
5	/	/	/	/	5	/	/	/	/	/	JS
6	7	8	7	8	9	7	/	6	7	11	JS
7	13	13	13	14	14	13	13	13	14	/	JS
8										JW	
Total	23	25	24	26	28	24	16	22	~~28~~ 24 JW	~~17~~ 16	JW

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EMM
4	4	4	4	4	4	4	/	4	4	4	EL
5	/	/	/	/	/	/	XS	/	/	/	JS
6	8	6	7	8	/	4	|	7	5	9	JS
7	12	13	15	12	13	13	|	13	12	14	JS
8											
Total	24	23	26	24	17	21	5 X	24	21	27	JW

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EMM
4	4	5	2	/	3	4	3	4	/	4	EL
5	/	/	/	5	/	/	✓		2	/	JS
6	8	6	9	7	6	7	8 X	9	9	9	JS
7	16	11	12	12	12	10	|	12	11	13	JS
8							|				
Total	28	22	23	24	21	21	3 X JS | X	25	22	26	JW

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EMM
4	3	4	4	/	/	/	3	2	3	/	EL
5	/	/	X	4	2	/	/	/	/	/	JS
6	8	9	|	5	5	6	8	8	8	6	JS
7	12	11	|	8	10	12	X	13	11	9	JS
8			|				|				
Total	23	24	4 X	17	17	18	11 X	23	22	15	JW

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	/	/	/	/	/	/	/	/	/	/	JS
2	/	/	/	/	/	/	/	/	/	/	JS
3	/	/	/	/	/	/	/	/	/	/	EMM
4	/	/	/	/	/	/	/	/	/	/	EL
5	/	/	/	/	/	/	/	/	/	/	JS
6	/	/	/	/	/	/	/	/	/	/	JS
7	13	8	9	4	5	8	6	8	5	10	JS
8											
Total	13	8	9	4	5	8	6	8	5	10	JW

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See water quality sheet

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: May 31, 2017

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-8451-7983	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 10:04	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes
Batch ID:	05-9125-6199	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	25 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	09-1853-4142	**Code:**	36BFB7FE	**Client:**	Teck Coal
Sample Date:	24 Apr-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (8 °C)	**Station:**	WL_BFWB_OUT_SP21_20170424_N		

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Angle [Asin(P^0.5)=A+B*log(X)]	Control Threshold	0.0000001	No	Yes	No	Yes

Regression Summary

Iters	LL	AICc	BIC	Mu	Sigma	Adj R2	F Stat	Critical	P-Value	Decision(α:5%)
21	-14.11	34.63	32.38	-0.014		0.4661				Lack of Fit Not Tested

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	14.63	N/A	N/A	6.834	NA	NA
EC10	46.63	N/A	N/A	2.145	NA	NA
EC15	116.4	N/A	N/A	0.8594	NA	NA
EC20	257.5	N/A	N/A	0.3884	NA	NA
EC25	529.9	N/A	N/A	0.1887	NA	NA
EC40	3688	N/A	N/A	0.02711	NA	NA
EC50	12400	N/A	N/A	0.008066	NA	NA

> 100 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
Slope	0.1912	0.09922	-0.003254	0.3857	1.927	0.1022	Non-Significant Parameter
Intercept	0.002677	0.1241	-0.2407	0.246	0.02157	0.9835	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	4.567555	4.567555	1	7.112	0.0372	Significant
Residual	3.853497	0.6422496	6			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF	3.853	12.59	0.6965	Non-Significant Heterogenity
	Likelihood Ratio GOF	5.214	12.59	0.5167	Non-Significant Heterogenity
Distribution	Shapiro-Wilk W Normality	0.9672	0.6805	0.8754	Normal Distribution
	Anderson-Darling A2 Normality	0.2042	2.492	0.9162	Normal Distribution

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
25		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
50		10	0.8	0	1	0.1333	0.4216	52.7%	20.0%	8	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

Analyst:_____ QA: May 31/17

Analysis ID: 03-8451-7983 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 12 May-17 10:04 **Analysis:** Linear Regression (MLE) **Official Results:** Yes

7d Survival Rate Detail

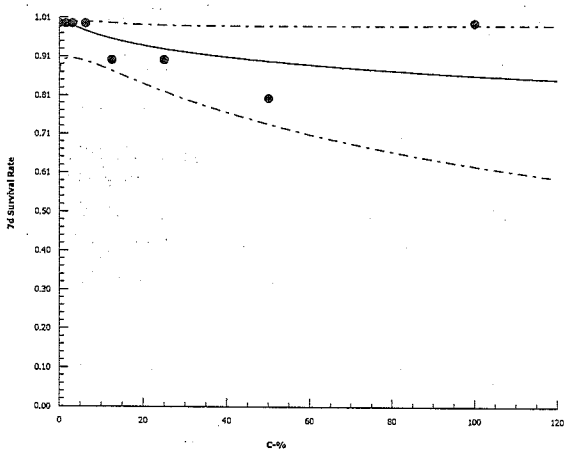
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	0	1	1	1
25		1	1	1	1	1	1	0	1	1	1
50		1	1	0	1	1	1	0	1	1	1
100		1	1	1	1	1	1	1	1	1	1

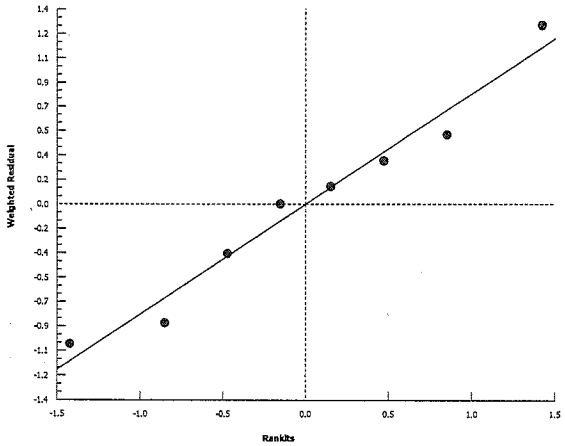
7d Survival Rate Binomials

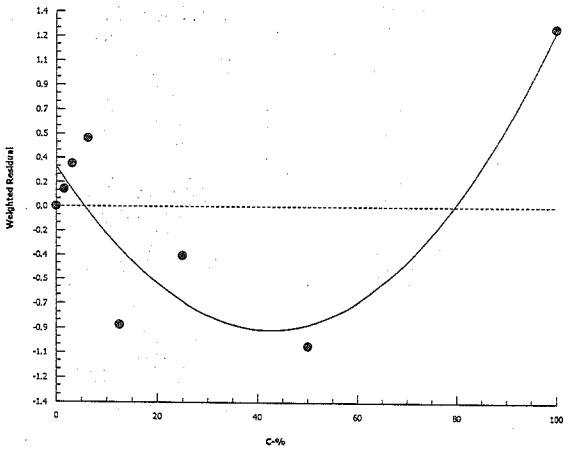
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
50		1/1	1/1	0/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

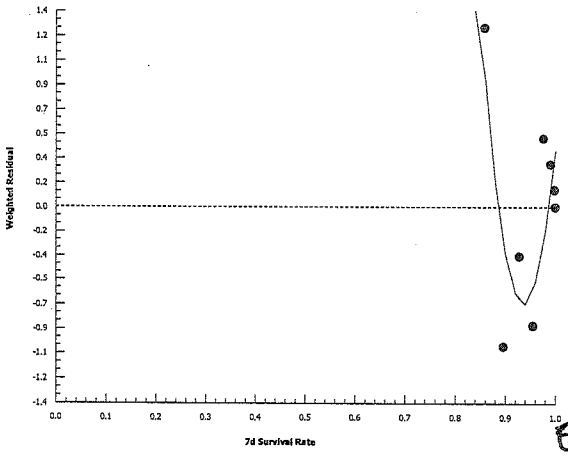
Graphics

Log-Angle [Asin(P^0.5)=A+B*log(X)]









May 31/17

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	18-4064-7071	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jun-17 13:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-9125-6199	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jeslin Wijaya
Start Date:	25 Apr-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	02 May-17 16:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	09-1853-4142	**Code:**	36BFB7FE	**Client:**	Teck Coal
Sample Date:	24 Apr-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (8 °C)	**Station:**	WL_BFWB_OUT_SP21_20170424_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	727948	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.528	0.7111	29.54	39.56	3.385	140.6
IC10	29.08	2.399	44.85	3.439	2.229	41.68
IC15	35.01	11.04	52.57	2.857	1.902	9.061
IC20	42.1	27.5	56.48	2.375	1.771	3.637
IC25	50.27	33.56	60.28	1.989	1.659	2.98
IC40	64.28	49.05	73.26	1.556	1.365	2.039
IC50	75.69	63.24	84.02	1.321	1.19	1.581

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	23.1	18	26	0.8492	2.685	11.62%	0.0%
1.56		10	22.4	19	26	0.6864	2.171	9.69%	3.03%
3.12		10	20.6	14	25	0.9452	2.989	14.51%	10.82%
6.25		10	22.8	16	28	1.245	3.938	17.27%	1.3%
12.5		10	21.2	5	27	2.01	6.356	29.98%	8.23%
25		10	22.3	11	28	1.446	4.572	20.5%	3.46%
50		10	17.4	4	24	1.984	6.275	36.06%	24.68%
100		10	7.6	4	13	0.8589	2.716	35.74%	67.1%

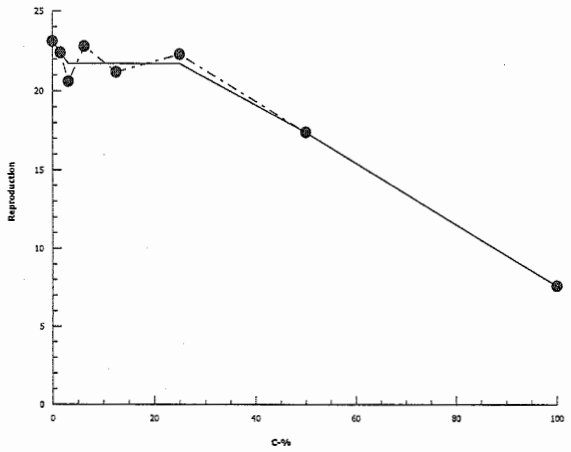
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	20	26	23	23	21	25	26	25	18	24
1.56		22	22	26	20	24	22	21	19	23	25
3.12		22	21	23	20	22	20	18	21	14	25
6.25		23	25	24	26	28	24	16	22	24	16
12.5		24	23	26	24	17	21	5	24	21	27
25		28	22	23	24	21	21	11	25	22	26
50		23	24	4	17	17	18	11	23	22	15
100		13	8	9	4	5	8	6	8	5	10

June 1/17

Analysis ID:	18-4064-7071	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Jun-17 13:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Client: Teck

W.O.#: 170365

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
LC-LCDSSLCC-WS-2017-04-24-N	April 25/17	April 25/17	50	10.0	10.3	194	100①	5.4	540	JS
LC-LCS-WS-2017-04-24-N	April 25/17	April 25/17	50	10.0	10.2	196	100①	4.9	490	JS
LC-FRDSDC-WS-2017-04-25N	April 25/17	April 25/17	50	10.3	10.5	202	100①	5.0	500	JS
LC-DC1-WS-2017-04-25N	April 26/17	April 26/17	50	6.8	7.0	~~132~~ 320 JN	50	6.5	130	JS
LC-DCDS-WS-2017-04-25N	April 26/17	April 26/17	50	5.4	5.6	104	50	5.5	110	JS
WLC-AWTF-WL-BTWB-OST-SP21-20170429N	April 25/17	April 25/17	100①	3.4	3.6	~~64~~ 320 ev	100①	12.6	1260	JS
20% Perrier	April 25/17	April 25/17	50	5.0	5.1	98	50	5.0	100	JS

Notes: ① Diluted to 100mL w/ D.I. water

Reviewed by: [signature]

Date Reviewed: May 31, 2017

APPENDIX B – Rainbow Trout Embryo *(Oncorhynchus mykiss)* Toxicity Test Data

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Apr 26/17 @ 2000h

Work Order No.: 170364

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2017-04-24_N
Sample Date: Apr 24/17
Date Received: Apr 25/17
Sample Volume: 8X20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 16
Alkalinity (mg/L $CaCO_3$): ~~32~~ 16

Test Organism Information:

Batch No.: 042617
Source: Campbell Lake
Loading Density: 1.07g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE97
Stock Solution ID: 17501 (1000 mg/L SDS)
Date Initiated: Apr 26/17
7-d EC50 (95% CL): 6.5 (6.2 – 6.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (1.9-8.5) mg/L SDS
Reference Toxicant CV (%): 45

Test Results:

	Sample ID		
	LC_LCDSSLCC_WS_2017-04-24_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCa

Date reviewed: May 19/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_LCDSSLCC_WS_2017-04-24_N
Work Order #: 170364

Start Date & Time: Apr 26 / 17e 2000h
Stop Date & Time: May 3 / 17e 0800h
Test Species: *Oncorhynchus mykiss*

%(v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.0	13.5	13.5	13.5	13.5	13.5	13.0	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.2	10.5	10.~~8~~4	10.3	10.3	10.2	10.1	10.3	10.1	10.1	10.3	10.5	10.5	10.5
pH	6.7	6.9	6.9	6.9	7.0	6.8	6.9	6.8	6.9	6.9	6.8	7.2	7.1	7.0
Cond. (µS/cm)	29	28		30		30		30		30		KL ~~40~~38		39
Initials	KL	KL		KL		A		A		KL		KL		KL

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.2	10.5	10.4	10.4	10.3	10.2	10.2	10.2	10.2	10.2	10.3	10.5	10.5	10.5
pH	7.0	7.2	7.2	7.3	7.2	7.3	7.1	7.2	7.3	7.3	7.2	7.3	7.2	7.1
Cond. (µS/cm)	99	92		97		90		92		96		101		99
Initials	KL	KL		KL		A		A		KL		KL		KL

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.3	10.5	10.3	10.4	10.3	10.2	10.2	10.3	10.2	10.3	10.3	10.5	10.5	10.5
pH	7.7	8.0	7.8	7.9	7.8	7.8	7.7	7.9	7.~~4~~6	8.0	7.8	7.8	7.7	7.5
Cond. (µS/cm)	303	309		296		289		283		307		295		299
Initials	KL	KL		KL		A		A		KL		KL		KL

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.~~0~~5	13.0	~~12.5~~ 13.0	13.0	~~12.5~~
DO (mg/L)	10.3	10.5	10.3	10.4	10.3	10.3	10.2	10.2	10.2	10.3	10.3	10.5	10.5	10.5
pH	8.0	8.0	8.1	8.1	8.3	8.1	8.1	8.0	7.9	8.1	8.4	8.0	8.2	8.1
Cond. (µS/cm)	938	950		942		942		945		949		953		948
Initials	KL	KL		KL		A		A		KL		KL		KL

Thermometer: CER-~~9~~3 KL **DO meter:** DO-2 **pH meter:** PH-1 **Conductivity meter:** C-2

	Control	LC_LCDSSLCC (100%)		
Hardness*	16	540		
Alkalinity*	KL ~~32~~16	194		

* mg/L as CaCO3

Analysts: AWO, KL

Reviewed by: JOL

Date reviewed: May 19/17

Sample Description: Clear; colourless, odourless, brown particulates present

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_LCOSSLCC_WS_2017-04-24_AV
Work Order #: A0364

Start Date & Time: Apr 26 /17 @ 2000h
Stop Date & Time: May 3/17 0800h
Test Species: *Oncorhynchus mykiss*

Concentration %(v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	1	4	3	5	13	DK 17	0	30
	2	↓	↓	↓	0	1	2	2	5	2	23	30
	3				0	0	0	0	0	1	29	30
	4				0	0	1	2	3	7	20	30
6.25	1			~	0	2	5	2	9	21	0	30
	2			1	0 2/A	3	0	2	6	1	23	30
	3			0	0	0	0	0	0	1	29	30
	4			↓	1	0	0	1	2	6	23	31
12.5	1				1	1	4	2	8	21	K ~~22~~ 21	30
	2				2	0	2	1	5	0	25	30
	3				0	1	0	0	1	0	29	30
	4				1	0	0	0	1	10	19	30
25	1				1	5	1	8	15	15	0	30
	2				1	1	3	0	5	1	24	30
	3				0	0	0	0	0	2	28	30
	4				0	0	1	0	1	6	23	30
50	1				2	2	5	5	14	16	0	30
	2				0	4	2	1	7	1	22	30
	3				↓	0	0	0	0	0	30	30
	4					0	3	1	4	7	19	30
100	1					4	5	6	15	TI	4	30
	2					0	0	1	1	1	26	28
	3					0	0	0	0	1	29	30
	4	↓	↓	—	—	3	0	1	4	10	19	33
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		K	K	A	A	K	K	K	K	K	K	K

Comments: _____

Reviewed by: JOK **Date reviewed:** May 19/17

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	09-1285-5295	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-17 12:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-8715-9665	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	26 Apr-17 20:00	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 May-17 08:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 12h	**Source:**	Campbel Lake	**Age:**	
Sample ID:	10-6359-5836	**Code:**	3F652F3C	**Client:**	Teck Coal
Sample Date:	24 Apr-17 15:20	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	53h (5 °C)	**Station:**	LC LCDSSLCC WS 2017-04-24 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1023943	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	3	0.8	0.6667	0.9667	0.08819	0.1528	19.09%	0.0%	72	90
6.25		3	0.8251	0.7419	0.9667	0.07115	0.1232	14.94%	-3.14%	75	91
12.5		3	0.8111	0.6333	0.9667	0.09686	0.1678	20.68%	-1.39%	73	90
25		3	0.8333	0.7667	0.9333	0.05092	0.08819	10.58%	-4.17%	75	90
50		3	0.7889	0.6333	1	0.1094	0.1895	24.03%	1.39%	71	90
100		3	0.8237	0.5758	0.9667	0.1244	0.2155	26.17%	-2.96%	74	91

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	① Rep 4
0	Negative Control	0.7667	0.9667	0.6667	
6.25		0.7667	0.9667	0.7419	
12.5		0.8333	0.9667	0.6333	
25		0.8	0.9333	0.7667	
50		0.7333	1	0.6333	
100		0.9286	0.9667	0.5758	

① Rep A was excluded from analysis due to bad female eggs

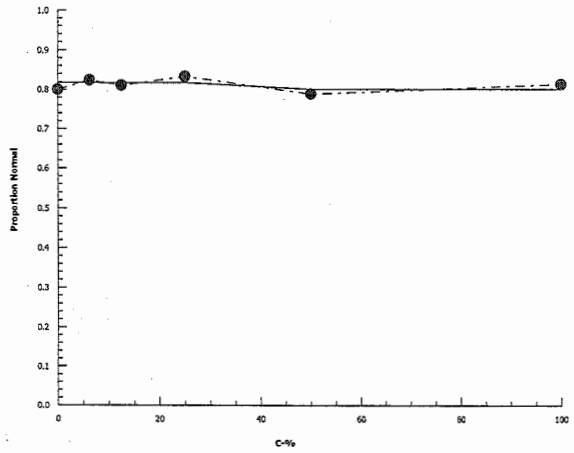
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	① Rep 4
0	Negative Control	23/30	29/30	20/30	
6.25		23/30	29/30	23/31	
12.5		25/30	29/30	19/30	
25		24/30	28/30	23/30	
50		22/30	30/30	19/30	
100		26/28	29/30	19/33	

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	09-1285-5295	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-17 12:50	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: ~~Apr 26/17~~ Apr 27/17 @ 2000h

Work Order No.: 170364

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCS_WS_2017-04-24_N

Sample Date: ~~Apr 25/17~~ Apr 24/17

Date Received: Apr 25/17

Sample Volume: 5X20L

Dilution Water:

Type: Dechlorinated Tap Water

Hardness (mg/L $CaCO_3$): 16

Alkalinity (mg/L $CaCO_3$): ~~42~~ 16

Test Organism Information:

Batch No.: 042617

Source: Campbell Lake

Loading Density: 1.07 g/L

Number of male broodstock used: 3

Number of female broodstock used: 4

Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE97

Stock Solution ID: 17501 (1000mg/L SDS)

Date Initiated: Apr 26/17

7-d EC50 (95% CL): 6.5 (6.2 – 6.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (1.9 – 8.5) mg/L SDS

Reference Toxicant CV (%): 45

Test Results:

	Sample ID		
	LC_LCS_WS_2017-04-24_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JOL

Date reviewed: May 23/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LLLS_WS_2017-04-24_N
Work Order #: 170364
Start Date & Time: Apr 26/17 2000h
Stop Date & Time: May 3/17 0900h
Test Species: *Oncorhynchus mykiss*

%(v/v) Concentration (control)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.0	13.5	13.5	13.5	13.6	13.0	13.0	13.6	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.2	10.5	10.3	10.3	10.1	10.2	10.1	10.3	10.2	10.1	10.2	10.5	10.4	10.5
pH	6.7	6.9	6.9	6.9	6.9	6.8	6.9	6.8	6.9	6.9	6.9	7.2	7.1	7.0
Cond. (µS/cm)	29	28		30		30		30		30		KH ~~40~~ 38		35
Initials	KH	KH		KH		AM		AM		KH		KH		KH

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.6	13.5	13.5	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.3	10.5	10.3	10.3	10.1	10.3	10.2	10.2	10.2	10.2	10.2	10.5	10.4	10.5
pH	7.1	7.3	7.3	7.4	7.4	7.3	7.3	7.4	7.2	7.1	7.2	7.3	7.3	7.2
Cond. (µS/cm)	80	76		70		68		67		80		84		82
Initials	KH	KH		KH		AM		AM		KH		KH		KH

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	KH ~~13.0~~ 13.5	13.5	13.5	13.5	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.4	10.5	10.3	10.3	10.1	10.2	10.2	10.2	10.3	10.2	10.2	10.5	10.4	10.5
pH	7.9	8.0	7.8	8.0	7.8	7.7	7.7	7.8	7.6	7.9	7.7	7.8	7.7	7.6
Cond. (µS/cm)	228	224		236		219		223		228		231		231
Initials	KH	KH		KH		AM		AM		KH		KH		KH

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.6	13.5	13.5	13.5	13.5	13.0	13.5	13.0	12.5
DO (mg/L)	10.5	10.5	10.3	10.3	10.1	10.3	10.2	10.3	10.2	10.2	10.2	10.8 KH	10.4	10.5
pH	8.2	8.2	8.3	8.3	8.4	8.1	8.3	8.2	8.1	~~8.3~~ 8.3	8.4	8.1	8.2	8.1
Cond. (µS/cm)	736	742		739		737		737		KH 743		742 ~~75~~ KH		744
Initials	KH	KH		KH		AM		AM		KH		KH		KH

Thermometer: KH ~~CER-913~~ **DO meter:** DO-2 **pH meter:** pH-1 **Conductivity meter:** C-2

	Control	LLLS (100%)		
Hardness*	16	490		
Alkalinity*	KH 3216	196		

Analysts: AWD, KH
Reviewed by: JOh
Date reviewed: May 23/17

* mg/L as $CaCO_3$

Sample Description: Clear ~~colorless~~ KH colourless, odourless, brown particulates present.

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_LCS_WS_2017-04-24_N
Work Order #: 170364

Start Date & Time: Apr 26/17 @ 2000h
Stop Date & Time: May 3/17 @ 0900h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
control	1	0	0	0	0	0	3	3	6	23	0	29
	2				1	1	3	0	5	~~2~~ 1	~~23~~ 24	30
	3				0	0	0	0	0	0	30	30
	4				2	0	1	1	4	9	17	30
6-25	1				1	4	7	7	19	10	1	30
	2				1	1	0	1	3	2	25	30
	3				0	0	0	0	0	0	30	30
	4		1		1	0	0	3	5	10	15	30
12-5	1		0	1	0	5	6	5	17	13	0	30
	2			1	0	0	3	1	5	1	24	30
	3			0	0	0	0	0	0	0	30	30
	4			0	2	1	0	4	7	7	17	31
25	1			0	1	5	8	7	21	8	1	30
	2			1	2	0	1	0	4	1	25	30
	3			0	0	0	0	1	1	0	29	30
	4			~~0~~ 1	2	0	1	4	8	9	12	29
50	1			0	1	6	4	11	22	8	0	30
	2				1	2	3	0	6	1	23	30
	3				0	0	0	2	2	0	28	30
	4				4	1	4	3	12	6	12	30
100	1				1	7	5	10	23	7	0	30
	2				0	1	4	0	5	1	24	30
	3				0	0	0	0	0	0	30	30
	4				1	4	4	3	12	8	10	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	A	A	KL	KL	KL	KL	KL	KL	KL

Comments:

Reviewed by: JGh **Date reviewed:** May 23/17

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	00-5624-4413	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-17 13:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-4486-7990	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	26 Apr-17 20:00	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 May-17 09:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 13h	**Source:**	Campbel Lake	**Age:**	
Sample ID:	21-2395-9097	**Code:**	7E990B39	**Client:**	Teck Coal
Sample Date:	24 Apr-17 14:17	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	54h (4 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1749283	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	21.65	N/A	N/A	4.618	NA	NA
EC10	45.93	N/A	N/A	2.177	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	3	0.7889	0.5667	1	0.1252	0.2169	27.49%	0.0%	71	90
6.25		3	0.7778	0.5	1	0.147	0.2546	32.73%	1.41%	70	90
12.5		3	0.7828	0.5484	1	0.1307	0.2263	28.91%	0.77%	71	91
25		3	0.7379	0.4138	0.9667	0.1666	0.2885	39.1%	6.46%	66	89
50		3	0.7	0.4	0.9333	0.1575	0.2728	38.98%	11.27%	63	90
100		3	0.7111	0.3333	1	0.1975	0.3421	48.11%	9.86%	64	90

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	① Rep 4
0	Negative Control	0.8	1	0.5667	
6.25		0.8333	1	0.5	
12.5		0.8	1	0.5484	
25		0.8333	0.9667	0.4138	
50		0.7667	0.9333	0.4	
100		0.8	1	0.3333	

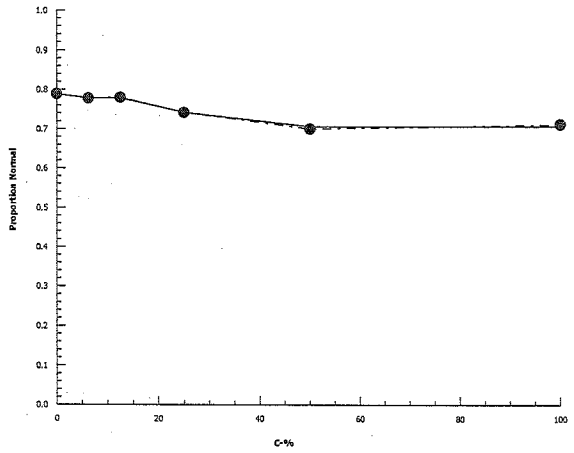
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	① Rep 4
0	Negative Control	24/30	30/30	17/30	
6.25		25/30	30/30	15/30	
12.5		24/30	30/30	17/31	
25		25/30	29/30	12/29	
50		23/30	28/30	12/30	
100		24/30	30/30	10/30	

① Rep A was excluded from analysis due to bad female eggs.

Analysis ID:	00-5624-4413	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-17 13:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Apr 26/17 @ 2000h

Work Order No.: 1703b4

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_FRDSDC_WS_2017-04-25_N

Sample Date: Apr 24/17

Date Received: Apr 25/17

Sample Volume: 5x20L

Dilution Water:

Type: Dechlorinated Tap Water

Hardness (mg/L $CaCO_3$): 16

Alkalinity (mg/L $CaCO_3$): ~~32~~ 16

Test Organism Information:

Batch No.: 042617

Source: Campbell Lake

Loading Density: 1.07 g/L

Number of male broodstock used: 3

Number of female broodstock used: 4

Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE97

Stock Solution ID: 17501 (1000 mg/L SDS)

Date Initiated: Apr 26/17

7-d EC50 (95% CL): 6.5 (7th 6.2 - 6.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (1.9 - 8.5) mg/L SDS

Reference Toxicant CV (%): 45

Test Results:

	Sample ID		
	LC_FRDSDC_WS_2017-04-25_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JGL

Date reviewed: May 23/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_FRDSDC_US_2017-04-25_N
Work Order #: 170304

Start Date & Time: Apr 26/17 @ 2000h
Stop Date & Time: May 3/17 @ 0830h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.0	13.5	13.5	13.5	13.5	13.6	13.0	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.2	10.5	10.3	10.3	10.2	10.2	10.2	10.3	10.2	10.1	10.2	10.5	10.4	10.5
pH	6.7	6.9	6.9	6.9	6.9	6.8	6.9	6.8	6.9	6.9	6.8	7.2	7.1	7.0
Cond. (µS/cm)	29	28		30		30		30		30		KL ~~40~~ 38		37
Initials	KL	KL		KL		A		A		KL		KL		KL

Concentration: 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.6	13.5	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.4	10.5	10.3	10.4	10.2	10.2	10.3	10.3	10.2	10.3	10.2	10.5	10.4	10.5
pH	7.2	7.2	7.3	7.2	7.1	7.2	7.3	7.3	7.2	7.2	7.2	7.2	7.3	7.2
Cond. (µS/cm)	86	72		74		76		74		77		89		71
Initials	KL	KL		KL		A		A		KL		KL		KL

Concentration: 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.5	10.5	10.3	10.4	10.2	10.2	10.2	10.2	10.2	10.3	10.2	10.5	10.4	10.5
pH	7.7	7.7	7.7	7.7	7.6	7.8	7.7	7.9	7.7	8.0	7.8	7.7	7.6	7.6
Cond. (µS/cm)	255	223		232		234		~~233~~ 226		239		244		242
Initials	KL	KL		KL		A		A		KL		KL		KL

Concentration: 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.05	13.0	13.0	13.0	12.5
DO (mg/L)	10.5	10.5	10.3	10.4	10.2	10.2	10.3	10.3	10.2	10.3	10.2	10.5	10.4	10.5
pH	8.0	8.1	8.3	8.1	8.3	8.2	8.3	8.1	8.0	8.1	8.4	8.0	8.2	8.1
Cond. (µS/cm)	753	758		755		753		755		756		758		757
Initials	KL	KL		KL		A		A		KL		KL		KL

Thermometer: KL CER-913 **DO meter:** DO-2 **pH meter:** pH-1 **Conductivity meter:** C-2

	Control	LC_FRDSDC (composite)		
Hardness*	46	500		
Alkalinity*	KL 32.6	202		

* mg/L as CaCO3

Analysts: AWD, KL
Reviewed by: JCL
Date reviewed: May 23/17

Sample Description: Clear, colourless, odourless, brown particulates present

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LL-FRDSDC_2015_2017-04-25_W
Work Order #: 170364

Start Date & Time: Apr 26 /17 @ 2000h
Stop Date & Time: May 3 /17 @ 0830h
Test Species: *Oncorhynchus mykiss*

Concentration %(v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	1	0	5	6	12	18	0	30
	2	↓	1	↓	1	3	1	1	7	5	18	30
	3	↓	0	↓	1	0	0	0	1	0	30	~~31~~ 30
	4	↓	↓	↓	0	0	1	3	4	6	19	29
6.25	1	↓	↓	↓	0	2	5	3	10	~~2~~ 18	2	30
	2	↓	↓	↓	0	0	0	0	0	1	29	30
	3	↓	↓	↓	0	0	0	0	0	1	29	30
	4	↓	↓	↓	0	0	0	0	0	11	19	30
12.5	1	↓	↓	↓	2	5	1	5	13	10	7	30
	2	↓	↓	↓	1	0	1	1	3	1	26	30
	3	↓	↓	↓	0	0	0	0	0	0	30	30
	4	↓	↓	↓	2	2	0	0	4	11	17	32
25	1	↓	↓	1	0	5	6	4	16	2	12	30
	2	↓	↓	2	2	0	2	2	8	2	20	30
	3	↓	↓	0	1	0	0	0	1	0	29	30
	4	↓	↓	0	1	2	3	2	8	6	18	32
50	1	↓	↓	0	1	2	6	8	17	13	0	30
	2	↓	↓	1	1	0	1	2	5	1	24	30
	3	↓	↓	0	0	0	0	0	0	0	30	30
	4	↓	↓	0	4	1	1	6	12	5	13	30
100	1	↓	↓	0	3	3	6	10	~~19~~ 22	8	0	30
	2	↓	1	2	1	1	2	1	8	0	22	30
	3	↓	0	0	0	0	0	0	0	1	29	30
	4	↓	0	0	0	1	1	2	4	6	20	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: VOh **Date reviewed:** May 23/17

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	20-5272-8135	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-17 13:11	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	18-6172-3895	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	26 Apr-17 20:00	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 May-17 08:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 12h	**Source:**	Campbel Lake	**Age:**	
Sample ID:	03-5831-0821	**Code:**	155B63A5	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:49	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	55h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	657725	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	22.49	N/A	N/A	4.446	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	3	0.741	0.6	0.9677	0.1145	0.1983	26.76%	0.0%	67	90
6.25		3	0.8556	0.6333	0.9667	0.1111	0.1925	22.49%	-15.46%	77	90
12.5		3	0.7993	0.5313	1	0.1394	0.2415	30.22%	-7.87%	73	92
25		3	0.7319	0.5625	0.9667	0.1212	0.2098	28.67%	1.22%	67	92
50		3	0.7444	0.4333	1	0.1659	0.2874	38.6%	-0.47%	67	90
100		3	0.7889	0.6667	0.9667	0.09095	0.1575	19.97%	-6.47%	71	90

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	① Rep 4
0	Negative Control	0.6	0.9677	0.6552	
6.25		0.9667	0.9667	0.6333	
12.5		0.8667	1	0.5313	
25		0.6667	0.9667	0.5625	
50		0.8	1	0.4333	
100		0.7333	0.9667	0.6667	

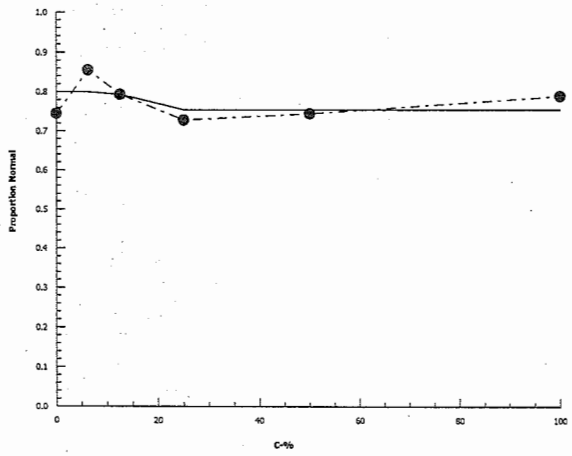
① Rep A was excluded from analysis due to bad female eggs

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	① Rep 4
0	Negative Control	18/30	30/31	19/29	
6.25		29/30	29/30	19/30	
12.5		26/30	30/30	17/32	
25		20/30	29/30	18/32	
50		24/30	30/30	13/30	
100		22/30	29/30	20/30	

Analysis ID:	20-5272-8135	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-17 13:11	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Apr 26/17 @ 2000h.

Work Order No.: 170364

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DC1_WS_2017-04-25_N
Sample Date: Apr 24/17
Date Received: Apr 25/17
Sample Volume: 5X20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 16
Alkalinity (mg/L $CaCO_3$): 14 ~~32~~ 16

Test Organism Information:

Batch No.: 042617
Source: Campbel Lake
Loading Density: 1.07 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE97
Stock Solution ID: 17503 (1000 mg/L SDS)
Date Initiated: Apr 26/17
7-d EC50 (95% CL): 6.5 (6.2 - 6.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (1.9 - 8.5) mg/L SDS
Reference Toxicant CV (%): 45

Test Results:

	Sample ID		
	LC_DC1_WS_2017-04-25_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCh

Date reviewed: May 19/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LCDC1_WS_2017_04-25_N
Work Order #: 170364

Start Date & Time: Apr 26 / 17 @ 2000h
Stop Date & Time: May 3 / 17 @ 0815h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.0	13.5	13.5	13.5	13.5	13.5	13.0	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.2	10.5	10.3	10.3	10.2	10.2	10.2	10.3	10.2	10.1	10.2	10.5	10.5	10.5
pH	6.7	6.9	6.9	6.9	6.9	6.8	6.9	6.8	6.9	6.9	6.8	7.2	7.1	7.0
Cond. (µS/cm)	29	~~9~~ 29		30		30		30		30		38 ~~38~~ 40		36
Initials	KL	KL		KL		A		A		KL		KL		KL

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.3	10.5	10.2 KL	10.3	10.2	10.2	10.2	10.1	10.2	10.3	10.3	10.5	10.4	10.5
pH	7.1	7.2	7.3	7.3	7.3	7.2	7.3	7.4	7.3	7.1	7.2	7.3	7.3	7.2
Cond. (µS/cm)	43	39		41		38		39		42		50		47
Initials	KL	KL		KL		A		A		KL		KL		KL

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.4	10.5	10.3	10.3	10.2	10.2	10.1	10.2	10.3	10.3	10.2	10.5	10.4	10.5
pH	7.5	7.6	7.6	7.7	7.6	7.6	7.7	7.7	7.6	7.5	7.6	7.5	7.5	7.4
Cond. (µS/cm)	88	86		87		86		88		89		93		92
Initials	KL	KL		KL		A		A		KL		KL		KL

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.0 KL	13.0	~~12.5~~ 13.0 KL	13.0	12.5
DO (mg/L)	10.5	10.5	10.3	10.3	10.2	10.3	10.1	10.3	10.2	10.3	10.2	10.5	10.4	10.5
pH	8.0	8.0	8.2	8.1	8.2	8.0	8.1	8.1	8.0	8.1	8.2	7.9	8.0	8.0
Cond. (µS/cm)	252	254		252		251		252		253		253		255
Initials	KL	KL		KL		A		A		KL		KL		KL

Thermometer: CER ~~9~~ KL 3 **DO meter:** DO-2 **pH meter:** PH-1 **Conductivity meter:** C-2

	Control	LCDC1 (100h)		
Hardness*	16	130		
Alkalinity*	KL ~~32~~ 16	132		

* mg/L as CaCO3

Analysts: KL, AWD

Reviewed by: [signature]
Date reviewed: May 19/17

Sample Description: Clear, colourless, odourless, brown particulates present

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_DCI_WS_2017-04-25_N
Work Order #: 170364

Start Date & Time: Apr 26 /17 @ 2000h
Stop Date & Time: May 3 /17 @ 0815h
Test Species: *Oncorhynchus mykiss*

Concentration %(v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
control	1	0	0	0	1	3	5	0	9	~~22 16 K 13 16~~	~~6~~ K 0	31
	2				1	2	2	2	7	1	22	30
	3				0	0	0	0	0	1	29	30
	4				0	1	1	2	4	~~5~~ K 10	~~24~~ 16 K	30
6.25	1		K +0		0	1	6	5	12	17	1	30
	2			1	2	1	1	4	9	0	21	30
	3			0	0	0	0	0	0	0	30	30
	4			0	2	0	0	1	3	10	17	30
12.5	1				0	2	6	6	14	2	14	30
	2				1	1	1	1	4	2	24	30
	3				0	0	0	0	0	0	30	30
	4				1	2	0	5	8	7	15	30
25	1		1		0	4	1	6	12	18	0	30
	2		0		0	0	1	0	1	3	26	30
	3				0	0	1	1	2	0	28	30
	4				1	2	0	2	5	9	16	30
50	1			1	2	0	9	2	13	17	0	30
	2			1	0	0	0	2	3	2	25	30
	3			0	0	0	0	0	0	2	28	30
	4			0	1	1	0	3	5	~~4~~ K 8	~~8~~ K 17	30
100	1			0	3	K 16	5	10	24	~~5~~ K 6	1	31
	2			2	0	2	1	1	6	~~8~~ K 2	K ~~24~~ 22	30
	3			0	0	1	0	0	1	0	K ~~30~~ 29	30
	4			0	1	0	0	1	2	K ~~3~~ 10	K ~~6~~ 18	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		K	K	A	A	K	K	K	K	K	K	K

Comments:

Reviewed by: JCh

Date reviewed: May 19/17

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	02-1362-3108	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-17 13:06	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-3385-7120	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	26 Apr-17 20:00	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 May-17 08:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 12h	**Source:**	Campbel Lake	**Age:**	
Sample ID:	05-2054-0776	**Code:**	1F06D268	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:29	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	56h (3 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	123006	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	3	0.7444	0.5333	0.9667	0.1252	0.2169	29.13%	0.0%	67	90
6.5		3	0.7556	0.5667	1	0.1281	0.2219	29.37%	-1.49%	68	90
12.5		3	0.7667	0.5	1	0.1453	0.2517	32.83%	-2.99%	69	90
25		3	0.7778	0.5333	0.9333	0.1237	0.2143	27.55%	-4.48%	70	90
50		3	0.7778	0.5667	0.9333	0.1094	0.1895	24.37%	-4.48%	70	90
100		3	0.7667	0.6	0.9667	0.1072	0.1856	24.21%	-2.99%	69	90

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4 ①
0	Negative Control	0.7333	0.9667	0.5333	
6.5		0.7	1	0.5667	
12.5		0.8	1	0.5	
25		0.8667	0.9333	0.5333	
50		0.8333	0.9333	0.5667	
100		0.7333	0.9667	0.6	

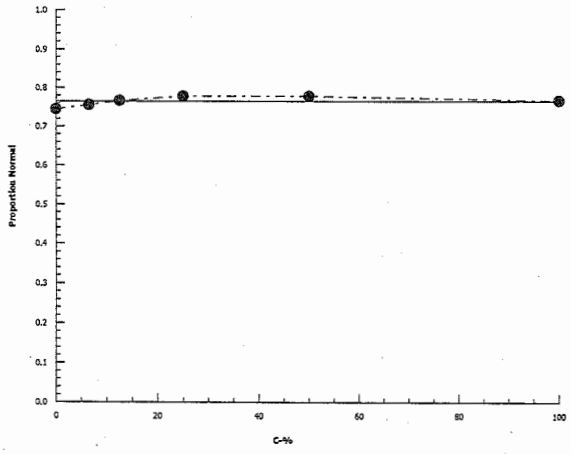
① Rep A was excluded from analysis due to bad female eggs

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4 ①
0	Negative Control	22/30	29/30	16/30	
6.5		21/30	30/30	17/30	
12.5		24/30	30/30	15/30	
25		26/30	28/30	16/30	
50		25/30	28/30	17/30	
100		22/30	29/30	18/30	

Analysis ID:	02-1362-3108	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-17 13:06	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Apr 26/17 @ 2000h

Work Order No.: 170364

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DCDS_WS_2017-04-25_N
Sample Date: Apr 24/17
Date Received: Apr 25/17
Sample Volume: 5 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 16
Alkalinity (mg/L $CaCO_3$): ~~32~~ 16

Test Organism Information:

Batch No.: D42617
Source: Campbell Lake
Loading Density: 1.07 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTC97
Stock Solution ID: A501 (1000 mg/L SDS)
Date Initiated: Apr 26/17
7-d EC50 (95% CL): 6.5 (6.2 – 6.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (1.9 – 8.5) mg/L SDS
Reference Toxicant CV (%): 45

Test Results:

	Sample ID		
	~~LC~~ LC_DCDS_WS_2017-04-25_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCh

Date reviewed: May 03/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_DCDS_WS_297-04-25_N
Work Order #: 170364

Start Date & Time: Apr 26/17 @ 2000h
Stop Date & Time: May 3/17 @ 0845h
Test Species: *Oncorhynchus mykiss*

%(v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	~~13~~ 14.0	13.0	13.5	13.5	13.5	13.5	13.5	13.0	13.5	13.0	13.0	12.5	13.0	13.0
DO (mg/L)	10.2	10.5	10.3	10.3	10.2	10.2	10.2	10.3	10.1	10.1	10.2	10.5	10.4	10.5
pH	6.7	6.9	6.9	6.9	7.0	6.8	6.9	6.8	6.9	6.9	6.8	7.2	7.1	7.0
Cond. (µS/cm)	29	28		30		30		30		30		~~40~~ 38		37
Initials	KL	KL		KL						KL		KL		KL

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	~~13.5~~ 13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.0	13.0	12.5	13.0	13.0
DO (mg/L)	10.4	10.5	10.3	10.2	10.2	10.2	10.2	10.3	10.2	10.3	10.2	10.5	10.4	10.5
pH	7.1	7.2	7.2	7.3	7.2	7.3	7.1	7.4	7.5	6.9	7.0	7.3	7.2	7.2
Cond. (µS/cm)	40	36		36		38		37		40		47		46
Initials	KL	KL		KL						KL		KL		KL

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.0	13.0	12.5	13.0	13.0
DO (mg/L)	10.4	10.5	10.3	10.2	10.2	10.3	10.2	10.2	10.3	10.3	10.2	10.5	10.4	10.5
pH	7.3	~~7.4~~ 7.5	7.4	7.4	7.4	~~7.5~~ 7.5	7.5	7.6	7.6	7.4	7.4	7.4	7.4	7.4
Cond. (µS/cm)	74	71		77		~~72~~ 72		74		76		81		80
Initials	KL	KL		KL						KL		KL		KL

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	~~13.5~~ 13.5	13.0	13.0	13.0	12.5
DO (mg/L)	10.5	10.5	10.3	10.2	10.1	10.2	10.1	10.3	10.3	10.3	10.2	10.5	10.4	10.5
pH	7.8	7.8	8.0	7.8	8.0	7.9	8.1	8.0	8.0	~~8.5~~ 7.8	8.0	7.6	7.9	7.8
Cond. (µS/cm)	200	202		201		202		204		202		203		208
Initials	KL	KL		KL						KL		KL		KL

Thermometer: ~~LEP 9/13~~ KL **DO meter:** DO-2 **pH meter:** pH-1 **Conductivity meter:** C-2

	Control	LC-DCDS (100%)		
Hardness*	16	110		
Alkalinity*	~~32~~ 16	104		

* mg/L as CaCO3

Analysts: AWD, KL
Reviewed by: JDH
Date reviewed: May 23/17

Sample Description: slightly turbid, colourless, odourless, brown particulates present

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_DCDS_WS_2017-04-25_IN
Work Order #: 170364

Start Date & Time: Apr 26/17 @ 2000h
Stop Date & Time: May 3/17 0845h
Test Species: *Oncorhynchus mykiss*

Concentration %(v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	1	2	4	2	9	9^M 19	2	30
	2				1	0	1	0	2	3^M 3^M 1	31	34
	3				0	0	0	0	0	~~29~~^M 1	29	30
	4				0	0	0	4	4	13	13	30
6.25	1				4	3	4	6	17	12	0	29
	2				0	1	1	4	6	2	22	30
	3		↓		0	0	0	0	0	1	29	30
	4		0		2	1	1	1	5	8	17	30
12.5	1			1	0	5	1	11	17	13	0	30
	2			1	1	0	2	1	5	1	24	30
	3			0	0	0	0	0	0	0	30	30
	4			0	1	1	0	4	6	9	15	30
25	1			0	1	2	8	7	~~25~~ 18	10	0	28
	2			2	1	2	1	1	7	1	22	30
	3			0	0	0	0	0	0	1	29	30
	4			0	1	2	2	1	6	10	14	30
50	1			2	4	1	6	6	19	11	0	30
	2			1	1	1	0	3	6	0	24	30
	3			0	0	0	0	0	0	1	29	30
	4			0	6	0	3	9	18	4	8	30
100	1			0	5	1	8	10	24	5	1	30
	2			2	2	1	0	1	6	0	24	30
	3			0	0	0	0	0	0	0	30	30
	4	↓	↓	0	3	9	6	3	21	3	6	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	A	A	KL	KL	KL	KL	KL	KL	KL

Comments:

Reviewed by: JGh **Date reviewed:** May 23/17

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	15-2611-1055	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-17 13:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-0431-5485	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	26 Apr-17 20:00	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 May-17 08:45	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 13h	**Source:**	Campbel Lake	**Age:**	
Sample ID:	07-7306-7951	**Code:**	2E1414AF	**Client:**	Teck Coal
Sample Date:	24 Apr-17 10:38	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (3.5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2010083	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	19.01	N/A	N/A	5.261	NA	NA
EC10	36.01	N/A	N/A	2.777	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	3	0.7706	0.4333	0.9667	0.1694	0.2934	38.07%	0.0%	73	94
6.25		3	0.7556	0.5667	0.9667	0.116	0.2009	26.59%	1.95%	68	90
12.5		3	0.7667	0.5	1	0.1453	0.2517	32.83%	0.51%	69	90
25		3	0.7222	0.4667	0.9667	0.1444	0.2502	34.64%	6.28%	65	90
50		3	0.6778	0.2667	0.9667	0.2111	0.3657	53.95%	12.04%	61	90
100		3	0.6667	0.2	1	0.2404	0.4163	62.45%	13.49%	60	90

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	① Rep 4
0	Negative Control	0.9118	0.9667	0.4333	
6.25		0.7333	0.9667	0.5667	
12.5		0.8	1	0.5	
25		0.7333	0.9667	0.4667	
50		0.8	0.9667	0.2667	
100		0.8	1	0.2	

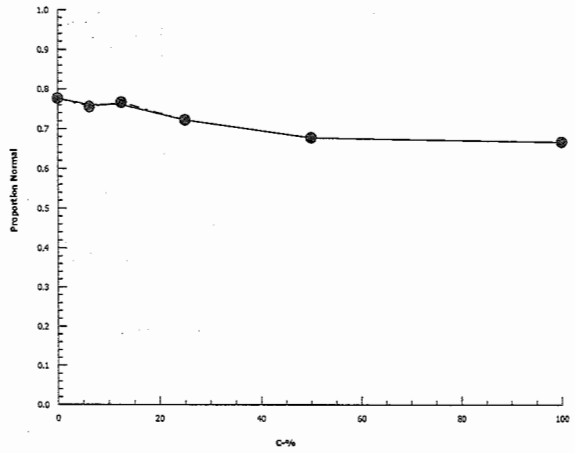
① Rep A was excluded from analysis due to bad female eggs

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	① Rep 4
0	Negative Control	31/34	29/30	13/30	
6.25		22/30	29/30	17/30	
12.5		24/30	30/30	15/30	
25		22/30	29/30	14/30	
50		24/30	29/30	8/30	
100		24/30	30/30	6/30	

Analysis ID:	15-2611-1055	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-17 13:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Apr 26/17 @ 2000h

Work Order No.: 170364

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: WL_BFWB_OUT_SP2L_20170424_N
Sample Date: Apr 24/17
Date Received: Apr 25/17
Sample Volume: 5 x 2L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 16
Alkalinity (mg/L $CaCO_3$): ~~35~~ 16

Test Organism Information:

Batch No.: 042617
Source: Campbel Lake
Loading Density: 1.07 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTC97
Stock Solution ID: RTS01 (1000 mg/L SDS)
Date Initiated: Apr 26/17
7-d EC50 (95% CL): 6.5 (6.2 – 6.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (1.9 – 8.5) mg/L SDS
Reference Toxicant CV (%): 45

Test Results:

	Sample ID		
	WL_BFWB_OUT_SP2L_20170424_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCL

Date reviewed: May 23/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: ~~WLR-AWTF~~ BFWB_OUT_SP21_20170424_N
Work Order #: 170364

Start Date & Time: Apr 26/17 @ 2000h.
Stop Date & Time: May 3/17 @ 0915h
Test Species: *Oncorhynchus mykiss*

%(v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.0	13.5	13.5	13.5	13.5	13.5	13.0	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.2	10.5	10.3	10.3	10.2	10.2	10.1	10.3	10.2	10.1	10.2	10.5	10.4	10.5
pH	6.7	6.9	6.9	~~6.8~~ 6.9	7.0	6.8	6.8	6.8	6.9	6.9	6.9	7.2	7.1	7.0
Cond. (µS/cm)	29	28		30		30		30		30		~~40~~ 38		36
Initials	KL	KL		KL		AM		AM		KL		KL		KL

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.5	10.5	10.3	10.3	10.2	10.2	10.2	10.2	10.1	10.2	10.2	10.5	10.4	10.5
pH	7.2	~~7.3~~ 7.2	7.5	7.4	7.4	7.3	7.3	7.3	7.3	7.2	7.2	7.3	7.3	7.2
Cond. (µS/cm)	179	164		172		173		173		~~244~~ 194		159		167
Initials	KL	KL		KL		AM		AM		KL		KL		KL

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.5	10.5	10.3	10.3	10.2	10.2	10.1	10.2	10.2	10.2	10.2	10.5	10.4	10.5
pH	7.6	7.7	7.9	7.8	7.9	7.7	7.7	7.8	7.6	7.7	7.8	7.8	7.8	7.8
Cond. (µS/cm)	569	597		586		575		568		626		589		593
Initials	KL	KL		KL		AM		AM		KL		KL		KL

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	~~13.5~~ 14.0	13.0	13.0	13.0	12.5
DO (mg/L)	10.5	10.5	10.3	10.3	10.2	10.3	10.2	10.2	10.2	10.2	10.2	10.5	10.4	10.5
pH	7.7	7.7	8.3	7.8	8.4	7.9	8.0	8.0	8.1	7.9	8.5	7.7	8.1	8.4
Cond. (µS/cm)	1861	1879		1872		1874		1873		1879		1880		1835
Initials	KL	KL		KL		AM		AM		KL		KL		KL

Thermometer: ~~CER-913~~ KL **DO meter:** DO-2 **pH meter:** pH-1 **Conductivity meter:** C-2

	Control	100%		
Hardness*	16	1260		
Alkalinity*	KL ~~32~~ 16	320		

Analysts: AWD, KL

Reviewed by: JBL
Date reviewed: May 23/17

* mg/L as CaCO3

Sample Description: clear, colourless, ~~colourless~~ KL hydrocarbon odour, brown particulates present

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: ~~WL8~~ ~~AWTF~~ WL_BFWB_OUT_SP21_20170424
Work Order #: 170364

Start Date & Time: Apr 26 /17e 2000h
Stop Date & Time: May 3/17e 0915h
Test Species: *Oncorhynchus mykiss*

Concentration %(v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
control	1	0	0	0	3	5	3	7	18	12	0	30
	2			1	0	4	1	2	8	0	22	30
	3			0	0	0	0	0	0	1	29	30
	4			1	0	0	3	4	8	9	13	30
6.25	1			0	0	4	5	5	14	14	1	29
	2			1	0	1	0	1	3	0	28	31
	3			0	0	1	0	1	2	0	28	30
	4			0	3	0	1	2	6	11	13	30
12.5	1		↓	0	0	7	4	8	19	11	0	30
	2		1	1	2	1	1	5	11	3	16	30
	3		0	0	0	0	0	0	0	0	30	30
	4			1	2	0	0	4	7	~~14~~ 11	~~19~~ 12	~~32~~ 30
25	1			1	0	3	5	5	14	16	0	30
	2			1	0	1	2	5	9	0	21	30
	3			0	1	0	0	0	1	0	29	30
	4			0	4	3	3	3	13	~~8~~ 2	~~19~~ 15	30
50	1			0	1	5	6	11	23	7	0	30
	2			1	0	1	2	~~0~~ 4	~~4~~ 8	5	17	30
	3			0	0	0	0	~~4~~ 0	0	0	30	30
	4			0	0	0	1	1	2	12	~~30~~ 16	30
100	1			0	3	4	7	2	16	~~12~~ 13	~~16~~ 3	32
	2			2	1	7	0	2	12	1	17	30
	3			0	1	0	0	0	1	0	29	30
	4	↓	↓	0	0	0	2	4	6	11	13	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	KL	[illegible]	[illegible]	KL	KL	KL	KL	KL	KL	KL

Comments:

Reviewed by: JGh

Date reviewed: May 23/17

CETIS Analytical Report

Report Date: 09 May-17 14:33 (p 1 of 2)
Test Code: 170364f | 12-1499-5044

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	14-4408-3109	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-17 13:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	14-8013-2106	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	26 Apr-17 20:00	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 May-17 09:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 13h	**Source:**	Campbel Lake	**Age:**	

Sample ID:	09-1853-4142	**Code:**	36BFB7FE	**Client:**	Teck Coal
Sample Date:	24 Apr-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	59h (8 °C)	**Station:**	WL_BFWB_OUT_SP21_20170424_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1045	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	10.94	N/A	N/A	9.142	NA	NA
EC10	88.95	N/A	N/A	1.124	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	3	0.7111	0.4333	0.9667	0.1544	0.2674	37.6%	0.0%	64	90
6.25		3	0.7566	0.4333	0.9333	0.1619	0.2804	37.06%	-6.4%	69	91
12.5		3	0.6444	0.4	1	0.1819	0.3151	48.89%	9.38%	58	90
25		3	0.7222	0.5	0.9667	0.1352	0.2341	32.42%	-1.56%	65	90
50		3	0.7	0.5333	1	0.1503	0.2603	37.19%	1.56%	63	90
100		3	0.6556	0.4333	0.9667	0.1602	0.2776	42.34%	7.81%	59	90

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	① Rep 4
0	Negative Control	0.7333	0.9667	0.4333	
6.25		0.9032	0.9333	0.4333	
12.5		0.5333	1	0.4	
25		0.7	0.9667	0.5	
50		0.5667	1	0.5333	
100		0.5667	0.9667	0.4333	

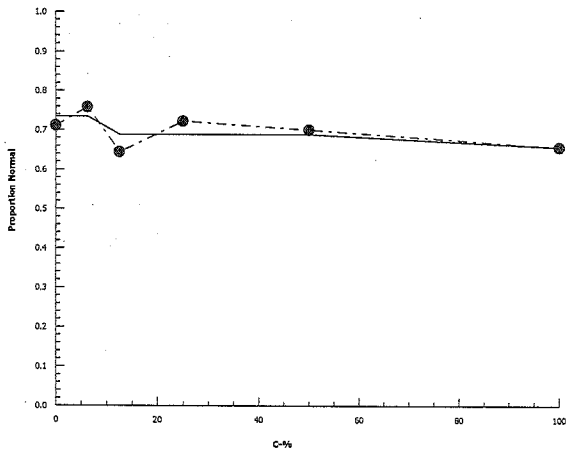
① Rep A was excluded from analysis due to bad female eggs.

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	① Rep 4
0	Negative Control	22/30	29/30	13/30	
6.25		28/31	28/30	13/30	
12.5		16/30	30/30	12/30	
25		21/30	29/30	15/30	
50		17/30	30/30	16/30	
100		17/30	29/30	13/30	

Analysis ID:	14-4408-3109	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	09 May-17 13:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Client: Teck

W.O.#: A0364

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
LC-LCDSSLCC-	Apr24/17	Apr25/17	50	10.0	10.3	194	100①	5.4	540	JS
WS-2017-04-24-N										
LC_LC5-WS-			50	10.0	10.2	196	100①	4.9	490	JS
2017.04_24_N										
LC-FRDSDC-WS-			50	10.3	10.5	202	100①	5.0	500	JS
2017_04_25N										
LC_DC1_WS_2017_			50	6.8	7.0	132	50	6.5	130	JS
04-25N										
LC_DCDS_WS_			50	5.4	5.6	104	50	5.5	110	JS
2017_04_25N										
WLC-AWTF-WL-BFWB			100①	3.4	3.6	~~64~~ 320	100①	12.6	1260	JS
-OUT_SP2L/20170429N										
WL_BFWB_OUT_SP2L	↓	↓								
20170424_N										
Dechlor	Apr26/17	Apr26/17	100	1.7	1.8	~~32~~16	100	1.6	16	IK

Notes: ① Diluted to 100mL w/ D.I. water

Reviewed by: JSh Date Reviewed: May 19/17

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Apr 26/17 @ 2000h

Work Order No.: 17036.8

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: Various (see below)
Sample Date: Apr 24/17
Date Received: Apr 25/17
Sample Volume: 7-8 X 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 16
Alkalinity (mg/L $CaCO_3$): 16

Test Organism Information:

Batch No.: 042617
Source: Campbell Lake
Loading Density: 1.07 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RE97
Stock Solution ID: 17501 (6000mg/L SDS)
Date Initiated: Apr 26/17
7-d EC50 (95% CL): 6.5 (6.2 – 6.9) mg/L SDS

Reference Toxicant Mean and Range: 4.0 (1.9 – 8.5) mg/L SDS
Reference Toxicant CV (%): 45

Test Results:

Embryo viability (mean ± SD)

	Sample ID		
	control	CHLER2_WS_2017-04-24_W	FRUFR1_R_0304 2017_W
EC25 % (v/v) (95% CL)	75.6 ± 26.9	~~62.2 ± 37.9~~ IC	~~67.4 ± 17.9~~ * IC
EC50 % (v/v) (95% CL)		67.4 ± 17.9	62.2 ± 37.9

* indicates significantly different compared to control

Reviewed by: JGH

Date reviewed: May 24/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: ~~GHLER2~~ Various (see below)
Work Order #: 170368

Start Date & Time: Apr 26 17C 2000h
Stop Date & Time: May 3/17 0930h
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration (control)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.0	13.5	13.5	13.5	13.5	13.5	13.0	13.5	13.0	13.0	12.5	13.0	12.5
DO (mg/L)	10.2	10.5	10.3	10.3	10.1	10.2	10.3	10.3	10.2	10.1	10.2	10.5	10.4	10.5
pH	6.7	6.9	6.9	6.9	9.0	6.8	6.9	6.8	6.9	6.9	6.9	7.2	7.1	7.0
Cond. (µS/cm)	29	28		30		30		30		30		38		36
Initials	KL	KL		KL		A		A		KL		KL		KL

① GHLER2 Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	~~13~~ 14.0	13.5	14.0	13.5	13.6	13.6	13.6	13.5	13.05	13.0	13.0	13.0	12.5
DO (mg/L)	10.4	10.3	10.2	10.2	10.1	10.2	10.2	10.3	10.2	10.2	10.2	10.5	10.4	10.5
pH	8.0	8.0	8.3	8.1	8.3	8.1	8.1	8.0	8.1	8.1	8.4	8.0	8.1	8.1
Cond. (µS/cm)	323	324		324		324		323		~~330~~ 326		325		324
Initials	KL	KL		KL		A		A		KL		KL		KL

② FR_UFR1 Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.5	13.5	14.0	13.5	13.6	13.6	13.6	13.5	13.85	13.0	13.0	13.0	13.0
DO (mg/L)	10.1	~~10.2~~ 10.1	10.2	10.1	10.1	10.3	10.2	10.3	10.2	10.2	10.2	10.5	10.4	10.5
pH	7.9	7.9	8.1	8.0	8.1	8.0	8.2	8.0	8.2	8.2	8.2	7.9	8.0	8.0
Cond. (µS/cm)	251	253		252		251		251		253		254		256
Initials	KL	KL		KL		A		A		KL		KL		KL

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: ~~CER-9~~ KL/3 **DO meter:** DO-2 **pH meter:** PH-1 **Conductivity meter:** C-2

	Control	GHLER2 (100%)	FR_UFR1 (100%)	
Hardness*	16	170	154 KL	
Alkalinity*	KL ~~32~~ 16	170	168	

* mg/L as CaCO3

Analysts: KL, AWD.

Reviewed by: JOL

Date reviewed: May 19/17

Sample Description: ① Clear, colourless, odourless, some brown particulates present ② Clear, colourless, odourless, some brown particulates present

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: ~~LFR_EQ2~~ Unknowns (see below)
Work Order #: 170368

Start Date & Time: Apr 26 17 2000h
Stop Date & Time: May 3/17 0930h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	1	3	6	5	15	11	4	30
	2	1	|	1	2	0	0	0	~~3~~ 4	2	~~26~~ 24	~~29~~ 30
	3	0	|	0	0	0	0	0	0	0	30	30
	4	0	|	0	1	1	0	0	2	14 ~~12~~ ~~19~~	~~17~~ 14	~~28~~ 30
100	1	|	|	0	0	4	6	7	17	12	1	30
LFR_EQ2	2	|	|	1	1	1	1	3	7	2	21	30
	3	|	|	0	0	0	1	2	3	2	26	31
	4	|	|	0	1	1	0	4	6	9	14	29
100	1	|	|	1	2	9	6	5	23	6	1	30
FR_UFF1	2	|	|	1	0	1	3	3	8	0	22	30
	3	|	|	0	0	1	1	0	2	0	28	30
	4	↓	↓	0	0	1	2	3	6	18	6	30
	1											
	2											
	3											
	4											
	1											
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	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: JBk **Date reviewed:** May 19/17

CETIS Summary Report

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Batch ID:	06-4245-5203	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	26 Apr-17 20:00	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 May-17 09:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 14h	**Source:**	Campbel Lake	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-1311-1684	26 Apr-17 20:00	03 May-17 09:30	NA	Teck Coal	
FR_UFR1	15-5756-3483	24 Apr-17 09:14	25 Apr-17 09:00	59h (8 °C)		
GH_ER2	17-9724-6204	24 Apr-17 12:00	25 Apr-17 09:00	56h (5.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	control	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_URF1_Q_03042017_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2017-04-24_N		

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	3	0.7556	0.08625	1	0.4667	1	0.1556	0.2694	35.66%	0.0%
① FR_UFR1	3	0.6222	0	1	0.2	0.9333	0.2189	0.3791	60.92%	17.65%
① GH_ER2	3	0.6738	0.2281	1	0.4828	0.8387	0.1036	0.1794	26.63%	10.82%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	② Rep 4
Control	0.8	1	0.4667	
FR_UFR1	0.7333	0.9333	0.2	
GH_ER2	0.7	0.8387	0.4828	

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	② Rep 4
Control	24/30	30/30	14/30	
FR_UFR1	22/30	28/30	6/30	
GH_ER2	21/30	26/31	14/29	

① GH_ER2 and FR_UFR1 are Sk controls.

② Rep A was excluded from analysis due to bad female eggs.

CETIS Analytical Report

Report Date:	24 May-17 09:41 (p 1 of 2)
Test Code:	170368 | 13-6398-9393

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	15-9370-0159	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 May-17 9:40	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

Batch ID:	06-4245-5203	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	26 Apr-17 20:00	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 May-17 09:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 14h	**Source:**	Campbel Lake	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	02-1311-1684	26 Apr-17 20:00	03 May-17 09:30	NA	Teck Coal	
FR_UFR1	15-5756-3483	24 Apr-17 09:14	25 Apr-17 09:00	59h (8 °C)		
GH_ER2	17-9724-6204	24 Apr-17 12:00	25 Apr-17 09:00	56h (5.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	control	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_URF1_Q_03042017_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2017-04-24_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Control		(1) FR_UFR1	0.03804	0.0761	Exact	Non-Significant Effect
Control		(1) GH_ER2	0.1605	0.1605	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Control	Negative Contr	68	22	90	0.7556	0.2444	0.0%
FR_UFR1		56	34	90	0.6222	0.3778	17.65%
GH_ER2		61	29	90	0.6778	0.3222	10.29%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	(2) Rep 4
Control	0.8	1	0.4667	
FR_UFR1	0.7333	0.9333	0.2	
GH_ER2	0.7	0.8387	0.4828	

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	(2) Rep 4
Control	24/30	30/30	14/30	
FR_UFR1	22/30	28/30	6/30	
GH_ER2	21/30	26/31	14/29	

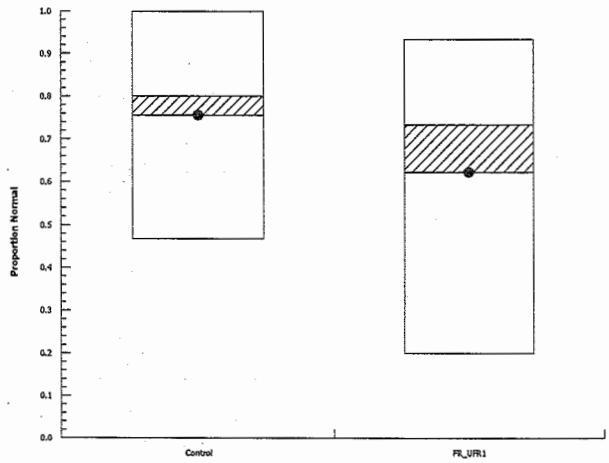
(1) FR_UFR1 and GH_ER2 are site controls.

(2) Rep A was excluded from analysis due to bad female eggs

Salmonid Embryo-Alevin Survival and Development Test | **Nautilus Environmental**

Analysis ID:	15-9370-0159	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 May-17 9:40	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Report Date: 24 May-17 09:47 (p 1 of 1)
Test Code: 170368 | 13-6398-9393

Salmonid Embryo-Alevin Survival and Development Test — **Nautilus Environmental**

Analysis ID:	15-7469-0042	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 May-17 9:46	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	06-4245-5203	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	26 Apr-17 20:00	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	03 May-17 09:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 14h	**Source:**	Campbel Lake	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	15-5756-3483	24 Apr-17 09:14	25 Apr-17 09:00	59h (8 °C)	Teck Coal	
GH_ER2	17-9724-6204	24 Apr-17 12:00	25 Apr-17 09:00	56h (5.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_URF1_Q_03042017_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2017-04-24_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	Upstream Contr	56	34	90	0.6222	0.3778	0.0%
GH_ER2	Receiving Wate	61	29	90	0.6778	0.3222	-8.93%

Proportion Normal Detail

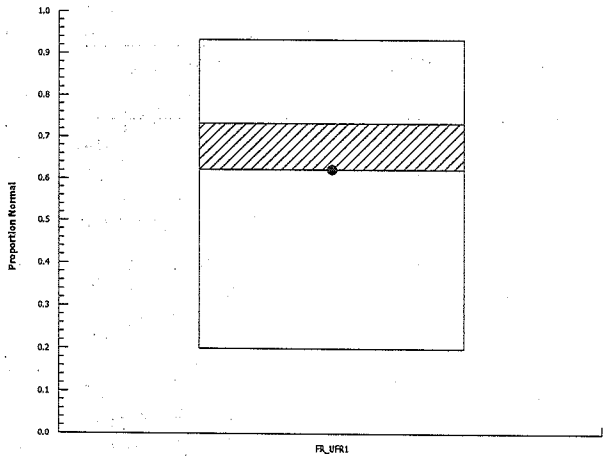
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	0.7333	0.9333	0.2	
GH_ER2	0.7	0.8387	0.4828	

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	22/30	28/30	6/30	
GH_ER2	21/30	26/31	14/29	

Graphics

Rep A was excluded from analysis due to bad female eggs.



Client: Teck

W.O.#: 170368

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
RR-UFF1	Apr 24/17	Apr 26/17	50	6.1	6.3	118	50	6.7	134	M
CHLER2	Apr 24/17	Apr 26/17	50	8.6	8.7	170	50	8.5	170	"
Dechlor	Apr 26/17	Apr 26/17	100	1.7	1.8	~~32~~ 16	100	1.6	16	"

Notes:

Reviewed by: JOL Date Reviewed: May 19/17

APPENDIX C – *Lemna minor* Toxicity Test Data

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 170367

Start Date: April 26/17
Set up by: JW

Sample Information:

Sample ID: LC-LCOSSLCC-WS-2017-04-24-N
Sample Date: April 24/17
Date Received: April 25/17
Sample Volume: 8 x 20L

Test Organism Information:

Culture Date: 041817
Age of culture (Day 0): 8 days
>8X growth in APHA?: Y (67 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 146
Date Initiated: May 3/17

7-d No. of Fronds IC50 (95% CL): 3.9 (2.9 - 4.9) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.8 (3.2-4.6) g/L KCl CV (%): 10

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	38.8 (24.4 - 63.3)	70.8 (33.3 - JW > 97)
IC50 %(v/v) (95% CL)	> 97	> 97

Reviewed by: [signature]

Date reviewed: May 30, 2017

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck | **Setup by:** JW

Sample ID: LC_LCDSSLCC_WS_2017-04-24_N | **Test Date:** April 26 / 17

Work Order No.: 170367 | **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 8 days | **> 8X Growth? (Y/N):** Y (67 fronds)

Light Intensity Range: 4500 - 5500 lux | **Date Measured:** April 25 / 17

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.5	24.0	23.5	24.0	24.0	24.0	24.0	24.0
Initials	JW	JW	[illegible]	[illegible]	[illegible]	JW	JW	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.5	Aeration?: 20 min	24.0
DO (mg/L)	9.7	Nutrients added?[1]: Y →	8.4
pH	8.0		8.0
Conductivity (µS)	922		1684

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.0	23.5	8.2	8.2	850
1.5	24.0	23.5	8.2	8.7	870
3.0	24.0	23.5	8.2	8.7	884
6.1	24.0	23.5	8.2	8.9	913
12.1	24.0	23.5	8.2	8.8	969
24.2	24.0	23.5	8.2	8.9	1084
48.5	24.0	23.5	8.1	9.0	1290
97	24.0	23.5	8.0	8.6	1684
Initials	JW	JW	JW	JW	JW

Thermometer: 8 **Cond. Meter:** 1 **pH meter:** 2 **Light meter:** 1.

Sample Description: Clear, colorless, odorless, brown ppt (JW) particulates present

Comments:

Reviewed: [signature] **Date Reviewed:** May 30, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - LCDSSLCC.WS-2017-04-24.N
Work Order #: 170367

Start Date: April 26 / 17
Termination Date: May 3 / 17
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
Control	A	6	68										JW
	B	6	79										
	C	6	70										
	D	6	77										
1.5	A	6	58										
	B	6	94										
	C	6	59										
	D	6	91										
3.0	A	6	74										
	B	6	105										
	C	6	88										
	D	6	62										
6.1	A	6	74										
	B	6	92										
	C	6	76										
	D	6	68										
12.1	A	6	58										
	B	6	58										
	C	6	67										
	D	6	95										
24.2	A	6	78										
	B	6	56										
	C	6	58										
	D	6	66										↓

Comments:

Reviewed by: [signature]

Date Reviewed: May 30, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: TECK
Sample ID: LC - LCDSSLCC - WS - 2017 - 04 - 24 - N
Work Order #: 170367

Start Date: April 26 / 17
Termination Date: May 3 / 17
Test set up by:

Concentration %o (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	64			X							JW
	B	6	57			X							
	C	6	51			X							
	D	6	49			X							
97	A	6	42		X	X							
	B	6	46		X	X							
	C	6	44		X	X							
	D	6	39		X	X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by:

Date Reviewed: May 30, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - LCDSSLCC - WS - 2017-04-24 - N
WO #: 170367
Start Date: April 26 /17
Termination Date: May 3 /17
Balance ID: Bal - 1

LCC

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	1	1044.37	1049.89	JW / JW
	B	2	1024.84	1031.16	↓
control	C	3	1008.98	1014.85	
	D	4	1032.71	1039.28	
	A	5	1027.35	1032.19	
	B	6	1032.92	1040.54	
1.5	C	7	1022.44	1027.26	
	D	8	1020.01	1026.94	
	A	9	1027.06	1033.00	
	B	10	1009.19	1018.30	
3.0	C	11	1028.27	1035.27	
	D	12	1008.70	1013.85	
	A	13	1029.62	1035.85	
	B	14	1004.11	1010.86	
6.1	C	15	1041.18	1047.64	
	D	16	1004.96	1010.94	
	A	17	1014.08	1019.40	
	B	18	1007.80	1012.81	
12.1	C	19	1011.34	1017.12	
	D	20	1046.26	1053.96	
	A	21	1017.36	1024.09	
	B	22	1009.95	1014.36	
24.2	C	23	1019.33	1024.37	
	D	24	1017.04	1022.91	
	A	25	999.72	1005.12	
	B	26	1029.79	1033.99	
48.5	C	27	1023.40	1027.83	
	D	28	1006.62	1011.18	↓

Comments: 10 % Re-weigh = # L. 1049.82 (mg) # 17. 1019.31 # 25. 1005.01 # 31. 1037.06

Reviewed by: [signature]
Date Reviewed: May 30, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_LCDSSLCC_WS_2017-04-24_N
WO #: 170367

Start Date: April 26 /17
Termination Date: May 3 /17
Balance ID: Bal - 1

LCC

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	1030.47	1034.91	JW / JW
	B	30	1018.95	1024.18	↓
97	C	31	1033.27	1037.12	↓
	D	32	1004.29	1008.20	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: May 30, 2017

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	19-6929-0408	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:22	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-5176-6868	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	03 May-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	10-6359-5836	**Code:**	LC LCDSSLCC	**Client:**	Teck Coal
Sample Date:	24 Apr-17 15:20	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	33h (5 °C)	**Station:**	LC LCDSSLCC WS 2017-04-24 N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
14	-93.67	196.8	201.2	0.4804	Yes	0.1985	2.776	0.9367	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	14.88	N/A	26.8	6.719	3.731	NA
IC10	19.14	N/A	33.28	5.224	3.004	NA
IC15	24.26	14.13	40.59	4.122	2.464	7.077
IC20	30.62	19	49.8	3.266	2.008	5.263
IC25	38.75	24.45	63.29	2.581	1.58	4.089
IC40	84.01	41.44	203.6	1.19	0.4911	2.413
IC50	~~157.2~~	~~55.64~~	~~731.1~~	~~0.6363~~	~~0.1368~~	~~1.797~~ JW 7 97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	67.06	5.856	55.58	78.54	11.45	<0.0001	Significant Parameter
C	1.272	0.1007	1.074	1.469	12.63	<0.0001	Significant Parameter
D	157.2	112.4	-63.1	377.4	1.398	0.1729	Non-Significant Parameter
E	0.1261	0.1813	-0.2293	0.4814	0.6955	0.4925	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	4641	4641	1	31.66	<0.0001	Significant
Lack of Fit	131.4682	32.86704	4	0.1985	0.9367	Non-Significant
Pure Error	3973.25	165.5521	24			
Residual	4104.718	146.5971	28			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	12.65	14.07	0.0811	Equal Variances
	Mod Levene Equality of Variance	2.243	2.423	0.0662	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9664	0.9338	0.4055	Normal Distribution
	Anderson-Darling A2 Normality	0.4744	2.492	0.2451	Normal Distribution

May 30/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 19-6929-0408 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 15 May-17 17:22 **Analysis:** Nonlinear Regression **Official Results:** Yes

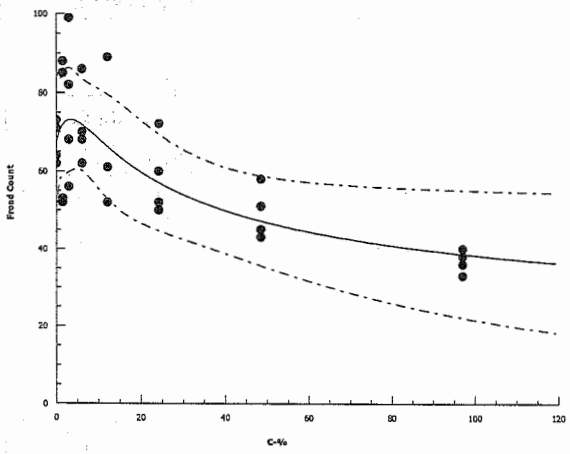
Frond Count Summary

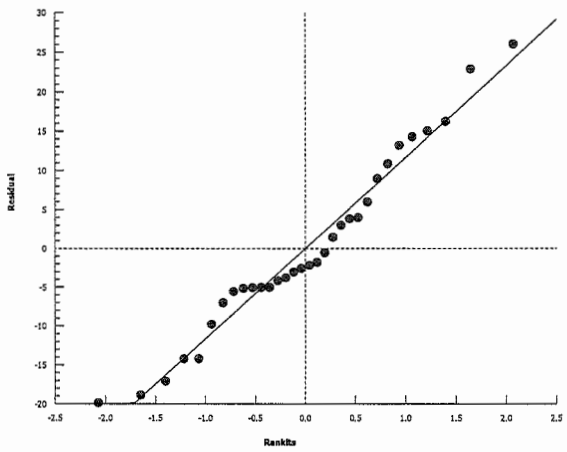
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	67.5	62	73	2.661	5.323	7.89%	0.0%
1.5		4	69.5	52	88	9.836	19.67	28.31%	-2.96%
3		4	76.25	56	99	9.259	18.52	24.29%	-12.96%
6.1		4	71.5	62	86	5.123	10.25	14.33%	-5.93%
12.1		4	63.5	52	89	8.761	17.52	27.59%	5.93%
24.2		4	58.5	50	72	4.992	9.983	17.07%	13.33%
48.5		4	49.25	43	58	3.376	6.752	13.71%	27.04%
97		4	36.75	33	40	1.493	2.986	8.13%	45.56%

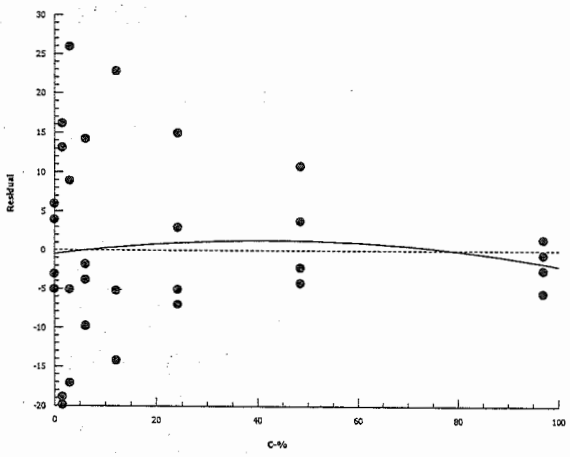
Frond Count Detail

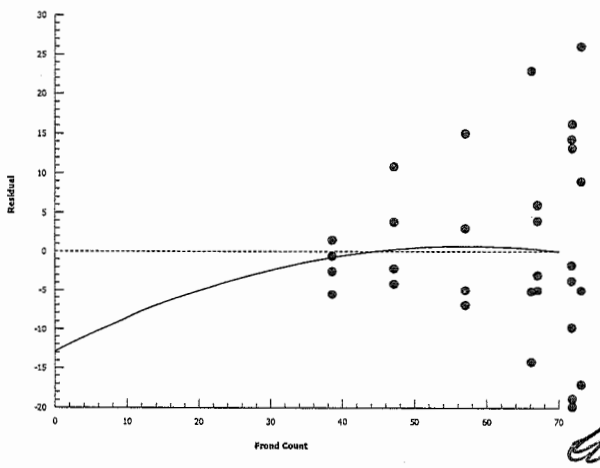
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	62	73	64	71
1.5		52	88	53	85
3		68	99	82	56
6.1		68	86	70	62
12.1		52	52	61	89
24.2		72	50	52	60
48.5		58	51	45	43
97		36	40	38	33

Graphics 4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]









May 30/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	09-0170-5662	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:23	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-5176-6868	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	03 May-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	10-6359-5836	**Code:**	LC LCDSSLCC	**Client:**	Teck Coal
Sample Date:	24 Apr-17 15:20	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	33h (5 °C)	**Station:**	LC LCDSSLCC WS 2017-04-24 N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
20	-13.06	35.6	39.98	0.3468	Yes	0.2643	2.776	0.8979	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	18.2	N/A	36.6	5.494	2.732	NA
IC10	25.66	13.07	47.91	3.897	2.087	7.649
IC15	35.76	20.02	64.33	2.796	1.555	4.996
IC20	49.99	27.14	96.01	2	1.042	3.685
IC25	70.78	33.32	166.2	1.413	0.6019	3.001
IC40	233.9	51.45	N/A	0.4276	NA	1.944
IC50	633	74.44	N/A	0.158	NA	1.343

JW } >97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	5.994	0.4782	5.057	6.932	12.54	<0.0001	Significant Parameter
C	1.178	0.07836	1.024	1.331	15.03	<0.0001	Significant Parameter
D	633	921.5	-1173	2439	0.6868	0.4978	Non-Significant Parameter
E	0.1636	0.2692	-0.364	0.6912	0.6078	0.5482	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	18.50183	18.50183	1	19.46	0.0001	Significant
Lack of Fit	1.123508	0.2808771	4	0.2643	0.8979	Non-Significant
Pure Error	25.50108	1.062545	24			
Residual	26.62459	0.9508782	28			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	11.26	14.07	0.1276	Equal Variances
	Mod Levene Equality of Variance	1.98	2.423	0.1005	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9614	0.9338	0.2996	Normal Distribution
	Anderson-Darling A2 Normality	0.4391	2.492	0.2976	Normal Distribution

May 30/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 09-0170-5662 **Endpoint:** Total Dry Weight-mg **CETIS Version:** CETISv1.8.7
Analyzed: 15 May-17 17:23 **Analysis:** Nonlinear Regression **Official Results:** Yes

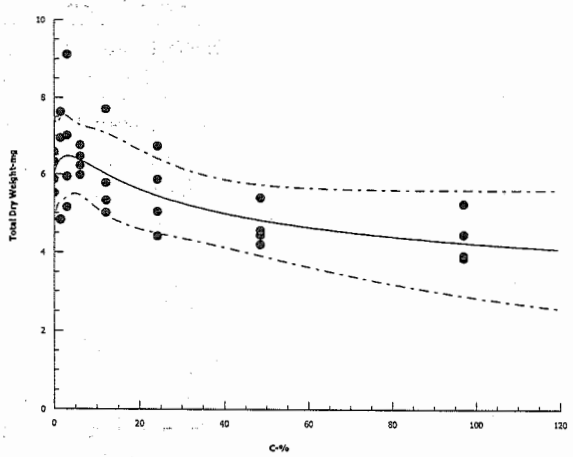
Total Dry Weight-mg Summary

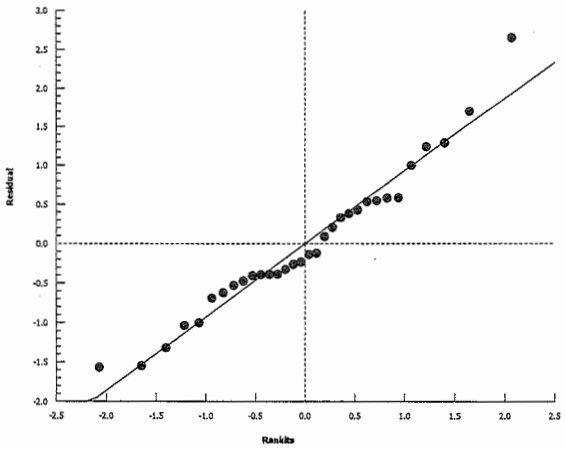
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.07	5.52	6.57	0.2336	0.4673	7.7%	0.0%
1.5		4	6.052	4.82	7.62	0.7197	1.439	23.78%	0.29%
3		4	6.8	5.15	9.11	0.8582	1.716	25.24%	-12.03%
6.1		4	6.355	5.98	6.75	0.1641	0.3283	5.17%	-4.69%
12.1		4	5.952	5.01	7.7	0.6036	1.207	20.28%	1.94%
24.2		4	5.512	4.41	6.73	0.5041	1.008	18.29%	9.19%
48.5		4	4.647	4.2	5.4	0.2617	0.5233	11.26%	23.44%
97		4	4.358	3.85	5.23	0.3196	0.6393	14.67%	28.21%

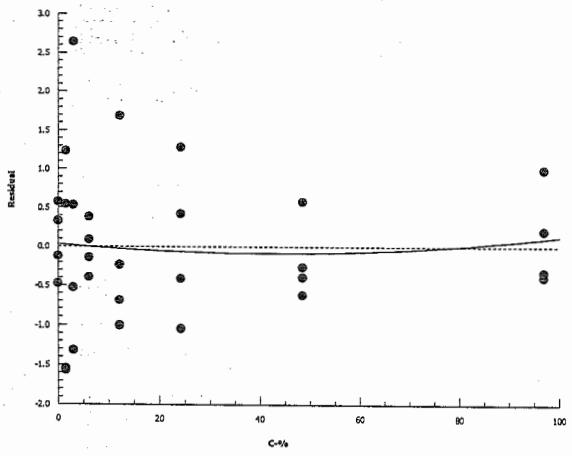
Total Dry Weight-mg Detail

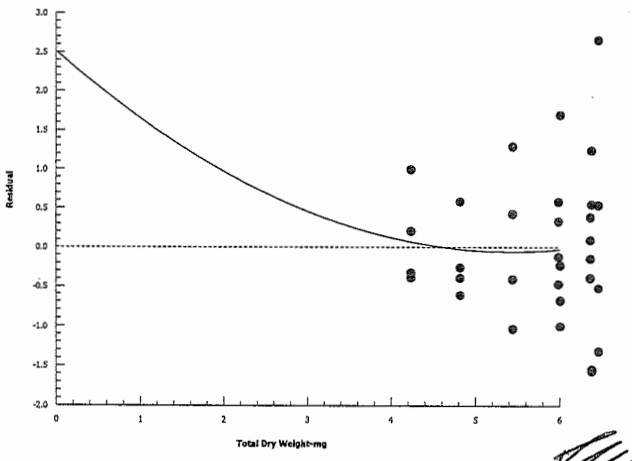
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5.52	6.32	5.87	6.57
1.5		4.84	7.62	4.82	6.93
3		5.94	9.11	7	5.15
6.1		6.23	6.75	6.46	5.98
12.1		5.32	5.01	5.78	7.7
24.2		6.73	4.41	5.04	5.87
48.5		5.4	4.2	4.43	4.56
97		4.44	5.23	3.85	3.91

Graphics 4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]









Lemna minor Summary Sheet

Client: Teck
Work Order No.: 170367

Start Date: April 27 / 17
Set up by: JW

Sample Information:

Sample ID: LC-LC5_WS-2017-04-24-N
Sample Date: April 24 / 17
Date Received: April 25 / 17
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 041917
Age of culture (Day 0): 8 days
>8X growth in APHA?: Y (67 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 146
Date Initiated: May 3 / 17

7-d No. of Fronds IC50 (95% CL): 3.9 (2.9 - 4.9) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.8 (3.2-4.6) g/L KCl CV (%): 10

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	58.9 (42.8 - 72.2)	89.2 (70.2 - > 97)
IC50 %(v/v) (95% CL)	> 97	> 97 JW

Reviewed by: [signature]

Date reviewed: June 1, 2017

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck **Setup by:** JW

Sample ID: LC_LCS_WS-2017-04-24-N **Test Date:** April 27 / 17

Work Order No.: 170367 **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 8 days **> 8X Growth? (Y/N):** Y (67 fronds)

Light Intensity Range: 4300 - 5200 lux **Date Measured:** April 25 / 17

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	23.5	24.0	24.0	24.0	24.0	24.0	24.0
Initials	JW	K	A	A	JW	JW	JW	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	26.0	Aeration?: 20 min	25.0
DO (mg/L)	9.9	Nutrients added?[1]: Y →	8.4
pH	8.1		8.0
Conductivity (µS)	726		1510

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.0	24.0	8.3	8.3	860
1.5	24.5	24.0	8.2	8.3	869
3.0	24.5	24.0	8.2	8.5	879
6.1	24.5	24.0	8.2	8.7	901
12.1	24.5	24.0	8.2	8.8	943
24.2	24.5	24.0	8.2	8.9	1025
48.5	25.0	24.0	8.2	9.0	1188
97	25.0	24.0	8.0	8.8	1510
Initials	JW	JW	JW	JW	JW

Thermometer: 8 **Cond. Meter:** 1 **pH meter:** 2 **Light meter:** 1

Sample Description: Clear, colorless, odorless, brown particulates present.

Comments:

Reviewed: [signature] **Date Reviewed:** May 30, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - LC5 - WS - 2017 - 04 - 24 - N
Work Order #: 170367

Start Date: April 27 / 17
Termination Date: May 4 / 17
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	107										JW
	B	6	86										
	C	6	104										
	D	6	97										
1.5	A	6	91										
	B	6	84										
	C	6	83										
	D	6	88										
3.0	A	6	92										
	B	6	90										
	C	6	88										
	D	6	113										
6.1	A	6	86										
	B	6	99										
	C	6	92										
	D	6	86										
12.1	A	6	97										
	B	6	83										
	C	6	86										
	D	6	87										
24.2	A	6	86										
	B	6	80										
	C	6	75										
	D	6	86										↓

Comments:

Reviewed by: [signature]

Date Reviewed: May 30, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC - LCS _ WS _ 2017 - 04 - 24 - N
Work Order #: 170367

Start Date: April 27 / 17
Termination Date: May 4 / 17
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	75										JW
	B	6	88										
	C	6	83										
	D	6	99										
97	A	6	53			X							
	B	6	52		X	X							
	C	6	61		X	X							
	D	6	46		X	X							↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: May 30, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - LC5 - WS - 2017 - 04 - 24 - N
WO #: 170367

Start Date: April 27 /17
Termination Date: May 4 /17
Balance ID: Bal - 1

LC 5

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	1	1037.23	1045.84	JW / JW
	B	2	1042.49	1050.88	
control	C	3	1006.40	1013.45	
	D	4	1027.96	1035.81	
	A	5	1013.20	1021.27	
	B	6	1020.35	1027.07	
1.5	C	7	1008.20	1014.95	
	D	8	1039.80	1047.45	
	A	9	1019.50	1026.50	
	B	10	1013.48	1021.06	
3.0	C	11	1021.52	1028.57	
	D	12	1023.92	1033.70	
	A	13	1008.75	1015.51	
	B	14	997.19	1005.47	
6.1	C	15	998.77	1005.83	
	D	16	1013.94	1020.65	
	A	17	1026.70	1034.94	
	B	18	1024.22	1030.94	
12.1	C	19	1012.87	1019.63	
	D	20	1029.38	1036.56	
	A	21	1031.50	1038.48	
	B	22	1023.32	1029.77	
24.2	C	23	1024.62	1031.00	
	D	24	1012.35	1019.47	
	A	25	1024.16	1029.85	
	B	26	1016.46	1024.12	
48.5	C	27	1016.82	1023.85	
	D	28	1013.57	1021.73	↓

Comments: 10 % Re-weigh (mg) : #6 . 1027.05 # 24 . 1019.33
15 . 1005.70 # 32 . 1013.20

Reviewed by: [signature]

Date Reviewed: May 30, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - LCS - WS - 2017 - 04 - 24 - N
WO #: 170367

Start Date: April 27 / 17
Termination Date: May 4 / 17
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (V/V)	A	29	1007.14	1012.38	JW / JW
	B	30	1005.14	1010.70	
97	C	31	1003.73	1009.61	
	D	32	1009.08	1013.30	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: May 30, 2017

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	21-0925-6589	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:34	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	13-0263-9978	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	27 Apr-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 May-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	21-2395-9097	**Code:**	7E990B39	**Client:**	Teck Coal
Sample Date:	24 Apr-17 14:17	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	58h (4 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2064867	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.7765	0.0851	26.73	128.8	3.74	1175
IC10	9.253	N/A	77.51	10.81	1.29	NA
IC15	21.89	N/A	77.69	4.569	1.287	NA
IC20	53.06	N/A	67.09	1.885	1.49	NA
IC25	58.86	42.83	72.2	1.699	1.385	2.335
IC40	80.26	65.92	96.9	1.246	1.032	1.517
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	92.5	80	101	4.664	9.327	10.08%	0.0%
1.5		4	80.5	77	85	1.848	3.697	4.59%	12.97%
3		4	89.75	82	107	5.808	11.62	12.94%	2.97%
6.1		4	84.75	80	93	3.092	6.185	7.3%	8.38%
12.1		4	82.25	77	91	3.038	6.076	7.39%	11.08%
24.2		4	75.75	69	80	2.658	5.315	7.02%	18.11%
48.5		4	80.25	69	93	5.023	10.05	12.52%	13.24%
97		4	47	40	55	3.082	6.164	13.12%	49.19%

Frond Count Detail

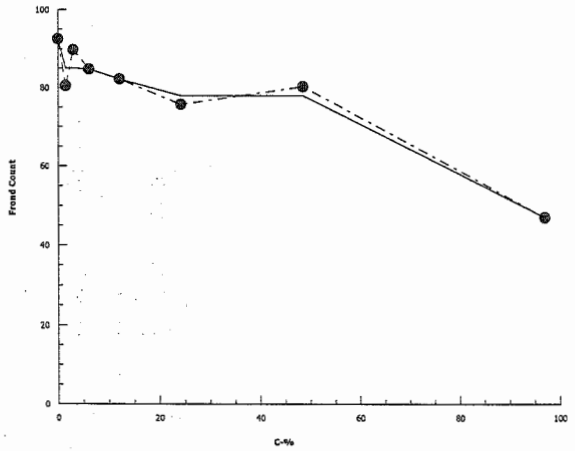
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	101	80	98	91
1.5		85	78	77	82
3		86	84	82	107
6.1		80	93	86	80
12.1		91	77	80	81
24.2		80	74	69	80
48.5		69	82	77	93
97		47	46	55	40

June 1/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	21-0925-6589	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:34	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 1 17

CETIS Analytical Report

Test Code: 170367b | 00-8652-1811

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	20-7946-8088	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:38	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	13-0263-9978	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	27 Apr-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 May-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	21-2395-9097	**Code:**	7E990B39	**Client:**	Teck Coal
Sample Date:	24 Apr-17 14:17	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	58h (4 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
73	-8.988	24.83	28.37	0.3980	Yes	1.214	2.621	0.3326	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	46.45	N/A	70.81	2.153	1.412	NA
IC10	59.31	N/A	83.82	1.686	1.193	NA
IC15	69.93	41.63	91.97	1.43	1.087	2.402
IC20	79.72	58.91	99	1.254	1.01	1.698
IC25	89.2	70.21	108.1	1.121	0.9254	1.424
IC40	118.4	80.59	165.1	0.8447	0.6056	1.241
IC50	140.4	81.6	241.5	0.7124	0.4141	1.226

JW } > 97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	7.408	0.1784	7.058	7.757	41.52	<0.0001	Significant Parameter
C	0.6723	0.356	-0.02556	1.37	1.888	0.0690	Non-Significant Parameter
D	140.4	34.48	72.78	208	4.071	0.0003	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	16.01496	16.01496	1	22.5	<0.0001	Significant
Lack of Fit	4.168828	0.8337654	5	1.214	0.3326	Non-Significant
Pure Error	16.47668	0.6865285	24			
Residual	20.64551	0.7119142	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	4.759	14.07	0.6894	Equal Variances
	Mod Levene Equality of Variance	0.3384	2.423	0.9281	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9454	0.9338	0.1065	Normal Distribution
	Anderson-Darling A2 Normality	0.6006	2.492	0.1200	Normal Distribution

May 30/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 20-7946-8088 **Endpoint:** Total Dry Weight-mg **CETIS Version:** CETISv1.8.7
Analyzed: 15 May-17 17:38 **Analysis:** Nonlinear Regression **Official Results:** Yes

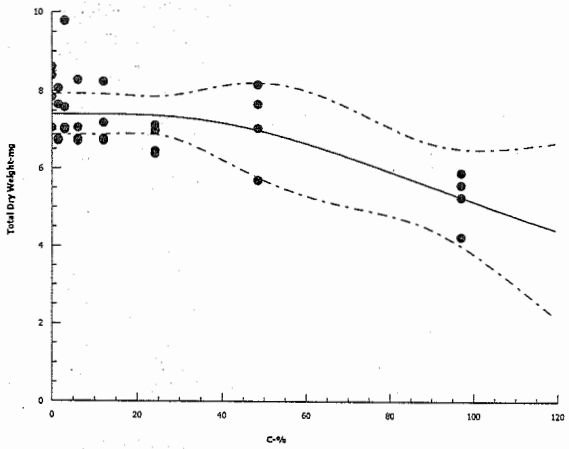
Total Dry Weight-mg Summary

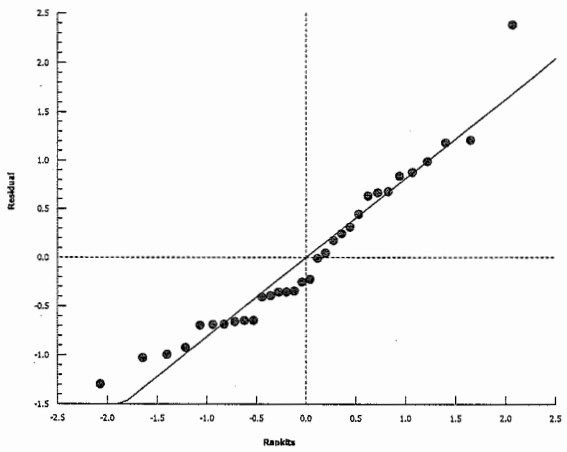
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	7.975	7.05	8.61	0.3472	0.6944	8.71%	0.0%
1.5		4	7.297	6.72	8.07	0.3359	0.6719	9.21%	8.5%
3		4	7.852	7	9.78	0.6558	1.312	16.7%	1.54%
6.1		4	7.202	6.71	8.28	0.3674	0.7348	10.2%	9.69%
12.1		4	7.225	6.72	8.24	0.354	0.7079	9.8%	9.41%
24.2		4	6.732	6.38	7.12	0.1861	0.3721	5.53%	15.58%
48.5		4	7.135	5.69	8.16	0.5343	1.069	14.98%	10.53%
97		4	5.225	4.22	5.88	0.3596	0.7192	13.76%	34.48%

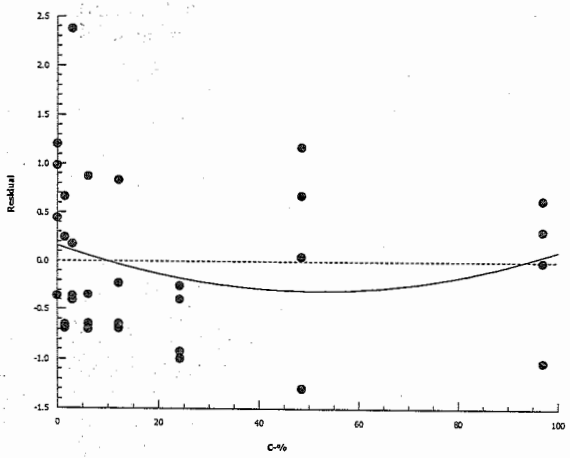
Total Dry Weight-mg Detail

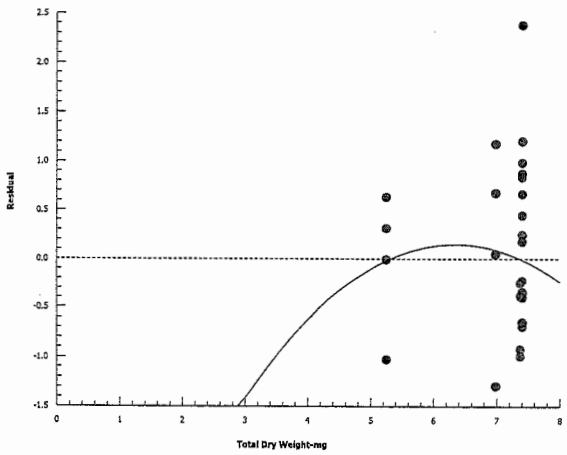
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	8.61	8.39	7.05	7.85
1.5		8.07	6.72	6.75	7.65
3		7	7.58	7.05	9.78
6.1		6.76	8.28	7.06	6.71
12.1		8.24	6.72	6.76	7.18
24.2		6.98	6.45	6.38	7.12
48.5		5.69	7.66	7.03	8.16
97		5.24	5.56	5.88	4.22

Graphics 3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]









May 30/17

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 170367

Start Date: April 26 / 17
Set up by: JW

Sample Information:

Sample ID: LC-FRDSDC-WS-2017-04-25-N
Sample Date: April 24 / 17
Date Received: April 25 / 17
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 041917
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (67 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 146
Date Initiated: May 3 / 17

7-d No. of Fronds IC50 (95% CL): 3.9 (2.9 - 4.9) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.8 (3.2-4.6) g/L KCl CV (%): 10

① 41.0 (n/a - 78.8)

Test Results:	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	~~49.9 41.0 (n/a - 78.8 65.9)~~ JW ①	71.5 (1.2 - n/a)
IC50 %(v/v) (95% CL)	JW > 97 JW	> 97

Reviewed by: [signature]

Date reviewed: June 1, 2017

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck **Setup by:** JW

Sample ID: LC_FRDSDC.WS_2017-04-25_N **Test Date:** April 26 / 17

Work Order No.: 170367 **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 7 days **> 8X Growth? (Y/N):** Y (67 fronds)

Light Intensity Range: 4500 - 5500 lux **Date Measured:** April 25 / 17 JW

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.5	24.0	23.5	24.0	24.0	24.0	24.0	24.0
Initials	JW	JW	[illegible]	[illegible]	[illegible]	JW	JW	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.0	Aeration?: 20 min	24.0
DO (mg/L)	9.8	Nutrients added?[1]: Y →	8.3
pH	8.0		8.2
Conductivity (µS)	740		1509

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration %o (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.5	23.5	8.3	8.4	845
1.5	24.5	23.5	8.2	8.4	865
3.0	24.5	23.5	8.2	8.5	877
6.1	24.5	23.5	8.2	9.1	900
12.1	24.5	23.5	8.3	8.6	944
24.2	24.5	23.5	8.3	8.9	1031
48.5	24.5	23.5	8.2	8.8	1197
97	24.0	23.5	8.2	8.7	1509
Initials	JW	JW	JW	JW	JW

Thermometer: 8 **Cond. Meter:** 1 **pH meter:** 2 **Light meter:** Lit - 1

Sample Description: Clear, colorless, odorless, brown particulates present.

Comments:

Reviewed: [signature] **Date Reviewed:** May 30, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC_FRDSDC_WS_2017-04-~~24~~25-N
Work Order #: 170367 JW

Start Date: April 26 /17
Termination Date: May 3 /17
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	70										JW
	B	6	90										
	C	6	70										
	D	6	73										
1.5	A	6	80										
	B	6	70										
	C	6	89										
	D	6	81										
3.0	A	6	76										
	B	6	62										
	C	6	79										
	D	6	61										
6.1	A	6	90										
	B	6	81										
	C	6	90										
	D	6	73										
12.1	A	6	60										
	B	6	71										
	C	6	64										
	D	6	63										
24.2	A	6	64										
	B	6	63										
	C	6	63										
	D	6	64										↓

Comments:

Reviewed by: [signature]

Date Reviewed: May 30, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-FRDSDC-WS-2017-04-24-N
Work Order #: 170367 25 JW

Start Date: April 26 /17
Termination Date: May 3 /17
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	64										JW
	B	6	58										
	C	6	55										
	D	6	58										
97	A	6	43		X	X							
	B	6	51		X	X							
	C	6	55		X	X							
	D	6	43		X	X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: May 30, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC - FRDSDC - INS - 2017-04-~~24~~ 25 .N
WO #: 170367 JW
FRDSDC

Start Date: April 26 /17
Termination Date: May 3 /17
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	1	1023.90	1029.13	JW / JW
	B	2	1010.66	1017.89	
control	C	3	1031.20	1036.91	
	D	4	1003.75	1009.67	
	A	5	1006.34	1012.78	
	B	6	999.38	1005.18	
1.5	C	7	1015.00	1022.07	
	D	8	1023.73	1030.34	
	A	9	1018.30	1024.31	
	B	10	1028.44	1033.57	
3.0	C	11	1037.67	1043.84	
	D	12	1016.84	1021.49	
	A	13	1012.29	1018.99	
	B	14	1008.15	1014.37	
6.1	C	15	1035.73	1042.73	
	D	16	1027.47	1033.47	
	A	17	1014.08	1018.85	
	B	18	1030.62	1036.24	
12.1	C	19	1014.48	1019.63	
	D	20	1021.50	1026.62	
	A	21	1024.55	1029.98	
	B	22	1022.08	1027.23	
24.2	C	23	1022.70	JW ~~1021~~. 1027.89	
	D	24	1004.13	1009.42	
	A	25	1016.43	1021.90	
	B	26	1015.74	1020.61	
48.5	C	27	1023.08	1027.97	
	D	28	1036.25	1041.30	↓

Comments: 10 % Re-weigh (mg) : #8. 1030.17 #26. 1020.57
#17. 1018.85 #32. 1036.34

Reviewed by: [signature]

Date Reviewed: May 30, 2017

7-d *Lemna minor* Weight Data Sheet

Client: TECK
Sample ID: LC - FRDSDC - WS - 2017-04-~~24~~ - N
WO #: 170367 25 JW

Start Date: April 26 / 17
Termination Date: May 3 / 17
Balance ID: Bal - 1

FRDSDC

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	1017.59	1021.12	JW / JW
	B	30	1028.07	1033.35	↓
97	C	31	1026.52	1031.25	↓
	D	32	1032.40	1036.41	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature] Date Reviewed: May 30, 2017

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-5709-4961	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-3444-3257	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	03 May-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	03-5831-0821	**Code:**	155B63A5	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:49	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	35h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	108216	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	6.951	N/A	8.801	14.39	11.36	NA
IC10	8.552	N/A	12.38	11.69	8.075	NA
IC15	10.48	4.285	30.47	9.546	3.282	23.34
IC20	24.2	N/A	51.75	4.132	1.932	NA
IC25	41	N/A	65.9	2.439	1.517	NA
IC40	90.24	45.11	N/A	1.108	NA	2.217
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	69.75	64	84	4.802	9.605	13.77%	0.0%
1.5		4	74	64	83	3.894	7.789	10.53%	-6.09%
3		4	63.5	55	73	4.664	9.327	14.69%	8.96%
6.1		4	77.5	67	84	4.093	8.185	10.56%	-11.11%
12.1		4	58.5	54	65	2.327	4.655	7.96%	16.13%
24.2		4	57.5	57	58	0.2887	0.5774	1.0%	17.56%
48.5		4	52.75	49	58	1.887	3.775	7.16%	24.37%
97		4	42	37	49	3	6	14.29%	39.78%

Frond Count Detail

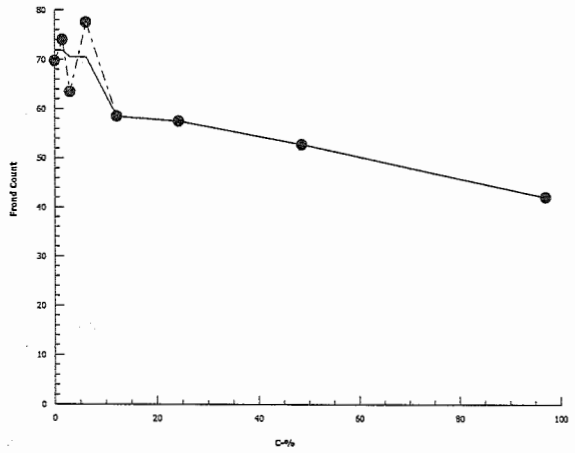
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	64	84	64	67
1.5		74	64	83	75
3		70	56	73	55
6.1		84	75	84	67
12.1		54	65	58	57
24.2		58	57	57	58
48.5		58	52	49	52
97		37	45	49	37

June 1/17

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	00-5709-4961	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 1/17

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-5202-1148	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-3444-3257	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	03 May-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	03-5831-0821	**Code:**	155B63A5	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:49	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	35h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	873046	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	6.366	N/A	9.177	15.71	10.9	NA
IC10	8.446	N/A	12.94	11.84	7.726	NA
IC15	11.11	4.587	81.33	8.999	1.229	21.8
IC20	52.04	N/A	N/A	1.922	NA	NA
IC25	71.52	1.19	N/A	1.398	NA	84.02
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.023	5.23	7.23	0.4276	0.8552	14.2%	0.0%
1.5		4	6.48	5.8	7.07	0.2628	0.5257	8.11%	-7.6%
3		4	5.49	4.65	6.17	0.3615	0.723	13.17%	8.84%
6.1		4	6.48	6	7	0.2267	0.4534	7.0%	-7.6%
12.1		4	5.165	4.77	5.62	0.1745	0.349	6.76%	14.24%
24.2		4	5.265	5.15	5.43	0.06237	0.1247	2.37%	12.58%
48.5		4	5.07	4.87	5.47	0.1393	0.2786	5.5%	15.82%
97		4	4.387	3.53	5.28	0.3864	0.7728	17.61%	27.15%

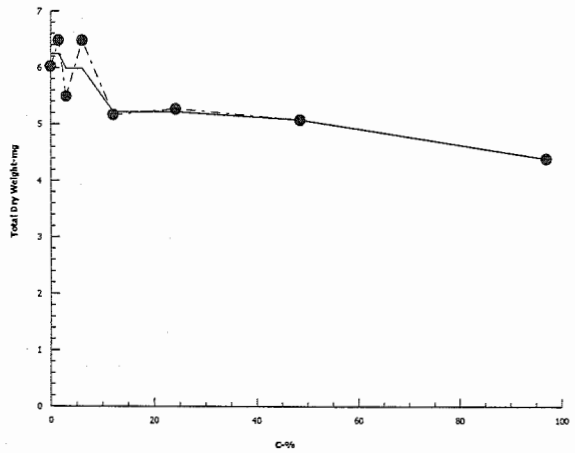
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5.23	7.23	5.71	5.92
1.5		6.44	5.8	7.07	6.61
3		6.01	5.13	6.17	4.65
6.1		6.7	6.22	7	6
12.1		4.77	5.62	5.15	5.12
24.2		5.43	5.15	5.19	5.29
48.5		5.47	4.87	4.89	5.05
97		3.53	5.28	4.73	4.01

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-5202-1148	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 1/17

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 170367

Start Date: April 26 / 17
Set up by: JW

Sample Information:

Sample ID: LC-DCL-WS-2017-04-25-N
Sample Date: April 24 / 17
Date Received: April 25 / 17
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 041817
Age of culture (Day 0): 8 days
>8X growth in APHA?: Y (67 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 146
Date Initiated: May 3 / 17

7-d No. of Fronds IC50 (95% CL): 3.9 (2.9 - 4.9) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.8 (3.2-4.6) g/L KCl CV (%): 10

Test Results:	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	> 97	> 97
IC50 %(v/v) (95% CL)	> 97	> 97

Reviewed by: [signature]

Date reviewed: May 29, 2017

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck **Setup by:** JW

Sample ID: LC - DC1 - INS - 2017 - 04 - 25 - N **Test Date:** April 26 /17

Work Order No.: 170367 **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 8 days **> 8X Growth? (Y/N):** Y (67 fronds)

Light Intensity Range: 4400 - 5200 lux **Date Measured:** April 25 /17

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.5	24.0	23.5	24.0	24.0	24.0	24.0	24.0
Initials	JW	JW	JW	A	A	JW	JW	JW

Sample Characteristics: **Initial Water Quality**

	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.0	Aeration?: 20 min	JW ~~24.0~~ 25.0
DO (mg/L)	9.8	Nutrients added?[1]:	8.3
pH	7.8	Y →	7.8
Conductivity (µS)	250		1082

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (V/V)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	JW 24.0 S	23.5	8.2	8.3	842
1.5	24.5	23.5	8.1	8.5	854
3.0	25.0	23.5	8.1	8.5	856
6.1	25.0	23.5	8.1	8.8	863
12.1	25.0	23.5	8.1	9.0	878
24.2	25.0	23.5	8.1	9.1	907
48.5	25.0	23.5	8.0	9.0	966
97	25.0	23.5	7.8	9.1	1082
Initials	JW	JW	JW	JW	JW

Thermometer: 8 **Cond. Meter:** 1 **pH meter:** 2 **Light meter:** 1.

Sample Description: Clear, colorless, odorless, brown particulates present

Comments:

Reviewed: **Date Reviewed:** May 29, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck 25 JW
Sample ID: LC-DC1-WS-2017-04-24-N
Work Order #: 170367

Start Date: April 26 / 17
Termination Date: May 3 / 17
Test set up by: JW

Concentration % (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	53										JW
	B	6	71										
	C	6	62										
	D	6	71										
1.5	A	6	69										
	B	6	71										
	C	6	73										
	D	6	85										
3.0	A	6	59										
	B	6	67										
	C	6	69										
	D	6	69										
6.1	A	6	67										
	B	6	67										
	C	6	56										
	D	6	58										
12.1	A	6	64										
	B	6	50										
	C	6	66										
	D	6	45										
24.2	A	6	69										
	B	6	61										
	C	6	75										
	D	6	61										↓

Comments:

Reviewed by: [signature]

Date Reviewed: May 29, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck 25 JW
Sample ID: LC - DC L . WS - 2017 - 04 - 24 _ N
Work Order #: 170367

Start Date: April 26 / 17
Termination Date: May 3 / 17
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	65										JW
	B	6	56										
	C	6	68										
	D	6	58										
97	A	6	49		x	x							
	B	6	50		x	x							
	C	6	49		x	x							
	D	6	65		x	x							↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments: _____

Reviewed by: _____ Date Reviewed: May 29, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck 25 JW
Sample ID: LC - DC1 - WS - 2017 - 04 - 24 - N
WO #: 170367
DC 1

Start Date: April 26 /17
Termination Date: May 3 /17
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	1	1045.46	1050.45	JW / JW
	B	2	1027.42	1033.19	
control	C	3	1022.15	1027.54	
	D	4	1015.20	1020.93	
	A	5	1028.65	1034.29	
	B	6	1010.68	1017.15	
1.5	C	7	1006.39	1012.62	
	D	8	1014.20	1021.12	
	A	9	1000.79	1005.53	
	B	10	1021.42	1027.39	
3.0	C	11	1016.88	1022.75	
	D	12	1003.04	1009.18	
	A	13	1009.83	1015.18	
	B	14	1017.19	1022.82	
6.1	C	15	1044.98	1049.25	
	D	16	1035.15	1039.84	
	A	17	1008.91	1014.07	
	B	18	1019.34	1023.46	
12.1	C	19	1023.46	1028.88	
	D	20	1003.05	1007.34	
	A	21	1017.82	1023.54	
	B	22	1025.44	1030.39	
24.2	C	23	1018.21	1024.61	
	D	24	1013.95	1018.96	
	A	25	1023.59	1028.92	
	B	26	1011.77	1016.72	
48.5	C	27	1009.12	1014.54	
	D	28	1023.83	1028.84	↓

Comments: 10% Re-weigh : # 6. 1017.12 (mg) # 24. 1018.90 # 16. 1039.74 # 32. 1042.83

Reviewed by: [signature]

Date Reviewed: May 29, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck 25 JW
Sample ID: LC - DC1 - 2017 - 04 - ~~24~~ N
WO #: 170367
DC 1

Start Date: April 26 / 17
Termination Date: May 3 /17
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	1024.59	1028.57	JW / JW
	B	30	1023.50	1028.82	
97	C	31	1023.17	1027.42	
	D	32	1036.79	1042.70	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: May 29, 2017

CETIS Analytical Report

Test Code: 170367d | 16-1996-9282

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-9064-3776	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:15	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-5176-6868	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	03 May-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	05-2054-0776	**Code:**	1F06D268	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:29	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (3 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
3	-82.03	168.5	171	0.1744	Yes	2.153	2.508	0.0840	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	22.16	1.328	44.04	4.513	2.27	75.31
IC10	45.51	17.68	75.27	2.197	1.329	5.657
IC15	70.21	28.7	116.1	1.424	0.8611	3.484
IC20	96.4	38.8	162.9	1.037	0.614	2.577
IC25	124.3	49.43	214.9	0.8047	0.4654	~~2.023~~ DW
IC40	220.7	89.48	410	~~0.4532~~	0.2439	1.118
IC50	~~299.4~~	126.7	591.8	0.334	0.169	0.7895

} > 97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	60.18	1.853	56.54	63.81	32.47	<0.0001	Significant Parameter
D	299.4	115.5	72.99	525.9	2.592	0.0146	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	498.9455	498.9455	1	7.549	0.0101	Significant
Lack of Fit	693.9295	115.6549	6	2.153	0.0840	Non-Significant
Pure Error	1289	53.70833	24			
Residual	1982.929	66.09765	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	2.313	14.07	0.9405	Equal Variances
	Mod Levene Equality of Variance	0.6847	2.423	0.6837	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9851	0.9338	0.9261	Normal Distribution
	Anderson-Darling A2 Normality	0.2764	2.492	0.6849	Normal Distribution

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	58.25	47	65	4.308	8.617	14.79%	0.0%
1.5		4	68.5	63	79	3.594	7.188	10.49%	-17.6%
3		4	60	53	63	2.38	4.761	7.94%	-3.0%
6.1		4	56	50	61	2.915	5.831	10.41%	3.86%
12.1		4	50.25	39	60	5.17	10.34	20.58%	13.73%
24.2		4	60.5	55	69	3.403	6.807	11.25%	-3.86%
48.5		4	55.75	50	62	2.839	5.679	10.19%	4.29%
97		4	47.25	43	59	3.924	7.848	16.61%	18.88%

May 29/17

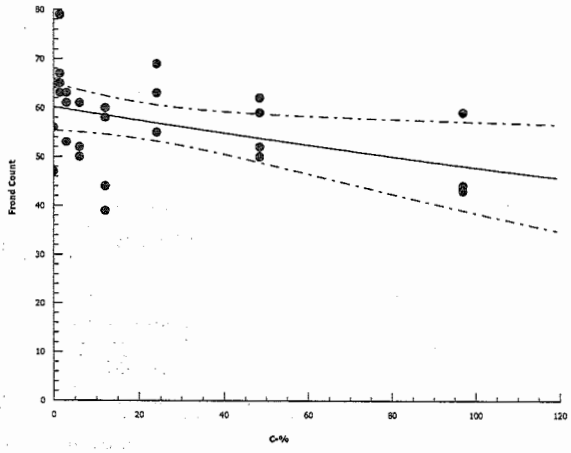
Lemna Growth Inhibition Test — **Nautilus Environmental**

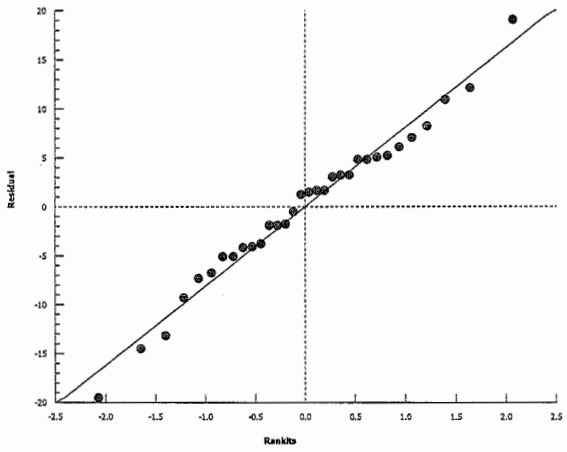
Analysis ID: 14-9064-3776 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 15 May-17 17:15 **Analysis:** Nonlinear Regression **Official Results:** Yes

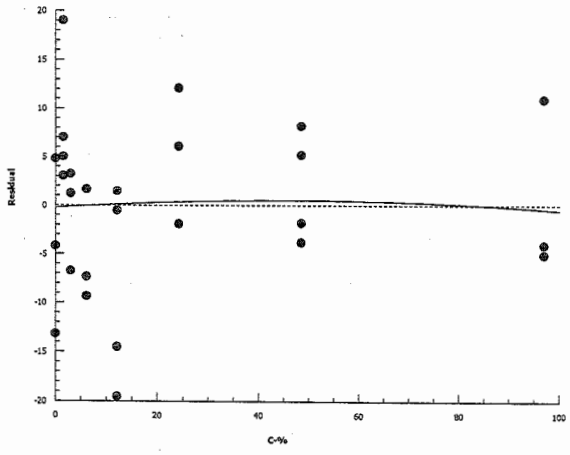
Frond Count Detail

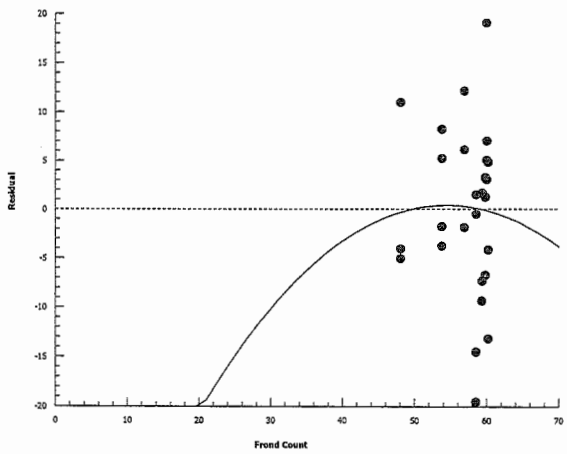
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	47	65	56	65
1.5		63	65	67	79
3		53	61	63	63
6.1		61	61	50	52
12.1		58	44	60	39
24.2		63	55	69	55
48.5		59	50	62	52
97		43	44	43	59

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









May 29/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-4163-5472	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-5176-6868	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	03 May-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	05-2054-0776	**Code:**	1F06D268	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:29	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	36h (3 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1927398	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	3.343	1.163	6.2	29.91	16.13	86.02
IC10	4.835	1.183	N/A	20.68	NA	84.5
IC15	64.39	N/A	N/A	1.553	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	5.47	4.99	5.77	0.1813	0.3626	6.63%	0.0%
1.5		4	6.315	5.64	6.92	0.2666	0.5332	8.44%	-15.45%
3		4	5.68	4.74	6.14	0.3182	0.6365	11.21%	-3.84%
6.1		4	4.985	4.27	5.63	0.3092	0.6185	12.41%	8.87%
12.1		4	4.748	4.12	5.42	0.3196	0.6391	13.46%	13.21%
24.2		4	5.52	4.95	6.4	0.3415	0.6829	12.37%	-0.91%
48.5		4	5.177	4.95	5.42	0.1162	0.2323	4.49%	5.35%
97		4	4.865	3.98	5.91	0.4528	0.9056	18.61%	11.06%

Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	4.99	5.77	5.39	5.73
1.5		5.64	6.47	6.23	6.92
3		4.74	5.97	5.87	6.14
6.1		5.35	5.63	4.27	4.69
12.1		5.16	4.12	5.42	4.29
24.2		5.72	4.95	6.4	5.01
48.5		5.33	4.95	5.42	5.01
97		3.98	5.32	4.25	5.91

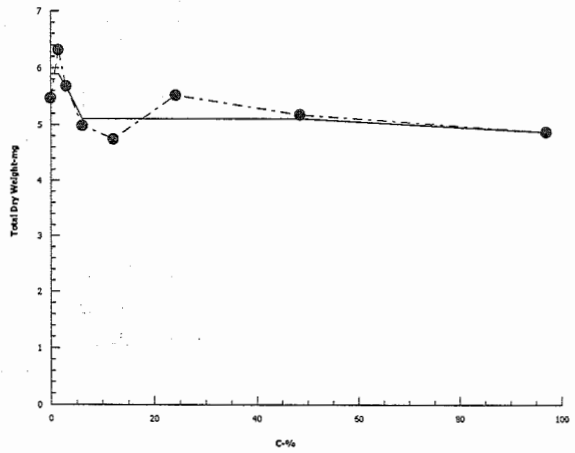
Analyst:_____ QA:_____

May 29/17

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	04-4163-5472	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



May 24/17

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 170367

Start Date: April 26 / 17
Set up by: JW

Sample Information:

Sample ID: LC-DCDS-WS-2017-04-25-N
Sample Date: April 24 / 17
Date Received: April 25 / 17
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 041817
Age of culture (Day 0): 8 days
>8X growth in APHA?: Y (67 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 146
Date Initiated: May 3 / 17

7-d No. of Fronds IC50 (95% CL): 3.9 (2.9 - 4.9) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.8 (3.2-4.6) g/L KCl CV (%): 10

Test Results:	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	63.1 (1.2 - >97)	>97
IC50 %(v/v) (95% CL)	>97 JW	>97

Reviewed by: [signature]

Date reviewed: May 29, 2017

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck | **Setup by:** JW

Sample ID: LC_DCDS_WS_2017-04-25_N | **Test Date:** April 26 / 17

Work Order No.: 170367 | **Test Species:** *Lemna minor*

Culture Source: CPCC #490

Test Culture Age: 8 days | **> 8X Growth? (Y/N):** Y (67 fronds)

Light Intensity Range: 4400 - 5200 lux | **Date Measured:** April 25 / 17

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.5	24.0	23.5	24.0	24.0	24.0	24.0	24.0
Initials	JW	JW	K	A	A	JW	JW	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	24.5
DO (mg/L)	10.1	Nutrients added?[1]: Y →	8.3
pH	7.7		8.0
Conductivity (µS)	199		1043

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	25.0	23.5	8.3	8.1	849
1.5	24.0	23.5	8.2	8.5	843
3.0	24.0	23.5	8.2	8.5	857
6.1	24.0	23.5	8.2	8.7	863
12.1	24.5	23.5	8.2	8.7	875
24.2	24.5	23.5	8.1	8.8	898
48.5	24.5	23.5	8.1	9.2	985
97	24.5	23.5	8.0	9.0	1043
Initials	JW	JW	JW	JW	JW

Thermometer: 8 **Cond. Meter:** 1 **pH meter:** 2 **Light meter:** Li-1

Sample Description: Slightly turbid, colorless, odorless, brown ~~precipitate~~ JW particulates present.

Comments:

Reviewed: [signature] **Date Reviewed:** May 29, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck 25 JW
Sample ID: LC-DCDS-WS-2017-04-24-N
Work Order #: 170367

Start Date: April 26 / 17
Termination Date: May 3 / 17
Test set up by: JW

Concentration % (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	61										JW
	B	6	80										
	C	6	92										
	D	6	83										
1.5	A	6	83										
	B	6	58										
	C	6	54										
	D	6	84										
3.0	A	6	63										
	B	6	69										
	C	6	57										
	D	6	75										
6.1	A	6	60										
	B	6	57										
	C	6	61										
	D	6	58										
12.1	A	6	76										
	B	6	59										
	C	6	47										
	D	6	58										
24.2	A	6	53										
	B	6	61										
	C	6	71										
	D	6	72										↓

Comments:

Reviewed by:

Date Reviewed: May 29, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck 25 JW
Sample ID: LC - DCDS_WS_2017-04-24_N
Work Order #: 170367

Start Date: April 26 / 17
Termination Date: May 3 / 17
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	53										JW
	B	6	61										
	C	6	68										
	D	6	69										
97	A	6	64										
	B	6	58										
	C	6	66										
	D	6	54										
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: May 29, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck 25
Sample ID: LC - DCDS - INS - 2017 - 04 - ~~24~~ - N
WO #: 170367 JW
DCDS

Start Date: April 26 /17
Termination Date: May 3 /17
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	1	1022.58	1027.58	JW / JW
	B	2	1001.42	1007.70	
control	C	3	1024.76	1032.47	
	D	4	1022.68	1030.02	
	A	5	1016.85	1023.09	
	B	6	1019.89	1024.66	
1.5	C	7	1002.32	1006.90	
	D	8	1024.91	1031.99	
	A	9	1010.58	1016.12	
	B	10	991.60	997.61	
3.0	C	11	1044.75	1049.86	
	D	12	1046.66	1052.74	
	A	13	1017.88	1022.97	
	B	14	1010.43	1014.97	
6.1	C	15	1012.04	1017.46	
	D	16	1023.80	1028.62	
	A	17	1030.50	1037.13	
	B	18	1018.51	1023.14	
12.1	C	19	1043.54	1047.59	
	D	20	1027.20	1032.47	
	A	21	1020.78	1025.43	
	B	22	1025.70	1030.65	
24.2	C	23	1012.4~~4~~2 JW	1018.54	
	D	24	995.19	1001.64	
	A	25	1004.13	1008.76	
	B	26	1000.80	1006.25	
48.5	C	27	1016.66	1022.29	
	D	28	1004.84	1010.99	↓

Comments: 10% Re-weigh = #9. 1016.03 #24. 1001.57
#16. 1028.42 #31. 1015.69

Reviewed by: [signature] Date Reviewed: May 29, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck 25
Sample ID: LC - DCDS - WS - 2017-04-~~24~~ - N
WO #: 170367 JW
DCDS

Start Date: April 26 / 17
Termination Date: May 3 / 17
Balance ID: Bal - L

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	1016.71	1022.18	JW / JW
	B	30	1023.37	1028.85	↓
97	C	31	1010.05	1015.74	↓
	D	32	1020.42	1025.68	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature] Date Reviewed: May 29, 2017

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-2616-5484	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:29	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-5176-6868	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	03 May-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	07-7306-7951	**Code:**	2E1414AF	**Client:**	Teck Coal
Sample Date:	24 Apr-17 10:38	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (3.5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
9	-86.53	179.9	183.5	0.2237	Yes	0.4699	2.621	0.7949	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.0000263	N/A	15.56	3799000	6.426	NA
IC10	0.00644	N/A	132.7	15530	0.7535	NA
IC15	0.2633	1.021E-06	150	379.8	0.6665	97960000
IC20	5.026	0.1512	93.74	19.9	1.067	661.3
IC25	63.11	1.163	1857	1.585	0.05385	86.02
IC40	37060	1.253E-06	1.095E+11	0.002698	~~0.0000000~~	~~79810000~~
IC50	~~1716000~~	~~N/A~~	~~N/A~~	0.0000582	NA	NA

JW } >97 % (V/V)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	73.07	4.759	63.74	82.39	15.35	<0.0001	Significant Parameter
C	15.14	14.29	-12.87	43.15	1.059	0.2982	Non-Significant Parameter
D	1716000	18590000	-34730000	38160000	0.09229	0.9271	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	990.7004	990.7004	1	10.93	0.0025	Significant
Lack of Fit	234.2683	46.85366	5	0.4699	0.7949	Non-Significant
Pure Error	2393.25	99.71875	24			
Residual	2627.518	90.60408	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	10.85	14.07	0.1455	Equal Variances
	Mod Levene Equality of Variance	1.961	2.423	0.1034	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9779	0.9338	0.7360	Normal Distribution
	Anderson-Darling A2 Normality	0.3015	2.492	0.6077	Normal Distribution

May 29/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-2616-5484	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:29	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

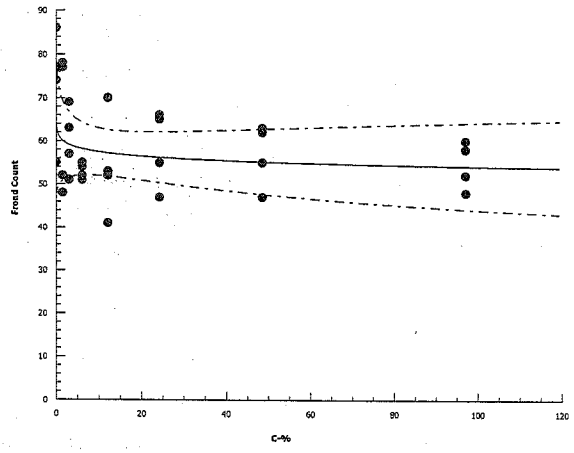
Frond Count Summary

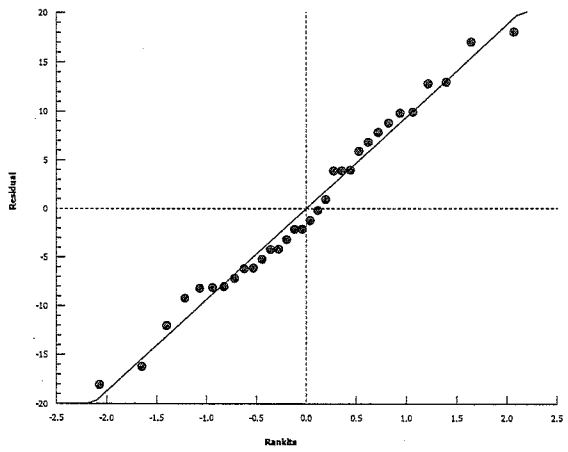
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	73	55	86	6.519	13.04	17.86%	0.0%
1.5		4	63.75	48	78	7.983	15.97	25.04%	12.67%
3		4	60	51	69	3.873	7.746	12.91%	17.81%
6.1		4	53	51	55	0.9129	1.826	3.45%	27.4%
12.1		4	54	41	70	5.986	11.97	22.17%	26.03%
24.2		4	58.25	47	66	4.498	8.995	15.44%	20.21%
48.5		4	56.75	47	63	3.705	7.411	13.06%	22.26%
97		4	54.5	48	60	2.754	5.508	10.11%	25.34%

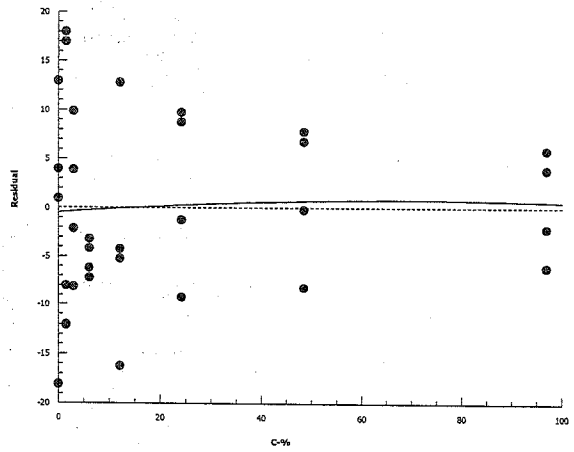
Frond Count Detail

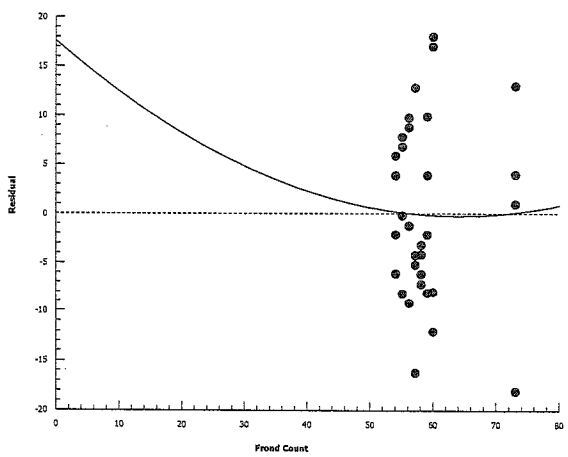
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	55	74	86	77
1.5		77	52	48	78
3		57	63	51	69
6.1		54	51	55	52
12.1		70	53	41	52
24.2		47	55	65	66
48.5		47	55	62	63
97		58	52	60	48

Graphics — 3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]









May 29/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-2932-5993	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-5176-6868	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	26 Apr-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	03 May-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	07-7306-7951	**Code:**	2E1414AF	**Client:**	Teck Coal
Sample Date:	24 Apr-17 10:38	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (3.5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1825542	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.3948	0.05779	55.56	253.3	1.8	1731
IC10	0.9456	0.07631	N/A	105.8	NA	1310
IC15	3.557	N/A	N/A	28.12	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.582	5	7.71	0.6083	1.217	18.48%	0.0%
1.5		4	5.668	4.58	7.08	0.5994	1.199	21.15%	13.9%
3		4	5.685	5.11	6.08	0.2261	0.4521	7.95%	13.63%
6.1		4	4.967	4.54	5.42	0.188	0.3761	7.57%	24.53%
12.1		4	5.145	4.05	6.63	0.5542	1.108	21.54%	21.84%
24.2		4	5.543	4.65	6.45	0.4382	0.8765	15.81%	15.8%
48.5		4	5.465	4.63	6.15	0.3154	0.6308	11.54%	16.98%
97		4	5.475	5.26	5.69	0.08778	0.1756	3.21%	16.82%

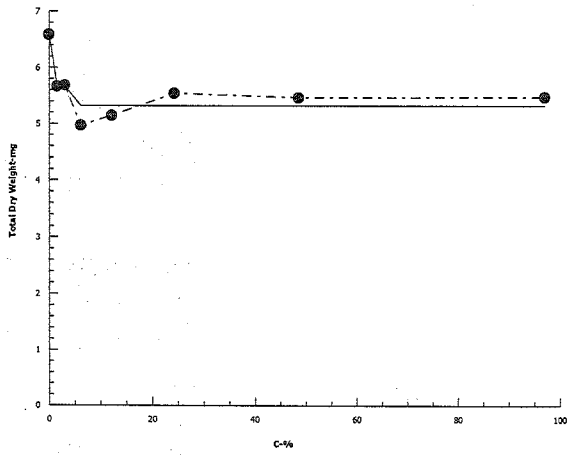
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5	6.28	7.71	7.34
1.5		6.24	4.77	4.58	7.08
3		5.54	6.01	5.11	6.08
6.1		5.09	4.54	5.42	4.82
12.1		6.63	4.63	4.05	5.27
24.2		4.65	4.95	6.12	6.45
48.5		4.63	5.45	5.63	6.15
97		5.47	5.48	5.69	5.26

May 29/17

Analysis ID:	05-2932-5993	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Lemna minor Summary Sheet

Client: Teck
Work Order No.: 170367

Start Date: April 27 / 17
Set up by: JW

Sample Information:

Sample ID: WL-BFNB-OUT-SP21-20170424-N
Sample Date: April 24 / 17
Date Received: April 25 / 17
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 041917
Age of culture (Day 0): 8 days
>8X growth in APHA?: Y (67 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 146
Date Initiated: May 3 / 17

7-d No. of Fronds IC50 (95% CL): 3.9 (2.9 - 4.9) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.8 (3.2-4.6) g/L KCl CV (%): 10

Test Results:	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	30.6 (22.2 - 40.2)	>97
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: May 30, 2017

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck **Setup by:** JW

Sample ID: ~~WLC - AWTF~~ JW WL - BAWB_OUT_SP21_20170424 - N **Test Date:** April 27 / 17

Work Order No.: 170367 **Test Species:** *Lemna minor*

Culture Source: CPCC # 490

Test Culture Age: 8 days **> 8X Growth? (Y/N):** Y (67 fronds)

Light Intensity Range: 4300 - 5200 lux **Date Measured:** April 25 / 17

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	23-25	24.0	24.0	24.0	24.0	24.0	24.0
Initials	JW	KL	A	[illegible]	JW	JW	JW	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	26.0	Aeration?: 20 min	25.0
DO (mg/L)	10.0	Nutrients added?[1]: Y →	8.4
pH	7.7		7.9
Conductivity (µS)	1831		2510

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.0	24.0	8.2	8.9	849
1.5	24.0	24.0	8.0	9.0	892
3.0	24.5	24.0	8.0	9.3	925
6.1	24.5	24.0	8.0	9.3	988
12.1	24.5	24.0	8.0	9.6	1117
24.2	24.5	24.0	8.1	9.6	1347
48.5	24.5	24.0	8.0	9.7	1761
97	25.0	24.0	7.9	9.4	2510
Initials	JW	JW	JW	JW	JW

Thermometer: 8 **Cond. Meter:** 2 JW **pH meter:** 1 **Light meter:** L.

Sample Description: Clear, colorless, ~~colorless~~, brown particulates present

Comments: hydrocarbon odor

Reviewed: [signature] **Date Reviewed:** May 30, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW ~~WLC - ANTF~~ WL - BFWB - OUT - SP21 - 20170424 - N
Work Order #: JW 170367

Start Date: April 27 /17
Termination Date: May 4 /17
Test set up by: JW

Concentration % (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	86										JW
	B	6	92										
	C	6	88										
	D	6	73										
1.5	A	6	88										
	B	6	91										
	C	6	84										
	D	6	73										
3.0	A	6	81										
	B	6	72										
	C	6	81										
	D	6	84										
6.1	A	6	76										
	B	6	74										
	C	6	72										
	D	6	80										
12.1	A	6	78										
	B	6	64										
	C	6	74										
	D	6	73										
24.2	A	6	66										
	B	6	65										
	C	6	86										
	D	6	80										↓

Comments:

Reviewed by: [signature]

Date Reviewed: May 30, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW ~~WLC - AWTF~~ WL-BFWB-OUT-SP21-20170424-N
Work Order #: 170367

Start Date: April 27 /17
Termination Date: May 4 /17
Test set up by: JW

Concentration %o (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	53										JW
	B	6	60		X	X							
	C	6	52		X	X							
	D	6	52		X	X							
97	A	6	50		X	X							
	B	6	48		X	X							
	C	6	47		X								
	D	6	45		X								↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: May 30, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Start Date: April 27 / 17
Sample ID: JW ~~WLC-AWTF~~ WL-BFWB-OUT-SP21-20170424
Termination Date: May 4 / 17
WO #: 170367 N
Balance ID: Bal - 1

WTF

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	1	1028.34	1035.53	JW / JW
	B	2	1017.40	1024.29	
control	C	3	1015.49	1022.50	
	D	4	1015.77	1021.65	
	A	5	1009.43	1016.54	
	B	6	1026.04	1033.37	
1.5	C	7	1054.38	1061.43 JW	
	D	8	1028.37	1034.44	
	A	9	1031.94	1038.18	
	B	10	1027.01	1033.37	
3.0	C	11	1014.13	1020.22	
	D	12	1026.35	1033.07	
	A	13	1013.82	1020.48	
	B	14	1004.72	1010.73	
6.1	C	15	1021.78	1028.05	
	D	16	1011.61	1018.19	
	A	17	1030.76	1037.10	
	B	18	1048.36	1053.87	
12.1	C	19	1022.33	1028.27	
	D	20	1029.08	1035.24	
	A	21	1039.31	1044.51	
	B	22	1040.75	1046.79	
24.2	C	23	1018.56	1026.27	
	D	24	1023.22	1030.43	
	A	25	1009.84	1015.10	
	B	26	1009.43	1015.17	
48.5	C	27	1030.58	1035.93	
	D	28	1019.82	1024.70	↓

Comments: 10 % Re-weigh = #2. 1024.22 #23. 1026.03
(mg) #17. 1036.95 #32. 1020.59

Reviewed by: [signature] Date Reviewed: May 30, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck

Start Date: April 27 /17

Sample ID: JW ~~WLC - AWTF~~ WL-BFWB_OUT-SP21-20170424 N

Termination Date: May 4 /17

WO #: 170367

Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	1023.13	1027.79	JW / JW
	B	30	1034.28	1039.80	
97	C	31	1016.04	1022.21	
	D	32	1015.87	1020.75	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by:

Date Reviewed: May 30, 2017

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-1451-2617	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:45	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	13-0263-9978	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	27 Apr-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 May-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	09-1853-4142	**Code:**	36BFB7FE	**Client:**	Teck Coal
Sample Date:	24 Apr-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	63h (8 °C)	**Station:**	WL_BFWB_OUT_SP21_20170424_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
6	-75.23	157.3	160.9	0.7751	Yes	1.476	2.621	0.2344	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL	
IC5	2.812	0.4145	6.241	35.56	16.02	241.3	
IC10	7.613	3.656	12.49	13.14	8.008	27.35	
IC15	13.87	8.233	20.59	7.211	4.856	12.15	
IC20	21.5	14.4	29.81	4.651	3.354	6.943	
IC25	30.56	22.22	40.18	3.272	2.489	4.501	
IC40	67.64	52.31	85.61	1.478	1.168	1.912	
IC50	~~103.2~~	~~74.15~~	~~140.4~~	~~0.9692~~	~~0.7124~~	~~1.349~~ JW	> 97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	78.66	2.707	73.35	83.96	29.06	<0.0001	Significant Parameter
C	0.7227	0.1559	0.4172	1.028	4.637	<0.0001	Significant Parameter
D	103.2	16.48	70.88	135.5	6.261	<0.0001	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	4868.903	4868.903	1	108.9	<0.0001	Significant
Lack of Fit	305.0971	61.01942	5	1.476	0.2344	Non-Significant
Pure Error	992	41.33333	24			
Residual	1297.097	44.72749	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	8.731	14.07	0.2726	Equal Variances
	Mod Levene Equality of Variance	1.41	2.423	0.2470	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9659	0.9338	0.3935	Normal Distribution
	Anderson-Darling A2 Normality	0.3906	2.492	0.3859	Normal Distribution

May 30/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 03-1451-2617 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 15 May-17 17:45 **Analysis:** Nonlinear Regression **Official Results:** Yes

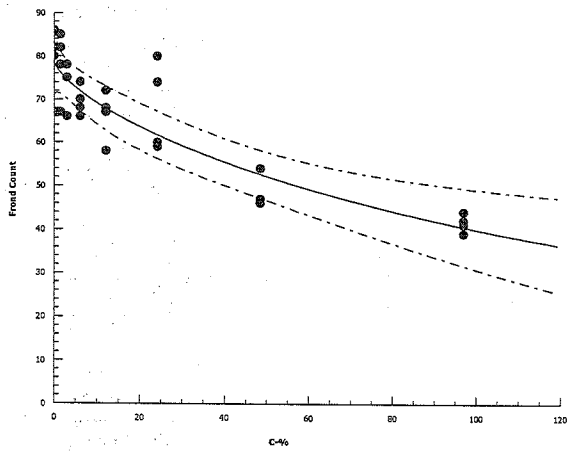
Frond Count Summary

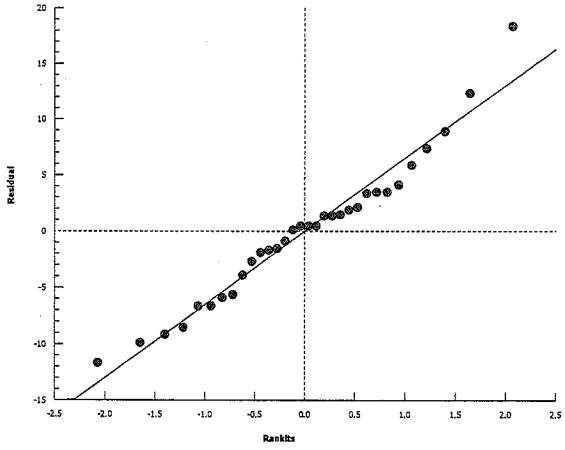
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	78.75	67	86	4.11	8.221	10.44%	0.0%
1.5		4	78	67	85	3.937	7.874	10.09%	0.95%
3		4	73.5	66	78	2.598	5.196	7.07%	6.67%
6.1		4	69.5	66	74	1.708	3.416	4.92%	11.75%
12.1		4	66.25	58	72	2.955	5.909	8.92%	15.87%
24.2		4	68.25	59	80	5.202	10.4	15.24%	13.33%
48.5		4	48.25	46	54	1.931	3.862	8.01%	38.73%
97		4	41.5	39	44	1.041	2.082	5.02%	47.3%

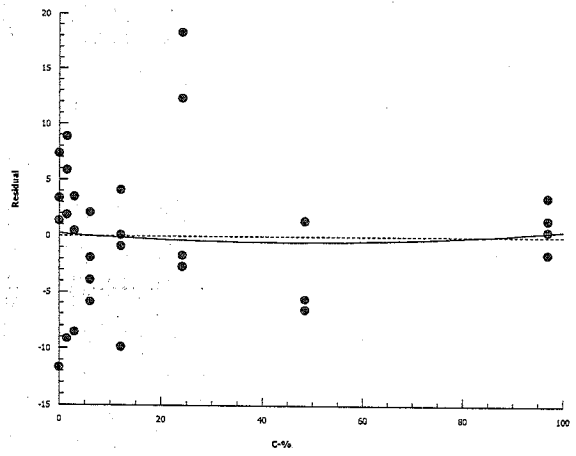
Frond Count Detail

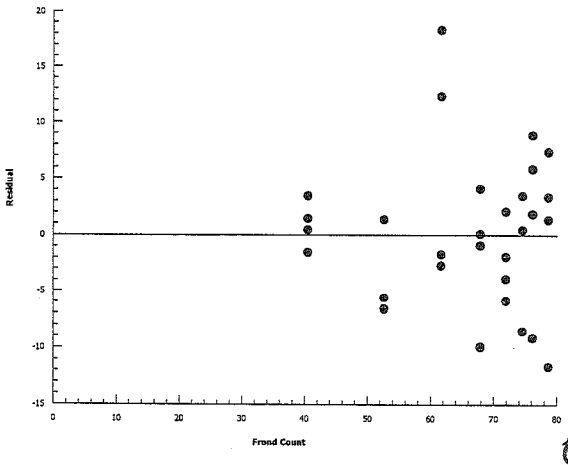
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	80	86	82	67
1.5		82	85	78	67
3		75	66	75	78
6.1		70	68	66	74
12.1		72	58	68	67
24.2		60	59	80	74
48.5		47	54	46	46
97		44	42	41	39

Graphics 3P Log-Gompertz EV [Y=A*exp(log(0.5)(X/D)^C)]









May 30/17

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-9370-0934	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	15 May-17 17:46	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	13-0263-9978	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	27 Apr-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	04 May-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	09-1853-4142	**Code:**	36BFB7FE	**Client:**	Teck Coal
Sample Date:	24 Apr-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	63h (8 °C)	**Station:**	WL_BFWB_OUT_SP21_20170424_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
7	1.242	4.374	7.914	0.3814	Yes	1.365	2.621	0.2722	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	5.781	0.427	16.05	17.3	6.232	234.2
IC10	18.16	6.672	36.78	5.507	2.719	14.99
IC15	39.31	20.02	68.18	2.544	1.467	4.994
IC20	72.62	34.13	135.9	1.377	0.7357	2.93
IC25	123	43.32	287.3	0.8133	0.3481	2.308
IC40	463.4	55.81	2753	0.2158	0.03632	1.792
IC50	1030	66.57	15920	0.09713	0.006281	1.502

JW

} > 97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	6.775	0.269	6.248	7.302	25.18	<0.0001	Significant Parameter
C	3.151	1.406	0.3945	5.907	2.241	0.0329	Significant Parameter
D	1030	1196	-1315	3374	0.8606	0.3965	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	7.931495	7.931495	1	21.12	<0.0001	Significant
Lack of Fit	2.411905	0.4823809	5	1.365	0.2722	Non-Significant
Pure Error	8.481231	0.3533846	24			
Residual	10.89314	0.3756253	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	9.579	14.07	0.2137	Equal Variances
	Mod Levene Equality of Variance	2.193	2.423	0.0717	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9435	0.9338	0.0940	Normal Distribution
	Anderson-Darling A2 Normality	0.5126	2.492	0.1981	Normal Distribution

May 30/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 05-9370-0934 **Endpoint:** Total Dry Weight-mg **CETIS Version:** CETISv1.8.7
Analyzed: 15 May-17 17:46 **Analysis:** Nonlinear Regression **Official Results:** Yes

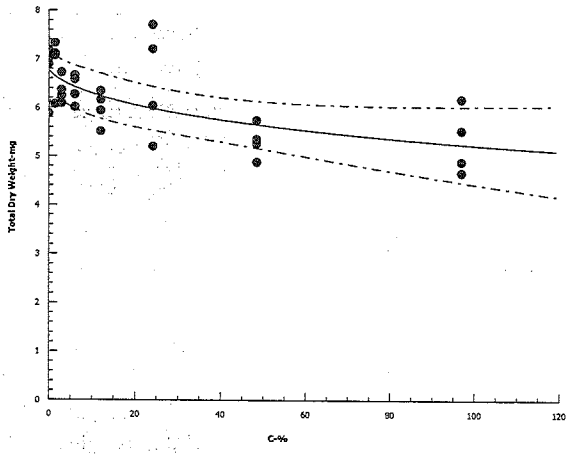
Total Dry Weight-mg Summary

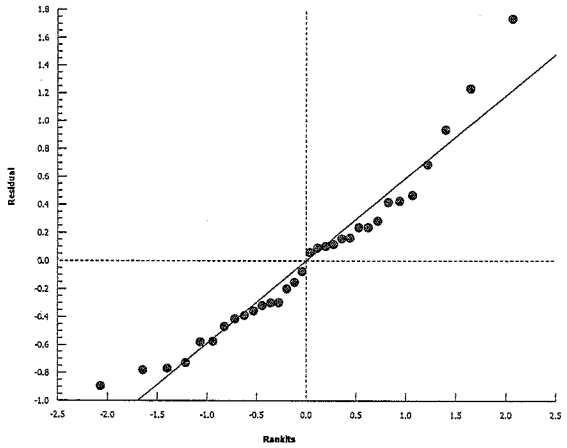
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.743	5.88	7.19	0.294	0.5881	8.72%	0.0%
1.5		4	6.895	6.07	7.33	0.2809	0.5618	8.15%	-2.26%
3		4	6.353	6.09	6.72	0.1344	0.2687	4.23%	5.78%
6.1		4	6.38	6.01	6.66	0.1493	0.2985	4.68%	5.38%
12.1		4	5.988	5.51	6.34	0.1789	0.3579	5.98%	11.2%
24.2		4	6.54	5.2	7.71	0.5674	1.135	17.35%	3.0%
48.5		4	5.307	4.88	5.74	0.1765	0.353	6.65%	21.28%
97		4	5.308	4.66	6.17	0.3405	0.681	12.83%	21.28%

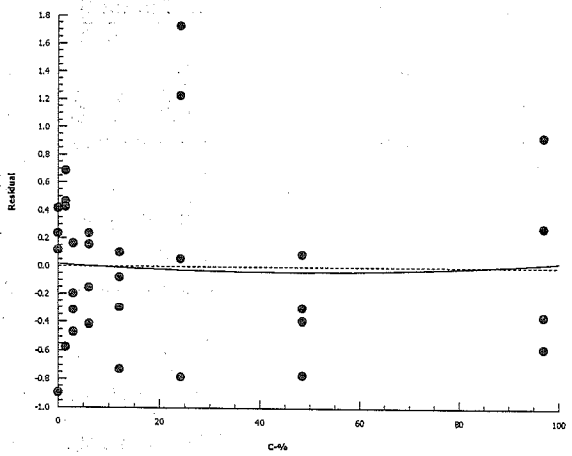
Total Dry Weight-mg Detail

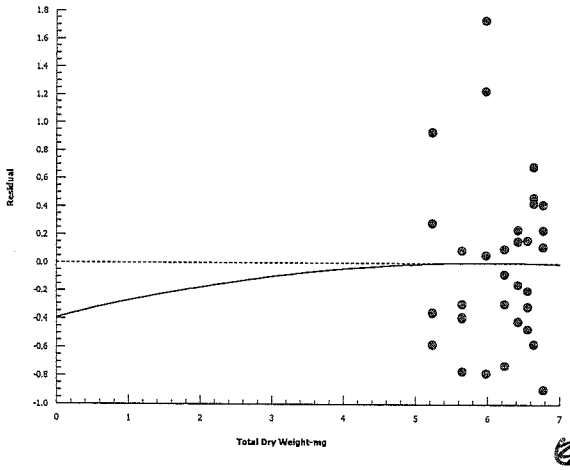
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.19	6.89	7.01	5.88
1.5		7.11	7.33	7.07	6.07
3		6.24	6.36	6.09	6.72
6.1		6.66	6.01	6.27	6.58
12.1		6.34	5.51	5.94	6.16
24.2		5.2	6.04	7.71	7.21
48.5		5.26	5.74	5.35	4.88
97		4.66	5.52	6.17	4.88

Graphics 3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]









APPENDIX D – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 170366

Start Date: April 25/17
Set up by: MLT

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2017-04-24_N
Sample Date: April 24/17
Date Received: April 25/17
Sample Volume: 8 x 20L

Test Organism Information:

Culture Date: April 21/17
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC156
Stock Solution ID: 173n01
Date Initiated: April 25/17

72-h IC50 (95% CL): 31.7 (27.6-36.2) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 33.6 (25.5-44.3) ug/L Zn CV (%): 15

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: May 15, 2017

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck coal | **Setup by:** MLT

Sample ID: LL-LCDSSLEC_WS-2017-04-24-N | **Test Date/Time:** April 25/17 @ 1715h

Work Order No.: 1703366 | **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: April 21/17 | **Age of Culture:** 4d | **Culture Health:** Good

Culture Count: 1 290 2 320 | **Average:** 305 | **Culture Cell Density (c1):** 305 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 305 x 10⁴ cells/ml = 7.21 mL

Time Zero Counts: 1 20 2 22 | **Average:** 21

No. of Cells/mL: 21 x 10⁴ | **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control	7.0	23.0	24.0	24.0	25.0	25.0	✓	✓	✓	✓
1.5	7.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.4	23.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.7	23.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.0 | Well 2: 7.0

Final control pH: Well 1: 6.8 | Well 2: 6.8

Light intensity (lux): 4310 | **Date measured:** April 25/17

Instruments: Thermometer 4 | pH meter 1 | Light meter 1

Sample Description: clear, colourless, odourless, brown particulates present

Comments:

Reviewed: | **Date reviewed:** May 15, 2017

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: April 25/17 @ 1715h

Work Order #: 170366 Termination Date: April 28/17 @ 1715h

Sample ID: LC-LCDSSLCC-WS-2017-04-24 Test set up by: MD

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	27					MD
	B	32					
	C	29					
	D	26					
	E	30					
	F	26					
	G	31					
	H	27					
1.5	A	28					
	B	27					
	C	29					
	D	28					
3.0	A	31					
	B	32					
	C	29					
	D	35					
6.0	A	50					
	B	51					
	C	53					
	D	46					
11.9	A	78					
	B	81					
	C	85					
	D	73					
23.8	A	88					
	B	97					
	C	105					
	D	99					
47.6	A	108					
	B	115					
	C	120					
	D	113					
95.8	A	136 ~~124~~ 127					
	B	125					
	C	137					
	D	134					

Comments:

Reviewed by: Date Reviewed: May 15, 2017

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	25-Apr-17 @ 1715h		
WO#:	170366	Termination Date/Time	28-Apr-17 @ 1715h		
Sample ID:	LC_LCDSSLCC_WS_2017-04-24_N				
		Initial Cell Density:	9545 cell/mL		210000
					0.22
					0.01
					9545.455

Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		
Control	A	27				27	26.0	mean	27.5
	B	32				32	31.0	SD	2.329929
	C	29				29	28.0	CV	8.45849
	D	26				26	25.0		
	E	30				30	29.0		
	F	26				26	25.0		
	G	31				31	30.0		
	H	27				27	26.0		
1.5	A	28				28	27.0		
	B	27				27	26.0		
	C	29				29	28.0		
	D	28				28	27.0		
3	A	31				31	30.0		
	B	32				32	31.0		
	C	29				29	28.0		
	D	35				35	34.0		
6	A	50				50	49.0		
	B	51				51	50.0		
	C	53				53	52.0		
	D	46				46	45.0		
11.9	A	72				72	71.0		
	B	81				81	80.0		
	C	85				85	84.0		
	D	73				73	72.0		
23.8	A	88				88	87.0		
	B	97				97	96.0		
	C	105				105	104.0		
	D	99				99	98.0		
47.6	A	108				108	107.0		
	B	115				115	114.0		
	C	120				120	119.0		
	D	113				113	112.0		
95.2	A	136				136	135.0		
	B	125				125	124.0		
	C	137				137	136.0		
	D	134				134	133.0		

Reviewed by: _____ Date reviewed: May 15, 2017

CETIS Analytical Report

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	01-3258-3330	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-17 13:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	17-4151-9747	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	25 Apr-17 17:15	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	28 Apr-17 17:15	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	10-6359-5836	**Code:**	3F652F3C	**Client:**	Teck Coal
Sample Date:	24 Apr-17 15:20	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	26h (5 °C)	**Station:**	LC LCDSSLCC WS 2017-04-24 N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1987868	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7232	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	27.5	25	31	0.8238	2.33	8.47%	0.0%
1.5		4	27	26	28	0.4082	0.8165	3.02%	1.82%
3		4	30.75	28	34	1.25	2.5	8.13%	-11.82%
6		4	49	45	52	1.472	2.944	6.01%	-78.18%
11.9		4	76.75	71	84	3.146	6.292	8.2%	-179.1%
23.8		4	96.25	87	104	3.521	7.042	7.32%	-250.0%
47.6		4	113	107	119	2.483	4.967	4.4%	-310.9%
95.2		4	132	124	136	2.739	5.477	4.15%	-380.0%

Cell Yield Detail

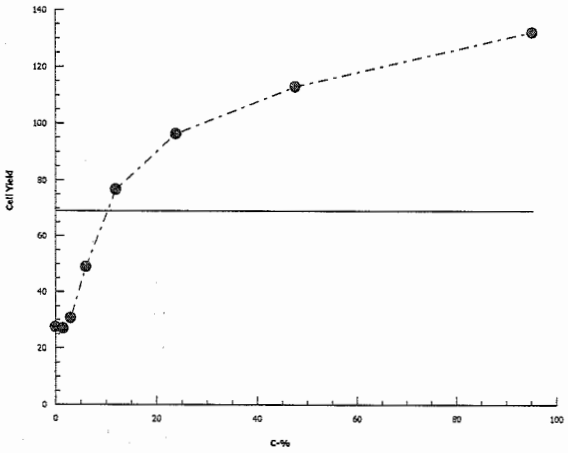
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	26	31	28	25	29	25	30	26
1.5		27	26	28	27				
3		30	31	28	34				
6		49	50	52	45				
11.9		71	80	84	72				
23.8		87	96	104	98				
47.6		107	114	119	112				
95.2		135	124	136	133				

MAY 15/17

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-3258-3330	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-17 13:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA:_____ May 15/17

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-3818-3754	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-17 13:30	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	17-4151-9747	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	25 Apr-17 17:15	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	28 Apr-17 17:15	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	10-6359-5836	**Code:**	3F652F3C	**Client:**	Teck Coal
Sample Date:	24 Apr-17 15:20	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	26h (5 °C)	**Station:**	LC LCDSSLCC WS 2017-04-24 N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	24.2%	3	6	4.243	33.33

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.1902	2.526	6.643	10	0.9562	CDF	Non-Significant Effect
		3	1.236	2.526	6.643	10	0.4327	CDF	Non-Significant Effect
		6*	8.177	2.526	6.643	10	<0.0001	CDF	Significant Effect
		11.9*	18.73	2.526	6.643	10	<0.0001	CDF	Significant Effect
		23.8*	26.15	2.526	6.643	10	<0.0001	CDF	Significant Effect
		47.6*	32.52	2.526	6.643	10	<0.0001	CDF	Significant Effect
		95.2*	39.74	2.526	6.643	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7232	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	54360.5	7765.786	7	421.2	<0.0001	Significant Effect
Error	516.25	18.4375	28			
Total	54876.75		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	14.72	18.48	0.0397	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9768	0.9166	0.6354	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	27.5	25.55	29.45	27	25	31	0.8238	8.47%	0.0%
1.5		4	27	25.7	28.3	27	26	28	0.4082	3.02%	1.82%
3		4	30.75	26.77	34.73	30.5	28	34	1.25	8.13%	-11.82%
6		4	49	44.32	53.68	49.5	45	52	1.472	6.01%	-78.18%
11.9		4	76.75	66.74	86.76	76	71	84	3.146	8.2%	-179.1%
23.8		4	96.25	85.05	107.5	97	87	104	3.521	7.32%	-250.0%
47.6		4	113	105.1	120.9	113	107	119	2.483	4.4%	-310.9%
95.2		4	132	123.3	140.7	134	124	136	2.739	4.15%	-380.0%

May 15/17

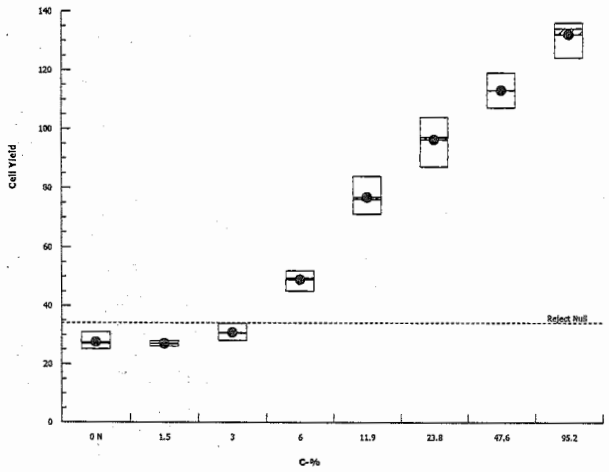
EC Alga Growth Inhibition Test — **Nautilus Environmental**

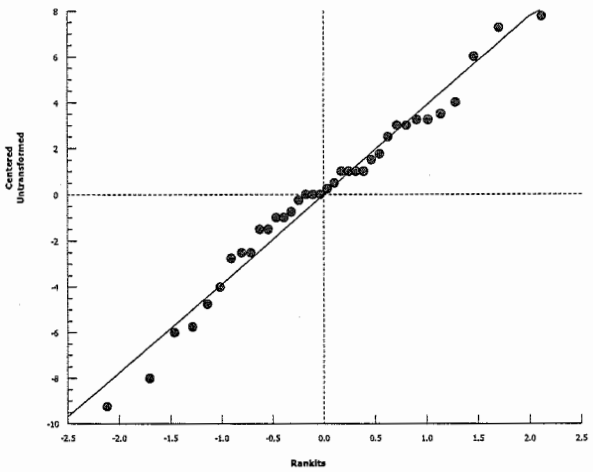
Analysis ID:	11-3818-3754	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-17 13:30	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	26	31	28	25	29	25	30	26
1.5		27	26	28	27				
3		30	31	28	34				
6		49	50	52	45				
11.9		71	80	84	72				
23.8		87	96	104	98				
47.6		107	114	119	112				
95.2		135	124	136	133				

Graphics





May 15/17

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 170366

Start Date: April 25/17
Set up by: MLT

Sample Information:

Sample ID: LC-LC5_WS_2017-04-24_N
Sample Date: April 24/17
Date Received: April 25/17
Sample Volume: 5x20L

Test Organism Information:

Culture Date: April 21/17
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC156
Stock Solution ID: 17Zn01
Date Initiated: April 25/17

72-h IC50 (95% CL): 31.7 (27.6-36.2) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 33.6 (25.5-44.3) ug/L Zn CV (%): 15

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: May 15, 2017

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MLT

Sample ID: LC-LC5-WS-2017-04-24-N **Test Date/Time:** April 25/17 @ 1725h

Work Order No.: 170366 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: April 21/17 **Age of Culture:** 4d **Culture Health:** Good

Culture Count: 1 290 2 320 **Average:** 305 **Culture Cell Density (c1):** 305 x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / 305x10⁴ cells/ml (c1) = 7.21 mL

Time Zero Counts: 1 20 2 22 **Average:** 21

No. of Cells/mL: 21x10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL.

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control	7.0	23.0	24.0	24.0	25.0	25.0	✓	✓	✓	✓
1.5	7.0	23.0	|	|	|	|	~	✓	✓	~
3.0	7.0	23.0	|	|	|	|	~	✓	✓	~
6.0	7.1	23.0	|	|	|	|	~	✓	✓	~
11.9	7.2	23.0	|	|	|	|	✓	✓	~	✓
23.8	7.4	23.0	|	|	|	|	✓	✓	~	~
47.6	7.7	23.0	|	|	|	|	✓	✓	~	✓
95.2	8.0	23.0	↓	↓	↓	↓	✓	✓	~	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 6.8 Well 2: 6.8

Light intensity (lux): 4090 **Date measured:** April 25/17

Instruments: Thermometer 4 pH meter 1 Light meter 1

Sample Description: clear, colourless, odourless, brown particulates present.

Comments:

Reviewed: [signature] **Date reviewed:** May 15, 2017

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: April 25/17 @ 1725h
Work Order #: 170366 Termination Date: April 28/17 @ 1725h
Sample ID: LC-LC5-WS-2017-04-24-N Test set up by: MG
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	29					MG
	B	28					
	C	29					
	D	33					
	E	27					
	F	30					
	G	31					
	H	28					
1.5	A	27					
	B	31					
	C	29					
	D	33					
3.0	A	34					
	B	36					
	C	31					
	D	35					
6.0	A	40					
	B	48					
	C	43					
	D	44					
11.9	A	64					
	B	59					
	C	69					
	D	68					
23.8	A	124					
	B	128					
	C	118					
	D	114					
47.6	A	135					
	B	144					
	C	141					
	D	149					
95.8	A	145					
	B	133					
	C	140					
	D	141					

Comments:

Reviewed by: Date Reviewed: May 25, 2017

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	25-Apr-17 @ 1725h		
WO#:	170366	Termination Date/Time	28-Apr-17 @ 1725h		
Sample ID:	LC_LC5_WS_2017-04-24_N				
		Initial Cell Density:	9545 cell/mL		210000
					0.22
					0.01

Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	29				29	28.0	mean	28.4
	B	28				28	27.0	SD	1.92261
	C	29				29	28.0	CV	6.764881
	D	33				33	32.0		
	E	27				27	26.0		
	F	30				30	29.0		
	G	31				31	30.0		
	H	28				28	27.0		
1.5	A	27				27	26.0		
	B	31				31	30.0		
	C	29				29	28.0		
	D	33				33	32.0		
3	A	34				34	33.0		
	B	36				36	35.0		
	C	31				31	30.0		
	D	35				35	34.0		
6	A	40				40	39.0		
	B	48				48	47.0		
	C	43				43	42.0		
	D	44				44	43.0		
11.9	A	64				64	63.0		
	B	59				59	58.0		
	C	69				69	68.0		
	D	68				68	67.0		
23.8	A	124				124	123.0		
	B	128				128	127.0		
	C	118				118	117.0		
	D	114				114	113.0		
47.6	A	135				135	134.0		
	B	144				144	143.0		
	C	141				141	140.0		
	D	149				149	148.0		
95.2	A	145				145	144.0		
	B	133				133	132.0		
	C	140				140	139.0		
	D	141				141	140.0		

Reviewed by: _____ Date reviewed: May 15, 2017

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-2605-8695	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 14:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-1168-7283	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	25 Apr-17 17:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	28 Apr-17 17:25	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	21-2395-9097	**Code:**	7E990B39	**Client:**	Teck Coal
Sample Date:	24 Apr-17 14:17	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	27h (4 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2085302	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			1.0000	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	28.38	26	32	0.6797	1.923	6.78%	0.0%
1.5		4	29	26	32	1.291	2.582	8.9%	-2.2%
3		4	33	30	35	1.08	2.16	6.55%	-16.3%
6		4	42.75	39	47	1.652	3.304	7.73%	-50.66%
11.9		4	64	58	68	2.273	4.546	7.1%	-125.6%
23.8		4	120	113	127	3.109	6.218	5.18%	-322.9%
47.6		4	141.3	134	148	2.926	5.852	4.14%	-397.8%
95.2		4	138.8	132	144	2.496	4.992	3.6%	-389.0%

Cell Yield Detail

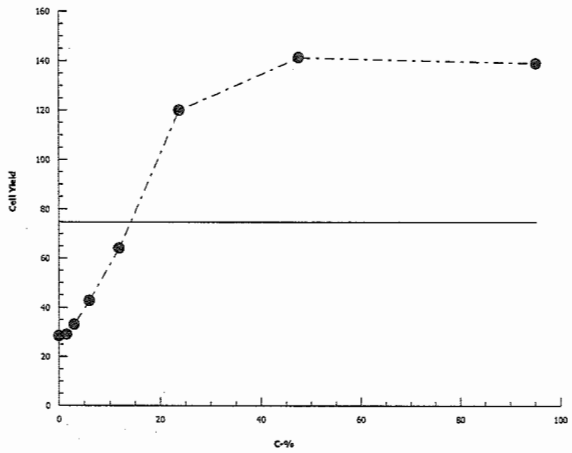
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	28	27	28	32	26	29	30	27
1.5		26	30	28	32				
3		33	35	30	34				
6		39	47	42	43				
11.9		63	58	68	67				
23.8		123	127	117	113				
47.6		134	143	140	148				
95.2		144	132	139	140				

May 15/17

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-2605-8695	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 14:07	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



May 15/17

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-8471-3916	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 14:07	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-1168-7283	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	25 Apr-17 17:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	28 Apr-17 17:25	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	21-2395-9097	**Code:**	7E990B39	**Client:**	Teck Coal
Sample Date:	24 Apr-17 14:17	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	27h (4 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	21.8%	3	6	4.243	33.33

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.2551	2.526	6.189	10	0.8665	CDF	Non-Significant Effect
		3	1.888	2.526	6.189	10	0.1710	CDF	Non-Significant Effect
		6*	5.868	2.526	6.189	10	<0.0001	CDF	Significant Effect
		11.9*	14.54	2.526	6.189	10	<0.0001	CDF	Significant Effect
		23.8*	37.4	2.526	6.189	10	<0.0001	CDF	Significant Effect
		47.6*	46.07	2.526	6.189	10	<0.0001	CDF	Significant Effect
		95.2*	45.05	2.526	6.189	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			1.0000	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	78378.88	11196.98	7	699.6	<0.0001	Significant Effect
Error	448.125	16.00447	28			
Total	78827		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	9.592	18.48	0.2129	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9753	0.9166	0.5882	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	28.38	26.77	29.98	28	26	32	0.6797	6.78%	0.0%
1.5		4	29	24.89	33.11	29	26	32	1.291	8.9%	-2.2%
3		4	33	29.56	36.44	33.5	30	35	1.08	6.55%	-16.3%
6		4	42.75	37.49	48.01	42.5	39	47	1.652	7.73%	-50.66%
11.9		4	64	56.77	71.23	65	58	68	2.273	7.1%	-125.6%
23.8		4	120	110.1	129.9	120	113	127	3.109	5.18%	-322.9%
47.6		4	141.3	131.9	150.6	141.5	134	148	2.926	4.14%	-397.8%
95.2		4	138.8	130.8	146.7	139.5	132	144	2.496	3.6%	-389.0%

May 15/17

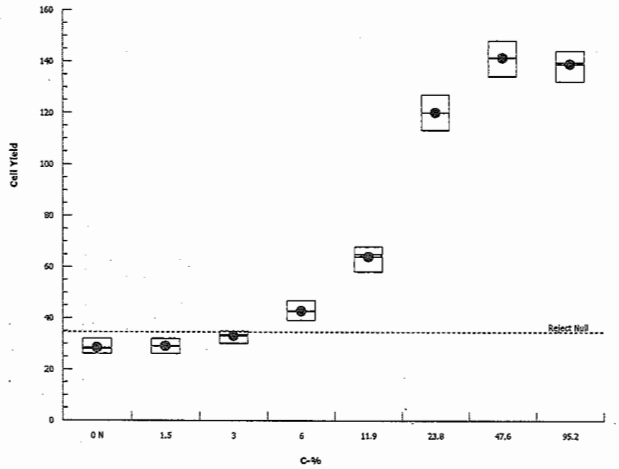
EC Alga Growth Inhibition Test — **Nautilus Environmental**

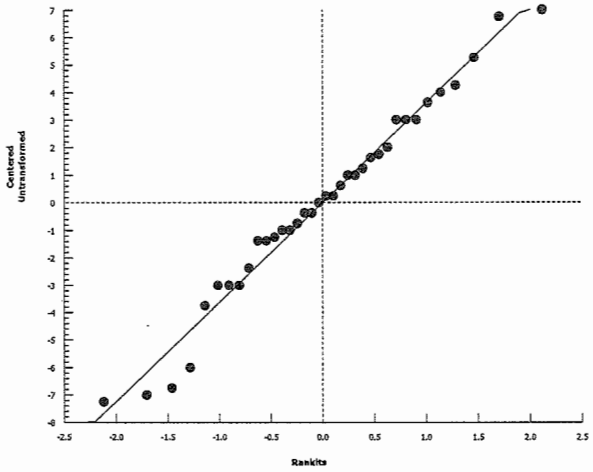
Analysis ID: 00-8471-3916 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 12 May-17 14:07 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	28	27	28	32	26	29	30	27
1.5		26	30	28	32				
3		33	35	30	34				
6		39	47	42	43				
11.9		63	58	68	67				
23.8		123	127	117	113				
47.6		134	143	140	148				
95.2		144	132	139	140				

Graphics





May 15/17

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 170366

Start Date: April 25/17
Set up by: MLT

Sample Information:

Sample ID: LC-FRDSDC-WS-2017-04-25_N
Sample Date: April 24/17
Date Received: April 25/17
Sample Volume: 5x20L

Test Organism Information:

Culture Date: April 21/17
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC156
Stock Solution ID: 173n01
Date Initiated: April 25/17

72-h IC50 (95% CL): 31.7 (27.6-36.2) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 33.6 (25.5-44.3) ug/L Zn CV (%): 15

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: May 15, 2017

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck Coal **Setup by:** MLT

Sample ID: LC FRDSDC_WS_2017-04-25_N **Test Date/Time:** Apr 25/17 @ 710h

Work Order No.: 170366 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: Apr 21/17 **Age of Culture:** 4d **Culture Health:** Good

Culture Count: 1 290 2 320 **Average:** 305 **Culture Cell Density (c1):** 305 x 10^4 cells/mL

v1 = 220,000 cells/ml (c1) x 100 ml / 305 x 10^4 cells/ml = 7.21 mL

Time Zero Counts: 1 20 2 22 **Average:** 21

No. of Cells/mL: 21 x 10^4 **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	24.0	24.0	25.0	~~24.9~~ 25.0	✓	✓	✓	✓
1.5	7.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	23.0					✓	✓	✓	✓
6.0	7.1	23.0					✓	✓	✓	✓
11.9	7.3	23.0					✓	✓	✓	✓
23.8	7.6	23.0					✓	✓	✓	✓
47.6	7.9	23.0					✓	✓	✓	✓
95.2	8.1	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 6.8 Well 2: 6.8

Light intensity (lux): 3900 **Date measured:** Apr 25/17

Instruments: Thermometer 4 pH meter 1 Light meter 1

Sample Description: clear, colourless, odourless, brown particulates present.

Comments:

Reviewed: [signature] **Date reviewed:** May 15, 2017

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: April 25/17 @ 1710h
Work Order #: 1703366 Termination Date: April 28/17 @ 1710h
Sample ID: LC-PROSDC-WS-2017-04-25_N Test set up by: ML
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	26					ML
	B	28					
	C	27					
	D	30					
	E	26					
	F	29					
	G	27					
	H	31					
1.5	A	28					
	B	26					
	C	27					
	D	31					
3.0	A	33					
	B	36					
	C	30					
	D	35					
6.0	A	41					
	B	36					
	C	35					
	D	39					
11.9	A	51					
	B	59					
	C	58					
	D	57					
23.8	A	97					
	B	100					
	C	91					
	D	105					
47.6	A	115					
	B	119					
	C	121					
	D	110					
95.2	A	127					
	B	118					
	C	131					
	D	133					

Comments:

Reviewed by: Date Reviewed: May 15, 2017

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	25-Apr-17 @ 1710h		
WO#:	170366	Termination Date/Time	28-Apr-17 @ 1710h		
Sample ID:	LC_FRDSDC_WS_2017-04-25_N				
		Initial Cell Density:	9545 cell/mL		210000
					0.22
					0.01

Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	26				26	25.0	mean	27.0
	B	28				28	27.0	SD	1.85164
	C	27				27	26.0	CV	6.846401
	D	30				30	29.0		
	E	26				26	25.0		
	F	29				29	28.0		
	G	27				27	26.0		
	H	31				31	30.0		
1.5	A	28				28	27.0		
	B	26				26	25.0		
	C	27				27	26.0		
	D	31				31	30.0		
3	A	33				33	32.0		
	B	36				36	35.0		
	C	30				30	29.0		
	D	35				35	34.0		
6	A	41				41	40.0		
	B	36				36	35.0		
	C	35				35	34.0		
	D	39				39	38.0		
11.9	A	51				51	50.0		
	B	59				59	58.0		
	C	58				58	57.0		
	D	57				57	56.0		
23.8	A	97				97	96.0		
	B	100				100	99.0		
	C	91				91	90.0		
	D	105				105	104.0		
47.6	A	115				115	114.0		
	B	119				119	118.0		
	C	121				121	120.0		
	D	110				110	109.0		
95.2	A	127				127	126.0		
	B	118				118	117.0		
	C	131				131	130.0		
	D	133				133	132.0		

Reviewed by: _____ Date reviewed: May 15, 2017

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-6094-2172	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 13:51	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-2631-0776	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	25 Apr-17 17:10	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	28 Apr-17 17:10	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	03-5831-0821	**Code:**	155B63A5	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:49	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1754202	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.4054	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	27	25	30	0.6547	1.852	6.86%	0.0%
1.5		4	27	25	30	1.08	2.16	8.0%	0.0%
3		4	32.5	29	35	1.323	2.646	8.14%	-20.37%
6		4	36.75	34	40	1.377	2.754	7.49%	-36.11%
11.9		4	55.25	50	58	1.797	3.594	6.51%	-104.6%
23.8		4	97.25	90	104	2.926	5.852	6.02%	-260.2%
47.6		4	115.3	109	120	2.428	4.856	4.21%	-326.9%
95.2		4	126.3	117	132	3.326	6.652	5.27%	-367.6%

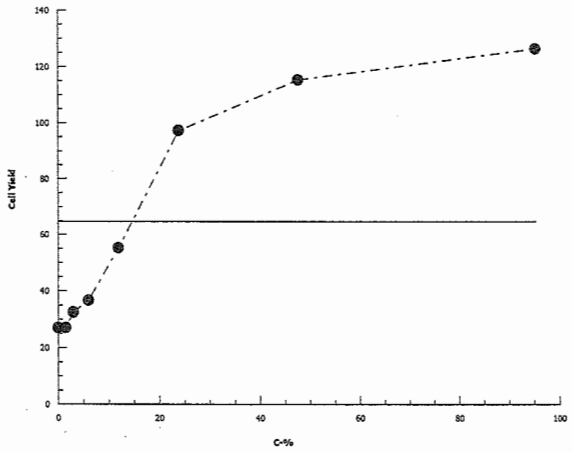
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	25	27	26	29	25	28	26	30
1.5		27	25	26	30				
3		32	35	29	34				
6		40	35	34	38				
11.9		50	58	57	56				
23.8		96	99	90	104				
47.6		114	118	120	109				
95.2		126	117	130	132				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-6094-2172	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 13:51	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



May 15/17

CETIS Analytical Report

Test Code: 170366c | 01-5497-1337

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-4299-5817	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 13:51	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-2631-0776	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	25 Apr-17 17:10	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	28 Apr-17 17:10	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	03-5831-0821	**Code:**	155B63A5	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:49	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (3.5 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	22.4%	3	6	4.243	33.33

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0	2.526	6.039	10	0.9269	CDF	Non-Significant Effect
		3	2.301	2.526	6.039	10	0.0797	CDF	Non-Significant Effect
		6*	4.078	2.526	6.039	10	0.0011	CDF	Significant Effect
		11.9*	11.82	2.526	6.039	10	<0.0001	CDF	Significant Effect
		23.8*	29.38	2.526	6.039	10	<0.0001	CDF	Significant Effect
		47.6*	36.91	2.526	6.039	10	<0.0001	CDF	Significant Effect
		95.2*	41.52	2.526	6.039	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.4054	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	53654.22	7664.889	7	502.9	<0.0001	Significant Effect
Error	426.75	15.24107	28			
Total	54080.97		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	10.73	18.48	0.1506	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9695	0.9166	0.4108	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	27	25.45	28.55	26.5	25	30	0.6547	6.86%	0.0%
1.5		4	27	23.56	30.44	26.5	25	30	1.08	8.0%	0.0%
3		4	32.5	28.29	36.71	33	29	35	1.323	8.14%	-20.37%
6		4	36.75	32.37	41.13	36.5	34	40	1.377	7.49%	-36.11%
11.9		4	55.25	49.53	60.97	56.5	50	58	1.797	6.51%	-104.6%
23.8		4	97.25	87.94	106.6	97.5	90	104	2.926	6.02%	-260.2%
47.6		4	115.3	107.5	123	116	109	120	2.428	4.21%	-326.9%
95.2		4	126.3	115.7	136.8	128	117	132	3.326	5.27%	-367.6%

Analyst:_____ QA:_____

May 15/17

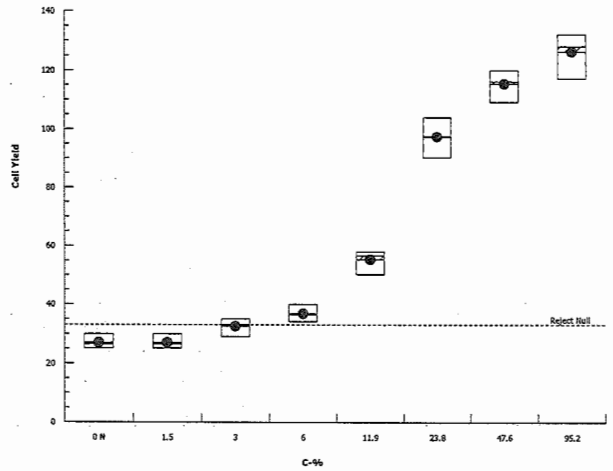
EC Alga Growth Inhibition Test — **Nautilus Environmental**

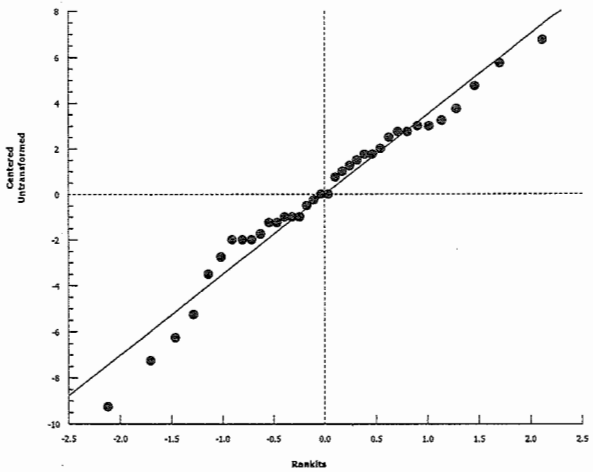
Analysis ID:	11-4299-5817	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 13:51	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	25	27	26	29	25	28	26	30
1.5		27	25	26	30				
3		32	35	29	34				
6		40	35	34	38				
11.9		50	58	57	56				
23.8		96	99	90	104				
47.6		114	118	120	109				
95.2		126	117	130	132				

Graphics





May 15/17

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 170366

Start Date: April 25/17
Set up by: MLT

Sample Information:

Sample ID: LC_DCI_WS_2017-04-25_N
Sample Date: April 24/17
Date Received: April 25/17
Sample Volume: ~~8 x MLT~~ 5 x 20L

Test Organism Information:

Culture Date: April 21/17
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC156
Stock Solution ID: 17Zn01
Date Initiated: April 25/17

72-h IC50 (95% CL): 31.7 (27.6-36.2) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 33.6 (25.5-44.3) ug/L Zn CV (%): 15

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: May 15, 2017

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MLT

Sample ID: LC_DC1_WS_2017-04-25_N **Test Date/Time:** April 25/17 @ 1705h

Work Order No.: 170366 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: April 21/17 **Age of Culture:** 4d **Culture Health:** Good

Culture Count: 1 290 2 320 **Average:** 305 **Culture Cell Density (c1):** 305 X 10⁴ cells/mL

v1 = 220,000 cells/ml (c1) x 100 ml (305 X 10⁴ cells/ml) = 7.21

Time Zero Counts: 1 20 2 22 **Average:** 21

No. of Cells/mL: 21 X 10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	24.0	24.0	25.0	24.0	✓	✓	✓	✓
1.5	7.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	23.0					✓	✓	✓	✓
6.0	7.1	23.0					✓	✓	✓	✓
11.9	7.2	23.0					✓	✓	✓	✓
23.8	7.3	23.0					✓	✓	✓	✓
47.6	7.5	23.0					✓	✓	✓	✓
95.2	7.9	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 6.8 Well 2: 6.8

Light intensity (lux): 4120 **Date measured:** April 25/17

Instruments: Thermometer 4 pH meter 1 Light meter 1

Sample Description: clear, colourless, odourless, brown particulates present

Comments:

Reviewed: [signature] **Date reviewed:** May 15, 2017

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: Apr 25/17 @ 1705h
Work Order #: 170366 Termination Date: Apr 28/17 @ 1705h
Sample ID: LC_Del_WS-2017-04-25-N Test set up by: MB

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	30					MB
	B	27					
	C	29					
	D	31					
	E	27					
	F	28					
	G	27					
	H	26					
1.5	A	26					
	B	28					
	C	27					
	D	30					
3.0	A	30					
	B	35					
	C	36					
	D	31					
6.0	A	32					
	B	31					
	C	36					
	D	34					
11.9	A	43					
	B	44					
	C	42					
	D	40					
23.8	A	68					
	B	74					
	C	79					
	D	74					
47.6	A	120					
	B	118					
	C	124					
	D	110					
95.8	A	141					
	B	138					
	C	137					
	D	140					

Comments:

Reviewed by: Date Reviewed: May 15, 2017

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 170366
Sample ID: LC_DC1_WS_2017-04-25_N

Start Date/Time: 25-Apr-17 @ 1705h
Termination Date/Time 28-Apr-17 @ 1705h

Initial Cell Density: 9545 cell/mL

									210000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	30				30	29.0	mean	27.2
	B	27				27	26.0	SD	1.726888
	C	29				29	28.0	CV	6.355757
	D	31				31	30.0		
	E	27				27	26.0		
	F	28				28	27.0		
	G	27				27	26.0		
	H	26				26	25.0		
1.5	A	26				26	25.0		
	B	28				28	27.0		
	C	27				27	26.0		
	D	30				30	29.0		
3	A	30				30	29.0		
	B	35				35	34.0		
	C	36				36	35.0		
	D	31				31	30.0		
6	A	32				32	31.0		
	B	31				31	30.0		
	C	36				36	35.0		
	D	34				34	33.0		
11.9	A	43				43	42.0		
	B	44				44	43.0		
	C	42				42	41.0		
	D	40				40	39.0		
23.8	A	68				68	67.0		
	B	74				74	73.0		
	C	79				79	78.0		
	D	74				74	73.0		
47.6	A	120				120	119.0		
	B	112				112	111.0		
	C	124				124	123.0		
	D	110				110	109.0		
95.2	A	141				141	140.0		
	B	138				138	137.0		
	C	137				137	136.0		
	D	140				140	139.0		

Reviewed by: _____

Date reviewed: May 15, 2017

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	19-2471-0259	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-17 13:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	08-7971-6055	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	25 Apr-17 17:05	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	28 Apr-17 17:05	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	05-2054-0776	**Code:**	1F06D268	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:29	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	29h (3 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	185365	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.0729	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	27.13	25	30	0.6105	1.727	6.37%	0.0%
1.5		4	26.75	25	29	0.8539	1.708	6.38%	1.38%
3		4	32	29	35	1.472	2.944	9.2%	-17.97%
6		4	32.25	30	35	1.109	2.217	6.88%	-18.89%
11.9		4	41.25	39	43	0.8539	1.708	4.14%	-52.07%
23.8		4	72.75	67	78	2.25	4.5	6.19%	-168.2%
47.6		4	115.5	109	123	3.304	6.608	5.72%	-325.8%
95.2		4	138	136	140	0.9129	1.826	1.32%	-408.8%

Cell Yield Detail

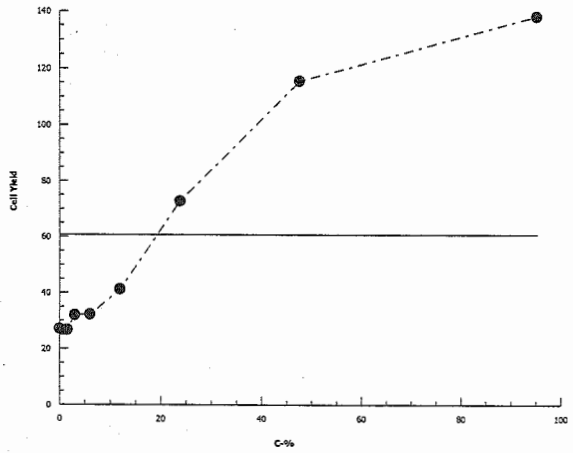
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	29	26	28	30	26	27	26	25
1.5		25	27	26	29				
3		29	34	35	30				
6		31	30	35	33				
11.9		42	43	41	39				
23.8		67	73	78	73				
47.6		119	111	123	109				
95.2		140	137	136	139				

May 15/17

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	19-2471-0259	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-17 13:33	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



May 15/17

Analyst:_____ QA:_____

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-0760-7270	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-17 13:33	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	08-7971-6055	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	25 Apr-17 17:05	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	28 Apr-17 17:05	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	05-2054-0776	**Code:**	1F06D268	**Client:**	Teck Coal
Sample Date:	24 Apr-17 12:29	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	29h (3 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	18.1%	3	6	4.243	33.33

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.1933	2.526	4.9	10	0.9566	CDF	Non-Significant Effect
		3	2.514	2.526	4.9	10	0.0514	CDF	Non-Significant Effect
		6*	2.642	2.526	4.9	10	0.0389	CDF	Significant Effect
		11.9*	7.283	2.526	4.9	10	<0.0001	CDF	Significant Effect
		23.8*	23.52	2.526	4.9	10	<0.0001	CDF	Significant Effect
		47.6*	45.57	2.526	4.9	10	<0.0001	CDF	Significant Effect
		95.2*	57.17	2.526	4.9	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.0729	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57668.1	8238.3	7	821.3	<0.0001	Significant Effect
Error	280.875	10.03125	28			
Total	57948.97		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	13.68	18.48	0.0572	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9803	0.9166	0.7563	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	27.13	25.68	28.57	26.5	25	30	0.6105	6.37%	0.0%
1.5		4	26.75	24.03	29.47	26.5	25	29	0.8539	6.38%	1.38%
3		4	32	27.32	36.68	32	29	35	1.472	9.2%	-17.97%
6		4	32.25	28.72	35.78	32	30	35	1.109	6.88%	-18.89%
11.9		4	41.25	38.53	43.97	41.5	39	43	0.8539	4.14%	-52.07%
23.8		4	72.75	65.59	79.91	73	67	78	2.25	6.19%	-168.2%
47.6		4	115.5	105	126	115	109	123	3.304	5.72%	-325.8%
95.2		4	138	135.1	140.9	138	136	140	0.9129	1.32%	-408.8%

May 15/17

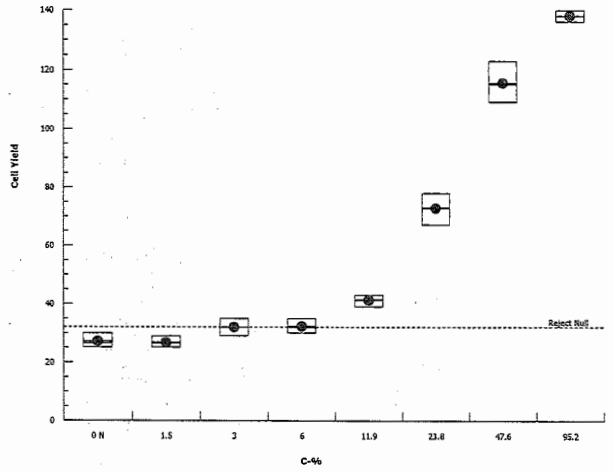
EC Alga Growth Inhibition Test — **Nautilus Environmental**

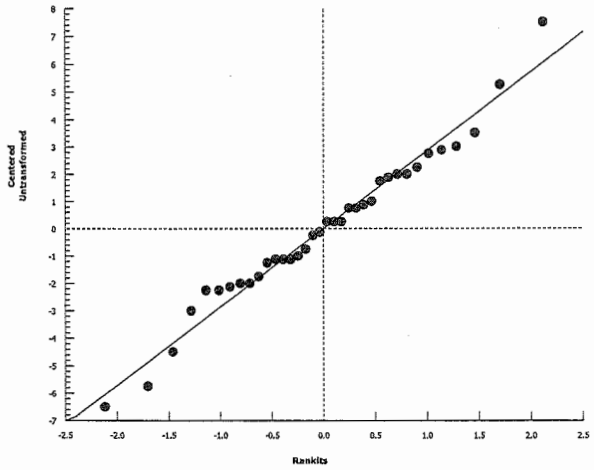
Analysis ID:	00-0760-7270	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 May-17 13:33	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	29	26	28	30	26	27	26	25
1.5		25	27	26	29				
3		29	34	35	30				
6		31	30	35	33				
11.9		42	43	41	39				
23.8		67	73	78	73				
47.6		119	111	123	109				
95.2		140	137	136	139				

Graphics





May 15/17

Analyst:_____ QA:_____

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 1703b6

Start Date: April 25/17
Set up by: MLT

Sample Information:

Sample ID: LC_DCDS_WS_2017-04-25_N
Sample Date: April 24/17
Date Received: April 25/17
Sample Volume: 5X20L

Test Organism Information:

Culture Date: April 21/17
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC156
Stock Solution ID: 17Zn01
Date Initiated: April 25/17

72-h IC50 (95% CL): 31.7 (27.6-36.2) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 33.6 (25.5-44.3) ug/L Zn CV (%): 15

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: May 15 2017

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | **Setup by:** MLT

Sample ID: LC-DCDS-WS-2017-04-25-N | **Test Date/Time:** April 25/17 @ 1730h

Work Order No.: 170366. | **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: April 21/17 | **Age of Culture:** 4d | **Culture Health:** Good

Culture Count: 1 290 2 320 | **Average:** 305 | **Culture Cell Density (c1):** 305 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 305 x 10⁴ cells/ml = 7.21

Time Zero Counts: 1 20 2 22 | **Average:** 21

No. of Cells/mL: 21 x 10⁴ | **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control	7.0	23.0	24.0	24.0	25.0	25.0	✓	✓	✓	✓
1.5	7.0	23.0					✓	✓	✓	✓
3.0	7.0	23.0					✓	✓	✓	✓
6.0	7.1	23.0					✓	✓	✓	✓
11.9	7.2	23.0					✓	✓	✓	✓
23.8	7.4	23.0					✓	✓	✓	✓
47.6	7.5	23.0					✓	✓	✓	✓
95.2	7.8	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.0 | Well 2: 7.0

Final control pH: Well 1: 6.8 | Well 2: 6.8

Light intensity (lux): 3860 | **Date measured:** April 25/A

Instruments: Thermometer 4 | pH meter 1 | Light meter 1

Sample Description: slightly turbid, colourless, odourless, brown particulates present

Comments:

Reviewed: | **Date reviewed:** May 15, 2017

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: April 25/17 @ 1720h
Work Order #: 170366 Termination Date: April 28/17 @ 1720h
Sample ID: LC_DCDS_WS_2017-04-25_N Test set up by: MG

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	28					MG
	B	25					
	C	29					
	D	27					
	E	30					
	F	31					
	G	26					
	H	31					
1.5	A	29					
	B	27					
	C	32					
	D	29					
3.0	A	28					
	B	29					
	C	33					
	D	31					
6.0	A	41					
	B	37					
	C	34					
	D	36					
11.9	A	42					
	B	45					
	C	42					
	D	41					
23.8	A	78					
	B	84					
	C	76					
	D	71					
47.6	A	113					
	B	124					
	C	118					
	D	111					
95.2	A	150					
	B	144					
	C	132					
	D	140					

Comments:

Reviewed by: Date Reviewed: May 15, 2017

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	25-Apr-17 @ 1720h
WO#:	170366	Termination Date/Time	28-Apr-17 @ 1720h
Sample ID:	LC_DCDS_WS_2017-04-25_N		
		Initial Cell Density:	9545 cell/mL

									210000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	28				28	27.0	mean	27.4
	B	25				25	24.0	SD	2.263846
	C	29				29	28.0	CV	8.256049
	D	27				27	26.0		
	E	30				30	29.0		
	F	31				31	30.0		
	G	26				26	25.0		
	H	31				31	30.0		
1.5	A	29				29	28.0		
	B	27				27	26.0		
	C	32				32	31.0		
	D	29				29	28.0		
3	A	28				28	27.0		
	B	29				29	28.0		
	C	33				33	32.0		
	D	31				31	30.0		
6	A	41				41	40.0		
	B	37				37	36.0		
	C	34				34	33.0		
	D	36				36	35.0		
11.9	A	42				42	41.0		
	B	45				45	44.0		
	C	42				42	41.0		
	D	41				41	40.0		
23.8	A	78				78	77.0		
	B	84				84	83.0		
	C	76				76	75.0		
	D	71				71	70.0		
47.6	A	113				113	112.0		
	B	124				124	123.0		
	C	118				118	117.0		
	D	111				111	110.0		
95.2	A	150				150	149.0		
	B	144				144	143.0		
	C	132				132	131.0		
	D	140				140	139.0		

Reviewed by: _____ Date reviewed: May 15, 2017

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-6695-2684	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 13:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-5743-6375	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	25 Apr-17 17:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	28 Apr-17 17:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	07-7306-7951	**Code:**	2E1414AF	**Client:**	Teck Coal
Sample Date:	24 Apr-17 10:38	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	31h (3.5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1749577	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2751	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	27.38	24	30	0.8004	2.264	8.27%	0.0%
1.5		4	28.25	26	31	1.031	2.062	7.3%	-3.2%
3		4	29.25	27	32	1.109	2.217	7.58%	-6.85%
6		4	36	33	40	1.472	2.944	8.18%	-31.51%
11.9		4	41.5	40	44	0.866	1.732	4.17%	-51.6%
23.8		4	76.25	70	83	2.689	5.377	7.05%	-178.5%
47.6		4	115.5	110	123	2.901	5.802	5.02%	-321.9%
95.2		4	140.5	131	149	3.775	7.55	5.37%	-413.2%

Cell Yield Detail

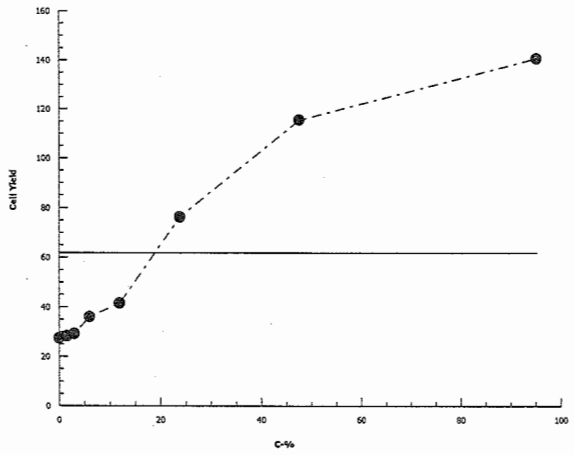
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	27	24	28	26	29	30	25	30
1.5		28	26	31	28				
3		27	28	32	30				
6		40	36	33	35				
11.9		41	44	41	40				
23.8		77	83	75	70				
47.6		112	123	117	110				
95.2		149	143	131	139				

May 15/17

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-6695-2684	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 13:53	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst:_____ QA: May 15/17

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	09-6575-0493	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 13:53	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-5743-6375	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	25 Apr-17 17:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	28 Apr-17 17:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	07-7306-7951	**Code:**	2E1414AF	**Client:**	Teck Coal
Sample Date:	24 Apr-17 10:38	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	31h (3.5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	22.8%	3	6	4.243	33.33

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.3536	2.526	6.251	10	0.8360	CDF	Non-Significant Effect
		3	0.7578	2.526	6.251	10	0.6710	CDF	Non-Significant Effect
		6*	3.486	2.526	6.251	10	0.0052	CDF	Significant Effect
		11.9*	5.709	2.526	6.251	10	<0.0001	CDF	Significant Effect
		23.8*	19.75	2.526	6.251	10	<0.0001	CDF	Significant Effect
		47.6*	35.62	2.526	6.251	10	<0.0001	CDF	Significant Effect
		95.2*	45.72	2.526	6.251	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.2751	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	59156.88	8450.982	7	517.6	<0.0001	Significant Effect
Error	457.125	16.32589	28			
Total	59614		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	13.52	18.48	0.0604	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9676	0.9166	0.3645	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	27.38	25.48	29.27	27.5	24	30	0.8004	8.27%	0.0%
1.5		4	28.25	24.97	31.53	28	26	31	1.031	7.3%	-3.2%
3		4	29.25	25.72	32.78	29	27	32	1.109	7.58%	-6.85%
6		4	36	31.32	40.68	35.5	33	40	1.472	8.18%	-31.51%
11.9		4	41.5	38.74	44.26	41	40	44	0.866	4.17%	-51.6%
23.8		4	76.25	67.69	84.81	76	70	83	2.689	7.05%	-178.5%
47.6		4	115.5	106.3	124.7	114.5	110	123	2.901	5.02%	-321.9%
95.2		4	140.5	128.5	152.5	141	131	149	3.775	5.37%	-413.2%

May 15/17

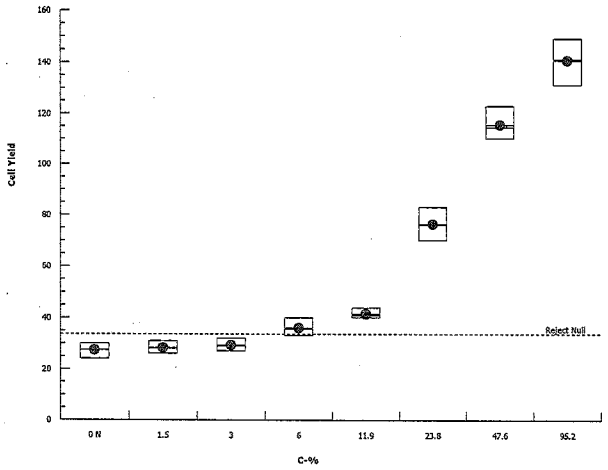
EC Alga Growth Inhibition Test — **Nautilus Environmental**

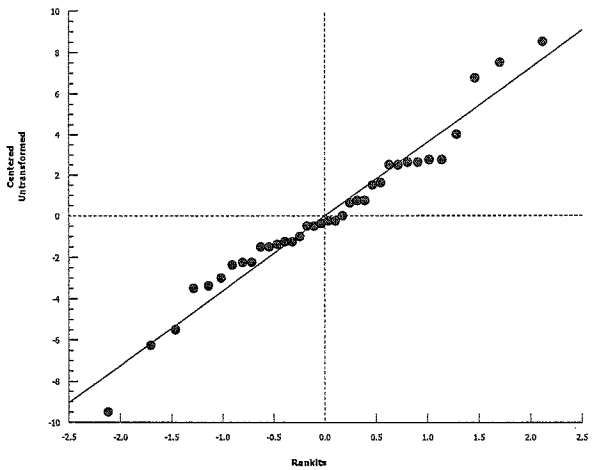
Analysis ID:	09-6575-0493	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 13:53	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	27	24	28	26	29	30	25	30
1.5		28	26	31	28				
3		27	28	32	30				
6		40	36	33	35				
11.9		41	44	41	40				
23.8		77	83	75	70				
47.6		112	123	117	110				
95.2		149	143	131	139				

Graphics





May 15/17

Analyst:_____ QA:_____

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 170366

Start Date: April 25/17
Set up by: MLT

Sample Information:

Sample ID: WL-BFWB_OUT_SP21_20170424_N
Sample Date: April 24/17
Date Received: April 25/17
Sample Volume: 5x20L

Test Organism Information:

Culture Date: April 21/17
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC156
Stock Solution ID: 173n01
Date Initiated: April 25/17

72-h IC50 (95% CL): 31.7 (27.6-36.2) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 33.6 (25.5-44.3) ug/L Zn CV (%): 15

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: _____ Date reviewed: _____

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal **Setup by:** MLT

Sample ID: ~~WLC-AWTF~~ WL-BFWB-OUT-SP21-20170424 **Test Date/Time:** April 25/17 @ 1730h

Work Order No.: 170366 **Test Species:** *Pseudokirchneriella subcapitata*

Culture Date: April 21/17 **Age of Culture:** 4d **Culture Health:** Good

Culture Count: 1 290 2 320 **Average:** 305 **Culture Cell Density (c1):** 305 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 305 x 10⁴ cells/ml = 7.21 mL

Time Zero Counts: 1 20 2 22 **Average:** 21

No. of Cells/mL: 21 x 10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9545 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	24.0	24.0	25.0	25.0	✓	✓	✓	✓
1.5	7.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.1	23.0					✓	✓	✓	✓
6.0	7.2	23.0					✓	✓	✓	✓
11.9	7.3	23.0					✓	✓	✓	✓
23.8	7.5	23.0					✓	✓	✓	✓
47.6	7.9	23.0					✓	✓	✓	✓
95.2	8.2	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 6.8 Well 2: 6.8

Light intensity (lux): 4100 **Date measured:** April 25/17

Instruments: Thermometer 4 pH meter) Light meter)

Sample Description: clear, colourless, hydrocarbon odour, brown particulates present

Comments:

Reviewed: [signature] **Date reviewed:** May 19, 2017

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck (ocl) Start Date/Time: April 25/17 @ 1730h

Work Order #: 1703166 Termination Date: April 28/17 @ 1730h

Sample ID: ~~WLE AWTF~~ MG Test set up by: MG

%(v/v) WL-BFWB_OUT-SP21_20170424_N

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	34					MG
	B	29					
	C	27					
	D	30					
	E	34					
	F	28					
	G	26					
	H	31					
1.5	A	33					
	B	32					
	C	37					
	D	38					
3.0	A	45					
	B	43					
	C	47					
	D	50					
6.0	A	75					
	B	78					
	C	70					
	D	65					
11.9	A	106					
	B	110					
	C	114					
	D	118					
23.8	A	117					
	B	126					
	C	118					
	D	123					
47.6	A	130					
	B	135					
	C	130					
	D	134					
95%	A	117					
	B	108					
	C	114					
	D	101					

Comments:

Reviewed by: Date Reviewed: May 19, 2017

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	25-Apr-17 @ 1730h
WO#:	170366	Termination Date/Time	28-Apr-17 @ 1730h
Sample ID:	WL_BFWB_OUT_SP21_201710424		
		Initial Cell Density:	9545 cell/mL

									210000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9545.455
Control	A	34				34	33.0	mean	28.9
	B	29				29	28.0	SD	2.997022
	C	27				27	26.0	CV	10.36298
	D	30				30	29.0		
	E	34				34	33.0		
	F	28				28	27.0		
	G	26				26	25.0		
	H	31				31	30.0		
1.5	A	33				33	32.0		
	B	32				32	31.0		
	C	37				37	36.0		
	D	38				38	37.0		
3	A	45				45	44.0		
	B	43				43	42.0		
	C	47				47	46.0		
	D	50				50	49.0		
6	A	75				75	74.0		
	B	72				72	71.0		
	C	70				70	69.0		
	D	65				65	64.0		
11.9	A	106				106	105.0		
	B	110				110	109.0		
	C	114				114	113.0		
	D	112				112	111.0		
23.8	A	117				117	116.0		
	B	126				126	125.0		
	C	118				118	117.0		
	D	123				123	122.0		
47.6	A	120				120	119.0		
	B	135				135	134.0		
	C	130				130	129.0		
	D	134				134	133.0		
95.2	A	117				117	116.0		
	B	108				108	107.0		
	C	114				114	113.0		
	D	101				101	100.0		

Reviewed by: _____

Date reviewed: May 19, 2017

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	19-6916-9581	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 14:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-5616-7221	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	25 Apr-17 17:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	28 Apr-17 17:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	09-1853-4142	**Code:**	36BFB7FE	**Client:**	Teck Coal
Sample Date:	24 Apr-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	32h (8 °C)	**Station:**	WL_BFWB_OUT_SP21_20170424_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1110110	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5484	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	28.88	25	33	1.06	2.997	10.38%	0.0%
1.5		4	34	31	37	1.472	2.944	8.66%	-17.75%
3		4	45.25	42	49	1.493	2.986	6.6%	-56.71%
6		4	69.5	64	74	2.102	4.203	6.05%	-140.7%
11.9		4	109.5	105	113	1.708	3.416	3.12%	-279.2%
23.8		4	120	116	125	2.121	4.243	3.54%	-315.6%
47.6		4	128.8	119	134	3.425	6.85	5.32%	-345.9%
95.2		4	109	100	116	3.536	7.071	6.49%	-277.5%

Cell Yield Detail

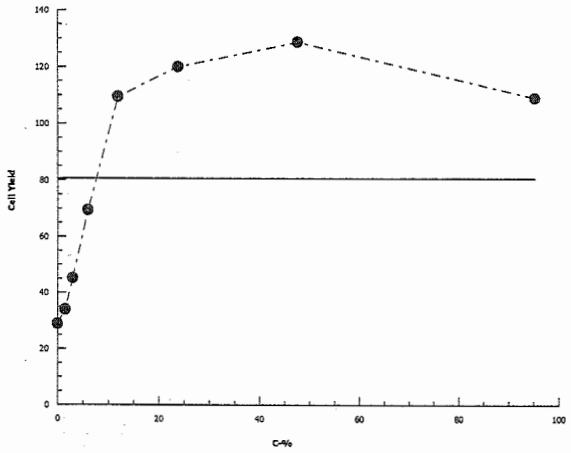
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	33	28	26	29	33	27	25	30
1.5		32	31	36	37				
3		44	42	46	49				
6		74	71	69	64				
11.9		105	109	113	111				
23.8		116	125	117	122				
47.6		119	134	129	133				
95.2		116	107	113	100				

May 19/17

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	19-6916-9581	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 14:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



May 19/17

 Analyst:_____ QA:_____

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-9780-9206	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 14:09	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	05-5616-7221	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	25 Apr-17 17:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	28 Apr-17 17:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	09-1853-4142	**Code:**	36BFB7FE	**Client:**	Teck Coal
Sample Date:	24 Apr-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	25 Apr-17 09:00	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	32h (8 °C)	**Station:**	WL_BFWB_OUT_SP21_20170424_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	23.7%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.891	2.526	6.846	10	0.1701	CDF	Non-Significant Effect
		3*	6.042	2.526	6.846	10	<0.0001	CDF	Significant Effect
		6*	14.99	2.526	6.846	10	<0.0001	CDF	Significant Effect
		11.9*	29.75	2.526	6.846	10	<0.0001	CDF	Significant Effect
		23.8*	33.62	2.526	6.846	10	<0.0001	CDF	Significant Effect
		47.6*	36.85	2.526	6.846	10	<0.0001	CDF	Significant Effect
		95.2*	29.57	2.526	6.846	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5484	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	56445.93	8063.705	7	411.7	<0.0001	Significant Effect
Error	548.375	19.58482	28			
Total	56994.3		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.223	18.48	0.5139	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9654	0.9166	0.3133	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	28.88	26.37	31.38	28.5	25	33	1.06	10.38%	0.0%
1.5		4	34	29.32	38.68	34	31	37	1.472	8.66%	-17.75%
3		4	45.25	40.5	50	45	42	49	1.493	6.6%	-56.71%
6		4	69.5	62.81	76.19	70	64	74	2.102	6.05%	-140.7%
11.9		4	109.5	104.1	114.9	110	105	113	1.708	3.12%	-279.2%
23.8		4	120	113.2	126.8	119.5	116	125	2.121	3.54%	-315.6%
47.6		4	128.8	117.9	139.6	131	119	134	3.425	5.32%	-345.9%
95.2		4	109	97.75	120.3	110	100	116	3.536	6.49%	-277.5%

May 19/17

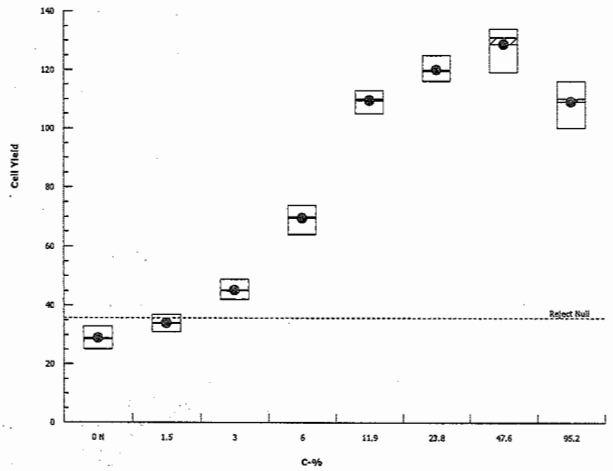
EC Alga Growth Inhibition Test — **Nautilus Environmental**

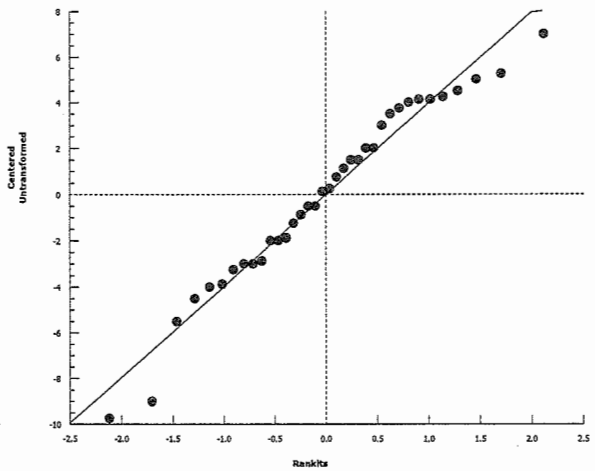
Analysis ID:	16-9780-9206	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	12 May-17 14:09	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	33	28	26	29	33	27	25	30
1.5		32	31	36	37				
3		44	42	46	49				
6		74	71	69	64				
11.9		105	109	113	111				
23.8		116	125	117	122				
47.6		119	134	129	133				
95.2		116	107	113	100				

Graphics





APPENDIX E – Chain-of-Custody Forms

Teck

COC ID: 20170424-0720 | **TURNAROUND TIME:** | **RUSH:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Jay Jones			Lab Contact	Krysta Pearcy			Email 1:	jay.jones@teck.com	x	x	
Email	jay.jones@teck.com			Email	Krysta@NautilusEnvironmental.ca			Email 2:	tim.chala@teck.com	x	x	
Address	Box 2003			Address	8664 commerce Court			Email 3:	teckcoal@equisonline.com	x	x	x
	15km North Hwy 43							Email 4:	cait.good@teck.com			
City	Sparwood	Province	BC	City	Burnaby	Province	BC					
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number	432106			
Phone Number	250-425-6111			Phone Number	604-420-8773							

SAMPLE DETAILS | **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	PRESERV	ANALYSIS: 7 d Cdubia dilution series	72hr Psubcapitata dilution series	7d L minor plant grown dilution series	7 d O mykis development dilution series	72h P. subcapitata P/F	7d C.dubia P/F	30 d rainbow trout early life stage P/F					Temp °C
1	LC_LCDSSLCC_WS_2017-04-24_N	LC_LCDSSLCC	WS	N	24-Apr-17	15:20	G	8 x 20L			X	X	X	X	X	X	X					5.0
2	LC_LC5_WS_2017-04-24_N	LC_LC5	WS	N	24-Apr-17	14:17	G	5 x 20L			X	X	X	X								4.0
3	LC_FRDSDC_WS_2017-04-25_N	LC_FRDSDC	WS	N	24-Apr-17	12:49	G	5 x 20L			X	X	X	X								3.5
4	LC_DC1_WS_2017-04-25_N	LC_DC1	WS	N	24-Apr-17	12:29	G	5 x 20L			X	X	X	X								3.0
5	LC_DCDS_WS_2017-04-25_N	LC_DCDS	WS	N	24-Apr-17	10:38	G	5 x 20L			X	X	X	X								3.5
	Sample description :																					
	1-4 : clear, colorless, odorless, brown particulates present.																					
	5 : slightly turbid, colorless, odorless, brown particulates present.																					
										LIMS #	170369	170368	170367	170364	170359	170358	170360					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	T Phillips/ NUPQU	April 24, 2017	Nautilus - Burnaby NY - Nari Yamamoto	Apr 25/17 @ 09:00

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Tyler Phillips	Mobile #	(250) 919-0965
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	April 24, 2017
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID: **20170424-Toxicity** | TURNAROUND TIME: REGULAR | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	WLC AWTF			Lab Name	Nautilus Environmental			Report Delivery Formats		Excel	PDF	EDD
Project Manager	Thomas Davidson			Lab Contact	Krysta Pearcy			Email 1:	thomas.davidson@teck.com	X	X	X
Email	Thomas.Davidson@teck.com			Email	Krysta@NautilusEnvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Address	15 Km North HWY 43			Address	8664 Commerce Court			Email 3:	teckwlclab@epcor.com	X	X	X
								Email 4:	Chris.Stroich@teck.com	X	X	X
City	Sparwood	Province	BC	City	Brunaby	Province	BC	Email 5:	colin.lynch@teck.com			X
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250.603.9417			Phone Number	+1.604.420.8773			VPO 00473572				

SAMPLE DETAILS / **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	FIL	PRESERV	ANALYSIS: 7 d Ceriodaphnia dubia survival and reproduction test	72hr Pseudokirchneriella subcapitata growth inhibition test	7 d Lemna minor plant growth inhibition test	7 d Oncorhynchus mykiss development inhibition test								Temp °C
								N	N	N	N	N	N	N	N						
WL_BFWB_OUT_SP21_20170424_N	WL_BFWB_OUT_SP21	WS	N	24-Apr-17	0900	G	9			X	X	X	X								8.0
Sample description = clear, colorless, hydrocarbon odor, brown particulates present.						NY	5x20L			170341	170341	170341	170341								

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Nautilus - Burnaby	Apr 25/17 @ 09:00
			NY - Nau Yamamoto	

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Tyson Wolowski	Mobile #	
Sampler's Signature		Date/Time	24-April-17

Teck

COC ID: 20170424-1248 | **TURNAROUND TIME:** | **RUSH:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	Lee.Wilm@teck.com	x	x	x
Email	Neil.MacDonald@teck.com			Email				Email 2:	Neil.Macdonald@teck.com	x	x	x
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	teckcoal@equisonline.com			x
City	Elkford	Province	BC	City	Burnaby	Province	BC	PO number				
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5204			Phone Number	604-420-8773							

SAMPLE DETAILS | **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 28 Day H. azteca Pass/Fail	7 D C. Dubia Pass/Fail	72 hr P. subcapitata Pass/Fail	30 D Rainbow Trout early life stage Pass/Fail	30d EA Rainbow Trout Microbial Testing Copper Test	32d FHM P/F Conducted in Calgary	7d Rbt Embryo P/F					Temp °C
FR_FRCP1_Q_03042017_N (1)	FR_FRCP1	WS		2017/04/24	10:55	G	7 x 20L			1	1	1	1	1	-						6.5
FR_UFR1_Q_03042017_N (2)	FR_UFR1	WS		2017/04/24	09:14	G	8 x 20L			1	1	1	1	1	-	-					8.0
									WO #	170361	170358	170359	170360	170363	170362	170368					

(1) clear, colourless, odourless, dark brown particulates present
(2) clear, colourless, odourless, some brown particulates present

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Dylan Begin	4/25	Nautilus - Burnaby	Apr 25/17 @ 09:00
			Mr. Nair Yamamoto	

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Dylan Begin	Mobile #	250 865 5273
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	April 24/2017
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Teck

COC ID:	April 24 TOX	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Krysta Pearcy			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commence Court				Yes PDF	Yes Excel	
					Imperial Square Lake City			Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	sean.beswick@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	jevin.wolchuk@teck.com		
Phone Number	250 865 3274			Phone Number				PO number			

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A 96 hr Rainbow trout (pass/fail)	#N/A 48 hr daphnia (pass/fial)	#N/A 48 hr daphnia @ 10 deg C (pass/fial)	#N/A 7d C.dubia P/F	#N/A 39 d rainbow trout early life stage NO3/SO4	#N/A 72 hr P. Subcapitata P/F	#N/A 30 day rainbow trout early life stage P/F	#N/A 32 d FHM P/F ~~28 day Hazteca~~ conducted in Calgary	#N/A 28 Day Hyallella P/F	None 30d EA Rainbow Trout Microbial Testing (Copper Test	#N/A 7 Day Rainbow Trout P/F	#N/A
GH_FR1_WS_2017-04-24_N ①	GH_FR1	WS	N	24-Apr-17	10:00	G	7 x 20L					x		x	x	X	x	x		4.5
GH_ERC_WS_2017-04-24_N ②	GH_ERC	WS	N	24-Apr-17	13:00	G	4 x 20L					x		x	x					5.5
GH_ER2_WS_2017-04-24_N ②	GH_ER2	WS	N	24-Apr-17	12:00	G	7 x 20L					x		x	x	X	x		X	5.5
								WO #				170358		170359	170360	170362	170361	170363	170368	

① clear, colourless, odourless, dark brown particulates present
② clear, colourless, odourless, some brown particulates present

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
	J. Evans	24-April-17		Nautilus - Burnaby	Apr 25/17 @ 09:00	
				NY - Nair Yamamoto		

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X	Sampler's Name	J. Evans	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	[signature]	Date/Time	
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

END OF REPORT

Toxicity testing on Line Creek Operations samples with *Ceriodaphnia dubia*, *Oncorhynchus mykiss*, *Lemna minor* and *Pseudokirchneriella subcapitata*

Fourth Quarter 2017 Results

Final Report

March 29, 2018

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

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SIGNATURE PAGE



Report By:
Emma Marus, B. Sc.
Laboratory Biologist



Reviewed By:
James Elphick, R.P. Bio.
Environmental Toxicologist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

SUMMARY

Summaries of sample information and test results from the toxicity tests conducted on samples collected from the Line Creek Operations to meet requirements of the semi-annual toxicity testing program required under BC Ministry of Environment and Sustainability permit number 106970 in the fourth quarter of 2017 are provided in the tables below.

Sample and Test Type Information

Sample IDs	FR_UFR1*, GH_ER2*, LC_LCDSSLCC, LC_DC1, LC_FRDSDC, LC_DCDS, LC_LC5, WL_BFWB_OUT_SP21
Sample collection dates	October 2, 2017
Sample receipt dates	October 3, 2017
Sample receipt temperatures	Ranged from 7.8 to 9.0°C
Test types	*Ceriodaphnia dubia* survival and reproduction 7-d rainbow trout (*Oncorhynchus mykiss*) embryo viability 7-d *Lemna minor* growth inhibition 72-h *Pseudokirchneriella subcapitata* growth inhibition

*Reference site; conducted as a single concentration toxicity test for *C. dubia*, *O. mykiss* and *P. subcapitata*

Summary of Results

Endpoint	Point Estimate (with 95% CL)					
	LC_LCDSSLCC	**LC_DC1**	**LC_FRDSDC**	**LC_DCDS**	**LC_LC5**	**WL_BFWB_OUT_SP21**
Ceriodaphnia dubia						
Survival LC50	>100	>100	>100	>100	>100	>100
Reproduction IC25	80.6 (39.1 – 100)	>100	>100	>100	>100	61.3 (23.2 – 72.0)
Reproduction IC50	>100	>100	>100	>100	>100	>100
Oncorhynchus mykiss						
Embryo viability EC25	>100	>100	>100	67.8 (0.0 – 100)	>100	94.7 (N/A – N/A)
Embryo viability EC50	>100	>100	>100	>100	>100	>100
Lemna minor						
Frond count IC25	65.2 (19.5 – 74.6)	>97	71.8 (56.6 – 93.8)	>97	87.1 (71.1 – 97.0)	21.4 (15.4 – 30.3)
Frond count IC50	97.0 (68.4 – N/A)	>97	>97	>97	>97	>97
Dry weight IC25	77.7 (20.0 – 92.9)	>97	90.9 (58.3 – N/A)	>97	>97	>97
Dry weight IC50	>97	>97	>97	>97	>97	>97
Pseudokirchneriella subcapitata						
Growth IC25	>95.2	>95.2	>95.2	>95.2	>95.2	>95.2
Growth IC50	>95.2	>95.2	>95.2	>95.2	>95.2	>95.2

CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effective Concentration, N/A = Not Available

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on six samples collected from Line Creek Operations as part of a toxicity testing program required under BC Ministry of Environment and Sustainability permit number 106970, Section 5.2. Test types included survival and reproduction of a cladoceran (*Ceriodaphnia dubia*), embryo development of rainbow trout (*Oncorhynchus mykiss*), growth of a freshwater plant (*Lemna minor*) and population growth of a unicellular green alga (*Pseudokirchneriella subcapitata*). The samples from Line Creek Operations were tested using serial dilutions of the sample using laboratory control water.

In addition to the Line Creek Operations samples, samples collected from FR_UFR1 and GH_ER2 were tested at full strength as site reference waters. FR_UFR1 and GH_ER2 are upstream reference locations that are not required as part of the Line Creek Operations testing program, but the data for these samples were included here as a basis for comparison to Line Creek Operations mine-influenced samples. These samples were tested with all of the species except for *L. minor*.

The toxicity tests that were conducted on the samples are summarized in Table 1. The locations of Line Creek Operations sample sites are shown in Figure 1. Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 7.8 to 9.0°C and were stored in the dark at 4 ± 2°C prior to testing.

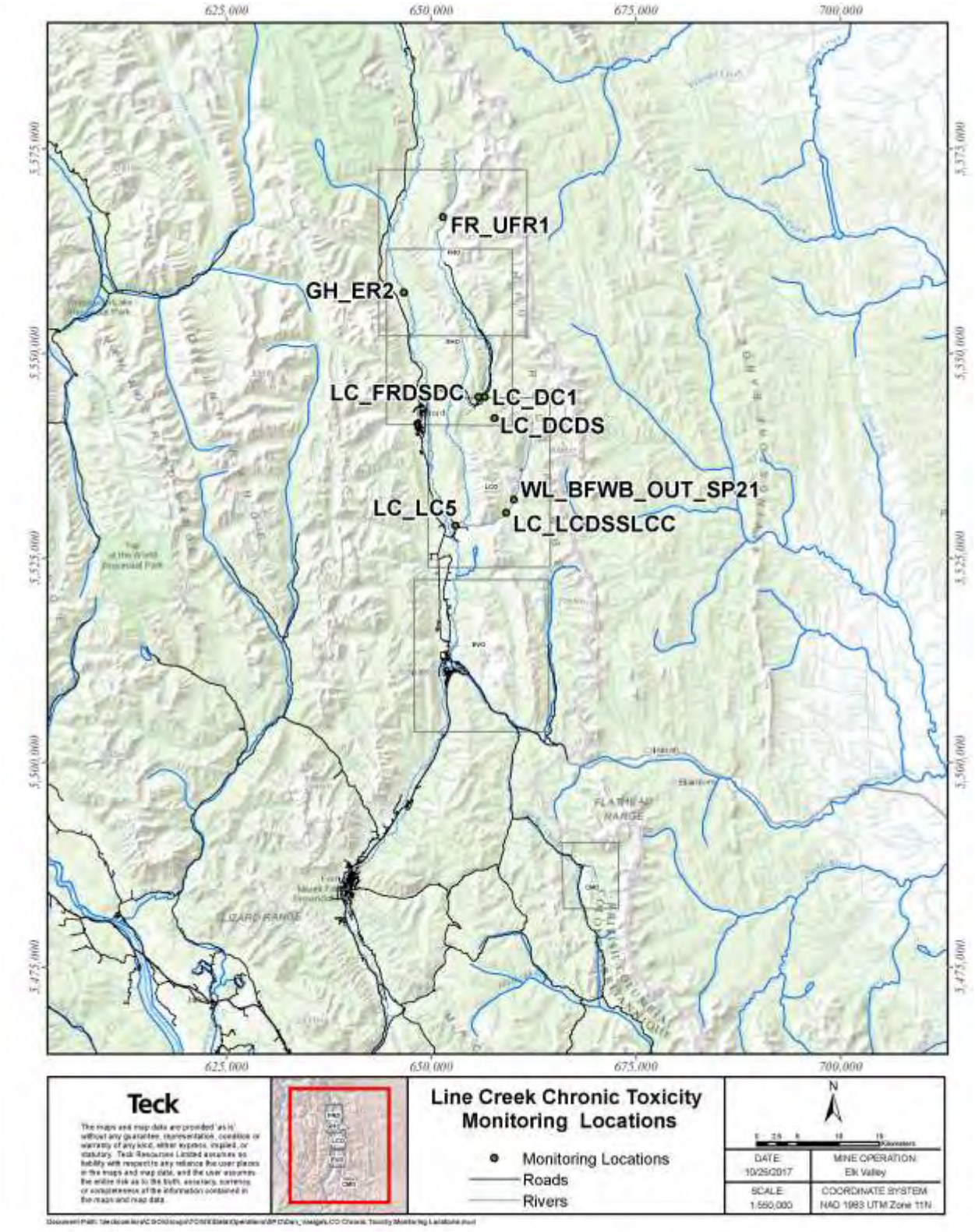
This report describes the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. Results of analytical chemistry that was performed on the samples tested in this program have been uploaded to the BC Ministry of Environment and Sustainability web reporting system (EMS). Samples for water chemistry analysis were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix E.

Table 1. Summary of toxicity testing program.

Sample ID	EMS #	Location Description	Species Tested	Sample Collection Date
FR_UFR1*	216777	Fording River upstream of Henretta Creek	*C. dubia*, *O. mykiss*, and *P. subcapitata*	October 2, 2017
GH_ER2*	200389	Elk River upstream of Greenhill Operations	*C. dubia*, *O. mykiss*, and *P. subcapitata*	October 2, 2017
LC_LCDSSLCC	297110	Line Creek downstream of South Line Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 2, 2017
LC_DC1	288270	Dry Creek near mouth	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 2, 2017
LC_FRDSDC	288272	Fording River downstream of Dry Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 2, 2017
LC_DCDS	295210	Dry Creek downstream of sedimentation ponds	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 2, 2017
LC_LC5	200028	Lower Fording River (downstream of Line Creek)	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 2, 2017
WL_BFWB_OUT_SP21	291569	West Line Creek Active Water Treatment Facility Effluent Outfall	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 2, 2017

*Reference site, tested as a single concentration toxicity test.

Figure 1. Line Creek Operations chronic toxicity monitoring locations.



2.0 METHODS

Methods for the toxicity tests are summarized in Tables 2 through 5. Testing was conducted according to procedures described by Environment Canada protocols (2007a, 2007b and 2007c). The rainbow trout embryo viability test followed modified procedures described by Environment Canada (1998) and Canaria et al. (1999). Statistical analyses for the tests were performed using CETIS (Tidepool Scientific Software, 2013).

Table 2. Test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test species	*Ceriodaphnia dubia*
Organism source	In-house culture
Organism age	<24 hour old neonates, produced within a 12 hour window
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20-mL glass test tube
Test volume	15 mL
Test solution depth	10 cm
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	10 per treatment
Number of organisms	1 per replicate
Control/dilution water	20% Perrier water and 80% deionized water + 5 µg/L Se and 2 µg/L vitamin B12
Test solution renewal	Daily (100% renewal)
Test temperature	25 ± 1°C
Feeding	Daily with *Pseudokirchneriella subcapitata* and YCT (3:1 ratio)
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival and reproduction checked daily
Test protocol	Environment Canada (2007a), EPS 1/RM/21
Statistical software	CETIS Version 1.8.7
Test endpoints	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods; no ephippia present
Reference toxicant	Sodium chloride (NaCl)

Table 3. Test conditions: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Test species	*Oncorhynchus mykiss*
Organism source	Ted's Trout (Campbell Lake), Little Fort, BC
Organism age	<30 minutes post fertilization, <24 hour old gametes
Test type	Static-renewal
Test duration	7 days
Test vessel	2-L plastic container
Test volume	2 L
Test solution depth	17 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	4 per treatment
Number of organisms	30 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tap water
Test solution renewal	Daily (80% renewal)
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark
Aeration	Continuous gentle aeration
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival checked daily
Test protocol	Environment Canada (1998), EPS 1/RM/28; Canaria et al. (1999)
Statistical software	CETIS Version 1.8.7
Test endpoints	Embryo viability
Test acceptability criteria for controls	Embryo viability ≥70%
Reference toxicant	Sodium dodecyl sulphate (SDS)

Table 4. Test conditions: *Lemna minor* growth inhibition test.

Test species	*Lemna minor*, strain CPCC# 490
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Wainfleet, Stinking Barn, Niagara Peninsula, Ontario, Canada
Organism age	7- to 10-day old culture
Test type	Static
Test duration	7 days
Test vessel	250-mL glass container
Test volume	100 mL
Test solution depth	4 cm
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	4 per treatment
Number of organisms	Two 3-frond plants per replicate
Control/dilution water	Modified APHA media (deionized water plus 1% of each APHA stock solution A, B and C)
Test solution renewal	None
Test temperature	25 ± 2°C
Feeding	None
Light intensity	4000 to 5600 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature, pH and conductivity measured in all concentrations at test initiation; dissolved oxygen of highest concentration measured at test initiation; temperature and pH measured at test termination
Test protocol	Environment Canada (2007b), EPS 1/RM/37
Statistical software	CETIS Version 1.8.7
Test endpoints	Number of fronds and dry weight
Test acceptability criteria for controls	≥ 8-fold increase in number of fronds
Reference toxicant	Potassium chloride (KCl)

Table 5. Test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test species	*Pseudokirchneriella subcapitata*, strain CPCC# 37
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Center, and originally isolated from Nivelta River, Norway.
Organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	4 per treatment; 8 for laboratory control
Number of organisms	10,000 cells/mL
Control/dilution water	Deionized water supplemented with nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature and pH measured at test initiation; pH of two control wells measured at test termination
Test protocol	Environment Canada (2007c), EPS 1/RM/25
Statistical software	CETIS Version 1.8.7
Test endpoints	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤ 20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc (added as $ZnSO_4$)

3.0 RESULTS

Results of the toxicity tests and associated statistical analyses are provided in Appendices A through D, with the exception of data for FR_UFR1 and GH_ER2 (site reference waters) for *C. dubia* and *P. subcapitata*, which are reproduced here, but the raw data have been provided in a separate report (Nautilus Environmental, 2018). The statistical analyses for samples FR_UFR1 and GH_ER2 involved a comparison of performance in the site waters with the laboratory controls using a hypothesis test, since there were no dilutions tested for these samples. The results for all of the other samples are presented here on the basis of point estimates (e.g., IC25), since the data available for a range of test concentrations in these samples enabled statistical fitting of dose-response relationships. This approach is considered preferable to hypothesis testing in cases where the data allow. Hypothesis tests were conducted for all samples in the *P. subcapitata* test to identify stimulation in cell growth relative to the control, as specified in the test method for this species.

Results of the toxicity tests using *C. dubia* are provided in Table 6. There was no statistically significant difference in survival or reproduction for the site reference waters (FR_UFR1 and GH_ER2) relative to the laboratory control. There was no adverse effect on survival in the samples. An adverse effect on reproduction was observed in two samples; the IC25 values for LC_LCDSSLCC and WL_BFWB_OUT_SP21 were 80.6 and 61.3%, respectively.

Results of the toxicity tests using *O. mykiss* are provided in Table 7. There was no statistically significant difference in embryo viability for the site reference waters (FR_UFR1 and GH_ER2) compared to the laboratory control. An adverse effect on embryo viability was observed in two samples; the EC25 values for LC_DCDS and WL_BFWB_OUT were 67.8 and 94.7%, respectively.

Results of the toxicity tests using *L. minor* are provided in Table 8; the highest test concentration was 97% as a result of dilution associated with addition of nutrients, as required in the method. An adverse effect on frond count was observed in four samples; the IC25 values for LC_LCDSSLCC, LC_FRDSDC, LC_LC5 and WL_BFWB_OUT_SP21 were 65.2, 71.8, 87.1 and 21.4%, respectively. An adverse effect on dry weight was observed in two samples; the IC25 values for LC_LCDSSLCC and LC_FRDSDC were 77.7 and 90.9%, respectively.

Results of the toxicity tests using *P. subcapitata* are provided in Table 9; the highest test concentration was 95.2% as a result of dilution associated with addition of nutrients, as required in the method. Growth enhancement was observed in all samples, including in the site reference waters (FR_UFR1 and GH_ER2); there was no statistically significant reduction in cell yield for the site reference waters relative to the laboratory control and the IC25 values for cell yield in the

samples were all >95.2%. This finding is not unusual, since the higher ionic strength associated with the site waters would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	FR_UFR1		GH_ER2		LC_LCDSSLCC		LC_DC1	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	18.4 ± 2.4	100	18.4 ± 2.4	100	18.8 ± 4.0	80	15.2 ± 6.1
1.56	NT	NT	NT	NT	100	19.3 ± 5.2	100	14.8 ± 6.0
3.12	NT	NT	NT	NT	100	17.6 ± 3.7	100	17.6 ± 3.9
6.25	NT	NT	NT	NT	100	17.1 ± 5.3	90	15.8 ± 7.4
12.5	NT	NT	NT	NT	90	16.2 ± 5.2	100	17.0 ± 7.4
25	NT	NT	NT	NT	100	16.4 ± 5.4	100	15.3 ± 6.5
50	NT	NT	NT	NT	100	16.6 ± 5.7	100	17.9 ± 5.3
100	100	18.7 ± 4.7	100	17.9 ± 2.9	100	12.3 ± 5.3	100	19.1 ± 5.5
Test endpoint (% v/v) [with 95% CL]								
LC50	--	--	--	--	>100	--	>100	--
IC25	--	--	--	--	--	80.6 (39.1 – 100)	--	>100
IC50	--	--	--	--	--	>100	--	>100

NT = Not Tested, SD = Standard Deviation, CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration

Table 6 (continued). Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5		WL_BFWB_OUT_SP21	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	90	15.5 ± 6.5	90	16.5 ± 4.9	100	18.9 ± 1.7	100	15.4 ± 3.7
1.56	100	18.1 ± 4.7	90	17.4 ± 4.9	100	19.6 ± 2.3	90	15.6 ± 4.6
3.12	100	16.7 ± 3.7	100	16.8 ± 5.7	100	18.8 ± 3.6	100	16.7 ± 2.4
6.25	100	15.2 ± 4.3	100	17.2 ± 6.0	90	17.6 ± 6.6	100	16.9 ± 3.1
12.5	90	18.7 ± 8.2	100	16.6 ± 6.1	80	16.3 ± 8.7	100	14.7 ± 3.7
25	100	19.0 ± 3.4	100	16.5 ± 5.7	100	17.8 ± 3.2	100	13.5 ± 3.2
50	90	14.2 ± 4.9	100	17.4 ± 4.8	100	17.2 ± 3.3	100	13.4 ± 3.5
100	100	15.0 ± 3.0	100	16.0 ± 4.7	100	16.9 ± 4.5	100	9.0 ± 3.1
Test endpoint (% v/v) [with 95% CL]								
LC50	>100	--	>100	--	>100	--	>100	--
IC25	--	>100	--	>100	--	>100	--	61.3 (23.2 – 72.0)
IC50	--	>100	--	>100	--	>100	--	>100

SD = Standard Deviation, CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration

Table 7. Results: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Concentration (% v/v)	Embryo Viability (%) (Mean ± SD)							
	FR_UFR1	**GH_ER2**	**LC_LCDSSCLCC**	**LC_DC1**	**LC_FRDSDC**	**LC_DCDS**	**LC_LC5**	**WL_BFWB_OUT_21**
Laboratory Control	90.0 ± 8.6	90.0 ± 8.6	90.8 ± 16.2	91.7 ± 12.6	90.8 ± 16.2	94.2 ± 7.4	90.0 ± 6.1	87.5 ± 9.6
6.25	NT	NT	95.0 ± 10.0	94.2 ± 7.9	85.0 ± 14.5	87.2 ± 12.5	87.5 ± 7.4	90.8 ± 5.0
12.5	NT	NT	94.2 ± 7.9	93.3 ± 13.3	95.0 ± 7.9	91.7 ± 4.3	93.2 ± 9.8	90.0 ± 13.3
25	NT	NT	92.5 ± 10.7	88.3 ± 16.7	89.2 ± 11.0	81.7 ± 15.0	85.8 ± 7.9	89.2 ± 11.0
50	NT	NT	93.3 ± 7.2	83.2 ± 12.4	85.0 ± 4.3	79.2 ± 9.6	84.6 ± 7.2	85.0 ± 7.9
100	85.0 ± 12.5	89.2 ± 9.2	93.3 ± 13.3	86.1 ± 15.4	89.2 ± 14.2	58.1 ± 21.3	88.3 ± 8.8	64.2 ± 18.1
Test endpoint (% v/v) [with 95% CL]								
EC25	--	--	>100	>100	>100	67.8 (0.0 – 100)	>100	94.7 (N/A – N/A)
EC50	--	--	>100	>100	>100	>100	>100	>100

NT = Not Tested, SD = Standard Deviation, EC = Effective Concentration

Table 8. Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_LCDSSLCC		LC_DC1		LC_FRDSDC	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	73.0 ± 13.3	6.9 ± 1.3	75.2 ± 17.1	6.2 ± 1.6	64.0 ± 6.3	6.3 ± 0.3
1.5	81.5 ± 11.1†	7.5 ± 0.7†	69.0 ± 9.4	6.0 ± 0.7	78.2 ± 13.2†	7.2 ± 1.2
3.0	77.0 ± 7.9†	7.3 ± 0.4†	55.0 ± 6.2	5.0 ± 0.4	68.2 ± 7.8†	6.2 ± 0.8
6.1	72.8 ± 11.3	6.7 ± 0.8†	66.0 ± 11.2	6.1 ± 1.0	59.8 ± 5.7	5.9 ± 0.8
12.1	81.2 ± 9.0	7.5 ± 1.0†	65.5 ± 21.0	6.1 ± 1.6	73.5 ± 15.6†	6.6 ± 1.2
24.2	90.5 ± 13.9	7.7 ± 0.7†	70.2 ± 11.9	6.5 ± 1.1	61.5 ± 11.1	6.1 ± 1.4
48.5	68.2 ± 22.8	6.3 ± 1.4	61.0 ± 9.2	5.4 ± 1.5	73.5 ± 14.0†	7.1 ± 1.1
97	36.5 ± 7.9	4.7 ± 0.2	54.5 ± 10.0	5.0 ± 0.8	37.0 ± 8.2	4.9 ± 0.6
Test endpoint (% v/v) [with 95% CL]						
IC25	65.2 (19.5 – 74.6)	77.7 (20.0 – 92.9)	>97	>97	71.8 (56.6 – 93.8)	90.9 (58.3 – N/A)
IC50	97.0 (68.4 – N/A)	>97	>97	>97	>97	>97

SD = Standard Deviation, CL = Confidence Limits, IC = Inhibition Concentration, N/A = Not Available

† The data did not fit the hormesis regression model, therefore the number of fronds/dry weight was adjusted to that of the control value and analyzed using linear interpolation

Table 8 (continued). Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_DCDS		LC_LC5		WL_BFWB_OUT_SP21	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	82.5 ± 10.4	7.0 ± 0.7	64.2 ± 4.5	6.5 ± 0.6	85.5 ± 7.2	7.4 ± 1.0
1.5	80.5 ± 7.7	6.8 ± 0.8	68.8 ± 6.2	7.4 ± 1.3	88.8 ± 11.5	7.7 ± 1.0
3.0	77.8 ± 18.6	6.9 ± 1.4	68.0 ± 12.4	6.5 ± 1.0	94.0 ± 13.9	7.6 ± 1.6
6.1	82.8 ± 13.8	6.8 ± 0.9	67.8 ± 16.1	6.8 ± 1.7	78.2 ± 19.3	6.9 ± 1.5
12.1	81.5 ± 15.0	7.0 ± 1.3	66.0 ± 10.1	6.5 ± 0.9	77.0 ± 7.3	6.8 ± 0.6
24.2	69.0 ± 15.1	6.2 ± 1.0	73.0 ± 9.8	7.2 ± 0.9	62.2 ± 6.3	6.0 ± 0.1
48.5	70.5 ± 20.4	6.1 ± 1.5	70.5 ± 12.3	7.0 ± 1.4	48.5 ± 6.6	5.5 ± 0.6
97	66.5 ± 12.8	6.4 ± 0.9	42.8 ± 4.1	5.5 ± 0.6	45.0 ± 2.9	5.8 ± 0.6
Test endpoint (% v/v) [with 95% CL]						
IC25	>97	>97	87.1 (71.1 – 97)	>97	21.4 (15.4 – 30.3)	>97
IC50	>97	>97	>97	>97	>97	>97

SD = Standard Deviation, CL = Confidence Limits, IC = Inhibition Concentration

Table 9. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	FR_UFR1		GH_ER2		LC_LCDSSLCC		LC_DC1	
	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)
Laboratory Control	29.2 ± 1.8	--	29.2 ± 1.8	--	28.5 ± 1.9	--	28.8 ± 1.3	--
1.5	NT	NT	NT	NT	30.2 ± 2.6	6.1	31.8 ± 2.6	10.4
3.0	NT	NT	NT	NT	30.5 ± 3.1	7.0	31.8 ± 2.4	10.4
6.0	NT	NT	NT	NT	32.5 ± 2.1	14.0	39.8 ± 4.6 *	38.3
11.9	NT	NT	NT	NT	48.0 ± 3.4 *	68.4	48.8 ± 1.7 *	69.6
23.8	NT	NT	NT	NT	76.5 ± 5.3 *	168.4	93.0 ± 3.9 *	223.5
47.6	NT	NT	NT	NT	88.0 ± 3.2 *	208.8	107.3 ± 4.1 *	273.0
95.2	108.1 ± 7.4 *	296.7	109.6 ± 8.2 *	274.8	103.0 ± 2.9 *	261.4	114.8 ± 5.6 *	299.1
Test endpoint (% v/v)								
IC25	--	--	--	--	>95.2	--	>95.2	--
IC50	--	--	--	--	>95.2	--	>95.2	--

NT = Not Tested, SD = Standard Deviation, IC = Inhibition Concentration
*Result was significantly greater than the laboratory control

Table 9 (continued). Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5		WL_BFWB_OUT_SP21	
	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)
Laboratory Control	28.6 ± 2.0	--	30.2 ± 2.5	--	28.4 ± 1.8	--	29.0 ± 1.7	--
1.5	31.0 ± 1.4	8.3	29.8 ± 1.7	--	28.5 ± 1.3	0.4	34.8 ± 2.5 *	19.8
3.0	41.0 ± 3.7 *	43.2	33.2 ± 1.9	9.9	29.5 ± 2.1	4.0	37.8 ± 2.8 *	30.2
6.0	47.0 ± 3.2 *	64.2	34.5 ± 2.4	14.0	42.5 ± 3.7 *	49.8	44.0 ± 4.2 *	51.7
11.9	64.5 ± 4.4 *	125.3	48.2 ± 2.2 *	59.5	68.0 ± 6.1 *	139.6	72.0 ± 3.7 *	148.3
23.8	96.2 ± 5.9 *	236.2	83.2 ± 4.2 *	175.2	94.8 ± 4.3 *	233.9	86.8 ± 3.6 *	199.1
47.6	107.5 ± 7.4 *	275.5	104.3 ± 4.3 *	244.6	110.8 ± 3.4 *	290.3	95.8 ± 3.8 *	230.2
95.2	107.0 ± 7.9 *	273.8	123.0 ± 4.1 *	306.6	112.8 ± 5.0 *	297.4	50.8 ± 2.8 *	75.0
Test endpoint (% v/v)								
IC25	>95.2	--	>95.2	--	>95.2	--	>95.2	--
IC50	>95.2	--	>95.2	--	>95.2	--	>95.2	--

SD = Standard Deviation, IC = Inhibition Concentration
*Result was significantly greater than the laboratory control

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within the ranges specified in the protocols throughout the tests. Uncertainty associated with these tests is best described by the standard deviations around the means.

The eggs in the rainbow trout embryo test were exposed using a blocked design (i.e., eggs from one fish was used for replicate A of each test concentration, eggs from the second fish for replicate B, and so on); this approach deviates from the Environment Canada test method, which indicates that the eggs should be pooled prior to testing. This modification was considered appropriate because it reduces the risk of non-viable eggs affecting the test results, since if one of the batches of eggs was not viable, the data for that replicate could be excluded during statistical analysis. There were no other deviations from the test methodologies.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate. The reference toxicant tests were performed under the same conditions as those used for the samples.

Table 10. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.1 g/L NaCl	2.0 (1.8 – 2.3)	6	October 4, 2017
	Reproduction (IC50): 1.9 g/L NaCl	1.5 (1.0 – 2.1)	20	
O. mykiss	Viability (EC50): 4.6 mg/L SDS	4.2 (2.0– 8.8)	45	October 5, 2017
L. minor	Number of fronds (IC50): 3.8 g/L KCl	3.7 (3.0 – 4.6)	11	September 29, 2017
P. subcapitata	Growth (IC50): 34.9 µg/L Zn	32.8 (26.5 – 40.5)	11	September 22, 2017

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effect Concentration

5.0 REFERENCES

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Tidepool Scientific Software. 2013. CETIS comprehensive environmental toxicity information system, version 1.8.7.16 Tidepool Scientific Software, McKinleyville, CA. 222 pp.

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 171086

Start Date/Time: Oct 4/17 @ 1000h
Set up by: EMM/JS

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2017-10-02N
Sample Date: Oct 02, 2017
Date Received: Oct 03, 2017
Sample Volume: 8 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 092017A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 43
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 3, 5, 7, 9, 19, 20

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd167
Stock Solution ID: 17Na05
Date Initiated: Oct 4/17

7-d LC50 (95% CL): 2.1 (1.5-3.0) g/L NaCL
7-d IC50 (95% CL): 1.9 (1.6-2.1) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-~~2.2~~ 2.3) g/L NaCL CV (%): 6
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.0-2.1) g/L NaCL CV (%): 20

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		80.6 (39.1 - 100)
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]

Date reviewed: Nov 23, 2017

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC-LCDSSLCC-WS-2017-10-02-N
Work Order #: 171086

Start Date & Time: Oct 4/17 @ 1000h
Stop Date & Time: Oct 11/17 @ 900h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration control	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	24.5	24.0	24.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	25.0	24.0	24.0	
DO (mg/L)	8.0	7.3	8.0	7.8	8.0	7.7	8.1	7.5	8.0	7.3	8.1	7.6	8.2	7.1	
pH	7.9	7.6	8.0	7.7	7.8	7.9	8.0	7.8	8.0	7.6	8.2	7.6	8.1	8.0	
Cond. (µS/cm)	215	216		213		206		210		219		215		223	
Initials	JS	EMM		EMM		EMM		EMM		JS		EMM		JS	

(V/V) Concentration 1.56%	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	24.5	24.0	24.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	25.0	24.0	24.0	
DO (mg/L)	8.2	7.6	8.2	7.9	8.2	7.7	8.2	7.3	8.2	7.4	8.1	7.6	8.0	7.0	
pH	7.9	7.8	8.0	7.7	7.9	7.9	7.9	7.8	8.0	7.8	8.2	7.8	8.1	8.0	
Cond. (µS/cm)	230	230		228		220		219		233		220		225	
Initials	JS	EMM		EMM		EMM		EMM		JS		EMM		JS	

(V/V) Concentration 12.5%	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	24.5	24.0	24.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	25.0	24.0	24.0	
DO (mg/L)	8.2	7.3	8.2	7.9	8.1	7.6	8.1	7.3	8.1	7.4	8.2	7.6	8.1	7.0	
pH	7.9	7.8	8.0	7.6	7.9	7.9	7.9	7.8	8.0	7.9	8.2	8.0	8.2	8.0	
Cond. (µS/cm)	312	318		320		321		320		316		320		345	
Initials	JS	EMM		EMM		EMM		EMM		JS		EMM		JS	

(V/V) Concentration 100%	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	24.5	24.0	24.0	25.0	25.0	24.0	24.0	24.0	24.0	24.0	25.0	24.0	24.0	
DO (mg/L)	8.2	7.8	8.2	8.1	8.1	7.6	8.2	7.3	8.1	7.4	8.2	7.3	8.1	7.0	
pH	8.0	7.8	8.2	7.9	8.4	8.0	8.2	7.9	8.0	7.9	8.3	8.1	8.2	8.2	
Cond. (µS/cm)	886	897		896		892		892		889		896		891	
Initials	JS	EMM		EMM		EMM		EMM		JS		EMR		JS	

Thermometer: 4 DO meter/probe: 1 / 2 pH meter/probe: 1 / 2 Conductivity meter/probe: 1 / 2

	Control	100% (V/V)		
Hardness*	100	660		
Alkalinity*	98	206		

* mg/L as CaCO3

Analysts: EMM, JS
Reviewed by:
Date reviewed: NOV 23, 2017

Sample Description: clear, colourless, odourless, some particulates

Comments: Broodboard Used: 892017A (3,5,7,9,19,20)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC-LCOSSLCC-WS-2017-10-02-N
Work Order: 1718816

Start Date & Time: Oct 4/17 @ 1000h
Stop Date & Time: Oct 11/17 @ 902
Set up by: EMM/JS

%(V/V)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	✓	✓	3	3	3	3	4	✓	✓	3	EMM
5	3	6	6	6	✓	✓	6	5	5	6	EL
6	6	6	✓	✓	8	8	✓	6	10	✓	EMM
7	8	7	✓	9	11	8	11	10	9	9	JS
8											
Total	17	19	9	18	22	19	21	21	24	18	JS

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	✓	✓	3	3	✓	4	4	4	✓	✓	EMM
5	X6	6	5	3	6	6	✓	6	3	3	EL
6	X9	10	✓	✓	7	✓	8	✓	8	9	EMM
7	10	12	10	12	9	10	4	10	✓		JS
8	JS										
Total	10	28	18	18	22	20	19	20	11	12	JS

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	3	3	3	3	3	4	4	3	✓	4	EMM
5	7	6	5	6	6	6	✓	6	6	5	EL
6	✓	✓	✓	✓	✓	✓	6	✓	8	✓	EMM
7	8	12	12	10	12	10	8	7	✓	✓	JS
8											
Total	18	21	20	19	21	20	18	16	14	9	JS

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	3	3	3	3	✓	3	✓	✓	✓	✓	EMM
5	4	5	✓	✓	6	6	6	✓	6	6	EL
6	✓	✓	9	9	8	✓	✓	3	7	8	EMM
7	11	8	11	12	✓	10	✓	5	10	✓	JS
8											
Total	18	16	23	24	14	19	12	8	23	14	JS

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	3	✓	✓	2	✓	4	3	4	4	4	EMM
5	6	4	6	6	3	✓	✓	✓	✓	3	EL
6	✓	9	10	✓	9	10	8	3	4	✓	EMM
7	13	✓	✓	13	7	10	✓	6	✓	8	JS
8											
Total	22	13	16	21	19	24	11	13	8	15	JS

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	3	3	3	4	✓	✓	3	✓	✓	✓	EMM
5	6	6	6	7	4	6	5	5	6	6	EL
6	✓	✓	✓	✓	9	10	✓	9	8	9	EMM
7	7	8	✓	4	✓	7	✓	10	7	✓	JS
8											
Total	16	17	9	18	13	23	8	24	21	15	JS

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	3	✓	✓	✓	✓	✓	4	✓	✓	3	EMM
5	7	8	✓	4	6	6	7	7	✓	✓	EL
6	✓	8	3	9	11	10	✓	8	5	10	EMM
7	6	6✓	6	7	7	✓	8	✓	6	13	JS
8		JS									
Total	16	10	9	20	24	16	19	15	11	26	JS

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	3	2	2	✓	✓	✓	✓	✓	✓	✓	EMM
5	4	7	4	7	4	✓	7	✓	4	✓	EL
6	✓	✓	9	9	8	5	8	6	10	9	EMM
7	✓	✓	✓	✓	✓	6	9	✓	✓	✓	JS
8	7										
Total	7	9	15	16	12	11	24	6	14	9	JS

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See water quality sheets
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: EMM

Date reviewed: Nov. 23, 2017

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-7941-3915	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Nov-17 16:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-7292-8757	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jill Sones
Start Date:	04 Oct-17 10:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	11 Oct-17 09:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 23h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	16-4401-7416	**Code:**	61FDB708	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:14	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	49h	**Station:**	LC_LCDSSLCC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	942668	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	0	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

Analyst: JK QA: Nov 23/17

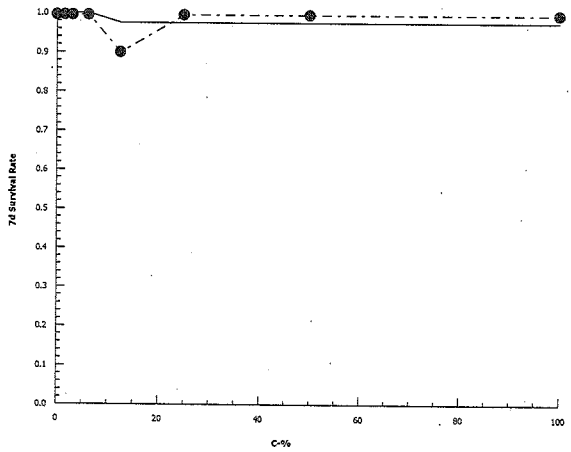
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-7941-3915	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Nov-17 16:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst: JS QA: Nov 23/17

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	02-4436-8300	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	10 Nov-17 9:49	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	07-7292-8757	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jill Sones
Start Date:	04 Oct-17 10:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	11 Oct-17 09:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 23h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	16-4401-7416	**Code:**	61FDB708	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:14	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	49h	**Station:**	LC_LCDSSLCC_WS_2017-10-02_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
3	-166.3	336.8	341.4	0.1091	Yes	0.3979	2.227	0.8781	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	14.36	N/A	33.03	6.961	3.027	NA
IC10	29.51	10.86	49.48	3.389	2.021	9.209
IC15	45.51	21.34	71.98	2.197	1.389	4.686
IC20	62.49	30.3	98.87	1.6	1.011	3.3
IC25	80.57	39.07	129.3	1.241	0.7734	2.559
IC40	143.1	69.44	243.2	0.699	0.4112	~~1.44~~
IC50	~~194.1~~	96.09	346.2	0.5151	0.2888	1.041

>100 JS

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	18.23	0.7182	16.82	19.63	25.38	<0.0001	Significant Parameter
D	194.1	65.42	65.9	322.3	2.967	0.0040	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	257.4912	257.4912	1	10.67	0.0016	Significant
Lack of Fit	60.39629	10.06605	6	0.3979	0.8781	Non-Significant
Pure Error	1821.5	25.29861	72			
Residual	1881.896	24.12687	78			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	2.498	14.07	0.9272	Equal Variances
	Mod Levene Equality of Variance	0.5663	2.14	0.7809	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9861	0.9691	0.5421	Normal Distribution
	Anderson-Darling A2 Normality	0.3034	2.492	0.6021	Normal Distribution

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	18.8	9	24	1.281	4.05	21.54%	0.0%
1.56		10	19.3	11	28	1.64	5.187	26.87%	-2.66%
3.12		10	17.6	9	21	1.185	3.748	21.29%	6.38%
6.25		10	17.1	8	24	1.67	5.28	30.88%	9.04%
12.5		10	16.2	8	24	1.638	5.181	31.98%	13.83%
25		10	16.4	8	24	1.714	5.42	33.05%	12.77%
50		10	16.6	9	26	1.815	5.739	34.57%	11.7%
100		10	12.3	6	24	1.674	5.293	43.03%	34.57%

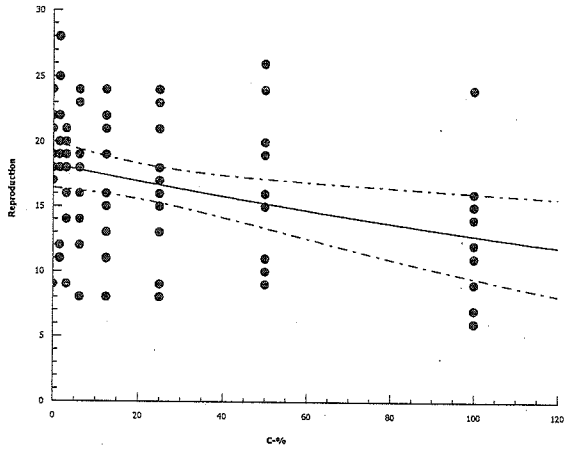
Analyst: JS QA: Nov 23/17

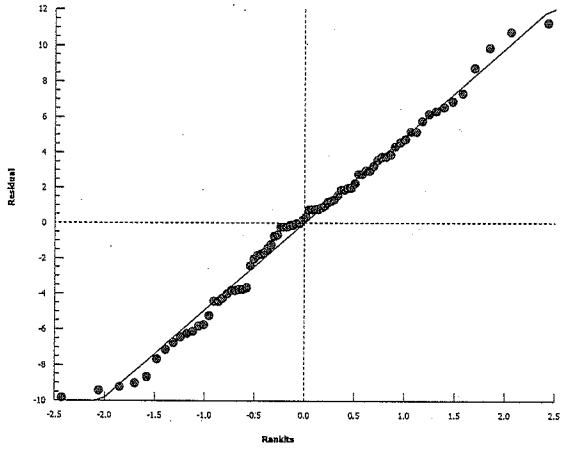
Analysis ID: 02-4436-8300 **Endpoint:** Reproduction **CETIS Version:** CETISv1.8.7
Analyzed: 10 Nov-17 9:49 **Analysis:** Nonlinear Regression **Official Results:** Yes

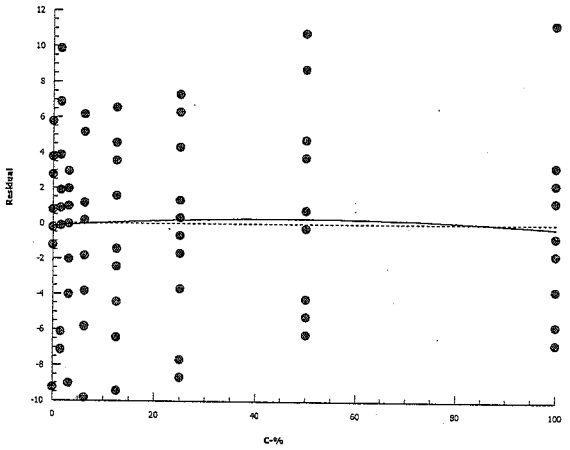
Reproduction Detail

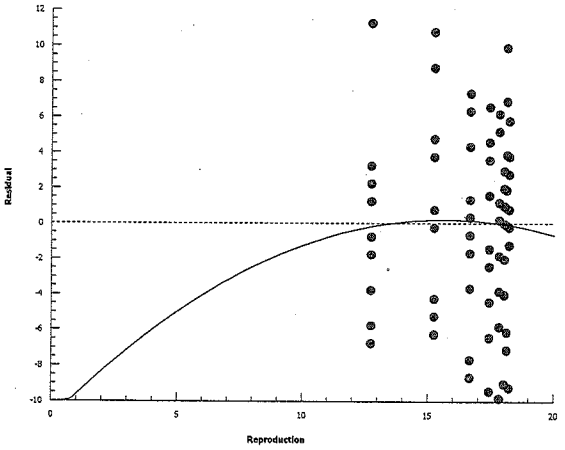
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	17	19	9	18	22	19	21	21	24	18
1.56		25	28	18	18	22	20	19	20	11	12
3.12		18	21	20	19	21	20	18	16	14	9
6.25		18	16	23	24	14	19	12	8	23	14
12.5		22	13	16	21	19	24	11	13	8	15
25		16	17	9	18	13	23	8	24	21	15
50		16	10	9	20	24	16	19	15	11	26
100		7	9	15	16	12	11	24	6	14	9

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 171086

Start Date/Time: Oct 5/17 @ 700h
Set up by: FMM/JS

Sample Information:

Sample ID: LC_LCS_WS_2017-10-02_N
Sample Date: Oct 02, 2017
Date Received: Oct 03, 2017
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 092617A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 19
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 2-8, 10-20

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd167
Stock Solution ID: 17NaCl05
Date Initiated: Oct 4/17

7-d LC50 (95% CL): 2.1 (1.5-3.0) g/L NaCl
7-d IC50 (95% CL): 1.9 (1.6-2.1) g/L NaCl

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCl CV (%): 6
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.0-2.1) g/L NaCl CV (%): 20

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]

Date reviewed: Nov. 23, 2017

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LCLC5-WS-2017-10-02-N
Work Order #: 171086

Start Date & Time: Oct 5/17 @ 700h
Stop Date & Time: Oct 12/17 @ 900h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.0	7.6	8.0	7.4	8.0	7.3	8.0	7.4	8.1	7.6	8.2	7.2	8.1	7.6
pH	8.0	7.8	7.8	7.9	7.9	7.8	8.0	8.0	8.2	7.6	8.1	7.8	8.1	7.8
Cond. (µS/cm)	216	213		206		210		219		215		218		220
Initials	JS	EMM		EMM		EMM		JS		EMM		EMM		EMM

Concentration (v/v) 1.56%

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.6	8.2	7.4	8.2	7.3	8.1	7.1	8.2	7.6	8.1	7.6	8.1	7.6
pH	8.0	7.8	7.9	7.8	8.0	7.9	8.0	8.1	8.1	7.3	8.1	7.9	8.1	8.0
Cond. (µS/cm)	228	226		225		224		247		248		250		250 → 330
Initials	JS	EMM		EMM		EMM		JS		EMM		EMM		EMM

Concentration (v/v) 12.5%

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.8	8.2	7.4	8.2	7.3	8.2	7.1	8.2	7.4	8.1	7.6	8.1	7.6
pH	8.0	7.8	7.9	7.9	8.0	7.9	8.0	8.2	8.1	7.9	8.1	7.9	8.1	8.0
Cond. (µS/cm)	293	290		290		297		307		308		310		311
Initials	JS	EMM		EMM		EMM		JS		EMM		EMM		EMM

Concentration (v/v) 100%

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0
DO (mg/L)	8.2	7.8	8.2	7.4	8.2	7.2	8.2	7.1	8.2	7.3	8.1	7.6	8.1	7.9
pH	8.0	8.1	7.9	8.1	8.0	8.1	8.0	8.4	8.3	8.3	8.3	8.2	8.2	8.1
Cond. (µS/cm)	738	739		740		741		759		758		760		750
Initials	JS	EMM		EMM		EMM		JS		EMM		EMM		EMM

Thermometer: 4 DO meter/probe: 1 / 2 pH meter/probe: 1 / 2 Conductivity meter/probe: 1 / 2

	Control	100%(v/v)		
Hardness*	100	610		
Alkalinity*	98	190		

* mg/L as CaCO3

Analysts: EMM, JS
Reviewed by: [signature]
Date reviewed: Nov 23, 2017

Sample Description: clear, colourless, odourless, some particulates

Comments: Broodboard Used: 092617A (2-8, 10-20)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck coal
Sample ID: LC_LC5_WS_2017-10-02_N
Work Order: 1710860

Start Date & Time: Oct 5/17 @ 700h
Stop Date & Time: Oct 12/17 @ 900h
Set up by: EMM/JS

% (V/V)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1											EMM
2											JS
3											EMM
4			3								K
5	3	2		3	3	4	3	2	3	3	EMM
6	6	6	4	6	6	8	6	6	7	6	EMM
7	10	9	10	9	11	10	10	9	11	10	EMM
8											
Total	19	17	17	18	20	22	19	17	21	19	JS

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1											EMM
2											JS
3											EMM
4										3	K
5	3	2	3	3	2	4	3	3	3		EMM
6	6	6	7	8	9	6	9	6	6	8	EMM
7	8	9	9	11	12	10	9	8	9	11	EMM
8											
Total	17	17	19	22	23	20	21	17	18	22	JS

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1											EMM
2											JS
3											EMM
4							4				K
5	3	2	2	3	3	3		2	3	3	EMM
6	8	7	7	6	6	8	9	7	6	6	EMM
7		9	11	11	9	10	12	11	9	8	EMM
8											
Total	11	18	20	20	18	21	25	20	18	17	JS

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1											EMM
2											JS
3											EMM
4				3	K					2	K
5	X	3	3		3	3	2	3	3		EMM
6		9	8	6	8	7	6	6	9		EMM
7		9	6	11	10	12	11	10	6	9	EMM
8											
Total	0X	18	18	22	21	23	20	19	15	20	JS

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1											EMM
2			X								JS
3											EMM
4					X				4		K
5	4	3		4		3	3	3			EMM
6		6		8		6	9	7	6	8	EMM
7		11		9		11	10	9	11	12	EMM
8											
Total	18	20	0X	21	0X	20	22	19	21	22	JS

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1											EMM
2											JS
3											EMM
4	2										K
5		3	2	3	3	2	2	2	3	2	EMM
6	4	7	6	6	7	8	4	6	6	4	EMM
7	9	11	12	11	8	9	6	9	13	9	EMM
8											
Total	15	21	20	20	18	19	12	16	22	15	JS

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1											EMM
2											JS
3											EMM
4				3					3		K
5	2	2	3		2	2	3	2	3		EMM
6	6	6	8	4	8	6	4	6	6	4	EMM
7	8	8	9	10	13	12	6	9	9	5	EMM
8											
Total	16	16	20	17	23	20	13	17	18	12	JS

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1											EMM
2											JS
3											EMM
4							3				K
5	3		4	3	2	2		3	2	3	EMM
6	6	7	8	6	6	7	8	8	6	6	EMM
7	9	8	9	10	10	9	8	9			EMM
8											
Total	18	19	21	19	18	18	19	20	8	9	JS

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Same as water quality page.
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: NOV. 23, 2017

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	09-3327-5835	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Nov-17 16:20	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	16-4676-4011	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jill Sones
Start Date:	05 Oct-17 07:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	20% Perrier Water
Ending Date:	12 Oct-17 09:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	09-0459-2041	**Code:**	35EAFAA9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 15:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	64h (8.1 °C)	**Station:**	LC_LC5_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1012520	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	1	0.8 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	5.598	4.214	N/A	17.86	NA	23.73
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
12.5		10	0.8	0	1	0.1333	0.4216	52.7%	20.0%	8	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		0	1	1	1	1	1	1	1	1	1
12.5		1	1	0	1	0	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

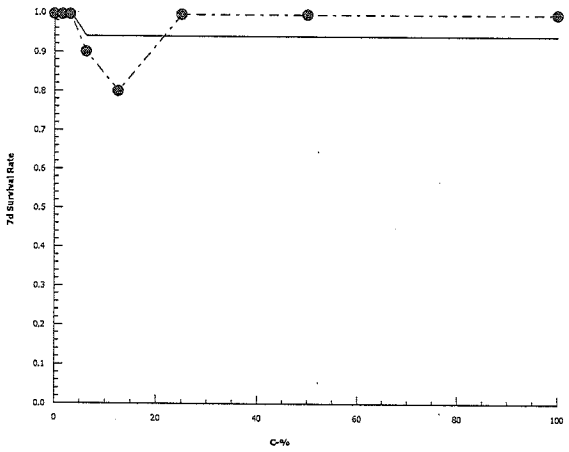
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 09-3327-5835 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 01 Nov-17 16:20 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	0/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst: JS QA: NOV 23/17

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	16-1877-2731	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Nov-17 16:21	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	16-4676-4011	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jill Sones
Start Date:	05 Oct-17 07:00	**Protocol:**	EPA/821/R-02-013 (2002)	**Diluent:**	20% Perrier Water
Ending Date:	12 Oct-17 09:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	09-0459-2041	**Code:**	35EAFAA9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 15:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	64h (8.1 °C)	**Station:**	LC_LC5_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1645167	200	Yes	Two-Point Interpolation

Test Acceptability Criteria

Attribute	Test Stat	TAC Limits	Overlap	Decision
Control Resp	18.9	15 - NL	Yes	Passes Acceptability Criteria

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	4.245	2.076	45.88	23.56	2.18	48.17
IC10	9.206	2.903	N/A	10.86	NA	34.45
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

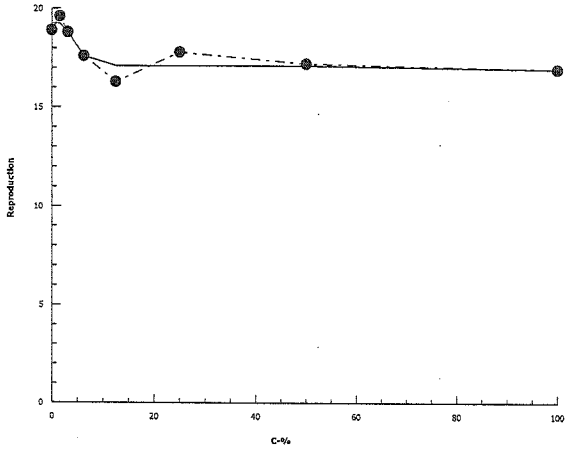
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	18.9	17	22	0.5467	1.729	9.15%	0.0%
1.56		10	19.6	17	23	0.7333	2.319	11.83%	-3.7%
3.12		10	18.8	11	25	1.123	3.553	18.9%	0.53%
6.25		10	17.6	0	23	2.083	6.586	37.42%	6.88%
12.5		10	16.3	0	22	2.745	8.68	53.25%	13.76%
25		10	17.8	12	22	1.009	3.19	17.92%	5.82%
50		10	17.2	12	23	1.041	3.293	19.15%	9.0%
100		10	16.9	8	21	1.433	4.533	26.82%	10.58%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	19	17	17	18	20	22	19	17	21	19
1.56		17	17	19	22	23	20	21	17	18	22
3.12		11	18	20	20	18	21	25	20	18	17
6.25		0	18	18	22	21	23	20	19	15	20
12.5		18	20	0	21	0	20	22	19	21	22
25		15	21	20	20	18	19	12	16	22	15
50		16	16	20	17	23	20	13	17	18	12
100		18	19	21	19	18	18	19	20	8	9

Analysis ID:	16-1877-2731	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Nov-17 16:21	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: JS QA: Nov 23/17

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 171086

Start Date/Time: Oct 5/17 @ 7004
Set up by: EMM/JS

Sample Information:

Sample ID: LC_DCL_WS_2017-10-02_N
Sample Date: Oct 02, 2017
Date Received: Oct 03, 2017
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.:	092617A
Age of young (Day 0):	<24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d:	19
Mortality (%) in previous 7 d:	0
Individual female # used ≥8 young on test day	2-8, 10-20

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd167
Stock Solution ID: 17Na05
Date Initiated: Oct 4/17

7-d LC50 (95% CL): 2.1 (1.5-3.0) g/L NaCL
7-d IC50 (95% CL): 1.9 (1.6-2.1) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.3) g/L NaCL CV (%): 6
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.0-2.1) g/L NaCL CV (%): 20

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]

Date reviewed: Nov. 23, 2017

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LC_DC1_WS_2017-10-02_N
Work Order #: 171086

Start Date & Time: Oct 5/17 @ 700 h
Stop Date & Time: Oct 12/17 @ 930h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.0	7.6	8.0	7.5	8.0	7.4	8.0	7.9	8.1	7.5	8.2	7.2	8.1	7.6
pH	8.0	7.8	7.9	7.8	7.9	7.9	8.0	7.8	8.2	7.7	8.1	7.8	8.1	7.8
Cond. (µS/cm)	216	213		206		210		219		215		218		220
Initials	JS	EMM		EMM		EMM		JS		EMM		EMM		EMM

Concentration: 1.56% (V/V)

	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.2	7.6	8.2	7.5	8.1	7.4	8.1	7.9	8.2	7.5	8.1	7.2	8.2	7.6
pH	8.1	7.9	8.0	7.9	8.0	7.9	8.0	7.8	8.2	7.7	8.2	7.8	8.2	8.1
Cond. (µS/cm)	219	217		216		212		225		219		220		221
Initials	JS	EMM		EMM		EMM		JS		EMM		EMM		EMM

Concentration: 12.5% (V/V)

	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.2	7.6	8.1	7.5	8.2	7.4	8.1	7.9	8.2	7.5	8.1	7.2	8.2	7.6
pH	8.2	8.1	8.1	7.9	8.0	8.0	8.1	8.0	8.2	7.7	8.2	7.8	8.2	8.0
Cond. (µS/cm)	236	232		231		230		240		235		242		248
Initials	JS	EMM		EMM		EMM		JS		EMM		EMM		EMM

Concentration: 100% (V/V)

	Days 0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.2	7.8	8.1	7.6	8.2	7.5	8.1	7.6	8.2	7.5	8.1	7.2	8.2	7.6
pH	8.3	8.4	8.3	8.1	8.2	8.1	8.1	8.1	8.3	8.1	8.3	7.9	8.3	7.9
Cond. (µS/cm)	381	379		372		378		405		390		409		410
Initials	JS	EMM		EMM		EMM		JS		EMM		EMM		EMM

Thermometer: 4 DO meter/probe: 1 / 2 pH meter/probe: 1 / 2 Conductivity meter/probe: 1 / 2

	Control	100% (V/V)		
Hardness*	100	310		
Alkalinity*	98	190		

* mg/L as CaCO3

Analysts: EMM, JS
Reviewed by: EM
Date reviewed: NOV. 23, 2017

Sample Description: clear, colourless, odourless, some particulates

Comments: Broodboard Used: 092617A (2-8, 10-20)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck coal
Sample ID: LEDE1-WS-2017-10-02-N
Work Order: 171086

Start Date & Time: Oct 5/17 @ 700h
Stop Date & Time: Oct 12/17 @ 930h
Set up by: EMM/JS

%(V/V)

Concentration: control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
5	2	3	2	2	2	4	2	X	3	2	JS
6	6	6	7	7	5	6	8		6	6	EMM
7	8	9	✓	9	9	8	9		11	10	EMM
8							1				
Total	16	18	9	18	16	18	19	0X	20	18	JS

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
5	2	3	4	2	2	4	2	3	3	3	JS
6	3	6	6	7	3	6	4	6	6	7	EMM
7	8	9	9	✓	✓	9	✓	11	10	10	EMM
8											
Total	13	18	19	9	5	19	6	20	19	20	JS

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
5	3	2	4	3	3	4	3	2	3	4	JS
6	8	7	8	6	6	9	6	4	6	8	EMM
7	9	6	9	10	10	11	8	8	9	✓	EMM
8											
Total	20	12	21	19	19	24	17	14	18	12	JS

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
5	3	3	2	3	4	✓	2	3	3	1X	JS
6	9	6	6	9	8	3	4	9	6		EMM
7	13	11	10	10	9	6	8	✓	8		EMM
8											
Total	25	20	18	22	21	9	14	12	17	0X	JS

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
5	5	2	4	2	4	4	4	3	2	3	JS
6	8	6	8	9	8	8	9	6	4	4	EMM
7	13	12	12	✓	9	9	8	✓	✓	9	EMM
8											
Total	26	20	24	6	21	21	21	9	6	16	JS

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
5	4	3	2	4	2	4	3	4	3	4	JS
6	8	4	4	8	3	6	8	9	6	7	EMM
7	11	9	8	9	✓	✓	9	11	✓	✓	EMM
8											
Total	23	16	14	21	5	10	20	24	9	11	JS

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
5	3	3	3	4	4	2	3	3	4	2	JS
6	8	9	6	6	7	2	6	6	9	6	EMM
7	10	9	8	8	9	✓	9	11	10	9	EMM
8											
Total	21	21	17	18	20	4	18	20	23	17	JS

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EL
5	4	4	4	3	2	4	3	3	3	4	JS
6	8	9	9	6	6	7	8	7	7	6	EMM
7	9	13	11	10	✓	✓	11	11	10	9	EMM
8											
Total	21	26	24	19	8	11	22	21	20	19	JS

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: same as water quality page 2.
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: Nov. 23, 2017

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	19-4843-5741	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Nov-17 16:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-6567-9051	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jill Sones
Start Date:	05 Oct-17 07:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 Oct-17 09:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-1973-7755	**Code:**	3CC7F69B	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:51	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	66h (8 °C)	**Station:**	LC_DC1_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	80747	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.8	0	1	0.1333	0.4216	52.7%	0.0%	8	10
1.56		10	1	1	1	0	0	0.0%	-25.0%	10	10
3.12		10	1	1	1	0	0	0.0%	-25.0%	10	10
6.25		10	0.9	0	1	0.1	0.3162	35.14%	-12.5%	9	10
12.5		10	1	1	1	0	0	0.0%	-25.0%	10	10
25		10	1	1	1	0	0	0.0%	-25.0%	10	10
50		10	1	1	1	0	0	0.0%	-25.0%	10	10
100		10	1	1	1	0	0	0.0%	-25.0%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	0	0	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	0
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

Nov 23/17

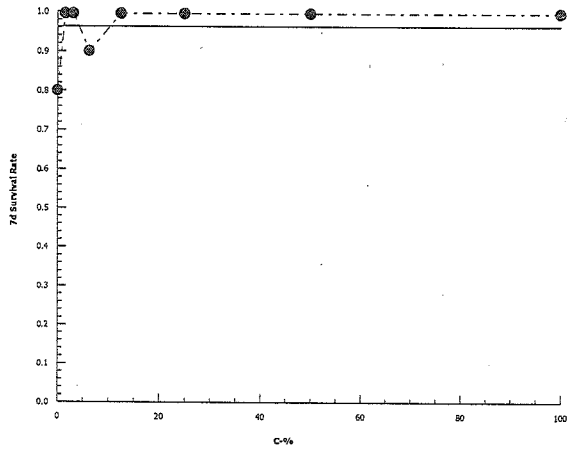
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 19-4843-5741 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 01 Nov-17 16:25 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	0/1	0/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



NOV-23/17

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-0948-3443	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Nov-17 16:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	15-6567-9051	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jill Sones
Start Date:	05 Oct-17 07:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 Oct-17 09:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	10-1973-7755	**Code:**	3CC7F69B	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:51	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	66h (8 °C)	**Station:**	LC_DC1_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	135081	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>100	N/A	N/A	<1	NA	NA
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	15.2	0	20	1.943	6.143	40.41%	0.0%
1.56		10	14.8	5	20	1.908	6.033	40.77%	2.63%
3.12		10	17.6	12	24	1.24	3.921	22.28%	-15.79%
6.25		10	15.8	0	25	2.328	7.361	46.59%	-3.95%
12.5		10	17	6	26	2.343	7.409	43.58%	-11.84%
25		10	15.3	5	24	2.066	6.533	42.7%	-0.66%
50		10	17.9	4	23	1.663	5.259	29.38%	-17.76%
100		10	19.1	8	26	1.754	5.547	29.04%	-25.66%

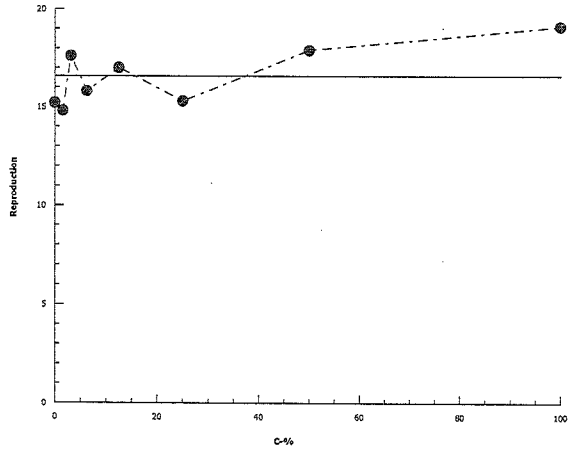
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	16	18	9	18	16	18	19	0	20	18
1.56		13	18	19	9	5	19	6	20	19	20
3.12		20	12	21	19	19	24	17	14	18	12
6.25		25	20	18	22	21	9	14	12	17	0
12.5		26	20	24	6	21	21	21	9	6	16
25		23	16	14	21	5	10	20	24	9	11
50		21	21	17	18	20	4	18	20	23	17
100		21	26	24	19	8	11	22	21	20	19

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	15-0948-3443	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Nov-17 16:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: JS QA: NW 23/19

Ceriodaphnia dubia Summary Sheet

Client: Teck coal
Work Order No.: 171086

Start Date/Time: Oct 4/17 @ 1000h
Set up by: JS Oct 11/17 @ T EMM/JS

Sample Information:

Sample ID: LC_FRDSDC_WS_2017-10-02_N
Sample Date: Oct 02, 2017
Date Received: Oct 03, 2017
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 092017B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 39
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 21, 30, 31, 34, 37, 39, 40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd167
Stock Solution ID: 17NaCl05
Date Initiated: Oct 4/17

7-d LC50 (95% CL): 2.1 (1.5-3.0) g/L NaCL
7-d IC50 (95% CL): 1.9 (1.6-2.1) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) g/L NaCL CV (%): 6
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.0-2.1) g/L NaCL CV (%): 20

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: NOV-23, 2017

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC_FDDSDC_WS_2017-10-02_N
Work Order #: 171086
Start Date & Time: Oct 4/17 @ 1000h
Stop Date & Time: Oct 11/17 @ 1200h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.0	7.6	8.0	7.4	8.0	7.4	8.0	7.5	8.0	7.3	8.1	7.0	8.2	7.0
pH	7.9	7.8	8.0	7.7	7.8	7.9	7.9	7.6	8.0	7.7	8.2	7.7	8.1	8.0
Cond. (µS/cm)	215	216		213		206		210		219		215		220
Initials	JS	EMM		EMM		EMM		EMM		JS		JS		JS

Concentration: (v/v) 1.56%

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.2	7.8	8.1	7.4	8.2	7.4	8.1	7.3	8.1	7.1	8.1	7.1	8.1	7.0
pH	7.9	7.9	8.0	7.8	7.9	7.9	8.0	7.6	8.0	7.7	8.0	7.7	8.1	7.9
Cond. (µS/cm)	228	226		221		220		219		236		230		245
Initials	JS	EMM		EMM		EMM		EMM		JS		EMM		JS

Concentration: (v/v) 12.5%

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.2	7.8	8.1	7.4	8.2	7.5	8.1	7.2	8.1	7.1	8.1	7.1	8.1	7.0
pH	7.8	7.9	7.9	7.9	8.0	7.9	8.0	7.7	8.0	7.8	8.1	7.7	8.1	8.0
Cond. (µS/cm)	294	292		290		291		291		306		309		314
Initials	JS	EMM		EMM		EMM		EMM		JS		EMM		JS

Concentration: (v/v) 100%

	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	25.0	24.0	24.0
DO (mg/L)	8.2	7.6	8.2	7.3	8.2	7.4	8.2	7.2	8.1	7.0	8.1	7.1	8.1	7.0
pH	7.9	7.9	8.2	8.2	8.4	8.1	8.3	7.8	8.1	8.0	8.2	7.9	8.2	8.1
Cond. (µS/cm)	780	787		781		781		782		784		782 JS		~~796~~ 790
Initials	JS	EMM		EMM		EMM		EMM		JS		EMM		JS

Thermometer: 4 **DO meter/probe:** 1 / 2 **pH meter/probe:** 1 / 2 **Conductivity meter/probe:** 1 / 2

	Control	100%(v/v)		
Hardness*	100	570		
Alkalinity*	98	202		

* mg/L as CaCO3

Analysts: EMM, JS
Reviewed by:
Date reviewed: NOV-23, 2017

Sample Description: Clear, colourless, odourless, some particulates

Comments: **Broodboard Used:** 092017B (21, 30, 31, 34, 37, 39, 40)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LC-ERDSDC-WS-2017-10-02-N
Work Order: 17 1026

Start Date & Time: Oct 4/17 @ 1000h
Stop Date & Time: Oct 11/17 @ 1200h
Set up by: EMM/JS

%(V/V)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	✓	4	✓	X	✓	4	✓	✓	3	✓	EMM
5	✓4	5	5	|	8	7	2	3	4	3	JS
6	✓	✓	✓	|	8	7	5	4	✓	4	JS
7	8	9	9	|	11	11	11	9	9	8	JS
8											
Total	12	18	14	CX	24	29	18	16	16	15	JS

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	3	✓	✓	✓	✓	✓	4	✓	4	✓	EMM
5	6	5	5	3	4	5	✓	3	✓	2	JS
6	✓	✓	✓	4	5	12	11	7	3	2	JS
7	12	9	12	13	✓	✓	11	11	14	11	JS
8										15	
Total	21	14	17	20	9	17	26	21	21	25	JS

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	✓	9	4	✓	✓	✓	✓	5	✓	3	EMM
5	2	✓	6	4	4	4	5	✓	4	5	JS
6	✓	6	✓	✓	5	9	✓	4	9	✓	JS
7	10	7	12	10	10	✓	11	12	✓	12	JS
8											
Total	12	17	22	14	19	13	16	21	13	20	JS

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	✓	✓	✓	3	✓	✓	3	✓	✓	✓	EMM
5	✓4	7	4	6	2	3	4	2	5	5	JS
6	✓	12	10	✓	5	9	✓	5	9	12	JS
7	8	✓	✓	12	✓	✓	10	15	✓	✓	JS
8											
Total	17	14	14	21	7	14	17	22	14	17	JS

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	✓	✓	✓	✓	4	✓	✓	✓	✓	✓	EMM
5	5	6	X	4	✓	4	4	3	5	5	JS
6	9	11	|	5	6	5	5	4	✓	8	JS
7	12	12	|	13	13	12	11	12	9	✓	JS
8											
Total	26	29	OX	22	23	21	20	19	14	13	JS

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	✓	✓	✓	✓	✓	3	✓	3	4	✓	EMM
5	3	5	3	4	5	8	5	8	8	4	JS
6	4	4	7	✓	✓	✓	✓	✓	✓	✓	JS
7	11	8	8	12	11	9	13	13	14	13	JS
8											
Total	18	17	18	16	16	20	18	24	26	17	JS

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	✓	✓	✓	✓	✓	4	✓	3	✓	✓	EMM
5	3	2	2	4	2	✓	5	6	4	2	JS
6	✓	6	3	✓	6	6	11	X	5	3	JS
7	8	10	7	11	11	6	✓	|	12	✓	JS
8											
Total	11	18	12	15	19	16	16	9X	21	5	JS

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
4	✓	✓	✓	✓	2	✓	✓	✓	✓	✓	EMM
5	4	3	5	5	3	4	5	5	3	4	JS
6	10	9	✓	✓	✓	3	10	✓	3	5	JS
7	✓	✓	9	9	12	9	✓	14	5	9	JS
8											
Total	14	11	14	14	17	18	15	19	10	18	JS

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Some 25 water quality range

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: Nov 23, 2017

CETIS Analytical Report

Test Code: 171086d | 14-7438-5557

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	08-0359-8487	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Dec-17 8:57	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-1701-6598	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jill Sones
Start Date:	04 Oct-17 10:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	11 Oct-17 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	02-3018-8233	**Code:**	DB864C9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 10:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (7.8 °C)	**Station:**	LC_FRDSDC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	934270	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	0	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	0	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	0	1	1
100		1	1	1	1	1	1	1	1	1	1

Analyst: [signature] QA: [signature] NN 23/12

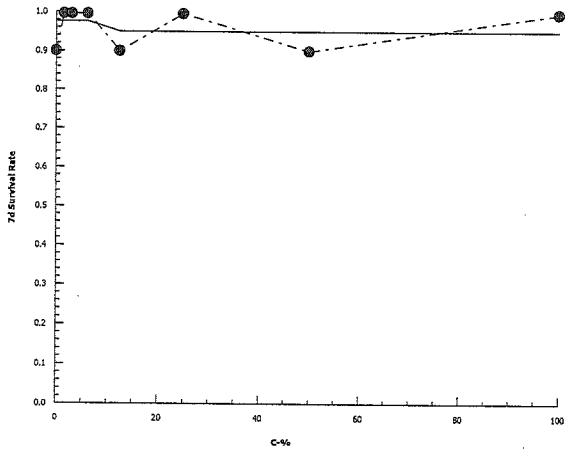
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 08-0359-8487 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 19 Dec-17 8:57 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



NN 23/17

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-9478-7378	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Nov-17 17:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-1701-6598	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jill Sones
Start Date:	04 Oct-17 10:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	11 Oct-17 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	02-3018-8233	**Code:**	DB864C9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 10:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (7.8 °C)	**Station:**	LC_FRDSDC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	746898	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	31.49	2.167	74.2	3.176	1.348	46.15
IC10	39.6	3.036	N/A	2.525	NA	32.94
IC15	49.74	28.54	N/A	2.011	NA	3.504
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

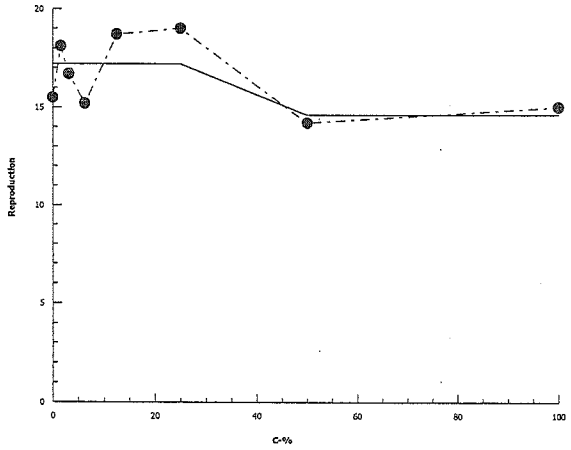
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	15.5	0	24	2.062	6.519	42.06%	0.0%
1.56		10	18.1	9	26	1.501	4.748	26.23%	-16.77%
3.12		10	16.7	12	22	1.155	3.653	21.87%	-7.74%
6.25		10	15.2	7	22	1.373	4.341	28.56%	1.94%
12.5		10	18.7	0	29	2.582	8.166	43.67%	-20.65%
25		10	19	16	26	1.075	3.399	17.89%	-22.58%
50		10	14.2	5	21	1.555	4.917	34.63%	8.39%
100		10	15	10	19	0.9545	3.018	20.12%	3.23%

Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	12	18	14	0	24	22	18	16	16	15
1.56		21	14	17	20	9	17	26	21	21	15
3.12		12	17	22	14	19	13	16	21	13	20
6.25		12	14	14	21	7	14	17	22	14	17
12.5		26	29	0	22	23	21	20	19	14	13
25		18	17	18	16	16	20	18	24	26	17
50		11	18	12	15	19	16	16	9	21	5
100		14	11	14	14	17	18	15	19	10	18

Analysis ID:	03-9478-7378	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Nov-17 17:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 171086

Start Date/Time: Oct 5/17 @ 700h
Set up by: ~~Oct 12/17 @ 915h~~ EMM/JS
JS

Sample Information:

Sample ID: LC_DCDS_WS_2017-10-02_N
Sample Date: Oct 02, 2017
Date Received: Oct 03, 2017
Sample Volume: 5 x 2L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 092617B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 36
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 23-26, 36-40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd167
Stock Solution ID: 17Na05
Date Initiated: Oct 4/17

7-d LC50 (95% CL): 2.1 (1.5-3.0) g/L NaCL
7-d IC50 (95% CL): 1.9 (1.6-2.1) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.2) 2.3 g/L NaCL CV (%): 6
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.0-2.1) g/L NaCL CV (%): 20

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]

Date reviewed: Nov 23, 2017

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck Coal
Sample ID: LC OCDS-WS-2017-10-02-N
Work Order #: 171086

Start Date & Time: Oct 5/17 @ 700h
Stop Date & Time: Oct 12/17 @ 915h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration: control

	Days 0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.0	7.6	8.0	7.5	8.0	7.3	8.0	7.2	8.1	7.5	8.1	7.3	8.1	7.8
pH	8.0	8.0	7.9	7.8	7.9	7.8	8.0	8.1	8.2	7.8	8.0	7.6	8.1	7.9
Cond. (µS/cm)	216	213		206		210		219		215		218		221
Initials	JS	EMM		EMM		EMM		JS		EMM		EMM		EMM

Concentration: 1.56% (v/v)

	Days 0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.2	7.8	8.2	7.3	8.0	7.3	8.1	7.2	8.2	7.3	8.1	7.3	8.1	7.2
pH	8.1	8.0	7.9	7.8	7.9	7.9	8.0	8.1	8.1	7.9	8.1	7.6	8.1	7.9
Cond. (µS/cm)	219	219		216		218		223		223		221		223
Initials	JS	EMM		EMM		EMM		JS		EMM		EMM		EMM

Concentration: 12.5% (v/v)

	Days 0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.2	7.6	8.2	7.3	8.2	7.3	8.1	7.1	8.2	7.3	8.2	7.3	8.1	7.6
pH	8.1	8.0	7.9	7.9	8.0	7.9	8.0	8.1	8.1	7.9	8.1	7.6	8.1	8.0
Cond. (µS/cm) ①	~~215~~	238		239		239		241		247		239		238
Initials	JS	EMM		EMM		EMM		JS		EMM		EMM		EMM

① 239 em

Concentration: 100% (v/v)

	Days 0 init.	1 old	1 new	2 old	2 new	3 old	3 new	4 old	4 new	5 old	5 new	6 old	6 new	7 final
Temperature (°C)	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0	24.0	24.0	24.0	24.0	24.0	24.0
DO (mg/L)	8.2	7.6	8.2	7.4	8.2	7.6	8.1	7.1	8.2	7.3	8.0	7.3	8.0	7.6
pH	8.2	8.2	8.0	7.9	8.0	7.9	8.0	8.2	8.2	8.1	8.2	7.6	8.2	8.1
Cond. (µS/cm) ②	~~240~~	402		402		410		398		407		396		392
Initials	JS	EMM		EMM		EMM		JS		EMM		EMM		EMM

② 403 em

Thermometer: 4 DO meter/probe: 1 / 2 pH meter/probe: 1 / 2 Conductivity meter/probe: 1 / 2

	Control	100% (v/v)		
Hardness*	100	580		
Alkalinity*	98	148		

* mg/L as CaCO3

Analysts: EMM, JS
Reviewed by: [illegible]
Date reviewed: NOV 23, 2017

Sample Description: light yellow, clear, odourless, some particulates

Comments: Broodboard Used: 092617B (23-26, 36-40)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: LCDCDS_WS_2017-10-02_N
Work Order: 171086

%(V/V)

Start Date & Time: Oct 5/17 @ 700h
Stop Date & Time: Oct 12/17 @ 915h
Set up by: EMM/JS

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	—	—	—	—	—	—	2	3	—	2	K
5	2	3	2	2	3	2	✓	✓	3	✓	EMM
6	6	6	7	6	4	8	8	9	6	4	EMM
7	8	8	10	10	9	✓	13	12	✓	7X	EMM
8										↓	
Total	16	17	19	18	16	10	23	24	9	13	JS

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	4	—	2	3	4	—	—	—	—	—	K
5	K	3	K	6	✓	3	2	3	3	3	EMM
6	8	9	6	6	7	8	9	6	7	8X	EMM
7	11	9	9	9	13	✓	✓	11	8		EMM
8											
Total	23	21	17	18	24	11	11	20	18	11X	JS

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	—	—	3	3	—	—	—	—	—	2	K
5	3	3	✓	✓	3	3	2	2	3	✓	EMM
6	8	9	10	9	7	7	8	9	8	4	EMM
7	✓	✓	12	10	11	10	✓	✓	11	8	EMM
8											
Total	11	12	25	22	21	20	10	11	22	14	JS

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	—	2	—	—	3	—	2	—	—	—	K
5	2	✓	2	3	✓	3	✓	3	3	2	EMM
6	9	10	8	9	10	11	11	9	8	9	EMM
7	✓	12	9	11	9	✓	12	✓	✓	✓	EMM
8											
Total	11	24	19	23	22	14	25	12	11	11	JS

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	—	3	—	2	—	—	—	—	—	—	K
5	3	✓	3	✓	3	3	2	2	2	3	EMM
6	8	9	7	7	8	9	6	6	7	8	EMM
7	✓	11	10	13	9	✓	✓	✓	12	10	EMM
8											
Total	11	23	20	22	20~	12	8	8	21	21	JS

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	—	—	—	—	—	—	—	—	—	—	K
5	3	3	2	3	3	3	2	3	3	3	EMM
6	9	8	8	7	7	9	8	8	7	6	EMM
7	10	10	10	9	✓	✓	8	13	✓	✓	
8											
Total	22	21	20	19	10	12	18	24	10	9	JS

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	—	—	—	—	—	—	—	—	—	—	K
5	2	3	3	2	3	3	3	2	3	2	EMM
6	7	6	✓	9	7	7	7	8	9	8	EMM
7	✓	13	9	✓	9	11	10	9	9	10	EMM
8											
Total	9	22	12	11	19	21	20	19	21	20	JS

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	JS
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	—	—	—	—	—	—	—	—	—	—	K
5	3	3	3	3	2	2	3	2	2	3	EMM
6	8	7	7	6	6	7	8	9	8	9	EMM
7	9	✓	✓	13	10	9	9	✓	9	✓	EMM
8											
Total	20	10	10	22	18	18	20	11	19	12	JS

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Same as water quality page.

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: Nov 23, 2017

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	12-6882-8812	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Nov-17 16:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	17-1456-0513	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jill Sones
Start Date:	05 Oct-17 07:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 Oct-17 09:15	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 2h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	07-5716-3320	**Code:**	2D216538	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:40	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	66h (7.8 °C)	**Station:**	LC_DCDS_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2116035	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	1	1	1	0	0	0.0%	-11.11%	10	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	0
1.56		1	1	1	1	1	1	1	1	1	0
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

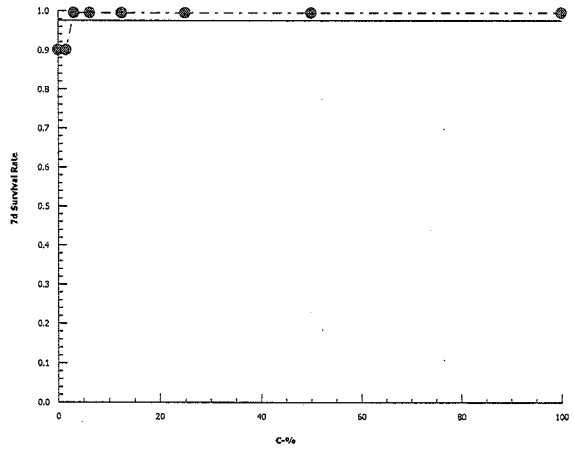
Ceriodaphnia 7-d Survival and Reproduction Test | **Nautilus Environmental**

Analysis ID: 12-6882-8812 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 01 Nov-17 16:30 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	0/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	16-5343-4095	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Nov-17 16:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	17-1456-0513	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jill Sones
Start Date:	05 Oct-17 07:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	12 Oct-17 09:15	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	7d 2h	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	07-5716-3320	**Code:**	2D216538	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:40	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	66h (7.8 °C)	**Station:**	LC_DCDS_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	335297	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	90.07	0.7691	N/A	1.11	NA	130
IC10	>100	N/A	N/A	<1	NA	NA
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	16.5	9	24	1.558	4.927	29.86%	0.0%
1.56		10	17.4	11	24	1.558	4.926	28.31%	-5.46%
3.12		10	16.8	10	25	1.806	5.712	34.0%	-1.82%
6.25		10	17.2	11	25	1.884	5.959	34.65%	-4.24%
12.5		10	16.6	8	23	1.922	6.077	36.61%	-0.61%
25		10	16.5	9	24	1.79	5.662	34.31%	0.0%
50		10	17.4	9	22	1.514	4.789	27.52%	-5.46%
100		10	16	10	22	1.483	4.69	29.32%	3.03%

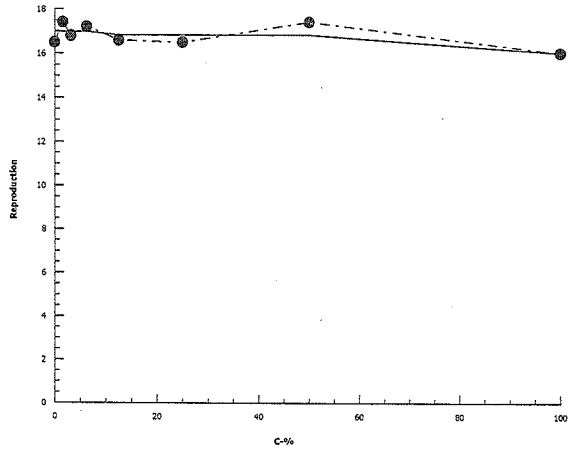
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	16	17	19	18	16	10	23	24	9	13
1.56		23	21	17	18	24	11	11	20	18	11
3.12		11	12	25	22	21	20	10	11	22	14
6.25		11	24	19	23	22	14	25	12	11	11
12.5		11	23	20	22	20	12	8	8	21	21
25		22	21	20	19	10	12	18	24	10	9
50		9	22	12	11	19	21	20	19	21	20
100		20	10	10	22	18	18	20	11	19	12

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	16-5343-4095	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	01 Nov-17 16:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: JS QA: NOV 23/17

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 171086

Start Date/Time: Oct 3/17 @ 1300h
Set up by: ~~Oct 4/17~~ FMM/JS
JS

Sample Information:

Sample ID: WL_BFWB_OUT_SP21_20171002_N
Sample Date: Oct 02, 2017
Date Received: Oct 03, 2017
Sample Volume: 5 x 20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: 092017B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 41
Mortality (%) in previous 7 d: 5
Individual female # used ≥8 young on test day: 22, 24-26, 29, 31, 35-40

NaCl Reference Toxicant Results:

Reference Toxicant ID: cd167
Stock Solution ID: 17NaCl05
Date Initiated: Oct 4/17

7-d LC50 (95% CL): 2.1 (1.5-3.0) g/L NaCL
7-d IC50 (95% CL): 1.9 (1.6-2.1) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-~~2.2~~ 2.3) g/L NaCL CV (%): 6
7-d IC50 Reference Toxicant Mean and Historical Range: 1.5 (1.0-2.1) g/L NaCL CV (%): 20

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	7100	
IC25 % (v/v) (95% CL)		~~61.3~~ 61.9 (23.2-72.6)
IC50 % (v/v) (95% CL)		7100

Reviewed by: [signature]
Date reviewed: NOV 23, 2017

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: JS ~~WF-OUT~~ WL-BFWB_OUTSP21_20171002W
Work Order #: 171086
Start Date & Time: Oct 3/17 @ 1300h
Stop Date & Time: Oct 9/17 @ 1530h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	24.5	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0			
DO (mg/L)	8.0	7.5	8.0	7.6	8.0	8.1	8.0	7.6	8.0	7.2	8.0	7.2			
pH	7.9	7.7	7.9	7.8	8.0	7.8	7.8	7.7	7.9	7.8	8.0	7.9			
Cond. (µS/cm)	247	215		216		213		206		210		246			
Initials	JS	JS		EMM		EMM		EMM		EMM		JS			

Concentration	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	24.5	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0			
DO (mg/L)	8.1	7.5	8.1	7.6	8.2	8.0	8.1	7.6	8.1	7.2	8.1	7.2			
pH	7.9	7.7	7.9	7.8	8.0	7.8	8.0	7.8	8.0	8.0	8.0	7.9			
Cond. (µS/cm)	253	260		260		258		252		250		257			
Initials	JS	JS		EMM		EMM		EMM		EMM		JS			

Concentration	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	24.5	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0			
DO (mg/L)	8.1	7.6	8.1	8.0	8.2	7.8	8.1	7.6	8.1	7.2	8.1	7.2			
pH	7.8	7.9	7.8	7.9	7.9	7.8	8.0	7.9	8.0	8.0	8.0	8.1			
Cond. (µS/cm)	521	510		515		510		512		516		JS 3507			
Initials	JS	JS		EMM		EMM		EMM		EMM		JS			

Concentration	Days														
	0	1		2		3		4		5		6		7	
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final	
Temperature (°C)	24.0	25.0	24.0	24.5	24.0	24.0	24.0	25.0	24.0	24.0	24.0	25.0			
DO (mg/L)	8.2	7.6	8.1	7.4	8.2	7.6	8.1	7.3	8.1	7.2	8.2	7.1			
pH	7.7	7.9	7.8	8.0	7.8	7.7	7.6	7.8	7.6	7.6	7.6	8.0			
Cond. (µS/cm)	1995	2000		2000		2010		2010		2010		1996			
Initials	JS	JS		EMM		EMM		EMM		EMM		JS			

Thermometer: 4 **DO meter/probe:** 1 / 2 **pH meter/probe:** 1 / 2 **Conductivity meter/probe:** 1 / 2

	Control	100%(v/v)		
Hardness*	100	1220		
Alkalinity*	98	342		

* mg/L as CaCO3

Analysts: EMM, TS
Reviewed by: [illegible]
Date reviewed: Nov 23, 2017

Sample Description: clear, colourless, hydrocarbon odour, no particulates

Comments: **Broodboard Used:** 092017B (22, 24-26, 29, 31, 35-40)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck Coal
Sample ID: ~~WFF OUT~~ WL_BFWB_OUT_SP2L_20171002_N
Work Order: 171086

Start Date & Time: Oct 3/17 @ 1300
Stop Date & Time: Oct 9/17 @ 1530
Set up by: EMM/JS

%(V/V)

Concentration: Control

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	3	2	2	3	3	4	2	2	2	EMM
5	7	6	✓	6	5	6	6	4	✓	4	EMM
6	8	7	8	10	10	8	9	9	6	9	JS
7											
8											
Total	18	16	10	18	18	17	19	15	8	15	JS

Concentration: 1.56

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	2	2	3	2	2	3	3	2	2	3	EMM
5	6	6	7	4	6	6	X	5	5	7	EMM
6	9	11	8	9	10	8	|	8	9	8	JS
7											
8											
Total	17	19	18	15	18	17	3X	15	16	18	JS

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	2	2	3	2	2	2	3	3	2	EMM
5	6	6	7	6	✓	6	6	7	5	6	EMM
6	10	8	8	11	10	8	6	8	9	10	JS
7											
8									17		
Total	19	16	17	20	12	16	14	18	~~16~~ 17 JS	18	JS

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	2	3	3	2	3	3	2	2	2	EMM
5	6	6	7	7	6	6	✓	6	7	7	EMM
6	7	10	11	9	6	5	9	11	6	12	JS
7											
8											
Total	16	18	21	19	14	14	12	19	15	21	JS

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	2	4	✓	3	3	2	✓	✓	3	EMM
5	6	4	4	3	6	6	4	3	3	6	EMM
6	10	10	5	8	9	10	8	7	11	8	JS
7											
8											
Total	19	16	9	11	18	19	14	10	14	17	JS

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	3	2	3	✓	✓	3	2	3	3	✓	EMM
5	6	✓	6	4	5	6	6	7	6	3	EMM
6	6	8	8	9	7	9	9	✓	5	6	JS
7											
8			17		JS		17				
Total	15	10	~~15~~ JS 13		~~12~~ 18		~~16~~ JS 10		14	9	JS

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	2	✓	3	2	3	3	2	✓	✓	✓	EMM
5	6	3	✓	6	3	4	5	4	4	3	EMM
6	9	6	8	9	9	8	11	8	8	5	JS
7											
8											
Total	17	9	11	17	15	15	18	12	12	8	JS

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	EMM
4	2	2	2	3	2	2	3	2	2	3	EMM
5	✓	✓	3	✓	6	✓	✓	2	4	✓	EMM
6	5	3	5	7	7	5	4	5	7	4	JS
7											
8					15						
Total	7	5	10	10	~~14~~ JS 14	7	7	9	13	7	JS

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: Same as water quality page.

Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: Nov 23, 2017

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	03-0289-7986	**Endpoint:**	6d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Nov-17 16:48	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-1063-8598	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jill Sones
Start Date:	03 Oct-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	09 Nov-17 15:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	37d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	17-2466-1926	**Code:**	66CC40A6	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (9 °C)	**Station:**	WL_BFWB_OUT_SP21_20171002_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	927688	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

6d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

6d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	0	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

Ceriodaphnia 7-d Survival and Reproduction Test

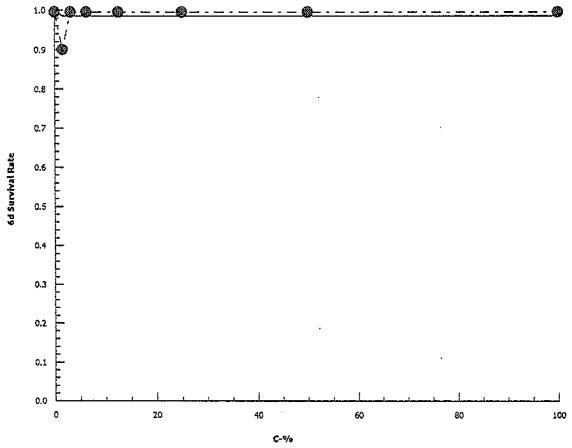
Nautilus Environmental

Analysis ID: 03-0289-7986 **Endpoint:** 6d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 02 Nov-17 16:48 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

6d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test

Nautilus Environmental

Analysis ID:	19-4767-5008	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Nov-17 16:48	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-1063-8598	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Jill Sones
Start Date:	03 Oct-17 13:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	09 Nov-17 15:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	37d 3h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	17-2466-1926	**Code:**	66CC40A6	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (9 °C)	**Station:**	WL_BFWB_OUT_SP21_20171002_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	937188	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	9.249	1.084	23.75	10.81	4.21	92.28
IC10	13.77	7.329	51.49	7.261	1.942	13.64
IC15	21.96	10.31	57.12	4.553	1.751	9.704
IC20	53.95	12.5	64.68	1.854	1.546	8
IC25	61.29	23.24	72	1.632	1.389	4.304
IC40	89.74	69.18	N/A	1.114	NA	1.446
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	15.4	8	19	1.157	3.658	23.75%	0.0%
1.56		10	15.6	3	19	1.462	4.624	29.64%	-1.3%
3.12		10	16.7	12	20	0.7461	2.359	14.13%	-8.44%
6.25		10	16.9	12	21	0.9939	3.143	18.6%	-9.74%
12.5		10	14.7	9	19	1.174	3.713	25.26%	4.55%
25		10	13.5	9	18	1.025	3.24	24.0%	12.34%
50		10	13.4	8	18	1.108	3.502	26.14%	12.99%
100		10	9	5	15	0.9775	3.091	34.35%	41.56%

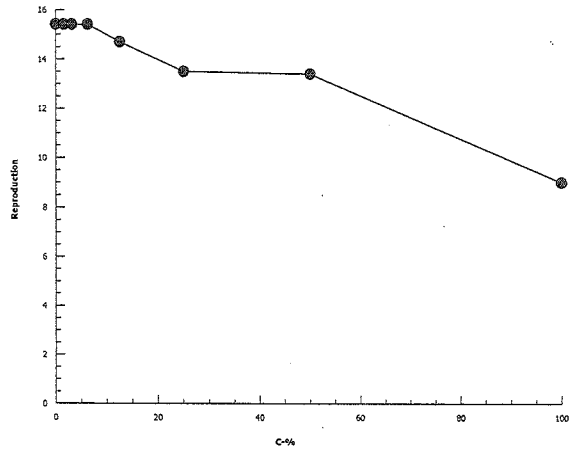
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	18	16	10	18	18	17	19	15	8	15
1.56		17	19	18	15	18	17	3	15	16	18
3.12		19	16	17	20	12	16	14	18	17	18
6.25		16	18	21	19	14	14	12	19	15	21
12.5		19	16	9	11	18	19	14	10	14	17
25		15	10	17	13	12	18	17	10	14	9
50		17	9	11	17	15	15	18	12	12	8
100		7	5	10	10	15	7	7	9	13	7

NN 23/17

Analysis ID:	08-8581-2669	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Nov-17 16:54	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Client: Teck

W.O.#: 1W0896

Hardness and Alkalinity Datasheet

		Alkalinity						Hardness			
	Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity (mg/L$CaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness (mg/L $CaCO_3$)	Technician
10	LC-LCDSSLCC_	Oct 5/17	Oct 5/17	50	10.5	10.7	206	①10	6.6	660	AWZ
	WS_2017-10-02_N										
11	LC-DCL_	Oct 5/17	Oct 5/17	50	9.7	9.9	190	①10	3.1	310	AWZ
	WS_2017-10-02_N										
12	LC-FRDSDC_	Oct 5/17	Oct 5/17	50	10.3	10.5	202	①10	5.7	570	AWZ
	WS_2017-10-02_N										
13	LC-DCDS_	Oct 5/17	Oct 5/17	50	7.6	7.8	148	①10	5.8	580	AWZ
	WS_2017-10-02_N										
14	LC-LCS_	Oct 5/17	Oct 5/17	50	9.6	9.7	190	①10	6.1	610	AWZ
	WS_2017-10-02_N										
15	~~DS SP-21~~ WL_	Oct 5/17	Oct 5/17	50	17.4	17.7	~~17.7~~ 342	①10	12.2	1220	AWZ
	BFWB_OUT_SP21_										
DS	20171002_N Decimal	Oct 5/17	Oct 5/17	~~50~~ 100	0.6	0.7	10	100	1.1	11	
	20% Perrier	Oct 5/17	Oct 5/17	50	5.0	~~5.0~~ 5.1	98	50	5.0	100	JJ

Notes: ① Sample diluted w/ DI water up to 100mL

Reviewed by: [signature]

Date Reviewed: Nov. 22, 2017

APPENDIX B – Rainbow Trout Embryo (*Oncorhynchus mykiss*) Toxicity Test Data

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 5 17 1705h

Work Order No.: 17089

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LLCOSSLE_WS_2017-10-02_N
Sample Date: Oct 2 17
Date Received: Oct 3 17
Sample Volume: 8 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10th U
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 100517
Source: Vancouver Island Trout Hatchery
Loading Density: 1.0 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE98
Stock Solution ID: 17503 (1000mg/L SDS)
Date Initiated: Oct 5 17
7-d EC50 (95% CL): 4.6 (4.1 – 5.3) mg/L SDS

Reference Toxicant Mean and Range: 4.2 (2.0 – 8.8) mg/L SDS
Reference Toxicant CV (%): 45

Test Results:

	Sample ID		
	LLCOSSLE_WS_2017-10-02_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JBe

Date reviewed: Nov-9/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teal
Sample ID: LL-LOSSLEE_WS_2017-10-02_N
Work Order #: 171089

Start Date & Time: OCT 5 17 1705h
Stop Date & Time: OCT 12 17 1200h
CER #: 9[illegible]3
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	~~15.1~~ 14.9 K	15.0	14.0	15.0	14.0	15.0	14.0	14.5	13.5	15.0	13.5	14.0
DO (mg/L)	10.0	10.1	10.0	~~12.0~~ 10.1		10.2	10.1	9.9	10.1	10.0	9.9	9.5	9.8	9.4
pH	6.7	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	~~9.5~~ 7.0 K	~~9.8~~ 7.0 K	~~6.9~~ 6.9 K
Cond. (µS/cm)	31	29		28		30		29		30		28 K		~~29~~ 29 K
Initials	K	K		EMM		K		K		K		K		K

Concentration: 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	~~15.1~~ 14.5 K	14.0	14.5	13.5	14.5	13.5	14.0
DO (mg/L)	10.0	10.1	10.0	10.0	10.1	10.1	10.1	10.2	10.1	9.9	9.9	9.7	9.8	9.4
pH	6.9	7.1	7.1	7.1	7.1	7.2	6.9	7.0	6.9	~~7.3~~ 7.3 K	7.0	~~7.5~~ 7.5 K	~~7.4~~ 7.4 K	7.1
Cond. (µS/cm)	100	94		99		90		92		105		92 K		96
Initials	K	K		EMM		K		K		K		K		K

Concentration: 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	13.5	14.5	13.5	14.0
DO (mg/L)	10.1	10.1	10.0	10.0	10.1	10.1	10.2	10.2	10.1	10.0	10.0	9.7	9.8	9.4
pH	7.6	7.9	7.8	8.0	7.9	7.8	7.7	7.7	7.7	8.0	7.7	~~7.9~~ 7.9 K	~~7.8~~ 7.7 K	8.0
Cond. (µS/cm)	261	298		278		290		258		K ~~274~~ 259 K		K ~~290~~ 290 K		276
Initials	K	K		EMM		K		K		K		K		K

Concentration: 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	13.5	14.5	13.5	14.0
DO (mg/L)	10.0	10.1	10.0	10.0	10.1	10.1	10.2	10.2	10.1	10.0	10.0	9.7	9.8	9.4
pH	8.3	8.1	8.5	8.2	8.4	8.2	8.5	8.1	8.6	8.3	8.5	8.2	8.4	8.7
Cond. (µS/cm)	402	396	~~389~~ K	401		388		388		405		399		389
Initials	K	K		EMM		K		K		K		K		K

Thermometer: CER-9[illegible]3 DO meter/probe: 2 / 2 (100%v/v) pH meter/probe: 3 / 3 Conductivity meter/probe: 2 / 2

	Control	~~LL-LOSSLEE~~	K	
Hardness*	K 110	660		
Alkalinity*	40	206 ~~208~~ K		

* mg/L as CaCO3

Analysts: EMM, KL
Reviewed by: JOL
Date reviewed: NOV. 9/17

Sample Description: Clear, colourless, odourless, some ~~no~~ K particulates

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_LCOSSLCC_WS_2017-10-02_N
Work Order #: 171089

Start Date & Time: Oct 5 17C 1705h
Stop Date & Time: Oct 12 17C 1200h
Test Species: *Oncorhynchus mykiss*

Concentration (%v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	0	30	30
	2								0	10	20	30
	3								0	0	31	30
	4								0	1	29	30
6.25	1					↓			0	0	30	30
	2					1			1	5	24	30
	3					0			0	0	30	30
	4					0			0	0	30	30
12.5	1					1			0	0	30	30
	2								0	5	25	30
	3								0	0	30	30
	4								0	2	28	30
25	1								0	1	29	30
	2								0	7	23	30
	3								0	0	30	30
	4								0	1	29	30
50	1								0	1	29	30
	2								0	5	25	30
	3								0	2	28	30
	4							↓	0	0	30	30
100	1							0	0	0	30	30
	2							1	1	7	22	30
	3							0	0	0	30	30
	4	↓	↓	↓	↓	↓	↓	0	0	0	30	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		K	JM	K	K	K	K	K	K	K	K	K

Comments:

Reviewed by: JOK **Date reviewed:** Nov. 9/17

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	20-1492-1118	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 19:48	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	01-1008-4632	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	05 Oct-17 17:05	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	12 Oct-17 12:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	14-4545-9701	**Code:**	5627F6F5	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:14	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	80h (8.2 °C)	**Station:**	LC_LCDSSLCC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	210927	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9083	0.6667	1	0.08094	0.1619	17.82%	0.0%	109	120
6.25		4	0.95	0.8	1	0.05	0.1	10.53%	-4.59%	114	120
12.5		4	0.9417	0.8333	1	0.03938	0.07876	8.36%	-3.67%	113	120
25		4	0.925	0.7667	1	0.05336	0.1067	11.54%	-1.84%	111	120
50		4	0.9333	0.8333	1	0.036	0.07201	7.72%	-2.75%	112	120
100		4	0.9333	0.7333	1	0.06667	0.1333	14.29%	-2.75%	112	120

Proportion Normal Detail

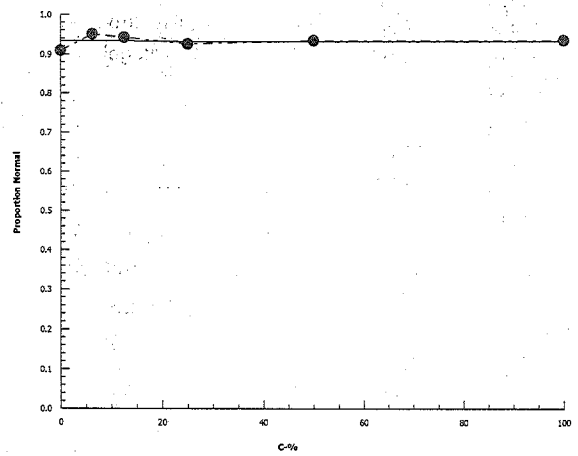
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.6667	1	0.9667
6.25		1	0.8	1	1
12.5		1	0.8333	1	0.9333
25		0.9667	0.7667	1	0.9667
50		0.9667	0.8333	0.9333	1
100		1	0.7333	1	1

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	20/30	30/30	29/30
6.25		30/30	24/30	30/30	30/30
12.5		30/30	25/30	30/30	28/30
25		29/30	23/30	30/30	29/30
50		29/30	25/30	28/30	30/30
100		30/30	22/30	30/30	30/30

Analysis ID:	20-1492-1118	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 19:48	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 5/17 @ 1705h

Work Order No.: 176089

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_OC1_WS_2017-10-02_N
Sample Date: Oct 2/17
Date Received: Oct 3/17
Sample Volume: 5x20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 11
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 100517
Source: Vancouver Island Trout Hatchery
Loading Density: 1.0g/L

Number of male broodstock used: 3
Number of female broodstock used: ~~8~~ 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTC918
Stock Solution ID: 17503 (1000 mg/L SDS)
Date Initiated: Oct 5/17
7-d EC50 (95% CL): 4.6 (4.1–5.3) mg/L SDS

Reference Toxicant Mean and Range: 4.2 (2.0–8.8) mg/L SDS
Reference Toxicant CV (%): 45

Test Results:

	Sample ID		
	LC_OC1_WS_2017-10-02_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCh

Date reviewed: Nov-9/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_DC1-WS-2017-10-02_N
Work Order #: 178089

Start Date & Time: Oct 5 (17 @ 1705h
Stop Date & Time: Oct 12 (17 @ 1215h
CER #: K 9.3
Test Species: *Oncorhynchus mykiss*

Concentration 6.6 (N) (control)

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	14.0	15.0	14.0	15.0	14.0	15.0	14.0	14.5	13.5	15.0	13.5	14.0
DO (mg/L)	10.0	10.1	10.0	10.0	10.1	10.1	10.2	9.9	10.1	10.0	9.9	9.5	9.8	9.2
pH	6.7	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.7	6.8	6.9	7.0	7.0	6.9
Cond. (µS/cm)	31	29		28		30		29		30		28		29
Initials	K	K		EMM		K		K		K		K		K

① 10.1 ea

Concentration 6.25

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	13.5	14.5	13.5	14.0
DO (mg/L) 10.1	~~6.9~~ K	10.1	10.0	~~10.0~~	10.1	10.3	10.2	10.2	10.1	10.0	10.0	9.8	9.8	9.2
pH	~~6.2~~ 7.1	7.2	7.4	7.2	7.2	7.3	7.3	7.4	7.4	7.4	7.4	7.5	7.4	7.4
Cond. (µS/cm)	54	48		49		49		52		50		48		50
Initials	K	K		EMM		K		K		K		K		K

① 10.1 ea

Concentration 25

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	13.5	14.5	13.5	14.0
DO (mg/L) 10.1	~~7.6~~ K	10.1	10.0	10.1	10.1	10.3	10.2	10.2	10.1	10.0	10.0	9.8	9.8	9.2
pH	7.6	8.1 ②	7.7	7.9	7.8	7.8	7.7	8.0	7.7	8.0	7.8	8.0	7.8	8.0
Cond. (µS/cm)	119	132		130		122		133		118		130		128
Initials	K	K		EMM		K		K		K		K		K

Concentration 100

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	13.5	14.5	13.5	14.0
DO (mg/L) *	~~8~~ 10.1	10.1	10.0	~~10.0~~	10.1	10.3	10.2	10.2	10.1	10.0	10.0	9.8	9.8	9.2
pH	8.3	8.4	~~8.5~~	8.3	8.4	8.3	8.4	8.3	8.5	8.4	8.5	8.3	8.4	8.7
Cond. (µS/cm)	375	368		379		369		369		377		373		375
Initials	K	K		EMM		K		K		K		K		K

① 10.1 ea

Thermometer: CER 9.3 K DO meter/probe: 2 / 2 pH meter/probe: 3 / 3 Conductivity meter/probe: 2 / 2

	Control	100 Z (N)		
Hardness*	11	310		
Alkalinity*	10	190		

* mg/L as CaCO3

Analysts: EMM, K
Reviewed by: JBL
Date reviewed: Nov. 9/17

Sample Description: Clear, colourless, odourless, some particulates

Comments: ② K checked w/ another meter

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_DC1_WS_20A-10-02_N
Work Order #: 171089

Start Date & Time: Oct 5 /AE 1705h
Stop Date & Time: Oct 12 /AE 1215h
Test Species: *Oncorhynchus mykiss*

Concentration °6 (w/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
control	1	0	0	0	0	0	0	0	0	0	30	30
	2					1		1	2	6	22	30
	3					0		1	1	1	28	30
	4							0	0	0	30	30
6.25	1								0	0	30	30
	2						1		1	4	25	30
	3						0		0	0	30	30
	4						0		0	2	28	30
12.5	1						0		0	0	30	30
	2						1		1	7	22	30
	3						0		0	0	30	30
	4						0		0	0	30	30
25	1						0		0	1	29	30
	2						2	1	3	~~8~~ 8	19	30
	3						0	0	0	1	29	30
	4				1		0	0	1	0	29	30
50	1				0		0	0	0	3	27	30
	2				0		1	1	2	8	19	~~3~~ 29
	3				0		0	2	2	0	28	30
	4			1	1	1	0	0	3	2	26	31
100	1			0	0	0	0	1	1	1	28	30
	2			1	0	1	1	1	4	7	20	31
	3			0	0	0	0	0	0	0	30	30
	4			2	1	0	0	0	3	1	26	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments:

Reviewed by: [illegible]

Date reviewed: Nov. 9/17

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	18-8858-3409	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 19:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-6904-5061	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	05 Oct-17 17:05	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	12 Oct-17 12:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	10-1973-7755	**Code:**	3CC7F69B	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:51	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	76h (8 °C)	**Station:**	LC_DC1_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1901112	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	24.75	N/A	N/A	4.04	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9167	0.7333	1	0.0631	0.1262	13.77%	0.0%	110	120
6.25		4	0.9417	0.8333	1	0.03938	0.07876	8.36%	-2.73%	113	120
12.5		4	0.9333	0.7333	1	0.06667	0.1333	14.29%	-1.82%	112	120
25		4	0.8833	0.6333	0.9667	0.08333	0.1667	18.87%	3.64%	106	120
50		4	0.8318	0.6552	0.9333	0.06205	0.1241	14.92%	9.26%	100	120
100		4	0.8613	0.6452	1	0.07701	0.154	17.88%	6.04%	104	121

Proportion Normal Detail

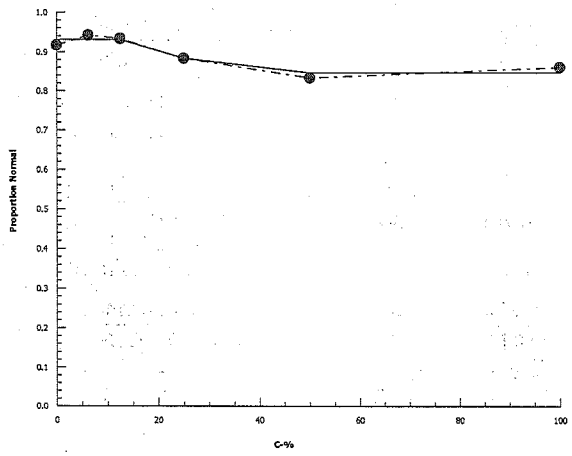
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.7333	0.9333	1
6.25		1	0.8333	1	0.9333
12.5		1	0.7333	1	1
25		0.9667	0.6333	0.9667	0.9667
50		0.9	0.6552	0.9333	0.8387
100		0.9333	0.6452	1	0.8667

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	22/30	28/30	30/30
6.25		30/30	25/30	30/30	28/30
12.5		30/30	22/30	30/30	30/30
25		29/30	19/30	29/30	29/30
50		27/30	19/29	28/30	26/31
100		28/30	20/31	30/30	26/30

Analysis ID:	18-8858-3409	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 19:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: ____ QA: JCH Nov. 9/17

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 5/17 @ 1705h

Work Order No.: 171089

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC-PROSDC_WB-20A-10-02_N
Sample Date: Oct 2/17
Date Received: Oct 3/17
Sample Volume: 5x20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 11
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 100517
Source: Vancouver Island Trout Hatchery
Loading Density: 1.0 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: SDS RTE98
Stock Solution ID: 17503 (1000mg/L SDS)
Date Initiated: Oct 5/17
7-d EC50 (95% CL): 4.6 (4.1-5.3) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.0 - 8.8) mg/L SDS
Reference Toxicant CV (%): 45

Test Results:

	Sample ID		
	LC-PROSDC_WB-20A-10-02_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCh

Date reviewed: Nov. 9/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_FROSDC_WS_2017-10-02_N
Work Order #: 171089

Start Date & Time: Oct 5 17 @ 1705h
Stop Date & Time: Oct 12 17 @ 1230h
CER #: R 9/3
Test Species: *Oncorhynchus mykiss*

%(v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	14.0	15.0	14.0	15.0	14.0	15.0	14.0	14.5	13.5	15.0	13.5	14.0
DO (mg/L)	10.0	10.1	10.1	~~10.2~~	10.1	10.2	10.2	9.9	10.1	10.0	9.9	9.5	9.8	9.3
pH	6.7	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.7	6.8	6.9	7.0	7.0	6.9
Cond. (µS/cm)	~~26~~ 31	34	29	29		30		29		30		28		28
Initials	K	K		EMM		K		K		K		K		K

10:10

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	13.5	15.0	13.5	14.0
DO (mg/L)	10.1	10.1	10.0	~~10.2~~	10.1	10.1	10.2	9.9	10.1	9.9	10.0	9.8	9.8	9.3
pH	7.2	7.3	7.4	7.3	7.3	7.3	7.3	7.4	7.4	7.4	7.2	7.4	7.5	7.5
Cond. (µS/cm)	98	80		83		78		85		89		85		86
Initials	K	K		EMM		K		K		K		K		K

10:20

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	13.5	15.0	13.5	14.0
DO (mg/L)	10.1	10.1	10.2	10.1	10.1	10.2	10.3	9.9	10.1	10.0	10.1	9.8	9.8	9.3
pH	7.8	7.9	7.9	7.9	7.8	7.7	7.8	7.8	7.8	8.0	7.8	7.9	7.8	8.0
Cond. (µS/cm)	261	236		242		235		248		250		239		245
Initials	K	K		EMM		K		K		K		K		K

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.5	13.5	15.0	13.5	14.0
DO (mg/L)	10.2	10.4	10.2	10.1	10.2	10.1	10.3	9.9	10.1	10.0	10.1	9.8	9.8	9.~~8~~7
pH	8.2	8.2	8.5	8.4	8.4	8.2	8.5	8.2	8.6	8.2	8.6	8.2	8.4	8.7
Cond. (µS/cm)	799	781		789		780		778		802		796		782
Initials	K	K		EMM		K		K		K		K		K

Thermometer: ~~CER-9~~ K **DO meter/probe:** 2 / 2 **pH meter/probe:** 3 / 3 **Conductivity meter/probe:** 2 / 2

	Control	100 %(v/v)		
Hardness*	11	570		
Alkalinity*	10	202		

Analysts: Emma, KC
Reviewed by: JOH
Date reviewed: Nov. 9/17

* mg/L as CaCO3

Sample Description: Clear, colourless, odourless, some fine particulates

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: ~~LC-FR~~ LC_FRDSDC_WS-20A-10-02_N
Work Order #: A1089

Start Date & Time: Oct 5/17 @ 1705h
Stop Date & Time: Oct 12/17 @ 1230h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
control	1	0	0	0	0	0	0	0	0	0	30	30
	2								0	10	20	30
	3								0	1	29	30
	4								0	0	30	30
6.25	1								0	1	29	30
	2								0	10	20	30
	3								0	6	24	30
	4								0	1	29	30
12.5	1								0	0	30	30
	2								0	5	25	30
	3								0	1	29	30
	4								0	0	30	30
25	1								0	0	30	30
	2								0	7	23	30
	3								0	5	25	30
	4								0	1	29	30
50	1					1		ANT ~~2~~ 1	2	1	27	30
	2			1		0		2	3	2	25	30
	3			0				0	0	4	26	30
	4			1				1	2 ~~1~~	4	24	~~3~~ 30
100	1			0				0	0	0	30	30
	2				1			0	1	8	21	30
	3				0			0	0	0	30	30
	4				0			0	0	4	26	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments:

Reviewed by: JGW

Date reviewed: Nov. 9/17

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	06-6904-3932	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 19:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	09-9605-2238	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	05 Oct-17 17:05	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	12 Oct-17 12:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 19h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	02-3018-8233	**Code:**	DB864C9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 10:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	79h (7.8 °C)	**Station:**	LC_FRDSDC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	440029	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9083	0.6667	1	0.08094	0.1619	17.82%	0.0%	109	120
6.25		4	0.85	0.6667	0.9667	0.07265	0.1453	17.09%	6.42%	102	120
12.5		4	0.95	0.8333	1	0.03967	0.07935	8.35%	-4.59%	114	120
25		4	0.8917	0.7667	1	0.05507	0.1101	12.35%	1.84%	107	120
50		4	0.85	0.8	0.9	0.02152	0.04303	5.06%	6.42%	102	120
100		4	0.8917	0.7	1	0.0712	0.1424	15.97%	1.84%	107	120

Proportion Normal Detail

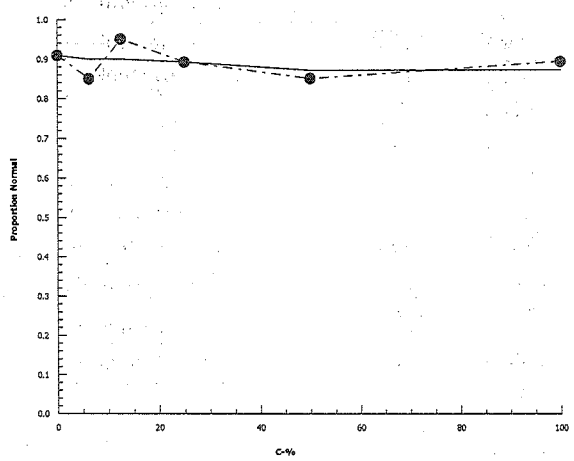
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.6667	0.9667	1
6.25		0.9667	0.6667	0.8	0.9667
12.5		1	0.8333	0.9667	1
25		1	0.7667	0.8333	0.9667
50		0.9	0.8333	0.8667	0.8
100		1	0.7	1	0.8667

Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	20/30	29/30	30/30
6.25		29/30	20/30	24/30	29/30
12.5		30/30	25/30	29/30	30/30
25		30/30	23/30	25/30	29/30
50		27/30	25/30	26/30	24/30
100		30/30	21/30	30/30	26/30

Analysis ID:	06-6904-3932	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 19:59	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 5/17 @ 1705h

Work Order No.: 17089

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DCDS_WS_2017-10-02_N
Sample Date: Oct 2/17
Date Received: Oct 3/17
Sample Volume: 5x20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 14
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 100517
Source: Vancouver Island trout Hatchery
Loading Density: 1.0 g/L

Number of male broodstock used: 3
Number of female broodstock used: ~~8~~ 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTC98
Stock Solution ID: 17503 (1000mg/L SDS)
Date Initiated: Oct 5/17
7-d EC50 (95% CL): 4.6 (4.1-5.3) mg/L SDS

Reference Toxicant Mean and Range: 4.2 (~~2.0-8.8~~ 2.0 - 8.8) mg/L SDS*
Reference Toxicant CV (%): 45

Test Results:

	Sample ID		
	LC_DCDS_WS_2017-10-02_N		
EC25 % (v/v) (95% CL)	67.8 (~~60-100~~)* (60.4-100)		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCL

Date reviewed: Nov. 14/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: ~~LC_DC_25_LL_0005_WS_2017-10-02_W~~
Work Order #: 171089

Start Date & Time: Oct 5 / 17 @ 1705h
Stop Date & Time: Oct 12 / 17 @ 1245h
CER #: 9873
Test Species: *Oncorhynchus mykiss*

% (v/v) Concentration: control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	14.0	~~15.0~~ 15.0	14.0	15.0	14.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.0	~~10.0~~ 10.0	10.1	10.2 ~~1~~	10.1	9.9	10.0	9.9	9.7	10.1	10.2	9.2
pH	6.7	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.7	6.8	6.9	7.1	7.2	7.0
Cond. (µS/cm)	31	29		28		30		29		30		30		29
Initials	KL	KL		EMM		KL		KL		AWT		AWT		AWT

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Concentration: 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	10.0	10.1	10.1	10.3	10.1	9.9	10.0	10.1	9.9	10.2	10.3	9.2
pH	7.0	7.3	7.3	7.2	7.1	7.3	7.3	7.5	7.4	7.4	7.0	7.4	7.3	7.1
Cond. (µS/cm)	55	54		56		51		53		54		53		55
Initials	KL	KL		EMM		KL		KL		AWT		AWT		AWT

Concentration: 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0 ~~5~~	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.0	14.0	14.5	14.0	14.0
DO (mg/L)	10.1	~~15~~ 10.1	10.2	10.1	10.1	10.3	10.3	9.9	10.1	9.7	9.8	10.1	10.2	9.2
pH	7.4	7.8	7.6	7.9	7.8	7.6	7.6	7.7	7.6	7.7	7.6	7.8	7.6	7.8
Cond. (µS/cm)	128	136		139		116		137		132		134		132
Initials	KL	KL		EMM		KL		KL		AWT		AWT		AWT

Concentration: 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.0	10.1	10.0	10.1	10.3	10.3	9.9	10.1	9.7	9.7	10.1	10.3	9.1
pH	8.2	7.2	8.2	8.1	8.0	8.1	8.3	8.1	8.4	8.2	8.4	8.1	8.3	7.9
Cond. (µS/cm)	403	397		399		397		396		405		403		403
Initials	KL	KL		EMM		KL		KL		AWT		AWT		AWT

Thermometer: ~~052~~ 95 K DO meter/probe: 2 / 2 pH meter/probe: 3 / 3 Conductivity meter/probe: 2 / 2

	Control	100% (v/v)		
Hardness*	41	580		
Alkalinity*	10	148		

* mg/L as CaCO3

Analysts: EMM, AWT, KL
Reviewed by: JDL
Date reviewed: Nov-9/17

Sample Description: light yellow, clear, odourless, some particulates, K

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC-DCDS-WS-20A-10-02-W
Work Order #: ~~190~~ 171089

Start Date & Time: Oct 5 /17 @ 1705h
Stop Date & Time: Oct 12 /17 @ 1245h
Test Species: *Oncorhynchus mykiss*

Concentration %(v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	0	30	30
	2							1	1	4	25	30
	3							0	0	1	29	30
	4							0	0	1	29	30
6.25	1							1	1	0	29	30
	2						↓	1	1	8	20	~~30~~ 29
	3				↓		1	0	1	2	27	30
	4				1		0		1	1	28	30
12.5	1			↓	0		0		0	1	29	30
	2			1		↓	1		2	1	27	30
	3			0		1	0	↓	1	1	28	30
	4			1		0	0	1	2	2	26	30
25	1			0			0	0	0	0	30	30
	2			1	↓		0		1	4	25	30
	3			1	1		3		5	1	24	30
	4			7	0	↓	3		10	1	~~18~~ 19	30
50	1			0	3	1	0	↓	4	0	26	30
	2			1	1	1	2	2	7	3	20	30
	3			0	0	0	0	2	2	2	26	30
	4			3	1	0	1	1	6	1	23	30
100	1			1	0	1	4	1	7	1	21	~~30~~ 29
	2			9	2	1	5	1	18	3	9	30
	3			2	2	0	1	0	5	2	23	30
	4	↓	↓	3	1	3	3	4	14	0	16	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		K	HW	K	K	AWZ	AWZ	K AWZ	K	K	K	K

Comments:

Reviewed by: JOh **Date reviewed:** Nov-9/17

CETIS Analytical Report

Test Code: 171089d | 10-5732-7091

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	09-2987-9163	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 20:12	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes
Batch ID:	20-8110-2326	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	05 Oct-17 17:05	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	12 Oct-17 12:45	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	07-5716-3320	**Code:**	2D216538	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:40	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	76h (7.8 °C)	**Station:**	LC_DCDS_WS_2017-10-02_N		

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Gompertz [log(-log(1-P)=A+B*log(X)]	Control Threshold	0.0583333	Yes	No	Yes	Yes

Regression Summary

Iters	LL	AICc	BIC	Mu	Sigma	Adj R2	F Stat	Critical	P-Value	Decision(α:5%)
13	-308.1	623.3	625.7	2.319		0.4345	0.8444	3.16	0.4874	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	14.33	N/A	37.12	6.978	2.694	NA
EC10	27.41	N/A	53.87	3.648	1.856	NA
EC15	40.51	N/A	70	2.469	1.429	NA
EC20	53.9	2.191E-07	90.88	1.855	1.1	456300000
EC25	67.77	0.003664	~~136.7~~ 100	1.476	0.7314	27290
EC40	113.7	63.17	~~70040000~~	0.8797	0.0000014	1.583
EC50	~~149.7~~	89	1E+10	0.6682	0.0000000	1.124

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
Threshold	0.07213	0.03698	-0.004771	0.149	1.951	0.0646	Non-Significant Parameter
Slope	2.556	1.201	0.0584	5.053	2.128	0.0453	Significant Parameter
Intercept	-5.925	2.206	-10.51	-1.337	-2.686	0.0138	Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	62.86715	62.86715	1	19.67	0.0002	Significant
Lack of Fit	8.278958	2.759653	3	0.8444	0.4874	Non-Significant
Pure Error	58.82864	3.268258	18			
Residual	67.1076	3.1956	21			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF	67.11	32.67	<0.0001	Significant Heterogenity
	Likelihood Ratio GOF	66.88	32.67	<0.0001	Significant Heterogenity
Variances	Mod Levene Equality of Variance	0.5575	2.773	0.7310	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9032	0.9169	0.0251	Non-normal Distribution
	Anderson-Darling A2 Normality	0.9445	2.492	0.0169	Non-normal Distribution

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9417	0.8333	1	0.03696	0.07391	7.85%	0.0%	113	120
6.25		4	0.8724	0.6897	0.9667	0.06242	0.1248	14.31%	7.35%	104	119
12.5		4	0.9167	0.8667	0.9667	0.02152	0.04303	4.7%	2.66%	110	120
25		4	0.8167	0.6333	1	0.07515	0.1503	18.41%	13.27%	98	120
50		4	0.7917	0.6667	0.8667	0.04787	0.09574	12.09%	15.93%	95	120
100		4	0.581	0.3	0.7667	0.1065	0.2131	36.67%	38.3%	69	119

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	09-2987-9163	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 20:12	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes

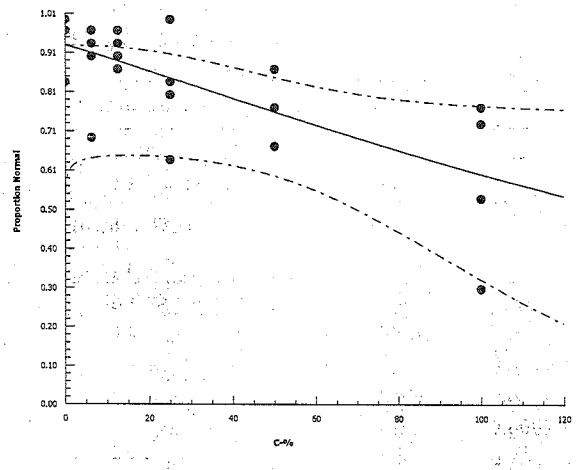
Proportion Normal Detail

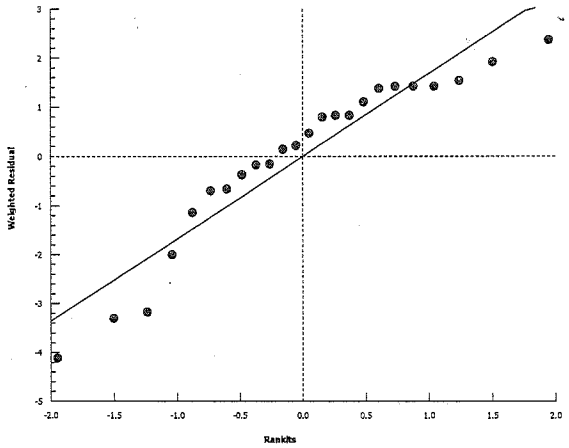
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.8333	0.9667	0.9667
6.25		0.9667	0.6897	0.9	0.9333
12.5		0.9667	0.9	0.9333	0.8667
25		1	0.8333	0.8	0.6333
50		0.8667	0.6667	0.8667	0.7667
100		0.7241	0.3	0.7667	0.5333

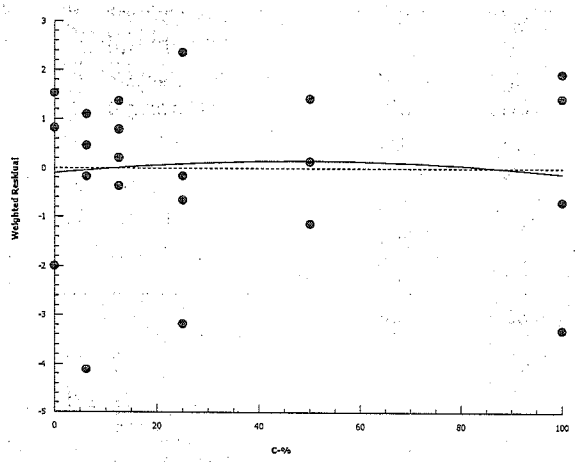
Proportion Normal Binomials

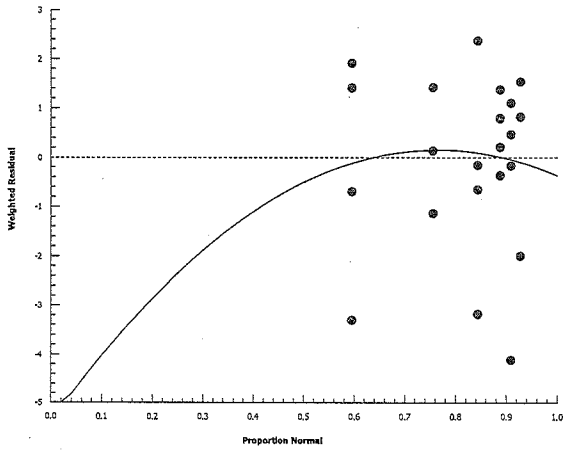
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	25/30	29/30	29/30
6.25		29/30	20/29	27/30	28/30
12.5		29/30	27/30	28/30	26/30
25		30/30	25/30	24/30	19/30
50		26/30	20/30	26/30	23/30
100		21/29	9/30	23/30	16/30

Graphics Log-Gompertz [log(-log(1-P)=A+B*log(X)]









Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 5 17 @ 1705h

Work Order No.: ~~17089~~ 17089

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LCLCS_WS_2017-10-02_W
Sample Date: Oct 2/17
Date Received: Oct 3/17
Sample Volume: 5x20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 11
Alkalinity (mg/L $CaCO_3$): 6

Test Organism Information:

Batch No.: 100517
Source: Vancouver Island Trout Hatchery
Loading Density: 1.0 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE98
Stock Solution ID: 17503 (1000 mg/L SDS)
Date Initiated: Oct 5/17
7-d EC50 (95% CL): 4.6 (4.1 – 5.3) mg/L SDS

Reference Toxicant Mean and Range: 4.2 (2.0 – 8.8) mg/L SDS
Reference Toxicant CV (%): 45

Test Results:

	Sample ID		
	LCLCS_WS_2017-10-02_W		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JGL

Date reviewed: Nov 9/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_LLS_WS_20A-0-02_W
Work Order #: 17089

Start Date & Time: Oct 5 17 1705h
Stop Date & Time: Oct 12 17 1300h
CER #: 193
Test Species: *Oncorhynchus mykiss*

Concentration (control)	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.0	15.0	14.0	15.0	14.0	15.0	14.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.0	10.4	10.2	10.0	10.1	10.2	10.2	9.9	10.1	9.9	9.7	10.1	10.1	9.4	
pH	6.7	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.7	6.8	6.9	7.1	7.2	7.0	
Cond. (µS/cm)	31	2829		28		30		29		29		30		29	
Initials	K	K		EMM		K		K		AWZ		AWZ		AWZ	

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Concentration 6.25	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.1	10.1	10.0	10.1	10.1	10.2	10.2	9.8	10.1	9.8	9.8	10.1	10.2	9.4	
pH	7.2	7.5	7.4	7.6	7.3	7.3	7.4	7.4	7.4	7.4	7.2	7.5	7.3	7.5	
Cond. (µS/cm)	95	85		84		80		75		81		77		78	
Initials	K	K		EMM		K		K		AWZ		AWZ		AWZ	

Concentration 25	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.2	10.4	10.0	10.1	10.1	10.2	10.2	9.8	10.1	10.0	9.8	10.2	10.2	9.4	
pH	7.6	8.1	7.6	8.0	7.8	7.8	7.7	8.0	7.7	8.2	7.7	8.1	7.8	7.9	
Cond. (µS/cm)	201	229		223		220		227		226		222		225	
Initials	K	K		EMM		K		K		AWZ		AWZ		AWZ	

Concentration 100	Days														
	0	1		2		3		4		5		6		7	
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final	
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0	
DO (mg/L)	10.2	10.1	10.0	10.0	10.1	10.2	10.2	9.8	10.1	10.0	9.9	10.2	10.3	9.4	
pH	8.4	8.4	8.5	8.2	8.4	8.3	8.4	8.3	8.5	8.5	8.5	8.4	8.4	8.7	
Cond. (µS/cm)	3856	738		742		738		737		757		752		750	
Initials	K	K		EMM		K		K		AWZ		AWZ		AWZ	

Thermometer: ~~CER-913~~ K DO meter/probe: 2 / 2 pH meter/probe: 3 / 3 Conductivity meter/probe: 2 / 2

	Control	100% (v/v)		
Hardness*	41	610		
Alkalinity*	10	190		

* mg/L as CaCO3

Analysts: EMM, AWZ, K
Reviewed by: JCH
Date reviewed: Nov-9/17

Sample Description: clear, colourless, odourless, some particulates.

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_LES_WS_2017-10-02_W
Work Order #: 171089

Start Date & Time: Oct 5 17 @ 1705h
Stop Date & Time: Oct 12/17 @ 1300h
Test Species: *Oncorhynchus mykiss*

Concentration %(v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	1	29	30
	2	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	3	↓	↓	↓	↓	↓	↓	↓	0	5	25	30
	4	↓	↓	↓	↓	↓	↓	↓	0	2	28	30
6.25	1	↓	↓	↓	↓	↓	↓	↓	0	2	28	30
	2	↓	↓	↓	↓	↓	↓	↓	0	7	23	30
	3	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
	4	↓	↓	↓	↓	↓	↓	↓	0	3	27	30
12.5	1	↓	↓	↓	↓	↓	↓	↓	0	0	30	30
	2	↓	↓	↓	↓	↓	↓	2	2	4	23	~~30~~ 29
	3	↓	↓	↓	↓	↓	↓	0	0	2	28	30
	4	↓	↓	↓	↓	↓	↓	↓	0	0	30	30
25	1	↓	↓	↓	↓	↓	↓	↓	0	1	29	30
	2	↓	↓	↓	↓	↓	↓	↓	0	4	26	30
	3	↓	↓	↓	↓	↓	↓	↓	0	6	24	30
	4	↓	↓	↓	↓	↓	↓	↓	0	6	24	30
50	1	↓	↓	↓	↓	↓	↓	↓	0	2	28	30
	2	↓	↓	1	↓	↓	↓	↓	1	5	24	30
	3	↓	↓	0	↓	↓	↓	1	1	6	24	31
	4	↓	↓	↓	↓	↓	~~1~~ 0	1	2	2	28	32
100	1	↓	↓	↓	↓	↓	0	0	0	0	29	29
	2	↓	↓	↓	1	↓	0	0	1	5	24	30
	3	↓	↓	↓	1	↓	0	0	1	4	25	30
	4	↓	↓	1	0	↓	0	2	3	0	27	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		KL	AW	KL	KL	AWZ	AWZ	AWZ	KL	KL	KL	KL

Comments:

Reviewed by: JCL **Date reviewed:** Nov. 9/17

Salmonid Embryo Survival and Development Test

Nautilus Environmental

Analysis ID:	20-7014-5194	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 20:17	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes
Batch ID:	18-4205-7716	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	05 Oct-17 17:05	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	12 Oct-17 13:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	
Sample ID:	09-0459-2041	**Code:**	35EAFAA9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 15:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	74h (8.1 °C)	**Station:**	LC_LC5_WS_2017-10-02_N		

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Normal [NED=A+B*log(X)]	Control Threshold	0.1	Yes	No	Yes	Yes

Regression Summary

Iters	LL	AICc	BIC	Mu	Sigma	Adj R2	F Stat	Critical	P-Value	Decision(α:5%)
18	-261	529.2	531.6	6.202	2.433		0.09991	3.16	0.9590	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	158.7	N/A	N/A	0.63	NA	NA
EC10	1215	N/A	N/A	0.08232	NA	NA
EC15	4795	N/A	N/A	0.02086	NA	NA
EC20	14280	N/A	N/A	0.007003	NA	NA
EC25	36410	N/A	N/A	0.002746	NA	NA
EC40	385300	N/A	N/A	0.0002595	NA	NA
EC50	1583000	N/A	N/A	0.0000627	NA	NA

>100

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
Threshold	0.09844	0.03584	0.02391	0.173	2.747	0.0121	Significant Parameter
Slope	0.4111	1.018	-1.706	2.528	0.4038	0.6904	Non-Significant Parameter
Intercept	-2.549	1.8	-6.293	1.194	-1.416	0.1713	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	1.133511	1.133511	1	0.643	0.4316	Non-Significant
Lack of Fit	0.6063597	0.2021199	3	0.09991	0.9590	Non-Significant
Pure Error	36.41533	2.023074	18			
Residual	37.02169	1.762938	21			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF	37.02	32.67	0.0167	Significant Heterogenity
	Likelihood Ratio GOF	46.5	32.67	0.0011	Significant Heterogenity
Variances	Bartlett Equality of Variance	0.5198	11.07	0.9914	Equal Variances
	Mod Levene Equality of Variance	0.1227	2.773	0.9855	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9553	0.9169	0.3516	Normal Distribution
	Anderson-Darling A2 Normality	0.3894	2.492	0.3884	Normal Distribution

Analysis ID: 20-7014-5194 Endpoint: Proportion Normal CETIS Version: CETISv1.8.7
Analyzed: 19 Oct-17 20:17 Analysis: Linear Regression (MLE) Official Results: Yes

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9	0.8333	0.9667	0.03043	0.06086	6.76%	0.0%	108	120
6.25		4	0.875	0.7667	0.9333	0.03696	0.07391	8.45%	2.78%	105	120
12.5		4	0.9316	0.7931	1	0.04877	0.09754	10.47%	-3.51%	111	119
25		4	0.8583	0.8	0.9667	0.03938	0.07876	9.18%	4.63%	103	120
50		4	0.8456	0.7742	0.9333	0.03622	0.07243	8.57%	6.04%	104	123
100		4	0.8833	0.8	1	0.0441	0.08819	9.98%	1.85%	105	119

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9667	0.8667	0.8333	0.9333
6.25		0.9333	0.7667	0.9	0.9
12.5		1	0.7931	0.9333	1
25		0.9667	0.8667	0.8	0.8
50		0.9333	0.8	0.7742	0.875
100		1	0.8	0.8333	0.9

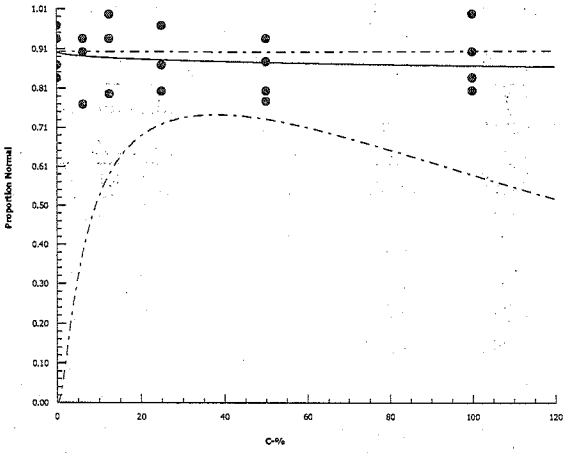
Proportion Normal Binomials

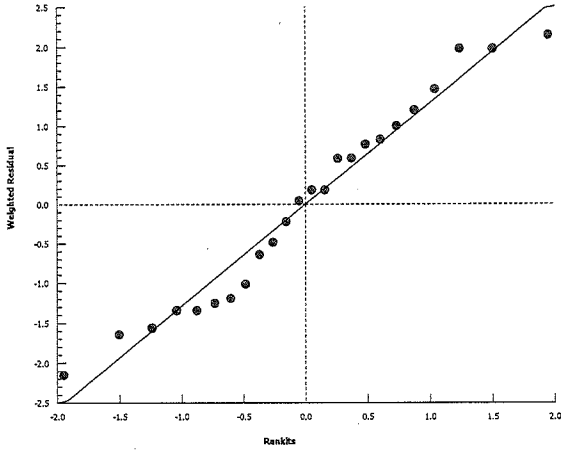
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	29/30	26/30	25/30	28/30
6.25		28/30	23/30	27/30	27/30
12.5		30/30	23/29	28/30	30/30
25		29/30	26/30	24/30	24/30
50		28/30	24/30	24/31	28/32
100		29/29	24/30	25/30	27/30

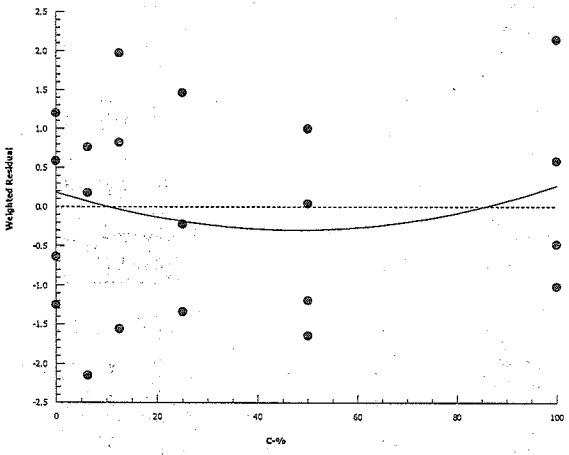
Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

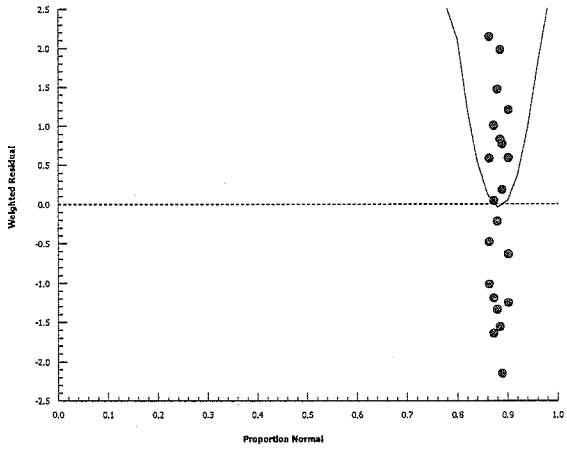
Analysis ID:	20-7014-5194	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 20:17	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes

Graphics — Log-Normal [NED=A+B*log(X)]









Rainbow Trout Early Life Stage Summary Sheet

Client: Teck Start Date/Time: Oct 5/17 @ 1705h

Work Order No.: 17089 Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: WL_BFWB_OUT_SP21_20171002_W
Sample Date: Oct 2/17
Date Received: Oct 3/17
Sample Volume: 5 X 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 11
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 100517
Source: Vancouver Island Trout Hatchery
Loading Density: 1.0 g/L

Number of male broodstock used: 11
Number of female broodstock used: 10
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTC98
Stock Solution ID: 1503 (1000mg/L SDS)
Date Initiated: Oct 5/17
7-d EC50 (95% CL): 4.6 (4.1-5.3) mg/L SDS

Reference Toxicant Mean and Range: 4.2 (2.0-8.8) mg/L SDS
Reference Toxicant CV (%): 45

Test Results:

	Sample ID		
	WL_BFWB_OUT_SP21_	20171002_W	
EC25 % (v/v) (95% CL)	~~>100~~ 94.7 (N/A-N/A)		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCh Date reviewed: Nov-9/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: ~~WTF-OUT-SPIT~~ WL-BFWB_OUT_SPIL_20171012_N
Work Order #: 170189

Start Date & Time: OCT 5 /17 @ 1705h
Stop Date & Time: OCT 12 /17 @ 1315h
CER #: 29313
Test Species: *Oncorhynchus mykiss*

6 (v/v) Concentration Control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	~~14.5~~ 15.0	14.0	15.0	14.0	15.0	14.0	15.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.1	10.2	~~10.2~~ 10.0	10.1	~~10.2~~ 10.0	10.2	9.9	10.1	9.9	9.8	10.1	10.3	9.2
pH	6.7	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.7	6.8	6.9	7.1	7.2	7.0
Cond. (µS/cm)	31	29		28		30		29		30		29		29
Initials	K	K		EMM		K		K		AWZ		AWZ		AWZ

@ 10.1 am

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.0	10.0	10.1	10.1	10.2	10.2	9.8	10.2	9.8	9.8	10.3	10.3	9.1
pH	7.2	~~7.6~~ 7.4	7.6	7.6	7.4	7.4	7.5	7.5	7.6	7.5	7.4	7.6	7.5	7.7
Cond. (µS/cm)	194	185		180		173		185		187		183		187
Initials	K	K		EMM		K		K		AWZ		AWZ		AWZ

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	10.0	~~10.2~~ 10.0	10.1	10.2	10.2	9.8	10.2	9.9	9.9	~~10.2~~ 10.2	10.3	9.1
pH	7.6	7.9	8.0	7.9	7.9	7.8	8.0	7.7	8.1	8.0	8.1	7.8	8.1	8.4
Cond. (µS/cm)	640	611		612		597		606		623		616		639
Initials	K	K		EMM		K		K		AWZ		AWZ		AWZ

10.1 am

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.5	15.0	14.0	15.0	14.0	14.0	14.0	14.5	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	10.0	10.1	10.2	10.2	10.2	9.8	10.2	9.8	9.9	10.2	9.7	9.2
pH	7.7	7.8	7.6	7.7	7.7	8.0	~~8.1~~ 8.0	7.7	8.6	8.0	8.5	~~7.8~~ 7.8	8.4	8.9
Cond. (µS/cm)	2050	2010		2010		2010		2000		1981		2010		2000
Initials	K	K		EMM		K		K		AWZ		AWZ		AWZ

Thermometer: ~~CER-913~~ K **DO meter/probe:** 2 / 2 **pH meter/probe:** K 3 / 3 **Conductivity meter/probe:** 2 / 2

	Control	~~WTF-OUT~~ 100% EMM		
Hardness*	11	1220		
Alkalinity*	10	342		

* mg/L as CaCO3

Analysts: K, AWZ, EMM
Reviewed by: JOL
Date reviewed: Nov. 9/17

Sample Description: Clear, colourless, hydrocarbon odour, no ~~grit~~ K particulates.

Comments: Checked w/ another meter

Embryo Toxicity Test
Daily Mortality

Client: Teck **Start Date & Time:** OCT 5/17 @ 1705h
Sample ID: ~~WTF_OUT SBC~~ WL_SFWS_OUTLSPZL_ZAPHODL_W **Stop Date & Time:** OCT 12/17 @ 1315h
Work Order #: 170089 **Test Species:** *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	0	30	30
	2	↓	↓	↓	↓	0	↓	↓	0	7	23	30
	3	↓	↓	↓	↓	0	↓	↓	0	4	26	30
	4	↓	↓	↓	↓	0	↓	↓	0	4	26	30
6.25	1	↓	↓	↓	↓	0	↓	↓	0	2	28	30
	2	↓	↓	↓	↓	0	↓	↓	1	4	25	30
	3	↓	↓	↓	↓	~~AWZ~~ 0	↓	↓	1	1	28	30
	4	↓	↓	1	↓	0	0	↓	1	1	28	30
12.5	1	↓	↓	0	↓	↓	↓	↓	0	1	29	30
	2	↓	↓	↓	↓	↓	↓	↓	0	9	21	30
	3	↓	↓	↓	↓	↓	↓	↓	0	1	29	30
	4	↓	↓	↓	↓	↓	↓	↓	0	1	29	30
25	1	↓	↓	↓	↓	↓	↓	↓	0	1	29	30
	2	↓	↓	↓	↓	~~AWZ~~	1	2	3	4	23	30
	3	↓	↓	↓	↓	↓	0	0	0	0	30	30
	4	↓	↓	2	↓	↓	↓	↓	2	3	25	30
50	1	↓	↓	0	↓	↓	↓	↓	0	1	29	30
	2	↓	↓	0	↓	↓	↓	↓	0	6	24	30
	3	↓	↓	1	↓	↓	↓	↓	1	4	25	30
	4	↓	↓	0	2	↓	↓	2	4	2	24	30
100	1	↓	↓	↓	8①	↓	↓	7①	15	0	15	30
	2	↓	↓	↓	4①	↓	↓	0	4	7	19	30
	3	↓	↓	↓	7①	↓	↓	3①	10	4	16	30
	4	↓	↓	↓	0	↓	↓	0	0	3	27	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		K	[illegible]	K	K	AWZ	AWZ	AWZ	K	K	K	K

Comments: ① ~~2~~ K dead eggs w/ fungus

Reviewed by: JOL **Date reviewed:** Nov-9/17

CETIS Analytical Report

Report Date: 19 Oct-17 20:21 (p 1 of 3)
Test Code: 171089f | 08-8019-6119

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	12-8500-6080	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 20:20	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes

Batch ID:	18-8508-3886	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	05 Oct-17 17:05	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	12 Oct-17 13:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 20h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample ID:	17-2466-1926	**Code:**	66CC40A6	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	80h (9 °C)	**Station:**	WL_BFWB_OUT_SP21_20171002_N		

Linear Regression Options

Model Function	Threshold Option	Threshold	Optimized	Pooled	Het Corr	Weighted
Log-Gompertz [log(-log(1-P)=A+B*log(X)]	Control Threshold	0.125	Yes	No	Yes	Yes

Regression Summary

Iters	LL	AICc	BIC	Mu	Sigma	Adj R2	F Stat	Critical	P-Value	Decision(α:5%)
8	-291.6	590.3	592.7	2.173		0.3866	0.07296	3.16	0.9737	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	50.6	N/A	N/A	1.976	NA	NA
EC10	65.74	N/A	N/A	1.521	NA	NA
EC15	76.97	N/A	N/A	1.299	NA	NA
EC20	86.38	N/A	N/A	1.158	NA	NA
EC25	94.74	N/A	N/A	1.055	NA	NA
EC40	~~116.8~~ >100	N/A	N/A	0.8565	NA	NA
EC50	~~130.5~~	N/A	N/A	0.7665	NA	NA

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
Threshold	0.1047	0.02566	0.05133	0.1581	4.08	0.0005	Significant Parameter
Slope	6.33	4.726	-3.498	16.16	1.339	0.1947	Non-Significant Parameter
Intercept	-13.76	9.357	-33.22	5.703	-1.47	0.1563	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	45.02618	45.02618	1	16.49	0.0006	Significant
Lack of Fit	0.6886835	0.2295612	3	0.07296	0.9737	Non-Significant
Pure Error	56.63476	3.146375	18			
Residual	57.32344	2.729688	21			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Goodness-of-Fit	Pearson Chi-Sq GOF	57.32	32.67	<0.0001	Significant Heterogenity
	Likelihood Ratio GOF	63.1	32.67	<0.0001	Significant Heterogenity
Variances	Bartlett Equality of Variance	2.976	11.07	0.7037	Equal Variances
	Mod Levene Equality of Variance	0.3749	2.773	0.8593	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9761	0.9169	0.8140	Normal Distribution
	Anderson-Darling A2 Normality	0.3245	2.492	0.5424	Normal Distribution

Salmonid Embryo Survival and Development Test — Nautilus Environmental

Analysis ID: 12-8500-6080 Endpoint: Proportion Normal CETIS Version: CETISv1.8.7
Analyzed: 19 Oct-17 20:20 Analysis: Linear Regression (MLE) Official Results: Yes

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.875	0.7667	1	0.04787	0.09574	10.94%	0.0%	105	120
6.25		4	0.9083	0.8333	0.9333	0.025	0.05	5.51%	-3.81%	109	120
12.5		4	0.9	0.7	0.9667	0.06667	0.1333	14.81%	-2.86%	108	120
25		4	0.8917	0.7667	1	0.05507	0.1101	12.35%	-1.91%	107	120
50		4	0.85	0.8	0.9667	0.03967	0.07935	9.34%	2.86%	102	120
100		4	0.6417	0.5	0.9	0.09065	0.1813	28.25%	26.67%	77	120

Proportion Normal Detail

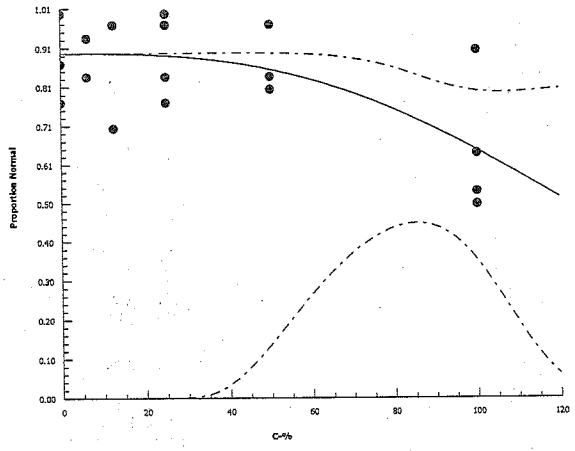
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.7667	0.8667	0.8667
6.25		0.9333	0.8333	0.9333	0.9333
12.5		0.9667	0.7	0.9667	0.9667
25		0.9667	0.7667	1	0.8333
50		0.9667	0.8	0.8333	0.8
100		0.5	0.6333	0.5333	0.9

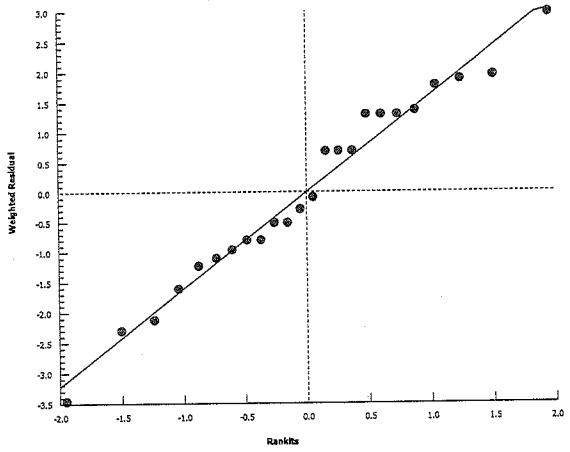
Proportion Normal Binomials

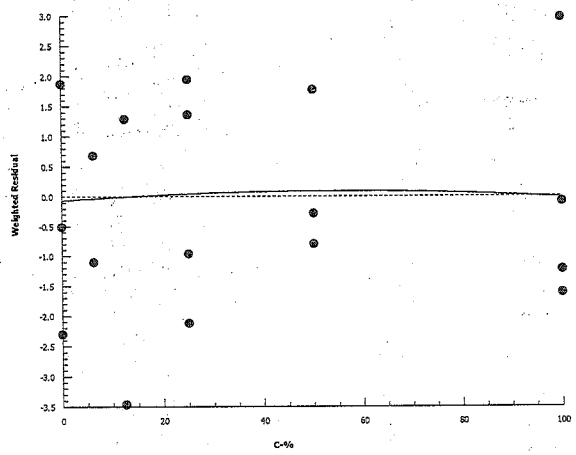
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	23/30	26/30	26/30
6.25		28/30	25/30	28/30	28/30
12.5		29/30	21/30	29/30	29/30
25		29/30	23/30	30/30	25/30
50		29/30	24/30	25/30	24/30
100		15/30	19/30	16/30	27/30

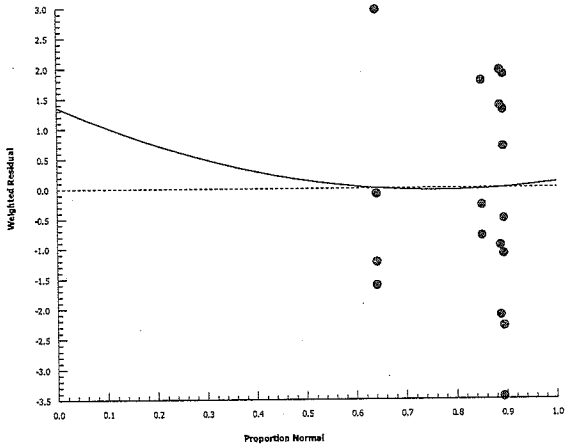
Analysis ID:	12-8500-6080	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 20:20	**Analysis:**	Linear Regression (MLE)	**Official Results:**	Yes

Graphics — Log-Gompertz [log(-log(1-P)=A+B*log(X)]









Client: Teck

W.O.#: 171089

Hardness and Alkalinity Datasheet

		Alkalinity						Hardness			
	Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
10	LC-LCDSS_LC_WS_2017-10-02_N	Oct 5/17	Oct 5/17	50	10.5	10.7	206	①10	6.6	660	AWZ
11	LC-DCL_WS_2017-10-02_N	Oct 5/17	Oct 5/17	50	9.7	9.9	190	①10	3.1	310	AWZ
12	LC-FRDSDC_WS_2017-10-02_N	Oct 5/17	Oct 5/17	50	10.3	10.5	202	①10	5.7	570	AWZ
13	LC-DCDS_WS_2017-10-02_N	Oct 5/17	Oct 5/17	50	7.6	7.8	148	①10	5.8	580	AWZ
14	LC-LCS_WS_2017-10-02_N	Oct 5/17	Oct 5/17	50	9.6	9.7	190	①10	6.1	610	AWZ
15	~~SP-21~~ WL_BFWB_OUT_SP21_20171002_N	Oct 5/17	Oct 5/17	50	17.4	17.7	~~17.1~~ AWZ 342	①10	12.2	1220	AWZ
	Dechlor	Oct 5/17	Oct 5/17	~~100~~ 50	0.6	0.7	10	100	1.1	11	AWZ

Notes: ① Sample diluted w/ DI water up to 100mL

Reviewed by: JGh Date Reviewed: Nov. 9/17

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: Oct 5/17 @ 1705h

Work Order No.: 171096

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: FR_UFR1_WS_2017-10-02_N_36 and GHER2-WS_2017-10-~~17~~ 02 N.
Sample Date: Oct 2/17
Date Received: Oct 3/17
Sample Volume: 11x20L and 8x20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 11
Alkalinity (mg/L $CaCO_3$): 10

Test Organism Information:

Batch No.: 100517
Source: Vancouver Island Trout Hatchery
Loading Density: 1.0~~0~~ g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE98
Stock Solution ID: 17503 (1000mg/L SDS)
Date Initiated: Oct 5/17
7-d EC50 (95% CL): 4.6 (4.1 – 5.3) mg/L SDS.

Reference Toxicant Mean and Range: 4.2 (~~x~~ 2.0 – 8.8) mg/L SDS
Reference Toxicant CV (%): 45

Test Results:

Embryo viability (mean ± SD)

	Sample ID		
	control	FR_UFR1_WS_2017-10-02_N_36	GHER2_WS_2017-10-02_N
EC25 % (v/v) (95% CL)	~~90~~ 90.0 ± 8.6	85.0 ± 12.5	89.2 ± ~~5.0~~ 9.2
EC50 % (v/v) (95% CL)			

Reviewed by: JGH

Date reviewed: Nov. 14/17

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (see below)
Work Order #: 171096

Start Date & Time: Oct 5 /17 @ 1705h
Stop Date & Time: Oct 12 /17 @ 1015h
CER #: 9
Test Species: *Oncorhynchus mykiss*

6(v/v) Concentration control	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	15.0	15.0	~~14~~ 13.5	15.0	13.5	15.0	14.0	14.0	14.0	14.5	14.5	15.0	14.5	14.5
DO (mg/L)	10.1	10.1	10.1	10.1	10.2	10.0	10.3	10.1	9.9	10.0	9.9	9.5	9.8	9.9
pH	6.8	6.8	6.8	6.8	6.8	6.9	6.9	6.8	6.9	6.8	6.8	7.0	7.2	6.7
Cond. (µS/cm)	~~2~~ 31	29		28		30		29		28		28		30
Initials	KL	KL		EMM		KL		KL		KL		KL		KL

100 Concentration ① FR_UFR1	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	~~15~~ 14.0	~~14~~ 13.5	15.0	13.5	14.0	14.0	14.0	14.0	14.0	14.5	~~15.0~~ 14.0	14.5	~~14~~ 14.5
DO (mg/L)	10.1	10.3	10.1	10.1	10.2	10.2	10.3	10.2	9.9	9.9	9.9	9.8	9.8	9.9
pH	8.2	8.3	8.2	8.2	8.1	8.2	8.3	8.2	8.4	8.4	8.4	8.4	8.3	8.4
Cond. (µS/cm)	363	369	2	369		356		355		361		359		358
Initials	KL	KL		EMM		KL		KL		KL		KL		KL

100 Concentration ② GH_ER2	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.5	13.5	14.0	14.0	14.0	14.0	14.0	14.5	14.0	14.5	14.5
DO (mg/L)	10.0	10.3	10.1	10.2	10.2	10.2	10.3	10.2	9.9	9.9	9.9	9.8	9.8	9.8
pH	8.2	8.3	8.1	8.2	~~6.8~~ ①	8.2	8.3	8.1	8.4	8.3	8.4	8.3	8.3	8.4
Cond. (µS/cm)	305	~~310~~ 307		310		301		300		305		306		302
Initials	KL	KL		EMM		KL		KL		KL		KL		KL

8.6m

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials						~~KL~~ KL		~~KL~~ KL						

Thermometer: CER9 DO meter/probe: 2 / 2 pH meter/probe: 3 / 3 Conductivity meter/probe: 2 / 2

	Control	~~100% (v/v)~~ FR_UFR1	GH_ER2	
Hardness*	11	192	160 KL	
Alkalinity*	10	146	148 KL	

* mg/L as CaCO3

Analysts: EMM, KL

Reviewed by: JOK
Date reviewed: Nov-8/17

Sample Description: ①② Clear, colourless, odourless, some particulates.

Comments:

Version 1.2 Issued July 19, 2017

Nautilus Environmental Company Inc.

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: (see below)
Work Order #: 171096

Start Date & Time: Oct 5 AM 1705h
Stop Date & Time: Oct 12 AM 1015h
Test Species: *Oncorhynchus mykiss*

Concentration % (v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
control	1	0	0	0	0	0	0	0	0	0	30	30
	2	↓	↓	↓	↓	0	↓	↓	0	4	26	30
	3	↓	↓	↓	↓	0	↓	↓	0	2	28	30
	4	↓	↓	↓	↓	0	↓	↓	0	6	24	30
FRUFR1 (100)	1	↓	↓	↓	↓	0	↓	↓	0	0	30	30
	2	↓	↓	↓	↓	1	1	↓	2	5	24	31
	3	↓	↓	1	↓	1	0	↓	2	1	27	30
	4	↓	↓	1	1	1	0	↓	3	5	21	29
FRLER2 (100)	1	↓	↓	0	0	0	0	↓	0	0	30	30
	2	↓	↓	1	1	0	2	↓	4	2	24	30
	3	↓	↓	1	0	0	0	↓	1	1	28	30
	4	↓	↓	0	1	1	0	↓	2	3	25	30
	1											
	2											
	3											
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	1											
	2											
	3											
	4											
Tech Initials		K	KM/M	K	K	K	K	K	K	K	K	K

Comments:

Reviewed by: JGH **Date reviewed:** Nov-8/17

CETIS Summary Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Batch ID:	07-6465-5792	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	05 Oct-17 17:05	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	12 Oct-17 10:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 17h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	09-7028-1525	05 Oct-17	05 Oct-17	17h	Teck Coal	
FR_UFR1	18-2543-6397	02 Oct-17 11:42	03 Oct-17 12:20	77h (9 °C)		
GH_ER2	10-5395-0543	02 Oct-17 10:40	03 Oct-17 12:20	78h (8.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	control	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_WS_2017-10-02_N_36		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2017-10-02_N		

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	0.9	0.763	1	0.8	1	0.04303	0.08607	9.56%	0.0%
FR_UFR1	4	0.8496	0.6513	1	0.7241	1	0.06231	0.1246	14.67%	5.6%
GH_ER2	4	0.8917	0.7456	1	0.8	1	0.0459	0.09179	10.29%	0.93%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1	0.8667	0.9333	0.8
FR_UFR1	1	0.7742	0.9	0.7241
GH_ER2	1	0.8	0.9333	0.8333

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	30/30	26/30	28/30	24/30
FR_UFR1	30/30	24/31	27/30	21/29
GH_ER2	30/30	24/30	28/30	25/30

CETIS Analytical Report

Test Code: 171096 | 16-1623-9940

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	18-1389-5928	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 19:36	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	07-6465-5792	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	05 Oct-17 17:05	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	12 Oct-17 10:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 17h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	09-7028-1525	05 Oct-17	05 Oct-17	17h	Teck Coal	
FR_UFR1	18-2543-6397	02 Oct-17 11:42	03 Oct-17 12:20	77h (9 °C)		
GH_ER2	10-5395-0543	02 Oct-17 10:40	03 Oct-17 12:20	78h (8.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	control	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_WS_2017-10-02_N_36		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2017-10-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	0.1646	0.3292	Exact	Non-Significant Effect
Control		GH_ER2	0.5	0.5000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Control	Negative Contr	108	12	120	0.9	0.1	0.0%
FR_UFR1		102	18	120	0.85	0.15	5.56%
GH_ER2		107	13	120	0.8917	0.1083	0.93%

Proportion Normal Detail

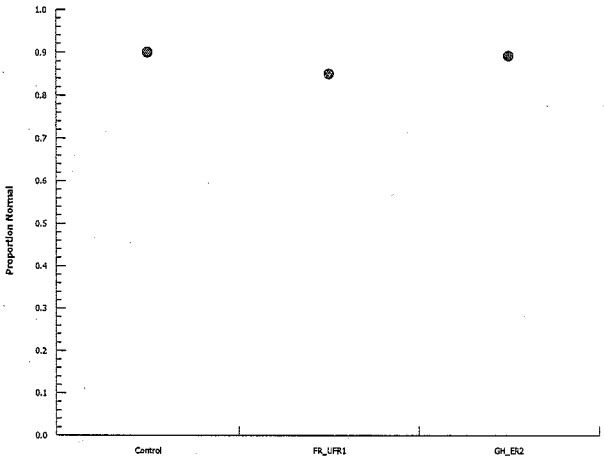
Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1	0.8667	0.9333	0.8
FR_UFR1	1	0.7742	0.9	0.7241
GH_ER2	1	0.8	0.9333	0.8333

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	30/30	26/30	28/30	24/30
FR_UFR1	30/30	24/31	27/30	21/29
GH_ER2	30/30	24/30	28/30	25/30

Analysis ID:	18-1389-5928	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 19:36	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Test Code: 171096 | 16-1623-9940

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	00-0975-1711	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	19 Oct-17 19:36	**Analysis:**	Single 2x2 Contingency Table	**Official Results:**	Yes
Batch ID:	07-6465-5792	**Test Type:**	Development	**Analyst:**	Kania Lywe
Start Date:	05 Oct-17 17:05	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	12 Oct-17 10:15	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 17h	**Source:**	Vancouver Island Trout Hatchery	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
FR_UFR1	18-2543-6397	02 Oct-17 11:42	03 Oct-17 12:20	77h (9 °C)	Teck Coal	
GH_ER2	10-5395-0543	02 Oct-17 10:40	03 Oct-17 12:20	78h (8.1 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_WS_2017-10-02_N_36		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2017-10-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
FR_UFR1		GH_ER2	1	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
FR_UFR1	Upstream Contr	102	18	120	0.85	0.15	0.0%
GH_ER2		107	13	120	0.8917	0.1083	-4.9%

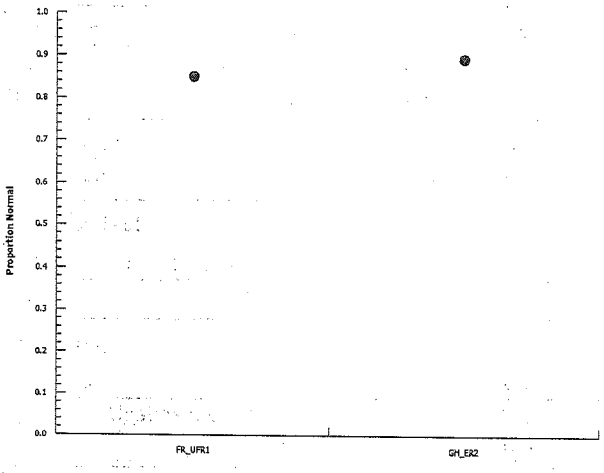
Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	1	0.7742	0.9	0.7241
GH_ER2	1	0.8	0.9333	0.8333

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
FR_UFR1	30/30	24/31	27/30	21/29
GH_ER2	30/30	24/30	28/30	25/30

Graphics



Client: Teck

W.O.#: 171096

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity (mg/L$CaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness (mg/L $CaCO_3$)	Technician
~~FR-UFR1_US_2017-10-03~~ FR-UFR1	Oct 5/17	Oct 5/17	~~100~~ 50	7.5	7.7	146	50	9.6	~~192~~ 192	AWZ
GHLER2	↓	↓	50	7.5	7.6	148	50	8.0	160	AWZ
Dechlor	↓	↓	50 ~~100~~	0.6	0.7	10	100	1.1	11	AWZ

Notes:

Reviewed by: JGh

Date Reviewed: Nov. 8/17

APPENDIX C – *Lemna minor* Toxicity Test Data

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 171088

Start Date: Oct 5 / 17
Set up by: JW

Sample Information:

Sample ID: ~~LEO~~ JW LC_LCDSSLCC_WS_2017_10_02_N
Sample Date: Oct 2 / 17
Date Received: Oct 3 / 17
Sample Volume: 8 x 20L

Test Organism Information:

Culture Date: ~~7 days~~ JW 092817
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (43 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: LM 151
Date Initiated: Sept 29 / 17

7-d No. of Fronds IC50 (95% CL): 3.8 (2.8 - 4.6) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.7 (3.0 - 4.6) g/L KCl CV (%): 11

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	65.2 (19.5 - 74.6)	~~69.4~~ 77.7 (20.0 - 92.9)
	IC50 %(v/v) (95% CL)	97.0 (68.4 JW - n/a)	JW >97

Reviewed by: [signature]
Date reviewed: Nov. 2, 2017

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck — **Setup by:** JW

Sample ID: ~~LCC~~ JW LC_LCDSSLCC-WS-2017-10-02-N — **Test Date:** Oct 5 / 17

Work Order No.: 171088 — **CER #:** 1

Culture Source: CPCC # 490 — **Test Species:** *Lemna minor*

Test Culture Age: 7 days — **> 8X Growth? (Y/N):** Y (43 fronds)

Light Intensity Range: 4100 - 5400 lux — **Date Measured:** Oct 5 / 17

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.5	23.0	24.5	25.0	25.0
Initials	MLT	MLT	MLT	VK	VK	MLT	MLT	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	23.0
DO (mg/L)	9.2	Nutrients added?[1]: Y →	8.2
pH	8.1		8.0
Conductivity (µS)	897		1667

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration	Temperature (°C)		pH		Conductivity (µS)
% (V/V)	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	25.0	8.3	8.2	878
JW 1.25	23.0	25.0	8.2	8.4	899
3	23.0	25.0	8.2	8.4	915
6.1	23.0	25.0	8.2	8.6	941
12.1	23.0	25.0	8.2	8.7	997
24.2	23.0	25.0	8.2	8.9	1098
48.5	23.0	25.0	8.1	9.2	1295
97	23.0	25.0	8.0	8.8	1667
Initials	JW	JW	JW	MLT	JW

Thermometer: 1 Light meter: 1 pH meter/probe: 1 / 1 DO meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

Sample Description: clear, colorless, odorless, some particulates.

Comments:

Reviewed: [signature] **Date Reviewed:** Nov 2, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW LEG_LC_LCDSSLCC_WS_2017-10-02_N
Work Order #: 1711088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	83										JW
	B	6	60										
	C	6	91										
	D	6	82										
1.5	A	6	88										
	B	6	100										
	C	6	89										
	D	6	73										
3	A	6	92										
	B	6	87										
	C	6	78										
	D	6	75										
6.1	A	6	86										
	B	6	85										
	C	6	62										
	D	6	82										
12.1	A	6	78										
	B	6	99										
	C	6	83										
	D	6	89										
24.2	A	6	103										
	B	6	113										
	C	6	86										
	D	6	84										

Comments:

Reviewed by:

Date Reviewed: Nov. 2, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW LEM-LC-LCDSSLCC-WS-2017-10-02-N
Work Order #: 171088

Start Date: Oct 5/17
Termination Date: Oct 12/17
Test set up by: JW

Concentration %o (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	101										JW
	B	6	59										
	C	6	85										
	D	6	52										
97	A	6	54		X	X							
	B	6	37		X	X							
	C	6	41		X	X							
	D	6	38		X	X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by:

Date Reviewed: Nov. 2, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: JW 120.LC-LCDSSLCC-WS-2017-10-02-N
WO #: 171088
Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Balance ID: Bal - 1

LCC Blank

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	1	1275.83	1283.03	JW
	B	2	1274.22	1279.40	
control	C	3	1281.14	1289.30	
	D	4	1275.23	1282.42	
	A	5	1277.91	1285.19	
	B	6	1276.35	1284.83	
1.5	C	7	1278.14	1285.48	
	D	8	1273.33	1280.16	
	A	9	1264.90	1272.79	
	B	10	1275.26	1282.46	
3	C	11	1268.35	1275.50	
	D	12	1278.59	1285.21	
	A	13	1278.82	1286.01	
	B	14	1266.68	1274.14	
6.1	C	15	1270.18	1275.74	
	D	16	1274.76	1281.53	
	A	17	1276.69	1283.18	
	B	18	1269.67	1278.39	
12.1	C	19	1273.20	1281.04	
	D	20	1269.38	1276.44	
	A	21	1274.89	1282.66	
	B	22	1271.60	1280.26	
24.2	C	23	1275.27	1282.37	
	D	24	1276.54	1283.93	
	A	25	1272.87	1280.89	
	B	26	1273.44	1279.22	
48.5	C	27	1268.96	1275.65	
	D	28	1274.08	1278.85	✓

Comments: 10 % Re-weigh = # 9: 1273.30 mg # 19: 1281.55 mg
26: 1279.60 mg # 31: 1277.42 mg

Reviewed by:

Date Reviewed: Nov. 2, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Start Date: Oct 5 / 17
Sample ID: JW 160-LC-LCDSSLCC-WS-2017-10-02-N
Termination Date: Oct 12 / 17
WO #: 171088
Balance ID: Bal - 1

LCC Black

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	1273.02	1277.84	JW
	B	30	1276.33	1280.79	↓
97	C	31	1272.16	1277.06	↓
	D	32	JW ~~1275~~ 1273.75	1278.26	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]
Date Reviewed: Nov 2, 2017

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-5869-2675	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 18:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	14-4545-9701	**Code:**	5627F6F5	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:14	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	63h (8.2 °C)	**Station:**	LC_LCDSSLCC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	988285	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	31.09	N/A	64.43	3.217	1.552	NA
IC10	39.86	21.07	65.1	2.509	1.536	4.745
IC15	49.38	20.6	65.71	2.025	1.522	4.855
IC20	53.86	23.5	69.77	1.857	1.433	4.256
IC25	58.75	26.23	74.06	1.702	1.35	3.813
IC40	76.18	40.38	97.97	1.313	1.021	2.476
IC50	90.55	70.36	N/A	1.104	NA	1.421

Frond Count Summary

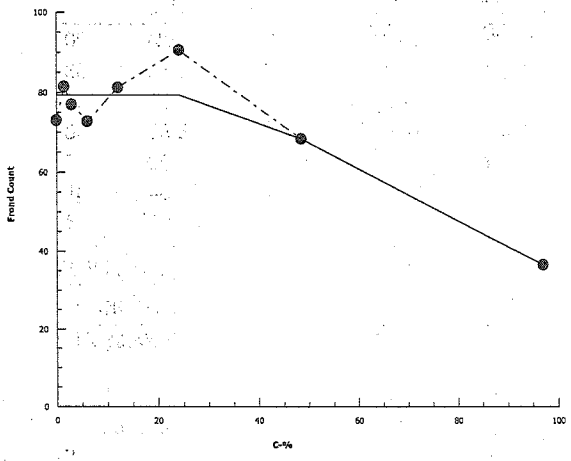
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	73	54	85	6.646	13.29	18.21%	0.0%
1.5		4	81.5	67	94	5.545	11.09	13.61%	-11.64%
3		4	77	69	86	3.937	7.874	10.23%	-5.48%
6.1		4	72.75	56	80	5.648	11.3	15.53%	0.34%
12.1		4	81.25	72	93	4.516	9.032	11.12%	-11.3%
24.2		4	90.5	78	107	6.958	13.92	15.38%	-23.97%
48.5		4	68.25	46	95	11.4	22.79	33.4%	6.51%
97		4	36.5	31	48	3.926	7.853	21.51%	50.0%

Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	77	54	85	76
1.5		82	94	83	67
3		86	81	72	69
6.1		80	79	56	76
12.1		72	93	77	83
24.2		97	107	80	78
48.5		95	53	79	46
97		48	31	35	32

Analysis ID:	00-5869-2675	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 18:56	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



CETIS Analytical Report

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	10-2839-9381	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	01-7578-9633	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	12 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	19 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	
Sample ID:	16-4401-7416	**Code:**	61FDB708	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:14	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	9d 15h	**Station:**	LC_LCDSSLCC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1477426	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	41.22	N/A	58.48	2.426	1.71	NA
IC10	51.29	N/A	58.69	1.95	1.704	NA
IC15	55.56	N/A	63.27	1.8	1.58	NA
IC20	60.18	1.496	68.24	1.662	1.465	66.86
IC25	65.18	19.54	74.58	1.534	1.341	5.117
IC40	82.76	40.51	104.4	1.208	0.9577	2.468
IC50	97	68.39	N/A	1.031	NA	1.462

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	73	54	85	6.646	13.29	18.21%	0.0%
1.5		4	73	54	85	6.646	13.29	18.21%	0.0%
3		4	73	54	85	6.646	13.29	18.21%	0.0%
6.1		4	72.75	56	80	5.648	11.3	15.53%	0.34%
12.1		4	73	54	85	6.646	13.29	18.21%	0.0%
24.2		4	73	54	85	6.646	13.29	18.21%	0.0%
48.5		4	68.25	46	95	11.4	22.79	33.4%	6.51%
97		4	36.5	31	48	3.926	7.853	21.51%	50.0%

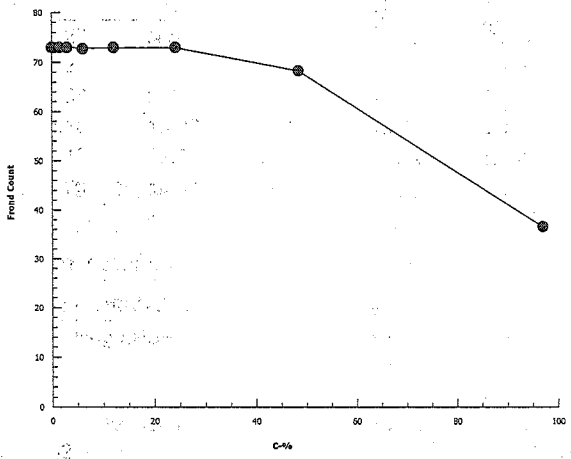
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	77	54	85	76
1.5		77	54	85	76
3		77	54	85	76
6.1		80	79	56	76
12.1		77	54	85	76
24.2		77	54	85	76
48.5		95	53	79	46
97		48	31	35	32

NW 2/17

Analysis ID:	10-2839-9381	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



NN 2/17

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-0319-6920	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 18:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	14-4545-9701	**Code:**	5627F6F5	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:14	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	63h (8.2 °C)	**Station:**	LC_LCDSSLCC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	273417	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	31.41	N/A	66.53	3.183	1.503	NA
IC10	40.69	17.81	69.79	2.457	1.433	5.616
IC15	50.95	20.39	73.43	1.963	1.362	4.903
IC20	59.45	24.1	80.18	1.682	1.247	4.149
IC25	69.35	26.11	86.64	1.442	1.154	3.829
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.933	5.18	8.16	0.6269	1.254	18.09%	0.0%
1.5		4	7.482	6.83	8.48	0.3514	0.7028	9.39%	-7.93%
3		4	7.34	7.12	7.89	0.1841	0.3682	5.02%	-5.88%
6.1		4	6.745	5.56	7.46	0.4197	0.8395	12.45%	2.71%
12.1		4	7.528	6.49	8.72	0.4843	0.9686	12.87%	-8.58%
24.2		4	7.73	7.1	8.66	0.339	0.678	8.77%	-11.5%
48.5		4	6.315	4.77	8.02	0.6905	1.381	21.87%	8.91%
97		4	4.673	4.46	4.9	0.1099	0.2199	4.71%	32.6%

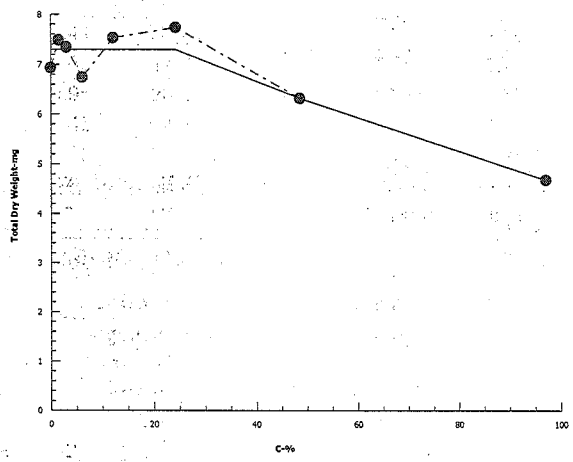
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.2	5.18	8.16	7.19
1.5		7.28	8.48	7.34	6.83
3		7.89	7.2	7.15	7.12
6.1		7.19	7.46	5.56	6.77
12.1		6.49	8.72	7.84	7.06
24.2		7.77	8.66	7.1	7.39
48.5		8.02	5.78	6.69	4.77
97		4.82	4.46	4.9	4.51

NN 2/17

Analysis ID:	04-0319-6920	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 18:52	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



NW. 2/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	20-9947-1358	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:02	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	01-7578-9633	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	12 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	19 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	
Sample ID:	16-4401-7416	**Code:**	61FDB708	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:14	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	9d 15h	**Station:**	LC_LCDSSLCC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2107849	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	34.6	N/A	65.94	2.89	1.517	NA
IC10	50.08	N/A	67.14	1.997	1.489	NA
IC15	58	N/A	74.02	1.724	1.351	NA
IC20	67.15	14.23	82.06	1.489	1.219	7.028
IC25	77.72	20.04	92.87	1.287	1.077	4.99
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.933	5.18	8.16	0.6269	1.254	18.09%	0.0%
1.5		4	6.933	5.18	8.16	0.6269	1.254	18.09%	0.0%
3		4	6.933	5.18	8.16	0.6269	1.254	18.09%	0.0%
6.1		4	6.745	5.56	7.46	0.4197	0.8395	12.45%	2.71%
12.1		4	6.933	5.18	8.16	0.6269	1.254	18.09%	0.0%
24.2		4	6.933	5.18	8.16	0.6269	1.254	18.09%	0.0%
48.5		4	6.315	4.77	8.02	0.6905	1.381	21.87%	8.91%
97		4	4.673	4.46	4.9	0.1099	0.2199	4.71%	32.6%

Total Dry Weight-mg Detail

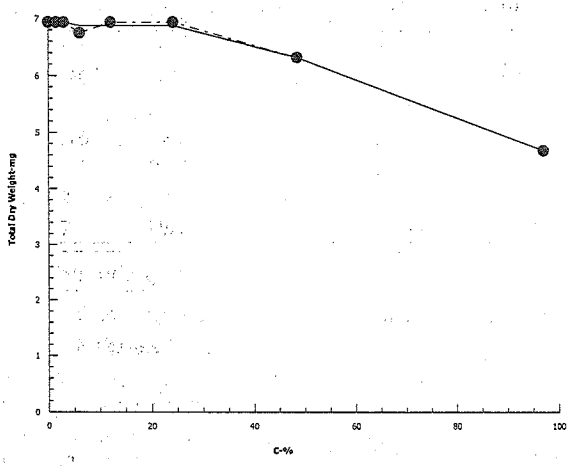
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.2	5.18	8.16	7.19
1.5		7.2	5.18	8.16	7.19
3		7.2	5.18	8.16	7.19
6.1		7.19	7.46	5.56	6.77
12.1		7.2	5.18	8.16	7.19
24.2		7.2	5.18	8.16	7.19
48.5		8.02	5.78	6.69	4.77
97		4.82	4.46	4.9	4.51

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	20-9947-1358	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:02	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Nov 2/17

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 171088

Start Date: Oct 5 / 17
Set up by: JW

Sample Information:

JW
Sample ID: ~~LCO~~ LC-OCT-WS-2017-10-02-N
Sample Date: Oct 2 / 17
Date Received: Oct 3 / 17
Sample Volume: 5 x 20L

Test Organism Information:

JW
Culture Date: ~~7 days~~ 092817
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (43 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: LM 151
Date Initiated: Sept 29 / 17

7-d No. of Fronds IC50 (95% CL): 3.8 (2.8 - 4.6) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.7 (3.0 - 4.6) g/L KCl CV (%): 11

Test Results:	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	> 97	> 97
IC50 %(v/v) (95% CL)	> 97	> 97

Reviewed by: [signature]

Date reviewed: Nov. 2, 2017

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck — **Setup by:** JW

Sample ID: JW LEG-LC-OC1-WS-2017-10-02-N — **Test Date:** Oct 5 / 17

Work Order No.: 1710B8 — **CER #:** 1

Culture Source: CPCC # 490 — **Test Species:** *Lemna minor*

Test Culture Age: 7 days — **> 8X Growth? (Y/N):** Y (43 fronds)

Light Intensity Range: 4010 - 4900 lux — **Date Measured:** Oct 5 / 17

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.5	23.0	24.5	25.0	25.0
Initials	MLT	MLT	MLT	VK	VK	MLT	MLT	JW

Sample Characteristics: **Initial Water Quality**

	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	23.0
DO (mg/L)	9.1	Nutrients added?[1]: Y →	8.4
pH	8.2		8.1
Conductivity (µS)	369		1192

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration	Temperature (°C)		pH		Conductivity (µS)
% (V / V)	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	25.0	8.3	8.4	878
JW 1.9 5	23.0	25.0	8.2	8.5	895
3	23.0	25.0	8.2	8.6	901
6.1	23.0	25.0	8.2	8.9	910
12.1	23.0	25.0	8.2	9.1	930
24.2	23.0	25.0	8.2	9.3	967
48.5	23.0	25.0	8.2	9.6	1046
97	23.0	25.0	8.1	9.6	1192
Initials	JW	JW	JW	MLT	JW

Thermometer: 1 Light meter: 1 pH meter/probe: 1 / 1 DO meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

Sample Description: Clear, colorless, odorless, some particulates

Comments:

Reviewed: [signature] **Date Reviewed:** Nov. 2, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW ~~LEO~~ LC-DC1-WS-2017-10-02 N
Work Order #: 1711088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	65										JW
	B	6	97										
	C	6	95										
	D	6	68										
1.5	A	6	62										
	B	6	84										
	C	6	79										
	D	6	75										
3	A	6	60										
	B	6	58										
	C	6	66										
	D	6	70										
6.1	A	6	61										
	B	6	79										
	C	6	84										
	D	6	64										
12.1	A	6	68										
	B	6	61										
	C	6	55										
	D	6	102										
24.2	A	6	66										
	B	6	93										
	C	6	76										
	D	6	70										✓

Comments:

Reviewed by:

Date Reviewed: Nov. 2, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW LEO-LC-DC1-WS-2017-10-02-N
Work Order #: 1710188

Start Date: Oct 5/17
Termination Date: Oct 12/17
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	55										JW
	B	6	72										
	C	6	76										
	D	6	65										
97	A	6	73										
	B	6	53										
	C	6	52										
	D	6	64										
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by:

Date Reviewed: Nov. 2, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: JW LEO-LC-DC1-WS-2017-10-02-N
WO #: 171088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Balance ID: Bal - 1

DC1 Black

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	1	1278.47	1283.47	JW
	B	2	JW ~~1278.65~~ 1282.92	1290.45	
control	C	3	1280.81	1288.50	
	D	4	1278.57	1283.35	
	A	5	1269.12	1274.13	
	B	6	1271.99	1278.49	
1.5	C	7	1275.76	1281.77	
	D	8	1280.42	1286.81	
	A	9	1273.67	1278.71	
	B	10	1277.20	1281.96	
3	C	11	1275.65	1280.31	
	D	12	1275.24	1280.86	
	A	13	1277.49	1283.32	
	B	14	1276.26	1282.26	
6.1	C	15	1274.95	1282.46	
	D	16	1272.78	1277.88	
	A	17	1274.97	1280.89	
	B	18	1276.59	1282.23	
12.1	C	19	1274.98	1279.47	
	D	20	1280.03	1288.27	
	A	21	1273.53	1279.16	
	B	22	1274.01	1282.06	
24.2	C	23	1269.96	1272.38	
	D	24	1269.37	1275.42	
	A	25	1275.18	1278.47	
	B	26	1267.16	1273.51	
48.5	C	27	1266.07	1272.52	
	D	28	1270.59	1275.91	↓

Comments: 10 % Re-weigh = # 6 : 1278.81 mg # 12: 1280.97 mg
24 : 1275.56 mg # 32 : 1285.47 mg

Reviewed by:

Date Reviewed: Nov. 2, 2017

DC1

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: JW ~~LC~~ LC - DC1 - WS - 2017 - 10 - 02 - N
WO #: 171088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Balance ID: Bal - 1

DC1 Black

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	1267.27	1273.24	JW
	B	30	1270.24	1275.10	↓
97	C	31	1267.87	1271.93	↓
	D	32	1280.19	1285.44	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: Nov. 2, 2017

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-2258-6320	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:27	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-1973-7755	**Code:**	3CC7F69B	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:51	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	59h (8 °C)	**Station:**	LC_DC1_WS_2017-10-02_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
4	-96.57	197.6	200.1	0.0643	Yes	1.001	2.508	0.4477	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	24.96	N/A	60.01	4.007	1.666	NA
IC10	51.26	4.352	103.2	1.951	0.9691	22.98
IC15	79.08	8.064	162.3	1.265	0.6163	12.4
IC20	108.6	10.55	231.5	0.921	0.4321	~~9.476~~
IC25	140	13.81	310.8	0.7144	0.3218	7.242
IC40	248.5	34.18	641	0.4023	0.156	2.926
IC50	~~337.3~~	60.55	1044	0.2965	0.0958	1.651

> 97 % (V/V) JW

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	67.7	2.912	61.99	73.41	23.25	<0.0001	Significant Parameter
D	337.3	201.5	-57.77	732.3	1.673	0.1047	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	513.3998	513.3998	1	3.129	0.0871	Non-Significant
Lack of Fit	984.9752	164.1625	6	1.001	0.4477	Non-Significant
Pure Error	3937.5	164.0625	24			
Residual	4922.475	164.0825	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	5.523	14.07	0.5965	Equal Variances
	Mod Levene Equality of Variance	0.9411	2.423	0.4941	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9385	0.9338	0.0680	Normal Distribution
	Anderson-Darling A2 Normality	0.6562	2.492	0.0871	Normal Distribution

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	75.25	59	91	8.548	17.1	22.72%	0.0%
1.5		4	69	56	78	4.708	9.416	13.65%	8.31%
3		4	55	50	64	3.109	6.218	11.31%	26.91%
6.1		4	66	55	78	5.612	11.22	17.01%	12.29%
12.1		4	65.5	49	96	10.51	21.02	32.09%	12.96%
24.2		4	70.25	60	87	5.949	11.9	16.94%	6.65%
48.5		4	61	49	70	4.601	9.201	15.08%	18.94%
97		4	54.5	46	67	4.975	9.95	18.26%	27.57%

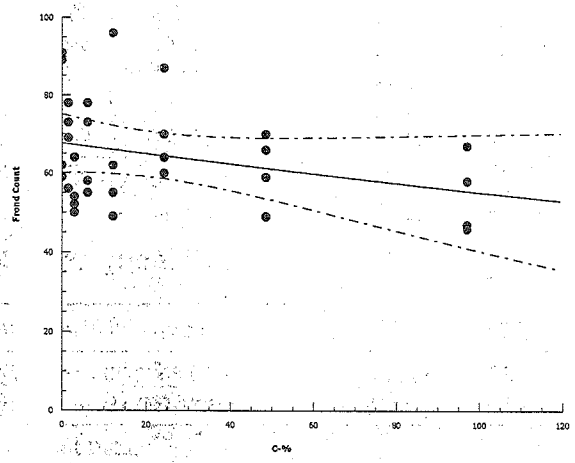
Lemna Growth Inhibition Test — **Nautilus Environmental**

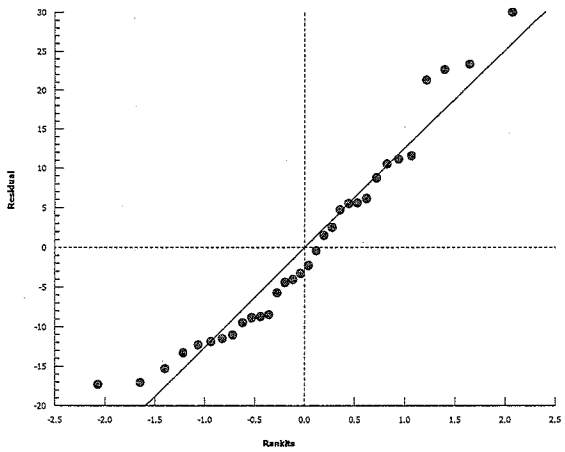
Analysis ID:	05-2258-6320	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:27	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes

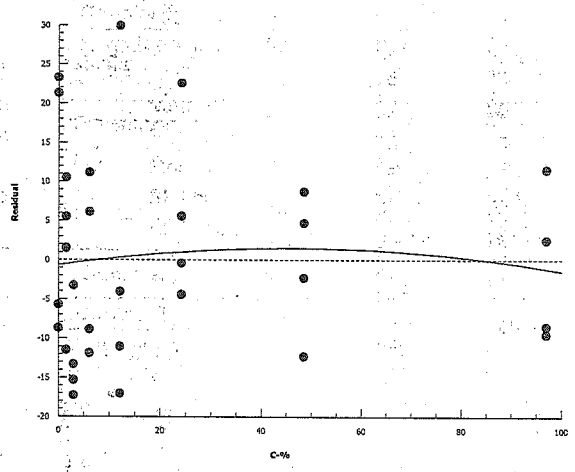
Frond Count Detail

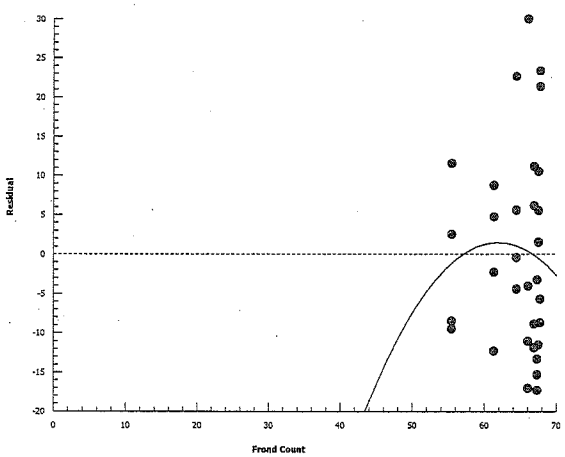
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	59	91	89	62
1.5		56	78	73	69
3		54	52	50	64
6.1		55	73	78	58
12.1		62	55	49	96
24.2		60	87	70	64
48.5		49	66	70	59
97		67	47	46	58

Graphics — 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-0257-7617	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:31	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	10-1973-7755	**Code:**	3CC7F69B	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:51	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	59h (8 °C)	**Station:**	LC_DC1_WS_2017-10-02_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
4	-18.85	42.11	44.63	0.0350	Yes	0.8438	2.508	0.5489	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	31.27	N/A	76.47	3.198	1.308	NA
IC10	64.23	N/A	142.6	1.557	0.7012	NA
IC15	99.07	N/A	229.8	1.009	0.4352	NA
IC20	136	N/A	331.9	0.7352	0.3013	NA
IC25	175.4	N/A	451.2	0.5702	0.2216	NA
IC40	311.4	N/A	998.8	0.3211	0.1001	NA
IC50	422.5	20.83	2069	0.2367	0.04834	4.802

JW

> 99 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	6.02	0.2556	5.519	6.521	23.56	<0.0001	Significant Parameter
D	422.5	304.5	-174.3	1019	1.388	0.1755	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	2.707181	2.707181	1	2.124	0.1554	Non-Significant
Lack of Fit	6.660526	1.110088	6	0.8438	0.5489	Non-Significant
Pure Error	31.57529	1.315637	24			
Residual	38.23582	1.274527	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	6.384	14.07	0.4957	Equal Variances
	Mod Levene Equality of Variance	0.9981	2.423	0.4566	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.972	0.9338	0.5565	Normal Distribution
	Anderson-Darling A2 Normality	0.3709	2.492	0.4280	Normal Distribution

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.25	4.78	7.69	0.7871	1.574	25.19%	0.0%
1.5		4	5.978	5.01	6.5	0.3391	0.6783	11.35%	4.36%
3		4	5.02	4.66	5.62	0.2156	0.4311	8.59%	19.68%
6.1		4	6.11	5.1	7.51	0.5059	1.012	16.56%	2.24%
12.1		4	6.073	4.49	8.24	0.786	1.572	25.89%	2.84%
24.2		4	6.538	5.63	8.05	0.5294	1.059	16.19%	-4.6%
48.5		4	5.353	3.29	6.45	0.7334	1.467	27.4%	14.36%
97		4	5.035	4.06	5.97	0.3981	0.7961	15.81%	19.44%

NN 2/17

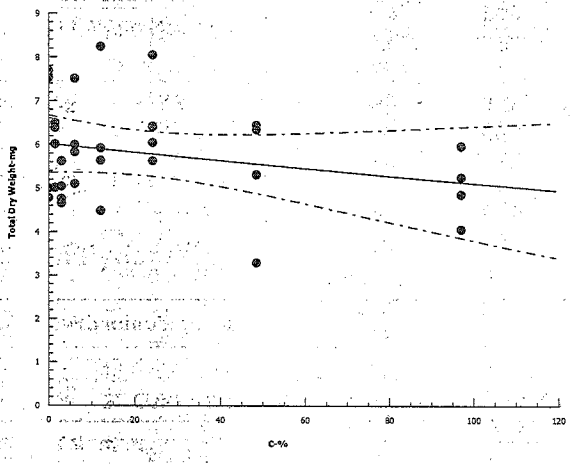
Lemna Growth Inhibition Test — **Nautilus Environmental**

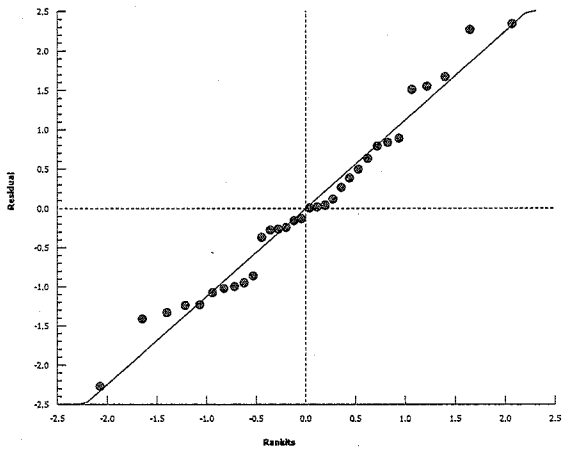
Analysis ID: 16-0257-7617 **Endpoint:** Total Dry Weight-mg **CETIS Version:** CETISv1.8.7
Analyzed: 27 Oct-17 19:31 **Analysis:** Nonlinear Regression **Official Results:** Yes

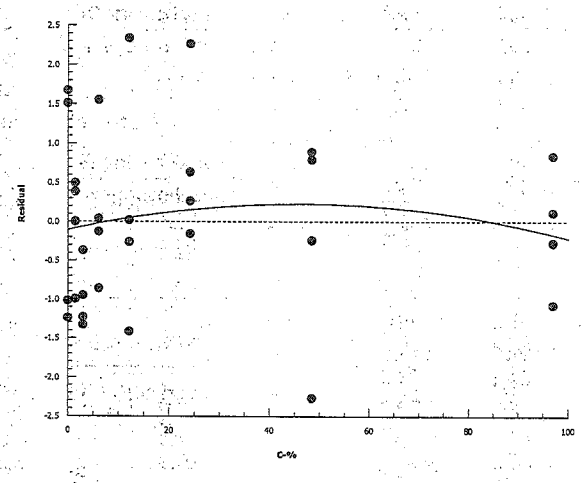
Total Dry Weight-mg Detail

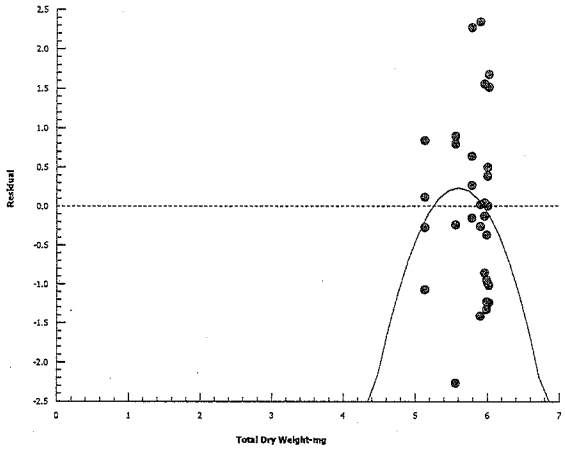
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	5	7.53	7.69	4.78
1.5		5.01	6.5	6.01	6.39
3		5.04	4.76	4.66	5.62
6.1		5.83	6	7.51	5.1
12.1		5.92	5.64	4.49	8.24
24.2		5.63	8.05	6.42	6.05
48.5		3.29	6.35	6.45	5.32
97		5.97	4.86	4.06	5.25

Graphics 2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









NOV. 2/17

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 171088

Start Date: Oct 5 / 17
Set up by: JW

Sample Information:

Sample ID: ~~LCO~~ LC - FRDSDC - WS - 2017 - 10-02 - N
Sample Date: Oct 2 / 17
Date Received: Oct 3 / 17
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: ~~7 days~~ JW 092817
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (43 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 151
Date Initiated: Sept 29 / 17

7-d No. of Fronds IC50 (95% CL): 3.8 (2.8 - 4.6) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.7 (3.0 - 4.6) g/L KCl CV (%): 11

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	JW ~~66.6 (49.8 - 79.2)~~ ① 71.8 (56.6 - 93.8)	90.9 (58.3 - n/a)
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: Nov. 3, 2017

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck — **Setup by:** JW

Sample ID: ~~L20~~ JW LC - FRDSDC - WS - 2017-10-09 . N — **Test Date:** Oct 5 / 17

Work Order No.: 171088 — **CER #:** 1

Culture Source: CPCC # 490 — **Test Species:** *Lemna minor*

Test Culture Age: 7 days — **> 8X Growth? (Y/N):** Y (43 fronds)

Light Intensity Range: 4100 - 5300 lux — **Date Measured:** Oct 5 / 17

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.5	23.0	24.5	25.0	25.0
Initials	MLT	MLT	MLT	K	K	MLT	MLT	JW

Sample Characteristics: **Initial Water Quality**

	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	23.0
DO (mg/L)	9.3	Nutrients added?[1]: Y →	8.4
pH	8.1		8.0
Conductivity (µS)	785		1963

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration	Temperature (°C)		pH		Conductivity (µS)
% (V / V)	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.5	8.3	8.6	878
JW 1.95	23.0	24.5	8.2	8.6	888
3	23.0	24.5	8.2	8.7	910
6.1	23.0	24.5	8.2	8.8	933
12.1	23.0	24.5	8.2	8.8	980
24.2	23.0	24.5	8.2	9.1	1071
48.5	23.0	24.5	8.2	9.2	1245
97	23.0	24.5	8.0	9.2	1563
Initials	JW	JW	JW	JW	JW

Thermometer: 1 Light meter: 1 pH meter/probe: 1 / 1 DO meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

Sample Description: clear, colorless, odorless, some particulates .

Comments:

Reviewed: [signature] **Date Reviewed:** Nov. 2, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW Lem_LC_FRDSDC_WS_2017-10-02_N
Work Order #: 1711088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	69										JW
	B	6	72										
	C	6	62										
	D	6	77										
1.5	A	6	94										
	B	6	94										
	C	6	83										
	D	6	66										
3	A	6	75										
	B	6	68										
	C	6	69										
	D	6	85										
6.1	A	6	59										
	B	6	77L	JW									
	C	6	70										
	D	6	63										
12.1	A	6	77										
	B	6	102										
	C	6	72										
	D	6	67										
24.2	A	6	63										
	B	6	84										
	C	6	63										
	D	6	60										

Comments:

Reviewed by: [signature]

Date Reviewed: NOV. 2, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW ~~LEC~~ - LC - FRDSDC - WS - 2017-10-02-N
Work Order #: 171088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	65										JW
	B	6	98										
	C	6	81										
	D	6	74										
97	A	6	41		x	x							
	B	6	55		x	x							
	C	6	39		x	x							
	D	6	37		x	x							↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: Nov. 2, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: JW ~~LCC~~ LC-FRDSDC-WS-2017-10-02-N
WO #: 171088
Start Date: Oct 5/17
Termination Date: Oct 12/17
Balance ID: Bal - 1

DSDC Black

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	1	1273.17	1279.34	JW
	B	2	1276.85	1283.10	
control	C	3	1282.27	1288.25	
	D	4	1274.78	1281.45	
	A	5	1279.83	1287.75	
	B	6	1280.15	1288.33	
1.5	C	7	1281.58	1288.51	
	D	8	1280.75	1286.37	
	A	9	1278.18	1284.40	
	B	10	1278.15	1283.85	
3	C	11	1275.12	1280.76	
	D	12	1271.64	1279.01	
	A	13	1272.81	1277.71	
	B	14	1274.60	1280.18	
6.1	C	15	1274.83	1281.18	
	D	16	1276.15	1282.82	
	A	17	1273.71	1280.35	
	B	18	1273.78	1282.02	
12.1	C	19	1277.41	1283.58	
	D	20	1274.70	1280.21	
	A	21	1273.73	1279.70	
	B	22	1277.48	1285.58	
24.2	C	23	1275.41	1280.92	
	D	24	1276.77	1281.61	
	A	25	1272.83	1279.03	
	B	26	1268.44	1277.08	
48.5	C	27	1279.58	1286.90	
	D	28	1275.61	1281.96	✓

Comments: 10 % Re-weigh = # 6: 1289.03 mg # 17: 1280.75 mg
#25: 1279.40 mg # 32: 1279.68 mg

Reviewed by: [signature]
Date Reviewed: Nov. 2, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Start Date: Oct 5 / 19
Sample ID: JW LEO-LC-FRDSDC-WS-2017-10-02-N
Termination Date: Oct 12 / 19
WO #: 171088
Balance ID: Bal - 1

JW FRDSDC BLOCK

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	1271.83	1276.19	JW
	B	30	1277.90	1283.69	
97	C	31	1274.98	1279.75	
	D	32	1275.07	1279.73	
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by:

Date Reviewed: Nov. 2, 2017

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	11-8724-6063	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:37	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	02-3018-8233	**Code:**	DB864C9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 10:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	62h (7.8 °C)	**Station:**	LC_FRDSDC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2026879	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	4.559	0.4596	81.2	21.93	1.232	217.6
IC10	52.05	N/A	59.83	1.921	1.672	NA
IC15	56.52	N/A	66.5	1.769	1.504	NA
IC20	61.36	44.22	72.57	1.63	1.378	2.262
IC25	66.6	49.81	79.19	1.501	1.263	2.007
IC40	85.15	67.17	N/A	1.174	NA	1.489
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	64	56	71	3.136	6.272	9.8%	0.0%
1.5		4	78.25	60	88	6.613	13.23	16.9%	-22.27%
3		4	68.25	62	79	3.902	7.805	11.44%	-6.64%
6.1		4	59.75	53	65	2.869	5.737	9.6%	6.64%
12.1		4	73.5	61	96	7.773	15.55	21.15%	-14.84%
24.2		4	61.5	54	78	5.545	11.09	18.03%	3.91%
48.5		4	73.5	59	92	6.982	13.96	19.0%	-14.84%
97		4	37	31	49	4.082	8.165	22.07%	42.19%

Frond Count Detail

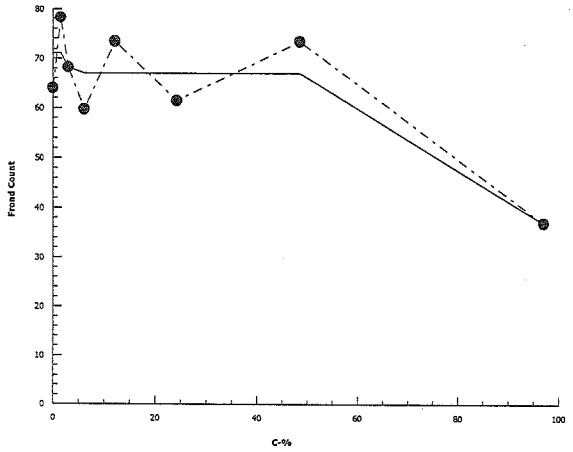
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	63	66	56	71
1.5		88	88	77	60
3		69	62	63	79
6.1		53	65	64	57
12.1		71	96	66	61
24.2		57	78	57	54
48.5		59	92	75	68
97		35	49	33	31

NN 3/17

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	11-8724-6063	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:37	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



NN 3/19

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-0717-7846	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Nov-17 17:57	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	07-7526-2277	**Code:**	2E359045	**Client:**	Teck Coal
Sample Date:	02 Oct-17 10:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	62h	**Station:**	LC_FRDSDC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1462894	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	50.56	N/A	54.31	1.978	1.841	NA
IC10	55.21	N/A	61.22	1.811	1.634	NA
IC15	60.28	42.59	69.99	1.659	1.429	2.348
IC20	65.81	49	81.09	1.52	1.233	2.041
IC25	71.83	56.6	93.82	1.392	1.066	1.767
IC40	93.37	72.86	N/A	1.071	NA	1.372
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	64	56	71	3.136	6.272	9.8%	0.0%
1.5		4	64	56	71	3.136	6.272	9.8%	0.0%
3		4	64	56	71	3.136	6.272	9.8%	0.0%
6.1		4	59.75	53	65	2.869	5.737	9.6%	6.64%
12.1		4	64	56	71	3.136	6.272	9.8%	0.0%
24.2		4	61.5	54	78	5.545	11.09	18.03%	3.91%
48.5		4	64	56	71	3.136	6.272	9.8%	0.0%
97		4	37	31	49	4.082	8.165	22.07%	42.19%

Frond Count Detail

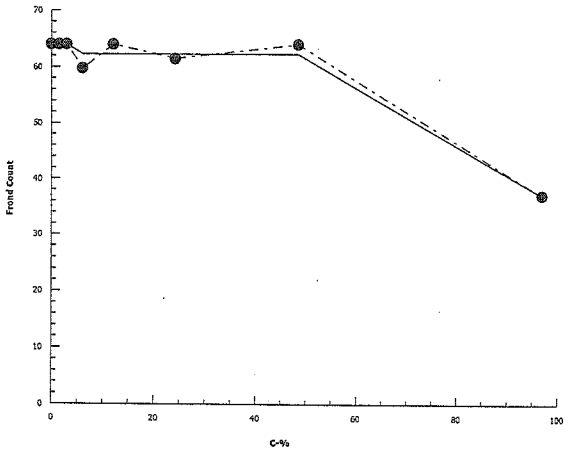
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	63	66	56	71
1.5		63	66	56	71
3		63	66	56	71
6.1		53	65	64	57
12.1		63	66	56	71
24.2		57	78	57	54
48.5		63	66	56	71
97		35	49	33	31

Nov-3/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-0717-7846	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	02 Nov-17 17:57	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



NN 3/7

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-1349-0659	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	02-3018-8233	**Code:**	DB864C9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 10:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	62h (7.8 °C)	**Station:**	LC_FRDSDC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	859690	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	48.88	N/A	61.2	2.046	1.634	NA
IC10	57.11	N/A	74.13	1.751	1.349	NA
IC15	66.7	39.88	93.65	1.499	1.068	2.507
IC20	77.88	48.68	N/A	1.284	NA	2.054
IC25	90.9	58.33	N/A	1.1	NA	1.714
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.267	5.98	6.67	0.1456	0.2912	4.65%	0.0%
1.5		4	7.163	5.62	8.18	0.5804	1.161	16.21%	-14.28%
3		4	6.232	5.64	7.37	0.4009	0.8018	12.87%	0.56%
6.1		4	5.875	4.9	6.67	0.3974	0.7949	13.53%	6.26%
12.1		4	6.64	5.51	8.24	0.5815	1.163	17.52%	-5.94%
24.2		4	6.105	4.84	8.1	0.7043	1.409	23.07%	2.59%
48.5		4	7.128	6.2	8.64	0.5619	1.124	15.77%	-13.72%
97		4	4.895	4.36	5.79	0.3106	0.6213	12.69%	21.9%

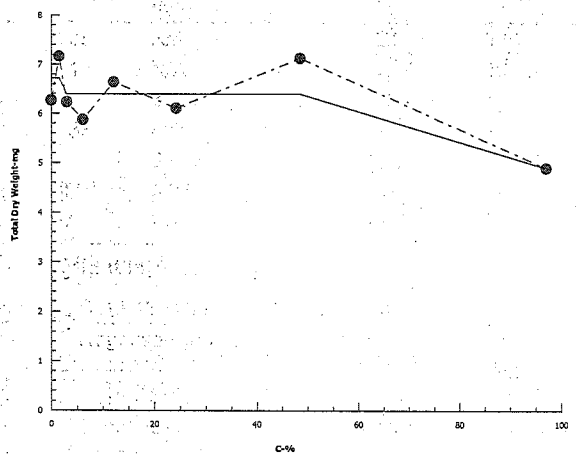
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.17	6.25	5.98	6.67
1.5		7.92	8.18	6.93	5.62
3		6.22	5.7	5.64	7.37
6.1		4.9	5.58	6.35	6.67
12.1		6.64	8.24	6.17	5.51
24.2		5.97	8.1	5.51	4.84
48.5		6.2	8.64	7.32	6.35
97		4.36	5.79	4.77	4.66

NDN 2/17

Analysis ID:	10-1349-0659	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



NN 2/17

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 171088

Start Date: Oct 5 / 17
Set up by: JW

Sample Information:

Sample ID: JW Leo_ LC-OCDS-INS-2017-10-02-N
Sample Date: Oct 2 / 17
Date Received: Oct 3 / 17
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: JW ~~7 days~~ 092817
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (43 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: LM 151
Date Initiated: Sept 29 / 17

7-d No. of Fronds IC50 (95% CL): 3.8 (2.8 - 4.6) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.7 (3.0 - 4.6) g/L KCl CV (%): 11

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	>97	>97
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: Nov. 2, 2017

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck | **Setup by:** JW

Sample ID: ~~LC~~ JW LC_DCDS_INS_2017-10.02-N | **Test Date:** Oct 5 / 17

Work Order No.: 171088 | **CER #:** 1

Culture Source: CPCC # 490 | **Test Species:** *Lemna minor*

Test Culture Age: 7 days | **> 8X Growth? (Y/N):** Y (43 fronds)

Light Intensity Range: 4050 - 5400 lux | **Date Measured:** Oct 5 / 17

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.5	23.0	24.5	25.0	24.5
Initials	MLT	MLT	MLT	W	W	MLT	MLT	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0		23.0
DO (mg/L)	9.3	Aeration?: 20 min	8.1
pH	8.0	Nutrients added?[1]: Y →	8.0
Conductivity (µS)	398		~~643~~ 1216 JW

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration	Temperature (°C)		pH		Conductivity (µS)
% (V / V)	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.5	8.3	8.7	878
JW 1.95	23.0	24.5	8.2	9.1	938
3	23.0	24.5	8.2	9.3	945
6.1	23.0	24.5	8.2	9.4	955
12.1	23.0	24.5	8.2	9.6	980
24.2	23.0	24.5	8.2	9.5	1025
48.5	23.0	24.5	8.1	9.4	1110
97	23.0	24.5	8.0	9.5	1216
Initials	JW	JW	JW	ATP	JW

Thermometer: 1 **Light meter:** 1 **pH meter/probe:** 1 / 1 **DO meter/probe:** 1 / 1 **Conductivity meter/probe:** 1 / 1

Sample Description: Light yellow, clear, odorless, some particulates.

Comments:

Reviewed: [signature] **Date Reviewed:** Nov. 2, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW LC-LC-DCDS-WS-2017-10-02-N
Work Order #: 1711088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	~~66~~ JW	88									JW
	B	6	74										
	C	6	96										
	D	6	96										
1.5	A	6	82										
	B	6	94										
	C	6	92										
	D	6	78										
3	A	6	111										
	B	6	73										
	C	6	80										
	D	6	71										
6.1	A	6	82										
	B	6	107										
	C	6	91										
	D	6	75										
12.1	A	6	86										
	B	6	75										
	C	6	109										
	D	6	80										
24.2	A	6	61										
	B	6	95										
	C	6	66										
	D	6	78										

Comments:

Reviewed by: [signature]

Date Reviewed: Nov. 2, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW LEO-LC-DCDS-WS-2017-10-02-N
Work Order #: 1710188

Start Date: Oct 5/17
Termination Date: Oct 12/17
Test set up by: JW

Concentration %o (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	49										JW
	B	6	96										
	C	6	74										
	D	6	89										
97	A	6	89										
	B	6	64										
	C	6	61										
	D	6	96										↓
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: Nov. 2, 2017

DCDS

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: JW LEO-LC-DCDS-INS-2017-10-02-N
WO #: 171088

Start Date: Oct 5/17
Termination Date: Oct 12/17
Balance ID: Bal - 1

DCDS Block

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (V/V)	A	1	1276.36	1282.62	JW
	B	2	1272.54	1279.04	
control	C	3	1279.61	1287.39	
	D	4	1276.75	1284.03	
	A	5	1278.47	1285.96	
	B	6	1277.99	1285.36	
1.5	C	7	1279.20	1286.78	
	D	8	1277.92	1283.72	
	A	9	1281.08	1290.09	
	B	10	1282.85	1289.37	
3	C	11	1280.08	1286.51	
	D	12	1282.07	1287.79	
	A	13	1280.69	1287.34	
	B	14	1276.90	1286.00	
6.1	C	15	1277.45	1283.99	
	D	16	1272.69	1278.53	
	A	17	1278.62	1285.46	
	B	18	1279.25	1284.65	
12.1	C	19	1274.61	1283.20	
	D	20	1280.48	1287.76	
	A	21	1278.70	1283.91	
	B	22	1282.44	1290.01	
24.2	C	23	1281.60	1287.44	
	D	24	1280.94	1287.17	
	A	25	1282.17	1286.29	
	B	26	1277.47	1285.04	
48.5	C	27	1278.14	1283.95	
	D	28	1279.08	1286.04	✓

Comments: 10 % Re-weigh = # 5: 1286.52 mg # 11: 1286.83 mg
23: 1287.81 mg # 32: 1285.69 mg

Reviewed by: [signature]

Date Reviewed: Nov 2, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: JW LEO-LC-DCDS-WS-2017-10-02-N
WO #: 171088
Start Date: Oct 5 /17
Termination Date: Oct 12 /17
Balance ID: Bal - 1

DCDS Black

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	1276.48	1283.97	JW
	B	30	1278.40	1284.20	↓
97	C	31	1275.45	1281.05	↓
	D	32	1278.69	1285.45	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by:

Date Reviewed: Nov. 2, 2017

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-3559-2453	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:23	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	07-5716-3320	**Code:**	2D216538	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:40	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	59h (7.8 °C)	**Station:**	LC_DCDS_WS_2017-10-02_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
10	-98.32	203.5	207	0.0904	Yes	0.255	2.621	0.9331	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	9.006	N/A	42.93	11.1	2.329	NA
IC10	25.9	1.75	80.55	3.861	1.241	57.14
IC15	52.82	11.42	139.2	1.893	0.7183	8.756
IC20	93.06	11.98	321.6	1.075	0.311	8.345
IC25	151.3	4.864	853.3	0.661	0.1172	20.56
IC40	514.7	N/A	50930	0.1943	0.001964	NA
IC50	1075	N/A	N/A	0.09301	NA	NA

JW

} >97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	82.3	5.69	71.14	93.45	14.46	<0.0001	Significant Parameter
C	2.907	2.717	-2.419	8.233	1.07	0.2935	Non-Significant Parameter
D	1075	2617	-4055	6205	0.4108	0.6842	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	961.9947	961.9947	1	5.08	0.0319	Significant
Lack of Fit	277.0053	55.40107	5	0.255	0.9331	Non-Significant
Pure Error	5214.5	217.2708	24			
Residual	5491.505	189.3623	29			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	3.217	14.07	0.8642	Equal Variances
	Mod Levene Equality of Variance	0.3133	2.423	0.9408	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9767	0.9338	0.6991	Normal Distribution
	Anderson-Darling A2 Normality	0.2955	2.492	0.6255	Normal Distribution

NOV-2/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 10-3559-2453 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 27 Oct-17 19:23 **Analysis:** Nonlinear Regression **Official Results:** Yes

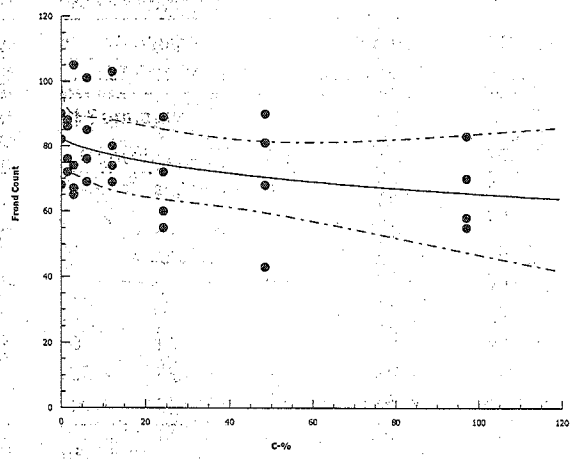
Frond Count Summary

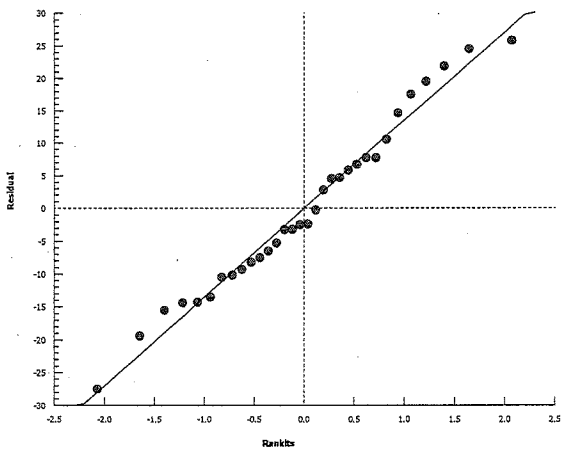
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	82.5	68	90	5.188	10.38	12.58%	0.0%
1.5		4	80.5	72	88	3.862	7.724	9.6%	2.42%
3		4	77.75	65	105	9.286	18.57	23.89%	5.76%
6.1		4	82.75	69	101	6.909	13.82	16.7%	-0.3%
12.1		4	81.5	69	103	7.511	15.02	18.43%	1.21%
24.2		4	69	55	89	7.561	15.12	21.92%	16.36%
48.5		4	70.5	43	90	10.22	20.44	28.99%	14.55%
97		4	66.5	55	83	6.384	12.77	19.2%	19.39%

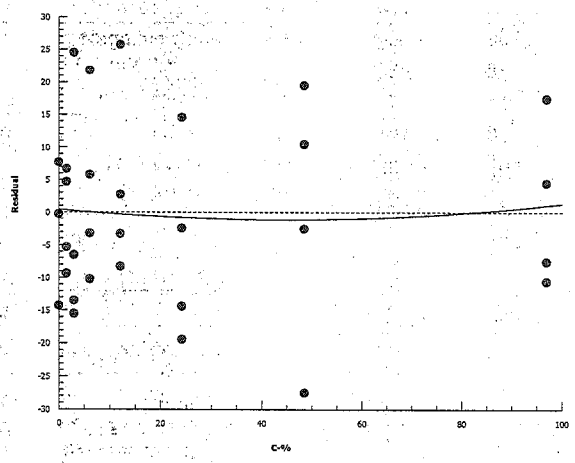
Frond Count Detail

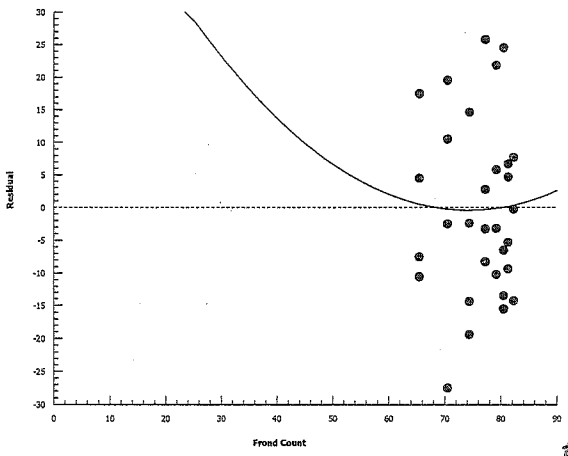
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	82	68	90	90
1.5		76	88	86	72
3		105	67	74	65
6.1		76	101	85	69
12.1		80	69	103	74
24.2		55	89	60	72
48.5		43	90	68	81
97		83	58	55	70

Graphics 3P Cumulative Log-Normal EV [Y=A*(1- Φ(log(X/D)/C))]









CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-4155-0107	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:23	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	07-5716-3320	**Code:**	2D216538	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:40	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	59h (7.8 °C)	**Station:**	LC_DCDS_WS_2017-10-02_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
2P Exponential EV [Y=A*exp(log(0.5)*X/D)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
4	-15.83	36.07	38.59	0.0138	Yes	0.2741	2.508	0.9437	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	47.57	N/A	115.2	2.102	0.8681	NA
IC10	97.71	N/A	243.5	1.023	0.4106	NA
IC15	150.7	N/A	400.6	0.6635	0.2496	NA
IC20	206.9	N/A	585.2	0.4832	0.1709	NA
IC25	266.8	N/A	806	0.3748	0.1241	NA
IC40	473.7	N/A	2011	0.2111	0.04973	NA
IC50	642.8	N/A	N/A	0.1556	NA	NA

JW

> 97 % (v/v)

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	6.825	0.2312	6.372	7.278	29.52	<0.0001	Significant Parameter
D	642.8	543.8	-423	1709	1.182	0.2464	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	1.511546	1.511546	1	1.432	0.2408	Non-Significant
Lack of Fit	2.030199	0.3383665	6	0.2741	0.9437	Non-Significant
Pure Error	29.63095	1.234623	24			
Residual	31.66114	1.055372	30			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	3.036	14.07	0.8817	Equal Variances
	Mod Levene Equality of Variance	0.321	2.423	0.9370	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9859	0.9338	0.9410	Normal Distribution
	Anderson-Darling A2 Normality	0.2858	2.492	0.6553	Normal Distribution

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.955	6.26	7.78	0.3508	0.7015	10.09%	0.0%
1.5		4	6.81	5.8	7.49	0.3925	0.7851	11.53%	2.09%
3		4	6.92	5.72	9.01	0.7193	1.439	20.79%	0.5%
6.1		4	6.783	5.84	8.1	0.4744	0.9487	13.99%	2.48%
12.1		4	7.027	5.4	8.59	0.6576	1.315	18.71%	-1.04%
24.2		4	6.213	5.21	7.57	0.4989	0.9978	16.06%	10.68%
48.5		4	6.115	4.12	7.57	0.7585	1.517	24.81%	12.08%
97		4	6.413	5.6	7.49	0.4394	0.8788	13.7%	7.8%

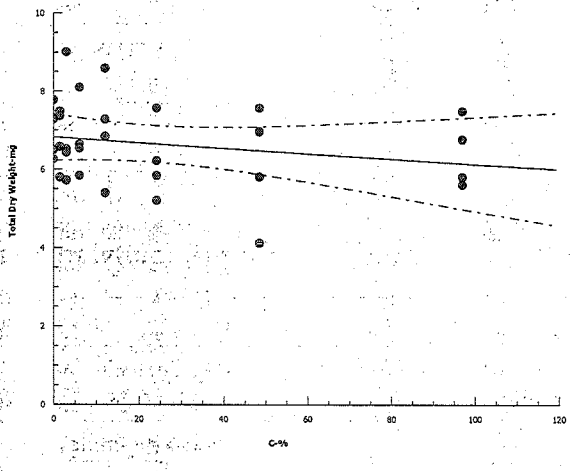
Analysis ID: 15-4155-0107 | Endpoint: Total Dry Weight-mg | CETIS Version: CETISv1.8.7
Analyzed: 27 Oct-17 19:23 | Analysis: Nonlinear Regression | Official Results: Yes

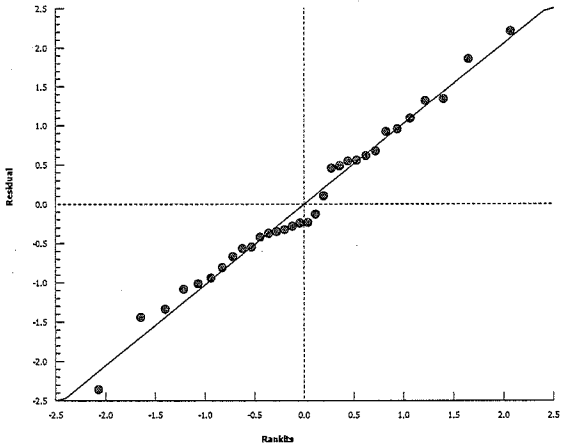
Total Dry Weight-mg Detail

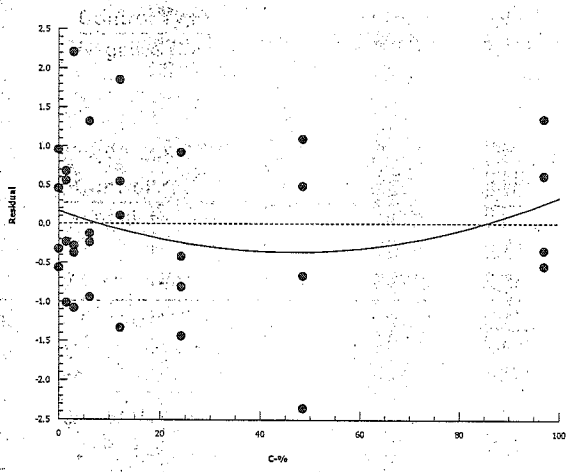
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.26	6.5	7.78	7.28
1.5		7.49	7.37	6.58	5.8
3		9.01	6.52	6.43	5.72
6.1		6.65	8.1	6.54	5.84
12.1		6.84	5.4	8.59	7.28
24.2		5.21	7.57	5.84	6.23
48.5		4.12	7.57	5.81	6.96
97		7.49	5.8	5.6	6.76

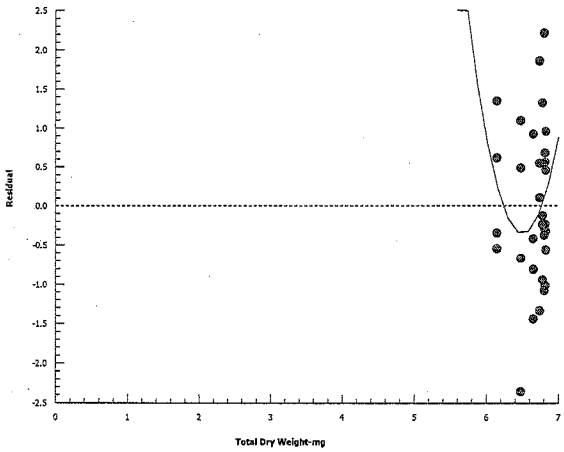
Graphics

2P Exponential EV [Y=A*exp(log(0.5)*X/D)]









Lemna minor Summary Sheet

Client: Teck
Work Order No.: 171088

Start Date: Oct 5 / 17
Set up by: JW

Sample Information:

Sample ID: ~~LC~~ JW LC-LCS-WS-2017-10-02-N
Sample Date: Oct 2 / 17
Date Received: Oct 3 / 17
Sample Volume: x 20L

Test Organism Information:

Culture Date: ~~7 days~~ JW 092817
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (43 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 151
Date Initiated: Sept 29 / 17

7-d No. of Fronds IC50 (95% CL): 3.8 (2.8 - 4.6) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.7 (3.0 - 4.6) g/L KCl CV (%): 11

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	87.1 (71.1 - >97)	>97
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: _____ Date reviewed: _____

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck

Setup by: JW

Sample ID: JW ~~100~~_LC_LC5_WS_2017-10-02_N

Test Date: Oct 5 / 17

Work Order No.: 171088

CER #: 1

Culture Source: CPCC # 490

Test Species: *Lemna minor*

Test Culture Age: 7 days

> 8X Growth? (Y/N): Y (43 fronds)

Light Intensity Range: 4200-5390 lux

Date Measured: Oct 5 / 17

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.5	23.0	24.5	25.0	25.0
Initials	MLT	MLT	MLT	K	K	MLT	MLT	JW

Sample Characteristics: **Initial Water Quality**

Temperature (°C) 23.0

DO (mg/L) 9.3

pH 8.2

Conductivity (µS) 739

Aeration?: 20 min

Nutrients added?[1]: Y

Adjusted Water Quality

23.0

8.4

8.1

1526

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (V / V)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.5	8.3	8.6	878
1.~~0~~5 JW	23.0	24.5	8.~~0~~2 MLT	8.6	901
3	23.0	24.5	8.~~1~~2	8.7	910
6.1	23.0	24.5	8.2	8.8	934
12.1	23.0	24.5	8.2	8.8	979
24.2	23.0	24.5	8.2	9.1	1062
48.5	23.0	24.5	8.1	9.~~2~~1 MLT	1225
97	23.0	24.5	8.1	9.2	1526
Initials	JW	JW	JW	MLT	JW

Thermometer: 1 **Light meter:** 1 **pH meter/probe:** 1 / 1 **DO meter/probe:** 1 / 1 **Conductivity meter/probe:** 1 / 1

Sample Description: Clear, colorless, odorless, some particulates

Comments:

Reviewed: [signature]

Date Reviewed: Nov 2, 2017

LC5

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW LC5.LC-LC5-WS-2017-10-02-N
Work Order #: 1711088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Test set up by: JW

Concentration %o (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	65										JW
	B	6	70										
	C	6	70										
	D	6	76										
1.5	A	6	73										
	B	6	68										
	C	6	75										
	D	6	83										
3	A	6	86										
	B	6	58										
	C	6	81										
	D	6	71										
6.1	A	6	83										
	B	6	91										
	C	6	56										
	D	6	65										
12.1	A	6	75										
	B	6	63										
	C	6	85										
	D	6	65										
24.2	A	6	88										
	B	6	71										
	C	6	87										
	D	6	70										↓

Comments:

Reviewed by: [signature]

Date Reviewed: NOV. 2, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW LC5_LC_LC5_WS_2017-10-02_N
Work Order #: 171088

Start Date: Oct 5/17
Termination Date: Oct 12/17
Test set up by: JW

Concentration %o (V/V)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	65										JW
	B	6	94										
	C	6	74										
	D	6	73										
97	A	6	46			X							
	B	6	50			X							
	C	6	54			X							
	D	6	45			X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: Nov. 2, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: JW L20-LC-LC5_WS-2017_10-02_N
WO #: 171088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Balance ID: Bal - 1

LC5 Black

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	1	JW ~~1272.69~~ 1276.89	1283.49	JW
	B	2	1277.87	1284.71	
control	C	3	1282.47	1288.08	
	D	4	1281.83	1288.59	
	A	5	1275.16	1282.07	
	B	6	1276.10	1282.01	
1.5	C	7	1273.13	1282.06	
	D	8	1272.57	1280.45	
	A	9	1272.58	AJP ~~1280.54~~ 1279.94	
	B	10	1272.34	AJP ~~1279.95~~ 1277.61	
3	C	11	1271.47	1278.69	
	D	12	1278.29	1284.33	
	A	13	1279.72	1286.19	
	B	14	1281.33	1290.60	
6.1	C	15	1279.64	1285.36	
	D	16	1272.69	1278.30	
	A	17	1280.47	1287.33	
	B	18	1282.60	1288.11	
12.1	C	19	1276.24	1283.88	
	D	20	1275.43	1281.47	
	A	21	1273.50	1281.64	
	B	22	1276.05	1282.42	
24.2	C	23	1282.96	1290.58	
	D	24	1280.44	1286.96	
	A	25	1281.10	1286.70	
	B	26	1279.93	1288.89	
48.5	C	27	1279.13	1285.82	
	D	28	1272.89	1279.47	✓

Comments: 10 % Re-weigh : # 4 : 1289.02 mg # 14 : 1291.12 mg
27 : 1286.23 mg # 31 : 1285.40 mg

Reviewed by:

Date Reviewed: Nov. 2, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: JW LC6-LC-LC5-WS-2017-10-02-N
WO #: 171088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	1283.11	1288.29	JW
	B	30	1288.00	1293.45	↓
97	C	31	1278.40	1284.75	↓
	D	32	1278.78	1283.70	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: Nov 2, 2017

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-8770-0249	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:16	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	09-0459-2041	**Code:**	35EAFAA9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 15:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (8.1 °C)	**Station:**	LC_LC5_WS_2017-10-02_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
9	-86.38	182.2	186.6	0.4238	Yes	0.2079	2.776	0.9315	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	67.24	N/A	90.69	1.487	1.103	NA
IC10	72.63	N/A	95.2	1.377	1.05	NA
IC15	77.61	N/A	98.41	1.288	1.016	NA
IC20	82.39	62.08	100.8	1.214	0.9918	1.611
IC25	87.09	71.13	103.1	1.148	0.97	1.406
IC40	101.6	85.8	120.4	0.9842	0.8303	1.166
IC50	112.5	87.16	153	0.8889	0.6535	1.147

JW

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	66.12	2.851	60.53	71.71	23.2	<0.0001	Significant Parameter
C	3.419	2.308	-1.105	7.943	1.481	0.1497	Non-Significant Parameter
D	112.5	15.94	81.27	143.7	7.06	<0.0001	Significant Parameter
E	0.003725	0.005056	-0.006185	0.01364	0.7368	0.4674	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	2398.312	2398.312	1	25.8	<0.0001	Significant
Lack of Fit	87.1879	21.79698	4	0.2079	0.9315	Non-Significant
Pure Error	2516	104.8333	24			
Residual	2603.188	92.97099	28			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	7.76	14.07	0.3542	Equal Variances
	Mod Levene Equality of Variance	1.984	2.423	0.0998	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9747	0.9338	0.6373	Normal Distribution
	Anderson-Darling A2 Normality	0.3276	2.492	0.5340	Normal Distribution

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 10-8770-0249 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 27 Oct-17 19:16 **Analysis:** Nonlinear Regression **Official Results:** Yes

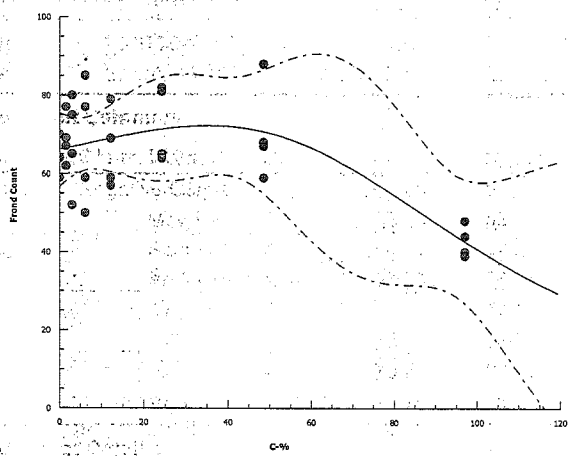
Frond Count Summary

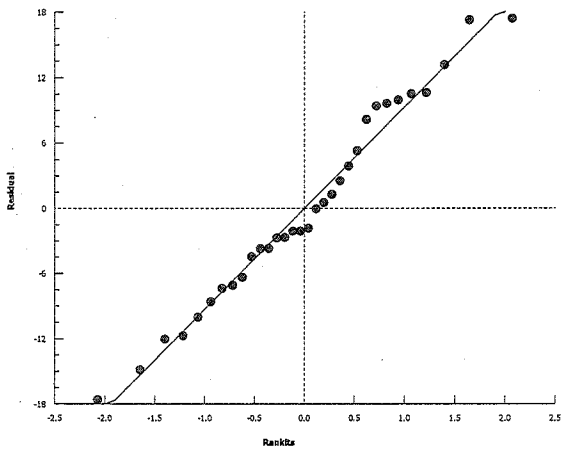
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	64.25	59	70	2.25	4.5	7.0%	0.0%
1.5		4	68.75	62	77	3.119	6.238	9.07%	-7.0%
3		4	68	52	80	6.178	12.36	18.17%	-5.84%
6.1		4	67.75	50	85	8.035	16.07	23.72%	-5.45%
12.1		4	66	57	79	5.066	10.13	15.35%	-2.72%
24.2		4	73	64	82	4.916	9.832	13.47%	-13.62%
48.5		4	70.5	59	88	6.171	12.34	17.51%	-9.73%
97		4	42.75	39	48	2.056	4.113	9.62%	33.46%

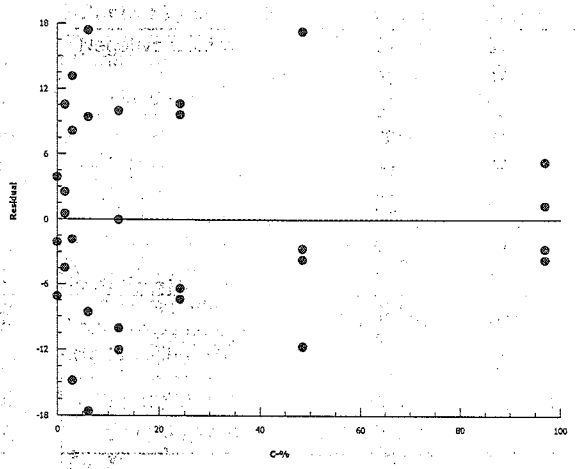
Frond Count Detail

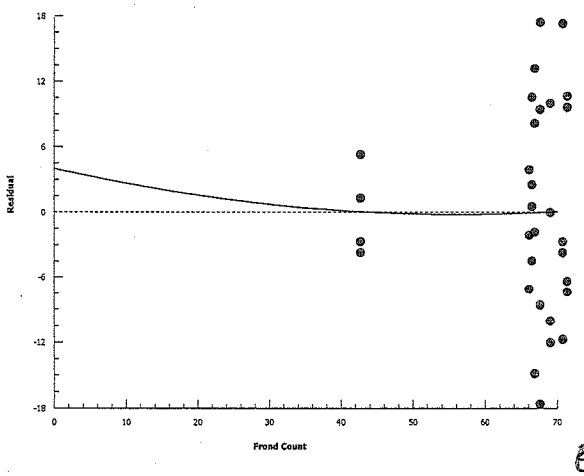
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	59	64	64	70
1.5		67	62	69	77
3		80	52	75	65
6.1		77	85	50	59
12.1		69	57	79	59
24.2		82	65	81	64
48.5		59	88	68	67
97		40	44	48	39

Graphics 4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]









CETIS Analytical Report

Test Code: 171088e | 08-3961-6661

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-4738-4560	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:18	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	09-0459-2041	**Code:**	35EAFAA9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 15:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (8.1 °C)	**Station:**	LC_LC5_WS_2017-10-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	28.0%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.6216	2.482	17.97	6	0.6554	CDF	Non-Significant Effect
		3	0.518	2.482	17.97	6	0.7000	CDF	Non-Significant Effect
		6.1	0.4834	2.482	17.97	6	0.7143	CDF	Non-Significant Effect
		12.1	0.2417	2.482	17.97	6	0.8045	CDF	Non-Significant Effect
		24.2	1.209	2.482	17.97	6	0.3861	CDF	Non-Significant Effect
		48.5	0.8633	2.482	17.97	6	0.5448	CDF	Non-Significant Effect
		97	-2.97	2.482	17.97	6	1.0000	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	2485.5	355.0714	7	3.387	0.0117	Significant Effect
Error	2516	104.8333	24			
Total	5001.5		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.76	18.48	0.3542	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9795	0.9081	0.7835	Normal Distribution

Frond Count Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	64.25	57.09	71.41	64	59	70	2.25	7.0%	0.0%
1.5		4	68.75	58.82	78.68	68	62	77	3.119	9.07%	-7.0%
3		4	68	48.34	87.66	70	52	80	6.178	18.17%	-5.84%
6.1		4	67.75	42.18	93.32	68	50	85	8.035	23.72%	-5.45%
12.1		4	66	49.88	82.12	64	57	79	5.066	15.35%	-2.72%
24.2		4	73	57.36	88.64	73	64	82	4.916	13.47%	-13.62%
48.5		4	70.5	50.86	90.14	67.5	59	88	6.171	17.51%	-9.73%
97		4	42.75	36.21	49.29	42	39	48	2.056	9.62%	33.46%

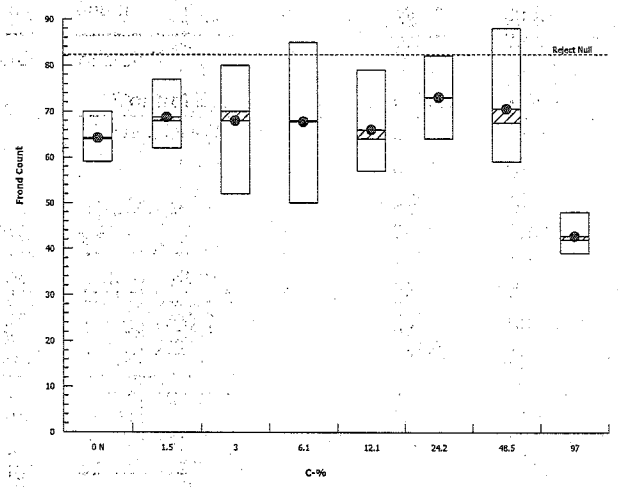
Frond Count Detail

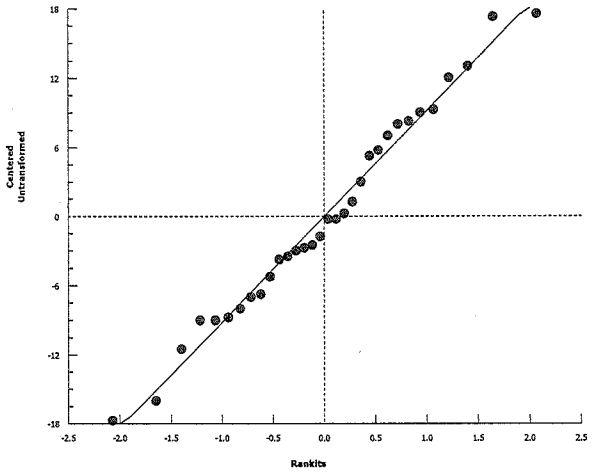
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	59	64	64	70
1.5		67	62	69	77
3		80	52	75	65
6.1		77	85	50	59
12.1		69	57	79	59
24.2		82	65	81	64
48.5		59	88	68	67
97		40	44	48	39

Nov. 2/17

Analysis ID: 03-4738-4560 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 27 Oct-17 19:18 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Graphics





NN 2/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-2759-6987	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:16	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	09-0459-2041	**Code:**	35EAFAA9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 15:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (8.1 °C)	**Station:**	LC_LC5_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1284662	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	53.73	N/A	71.54	1.861	1.398	NA
IC10	64.66	N/A	100.6	1.547	0.9941	NA
IC15	77.77	N/A	N/A	1.286	NA	NA
IC20	93.51	42.58	N/A	1.069	NA	2.349
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.452	5.61	6.84	0.2852	0.5705	8.84%	0.0%
1.5		4	7.408	5.91	8.93	0.6475	1.295	17.48%	-14.8%
3		4	6.472	5.27	7.36	0.4983	0.9966	15.4%	-0.31%
6.1		4	6.768	5.61	9.27	0.8558	1.712	25.29%	-4.88%
12.1		4	6.512	5.51	7.64	0.4673	0.9346	14.35%	-0.93%
24.2		4	7.163	6.37	8.14	0.4287	0.8575	11.97%	-11.0%
48.5		4	6.957	5.6	8.96	0.711	1.422	20.44%	-7.83%
97		4	5.475	4.92	6.35	0.3111	0.6222	11.36%	15.15%

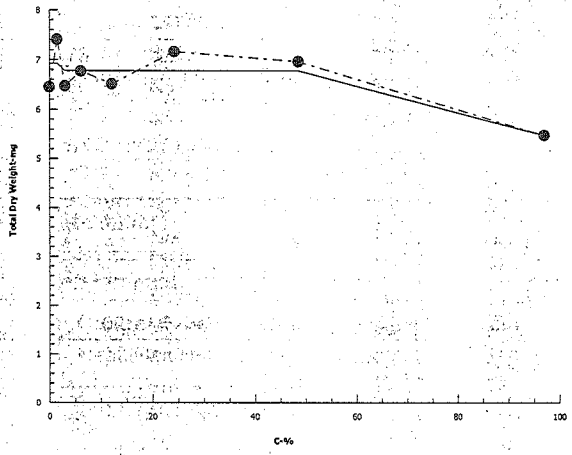
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.6	6.84	5.61	6.76
1.5		6.91	5.91	8.93	7.88
3		7.36	5.27	7.22	6.04
6.1		6.47	9.27	5.72	5.61
12.1		6.86	5.51	7.64	6.04
24.2		8.14	6.37	7.62	6.52
48.5		5.6	8.96	6.69	6.58
97		5.18	5.45	6.35	4.92

NN 2/17

Analysis ID:	07-2759-6987	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:16	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	00-0119-7550	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:18	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	09-0459-2041	**Code:**	35EAFAA9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 15:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	57h (8.1 °C)	**Station:**	LC_LC5_WS_2017-10-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	30.3%	97	>97	NA	1.031

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.211	2.482	1.957	6	0.3848	CDF	Non-Significant Effect
		3	0.02536	2.482	1.957	6	0.8686	CDF	Non-Significant Effect
		6.1	0.3996	2.482	1.957	6	0.7476	CDF	Non-Significant Effect
		12.1	0.07611	2.482	1.957	6	0.8550	CDF	Non-Significant Effect
		24.2	0.9007	2.482	1.957	6	0.5273	CDF	Non-Significant Effect
		48.5	0.6406	2.482	1.957	6	0.6470	CDF	Non-Significant Effect
		97	-1.24	2.482	1.957	6	0.9954	CDF	Non-Significant Effect

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	9.659707	1.379958	7	1.11	0.3887	Non-Significant Effect
Error	29.82934	1.242889	24			
Total	39.48904		31			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.24	18.48	0.6307	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9591	0.9081	0.2587	Normal Distribution

Total Dry Weight-mg Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	4	6.452	5.545	7.36	6.68	5.61	6.84	0.2852	8.84%	0.0%
1.5		4	7.408	5.347	9.468	7.395	5.91	8.93	0.6475	17.48%	-14.8%
3		4	6.472	4.887	8.058	6.63	5.27	7.36	0.4983	15.4%	-0.31%
6.1		4	6.768	4.044	9.491	6.095	5.61	9.27	0.8558	25.29%	-4.88%
12.1		4	6.512	5.025	8	6.45	5.51	7.64	0.4673	14.35%	-0.93%
24.2		4	7.163	5.798	8.527	7.07	6.37	8.14	0.4287	11.97%	-11.0%
48.5		4	6.957	4.695	9.22	6.635	5.6	8.96	0.711	20.44%	-7.83%
97		4	5.475	4.485	6.465	5.315	4.92	6.35	0.3111	11.36%	15.15%

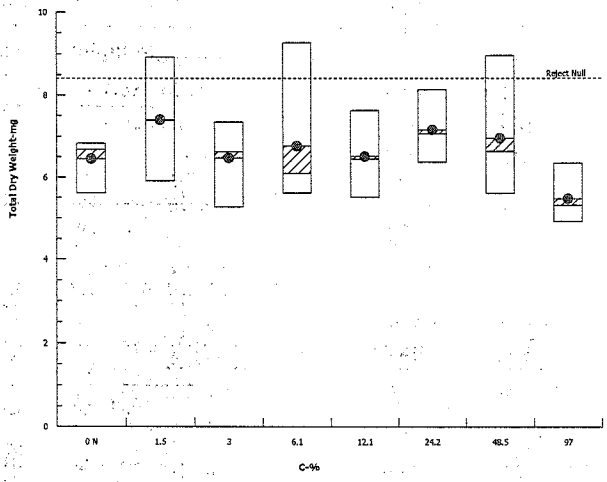
Total Dry Weight-mg Detail

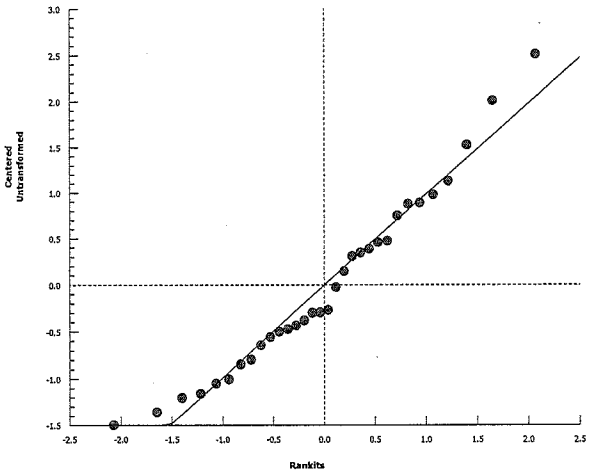
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.6	6.84	5.61	6.76
1.5		6.91	5.91	8.93	7.88
3		7.36	5.27	7.22	6.04
6.1		6.47	9.27	5.72	5.61
12.1		6.86	5.51	7.64	6.04
24.2		8.14	6.37	7.62	6.52
48.5		5.6	8.96	6.69	6.58
97		5.18	5.45	6.35	4.92

Nov 2/17

Analysis ID:	00-0119-7550	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:18	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Graphics





Lemna minor Summary Sheet

Client: Teck
Work Order No.: 171088

Start Date: Oct 5 / 17
Set up by: JW

Sample Information:

Sample ID: ~~LEO~~ JW WL-BFNB-OUT-SP21-20171002-N
Sample Date: Oct 2 / 17
Date Received: Oct 3 / 17
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: ~~7 days~~ JW 092817
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (43 fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 151
Date Initiated: Sept 29 / 17

7-d No. of Fronds IC50 (95% CL): 3.8 (2.8 - 4.6) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.7 (3.0 - 4.6) g/L KCl CV (%): 11

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	21.4 (15.4 JW - 30.3)	>97
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: Nov 2, 2017

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck — **Setup by:** JW

Sample ID: JW ~~L20~~-WL-BFNB-OUT-SP21_20171002_N — **Test Date:** Oct 5 / 17

Work Order No.: 171088 — **CER #:** 1

Culture Source: CPCC # 490 — **Test Species:** *Lemna minor*

Test Culture Age: 7 days — **> 8X Growth? (Y/N):** Y (43 fronds)

Light Intensity Range: 4000 - 5100 lux — **Date Measured:** Oct 5 / 17

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	24.0	24.0	24.0	24.5	23.0	24.5	25.0	25.0
Initials	MLT	MLT	MLT	K	K	MLT	MLT	JW

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	23.0	Aeration?: 20 min	23.0
DO (mg/L)	9.1.	Nutrients added?[1]: Y →	8.2
pH	7.8		7.8
Conductivity (µS)	2020		2710

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (V/V)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	23.0	24.5	8.3	8.7	878
JW 1.95	23.0	24.5	8.1	9.2	918
3	23.0	24.5	8.1	9.3	963
6.1	23.0	24.5	8.1	9.5	1034
12.1	23.0	24.5	8.1	9.6	1170
24.2	23.0	24.5	8.1	9.6	1416
48.5	23.0	24.5	8.0	9.4	1865
97	23.0	24.5	7.8	JW 9.65	2710
Initials	JW	JW	JW	JW	JW

Thermometer: 1. **Light meter:** 1 **pH meter/probe:** 1 / 1 **DO meter/probe:** 1 / 1 **Conductivity meter/probe:** 1 / 1.

Sample Description: Clear, colorless, hydrocarbon odor, no particulates

Comments:

Reviewed: [signature] **Date Reviewed:** Nov. 2, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JWLEE_WL_BFWB_OUT_SP21_20171002_N
Work Order #: 1711088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Test set up by: JW

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	86										JW
	B	6	95										
	C	6	100										
	D	6	85										
1.5	A	6	99										
	B	6	81										
	C	6	108										
	D	6	91										
3	A	6	112										
	B	6	88										
	C	6	88										
	D	6	112										
6.1	A	6	105										
	B	6	96										
	C	6	65										
	D	6	71										
12.1	A	6	76										
	B	6	85										
	C	6	80										
	D	6	92										
24.2	A	6	69			X							
	B	6	67			X							
	C	6	77										
	D	6	62			X							↓

Comments:

Reviewed by: [signature]

Date Reviewed: Nov. 2, 2017

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: JW LEO_WL_BFWB_OUT_SP21_20171002_N
Work Order #: 171088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Test set up by: JW

Concentration %o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	59			X							JW
	B	6	60			X							
	C	6	56			X							
	D	6	45		X	X							
97	A	6	51		X								
	B	6	54		X								
	C	6	47		X								
	D	6	52		X								
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: Nov. 2, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: JW LEO_WL_BFWB_OUT_SP21_20171002_N
WO #: 171088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Balance ID: Bal - 1

WTF Black

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	1	1271.78	1277.79	JW
	B	2	1273.14	1281.25	
control	C	3	1272.51	1280.68	
	D	4	1272.60	1279.74	
	A	5	1271.99	1280.42	
	B	6	1273.02	1279.68	
1.5	C	7	1270.25	1278.77	
	D	8	1273.76	1280.79	
	A	9	1273.21	1281.93	
	B	10	1277.54	1283.48	
3	C	11	1273.42	1280.02	
	D	12	1273.32	1282.65	
	A	13	1275.36	1283.68	
	B	14	1274.50	1282.59	
6.1	C	15	1276.09	1281.56	
	D	16	1278.28	1284.12	
	A	17	1273.07	1279.35	
	B	18	1270.43	1277.27	
12.1	C	19	1272.36	1278.65	
	D	20	1271.15	1278.72	
	A	21	1275.20	1281.33	
	B	22	1275.79	1281.75	
24.2	C	23	1276.81	1282.79	
	D	24	1273.72	1279.68	
	A	25	1270.65	1276.20	
	B	26	1273.6 (JW) 55	1279.85	
48.5	C	27	1276.42	1281.41	
	D	28	1271.97	1277.25	✓

Comments: 10 % Re-weigh = # 1 = 1278.25 mg # 15 = 1282.10 mg
20 = 1279.12 mg # 30 = 1274.80 mg

Reviewed by: [signature] Date Reviewed: Nov 2, 2017

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: JW LEO_WL-BFWB_OUT_SP21-20171002-N
WO #: 171088

Start Date: Oct 5 / 17
Termination Date: Oct 12 / 17
Balance ID: Bal - 1

WTF Black

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	1270.83	1276.94	JW
	B	30	1267.95	1274.41	↓
97	C	31	1274.07	1279.14	↓
	D	32	1271.28	1276.90	↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: Nov. 2, 2017

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	17-1936-6736	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 18:39	**Analysis:**	Nonlinear Regression	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	17-2466-1926	**Code:**	66CC40A6	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	63h (9 °C)	**Station:**	WL_BFWB_OUT_SP21_20171002_N		

Non-Linear Regression Options

Model Function	X Transform	Y Transform	Weighting Function	PTBS Function
4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]	None	None	Normal [W=1]	Off [Y*=Y]

Regression Summary

Iters	Log LL	AICc	BIC	Adj R2	Optimize	F Stat	Critical	P-Value	Decision(α:5%)
9	-88.59	186.7	191	0.7292	Yes	0.6999	2.776	0.5996	Non-Significant Lack of Fit

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	7.316	N/A	11.29	13.67	8.857	NA
IC10	9.78	6.022	14.87	10.22	6.724	16.61
IC15	12.77	8.4	19	7.833	5.264	11.9
IC20	16.53	11.44	23.93	6.051	4.179	8.741
IC25	21.42	15.35	30.31	4.668	3.299	6.514
IC40	50.31	33.12	80.69	1.987	1.239	3.019
IC50	101.1	53.07	223.6	0.9895	0.4473	1.884

Regression Parameters

Parameter	Estimate	Std Error	95% LCL	95% UCL	t Stat	P-Value	Decision(α:5%)
A	85.31	5.135	75.24	95.37	16.61	<0.0001	Significant Parameter
C	1.241	0.0515	1.14	1.342	24.1	<0.0001	Significant Parameter
D	101.1	43.77	15.26	186.9	2.309	0.0286	Significant Parameter
E	0.2048	0.2331	-0.252	0.6617	0.8787	0.3870	Non-Significant Parameter

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Model	9231.288	9231.288	1	86.49	<0.0001	Significant
Lack of Fit	312.1803	78.04507	4	0.6999	0.5996	Non-Significant
Pure Error	2676.25	111.5104	24			
Residual	2988.43	106.7297	28			

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Variances	Bartlett Equality of Variance	11.02	14.07	0.1378	Equal Variances
	Mod Levene Equality of Variance	6.005	2.423	0.0004	Unequal Variances
Distribution	Shapiro-Wilk W Normality	0.9751	0.9338	0.6487	Normal Distribution
	Anderson-Darling A2 Normality	0.2478	2.492	0.7785	Normal Distribution

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID: 17-1936-6736 **Endpoint:** Frond Count **CETIS Version:** CETISv1.8.7
Analyzed: 27 Oct-17 18:39 **Analysis:** Nonlinear Regression **Official Results:** Yes

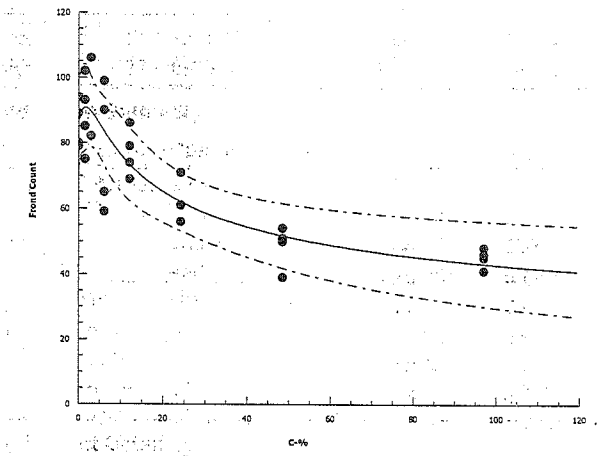
Frond Count Summary

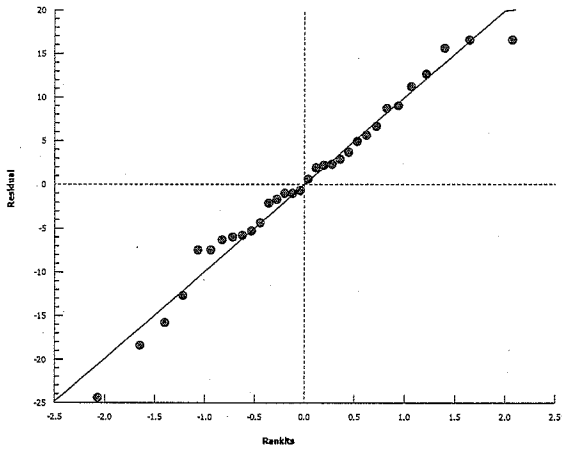
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	85.5	79	94	3.617	7.234	8.46%	0.0%
1.5		4	88.75	75	102	5.75	11.5	12.96%	-3.8%
3		4	94	82	106	6.928	13.86	14.74%	-9.94%
6.1		4	78.25	59	99	9.638	19.28	24.63%	8.48%
12.1		4	77	69	86	3.629	7.257	9.43%	9.94%
24.2		4	62.25	56	71	3.146	6.292	10.11%	27.19%
48.5		4	48.5	39	54	3.279	6.557	13.52%	43.27%
97		4	45	41	48	1.472	2.944	6.54%	47.37%

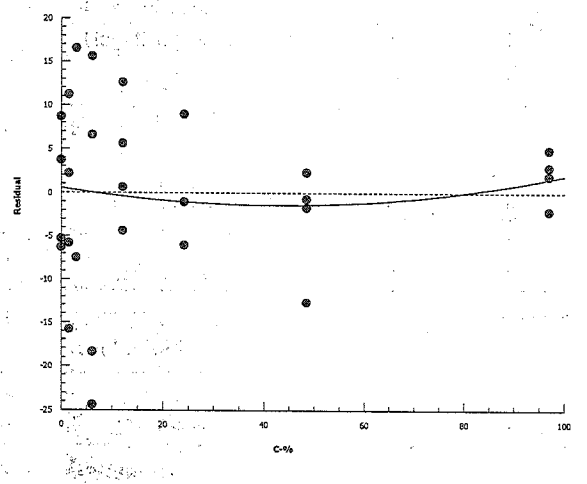
Frond Count Detail

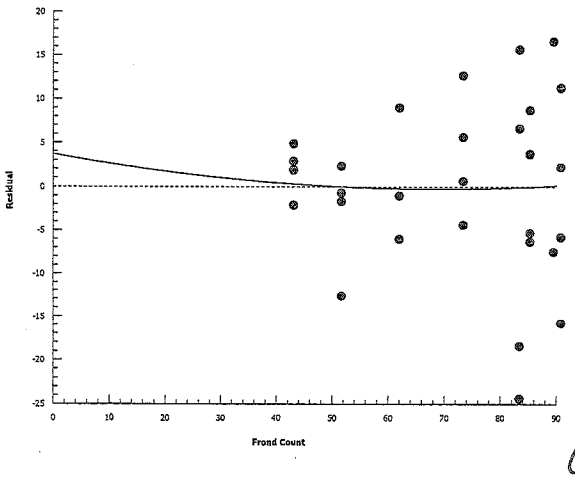
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	80	89	94	79
1.5		93	75	102	85
3		106	82	82	106
6.1		99	90	59	65
12.1		69	79	74	86
24.2		61	61	71	56
48.5		51	54	50	39
97		45	48	41	46

Graphics 4P Log-Logistic+Hormesis EV [Y=A(1+EX)/(1+(2ED+1)(X/D)^C)]









NOV 2/17

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-7483-8528	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 18:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	14-7322-9893	**Test Type:**	Lemna Growth	**Analyst:**	Jeslin Wijaya
Start Date:	05 Oct-17	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	12 Oct-17	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	17-2466-1926	**Code:**	66CC40A6	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	63h (9 °C)	**Station:**	WL_BFWB_OUT_SP21_20171002_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1138616	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	4.658	N/A	18.43	21.47	5.425	NA
IC10	9.937	N/A	21.45	10.06	4.662	NA
IC15	16.45	N/A	29.68	6.079	3.369	NA
IC20	23.4	N/A	N/A	4.274	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

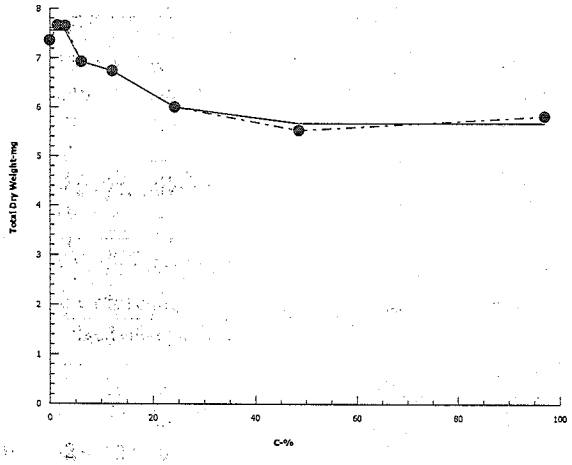
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	7.358	6.01	8.17	0.5074	1.015	13.79%	0.0%
1.5		4	7.66	6.66	8.52	0.4769	0.9538	12.45%	-4.11%
3		4	7.648	5.94	9.33	0.8162	1.632	21.35%	-3.94%
6.1		4	6.93	5.47	8.32	0.7415	1.483	21.4%	5.81%
12.1		4	6.745	6.28	7.57	0.3045	0.609	9.03%	8.33%
24.2		4	6.008	5.96	6.13	0.0411	0.08221	1.37%	18.35%
48.5		4	5.53	4.99	6.3	0.281	0.5619	10.16%	24.84%
97		4	5.815	5.07	6.46	0.3022	0.6045	10.39%	20.96%

Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.01	8.11	8.17	7.14
1.5		8.43	6.66	8.52	7.03
3		8.72	5.94	6.6	9.33
6.1		8.32	8.09	5.47	5.84
12.1		6.28	6.84	6.29	7.57
24.2		6.13	5.96	5.98	5.96
48.5		5.55	6.3	4.99	5.28
97		6.11	6.46	5.07	5.62

Analysis ID:	15-7483-8528	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 18:40	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: JW QA: NOV 2/17

APPENDIX D – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 171087

Start Date: Oct 4/17
Set up by: ML

Sample Information:

Sample ID: LC-LCDSSLCL-WS-2017-10-02-N
Sample Date: Oct 2/17
Date Received: Oct 3/17
Sample Volume: 8x20L

Test Organism Information:

Culture Date: Sept 29/17
Age of culture (Day 0): 5d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC161
Stock Solution ID: 171103
Date Initiated: Sept 28/17

72-h IC50 (95% CL): 34.9 (32.9-37.0) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 32.8 (26.5-40.5) ug/L Zn CV (%): 11

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: Nov 3, 2017

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck Coal | **Setup by:** MLT

Sample ID: EC-LCDSSLEC-WS-2017-10-02_N | **Test Date/Time:** Oct 4/17 @ 1200h

Work Order No.: 171087 | **CER #:** 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Sept 29/17 | **Age of Culture:** 5d | **Culture Health:** Good

Culture Count: 1 355 2 345 | **Average:** 350 | **Culture Cell Density (c1):** 350 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 350 x 10⁴ cells/ml = 6,29 mL

Time Zero Counts: 1 21 2 22 | **Average:** 21,5

No. of Cells/mL: 21,5 x 10⁴ | **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9773 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.8	23.0	24.0	24.0	24.0	24.0	✓	✓	✓	✓
1.5	6.8	23.0	|	|	|	|	✓	✓	✓	✓
3.0	6.8	23.0	|	|	|	|	✓	✓	✓	✓
6.0	6.9	23.0	|	|	|	|	✓	✓	✓	✓
11.9	7.3	23.0	|	|	|	|	✓	✓	✓	✓
23.8	7.7	23.0	|	|	|	|	✓	✓	✓	✓
47.6	8.1	23.0	|	|	|	|	✓	✓	✓	✓
95.2	8.3	23.0	✓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.8 | Well 2: 6.8

Final control pH: Well 1: 6.9 | Well 2: 6.9

Light intensity (lux): 4100 | **Date measured:** Oct 4/A

Thermometer: 4 | **Light meter:** 1 | **pH meter/probe:** 1 / 1

Sample Description: clear, colourless, odourless, some particulates

Comments:

Reviewed: [signature] | **Date reviewed:** Nov. 2, 2017

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck | Start Date/Time: Oct 4/17 @ 1200h
Work Order #: 171087 | Termination Date: Oct 7/17 @ 1200h
Sample ID: LC-LCDSSLCC-WS-2017-10-02 | Test set up by: MLT

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	30					MLT
	B	28					
	C	33					
	D	27					
	E	28					
	F	30					
	G	29					
	H	31					
1.5	A	29					
	B	35					
	C	31					
	D	30					
3.0	A	28					
	B	33					
	C	35					
	D	30					
6.0	A	34					
	B	31					
	C	36					
	D	33					
11.9	A	53					
	B	48					
	C	50					
	D	45					
23.8	A	82					
	B	70					
	C	78					
	D	80					
47.6	A	90					
	B	86					
	C	87					
	D	93					
95.2	A	101					
	B	108					
	C	103					
	D	104					

Comments:

Reviewed by: [signature] | Date Reviewed: Nov 2, 2017

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	4-Oct-17 @ 1200h
WO#:	171087	Termination Date/Time	7-Oct-17 @ 1200h
Sample ID:	LC_LCDSSLCC_WS_2017-10-02_N		
		Initial Cell Density:	9773 cell/mL

									215000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9772.727
Control	A	30				30	29.0	mean	28.5
	B	28				28	27.0	SD	1.927248
	C	33				33	32.0	CV	6.756886
	D	27				27	26.0		
	E	28				28	27.0		
	F	30				30	29.0		
	G	29				29	28.0		
	H	31				31	30.0		
1.5	A	29				29	28.0		
	B	35				35	34.0		
	C	31				31	30.0		
	D	30				30	29.0		
3	A	28				28	27.0		
	B	33				33	32.0		
	C	35				35	34.0		
	D	30				30	29.0		
6	A	34				34	33.0		
	B	31				31	30.0		
	C	36				36	35.0		
	D	33				33	32.0		
11.9	A	53				53	52.0		
	B	48				48	47.0		
	C	50				50	49.0		
	D	45				45	44.0		
23.8	A	82				82	81.0		
	B	70				70	69.0		
	C	78				78	77.0		
	D	80				80	79.0		
47.6	A	90				90	89.0		
	B	86				86	85.0		
	C	87				87	86.0		
	D	93				93	92.0		
95.2	A	101				101	100.0		
	B	108				108	107.0		
	C	103				103	102.0		
	D	104				104	103.0		

Reviewed by: _____ Date reviewed: NOV. 3, 2017

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	05-9087-4973	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Oct-17 21:16	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-4611-1355	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	04 Oct-17 12:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	07 Oct-17 12:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	14-4545-9701	**Code:**	5627F6F5	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:14	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	51h (8.2 °C)	**Station:**	LC_LCDSSLCC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1816117	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9061	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	28.5	26	32	0.6814	1.927	6.76%	0.0%
1.5		4	30.25	28	34	1.315	2.63	8.69%	-6.14%
3		4	30.5	27	34	1.555	3.109	10.19%	-7.02%
6		4	32.5	30	35	1.041	2.082	6.41%	-14.04%
11.9		4	48	44	52	1.683	3.367	7.01%	-68.42%
23.8		4	76.5	69	81	2.63	5.26	6.88%	-168.4%
47.6		4	88	85	92	1.581	3.162	3.59%	-208.8%
95.2		4	103	100	107	1.472	2.944	2.86%	-261.4%

Cell Yield Detail

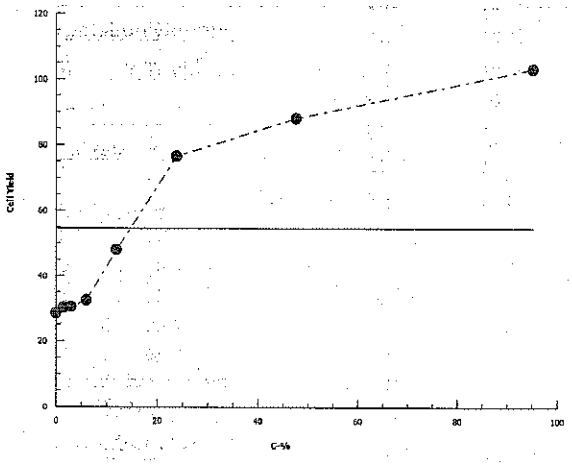
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	29	27	32	26	27	29	28	30
1.5		28	34	30	29				
3		27	32	34	29				
6		33	30	35	32				
11.9		52	47	49	44				
23.8		81	69	77	79				
47.6		89	85	86	92				
95.2		100	107	102	103				

Analyst: MT QA: MW 3/17

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 05-9087-4973 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 26 Oct-17 21:16 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

Graphics



Analyst: MCJ QA: NOV 3/17

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-4332-1934	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Oct-17 21:16	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-4611-1355	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	04 Oct-17 12:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	07 Oct-17 12:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	14-4545-9701	**Code:**	5627F6F5	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:14	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	51h (8.2 °C)	**Station:**	LC_LCDSSLCC_WS_2017-10-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	16.6%	6	11.9	8.45	16.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.9347	2.526	4.73	10	0.5843	CDF	Non-Significant Effect
		3	1.068	2.526	4.73	10	0.5167	CDF	Non-Significant Effect
		6	2.136	2.526	4.73	10	0.1095	CDF	Non-Significant Effect
		11.9*	10.41	2.526	4.73	10	<0.0001	CDF	Significant Effect
		23.8*	25.64	2.526	4.73	10	<0.0001	CDF	Significant Effect
		47.6*	31.78	2.526	4.73	10	<0.0001	CDF	Significant Effect
		95.2*	39.79	2.526	4.73	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9061	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	27731	3961.572	7	423.8	<0.0001	Significant Effect
Error	261.75	9.348214	28			
Total	27992.75		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.163	18.48	0.6401	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9637	0.9166	0.2783	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	28.5	26.89	30.11	28.5	26	32	0.6814	6.76%	0.0%
1.5		4	30.25	26.07	34.43	29.5	28	34	1.315	8.69%	-6.14%
3		4	30.5	25.55	35.45	30.5	27	34	1.555	10.19%	-7.02%
6		4	32.5	29.19	35.81	32.5	30	35	1.041	6.41%	-14.04%
11.9		4	48	42.64	53.36	48	44	52	1.683	7.01%	-68.42%
23.8		4	76.5	68.13	84.87	78	69	81	2.63	6.88%	-168.4%
47.6		4	88	82.97	93.03	87.5	85	92	1.581	3.59%	-208.8%
95.2		4	103	98.32	107.7	102.5	100	107	1.472	2.86%	-261.4%

NOV 3/17

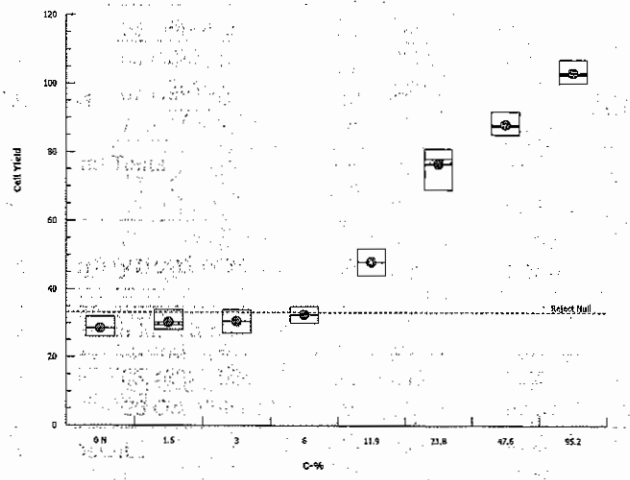
EC Alga Growth Inhibition Test — **Nautilus Environmental**

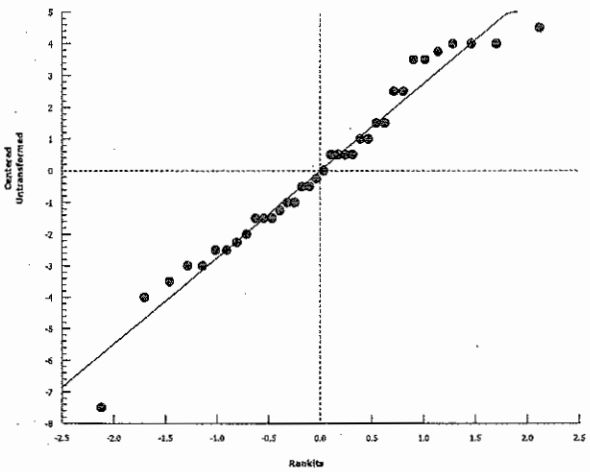
Analysis ID: 06-4332-1934 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 26 Oct-17 21:16 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	29	27	32	26	27	29	28	30
1.5		28	34	30	29				
3		27	32	34	29				
6		33	30	35	32				
11.9		52	47	49	44				
23.8		81	69	77	79				
47.6		89	85	86	92				
95.2		100	107	102	103				

Graphics





NA 3/17

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 171087

Start Date: Oct 4/17
Set up by: MLT

Sample Information:

Sample ID: LC-DCL-WS-2017-10-02-N
Sample Date: Oct 2/17
Date Received: Oct 3/17
Sample Volume: 5x20L

Test Organism Information:

Culture Date: Sept 29/17
Age of culture (Day 0): 5d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC161
Stock Solution ID: 17Zn03
Date Initiated: Sept 29/17

72-h IC50 (95% CL): 34.9 (30.9-37.0) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 32.8 (26.5-40.5) ug/L Zn CV (%): 11

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	795.2

Reviewed by: [signature]

Date reviewed: Nov. 2, 2017

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT

Sample ID: LC-DC1_WS_2017-10-02_N | Test Date/Time: Oct 4/17 @ 1205h

Work Order No.: 171087 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Sept 29/17 | Age of Culture: 5d | Culture Health: Good

Culture Count: 1 355 2 345 | Average: 350 | Culture Cell Density (c1): 350 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 350x10⁴ cells/ml = 6.29mL

Time Zero Counts: 1 21 2 22 | Average: 21.5

No. of Cells/mL: 21.5x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9773 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.8	23.0	24.0	24.0	24.0	24.0	✓	✓	✓	✓
1.5	6.9	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.4	23.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.6	23.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.3	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.8 Well 2: 6.8

Final control pH: Well 1: 6.9 Well 2: 6.9

Light intensity (lux): 3700 Date measured: Oct 4/17

Thermometer: 4 Light meter: 1 pH meter/probe: 1/1

Sample Description: clear, colourless, odourless, some particulates

Comments:

Reviewed: [signature] Date reviewed: Nov. 2, 2017

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: Oct 4/17 @ 1205h
Work Order #: 171087 Termination Date: Oct 7/17 @ 1205h
Sample ID: LC_Del_WS-2017-10-02_N Test set up by: MLT
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	29					MLT
	B	30					
	C	31					
	D	29					
	E	32					
	F	30					
	G	29					
	H	28					
1.5	A	35					
	B	31					
	C	30					
	D	35					
3.0	A	31					
	B	36					
	C	31					
	D	33					
6.0	A	35					
	B	42					
	C	40					
	D	46					
11.9	A	48					
	B	50					
	C	52					
	D	49					
23.8	A	89					
	B	98					
	C	93					
	D	96					
47.6	A	109					
	B	108					
	C	103					
	D	113					
95.2	A	121					
	B	118					
	C	108					
	D	116					

Comments:

Reviewed by: Date Reviewed: Nov 2, 2017

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 171087
Sample ID: LC_DC1_WS_2017-10-02_N

Start Date/Time: 4-Oct-17 @ 1205h
Termination Date/Time: 7-Oct-17 @ 1205h

Initial Cell Density: 9773 cell/mL

									215000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9772.727
Control	A	29				29	28.0	mean	28.8
	B	30				30	29.0	SD	1.28174
	C	31				31	30.0	CV	4.454704
	D	29				29	28.0		
	E	32				32	31.0		
	F	30				30	29.0		
	G	29				29	28.0		
	H	28				28	27.0		
1.5	A	35				35	34.0		
	B	31				31	30.0		
	C	30				30	29.0		
	D	35				35	34.0		
3	A	31				31	30.0		
	B	36				36	35.0		
	C	31				31	30.0		
	D	33				33	32.0		
6	A	35				35	34.0		
	B	42				42	41.0		
	C	40				40	39.0		
	D	46				46	45.0		
11.9	A	48				48	47.0		
	B	50				50	49.0		
	C	52				52	51.0		
	D	49				49	48.0		
23.8	A	89				89	88.0		
	B	98				98	97.0		
	C	93				93	92.0		
	D	96				96	95.0		
47.6	A	109				109	108.0		
	B	108				108	107.0		
	C	103				103	102.0		
	D	113				113	112.0		
95.2	A	121				121	120.0		
	B	118				118	117.0		
	C	108				108	107.0		
	D	116				116	115.0		

Reviewed by: _____

Date reviewed: Nov. 2, 2017

CETIS Analytical Report

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	13-7860-5413	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Oct-17 21:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	20-1109-2573	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	04 Oct-17 12:05	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	07 Oct-17 12:05	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	10-1973-7755	**Code:**	3CC7F69B	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:51	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	47h (8 °C)	**Station:**	LC_DC1_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	969949	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.3152	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	28.75	27	31	0.4532	1.282	4.46%	0.0%
1.5		4	31.75	29	34	1.315	2.63	8.28%	-10.43%
3		4	31.75	30	35	1.181	2.363	7.44%	-10.43%
6		4	39.75	34	45	2.287	4.573	11.51%	-38.26%
11.9		4	48.75	47	51	0.8539	1.708	3.5%	-69.57%
23.8		4	93	88	97	1.958	3.916	4.21%	-223.5%
47.6		4	107.3	102	112	2.056	4.113	3.84%	-273.0%
95.2		4	114.8	107	120	2.78	5.56	4.85%	-299.1%

Cell Yield Detail

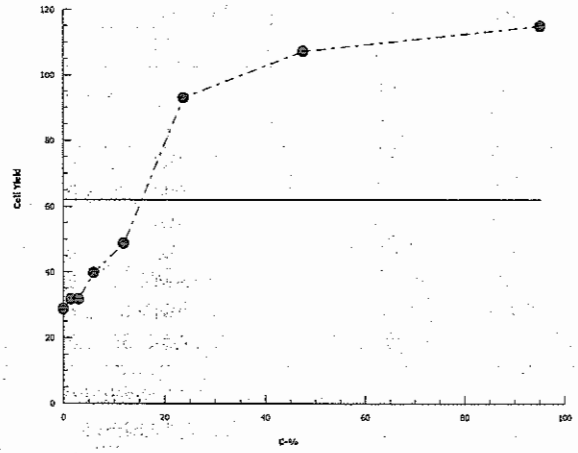
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	28	29	30	28	31	29	28	27
1.5		34	30	29	34				
3		30	35	30	32				
6		34	41	39	45				
11.9		47	49	51	48				
23.8		88	97	92	95				
47.6		108	107	102	112				
95.2		120	117	107	115				

Analyst: MT QA: Nov 2/17

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	13-7860-5413	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Oct-17 21:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: MH QA: NN 2/17

CETIS Analytical Report

Test Code: 171087b | 11-8871-8518

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-9463-8153	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Oct-17 21:24	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	20-1109-2573	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	04 Oct-17 12:05	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	07 Oct-17 12:05	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	10-1973-7755	**Code:**	3CC7F69B	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:51	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	47h (8 °C)	**Station:**	LC_DC1_WS_2017-10-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	17.9%	3	6	4.243	33.33

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.472	2.526	5.147	10	0.3226	CDF	Non-Significant Effect
		3	1.472	2.526	5.147	10	0.3226	CDF	Non-Significant Effect
		6*	5.399	2.526	5.147	10	<0.0001	CDF	Significant Effect
		11.9*	9.816	2.526	5.147	10	<0.0001	CDF	Significant Effect
		23.8*	31.53	2.526	5.147	10	<0.0001	CDF	Significant Effect
		47.6*	38.53	2.526	5.147	10	<0.0001	CDF	Significant Effect
		95.2*	42.21	2.526	5.147	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.3152	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	41513.22	5930.46	7	535.7	<0.0001	Significant Effect
Error	310	11.07143	28			
Total	41823.22		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	12.17	18.48	0.0951	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9602	0.9166	0.2177	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	28.75	27.68	29.82	28.5	27	31	0.4532	4.46%	0.0%
1.5		4	31.75	27.57	35.93	32	29	34	1.315	8.28%	-10.43%
3		4	31.75	27.99	35.51	31	30	35	1.181	7.44%	-10.43%
6		4	39.75	32.47	47.03	40	34	45	2.287	11.51%	-38.26%
11.9		4	48.75	46.03	51.47	48.5	47	51	0.8539	3.5%	-69.57%
23.8		4	93	86.77	99.23	93.5	88	97	1.958	4.21%	-223.5%
47.6		4	107.3	100.7	113.8	107.5	102	112	2.056	3.84%	-273.0%
95.2		4	114.8	105.9	123.6	116	107	120	2.78	4.85%	-299.1%

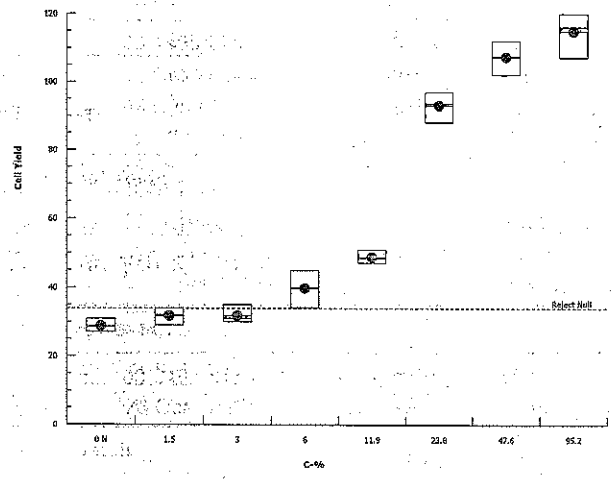
Nov-2/17

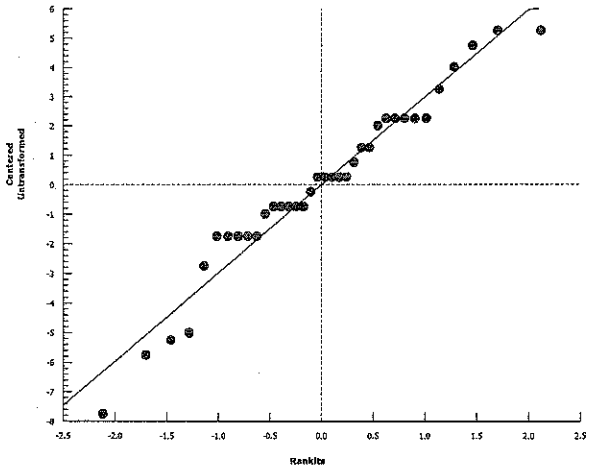
Analysis ID: 00-9463-8153 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 26 Oct-17 21:24 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	28	29	30	28	31	29	28	27
1.5		34	30	29	34				
3		30	35	30	32				
6		34	41	39	45				
11.9		47	49	51	48				
23.8		88	97	92	95				
47.6		108	107	102	112				
95.2		120	117	107	115				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 171087

Start Date: Oct 4/17
Set up by: MLT

Sample Information:

Sample ID: LC-FRDSDC-WS_2017-10-02_n
Sample Date: Oct 2/17
Date Received: Oct 3/17
Sample Volume: 5x2 L

Test Organism Information:

Culture Date: Sept 29/17
Age of culture (Day 0): 5d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC161
Stock Solution ID: 17Zn03
Date Initiated: Sept 29/17

72-h IC50 (95% CL): 34.9 (32.9-37.0) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 32.8 (26.5-40.5) ug/L Zn CV (%): 11

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: Nov. 2, 2017

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck Coal **Setup by:** MLT

Sample ID: LC_FRDSDC_WS_2017-10-02_N **Test Date/Time:** Oct 4/17 @ 1210h

Work Order No.: 171087 **CER #:** 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Sept 29/17 **Age of Culture:** 5d **Culture Health:** Good

Culture Count: 1 355 2 345 **Average:** 350 **Culture Cell Density (c1):** 350 x 10⁴ cells/mL

$$v1 = \frac{220{,}000 \text{ cells/ml} \times 100 \text{ ml}}{(c1) \quad 350 \times 10^4 \quad \text{cells/ml}} = 6.29 \text{mL}$$

Time Zero Counts: 1 21 2 22 **Average:** 21.5

No. of Cells/mL: 21.5 x 10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9773 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.8	23.0	24.0	24.0	24.0	24.0	✓	✓	✓	✓
1.5	6.9	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.5	23.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.8	23.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.3	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.8 Well 2: 6.8

Final control pH: Well 1: 6.9 Well 2: 6.9

Light intensity (lux): 3950 **Date measured:** Oct 4/17

Thermometer: 4 **Light meter:** 1 **pH meter/probe:** 1 / 1

Sample Description: clear, colourless, odourless, some particulates.

Comments:

Reviewed: [signature] **Date reviewed:** Nov. 2, 2017

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: Oct 4/17 @ 12:10h

Work Order #: 171087 Termination Date: Oct 7/17 @ 12:10h

Sample ID: LC-PRDSDC-WS-2017-1002_N Test set up by: MG

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	28					MG
	B	31					
	C	30					
	D	28					
	E	31					
	F	27					
	G	29					
	H	33					
1.5	A	33					
	B	32					
	C	33					
	D	30					
3.0	A	44					
	B	38					
	C	46					
	D	40					
6.0	A	45					
	B	52					
	C	46					
	D	49					
11.9	A	70					
	B	68					
	C	60					
	D	64					
23.8	A	101					
	B	103					
	C	90					
	D	95					
47.6	A	98					
	B	109					
	C	115					
	D	112					
95.2	A	101					
	B	119					
	C	108					
	D	104					

Comments:

Reviewed by: Date Reviewed: Nov. 2, 2017

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	4-Oct-17 @ 1210h		
WO#:	171087	Termination Date/Time	7-Oct-17 @ 1210h		
Sample ID:	LC_FRDSDC_WS_2017-10-02_N				
		Initial Cell Density:	9773 cell/mL		215000
					0.22
					0.01
					9772.727

Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		
Control	A	28				28	27.0	mean	28.6
	B	31				31	30.0	SD	1.995531
	C	30				30	29.0	CV	6.965756
	D	28				28	27.0		
	E	31				31	30.0		
	F	27				27	26.0		
	G	29				29	28.0		
	H	33				33	32.0		
1.5	A	33				33	32.0		
	B	32				32	31.0		
	C	33				33	32.0		
	D	30				30	29.0		
3	A	44				44	43.0		
	B	38				38	37.0		
	C	46				46	45.0		
	D	40				40	39.0		
6	A	45				45	44.0		
	B	52				52	51.0		
	C	46				46	45.0		
	D	49				49	48.0		
11.9	A	70				70	69.0		
	B	68				68	67.0		
	C	60				60	59.0		
	D	64				64	63.0		
23.8	A	101				101	100.0		
	B	103				103	102.0		
	C	90				90	89.0		
	D	95				95	94.0		
47.6	A	98				98	97.0		
	B	109				109	108.0		
	C	115				115	114.0		
	D	112				112	111.0		
95.2	A	101				101	100.0		
	B	119				119	118.0		
	C	108				108	107.0		
	D	104				104	103.0		

Reviewed by: _____ Date reviewed: NOV 2, 2017

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-3935-0964	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Oct-17 21:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-6050-6233	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	04 Oct-17 12:10	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	07 Oct-17 12:10	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	02-3018-8233	**Code:**	DB864C9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 10:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	50h (7.8 °C)	**Station:**	LC_FRDSDC_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	17530	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9061	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	28.63	26	32	0.7055	1.996	6.97%	0.0%
1.5		4	31	29	32	0.7071	1.414	4.56%	-8.3%
3		4	41	37	45	1.826	3.651	8.91%	-43.23%
6		4	47	44	51	1.581	3.162	6.73%	-64.19%
11.9		4	64.5	59	69	2.217	4.435	6.88%	-125.3%
23.8		4	96.25	89	102	2.955	5.909	6.14%	-236.2%
47.6		4	107.5	97	114	3.708	7.416	6.9%	-275.5%
95.2		4	107	100	118	3.937	7.874	7.36%	-273.8%

Cell Yield Detail

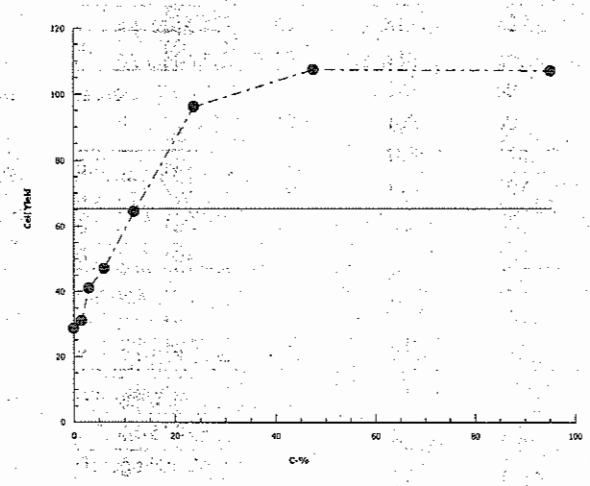
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	27	30	29	27	30	26	28	32
1.5		32	31	32	29				
3		43	37	45	39				
6		44	51	45	48				
11.9		69	67	59	63				
23.8		100	102	89	94				
47.6		97	108	114	111				
95.2		100	118	107	103				

NN-2/17

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 01-3935-0964 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 26 Oct-17 21:26 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

Graphics



Nov 2/17

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	09-3698-4625	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Oct-17 21:27	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	05-6050-6233	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	04 Oct-17 12:10	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	07 Oct-17 12:10	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	02-3018-8233	**Code:**	DB864C9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 10:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	50h (7.8 °C)	**Station:**	LC_FRDSDC_WS_2017-10-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	25.4%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.8251	2.526	7.271	10	0.6386	CDF	Non-Significant Effect
		3*	4.299	2.526	7.271	10	0.0006	CDF	Significant Effect
		6*	6.384	2.526	7.271	10	<0.0001	CDF	Significant Effect
		11.9*	12.46	2.526	7.271	10	<0.0001	CDF	Significant Effect
		23.8*	23.49	2.526	7.271	10	<0.0001	CDF	Significant Effect
		47.6*	27.4	2.526	7.271	10	<0.0001	CDF	Significant Effect
		95.2*	27.23	2.526	7.271	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9061	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	36498.6	5214.085	7	236	<0.0001	Significant Effect
Error	618.625	22.09375	28			
Total	37117.22		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	14.55	18.48	0.0423	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9854	0.9166	0.9068	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	28.63	26.96	30.29	28.5	26	32	0.7055	6.97%	0.0%
1.5		4	31	28.75	33.25	31.5	29	32	0.7071	4.56%	-8.3%
3		4	41	35.19	46.81	41	37	45	1.826	8.91%	-43.23%
6		4	47	41.97	52.03	46.5	44	51	1.581	6.73%	-64.19%
11.9		4	64.5	57.44	71.56	65	59	69	2.217	6.88%	-125.3%
23.8		4	96.25	86.85	105.7	97	89	102	2.955	6.14%	-236.2%
47.6		4	107.5	95.7	119.3	109.5	97	114	3.708	6.9%	-275.5%
95.2		4	107	94.47	119.5	105	100	118	3.937	7.36%	-273.8%

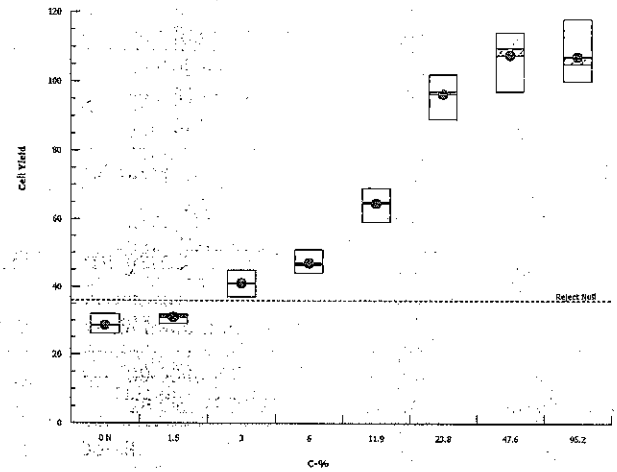
Nov 2/17

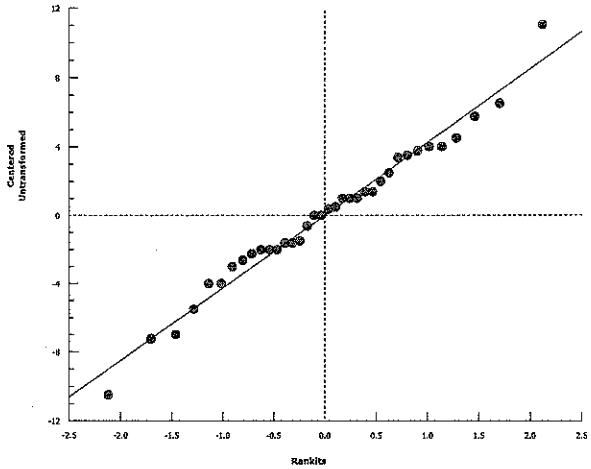
Analysis ID: 09-3698-4625 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 26 Oct-17 21:27 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	27	30	29	27	30	26	28	32
1.5		32	31	32	29				
3		43	37	45	39				
6		44	51	45	48				
11.9		69	67	59	63				
23.8		100	102	89	94				
47.6		97	108	114	111				
95.2		100	118	107	103				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 171087

Start Date: Oct 4/17
Set up by: MLT

Sample Information:

Sample ID: LC-DCDS-WS-2017-10-02-N
Sample Date: Oct 2/17
Date Received: Oct 3/17
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: Sept 29/17
Age of culture (Day 0): 5d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC161
Stock Solution ID: 17Zn03
Date Initiated: Sept 28/17

72-h IC50 (95% CL): 34.9 (32.9-37.0) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 32.8 (26.5-40.5) ug/L Zn CV (%): 11

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	795.2

Reviewed by: [signature]

Date reviewed: Nov 2, 2017

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MLT

Sample ID: LC_DCDS_WS_2017-10-02_N | Test Date/Time: Oct 4/17 @ 1220h

Work Order No.: 171087 | CER #: EM4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Sept 29/17 | Age of Culture: 5d | Culture Health: Good

Culture Count: 1 355 2 345 | Average: 350 | Culture Cell Density (c1): 350 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 350x10⁴ cells/ml = 6.29mL

Time Zero Counts: 1 21 2 22 | Average: 21.5

No. of Cells/mL: 21.5 x 10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9773 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	EM4 6.8	23.0	24.0	24.0	24.0	24.0	✓	✓	✓	✓
1.5	7.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.1	23.0					✓	✓	✓	✓
6.0	7.2	23.0					✓	✓	✓	✓
11.9	7.4	23.0					✓	✓	✓	✓
23.8	7.6	23.0					✓	✓	✓	✓
47.6	8.0	23.0					✓	✓	✓	✓
95.2	8.3	23.0					✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.8 Well 2: 6.9

Final control pH: Well 1: 6.9 Well 2: 6.9

Light intensity (lux): 4090 Date measured: Oct 4/17

Thermometer: 4 Light meter: 1 pH meter/probe: 1, 1

Sample Description: Light yellow, clear, odourless, some particulates.

Comments:

Reviewed: [signature] Date reviewed: Nov. 2, 2017

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: Oct 4/17 @ 1220h
Work Order #: 171087 Termination Date: Oct 7/17 @ 1220h
Sample ID: LC-DCDS-WS2017-10-02-N Test set up by: MG
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	34					MG
	B	36					
	C	30					
	D	31					
	E	29					
	F	30					
	G	31					
	H	29					
1.5	A	33					
	B	29					
	C	30					
	D	31					
3.0	A	33					
	B	37					
	C	34					
	D	33					
6.0	A	38					
	B	34					
	C	37					
	D	33					
11.9	A	50					
	B	46					
	C	51					
	D	50					
23.8	A	80					
	B	84					
	C	90					
	D	83					
47.6	A	101					
	B	103					
	C	111					
	D	106					
95.2	A	121					
	B	130					
	C	122					
	D	123					✓

Comments:

Reviewed by: Date Reviewed: Nov 2, 2017

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	4-Oct-17 @ 1220h
WO#:	171087	Termination Date/Time	7-Oct-17 @ 1220h
Sample ID:	LC_DCDS_WS_2017-10-02_N		
		Initial Cell Density:	9773 cell/mL

									215000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9772.727
Control	A	34				34	33.0	mean	30.3
	B	36				36	35.0	SD	2.492847
	C	30				30	29.0	CV	8.234629
	D	31				31	30.0		
	E	29				29	28.0		
	F	30				30	29.0		
	G	31				31	30.0		
	H	29				29	28.0		
1.5	A	33				33	32.0		
	B	29				29	28.0		
	C	30				30	29.0		
	D	31				31	30.0		
3	A	33				33	32.0		
	B	37				37	36.0		
	C	34				34	33.0		
	D	33				33	32.0		
6	A	38				38	37.0		
	B	34				34	33.0		
	C	37				37	36.0		
	D	33				33	32.0		
11.9	A	50				50	49.0		
	B	46				46	45.0		
	C	51				51	50.0		
	D	50				50	49.0		
23.8	A	80				80	79.0		
	B	84				84	83.0		
	C	90				90	89.0		
	D	83				83	82.0		
47.6	A	101				101	100.0		
	B	103				103	102.0		
	C	111				111	110.0		
	D	106				106	105.0		
95.2	A	121				121	120.0		
	B	130				130	129.0		
	C	122				122	121.0		
	D	123				123	122.0		

Reviewed by: _____ Date reviewed: NOV. 2, 2017

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	09-8469-4170	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Oct-17 21:31	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	03-9698-3873	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	04 Oct-17 12:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	07 Oct-17 12:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	07-5716-3320	**Code:**	2D216538	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:40	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (7.8 °C)	**Station:**	LC_DCDS_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1877099	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.0744	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	30.25	28	35	0.8814	2.493	8.24%	0.0%
1.5		4	29.75	28	32	0.8539	1.708	5.74%	1.65%
3		4	33.25	32	36	0.9465	1.893	5.69%	-9.92%
6		4	34.5	32	37	1.19	2.38	6.9%	-14.05%
11.9		4	48.25	45	50	1.109	2.217	4.6%	-59.5%
23.8		4	83.25	79	89	2.097	4.193	5.04%	-175.2%
47.6		4	104.3	100	110	2.175	4.349	4.17%	-244.6%
95.2		4	123	120	129	2.041	4.082	3.32%	-306.6%

Cell Yield Detail

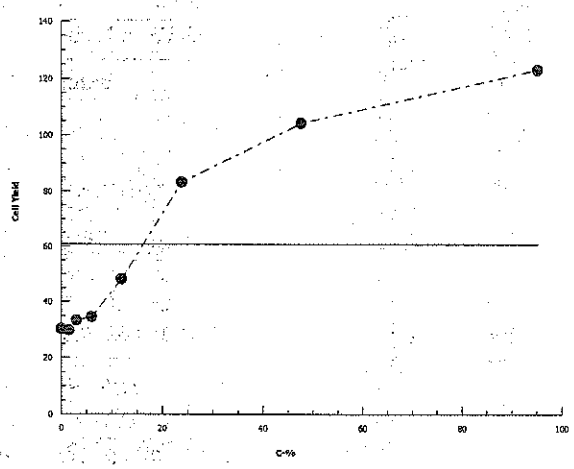
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	33	35	29	30	28	29	30	28
1.5		32	28	29	30				
3		32	36	33	32				
6		37	33	36	32				
11.9		49	45	50	49				
23.8		79	83	89	82				
47.6		100	102	110	105				
95.2		120	129	121	122				

Nov. 2/17

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 09-8469-4170 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 26 Oct-17 21:31 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

Graphics



Nov. 2/17

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-8277-9722	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Oct-17 21:32	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-9698-3873	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	04 Oct-17 12:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	07 Oct-17 12:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	07-5716-3320	**Code:**	2D216538	**Client:**	Teck Coal
Sample Date:	02 Oct-17 12:40	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (7.8 °C)	**Station:**	LC_DCDS_WS_2017-10-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	15.4%	6	11.9	8.45	16.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	-0.271	2.526	4.662	10	0.9654	CDF	Non-Significant Effect
		3	1.626	2.526	4.662	10	0.2596	CDF	Non-Significant Effect
		6	2.303	2.526	4.662	10	0.0792	CDF	Non-Significant Effect
		11.9*	9.755	2.526	4.662	10	<0.0001	CDF	Significant Effect
		23.8*	28.72	2.526	4.662	10	<0.0001	CDF	Significant Effect
		47.6*	40.1	2.526	4.662	10	<0.0001	CDF	Significant Effect
		95.2*	50.26	2.526	4.662	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.0744	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	42386.5	6055.214	7	666.8	<0.0001	Significant Effect
Error	254.25	9.080358	28			
Total	42640.75		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	5.465	18.48	0.6034	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.934	0.9166	0.0331	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	30.25	28.17	32.33	29.5	28	35	0.8814	8.24%	0.0%
1.5		4	29.75	27.03	32.47	29.5	28	32	0.8539	5.74%	1.65%
3		4	33.25	30.24	36.26	32.5	32	36	0.9465	5.69%	-9.92%
6		4	34.5	30.71	38.29	34.5	32	37	1.19	6.9%	-14.05%
11.9		4	48.25	44.72	51.78	49	45	50	1.109	4.6%	-59.5%
23.8		4	83.25	76.58	89.92	82.5	79	89	2.097	5.04%	-175.2%
47.6		4	104.3	97.33	111.2	103.5	100	110	2.175	4.17%	-244.6%
95.2		4	123	116.5	129.5	121.5	120	129	2.041	3.32%	-306.6%

Nov 2/17

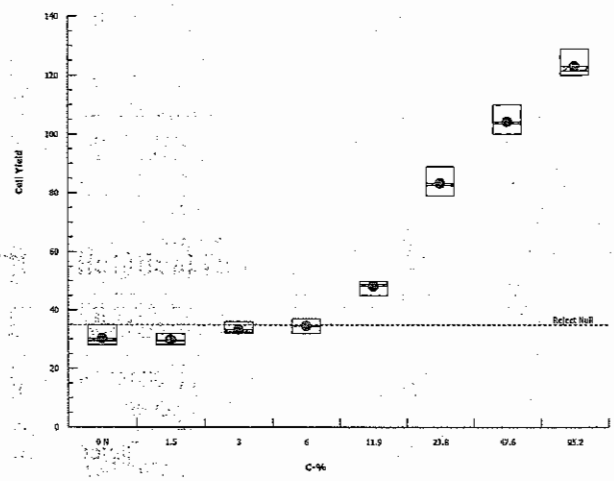
EC Alga Growth Inhibition Test — **Nautilus Environmental**

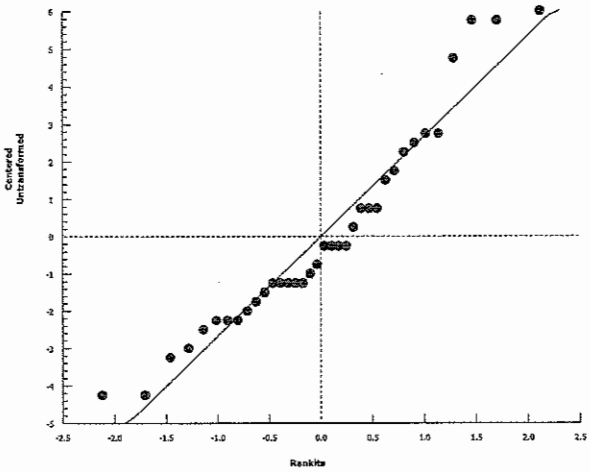
Analysis ID:	07-8277-9722	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	26 Oct-17 21:32	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	33	35	29	30	28	29	30	28
1.5		32	28	29	30				
3		32	36	33	32				
6		37	33	36	32				
11.9		49	45	50	49				
23.8		79	83	89	82				
47.6		100	102	110	105				
95.2		120	129	121	122				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 171087

Start Date: Oct 4/17
Set up by: MLT

Sample Information:

Sample ID: LC-LCS_WS_2017-10-02_N
Sample Date: Oct 2/17
Date Received: Oct 3/17
Sample Volume: 5x20L

Test Organism Information:

Culture Date: Sept 29/17
Age of culture (Day 0): 5d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC161
Stock Solution ID: 17Zn03
Date Initiated: Sept 29/17

72-h IC50 (95% CL): 34.9 (32.9-37.0) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 32.8 (26.5-40.5) ug/L Zn CV (%): 11

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	795.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: NOV. 2, 2017

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MG

Sample ID: LC-LC5_WS-2017-10-02_N | Test Date/Time: Oct 4/17 @ 1225h

Work Order No.: 171087 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Sept 29/17 | Age of Culture: 5d | Culture Health: Good

Culture Count: 1 355 2 345 | Average: 350 | Culture Cell Density (c1): 350X10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 350X10⁴ cells/ml = 6.29mL

Time Zero Counts: 1 21 2 22 | Average: 21.5

No. of Cells/mL: 21.5X10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9773 cells/mL

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control	6.8	23.0	24.0	24.0	24.0	24.0	✓	✓	✓	✓
1.5	7.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.1	23.0					✓	✓	✓	✓
6.0	7.2	23.0					✓	✓	✓	✓
11.9	7.3	23.0					✓	✓	✓	✓
23.8	7.6	23.0					✓	✓	✓	✓
47.6	8.0	23.0					✓	✓	✓	✓
95.2	8.3	23.0					✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 6.8 Well 2: 6.8

Final control pH: Well 1: 6.9 Well 2: 6.9

Light intensity (lux): 410 | Date measured: Oct 4/17

Thermometer: 4 | Light meter: 1 | pH meter/probe: 1 / 1

Sample Description: clear, colourless, odourless, some particulates

Comments:

Reviewed: [signature] | Date reviewed: Nov. 2, 2017

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: Oct 4/17 @ 1225h
Work Order #: 171087 Termination Date: Oct 7/17 @ 1225h
Sample ID: LC_LCLS_WS_2017-10-02_N Test set up by: MLT
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	28					MLT
	B	32					
	C	29					
	D	27					
	E	28					
	F	30					
	G	29					
	H	32					
1.9	A	31					
	B	30					
	C	28					
	D	29					
3.0	A	30					
	B	33					
	C	31					
	D	28					
6.0	A	47					
	B	39					
	C	42					
	D	46					
11.9	A	71					
	B	73					
	C	60					
	D	78					
23.8	A	95					
	B	98					
	C	90					
	D	100					
47.6	A	107					
	B	113					
	C	112					
	D	115					
95.2	A	114					
	B	107					
	C	115					
	D	119					

Comments:

Reviewed by: Date Reviewed: Nov 2, 2017

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	4-Oct-17 @ 1225h
WO#:	171087	Termination Date/Time	7-Oct-17 @ 1225h
Sample ID:	LC_LC5_WS_2017-10-02_N		
		Initial Cell Density:	9773 cell/mL

									215000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9772.727
Control	A	28				28	27.0	mean	28.4
	B	32				32	31.0	SD	1.846812
	C	29				29	28.0	CV	6.503379
	D	27				27	26.0		
	E	28				28	27.0		
	F	30				30	29.0		
	G	29				29	28.0		
	H	32				32	31.0		
1.5	A	31				31	30.0		
	B	30				30	29.0		
	C	28				28	27.0		
	D	29				29	28.0		
3	A	30				30	29.0		
	B	33				33	32.0		
	C	31				31	30.0		
	D	28				28	27.0		
6	A	47				47	46.0		
	B	39				39	38.0		
	C	42				42	41.0		
	D	46				46	45.0		
11.9	A	71				71	70.0		
	B	73				73	72.0		
	C	60				60	59.0		
	D	72				72	71.0		
23.8	A	95				95	94.0		
	B	98				98	97.0		
	C	90				90	89.0		
	D	100				100	99.0		
47.6	A	107				107	106.0		
	B	113				113	112.0		
	C	112				112	111.0		
	D	115				115	114.0		
95.2	A	114				114	113.0		
	B	107				107	106.0		
	C	115				115	114.0		
	D	119				119	118.0		

Reviewed by: _____ Date reviewed: NOV. 2, 2017

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	16-9815-2760	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:13	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	01-7071-6485	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	04 Oct-17 12:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	07 Oct-17 12:25	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	09-0459-2041	**Code:**	35EAFAA9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 15:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	45h (8.1 °C)	**Station:**	LC_LC5_WS_2017-10-02_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1506211	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7305	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	28.38	26	31	0.6529	1.847	6.51%	0.0%
1.5		4	28.5	27	30	0.6455	1.291	4.53%	-0.44%
3		4	29.5	27	32	1.041	2.082	7.06%	-3.97%
6		4	42.5	38	46	1.848	3.697	8.7%	-49.78%
11.9		4	68	59	72	3.028	6.055	8.91%	-139.6%
23.8		4	94.75	89	99	2.175	4.349	4.59%	-233.9%
47.6		4	110.8	106	114	1.702	3.403	3.07%	-290.3%
95.2		4	112.8	106	118	2.496	4.992	4.43%	-297.4%

Cell Yield Detail

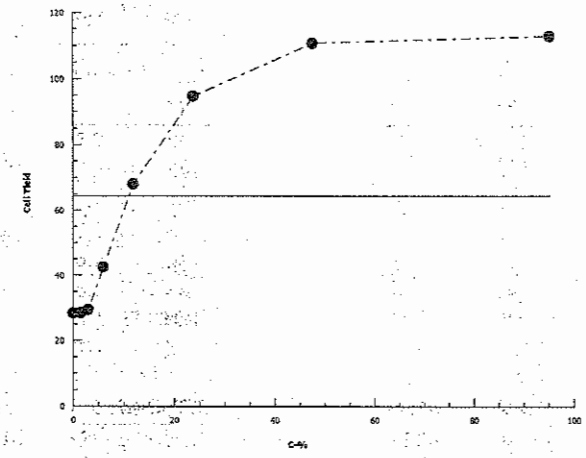
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	27	31	28	26	27	29	28	31
1.5		30	29	27	28				
3		29	32	30	27				
6		46	38	41	45				
11.9		70	72	59	71				
23.8		94	97	89	99				
47.6		106	112	111	114				
95.2		113	106	114	118				

Nov. 2/17

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 16-9815-2760 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 27 Oct-17 19:13 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

Graphics



NOV 2/17

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-4296-8832	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:13	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	01-7071-6485	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	04 Oct-17 12:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	07 Oct-17 12:25	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	09-0459-2041	**Code:**	35EAFAA9	**Client:**	Teck Coal
Sample Date:	02 Oct-17 15:15	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	45h (8.1 °C)	**Station:**	LC_LC5_WS_2017-10-02_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	19.5%	3	6	4.243	33.33

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.057	2.526	5.54	10	0.9156	CDF	Non-Significant Effect
		3	0.513	2.526	5.54	10	0.7780	CDF	Non-Significant Effect
		6*	6.441	2.526	5.54	10	<0.0001	CDF	Significant Effect
		11.9*	18.07	2.526	5.54	10	<0.0001	CDF	Significant Effect
		23.8*	30.27	2.526	5.54	10	<0.0001	CDF	Significant Effect
		47.6*	37.56	2.526	5.54	10	<0.0001	CDF	Significant Effect
		95.2*	38.47	2.526	5.54	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7305	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	43429.43	6204.205	7	483.7	<0.0001	Significant Effect
Error	359.125	12.82589	28			
Total	43788.55		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	11.16	18.48	0.1319	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9445	0.9166	0.0704	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	28.38	26.83	29.92	28	26	31	0.6529	6.51%	0.0%
1.5		4	28.5	26.45	30.55	28.5	27	30	0.6455	4.53%	-0.44%
3		4	29.5	26.19	32.81	29.5	27	32	1.041	7.06%	-3.97%
6		4	42.5	36.62	48.38	43	38	46	1.848	8.7%	-49.78%
11.9		4	68	58.36	77.64	70.5	59	72	3.028	8.91%	-139.6%
23.8		4	94.75	87.83	101.7	95.5	89	99	2.175	4.59%	-233.9%
47.6		4	110.8	105.3	116.2	111.5	106	114	1.702	3.07%	-290.3%
95.2		4	112.8	104.8	120.7	113.5	106	118	2.496	4.43%	-297.4%

Nov 2/17

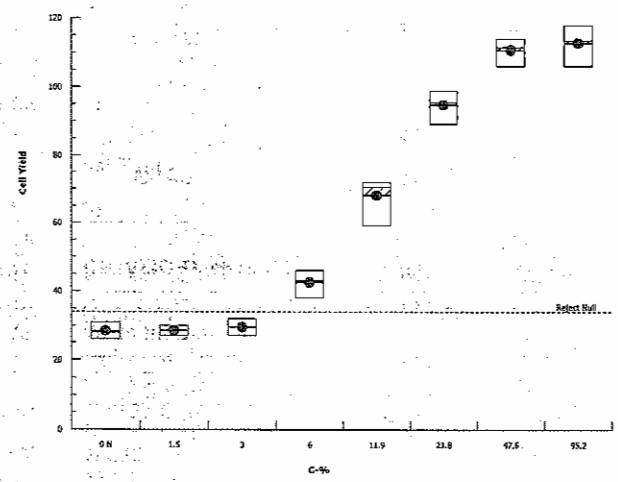
EC Alga Growth Inhibition Test — **Nautilus Environmental**

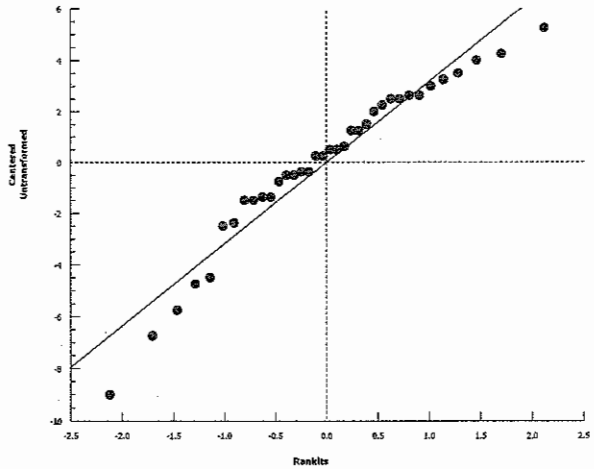
Analysis ID: 10-4296-8832 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 27 Oct-17 19:13 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	27	31	28	26	27	29	28	31
1.5		30	29	27	28				
3		29	32	30	27				
6		46	38	41	45				
11.9		70	72	59	71				
23.8		94	97	89	99				
47.6		106	112	111	114				
95.2		113	106	114	118				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 171087

Start Date: Oct 4/17
Set up by: MLT

Sample Information:

Sample ID: WL_DFLUB_OUT_SP21_20171002_N
Sample Date: Oct 2/17
Date Received: Oct 3/17
Sample Volume: 5x2L

Test Organism Information:

Culture Date: Sept 29/17
Age of culture (Day 0): 5d

Zinc Reference Toxicant Results:

Reference Toxicant ID: Sept
Stock Solution ID: 17Zn03
Date Initiated: Sept 29/17

72-h IC50 (95% CL): 34.9 (32.9-37.0) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 32.8 (26.5-40.5) ug/L Zn CV (%): 11

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: Nov. 3, 2017

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck Coal **Setup by:** MLT

Sample ID: ~~WTF-DUT~~ MLT WL-BFWB_OUT_SP21-20171002 **Test Date/Time:** OCT 4/17 @ 1240h

Work Order No.: 171087 **CER #:** 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Sept 29/17 **Age of Culture:** 5d **Culture Health:** Good

Culture Count: 1 355 2 345 **Average:** 350 **Culture Cell Density (c1):** 350 x10⁴ cells/mL

$$v1 = \frac{220{,}000 \text{ cells/ml} \times 100 \text{ ml}}{(c1) \quad 350 \times 10^4 \quad \text{cells/ml}} = 6.29\text{mL}$$

Time Zero Counts: 1 21 2 22 **Average:** 21.5

No. of Cells/mL: 21.5 x10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9773 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	6.8	23.0	24.0	24.0	24.0	24.0	✓	✓	✓	✓
1.5	6.8	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	6.9	23.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.5	23.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	8.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.3	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Initial control pH: Well 1: 6.8 Well 2: 6.8

Final control pH: Well 1: 6.9 Well 2: 6.9

Light intensity (lux): 4040 **Date measured:** OCT 4/17

Thermometer: 4 **Light meter:** 1 **pH meter/probe:** 1 / 1

Sample Description: clear, colourless, hydrocarbon odourless, no particulates

Comments:

Reviewed: [signature] **Date reviewed:** Nov 2, 2017

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal | Start Date/Time: Oct 4/17 @ 1240h
Work Order #: 171087 | Termination Date: Oct 7/17 @ 1240h
Sample ID: ~~WTR_OUT~~ MB | Test set up by: ML
%(v/v) WL_BFWB_OUT_SP2L_20171002_N

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	30					ML
	B	31					
	C	33					
	D	28					
	E	29					
	F	28					
	G	30					
	H	31					
1.5	A	33					
	B	36					
	C	35					
	D	39					
3.0	A	37					
	B	36					
	C	40					
	D	42					
6.0	A	40					
	B	44					
	C	46					
	D	50					
11.9	A	75					
	B	77					
	C	71					
	D	69					
23.8	A	83					
	B	87					
	C	91					
	D	90					
47.6	A	101					
	B	92					
	C	96					
	D	98					
95.2	A	50					
	B	55					
	C	53					
	D	49					

Comments:

Reviewed by: [signature] | Date Reviewed: Nov 2, 2017

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	4-Oct-17 @ 1240h
WO#:	171087	Termination Date/Time	7-Oct-17 @ 1240h
Sample ID:	WL_BFWB_OUT_SP21_20171002_N		
		Initial Cell Density:	9773 cell/mL

									215000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9772.727
Control	A	30				30	29.0	mean	29.0
	B	31				31	30.0	SD	1.690309
	C	33				33	32.0	CV	5.824086
	D	28				28	27.0		
	E	29				29	28.0		
	F	28				28	27.0		
	G	30				30	29.0		
	H	31				31	30.0		
1.5	A	33				33	32.0		
	B	36				36	35.0		
	C	35				35	34.0		
	D	39				39	38.0		
3	A	37				37	36.0		
	B	36				36	35.0		
	C	40				40	39.0		
	D	42				42	41.0		
6	A	40				40	39.0		
	B	44				44	43.0		
	C	46				46	45.0		
	D	50				50	49.0		
11.9	A	75				75	74.0		
	B	77				77	76.0		
	C	71				71	70.0		
	D	69				69	68.0		
23.8	A	83				83	82.0		
	B	87				87	86.0		
	C	91				91	90.0		
	D	90				90	89.0		
47.6	A	101				101	100.0		
	B	92				92	91.0		
	C	96				96	95.0		
	D	98				98	97.0		
95.2	A	50				50	49.0		
	B	55				55	54.0		
	C	53				53	52.0		
	D	49				49	48.0		

Reviewed by: _____ Date reviewed: Nov 2, 2017

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-8823-5113	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:18	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-3588-7694	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	04 Oct-17 12:40	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	07 Oct-17 12:40	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	17-2466-1926	**Code:**	66CC40A6	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	52h (9 °C)	**Station:**	WL_BFWB_OUT_SP21_20171002_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	352702	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7305	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	64.94	56.43	88.91	1.54	1.125	1.772
IC10	88.47	66.32	N/A	1.13	NA	1.508
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	29	27	32	0.5976	1.69	5.83%	0.0%
1.5		4	34.75	32	38	1.25	2.5	7.19%	-19.83%
3		4	37.75	35	41	1.377	2.754	7.3%	-30.17%
6		4	44	39	49	2.082	4.163	9.46%	-51.72%
11.9		4	72	68	76	1.826	3.651	5.07%	-148.3%
23.8		4	86.75	82	90	1.797	3.594	4.14%	-199.1%
47.6		4	95.75	91	100	1.887	3.775	3.94%	-230.2%
95.2		4	50.75	48	54	1.377	2.754	5.43%	-75.0%

Cell Yield Detail

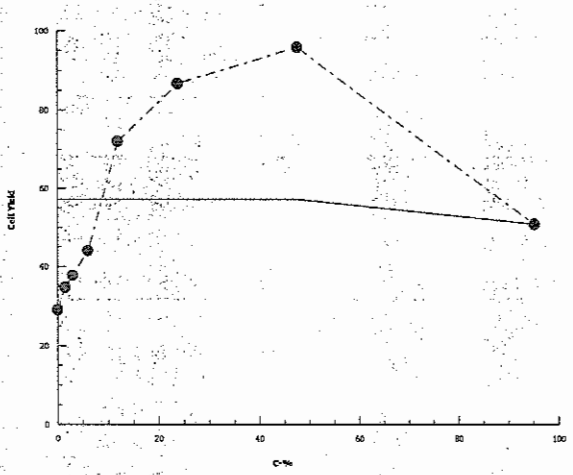
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	29	30	32	27	28	27	29	30
1.5		32	35	34	38				
3		36	35	39	41				
6		39	43	45	49				
11.9		74	76	70	68				
23.8		82	86	90	89				
47.6		100	91	95	97				
95.2		49	54	52	48				

Analyst: MT QA: Nov 2/17

EC Alga Growth Inhibition Test **Nautilus Environmental**

Analysis ID: 01-8823-5113 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 27 Oct-17 19:18 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

Graphics



Analyst: ML Nov 2/17 QA:

CETIS Analytical Report

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	17-9723-2801	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	27 Oct-17 19:19	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-3588-7694	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	04 Oct-17 12:40	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	07 Oct-17 12:40	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	5d
Sample ID:	17-2466-1926	**Code:**	66CC40A6	**Client:**	Teck Coal
Sample Date:	02 Oct-17 09:00	**Material:**	Water Sample	**Project:**	
Receive Date:	03 Oct-17 12:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	52h (9 °C)	**Station:**	WL_BFWB_OUT_SP21_20171002_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	16.2%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	3.095	2.526	4.694	10	0.0137	CDF	Significant Effect
		3*	4.709	2.526	4.694	10	0.0002	CDF	Significant Effect
		6*	8.073	2.526	4.694	10	<0.0001	CDF	Significant Effect
		11.9*	23.14	2.526	4.694	10	<0.0001	CDF	Significant Effect
		23.8*	31.08	2.526	4.694	10	<0.0001	CDF	Significant Effect
		47.6*	35.93	2.526	4.694	10	<0.0001	CDF	Significant Effect
		95.2*	11.71	2.526	4.694	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.7305	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	20521.89	2931.698	7	318.5	<0.0001	Significant Effect
Error	257.75	9.205358	28			
Total	20779.64		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.638	18.48	0.7040	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9695	0.9166	0.4121	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	29	27.59	30.41	29	27	32	0.5976	5.83%	0.0%
1.5		4	34.75	30.77	38.73	34.5	32	38	1.25	7.19%	-19.83%
3		4	37.75	33.37	42.13	37.5	35	41	1.377	7.3%	-30.17%
6		4	44	37.38	50.62	44	39	49	2.082	9.46%	-51.72%
11.9		4	72	66.19	77.81	72	68	76	1.826	5.07%	-148.3%
23.8		4	86.75	81.03	92.47	87.5	82	90	1.797	4.14%	-199.1%
47.6		4	95.75	89.74	101.8	96	91	100	1.887	3.94%	-230.2%
95.2		4	50.75	46.37	55.13	50.5	48	54	1.377	5.43%	-75.0%

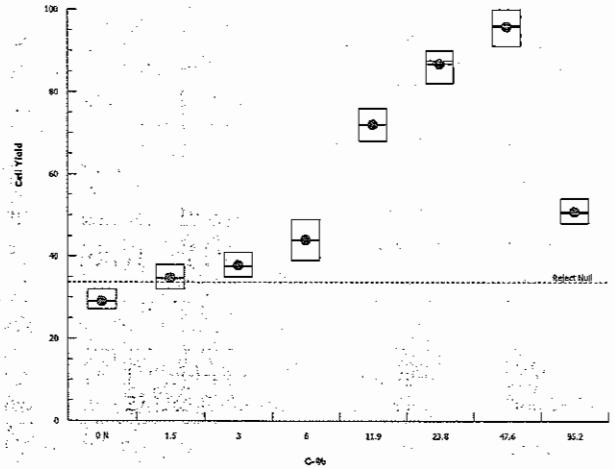
EC Alga Growth Inhibition Test — **Nautilus Environmental**

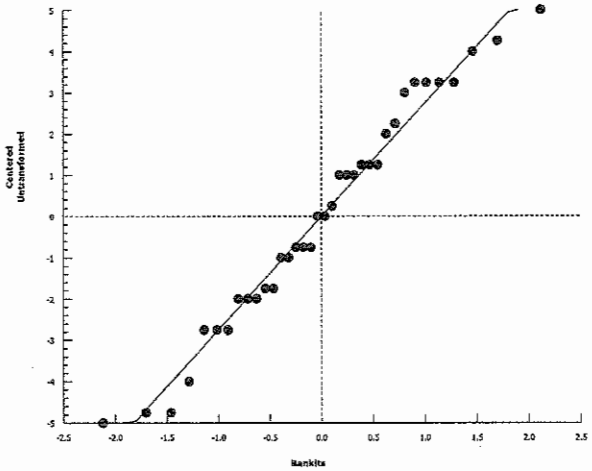
Analysis ID: 17-9723-2801 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 27 Oct-17 19:19 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	29	30	32	27	28	27	29	30
1.5		32	35	34	38				
3		36	35	39	41				
6		39	43	45	49				
11.9		74	76	70	68				
23.8		82	86	90	89				
47.6		100	91	95	97				
95.2		49	54	52	48				

Graphics





NN·2/17

APPENDIX E – Chain-of-Custody Forms

Teck

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COC ID: 20171002-1500 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental			Report Format / Distribution	Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact	Krysta Pearcy			Email 1: drake.tymstra@teck.com	x	x	
Email	chris.blurton@teck.com			Email	Krysta@NautilusEnvironmental.ca			Email 2: chris.blurton@teck.com	x	x	
Address	Box 2003			Address	8664 commerce Court			Email 3: teckcoal@equisonline.com			x
	15km North Hwy 43							Email 4: lee.wilm@teck.com	x	x	
City	Sparwood	Province	BC	City	Burnaby	Province	BC				
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	PO number	432106		
Phone Number	250-425-3196			Phone Number	604-420-8773						

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	72h P. subcapitata P/F	7d C.dubia P/F	30 d rainbow trout early life stage P/F	7 d Cdubia dilution series	72hr Psubcapitata dilution series	7d L minor plant grown dilution series	7 d O mykis development dilution series					Temp °C
① LC_LCDSSLCC_WS_2017-10-02_N	LC_LCDSSLCC	WS	N	2-Oct-17	9:14	G	8 x 20L			X	X	X	X	X	X	X					8.2
① LC_DC1_WS_2017-10-02_N	LC_DC1	WS	N	2-Oct-17	12:51	G	5 x 20L						X	X	X	X					8.0
① LC_FRDSDC_WS_2017-10-02_N	LC_FRDSDC	WS	N	2-Oct-17	10:15	G	5 x 20L						X	X	X	X					7.8
① LC_DCDS_WS_2017-10-02_N	LC_DCDS	WS	N	2-Oct-17	12:40	G	5 x 20L						X	X	X	X					7.8
① LC_LC5_WS_2017-10-02_N	LC_LC5	WS	N	2-Oct-17	~~13:15~~	G	5 x 20L						X	X	X	X					8.1
													X	X	X	X					
							40A			171090	171091	171092	171086	171087	171088	171089					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
T Phillips/ D Tymstra	October 2, 2017	Nautilus - Burnaby	Oct 03/17 @ 12:20
		NY - Nair Yamamoto	

NB OF BOTTLES RETURNED/DESCRIPTION

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Tyler Phillips. Drake Tymstra	Mobile #	(250) 919-0965
Sampler's Signature		Date/Time	October 2, 2017

① Clear, colourless, odourless, some particulates

② light yellow, clear, odourless, some particulates.

Teck

Page 1 of

COC ID:	20171002-Toxicity	TURNAROUND TIME:	REGULAR	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	WLC AWTF			Lab Name	Nautilus Environmental			Report Delivery Formats		Excel	PDF	EDD
Project Manager	Thomas Davidson			Lab Contact	Krysta Pearcy			Email 1:	thomas.davidson@teck.com	X	X	X
Email	Thomas.Davidson@teck.com			Email	Krysta@NautilusEnvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Address	15 Km North HWY 43			Address	8664 Commerce Court			Email 3:	teckwlclab@epcor.com	X	X	X
								Email 4:	marty.hafke@teck.com	X	X	X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	Email 5:	colin.lynch@teck.com			X
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250.603.9417			Phone Number	+1.604.420.8773			VPO 00473572				

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS: 7 d Ctubia dilution series	72hr Psubcapitata dilution series	7d L minor plant growth dilution series	7 d O mykis development dilution series							Temp °C
	FIL.								N	N	N	N	N	N					
	PRESERV.								N	N	N	N	N	N					
①	WL_BFWB_OUT_SP21_20171002_N	WL_BFWB_OUT_SP21	WS	N	2-Oct-17	0900	G		X	X	X	X							9.0
									171086	171087	171088	171089							
								4											

5x201

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
			Nautilus - Burnaby	Oct 03/17 @ 12:20
			NY - Nan Yamamoto	

NB OF BOTTLES RETURNED/DESCRIPTION	
Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Relda Akkerman	Mobile #	
Sampler's Signature		Date/Time	October 2, 2017

Oclear, colourless, hydrocarbon odour, no particulates.

Teck

COC ID:	20171002-1356	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email				Email 2:	dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	bryan.ogden@teck.com	X	X	X
								Email 4:	jason.gravelle@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	teckcoal@equisonline.com			X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5204			Phone Number	604-420-8773			PO number				

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

	Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	72h P. subcapitata P/F	7d C. dubia P/F	28d Hyalella P/F	30d rainbow trout early life stage P/F	7d rainbow trout P/F	Rainbow Trout microbial testing	30d FHM P/F (10µg/L CU Treated) conducted in Calgary	30d FHM P/F (20µg/L CU Treated) conducted in Calgary				Temp °C	
(1)	FR_FRCP1_WS_2017-10-02_N_39	FR_FRCP1	WS		2017/10/02	13:17	G	~~8~~ 9	1	1	1	1	~~1~~ DB	1	X	X				9.0	9x2
(1)	FR_UFR1_WS_2017-10-02_N_36	FR_UFR1	WS		2017/10/02	11:42	G	11	1	1	1	1	1	1	X					9.0	11x2
									WC # 171090	171091	171093	171092	171096	171097	171094	171095					

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
	Dylan Begin	10/02	Nautilus - Burnaby NY - Nair Yamamoto	Oct 03/17 @ 12:20

NB OF BOTTLES RETURNED/DESCRIPTION					
Regular (default)	X	Sampler's Name	Dylan Begin	Mobile #	250 865 5273
Priority (2-3 business days) - 50% surcharge		Sampler's Signature	[signature]	Date/Time	Oct 2, 2017
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

(1) clear, colourless, odourless, some particulate.

Teck

COC ID:	Q4 Chronic TOX October2	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name	Greenhills Operations			Lab Name	Nautilus Environmental			EDD delivery:			
Project Manager	Leigh Stickney			Lab Contact	Krysta Pearcy			Site:	leigh.stickney@teck.com	EQuIS:	GHO
Email	leigh.stickney@teck.com			Email				Report Format / Distribution			
Address	PO Box 5000			Address	8664 Commence Court				Yes PDF	Yes	Excel
					Imperial Square Lake City			Email 1:	leigh.stickney@teck.com		
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 2:	sean.beswick@teck.com		
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Can	Email 3:	jeremy.enns@teck		
Phone Number	250 865 3274			Phone Number				PO number			

SAMPLE DETAILS — **ANALYSIS REQUESTED** (Please indicate below Filtered, Perserved or both (F, P, F/P))

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	96 hr Rainbow trout (pass/fail)	48 hr daphnia (pass/fail)	48 hr daphnia (pass/fail)	7d C.dubia P/F	30 day Rainbow Trout Early Life Stage P/F	72 hr P. Subcapitata P/F	7 Day Rainbow Trout P/F	28 day H azteca	28 Day Hyallella P/F	Rainbow Trout Microbial Testing		Temp °C	
								#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	None	#N/A	#N/A	
3) GH_FR1_WS_2017-10-02_N	GH_FR1	WS	N	2-Oct-17	13:05	G	8		X	X	x	x	x			x	x		8.1	8x20
1) GH_ERC_WS_2017-10-02_N	GH_ERC	WS	N	2-Oct-17	12:05	G	4				x	x	x						8.1	4x20
2) GH_ER2_WS_2017-10-02_N	GH_ER2	WS	N	2-Oct-17	10:40	G	8		X		x	x	x	x		x			8.1	8x20
WO #									171094	171095	171091	171092	171090	171096		171093	171097			

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
	J. Enns	10/2/2017		Nautilus - Burnaby	Oct 03/17 @ 12:20	
				NY - Nan Yamamoto		

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	J. Enns / S. Raschella	Mobile #	604-561-3793
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	10/02/17
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

Oclear, colourless, odourless, some particulates

END OF REPORT

Toxicity testing on Line Creek Operations samples with *Ceriodaphnia dubia*, *Oncorhynchus mykiss*, *Lemna minor* and *Pseudokirchneriella subcapitata*

Second Quarter 2018 Results

Final Report

October 30, 2018

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

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APPENDIX E – Chain-of-Custody Forms

SIGNATURE PAGE



Report By:
Emma Marus, B. Sc.
Laboratory Biologist



Reviewed By:
James Elphick, R.P. Bio.
Environmental Toxicologist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

SUMMARY

Summaries of sample information and test results from the toxicity tests conducted on samples collected from the Line Creek Operations to meet requirements of the semi-annual toxicity testing program required under BC Ministry of Environment and Climate Change permit number 106970 in the second quarter of 2018 are provided in the tables below.

Sample and Test Type Information

Sample IDs	FR_UFR1*, GH_ER2*, LC_LCDSSLCC, LC_DC1, LC_FRDSDC, LC_DCDS, LC_LC5
Sample collection dates	April 30, 2018
Sample receipt dates	May 1, 2018
Sample receipt temperatures	Ranged from 4.7 to 7.5°C
Test types	*Ceriodaphnia dubia* survival and reproduction 7-d rainbow trout (*Oncorhynchus mykiss*) embryo viability 7-d *Lemna minor* growth inhibition 72-h *Pseudokirchneriella subcapitata* growth inhibition

*Reference site; conducted as a single concentration toxicity test for *C. dubia*, *O. mykiss* and *P. subcapitata*

Summary of Results

	Point Estimate with 95% CL				
Endpoint	**LC_LCDSSLCC**	**LC_DC1**	**LC_FRDSDC**	**LC_DCDS**	**LC_LC5**
Ceriodaphnia dubia					
Survival LC50	>100	>100	>100	>100	>100
Reproduction IC25	>100	92.6 (44.0 – N/A)	>100	90.3 (71.7 – N/A)	38.4 (12.4 – 60.7)
Reproduction IC50	>100	>100	>100	>100	>100
Oncorhynchus mykiss					
Embryo viability EC25	>100	>100	>100	>100	>100
Embryo viability EC50	>100	>100	>100	>100	>100
Lemna minor					
Frond count IC25	51.1 (34.8 – 65.6)	79.2 (N/A – N/A)	>97	>97	69.3 (N/A – 97.0)
Frond count IC50	>97	>97	>97	>97	>97
Dry weight IC25	51.7 (30.1 – 77.4)	24.1 (9.8 – N/A)	>97	67.2 (N/A – N/A)	52.2 (N/A – 97.0)
Dry weight IC50	>97	>97	>97	>97	>97
Pseudokirchneriella subcapitata					
Growth IC25	>95.2	>95.2	>95.2	>95.2	>95.2
Growth IC50	>95.2	>95.2	>95.2	>95.2	>95.2

CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effective Concentration, N/A = Not Available

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on five samples collected from the Line Creek Operations as part of a toxicity testing program required under BC Ministry of Environment and Sustainability permit number 106970, Section 5.2. A sample was not collected from EMS # 291569 (West Line Creek Active Water Treatment Facility Effluent Outfall) as the water treatment facility was not discharging effluent in the second quarter of 2018. Test types included survival and reproduction of a cladoceran (*Ceriodaphnia dubia*), embryo development of rainbow trout (*Oncorhynchus mykiss*), growth of a freshwater plant (*Lemna minor*) and population growth of a unicellular green alga (*Pseudokirchneriella subcapitata*). The samples from Line Creek Operations were tested using serial dilutions of the sample using laboratory control water.

In addition to the Line Creek Operations samples, samples collected from FR_UFR1 and GH_ER2 were tested at full strength as site reference waters. FR_UFR1 and GH_ER2 are upstream reference locations that are not required as part of the Line Creek Operations testing program, but the data for these samples were included here as a basis for comparison to Line Creek Operations mine-influenced samples. These samples were tested with all of the species except for *L. minor*.

The toxicity tests that were conducted on the samples are summarized in Table 1. The locations of Line Creek Operations sample sites are shown in Figure 1. Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 4.7 to 7.5°C and were stored in the dark at 4 ± 2°C prior to testing.

This report describes the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. Results of analytical chemistry that was performed on the samples tested in this program have been uploaded to the BC Ministry of Environment and Sustainability web reporting system (EMS). Samples for water chemistry analysis were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix E.

Table 1. Summary of toxicity testing program.

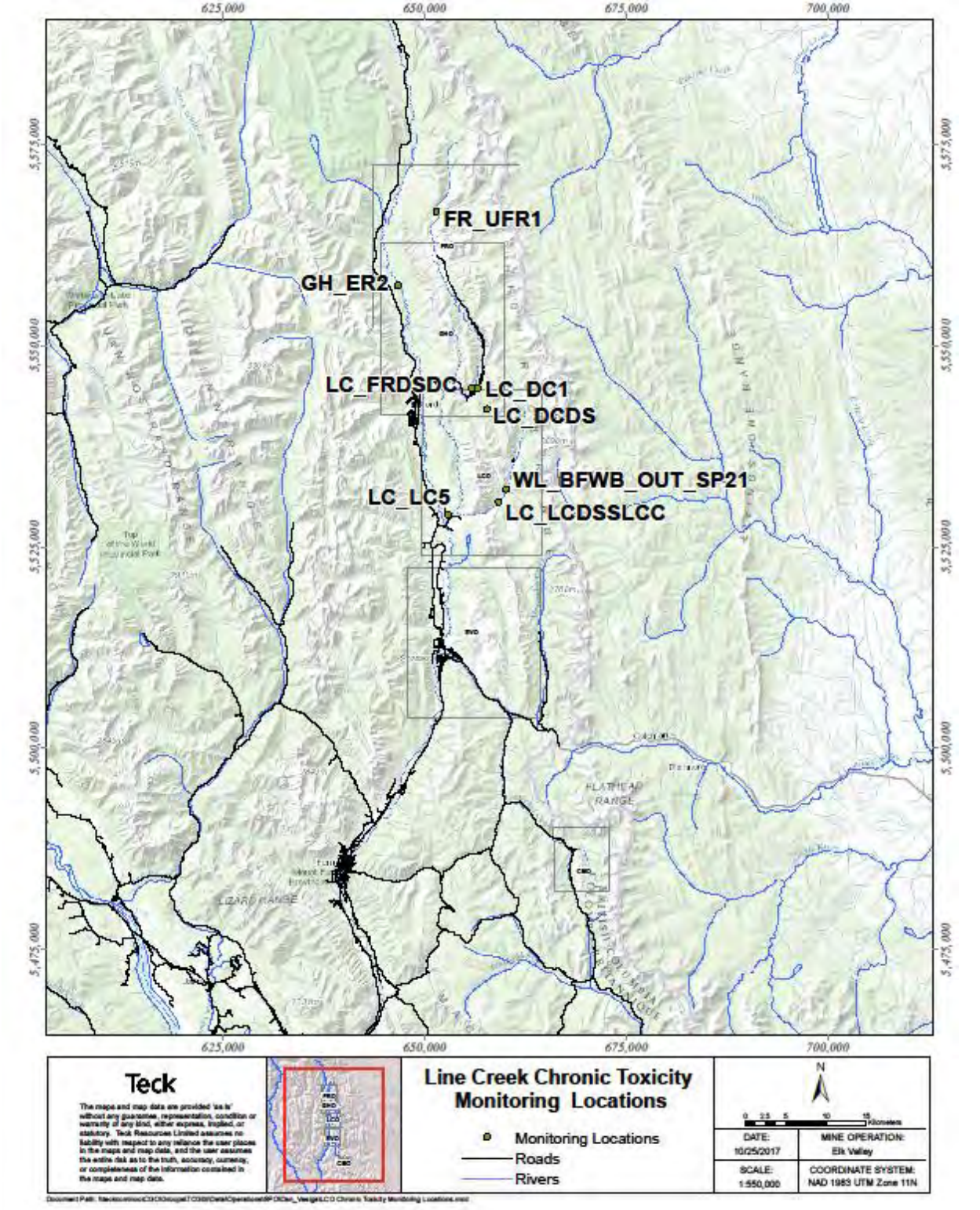
Sample ID	EMS #	Location Description	Species Tested	Sample Collection Date
FR_UFR1*	216777	Fording River upstream of Henretta Creek	*C. dubia*, *O. mykiss*, and *P. subcapitata*	April 30, 2018 †
GH_ER2*	200389	Elk River upstream of Greenhill Operations	*C. dubia*, *O. mykiss*, and *P. subcapitata*	April 30, 2018 †
LC_LCDSSLCC	297110	Line Creek downstream of South Line Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 30, 2018 †
LC_DC1	288270	Dry Creek near mouth	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 30, 2018 †
LC_FRDSDC	288272	Fording River downstream of Dry Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 30, 2018 †
LC_DCDS	295210	Dry Creek downstream of sedimentation ponds	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 30, 2018 †
LC_LC5	200028	Lower Fording River (downstream of Line Creek)	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	April 30, 2018 †
WL_BFWB_OUT_SP21	291569	West Line Creek Active Water Treatment Facility Effluent Outfall	NT	NT

*Reference site, tested as a single concentration toxicity test.

†For tests with *O. mykiss*, samples were collected on May 15, 2018.

NT = Not Tested

Figure 1. Line Creek Operations chronic toxicity monitoring locations.



2.0 METHODS

Methods for the toxicity tests are summarized in Tables 2 through 5. Testing was conducted according to procedures described by Environment Canada protocols (2007a, 2007b and 2007c). The rainbow trout embryo viability test followed modified procedures described by Environment Canada (1998) and Canaria et al. (1999). Statistical analyses for the tests were performed using CETIS (Tidepool Scientific Software, 2013).

Table 2. Test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test species	*Ceriodaphnia dubia*
Organism source	In-house culture
Organism age	<24 hour old neonates, produced within a 12 hour window
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20-mL glass test tube
Test volume	15 mL
Test solution depth	10 cm
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	10 per treatment
Number of organisms	1 per replicate
Control/dilution water	20% Perrier water and 80% deionized water + 5 µg/L Se and 2 µg/L vitamin B12
Test solution renewal	Daily (100% renewal)
Test temperature	25 ± 1°C
Feeding	Daily with *Pseudokirchneriella subcapitata* and YCT (3:1 ratio)
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival and reproduction checked daily
Test protocol	Environment Canada (2007a), EPS 1/RM/21
Statistical software	CETIS Version 1.8.7
Test endpoints	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods; no ephippia present
Reference toxicant	Sodium chloride (NaCl)

Table 3. Test conditions: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Test species	*Oncorhynchus mykiss*
Organism source	Ted's Trout (Campbell Lake), Little Fort, BC
Organism age	<30 minutes post fertilization, <24 hour old gametes
Test type	Static-renewal
Test duration	7 days
Test vessel	2-L plastic container
Test volume	2 L
Test solution depth	17 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	4 per treatment
Number of organisms	30 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tap water
Test solution renewal	Daily (80% renewal)
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark
Aeration	Continuous gentle aeration
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival checked daily
Test protocol	Environment Canada (1998), EPS 1/RM/28; Canaria et al. (1999)
Statistical software	CETIS Version 1.8.7
Test endpoints	Embryo viability
Test acceptability criteria for controls	Embryo viability ≥70%
Reference toxicant	Sodium dodecyl sulphate (SDS)

Table 4. Test conditions: *Lemna minor* growth inhibition test.

Test species	*Lemna minor*, strain CPCC# 490
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Wainfleet, Stinking Barn, Niagara Peninsula, Ontario, Canada
Organism age	7- to 10-day old culture
Test type	Static
Test duration	7 days
Test vessel	250-mL glass container
Test volume	100 mL
Test solution depth	4 cm
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	4 per treatment
Number of organisms	Two 3-frond plants per replicate
Control/dilution water	Modified APHA media (deionized water plus 1% of each APHA stock solution A, B and C)
Test solution renewal	None
Test temperature	25 ± 2°C
Feeding	None
Light intensity	4000 to 5600 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature, pH and conductivity measured in all concentrations at test initiation; dissolved oxygen of highest concentration measured at test initiation; temperature and pH measured at test termination
Test protocol	Environment Canada (2007b), EPS 1/RM/37
Statistical software	CETIS Version 1.8.7
Test endpoints	Number of fronds and dry weight
Test acceptability criteria for controls	≥ 8-fold increase in number of fronds
Reference toxicant	Potassium chloride (KCl)

Table 5. Test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test species	*Pseudokirchneriella subcapitata*, strain CPCC# 37
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Center, and originally isolated from Nivelta River, Norway.
Organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	4 per treatment; 8 for laboratory control
Number of organisms	10,000 cells/mL
Control/dilution water	Deionized water supplemented with nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature and pH measured at test initiation; pH of two control wells measured at test termination
Test protocol	Environment Canada (2007c), EPS 1/RM/25
Statistical software	CETIS Version 1.8.7
Test endpoints	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤ 20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc (added as $ZnSO_4$)

3.0 RESULTS

Results of the toxicity tests and associated statistical analyses are provided in Appendices A through D, with the exception of data for FR_UFR1 and GH_ER2 (site reference waters) for *C. dubia* and *P. subcapitata*, which are reproduced here, but the raw data have been provided in a separate report (Nautilus Environmental, 2018). The statistical analyses for samples FR_UFR1 and GH_ER2 involved a comparison of performance in the site waters with the laboratory controls using a hypothesis test, since there were no dilutions tested for these samples. The results for all of the other samples are presented here on the basis of point estimates (e.g., IC25), since the data available for a range of test concentrations in these samples enabled statistical fitting of dose-response relationships. This approach is considered preferable to hypothesis testing in cases where the data allow. Hypothesis tests were conducted for all samples in the *P. subcapitata* test to identify stimulation in cell growth relative to the control, as specified in the test method for this species.

Results of the toxicity tests using *C. dubia* are provided in Table 6. There was no statistically significant difference in survival for the site reference waters (FR_UFR1 and GH_ER2) relative to the laboratory control, and there was no difference between FR_UFR1 and control for reproduction; however, reproduction in site reference water GH_ER2 was statistically different from the control. There was no adverse effect on survival in the samples; the LC50 values were all >100%. An adverse effect on reproduction was observed in three samples; the IC25 values for LC_DC1, LC_DCDS and LC_LC5 were 92.6, 90.3 and 38.4%, respectively.

Results of the toxicity tests using *O. mykiss* are provided in Table 7. There was no statistically significant difference in embryo viability for the site reference waters (FR_UFR1 and GH_ER2) compared to the laboratory control. There were no adverse effects on embryo viability in any of the samples.

Results of the toxicity tests using *L. minor* are provided in Table 8; the highest test concentration was 97% as a result of dilution associated with addition of nutrients, as required in the method. An adverse effect on frond count was observed in three samples; the IC25 values for LC_LCDSSLCC, LC_DC1 and LC_LC5 were 51.1, 79.2 and 69.3%, respectively. An adverse effect on dry weight was observed in four samples; the IC25 values for LC_LCDSSLCC, LC_DC1, LC_DCDS and LC_LC5 were 51.7, 24.1, 67.2 and 52.2%, respectively.

Results of the toxicity tests using *P. subcapitata* are provided in Table 9; the highest test concentration was 95.2% as a result of dilution associated with addition of nutrients, as required in the method. Growth enhancement was observed in all samples, including in the site reference

waters (FR_UFR1 and GH_ER2); there was no statistically significant reduction in cell yield for the site reference waters relative to the laboratory control and the IC25 values for cell yield in the samples were all >95.2%. This finding is not unusual, since the higher ionic strength associated with the site waters would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	FR_UFR1		GH_ER2		LC_LCDSSLCC		LC_DC1	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	17.6 ± 2.5	100	17.6 ± 2.5	100	24.4 ± 3.1	100	17.9 ± 7.4
1.56	NT	NT	NT	NT	100	23.1 ± 2.5	100	19.2 ± 7.2
3.12	NT	NT	NT	NT	100	22.4 ± 1.9	100	18.2 ± 7.0
6.25	NT	NT	NT	NT	100	22.8 ± 4.1	100	18.0 ± 7.2
12.5	NT	NT	NT	NT	100	21.2 ± 8.4	100	20.4 ± 4.3
25	NT	NT	NT	NT	100	25.2 ± 3.8	100	18.5 ± 5.0
50	NT	NT	NT	NT	100	25.1± 2.4	100	18.5 ± 7.4
100	100	17.7 ± 7.3	90	13.3 ± 6.1*	100	21.0 ± 1.5	90	13.5 ± 9.0
Test endpoint (% v/v) [with 95% CL]								
LC50	--	--	--	--	>100	--	>100	--
IC25	--	--	--	--	--	>100	--	92.6 (44.0 – N/A)
IC50	--	--	--	--	--	>100	--	>100

NT = Not Tested, SD = Standard Deviation, CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration, N/A = Not Available, * reproduction significantly less than the laboratory control (only evaluated for reference samples)

Table 6 (continued). Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	90	12.4 ± 8.1	100	21.3 ± 1.6	100	18.0 ± 4.2
1.56	100	12.9 ± 8.0	100	24.3 ± 2.8	100	15.2 ± 4.3
3.12	100	15.5 ± 7.3	100	20.9 ± 3.0	100	15.8 ± 4.9
6.25	100	15.0 ± 6.5	100	21.1 ± 2.6	100	17.3 ± 5.7
12.5	100	13.4 ± 6.2	90	20.7 ± 4.5	90	15.7 ± 6.6
25	100	15.6 ± 6.7	100	21.9 ± 3.1	100	17.3 ± 4.3
50	100	15.1 ± 8.6	100	24.1 ± 3.1	100	11.8 ± 2.5
100	100	11.7 ± 6.1	100	16.3 ± 5.6	100	10.8 ± 3.4
Test endpoint (% v/v) [with 95% CL]						
LC50	>100	--	>100	--	>100	--
IC25	--	>100	--	90.3 (71.7 – N/A)	--	38.4 (12.4 – 60.7)
IC50	--	>100	--	>100	--	>100

SD = Standard Deviation, CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration, N/A = Not Available

Table 7. Results: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Concentration (% v/v)	Mean ± SD						
	FR_UFR1	**GH_ER2**	**LC_LCDSSCLCC**	**LC_DC1**	**LC_FRDSDC**	**LC_DCDS**	**LC_LC5**
Laboratory Control	90.0 ± 8.6	90.0 ± 8.6	100 ± 0.0	97.5 ± 3.2	98.3 ± 2.0	98.3 ± 3.3	96.7 ± 2.7
6.25	NT	NT	100 ± 0.0	96.6 ± 2.8	97.4 ± 3.3	97.5 ± 1.7	95.0 ± 1.9
12.5	NT	NT	96.6 ± 2.7	97.5 ± 1.7	97.5 ± 1.7	99.2 ± 1.7	96.6 ± 2.7
25	NT	NT	99.2 ± 1.7	97.5 ± 5.0	98.3 ± 3.3	96.7 ± 3.8	92.4 ± 7.4
50	NT	NT	100 ± 0.0	99.2 ± 1.7	97.5 ± 1.7	96.7 ± 4.7	93.3 ± 5.4
100	98.3 ± 1.9	98.3 ± 1.9	97.5 ± 1.7	98.3 ± 1.9	98.3 ± 2.0	97.5 ± 3.2	92.7 ± 4.8
Test endpoint (% v/v)							
EC25	--	--	>100	>100	>100	>100	>100
EC50	--	--	>100	>100	>100	>100	>100

NT = Not Tested, SD = Standard Deviation, EC = Effective Concentration

Table 8. Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_LCDSSLCC		LC_DC1		LC_FRDSDC	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	113.5 ± 8.5	9.2 ± 0.9	124.5 ± 13.5	10.5 ± 1.3	92.2 ± 14.7	7.0 ± 0.8
1.5	122.5 ± 4.5	10.1 ± 0.4	127.3 ± 9.0	10.2 ± 0.5	94.2 ± 13.7	6.9 ± 1.2
3.0	105.3 ± 9.8	8.3 ± 1.5	116.0 ± 19.7	9.0 ± 2.5	84.5 ± 11.1	6.0 ± 0.9
6.1	113.5 ± 15.6	9.5 ± 1.5	125.3 ± 13.0	9.9± 1.0	89.2 ± 10.9	6.6 ± 0.9
12.1	105.5 ± 5.4	8.4 ± 0.5	126.8 ± 9.3	10.0 ± 1.5	86.2 ± 7.1	5.8 ± 0.6
24.2	112.5 ± 9.1	8.6 ± 0.5	104.3 ± 25.7	7.8 ± 2.8	87.5 ± 10.6	5.9 ± 0.7
48.5	90.5 ± 10.4	7.4 ± 0.8	107.0 ± 9.6	7.9 ± 0.6	88.5 ± 12.6	5.9 ± 0.8
97	63.5 ± 7.4	6.0 ± 0.6	89.8 ± 16.9	6.9 ± 1.4	72.0 ± 22.4	5.9 ± 1.1
Test endpoint (% v/v) [with 95% CL]						
IC25	51.1 (34.8 – 65.6)	51.7 (30.1 – 77.4)	79.2 (N/A – N/A)	24.1 (9.8 – N/A)	>97	>97
IC50	>97.0	>97	>97	>97	>97	>97

SD = Standard Deviation, CL = Confidence Limits, IC = Inhibition Concentration, N/A = Not Available

Table 8 (continued). Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_DCDS		LC_LC5	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	120.5 ± 7.5	10.4 ± 1.0	117.0 ± 25.7	9.3 ± 2.3
1.5	122.3 ± 6.0	9.5 ± 1.2	112.8 ± 10.0	8.2 ± 0.8
3.0	103.3 ± 14.6	8.5 ± 1.0	111.0 ± 8.3	8.3 ± 1.0
6.1	106.0 ± 2.9	8.2 ± 0.4	108.8 ± 14.3	7.9 ± 1.0
12.1	108.0 ± 13.3	8.2 ± 0.9	102.8 ± 15.1	7.3 ± 1.0
24.2	97.8 ± 5.7	7.8 ± 0.6	106.0 ± 9.3	7.4 ± 0.9
48.5	108.0 ± 4.9	8.8 ± 0.3	96.8 ± 4.9	7.1 ± 0.7
97	97.0 ± 6.4	7.4 ± 0.7	79.2 ± 4.1	5.9 ± 0.3
Test endpoint (% v/v) [with 95% CL]				
IC25	>97	67.2 (N/A – N/A)	69.3 (N/A – 97.0)	52.2 (N/A – 97.0)
IC50	>97	>97	>97	>97

SD = Standard Deviation, CL = Confidence Limits, IC = Inhibition Concentration, N/A = Not Available

Table 9. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	FR_UFR1		GH_ER2		LC_LCDSSLCC		LC_DC1	
	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)
Laboratory Control	33.8 ± 2.1	--	33.8 ± 2.1	--	32.4 ± 2.6	--	34.5 ± 2.4	--
1.5	NT	NT	NT	NT	38.2 ± 3.5	18.2	37.0 ± 3.9	7.2
3.0	NT	NT	NT	NT	41.0 ± 1.8 *	26.6	43.5 ± 3.1*	26.1
6.0	NT	NT	NT	NT	69.8 ± 3.3 *	115.4	48.2 ± 3.5 *	39.9
11.9	NT	NT	NT	NT	124.8 ± 3.8 *	285.3	60.0 ± 6.3 *	73.9
23.8	NT	NT	NT	NT	124.0 ± 4.8 *	283.0	103.8 ± 3.4 *	200.7
47.6	NT	NT	NT	NT	139.8 ± 8.5 *	331.7	124.8 ± 4.3 *	261.6
95.2	75.4 ± 5.6 *	123.3	123.3 ± 6.5 *	265.2	148.0 ± 2.9 *	357.1	141.8 ± 5.3 *	310.9
Test endpoint (% v/v)								
IC25	--	--	--	--	>95.2	--	>95.2	--
IC50	--	--	--	--	>95.2	--	>95.2	--

NT = Not Tested, SD = Standard Deviation, IC = Inhibition Concentration
*Result was significantly greater than the laboratory control

Table 9 (continued). Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5	
	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)
Laboratory Control	33.6 ± 2.7	--	36.0 ± 2.9	--	36.8 ± 2.7	--
1.5	39.0 ± 3.4	16.0	45.0 ± 3.2*	25.0	39.0 ± 4.1	6.1
3.0	41.8 ± 3.6 *	24.2	48.2 ± 3.9*	34.0	56.8 ± 3.9*	54.4
6.0	65.2 ± 3.3 *	94.0	55.2 ± 5.4*	53.5	78.8 ± 3.8*	114.3
11.9	103.8 ± 7.0 *	208.6	81.0 ± 3.7*	125.0	108.5 ± 7.0*	195.2
23.8	132.8 ±6.2 *	294.8	107.3 ± 5.9*	197.9	137.8 ± 2.6*	274.8
47.6	142.0 ± 7.2 *	322.3	125.5 ± 7.2*	248.6	149.5 ± 11.9*	306.8
95.2	134.8 ± 5.9 *	300.7	148.3 ± 7.2*	311.8	157.8 ± 5.1*	329.3
Test endpoint (% v/v)						
IC25	>95.2	--	>95.2	--	>95.2	--
IC50	>95.2	--	>95.2	--	>95.2	--

SD = Standard Deviation, IC = Inhibition Concentration
*Result was significantly greater than the laboratory control

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within the ranges specified in the protocols throughout the tests. Uncertainty associated with these tests is best described by the standard deviations around the means.

The eggs in the rainbow trout embryo test were exposed using a blocked design (i.e., eggs from one fish was used for replicate A of each test concentration, eggs from the second fish for replicate B, and so on); this approach deviates from the Environment Canada test method, which indicates that the eggs should be pooled prior to testing. This modification was considered appropriate because it reduces the risk of non-viable eggs affecting the test results, and can allow for exclusion of all data in a particular replicate during statistical analysis. There were no other deviations from the test methodologies.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate. The reference toxicant tests were performed under the same conditions as those used for the samples.

Table 10. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 2.0 g/L NaCl	2.0 (1.8 – 2.3)	7	April 18, 2018
	Reproduction (IC50): 0.9 g/L NaCl	1.3 (0.9 – 1.9)	20	
O. mykiss	Viability (EC50): 3.0 mg/L SDS	4.3 (2.1– 8.8)	43	May 16, 2018
L. minor	Number of fronds (IC50): 3.4 g/L KCl	3.5 (2.9 – 4.3)	10	April 19, 2018
P. subcapitata	Growth (IC50): 28.8 µg/L Zn	31.8 (26.1 – 38.7)	10	April 20, 2018

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effect Concentration

5.0 REFERENCES

Canaria EC, Elphick JR, Bailey HC. 1999. A simplified procedure for conducting small-scale short-term embryo toxicity tests with salmonids. Environ Toxicol 14:301-307.

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Environment Canada. 2007b. Biological test method: tests for measuring the inhibition of growth using the freshwater macrophyte, *Lemna minor*. Environmental Protection Series, Report EPS 1/RM/37. Second Edition. January 2007. Environment Canada, Method Development and Application Section, Environmental Technology Centre, Ottawa, ON. 112 pp.

Environment Canada. 2007c. Biological test method: growth inhibition test using the freshwater alga. Environmental Protection Series, Report EPS 1/RM/25. Second Edition, March 2007. Environment Canada, Method Development and Application Section, Environmental Science and Technology Centre, Science and Technology Branch, Ottawa, ON. 53 pp.

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Tidepool Scientific Software. 2013. CETIS comprehensive environmental toxicity information system, version 1.8.7.16 Tidepool Scientific Software, McKinleyville, CA. 222 pp.

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck
Work Order No.: 180706

Start Date/Time: May 1/18 @ 1600h
Set up by: ~~May 8/18 @ 1~~ VL

Sample Information:

Sample ID: LCLCOSSLCC_WS_2017-04-24_W
Sample Date: Apr 30/18
Date Received: May 1/18
Sample Volume: 8x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: BB04718
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 38
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 2-5, 7-11, 16.

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd182
Stock Solution ID: BNa01 (100g/L NaCl)
Date Initiated: April 18/18 @ 1300h

7-d LC50 (95% CL): 2.0 (1.7–2.3) g/L NaCL
7-d IC50 (95% CL): 0.9 (0.6 – 1.2) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8–2.3) g/L NaCL CV (%): 7
7-d IC50 Reference Toxicant Mean and Historical Range: 1.3 (0.9–1.9) g/L NaCL CV (%): 20

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: VL
Date reviewed: May 31, 2018

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LC LC005LCC_WS2017-04-24W
Work Order #: ~~180706~~ 180706

Start Date & Time: May 1/18 @ 1600h
Stop Date & Time: May 8/18 @ 1130h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration: control	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	25.0	25.0
DO (mg/L)	8.0	7.8	8.0	7.2	7.9	7.7	8.2	7.6	8.0	7.4	8.2	7.3	7.8	7.4
pH	8.3	8.1	8.2	8.0	8.1	7.3	8.0	7.7	7.8	7.6	8.0	7.7	7.9	7.7
Cond. (µS/cm)	223	223		222		220		222		223		223		221
Initials	EMM	EMM		MB		MB		A		AWD		MB		EMM

Concentration: 1.56% (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.1	7.9	8.3	7.8	7.9	7.7	7.7	7.2	8.4	7.1	8.0	7.5	7.8	7.7
pH	8.2	8.1	8.2	7.9	8.3	7.3	8.2	7.6	7.9	7.7	7.9	7.7	8.0	7.8
Cond. (µS/cm)	230	229		232		224		234		230		219		220
Initials	EMM	EMM		MB		MB		A		AWD		MB		EMM

Concentration: 12.5% (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.1	7.9	8.2	7.4	8.0	7.2	7.7	7.2	8.1	7.3	8.1	7.5	7.9	7.8
pH	8.2	8.1	8.2	8.0	8.3	7.3	8.2	7.46	7.9	7.7	7.8	7.7	8.1	7.8
Cond. (µS/cm)	289	286		287		289		290		289		278		270
Initials	EMM	EMM		MB		MB		A		AWD		MB		EMM

Concentration: 100% (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.1	7.9	8.3	7.5	8.1	7.2	8.2	7.1	8.2	7.3	8.1	7.6	8.1	7.8
pH	8.2	8.2	8.3	8.1	8.2	7.5	8.1	7.8	8.0	8.0	8.1	7.8	8.2	7.8
Cond. (µS/cm)	706	709		706		709		712		711		713		710
Initials	EMM	EMM		MB		MB		A		AWD		MB		EMM

Thermometer: 4 **DO meter/probe:** ~~2~~ 1 / 1 **pH meter/probe:** ~~2~~ 1 / 1 **Conductivity meter/probe:** ~~17~~ 1 / 1

	Control	100% (v/v)		
Hardness*	100	~~340~~ 400		
Alkalinity*	98	~~238~~ 156		

* mg/L as CaCO3

Analysts: KL, EMM, ~~MB~~ MB, AWD
Reviewed by:
Date reviewed: May 31, 2018

Sample Description: Clear, colourless, odourless, some brown particulates.

Comments: **Broodboard Used:** BB041718 (2-5, 7-11, 16)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC-LCOSSLCC_WS-2017-04-24_W
Work Order: 180706

Start Date & Time: May 1/18 @ 1600h
Stop Date & Time: May 8 /18 @ 1130h
Set up by: VC

Concentration: Control (%(v/v))

Days	A	B	C	D	E	F	G	H	I	J	Init
1											HM
2											VC
3											HM
4		3	5	4	3	4		3	3	3	A
5	9	7	✓	10	✓	✓	9	✓	✓	7	CW
6	13	12	10	✓	11	9	12	10	9	11	HM
7	✓	✓	13	12	14	13	✓	15	10	✓	HM
8											
Total	22	22	28	26	28	26	21	28	22	21	HM

Concentration: 1.56 %(v/v)

Days	A	B	C	D	E	F	G	H	I	J	Init
1											HM
2											VC
3											HM
4	3	✓	3	3	4	2	3	2	2	3	A
5	5	8	6	9	✓	✓	✓	✓	9	9	CW
6	12	11	✓	✓	9	9	10	11	✓	✓	HM
7	✓	✓	13	15	10	12	12	12	14	10	HM
8											
Total	20	19	22	27	23	23	25	25	25	22	HM

Concentration: 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init
1											HM
2											VC
3											HM
4	2	4	3	4	4	5	3	3	3	3	A
5	6	✓	✓	9	✓	✓	✓	✓	✓	8	CW
6	12	9	8	✓	8	6	6	8	9	✓	HM
7	✓	10	12	11	13	11	12	14	13	9	HM
8											
Total	20	23	23	24	25	22	21	21	25	20	HM

Concentration: 6.25

Days	A	B	C	D	E	F	G	H	I	J	Init
1											HM
2											VC
3											HM
4	3	2	3	3	4	4	3	3	3	3	A
5	7	8	✓	12	✓	✓	5	✓	✓	7	CW
6	14	13	9	✓	12	9	6	9	10	12	HM
7	✓	✓	10	15	10	10	✓	12	7	✓	HM
8	VC										
Total	~~23~~ 24	23	22	30	26	23	14	24	20	22	HM

Concentration: 12.5

Days	A	B	C	D	E	F	G	H	I	J	Init
1											HM
2											VC
3											HM
4	3	✓	3	4	4	3	3	3	4	4	A
5	4	✓	8	8	✓	✓	7	✓	✓	8	CW
6	10	✓	✓	✓	9	9	✓	10	12	11	HM
7	✓	✓	10	12	12	13	9	15	14	✓	HM
8											
Total	17	10	21	24	25	25	19	28	30	23	HM

Concentration: 25

Days	A	B	C	D	E	F	G	H	I	J	Init
1											HM
2											VC
3	30										HM
4	3	3	5	4	4	3	4	3	4		A
5	8	✓	8	✓	✓	✓	✓	✓	✓	✓	CW
6	12	9	✓	13	12	9	9	9	8	9	HM
7	✓	13	12	16	19	10	12	16	11	12	HM
8											
Total	23	25	25	34	30	23	24	23	23	25	HM

Concentration: 50

Days	A	B	C	D	E	F	G	H	I	J	Init
1											HM
2											VC
3											HM
4	3	3	4	2	3	4	5	3	4	3	A
5	✓	✓	8	✓	✓	✓	✓	✓	✓	✓	CW
6	9	9	8	9	9	11	12	12	9	8	HM
7	13	12	14	15	12	12	13	12	10	12	HM
8		VC									
Total	~~25~~ 24	~~25~~ 24	22	26	24	~~27~~ 24	30	~~23~~ 24	23	23	HM

Concentration: 100

Days	A	B	C	D	E	F	G	H	I	J	Init
1											HM
2											VC
3											HM
4		3	4	3	2	3	2	3	3	3	A
5	2	✓	✓	✓	✓	✓	✓	✓	✓	✓	CW
6	6	8	8	9	8	7	7	6	8	8	HM
7	15	10	10	9	12	9	12	9	11	16	HM
8											
Total	23	21	22	21	22	19	21	18	22	27	HM

Concentration:

Days	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See WQ Sheet
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]
Date reviewed: May 31, 2018

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-1966-0356	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-8296-0490	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	01 May-18 16:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	08 May-18 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 20h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	09-3479-9715	**Code:**	37B7E963	**Client:**	Teck Coal
Sample Date:	30 Apr-18 12:43	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	27h (6.5 °C)	**Station:**	LC_LCDSSLCC_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	524889	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

May 31/18

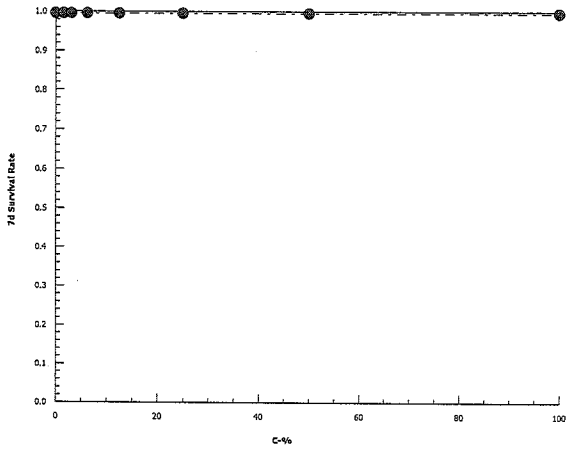
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-1966-0356	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:09	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst: VL QA: May 31/18

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	12-3439-5424	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:10	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	07-8296-0490	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	01 May-18 16:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	08 May-18 11:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 20h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	09-3479-9715	**Code:**	37B7E963	**Client:**	Teck Coal
Sample Date:	30 Apr-18 12:43	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	27h (6.5 °C)	**Station:**	LC_LCDSSLCC_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	27131	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	51.85	0.5155	74.11	1.929	1.349	194
IC10	74.94	1.297	N/A	1.334	NA	77.11
IC15	>100	N/A	N/A	<1	NA	NA
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	24.4	21	28	0.9684	3.062	12.55%	0.0%
1.56		10	23.1	19	27	0.781	2.47	10.69%	5.33%
3.12		10	22.4	20	25	0.6	1.897	8.47%	8.2%
6.25		10	22.8	14	30	1.298	4.104	18.0%	6.56%
12.5		10	21.2	0	30	2.657	8.404	39.64%	13.11%
25		10	25.2	22	34	1.209	3.824	15.17%	-3.28%
50		10	25.1	22	30	0.7667	2.424	9.66%	-2.87%
100		10	21	18	23	0.4714	1.491	7.1%	13.93%

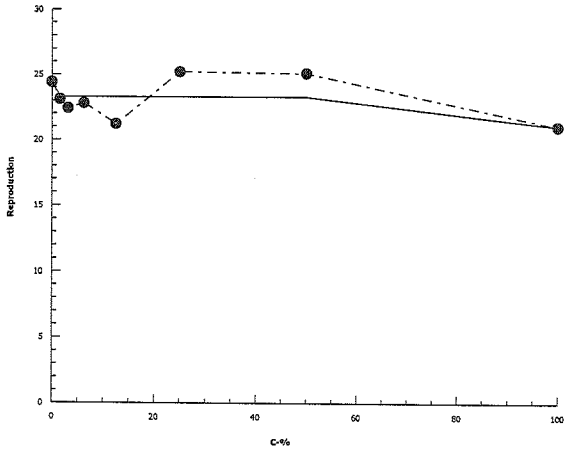
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	22	22	28	26	28	26	21	28	22	21
1.56		20	19	22	27	23	23	25	25	25	22
3.12		20	23	23	24	25	22	21	21	25	20
6.25		24	23	22	30	26	23	14	24	20	22
12.5		17	0	21	24	25	25	19	28	30	23
25		23	25	23	34	30	23	24	23	22	25
50		25	24	22	26	24	27	30	27	23	23
100		23	21	22	21	22	19	21	18	22	21

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	12-3439-5424	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:10	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: w QA: May 31 18

Ceriodaphnia dubia Summary Sheet

Client: Teck
Work Order No.: B0706

Start Date/Time: May 2/18 @ 1000h
Set up by: VL

Sample Information:

Sample ID: LC-DC1_WS_2018-04-25_AN
Sample Date: Apr 30/18
Date Received: May 1/18
Sample Volume: 5x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: BB041818 A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 36
Mortality (%) in previous 7 d: 10
Individual female # used ≥8 young on test day: 2,4,5,9,13,15

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd182
Stock Solution ID: 18NaCl 1 (100g/L NaCl)
Date Initiated: Apr 18/18 @ 1300h

7-d LC50 (95% CL): 2.0 (1.7 – 2.3) g/L NaCL
7-d IC50 (95% CL): 0.9 (0.6 – 1.2) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8 – 2.3) g/L NaCL CV (%): 9
7-d IC50 Reference Toxicant Mean and Historical Range: 1.3 (0.9 – 1.9) g/L NaCL CV (%): 30

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		92.6 (44.0 – N/A)
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: May 31, 2018

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LCPCI-WS_2018-04-25_N
Work Order #: 180706

Start Date & Time: May 2/18 ~~0900h~~ 1000h
Stop Date & Time: May 8/18 C 1000h
CER #: 4
Test Species: *Ceriodaphnia dubia*

% (v/v) Concentration (control)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	25.0	24.0	24.0	25.0	24.0	25.0	24.0	25.0	25.0	25.0		
DO (mg/L)	8.0	7.7	7.9	7.1	8.2	7.6	8.0	7.0	8.2	7.8	7.8	7.8		
pH	8.1	7.9	8.1	7.9	8.0	7.7	8.0	7.7	8.0	7.9	7.9	7.8		
Cond. (µS/cm)	223	222		220		222		223		223		221		
Initials	EMM	MB		MB		A		AWD		MB		EMM		

Concentration 1.56	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	24.5	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	7.8	7.6	7.2	7.9	7.2	8.0	7.3	8.1	7.7	7.7	7.3		
pH	8.3	8.1	8.2	7.9	8.2	7.7	8.0	7.7	8.0	7.8	8.2	7.8		
Cond. (µS/cm)	223	221		223		226		231		217		220		
Initials	EMM	MB		MB		A		AWD		MB		EMM		

Concentration 12.5	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	24.5	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	7.5	7.8	7.2	7.9	6.8	8.0	7.3	8.1	7.6	7.9	7.5		
pH	8.3	8.1	8.2	7.8	8.2	7.7	8.1	7.7	8.0	7.8	8.0	7.8		
Cond. (µS/cm)	231	231		233		246		242		240		242		
Initials	EMM	MB		MB		A		AWD		MB		EMM		

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	24.5	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.0	7.3	8.1	7.2	8.1	6.4	8.2	7.4	8.1	7.5	8.3	7.5		
pH	8.4	8.2	8.3	7.8	8.2	7.6	8.1	7.8	8.0	7.8	8.1	7.8		
Cond. (µS/cm)	316	312		311		318		322		315		326		
Initials	EMM	MB		MB		A		AWD		MB		EMM		

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	Control	100 %		
Hardness*	100	144		
Alkalinity*	98	110		

* mg/L as CaCO3

Analysts: EMM, MB, AWD, KL
Reviewed by:
Date reviewed: May 31, 2018

Sample Description: clear, colourless, odourless, some brown particulates.

Comments: Broodboard Used: BB041818A (~~2.5~~ 2, 4, 5, 9, 13, 15)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Tece
Sample ID: CC_DC1_WS_2017-04-25_W
Work Order: 180706

Start Date & Time: May 2/18 @ 1000h
Stop Date & Time: May 8 18 @ 1200h
Set up by: K

%(v/v)

Days	Concentration: (control)										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	4	4	✓	✓	3	✓	4	✓	4	✓	A
4	✓	✓	✓	5	✓	✓	✓	✓	✓	6	CW
5	7	8	9	✓	6	✓	8	5	7	9	K
6	10	6	8	11	10	✓	10	9	12	12	HM
7											
8											
Total	21	18	17	16	19	0	24	14	23	27	HM

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	2	3	3	3	✓	2	✓	✓	3	✓	A
4	✓	✓	✓	✓	2	✓	✓	5	✓	7	CW
5	8	7	9	8	9	8	✓	7	7	6	K
6	11	13	10	12	12	9	✓	13	9	10	HM
7											
8											
Total	21	23	22	23	23	19	0	25	18/19 K	17	HM

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	3	3	✓	✓	3	3	3	✓	✓	3	A
4	✓	✓	7	5	✓	✓	✓	5	✓	✓	CW
5	9	8	✓	✓	8	8	8	✓	✓	4	K
6	11	13	16	10	10	9	9	12	✓	12	HM
7											
8											
Total	22	24	23	15	21	20	20	17	0	19	HM

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	3	2	3	✓	3	✓	✓	2	✓	✓	A
4	✓	✓	✓	6	✓	✓	✓	4	✓	6	CW
5	8	8	8	8	8	✓	7	✓	6	✓	K
6	14	13	11	8	10	~~X~~	14	10	9	9	HM
7											
8											
Total	25	23	22	22	21	0	21	16	15	15	HM

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	2	4	3	✓	✓	3	3	✓	4	2	A
4	✓	✓	✓	5	3	✓	2	6	2	✓	CW
5	8	8	10	✓	7	9	9	✓	6	5	K
6	13	14	13	9	12	11	✓	12	9	13	HM
7											
8											
Total	23	26	26	14	22	23	14	18	19/20 K	20	HM

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	2	✓	3	✓	2	3	3	✓	✓	2	A
4	✓	✓	✓	7	✓	✓	✓	6	6	3	CW
5	8	8	✓	6	7	9	8	✓	✓	8	K
6	14	10	8	12	10	13	8	9	10	✓	HM
7											
8											
Total	24	18	11	25	19	25	19	15	16	13	HM

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	3	3	3	✓	✓	✓	✓	✓	3	✓	A
4	✓	✓	✓	4	7	✓	6	6	~~3~~ ✓	3	CW
5	9	7	8	✓	✓	✓	✓	✓	10	7	K
6	12	13	10	10	11	✓	13	12	14	11	HM
7											
8											
Total	24	23	21	14	18	0	19	18	27	21	HM

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	3	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	✓	4X	✓	5	✓	✓	5	3	✓	✓	CW
5	7	[illegible]	9	✓	6	✓	✓	✓	4	✓	K
6	13	[illegible]	16	13	12	✓	12	12	11	✓	HM
7											
8											
Total	23	4X	25	18	18	0	17	15	15	0	HM

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: see WQ sheet.
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count. ⑥ checked under microscope, no epiphia

Reviewed by: [signature]
Date reviewed: May 31, 2018

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	02-5962-4529	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:23	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-7837-8140	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	02 May-18 10:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	08 May-18 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	12-8100-7018	**Code:**	4C5A9DAA	**Client:**	Teck Coal
Sample Date:	30 Apr-18 11:11	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	47h (5.5 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	789595	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	70.77	56.15	N/A	1.413	NA	1.781
EC10	100	63.05	N/A	1	NA	1.586
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	1	1	1	0	0	0.0%	0.0%	10	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	0	1	1	1	1	1	1	1	1

May 31/18

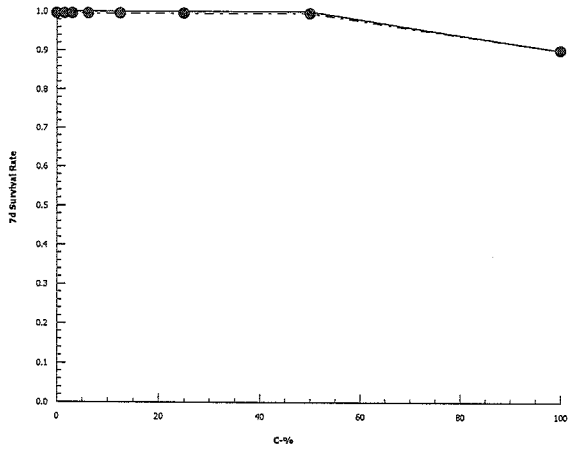
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 02-5962-4529 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 16 May-18 18:23 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



May 31/18

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-4010-0696	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-7837-8140	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	02 May-18 10:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	08 May-18 12:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	12-8100-7018	**Code:**	4C5A9DAA	**Client:**	Teck Coal
Sample Date:	30 Apr-18 11:11	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	47h (5.5 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2135613	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	55.1	0.4923	87.64	1.815	1.141	203.1
IC10	62.76	1.227	N/A	1.593	NA	81.5
IC15	71.47	20.52	N/A	1.399	NA	4.873
IC20	81.37	32.69	N/A	1.229	NA	3.059
IC25	92.62	43.95	N/A	1.08	NA	2.275
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	**Control Type**	**Count**	**Mean**	**Min**	**Max**	**Std Err**	**Std Dev**	**CV%**	**%Effect**
0	Negative Control	10	17.9	0	27	2.35	7.43	41.51%	0.0%
1.56		10	19.2	0	25	2.265	7.162	37.3%	-7.26%
3.12		10	18.2	0	24	2.205	6.973	38.31%	-1.68%
6.25		10	18	0	25	2.285	7.226	40.15%	-0.56%
12.5		10	20.4	14	26	1.352	4.274	20.95%	-13.97%
25		10	18.5	11	25	1.565	4.95	26.76%	-3.35%
50		10	18.5	0	27	2.353	7.442	40.23%	-3.35%
100		10	13.5	0	25	2.857	9.034	66.92%	24.58%

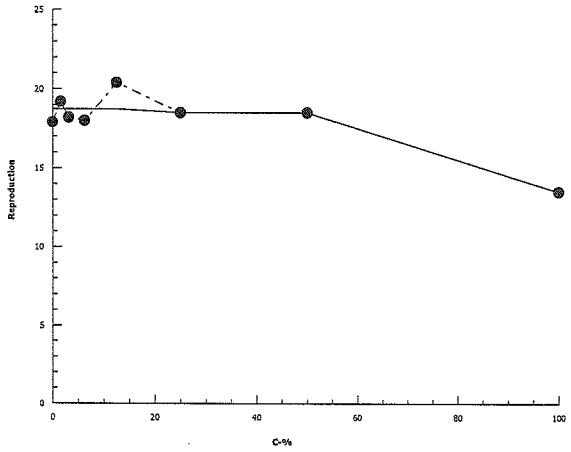
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	21	18	17	16	19	0	24	14	23	27
1.56		21	23	22	23	23	19	0	25	19	17
3.12		23	24	23	15	21	20	20	17	0	19
6.25		25	23	22	22	21	0	21	16	15	15
12.5		22	26	26	14	22	23	14	18	19	20
25		24	18	11	25	19	25	19	15	16	13
50		24	23	21	14	18	0	19	18	27	21
100		23	4	25	18	18	0	17	15	15	0

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	00-4010-0696	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:24	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: VL QA: May 31/18

Ceriodaphnia dubia Summary Sheet

Client: Teck
Work Order No.: 180706

Start Date/Time: May 2/18 @ 1030h
Set up by: [redacted]

Sample Information:

Sample ID: LC_FRDSDCWS_2017-04-25_W
Sample Date: Apr 30/18
Date Received: May 1/18
Sample Volume: 5x2L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: BRD04918B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 38
Mortality (%) in previous 7 d: 15
Individual female # used ≥8 young on test day: 32, 36, 37, 38, 40

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd182
Stock Solution ID: 18NaCl 1 (100g/L NaCl)
Date Initiated: Apr 28/18 @ 1300h

7-d LC50 (95% CL): 2.0 (1.7 – 2.3) g/L NaCL
7-d IC50 (95% CL): 0.9 (0.6 – 1.2) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8 – 2.3) g/L NaCL CV (%): 7
7-d IC50 Reference Toxicant Mean and Historical Range: 1.3 (0.9 – 1.9) g/L NaCL CV (%): 20

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: May 31, 2018

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: ~~FR-LC-FRDSDC~~ LC_FRDSDC_US-2017-04-25_N
Work Order #: 180706

Start Date & Time: May 2/18 @ 1030h
Stop Date & Time: May 8/18 @ 1300h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Control (water)

Days	0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	25.0	24.5		
DO (mg/L)	8.0	7.6	7.9	7.3	8.2	7.6	8.0	7.0	8.2	7.4	7.8	7.5		
pH	8.0	7.7	8.1	7.8	8.0	7.7	7.8	7.6	8.0	7.7	7.9	7.7		
Cond. (µS/cm)	223	222		220		222		223		223		223		
Initials	EMM	MB		MB		A		A		MB		EL		

1.56

Days	0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.5		
DO (mg/L)	8.1	7.6	7.7	7.8	7.6	7.6	8.0	7.2	8.0	7.4	8.0	7.5		
pH	8.2	7.8	8.2	7.9	8.1	7.8	7.9	7.8	7.9	7.8	8.1	7.8		
Cond. (µS/cm)	223	225		223		230		232		227		230		
Initials	EMM	MB		MB		A		A		MB		EL		

12.5

Days	0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.5		
DO (mg/L)	8.1	7.6	7.8	7.8	7.7	7.6	8.1	7.3	8.0	7.4	8.1	7.1		
pH	8.2	7.8	8.1	7.9	8.1	7.8	7.9	7.8	7.9	7.8	8.2	7.8		
Cond. (µS/cm)	280	271		271		283		284		277		276		
Initials	EMM	MB		MB		A		A		MB		EL		

100

Days	0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	24.5		
DO (mg/L)	8.1	7.3	8.0	7.8	8.1	7.5	8.2	7.2	8.1	7.1	8.3	7.3		
pH	8.3	7.9	8.1	8.1	8.0	8.0	7.8	7.8	7.8	7.8	8.1	7.8		
Cond. (µS/cm)	629	620		612		617		619		611		600		
Initials	EMM	MB		MB		A		A		MB		EL		

(1) EMM 8.2

Thermometer: 4 **DO meter/probe:** 1 / 1 **pH meter/probe:** 1 / 1 **Conductivity meter/probe:** 1 / 1

	Control	100 %		
Hardness*	100	350		
Alkalinity*	98	142		

* mg/L as CaCO3

Analysts: EMM, MB, KL, PLD, EC

Reviewed by: [signature]

Date reviewed: May 31, 2018

Sample Description: clear, colourless, odourless, some brown particulates.

Comments: **Broodboard Used:** BB041918B (32, 36, 37, 38, 40)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: lk Tece
Sample ID: ~~EP-AE-FRDSDC~~ LC_FRDSDC_WS_2017-04-25_N
Work Order: 180706

Start Date & Time: May 2/18 @ 1030h
Stop Date & Time: May 8/18 @ 1300h
Set up by: lk

%(v/v)

Days	Concentration: control										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	3	✓	3	✓	5	X	✓	5	3	2	CW
5	7	✓	8	4	6	|	4	7	6	6	HM
6	5	✓	6	✓	8	|	7	7	11	11	EL
7						|				
8											
Total	15	0	17	4	19	0X	11	19	20	19	lk

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	✓	✓	2	✓	3	4	2	4	4	3	CW
5	✓	✓	8	7	9	9	8	✓	7	7	HM
6	✓	✓	11	9	8	8	✓	7	9	6	EL
7											
8											
Total	0	0	21	11	20	21	10	11	19	16	lk

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	3	✓	5	3	3	4	✓	3	2	3	CW
5	8	✓	10	9	9	8	4	9	6	8	HM
6	7	✓	8	✓	8	9	8	9	✓	9	EL
7							12				
8											
Total	18	0	23	12	20	21	27 12	21	8	20	lk

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	4	✓	5	4	✓	3	2	4	3	2	CW
5	8	✓	9	9	6	8	6	7	7	8	HM
6	9b	✓ 6	8 8	✓	8 7	9 6	8	9	✓	9 10	EL
7											
8											
Total	20	0	22	13	13	17	16	19	10	20	lk

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	3	2	3	✓	4	3	✓	3	3	4	CW
5	6	6	7	2	5	5	3	5	8	8	HM
6	8 10	✓	9 8	✓	7 10	8 ✓	8	8 12	✓	10 6	EL
7											
8											
Total	19	8	18	2	19	8	11	20	11	18	lk

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	✓	✓	3	4	5	2	2	2	4	3	CW
5	4	✓	6	8	7	7	6	8	9	8	HM
6	10b	✓	8 8	X 10	10	8	8	12 10	✓	8	EL
7											
8											
Total	10	0	17	22	22	17	16	20	13	19	lk

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	3	✓	3	2	6	✓	✓	6	✓	4	CW
5	10	7	8	6	9	7	3	9	7	6	HM
6	8 8	✓	11	✓	10	4	8	12	9	8	EL
7											
8											
Total	21	2	22	8	25	6	11	27	11	18	lk

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	HM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	A
4	✓	2	3	✓	3	✓	✓	✓	2	4	CW
5	3	7	6	7	8	7	7	6	8	8	HM
6	6	✓	9	9	10	12	✓	8	✓	10	EL
7											
8											
Total	9	9	18	11	16	14	0	10	8	22	lk

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See WR sheet
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count. ①checked under microscope ; no epiphia

Reviewed by: [signature]
Date reviewed: May 31, 2018

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	02-4576-8446	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	08-3674-8135	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	02 May-18 10:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	08 May-18 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	02-2000-4056	**Code:**	D1CFED8	**Client:**	Teck Coal
Sample Date:	30 Apr-18 10:33	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (4.7 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1399125	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	0.9	0	1	0.1	0.3162	35.14%	0.0%	9	10
1.56		10	1	1	1	0	0	0.0%	-11.11%	10	10
3.12		10	1	1	1	0	0	0.0%	-11.11%	10	10
6.25		10	1	1	1	0	0	0.0%	-11.11%	10	10
12.5		10	1	1	1	0	0	0.0%	-11.11%	10	10
25		10	1	1	1	0	0	0.0%	-11.11%	10	10
50		10	1	1	1	0	0	0.0%	-11.11%	10	10
100		10	1	1	1	0	0	0.0%	-11.11%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	0	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

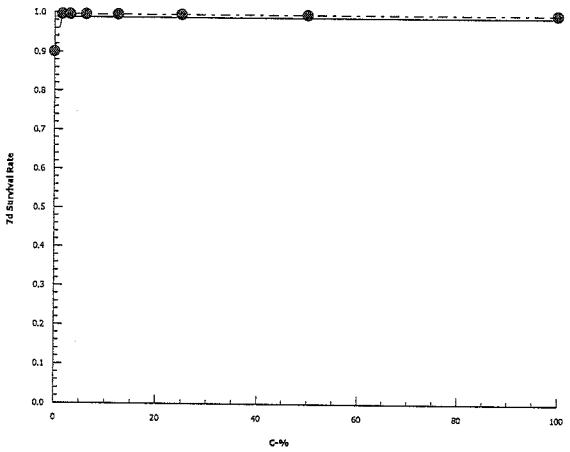
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	02-4576-8446	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Analyst: _____ QA: 5/18

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	09-3071-3764	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	08-3674-8135	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	02 May-18 10:30	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	08 May-18 13:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	02-2000-4056	**Code:**	D1CFED8	**Client:**	Teck Coal
Sample Date:	30 Apr-18 10:33	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	48h (4.7 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	25853	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	60.65	0.3622	N/A	1.649	NA	276.1
IC10	73.52	0.8557	N/A	1.36	NA	116.9
IC15	89.08	1.528	N/A	1.123	NA	65.45
IC20	>100	N/A	N/A	<1	NA	NA
IC25	>100	N/A	N/A	<1	NA	NA
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	12.4	0	20	2.574	8.14	65.65%	0.0%
1.56		10	12.9	0	21	2.532	8.006	62.06%	-4.03%
3.12		10	15.5	0	23	2.32	7.337	47.34%	-25.0%
6.25		10	15	0	22	2.049	6.481	43.2%	-20.97%
12.5		10	13.4	2	20	1.968	6.222	46.43%	-8.07%
25		10	15.6	0	22	2.104	6.653	42.65%	-25.81%
50		10	15.1	2	27	2.726	8.621	57.09%	-21.77%
100		10	11.7	0	22	1.938	6.129	52.39%	5.65%

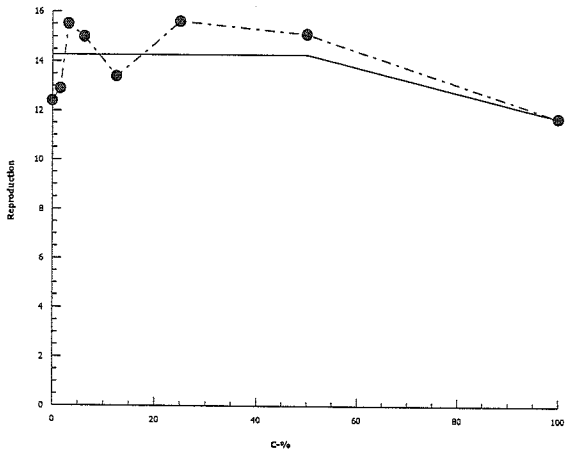
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	15	0	17	4	19	0	11	19	20	19
1.56		0	0	21	11	20	21	10	11	19	16
3.12		18	0	23	12	20	21	12	21	8	20
6.25		20	0	22	13	13	17	16	19	10	20
12.5		19	8	18	2	19	8	11	20	11	18
25		10	0	17	22	22	17	16	20	13	19
50		21	2	22	8	25	6	11	27	11	18
100		9	9	18	11	16	14	0	10	8	22

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	09-3071-3764	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:19	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: _____ QA: May 31/18

Ceriodaphnia dubia Summary Sheet

Client: Teck
Work Order No.: 180706

Start Date/Time: May 1/18 @ 1600h
Set up by: [illegible]

Sample Information:

Sample ID: LC_DCDS_US_2014-04-25_N
Sample Date: Apr 30/18
Date Received: May 1/18
Sample Volume: 5x20L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: BB041918A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 29
Mortality (%) in previous 7 d: 15
Individual female # used ≥8 young on test day 7, 9, 13, -17, 18

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cd182
Stock Solution ID: 18NaOS (100g/L NaCl)
Date Initiated: Apr 18/18

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 0.9 (0.6-1.2) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (1.8-2.3) g/L NaCL CV (%): 7
7-d IC50 Reference Toxicant Mean and Historical Range: 1.3 (0.9-1.9) g/L NaCL CV (%): 20

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		90.3 (71.7 - N/A)
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]

Date reviewed: May 31, 2018

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: LAWS_WS_2018-04-25_N
Work Order #: 180706

Start Date & Time: May 1/18 @ 1600h
Stop Date & Time: May 8/18 @ 1100h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration: control	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0	25.0	25.0
DO (mg/L)	8.0	7.8	8.0	7.3	7.8	7.3	8.2	7.6	8.0	7.0	8.2	7.4	7.8	7.3
pH	8.3	8.2	8.2	8.0	8.1	7.8	8.0	7.7	7.8	7.6	8.0	7.6	7.9	7.6
Cond. (µS/cm)	223	223		222		220		222		223		223		221
Initials	EMM	EMM												

Concentration: 1.56% (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.2	7.8	8.1	7.3	7.7	7.4	7.7	7.4	8.0	7.2	8.1	7.4	7.7	7.3
pH	8.26	8.2	8.2	8.0	8.1	7.8	8.1	7.8	7.9	7.7	7.8	7.6	8.1	7.6
Cond. (µS/cm)	221	225		222		217		226		235		217		220
Initials	EMM	EMM												

Concentration: 12.5% (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.2	7.8	8.1	7.3	7.8	7.4	7.7	7.5	8.0	7.3	8.1	7.4	7.9	7.3
pH	8.1	8.2	8.2	7.9	8.1	7.9	8.1	7.9	7.9	7.7	7.7	7.7	8.0	7.7
Cond. (µS/cm)	244	240		236		233		240		243		230		232
Initials	EMM	EMM												

Concentration: 100% (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	old	new	old	new	old	new	old	new	old	new	old	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0
DO (mg/L)	8.3	7.8	8.2	7.0	8.1	7.4	8.0	7.5	8.0	7.2	8.1	7.3	8.1	7.3
pH	8.1	8.3	8.1	7.9	8.0	8.0	7.9	7.9	7.8	7.7	7.7	7.7	8.0	7.9
Cond. (µS/cm)	360	364		360		355		356		360		360		361
Initials	EMM	EMM												

Thermometer: 4 DO meter/probe: 1 / 1 pH meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

	Control	100% (v/v)		
Hardness*	100	174		
Alkalinity*	98	96		

* mg/L as CaCO3

Analysts: KL, EMM, AMD, MB
Reviewed by:
Date reviewed: May 31, 2018

Sample Description: Slightly turbid, odourless, odourless, brown particulates.

Comments: Broodboard Used: ~~BB01~~ BB041918A (7, 9, 13-A, 18)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Tece
Sample ID: LC-DCDS_WS_2014 2017-04-25 AN
Work Order: 180706

Start Date & Time: May 2/18 @ 1600h
Stop Date & Time: May 8 18 @ 1100h
Set up by:

6 (n/a)

Concentration: (control) | **Concentration:** 1.56 | **Concentration:** 3.12

Days	A	B	C	D	E	F	G	H	I	J	Init	A	B	C	D	E	F	G	H	I	J	Init	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	4	AM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	4	AM
4	3	3	3	3	3	3	2	3	2	2	A	4	4	4	4	3	3	4	3	4	A	3	4	4	3	2	4	3	4	3	✓	A
5	✓	✓	7	6	6	✓	7	5	✓	8	CW	10	✓	✓	8	7	✓	12	8	✓	10	CW	✓	✓	✓	7	6	✓	✓	5	7	8	CW
6	8	7	11	10	12	9	10	12	8	11	AM	✓	9	8	12	11	9	✓	11	8	✓	AM	8	6	6	9	9	8	7	10	9	10	AM
7	12	13	✓	10	✓	11	✓	✓	9	✓	AM	9	11	12	✓	✓	9	16	10	14	12	AM	14	9	13	✓	✓	14	10	✓	14	✓	AM
8																																	
Total	23	23	21	23	21	23	19	20	19	21	AM	24	24	24	24	21	21	31	23	25	26	AM	25	19	23	19	17	26	20	19	19	22	AM

Concentration: 6.25 | **Concentration:** 12.5 | **Concentration:** 25

Days	A	B	C	D	E	F	G	H	I	J	Init	A	B	C	D	E	F	G	H	I	J	Init	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM
4	4	3	3	3	3	3	4	3	3	2	A	3	3	2	3	3	4	4	3	2	3	✓	3	4	4	3	3	3	3	4	3	4	✓
5	✓	✓	✓	7	7	7	8	8	7	8	CW	✓	✓	✓	4	✓	✓	✓	✓	7	✓	CW	✓	✓	✓	6	✓	✓	2	6	5	✓	CW
6	8	9	9	9	10	8	12	11	8	9	AM	10	8	8	9	7	9	8	7	11	✓	AM	9	8	7	10	9	7	✓	✓	13	9	AM
7	13	12	10	11	✓	✓	✓	✓	✓	✓	AM	16	12	10	9	11	10	X	13	✓	11	AM	13	10	11	✓	14	13	10	12	✓	11	AM
8																																	
Total	25	24	22	19	20	18	24	22	18	19	AM	29	23	20	16	21	23	12	23	20	20	AM	25	22	22	19	26	23	15	22	21	24	AM

Concentration: 50 | **Concentration:** 100 | **Concentration:**

Days	A	B	C	D	E	F	G	H	I	J	Init	A	B	C	D	E	F	G	H	I	J	Init	A	B	C	D	E	F	G	H	I	J	Init
1	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM											
2	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM											
3	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	AM											
4	2	3	3	3	2	3	2	✓	3	4	A	4	✓	✓	✓	2	2	✓	2	3	3	A											
5	✓	✓	✓	✓	4	✓	✓	4	✓	✓	CW	3	2	3	4	2	4	✓	5	4	4	CW											
6	8	8	9	10	10	9	10	11	12	9	AM	9	8	8	6	✓	✓	✓	9	10	9	AM											
7	11	12	14	12	✓	11	15	13	12	10	AM	✓	13	12	10	10	10	3	✓	✓	✓	AM											
8																																	
Total	21	23	26	25	18	23	27	28	27	23	AM	16	23	23	19	14	16	3	16	16	16	AM											

Notes: X = mortality.

Sample Description: see WQ sheet.
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by:
Date reviewed: May 31, 2018

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	10-8563-5267	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:57	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-8864-6074	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	01 May-18 16:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	08 May-18 11:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 19h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	19-5563-3815	**Code:**	74909A97	**Client:**	Teck Coal
Sample Date:	30 Apr-18 12:14	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	358021	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		1	1	1	1	1	1	0	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

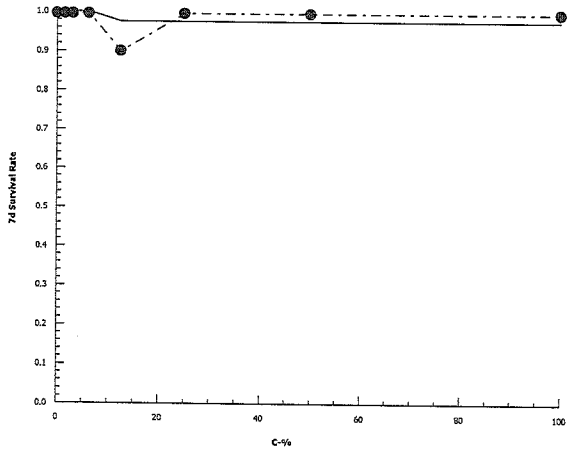
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID: 10-8563-5267 **Endpoint:** 7d Survival Rate **CETIS Version:** CETISv1.8.7
Analyzed: 16 May-18 18:57 **Analysis:** Linear Interpolation (ICPIN) **Official Results:** Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	09-0386-8917	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:28	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	04-8864-6074	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	01 May-18 16:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	08 May-18 11:00	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 19h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	19-5563-3815	**Code:**	74909A97	**Client:**	Teck Coal
Sample Date:	30 Apr-18 12:14	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	28h (5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1071794	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	50.52	2.285	58.74	1.98	1.702	43.77
IC10	58.45	50.48	77.17	1.711	1.296	1.981
IC15	67.6	57.55	N/A	1.479	NA	1.738
IC20	78.16	64.3	N/A	1.279	NA	1.555
IC25	90.34	71.68	N/A	1.107	NA	1.395
IC40	>100	N/A	N/A	<1	NA	NA
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	21.3	19	23	0.5175	1.636	7.68%	0.0%
1.56		10	24.3	21	31	0.895	2.83	11.65%	-14.08%
3.12		10	20.9	17	26	0.9363	2.961	14.17%	1.88%
6.25		10	21.1	18	25	0.836	2.644	12.53%	0.94%
12.5		10	20.7	12	29	1.43	4.523	21.85%	2.82%
25		10	21.9	15	26	0.9939	3.143	14.35%	-2.82%
50		10	24.1	18	28	0.9826	3.107	12.89%	-13.15%
100		10	16.3	3	23	1.783	5.638	34.59%	23.47%

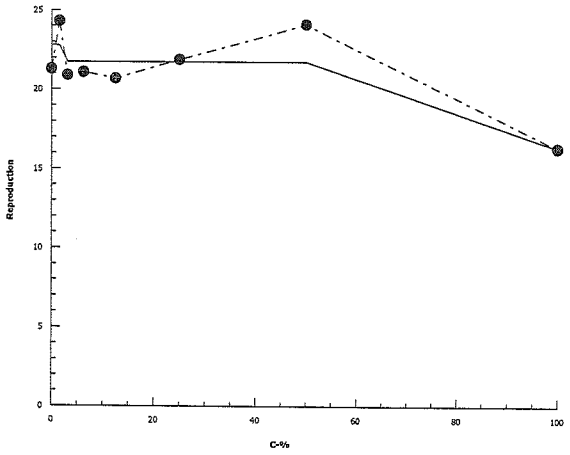
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	23	23	21	23	21	23	19	20	19	21
1.56		24	24	24	24	21	21	31	23	25	26
3.12		25	19	23	19	17	26	20	19	19	22
6.25		25	24	22	19	20	18	24	22	18	19
12.5		29	23	20	16	21	23	12	23	20	20
25		25	22	22	19	26	23	15	22	21	24
50		21	23	26	25	18	23	27	28	27	23
100		16	23	23	20	14	16	3	16	16	16

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	09-0386-8917	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:28	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: VL QA: May 31 | 18

Ceriodaphnia dubia Summary Sheet

Client: Teck
Work Order No.: 180706

Start Date/Time: May 1/18 @ 1600h
Set up by: VL

Sample Information:

Sample ID: LCLCS_WS_2017-04-24_N
Sample Date: Apr 30/18
Date Received: May 1/18
Sample Volume: 5x2L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: BB041918B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: VL ~~38~~ 33
Mortality (%) in previous 7 d: 15
Individual female # used ≥8 young on test day: 21, 23, 27-31, 33, 38

NaCl Reference Toxicant Results:

Reference Toxicant ID: Cdl82
Stock Solution ID: 18NaCl01 (100 g/L NaCl)
Date Initiated: Apr 18/18 @ 1300h

7-d LC50 (95% CL): 2.0 (1.7-2.3) g/L NaCL
7-d IC50 (95% CL): 0.9 (0.6-1.2) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 2.0 (VL 1.8-2.3) g/L NaCL CV (%): 7
7-d IC50 Reference Toxicant Mean and Historical Range: 1.3 (0.9-1.9) g/L NaCL CV (%): 20

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		38.4 (12.4-60.7)
IC50 % (v/v) (95% CL)		>100

Reviewed by: [signature]
Date reviewed: May 31, 2018

Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck coal
Sample ID: ~~LC LC5 LC-LCDSSLCC~~
Work Order #: LC LC5-WS2017-04-24N

Start Date & Time: May 1/18 @ 1600h
Stop Date & Time: May 8/18 @ 1730h
CER #: 4
Test Species: *Ceriodaphnia dubia*

Concentration control	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	~~old~~	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	25.0	25.0	25.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.0	8.0	8.0	7.2	7.9	7.6	8.2	7.6	8.0	7.3	8.2	7.3		
pH	8.3	8.2	8.2	~~7.8~~ 8.0	8.1	8.0	8.0	7.7	7.8	7.7	8.0	7.8		
Cond. (µS/cm)	223	223		222		220		222		223		226		
Initials	EMM	EMM		[illegible]		[illegible]		[illegible]		AWD		EMM		

Concentration 1.56% (v/v)	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	~~old~~	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	8.0	8.1	7.2	7.8	7.7	7.6	7.4	8.0	7.0	8.1	7.6		
pH	8.2	8.3	8.2	7.9	8.2	7.9	8.2	7.6	7.9	7.6	8.0	7.7		
Cond. (µS/cm)	230	226		224		221		226		230		232		
Initials	EMM	EMM		[illegible]		[illegible]		[illegible]		AWD		EMM		

Concentration 12.5% (v/v)	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	~~old~~	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.1	8.0	8.1	7.2	7.9	7.6	7.7	7.4	8.0	7.1	8.1	7.6		
pH	8.2	8.3	8.2	8.0	8.2	7.8	8.2	7.7	7.9	7.7	8.0	7.7		
Cond. (µS/cm)	275	~~286~~ 272		282		268		272		274		272		
Initials	EMM	EMM		[illegible]		[illegible]		[illegible]		AWD		EMM		

Concentration 100% (v/v)	Days 0	1		2		3		4		5		Final 6		7
	init.	old	new	old	new	old	new	old	new	old	new	~~old~~	new	final
Temperature (°C)	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0	24.0	25.0		
DO (mg/L)	8.2	8.0	8.2	7.2	8.1	7.6	8.1	7.6	8.1	7.4	8.1	7.6		
pH	8.2	8.3	8.3	8.1	8.1	7.8	8.1	7.8	7.9	7.8	7.9	7.8		
Cond. (µS/cm)	611	~~703~~ 609		~~700~~ 608		606		608		610		610		
Initials	EMM	EMM		[illegible]		[illegible]		[illegible]		AWD		EMM		

Thermometer: 4 DO meter/probe: ~~2~~ 1 / 1 pH meter/probe: ~~2~~ 1 / 1 Conductivity meter/probe: ~~2~~ 1 / 1

	Control	100% (v/v)		
Hardness*	100	490 ~~370~~		
Alkalinity*	98	160 ~~148~~		

* mg/L as CaCO3

Analysts: KL, EMM, AWD, MB

Reviewed by: [illegible]

Date reviewed: May 31, 2018

Sample Description: clear, colourless, odourless, some brown particulates

Comments: Broodboard Used: BB041918B (21, 23, 27-31, 33, 38)

Chronic Freshwater Toxicity Test
C. dubia Reproduction Data

Client: Teck
Sample ID: LC_LCS_WS-2017-04-24_W
Work Order: 180706

Start Date & Time: May 1/18 @ 1600h
Stop Date & Time: May 7/8 /18 @ 1730h
Set up by: K K

%(v/v)

Days	Concentration: Control										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4	3	3	4	3	3	3	5	3	4	4	
5	8	7	✓	8	✓	8	✓	5	✓	6	CW
6	11	12	10	11	9	10	11	8	9	12	
7											
8											
Total	22	22	14	22	12	21	16	16	13	22	K

Days	Concentration: 1.56										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4			3	4	3	3	4	4	3	3	
5	4	7	8	6	✓	2	✓	✓	8	6	CW
6	12	8	10	9	8	10	9	11	✓	✓	
7											
8											
Total	21	17	21	19	11	15	13	15	11	9	K

Days	Concentration: 3.12										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4	✓	3	3	3	2	3	2	3	4	3	
5	6	8	✓	9	✓	6	8	✓	8	✓	CW
6	9	10	9	11	8	12	10	9	✓	9	
7											
8											
Total	15	21	12	23	10	21	20	12	12	12	K

Days	Concentration: 6.25										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4	3	4	3	4	4	3	3	2	3	3	
5	6	6	✓	7	5	7	✓	✓	8	8	CW
6	10	✓	8	13	10	11	9	9	11	13	
7											
8											
Total	19	10	11	24	19	21	12	11	22	24	K

Days	Concentration: 12.5										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4	3	2	3	3	3	3	2	3	2	3	
5	ox	6	✓	7	6	7	✓	10	✓	✓	CW
6		9	11	12	12	10	8	12	11	9	
7											
8											
Total	3x	17	14	22	21	20	10	25	13	12	K

Days	Concentration: 25										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2		✓									
3						2					
4	1	2	2	3	2	✓	3	3	2	3	
5	6	7	✓	8	5	8	✓	✓	6	✓	CW
6	12	10	9	11	12	13	10	12	10	9	
7											
8											
Total	21	19	11	22	19	23	13	15	18	12	K

Days	Concentration: 50										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4			3	2	1	2	2	3	2	3	
5	2	6	✓	✓	7	✓	✓	✓	2	✓	CW
6	10	9	8	7	10	9	8	9	8	6	
7											
8											
Total	12	15	11	9	17	11	10	12	12	9	K

Days	Concentration: 100										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4	3	2	3	3	3	2	✓	3	3	3	
5	✓	4	✓	✓	✓	✓	✓	✓	✓	✓	CW
6	9	12	8	8	7	9	4	7	8	7	
7											
8											
Total	12	18	11	11	10	11	4	10	11	10	K

Days	Concentration:										
	A	B	C	D	E	F	G	H	I	J	Init
1											
2											
3											
4											
5											
6											
7											
8											
Total											

Notes: X = mortality.

Sample Description: See WQ Sheet
Comments: Total # Young only based on the first 3 Broods. Fourth and subsequent broods not included in total count.

Reviewed by: [signature]

Date reviewed: May 31, 2018

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	17-2749-6169	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	13-1850-1714	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	01 May-18 16:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 May-18 17:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	06-1759-8480	**Code:**	24CFCE10	**Client:**	Teck Coal
Sample Date:	30 Apr-18 13:40	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	26h (6 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1828073	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

7d Survival Rate Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	10	1	1	1	0	0	0.0%	0.0%	10	10
1.56		10	1	1	1	0	0	0.0%	0.0%	10	10
3.12		10	1	1	1	0	0	0.0%	0.0%	10	10
6.25		10	1	1	1	0	0	0.0%	0.0%	10	10
12.5		10	0.9	0	1	0.1	0.3162	35.14%	10.0%	9	10
25		10	1	1	1	0	0	0.0%	0.0%	10	10
50		10	1	1	1	0	0	0.0%	0.0%	10	10
100		10	1	1	1	0	0	0.0%	0.0%	10	10

7d Survival Rate Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1	1	1	1	1	1	1	1	1	1
1.56		1	1	1	1	1	1	1	1	1	1
3.12		1	1	1	1	1	1	1	1	1	1
6.25		1	1	1	1	1	1	1	1	1	1
12.5		0	1	1	1	1	1	1	1	1	1
25		1	1	1	1	1	1	1	1	1	1
50		1	1	1	1	1	1	1	1	1	1
100		1	1	1	1	1	1	1	1	1	1

May 31/18

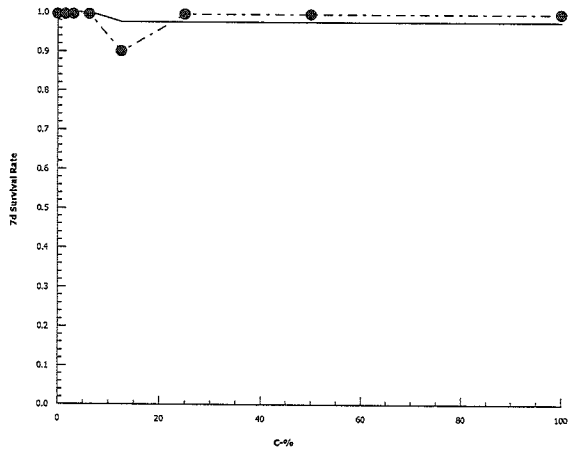
Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	17-2749-6169	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:14	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

7d Survival Rate Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.56		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.12		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Graphics



May 31/18

CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	09-5701-3404	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	13-1850-1714	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Kania Lywe
Start Date:	01 May-18 16:00	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	20% Perrier Water
Ending Date:	07 May-18 17:30	**Species:**	Ceriodaphnia dubia	**Brine:**	
Duration:	6d 2h	**Source:**	In-House Culture	**Age:**	<24h
Sample ID:	06-1759-8480	**Code:**	24CFCE10	**Client:**	Teck Coal
Sample Date:	30 Apr-18 13:40	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	26h (6 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2094313	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.6261	0.2576	28.73	159.7	3.481	388.1
IC10	25.24	0.5817	32.99	3.962	3.031	171.9
IC15	29.06	0.9892	38.18	3.441	2.619	101.1
IC20	33.43	1.502	45.26	2.991	2.21	66.59
IC25	38.45	12.43	60.66	2.601	1.649	8.044
IC40	100	44.75	N/A	1	NA	2.235
IC50	>100	N/A	N/A	<1	NA	NA

Reproduction Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	10	18	12	22	1.325	4.19	23.28%	0.0%
1.56		10	15.2	9	21	1.348	4.264	28.05%	15.56%
3.12		10	15.8	10	23	1.548	4.894	30.98%	12.22%
6.25		10	17.3	10	24	1.802	5.697	32.93%	3.89%
12.5		10	15.7	3	25	2.087	6.601	42.04%	12.78%
25		10	17.3	11	23	1.359	4.296	24.83%	3.89%
50		10	11.8	9	17	0.8	2.53	21.44%	34.44%
100		10	10.8	4	18	1.062	3.36	31.11%	40.0%

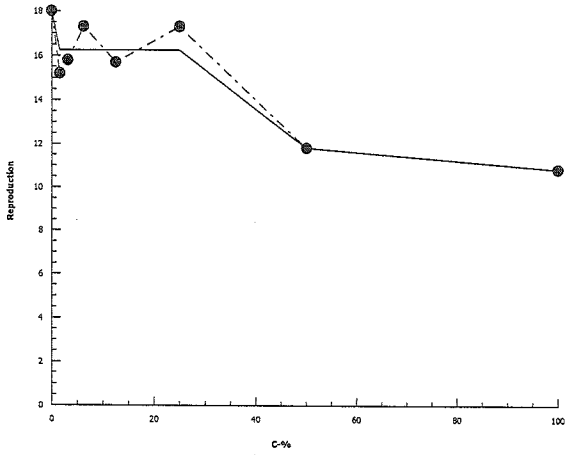
Reproduction Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	Negative Control	22	22	14	22	12	21	16	16	13	22
1.56		21	17	21	19	11	15	13	15	11	9
3.12		15	21	12	23	10	21	20	12	12	12
6.25		19	10	11	24	19	21	12	11	22	24
12.5		3	17	14	22	21	20	10	25	13	12
25		21	19	11	22	19	23	13	15	18	12
50		12	15	11	9	17	11	10	12	12	9
100		12	18	11	11	10	11	4	10	11	10

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental**

Analysis ID:	09-5701-3404	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.8.7
Analyzed:	16 May-18 18:15	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



May 31/18

Client: Teck

W.O.#: 180706

Hardness and Alkalinity Datasheet

	Alkalinity							Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
LC_LCOSSLCC_WS_2017-04-24_N	May 1/18	May 1/18	50	~~17.7~~ 7.9	~~12.2~~ 8.0	~~238~~ 156		100	~~3.94~~ 4.0	~~390~~ 400	
LC_LCS_WS_2017-04-24_N	May 1/18	May 1/18	50	~~7.6~~ 8.1	~~7.8~~ 8.2	~~148~~ 160		100	4.93 ~~7~~	~~490~~ ~~510~~	
LC_FRDSDC_WS_2017-04-25_N	May 1/18	May 2/18	50	7.3	7.5	142		100①	3.5	350	
LSDC1_WS_2017-04-25_N	May 1/18	May 2/18	50	5.7	5.9	110		50	7.2	144	
LC_DCDS_WS_2017-04-25_N	May 1/18	May 1/18	50	4.9	5.0	96		50	8.7	174	
20% perner	May 1/18	May 1/18	50	5.0	5.1	98		50	5.0	100	

Notes: ① sample diluted w/ DI water up to 100 mL

Reviewed by: [signature]

Date Reviewed: May 31, 2018

APPENDIX B – Rainbow trout embryo *(Oncorhynchus mykiss)* Toxicity Test Data

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: May 16, 2018 @ 1935h

Work Order No.: 180707

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2018-05-14_N
Sample Date: May 15, 2018
Date Received: May 16, 2018
Sample Volume: 7x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 11

Test Organism Information:

Batch No.: 051618
Source: Tedis Trout Fish Farm, Campbell Lake
Loading Density: 1.42 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE107
Stock Solution ID: 18501
Date Initiated: May 16, 2018
7-d EC50 (95% CL): 3.0 (2.8 – 3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.3 (2.1 - 8.8) mg/L SDS
Reference Toxicant CV (%): 43

Test Results:

	Sample ID		
	LC_LCDSSLCC_WS_2018-05-14_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JOh

Date reviewed: June 6/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-LCDSCLCC_WS-2018-05-14_N
Work Order #: 180707

Start Date & Time: May 16/18 @ 1935h
Stop Date & Time: May 23, 2018 @ 1000h
CER #: 3
Test Species: *Oncorhynchus mykiss*

Control	Days													
Concentration % (v/v)	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	10.1	10.2	10.0	10.2	9.8	10.1	9.9	10.1	9.8	10.2	10.1	10.2
pH	6.8	6.8	6.9	6.9	6.8	6.8	7.1	6.8	7.0	6.8	6.9	6.9	6.8	6.9
Cond. (µS/cm)	35	34		34		34		34		34		34		35
Initials	A	MM		MM		A		A		MM		MM		MM

6.25	Days													
Concentration	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.1	10.0	10.1	9.9	10.1	9.8	10.1	9.8	10.1	9.8	10.1	10.1	10.1
pH	7.1	7.1	6.9	7.0	6.9	7.0	7.1	7.4	7.2	7.1	7.2	7.0	7.1	7.0
Cond. (µS/cm)	64	66		66		61		58		65		66		65
Initials	A	MM		MM		A		A		MM		MM		MM

12.5	Days													
Concentration	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.1	10.0	10.0	10.0	10.1	9.9	10.1	9.9	10.1	9.9	10.1	10.2	10.1
pH	7.3	7.3	7.2	7.2	7.2	7.1	7.2	7.2	7.3	7.4	7.5	7.6	7.6	7.4
Cond. (µS/cm)	155	153		146		152		151		153		154		154
Initials	A	MM		MM		A		A		MM		MM		MM

100	Days													
Concentration	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.3	10.0	10.0	9.9	10.0	10.1	9.9	10.1	10.0	10.0	9.9	10.1	10.2	10.1
pH	7.5	7.8	7.9	7.8	7.8	7.8	7.7	7.9	7.6	7.9	8.0	7.9	8.1	8.1
Cond. (µS/cm)	445	452		448		451		452		450		453		450
Initials	A	MM		MM		A		A		MM		MM		MM

Thermometer: Temp-3 DO meter/probe: 2/3 , 2/3 pH meter/probe: 2/3 , 2/3 Conductivity meter/probe: 2/3 , 2/3

	Control	100%		
Hardness*	10	320		
Alkalinity*	11	130		

* mg/L as CaCO3

Analysts: YYL, MM
Reviewed by: JCL
Date reviewed: June 6/18

Sample Description: clear, no colour, no odour, some particulates

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck — **Start Date & Time:** May 16, 2018 @ 1835h
Sample ID: LC_LCDSSLCC_WS_2018 ~~EF~~ N — **Stop Date & Time:** May 23, 2018 @ 1000h
Work Order #: 180707 -05-14_N — **Test Species:** *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	0	30	30
	2								0	0	30	30
	3								0	0	30	30
	4								0	0	30	30
6.25	1								0	0	30	30
	2								0	0	30	30
	3								0	0	30	30
	4								0	0	30	30
12.5	1								0	0	30	30
	2					↓			0	2	28	30
	3					1			1	0	29	30
	4					0			0	1	27	28
25	1								0	0	30	30
	2								0	0	29	29
	3							↓	0	0	30	30
	4							1	1	0	29	~~29~~ 30
50	1							0	0	0	30	30
	2								0	0	30	30
	3								0	0	30	30
	4								0	0	30	30
100	1								0	1	28	29
	2								0	1	29	30
	3							↓	0	0	30	30
	4	↓	↓	—	—	↓	↓	1	1	0	29	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: JCL — **Date reviewed:** June 6/18

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	07-9524-6971	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	31 May-18 16:21	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	13-1049-9544	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	16 May-18 18:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 May-18 10:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 15h	**Source:**	Ted's Trout, Campbell Lake	**Age:**	
Sample ID:	13-2012-8488	**Code:**	4EAF8FE8	**Client:**	Teck Coal
Sample Date:	15 May-18 10:48	**Material:**	Water Sample	**Project:**	
Receive Date:	16 May-18 09:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	32h (10 °C)	**Station:**	LC_LCDSSLCC_WS_2018-05-14_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	331671	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	1	1	1	0	0	0.0%	0.0%	120	120
6.25		4	1	1	1	0	0	0.0%	0.0%	120	120
12.5		4	0.9661	0.9333	1	0.01362	0.02724	2.82%	3.39%	114	118
25		4	0.9917	0.9667	1	0.008333	0.01667	1.68%	0.83%	118	119
50		4	1	1	1	0	0	0.0%	0.0%	120	120
100		4	0.9747	0.9655	1	0.008433	0.01687	1.73%	2.53%	116	119

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	1	1	1
6.25		1	1	1	1
12.5		1	0.9333	0.9667	0.9643
25		1	1	1	0.9667
50		1	1	1	1
100		0.9655	0.9667	1	0.9667

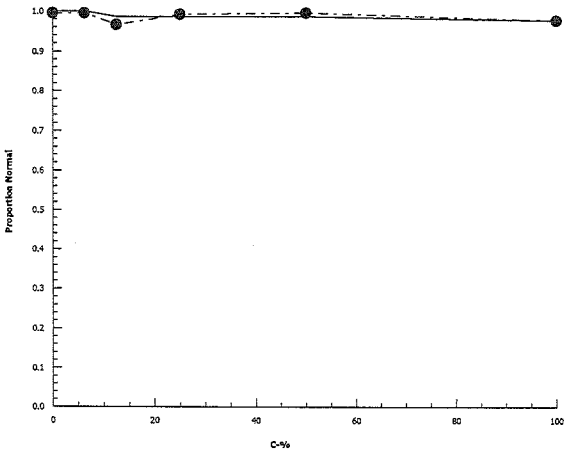
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	30/30	30/30	30/30
6.25		30/30	30/30	30/30	30/30
12.5		30/30	28/30	29/30	27/28
25		30/30	29/29	30/30	29/30
50		30/30	30/30	30/30	30/30
100		28/29	29/30	30/30	29/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	07-9524-6971	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	31 May-18 16:21	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: May 16, 2018 @ 1835h

Work Order No.: 180707

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC-DCI_WS-2018-05-14_N
Sample Date: May 15, 2018
Date Received: May 16, 2018
Sample Volume: 4x20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 11

Test Organism Information:

Batch No.: 051618
Source: Ted's Trout Fish Farm, Campbell Lake
Loading Density: 1.42 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE107
Stock Solution ID: 18501
Date Initiated: May 16 2018
7-d EC50 (95% CL): 3.0 (2.8 - 3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.3 (2.1 - 8.8) mg/L SDS
Reference Toxicant CV (%): 43

Test Results:

	Sample ID		
	LC-DCI_WS-2018-05-14_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCM

Date reviewed: June 6/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-DC1-WS-2018-05-14-N
Work Order #: 180707

Start Date & Time: May 16/18 @ 1835h
Stop Date & Time: May 23, 2018 @ 1010h
CER #: 3
Test Species: *Oncorhynchus mykiss*

Concentration Control %(v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	10.1	10.2	10.0	10.2	9.9	10.1	9.9	10.1	9.7	10.2	10.1	10.1
pH	6.8	6.8	6.7	6.7	6.9	6.8	7.1	6.8 A 7.1		6.8	6.8	6.7	6.8	6.8
Cond. (µS/cm)	35	34		34		34		34		34		34		35
Initials	A	YML		YML		A		A		YML		YML		YML

Concentration 6.25

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.0	10.1	10.1	9.9	10.0	9.9	10.1	9.9	10.2	9.8	10.1	10.0	10.1
pH	7.1	7.1	7.0	7.1	7.1	7.0	7.1	7.1	7.2	7.1	7.1	7.1	7.2	7.1
Cond. (µS/cm)	49	50		52		49		51		53		53		53
Initials	A	YML		YML		A		A		YML		YML		YML

Concentration 12.5

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.1	10.0	10.1	9.9	10.1	9.8	10.1	10.0	10.2	9.7	10.1	10.1	10.1
pH	7.2	7.3	7.3	7.4	7.3	7.3	7.4	7.4	7.4	7.4	7.5	7.5	7.5	7.4
Cond. (µS/cm)	99	108		106		104		105		108		100		106
Initials	A	YML		YML		A		A		YML		YML		YML

Concentration 100

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.3	10.1	10.1	10.1	9.9	10.2	9.9	10.1	10.0	10.1	9.6	10.2	10.1	10.2
pH	7.4	7.8	7.9	7.8	8.0	7.8	7.7	7.9	7.7	7.9	8.0	7.9	8.0	8.0
Cond. (µS/cm)	283	288		287		286		285		288		289		286
Initials	A	YML		YML		A		A		YML		YML		YML

Thermometer: Temp-3 **DO meter/probe:** 2/3 / 2/3 **pH meter/probe:** 2/3 / 2/3 **Conductivity meter/probe:** 2/3 / 2/3

	Control	100%		
Hardness*	10	156		
Alkalinity*	11	102		

* mg/L as $CaCO_3$

Analysts: YML, SMO
Reviewed by: JOE
Date reviewed: June 6/18

Sample Description: YML Slightly turbid brown, no odour, some particulates.

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_DC1_WS_2018-05-14_N
Work Order #: 180707
Start Date & Time: May 16, 2018 @ 1835h
Stop Date & Time: May 23, 2018 @ 1010h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	2	28	30
	2					0			0	0	30	30
	3					1			1	0	29	30
	4					0			0	0	29	29
6.25	1								0	1	29	30
	2								0	0	30	30
	3							↓	0	2	27	29
	4							1	1	0	29	30
12.5	1							0	0	0	30	30
	2							1	0	1	29	30
	3								0	1	29	30
	4								0	1	29	30
25	1								0	0	30	30
	2								0	3	27	30
	3								0	0	29	29
	4								0	0	29	29
50	1								0	1	29	30
	2								0	0	30	30
	3								0	0	30	30
	4					↓			0	0	30	30
100	1					1			1	0	29	30
	2					0			0	1	29	30
	3								0	0	30	30
	4	↓	↓	↓	↓	↓	↓	↓	0	0	30	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		AP	MW	AP	MW	MW	MW	MW	MW	MW	MW	MW

Comments:

Reviewed by: JCh **Date reviewed:** June 6/18

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	02-7437-6033	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	31 May-18 16:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-6450-4916	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	16 May-18 18:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 May-18 10:10	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 16h	**Source:**	Ted's Trout, Campbell Lake	**Age:**	
Sample ID:	09-3175-3229	**Code:**	37896D0D	**Client:**	Teck Coal
Sample Date:	15 May-18 09:53	**Material:**	Water Sample	**Project:**	
Receive Date:	16 May-18 09:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	33h (10 °C)	**Station:**	LC_DC1_WS_2018-05-14_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	387983	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.975	0.9333	1	0.01596	0.03191	3.27%	0.0%	116	119
6.25		4	0.9661	0.931	1	0.01408	0.02816	2.92%	0.91%	115	119
12.5		4	0.975	0.9667	1	0.008333	0.01667	1.71%	0.0%	117	120
25		4	0.975	0.9	1	0.025	0.05	5.13%	0.0%	115	118
50		4	0.9917	0.9667	1	0.008333	0.01667	1.68%	-1.71%	119	120
100		4	0.9833	0.9667	1	0.009622	0.01924	1.96%	-0.85%	118	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9333	1	0.9667	1
6.25		0.9667	1	0.931	0.9667
12.5		1	0.9667	0.9667	0.9667
25		1	0.9	1	1
50		0.9667	1	1	1
100		0.9667	0.9667	1	1

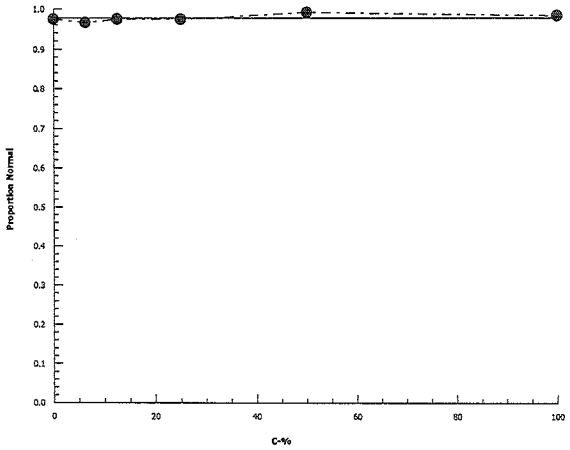
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	28/30	30/30	29/30	29/29
6.25		29/30	30/30	27/29	29/30
12.5		30/30	29/30	29/30	29/30
25		30/30	27/30	29/29	29/29
50		29/30	30/30	30/30	30/30
100		29/30	29/30	30/30	30/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	02-7437-6033	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	31 May-18 16:25	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: May 16, 2018 @ 1835h

Work Order No.: 180707

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC-FRDSDC-WS-2018-05-14-N
Sample Date: May 15, 2018
Date Received: May 16, 2018
Sample Volume: 4 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 11

Test Organism Information:

Batch No.: 051618
Source: Ted's Trout Fish Farm, Campbell Lake
Loading Density: 1.42 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE107
Stock Solution ID: 18501
Date Initiated: May 16, 2018
7-d EC50 (95% CL): 3.0 (2.8 - 3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.3 (2.1 - 8.8) mg/L SDS
Reference Toxicant CV (%): 43

Test Results:

	Sample ID		
	LC-FRDSDC-WS-2018-05-14-N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCh

Date reviewed: June 6/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_FRDSDC_WS_2018-05-14_N
Work Order #: 180707

Start Date & Time: May 16/18 @ 1835h
Stop Date & Time: May 23, 2018 @ 1020h
CER #: 3
Test Species: *Oncorhynchus mykiss*

Control Concentration % (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	10.1	10.2	10.1	10.2	9.9	10.1	10.0	10.1	9.8	10.2	10.2	10.0
pH	6.8	6.8	6.8	6.7	9.8	6.8	7.1	6.8	7.1	6.8	6.8	6.7	6.9	6.8
Cond. (µS/cm)	35	34		34		34		34		34		34		34
Initials	A	UML		UML		A		A		UML		UML		UML

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.0	10.2	10.0	10.0	10.1	9.9	10.1	9.9	10.0	9.9	10.1	10.2	10.0
pH	7.2	7.3	7.1	7.1	~~9.8~~ 7.1	7.1	7.2	7.2	7.2	7.1	7.0	7.1	7.1	7.0
Cond. (µS/cm)	65	68		66 UML		63		65		67		67		68
Initials	A	UML		UML		A		A		UML		UML		UML

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.1	10.2	10.1	10.0	10.1	9.8	10.1	9.9	10.1	9.9	10.0	10.3	10.0
pH	7.4	7.4	7.5	7.3	~~9.8~~ 7.3	7.2	7.2	7.4	7.3	7.4	7.6	7.5	7.5	7.4
Cond. (µS/cm)	147	164		167 UML		164		165		157		156		155
Initials	A	UML		UML		A		A		UML		UML		UML

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.1	10.1	10.1	10.0	10.1	9.9	10.2	10.0	10.0	9.7	10.0	10.2	10.1
pH	7.6	7.8	8.0	7.7	~~8.9~~ 7.9	7.6	7.7	7.7	7.7	7.9	8.1	7.9	8.1	8.0
Cond. (µS/cm)	445	449		446 UML		448		450		460		451		451
Initials	A	UML		UML		A		A		UML		UML		UML

Thermometer: Temp-3 **DO meter/probe:** 2/3 / 2/3 **pH meter/probe:** 2/3 / 2/3 **Conductivity meter/probe:** 2/3 / 2/3

	Control	100%		
Hardness*	10	340		
Alkalinity*	11	130		

* mg/L as CaCO3

Analysts: YYL, AWS

Reviewed by: JGL
Date reviewed: June 6/18

Sample Description: slightly turbid, brown, no odour, some particulates

Comments:

Version 1.2 Issued July 19, 2017

Nautilus Environmental Company Inc.

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC-FRDSDC_WS_2018-05-14_N
Work Order #: 180707
Start Date & Time: May 16, 2018 @ 1835h
Stop Date & Time: May 23, 2018 @ 1020h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	0	30	30
	2						0		0	1	29	30
	3						0		0	0	30	30
	4						1		1	0	28	29
6.25	1						0		0	0	30	30
	2						1		1	1	27	29
	3						0		0	0	30	30
	4								0	1	28	30
12.5	1								0	1	29	30
	2							1	1	0	29	30
	3							0	0	0	30	30
	4					↓			0	1	29	30
25	1					1			1	1	28	30
	2					0 dead			0	0	30	30
	3								0	0	30	30
	4								0	0	30	30
50	1								0	0	30	30
	2								0	1	28	29
	3								0	1	29	30
	4								0	1	29	30
100	1							↓	0	0	30	30
	2							1	1	0	29	30
	3							0	0	0	30	30
	4	—	↓	—	—	↓	↓	0	0	1	28	29
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: JGR **Date reviewed:** June 6/18

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	10-3127-6931	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	31 May-18 16:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-6482-6677	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	16 May-18 18:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 May-18 10:20	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 16h	**Source:**	Ted's Trout, Campbell Lake	**Age:**	
Sample ID:	17-4762-9706	**Code:**	682AB68A	**Client:**	Teck Coal
Sample Date:	15 May-18 08:50	**Material:**	Water Sample	**Project:**	
Receive Date:	16 May-18 09:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	34h (10 °C)	**Station:**	LC_FRDSDC_WS_2018-05-14_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1031334	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.983	0.9655	1	0.009791	0.01958	1.99%	0.0%	117	119
6.25		4	0.9744	0.931	1	0.01646	0.03292	3.38%	0.88%	116	119
12.5		4	0.975	0.9667	1	0.008333	0.01667	1.71%	0.82%	117	120
25		4	0.9833	0.9333	1	0.01667	0.03333	3.39%	-0.03%	118	120
50		4	0.9747	0.9655	1	0.008433	0.01687	1.73%	0.85%	116	119
100		4	0.983	0.9655	1	0.009791	0.01958	1.99%	0.0%	117	119

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	1	0.9667	1	0.9655
6.25		1	0.931	1	0.9667
12.5		0.9667	0.9667	1	0.9667
25		0.9333	1	1	1
50		1	0.9655	0.9667	0.9667
100		1	0.9667	1	0.9655

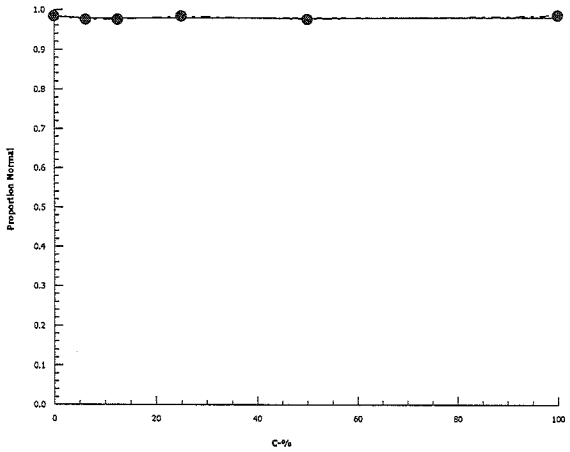
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	30/30	29/30	30/30	28/29
6.25		30/30	27/29	30/30	29/30
12.5		29/30	29/30	30/30	29/30
25		28/30	30/30	30/30	30/30
50		30/30	28/29	29/30	29/30
100		30/30	29/30	30/30	28/29

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	10-3127-6931	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	31 May-18 16:30	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: May 16, 2018 @ 1835h

Work Order No.: 180707

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DCDS_WS_2018-05-14_N
Sample Date: May 13, 2018
Date Received: May 16, 2018
Sample Volume: 4 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 11

Test Organism Information:

Batch No.: 051618
Source: Ted's Trout Fish Farm, Campbell Lake
Loading Density: 1.42 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE107
Stock Solution ID: 18501
Date Initiated: May 16, 2018
7-d EC50 (95% CL): 3.0 (2.8 - 3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.3 (2.1 - 8.8) mg/L SDS
Reference Toxicant CV (%): 43

Test Results:

	Sample ID		
	LC_DCDS_WS_2018-05-14_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCh

Date reviewed: June 6/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC_DCDS_WS_2018-05-14_N
Work Order #: 180707

Start Date & Time: May 16/18 @1835h
Stop Date & Time: May 23, 2018 @1030h
CER #: 3
Test Species: *Oncorhynchus mykiss*

Control Concentration % (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	9.9	10.2	9.9	10.2	9.8	10.1	10.1	10.1	9.8	10.2	10.1	10.0
pH	6.8	6.8	6.8	6.7	6.9	6.8	7.1	6.8	7.1	6.8	6.9	6.7	6.8	6.8
Cond. (µS/cm)	35	34		34		34		34		34		34		35
Initials	A	[illegible]		[illegible]		A		A		[illegible]		[illegible]		[illegible]

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.0	10.0	10.2	9.8	10.1	9.9	10.1	10.0	10.0	9.8	10.2	10.1	10.0
pH	7.1	7.0	7.2	7.0	7.1	7.0	7.1	7.1	7.2	7.0	7.1	7.0	7.0	7.0
Cond. (µS/cm)	56	57		59		61		64		57		59		60
Initials	A	[illegible]		[illegible]		A		A		[illegible]		[illegible]		[illegible]

Concentration 25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.0	10.0	10.2	9.8	10.1	9.9	10.1	10.0	10.0	9.9	10.2	10.1	10.1
pH	7.5	7.2	7.4	7.3	7.4	7.2	7.3	7.3	7.3	7.4	7.6	7.3	7.5	7.4
Cond. (µS/cm)	124	128		126		128		127		131		130		133
Initials	A	[illegible]		[illegible]		A		A		[illegible]		[illegible]		[illegible]

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.3	9.9	10.0	10.1	9.9	10.1	9.8	10.1	10.0	10.0	9.9	10.1	10.2	10.1
pH	7.7	7.7	7.8	7.8	7.9	7.7	7.6	7.8	7.7	7.8	7.9	7.8	8.0	8.0
Cond. (µS/cm)	363	366		372		373		374		373		374		374
Initials	A	[illegible]		[illegible]		A		A		[illegible]		[illegible]		[illegible]

Thermometer: Temp-3 **DO meter/probe:** 2/3 / 2/3 **pH meter/probe:** 2/3 / 2/3 **Conductivity meter/probe:** 2/3 / 2/3

	Control	100%		
Hardness*	10	260		
Alkalinity*	11	88		

* mg/L as CaCO3

Analysts: YYL, AWS

Reviewed by: JGL
Date reviewed: June 6/18

Sample Description: Slightly turbid, brown, no odour, some ~~p~~ in particulates

Comments:

Version 1.2 Issued July 19, 2017

Nautilus Environmental Company Inc.

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC-DCDS_WS-2018-05-14_N
Work Order #: 180707
Start Date & Time: May 16, 2018 @ 1835h
Stop Date & Time: May 23, 2018 @ 1030h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	2	28	30
	2								0	0	30	30
	3								0	0	30	30
	4								0	0	30	30
6.25	1					↓			0	1	29	30
	2					1			1	0	29	30
	3					0			0	0	30	30
	4					1			1	0	29	30
12.5	1					0			0	1	29	30
	2								0	0	30	30
	3								0	0	30	30
	4								0	0	30	30
25	1								0	2	28	30
	2								0	0	30	30
	3								0	0	30	30
	4								0	2	28	30
50	1								0	1	29	30
	2								0	0	30	30
	3						↓	↓	0	0	30	30
	4						1	1	2	1	27	30
100	1						0	0	0	0	30	30
	2								0	2	28	30
	3								0	1	29	30
	4	↓	↓	↓	↓	↓	↓	↓	0	0	30	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: JCR **Date reviewed:** June 6/18

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	16-1424-6416	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	31 May-18 16:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	08-5556-0689	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	16 May-18 18:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 May-18 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 16h	**Source:**	Ted's Trout, Campbell Lake	**Age:**	
Sample ID:	16-2860-7779	**Code:**	61129523	**Client:**	Teck Coal
Sample Date:	15 May-18 10:21	**Material:**	Water Sample	**Project:**	
Receive Date:	16 May-18 09:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	32h (10.2 °C)	**Station:**	LC_DCDS_WS_2018-05-14_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1897916	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9833	0.9333	1	0.01667	0.03333	3.39%	0.0%	118	120
6.25		4	0.975	0.9667	1	0.008333	0.01667	1.71%	0.85%	117	120
12.5		4	0.9917	0.9667	1	0.008333	0.01667	1.68%	-0.85%	119	120
25		4	0.9667	0.9333	1	0.01924	0.03849	3.98%	1.7%	116	120
50		4	0.9667	0.9	1	0.02357	0.04714	4.88%	1.7%	116	120
100		4	0.975	0.9333	1	0.01596	0.03191	3.27%	0.85%	117	120

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9333	1	1	1
6.25		0.9667	0.9667	1	0.9667
12.5		0.9667	1	1	1
25		0.9333	1	1	0.9333
50		0.9667	1	1	0.9
100		1	0.9333	0.9667	1

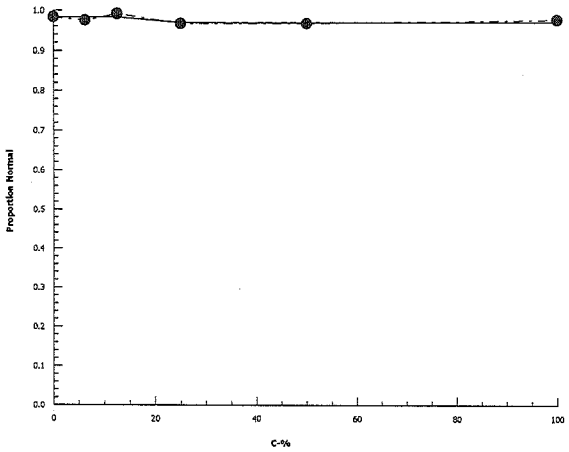
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	28/30	30/30	30/30	30/30
6.25		29/30	29/30	30/30	29/30
12.5		29/30	30/30	30/30	30/30
25		28/30	30/30	30/30	28/30
50		29/30	30/30	30/30	27/30
100		30/30	28/30	29/30	30/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	16-1424-6416	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	31 May-18 16:26	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: WM QA: JOE June 6/18

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: May 16, 2018 @ 1835h

Work Order No.: 180707

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCS_WS_2018-05-14_N
Sample Date: May 15, 2018
Date Received: May 16, 2018
Sample Volume: 4 x 20 L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 11

Test Organism Information:

Batch No.: 051618
Source: Tedris Trout Fish Farm, Campbell Lake
Loading Density: 1.42 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE107
Stock Solution ID: 18501
Date Initiated: May 16, 2018
7-d EC50 (95% CL): 3.0 (2.8 - 3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.3 (2.1-8.8) mg/L SDS
Reference Toxicant CV (%): 43

Test Results:

	Sample ID		
	LC_LCS_WS_2018-05-14_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCh

Date reviewed: June 6/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-LCS-WS-2018-05-14-N
Work Order #: 180707

Start Date & Time: May 16/18 @ 1835h
Stop Date & Time: May 23, 2018 @ 1040h
CER #: 3
Test Species: *Oncorhynchus mykiss*

Control Concentration % (v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.0	10.0	10.1	10.2	10.0	10.2	9.9	10.1	10.1	10.1	9.9	10.2	10.0	9.9
pH	6.8	6.8	6.7	6.7	6.9	6.8	7.1	6.8	7.0	6.8	6.8	6.7	6.8	6.8
Cond. (µS/cm)	35	34		34		34		34		34		34		34
Initials	A	YML		YML		A		A		YML		YML		YML

Concentration 6.25	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.1	10.0	10.1	10.1	10.1	9.8	10.1	10.0	10.1	9.8	10.1	10.0	9.9
pH	7.1	7.1	7.0	6.9	7.1	7.0	7.2	7.1	7.2	7.1	7.1	7.1	7.1	7.0
Cond. (µS/cm)	66	67		66		63		62		66		67		67
Initials	A	YML		YML		A		A		YML		YML		YML

Concentration 25	Days													
	0	1	13.5	2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	~~13.5~~	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.2	10.1	10.1	9.9	10.1	10.1	9.8	10.1	10.0	10.1	9.9	10.1	10.0	10.0
pH	7.4	7.3	7.5	7.5	7.4	7.4	7.3	7.3	7.4	7.5	7.6	7.5	7.5	7.5
Cond. (µS/cm)	150	168		157		145		151		152		163		155
Initials	A	YML		YML		A		A		YML		YML		YML

Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.3	10.1	9.9	10.0	10.1	10.1	9.9	10.2	10.1	10.0	9.8	10.1	10.0	10.0
pH	7.6	7.8	7.9	8.0	8.2	7.9	8.0	7.9	7.8	8.0	8.1	8.0	8.1	8.1
Cond. (µS/cm)	448	452		454		452		450		457		457		453
Initials	A	YML		YML		A		A		YML		YML		YML

Thermometer: Temp-3 **DO meter/probe:** 2/3 / 2/3 **pH meter/probe:** 2/3 / 2/3 **Conductivity meter/probe:** 2/3 / 2/3

	Control	100%		
Hardness*	10	270		
Alkalinity*	11	226		

* mg/L as CaCO3

Analysts: YML, AVO

Reviewed by: JOK

Date reviewed: June 6/18

Sample Description: slightly turbid, brown, no odour, some particulates

Comments:

Version 1.2 Issued July 19, 2017

Nautilus Environmental Company Inc.

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC-LCS_WS_2018-05-14-N
Work Order #: 180707
Start Date & Time: May 16, 2018 @ 1835h
Stop Date & Time: May 23, 2018 @ 1040h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	2	28	30
	2								0	1	29	30
	3								0	0	30	30
	4								0	1	29	30
6.25	1								0	1	29	30
	2								0	2	28	30
	3							↓	0	1	29	30
	4							1	1	1	28	30
12.5	1							0	0	1	29	30
	2							0	0	0	30	30
	3							1	1	0	27	28
	4							1	1	1	28	30
25	1					↓		0	0	3	26	29
	2					1		0	1	0	29	30
	3					0	↓	0	0	0	30	30
	4						1	1	2	3	25	30
50	1						1	0	1	1	28	30
	2					↓	0		0	0	30	30
	3					2	0	↓	2	0	27	29
	4					0	0	0	0	4	26	30
100	1					1	1	1	3	0	28	31
	2					0	0	0	0	1	29	30
	3					0	0	0	0	1	29	30
	4	—	↓	—	—	2	1	0	3	1	27	31
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: JCh **Date reviewed:** June 6/18

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	12-2459-5777	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	31 May-18 16:17	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	13-2001-0282	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	16 May-18 18:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 May-18 10:40	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 16h	**Source:**	Ted's Trout, Campbell Lake	**Age:**	
Sample ID:	04-9477-2640	**Code:**	1D7DA1A0	**Client:**	Teck Coal
Sample Date:	15 May-18 12:15	**Material:**	Water Sample	**Project:**	
Receive Date:	16 May-18 09:20	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	30h (9.5 °C)	**Station:**	LC_LC5_WS_2018-05-14_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1787760	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	N/A	N/A	<1	NA	NA
EC10	>100	N/A	N/A	<1	NA	NA
EC15	>100	N/A	N/A	<1	NA	NA
EC20	>100	N/A	N/A	<1	NA	NA
EC25	>100	N/A	N/A	<1	NA	NA
EC40	>100	N/A	N/A	<1	NA	NA
EC50	>100	N/A	N/A	<1	NA	NA

Proportion Normal Summary

			Calculated Variate(A/B)								
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect	A	B
0	Negative Control	4	0.9667	0.9333	1	0.01361	0.02722	2.82%	0.0%	116	120
6.25		4	0.95	0.9333	0.9667	0.009622	0.01924	2.03%	1.72%	114	120
12.5		4	0.9661	0.9333	1	0.01362	0.02724	2.82%	0.06%	114	118
25		4	0.9241	0.8333	1	0.03716	0.07432	8.04%	4.4%	110	119
50		4	0.9328	0.8667	1	0.02722	0.05445	5.84%	3.51%	111	119
100		4	0.9269	0.871	0.9667	0.02389	0.04779	5.16%	4.12%	113	122

Proportion Normal Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	0.9333	0.9667	1	0.9667
6.25		0.9667	0.9333	0.9667	0.9333
12.5		0.9667	1	0.9643	0.9333
25		0.8966	0.9667	1	0.8333
50		0.9333	1	0.931	0.8667
100		0.9032	0.9667	0.9667	0.871

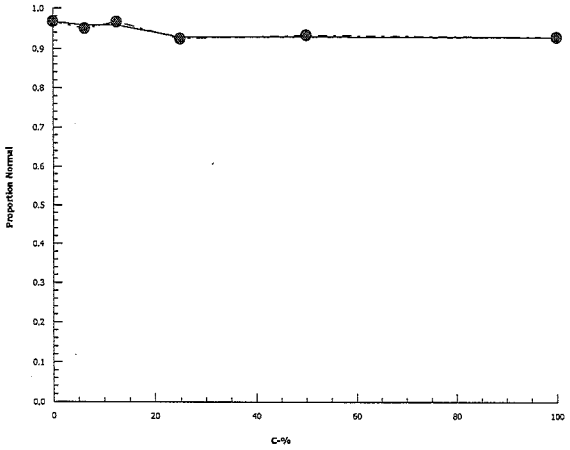
Proportion Normal Binomials

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	28/30	29/30	30/30	29/30
6.25		29/30	28/30	29/30	28/30
12.5		29/30	30/30	27/28	28/30
25		26/29	29/30	30/30	25/30
50		28/30	30/30	27/29	26/30
100		28/31	29/30	29/30	27/31

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	12-2459-5777	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	31 May-18 16:17	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: _____ QA: _____ 6/18

Client: Teck

W.O.#: 180707

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Dechlor	May16/18	May16/18	100	1.2	1.3	11	100	1.0	10	MM
LC_LCDSSLCC_WS_2018-05-14_N			50	6.6	6.7	130	100①	3.2	320	MB
LC_DC1_WS_2018-05-14_N			50	MB ~~5.3~~ 5.2	5.3	102	~~50~~ 100① MB	7.8	156	MB
LC_FRDSDC_WS_2018-05-14_N			50	6.6	6.7	130	100①	3.4	340	MB
LC_DCDS_WS_2018-05-14_N			50	4.5	4.6	88	100①	2.6	260	MB
LC_LCS_WS_2018-05-14_N			50	11.4	11.5	226	100①	2.7	270	MB
	"	"								"
	"	"								"

Notes: ① Dilute up to 100mL with DI water

Reviewed by: Jan Date Reviewed: June 6/18

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: May 16, 2018 @ 1835h

Work Order No.: 180717

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: FR_UFR1_WS_20180515091S_N; GH_ER2_WS_2018-05-15_N
Sample Date: May 15, 2018
Date Received: May 16, 2018
Sample Volume: FR_UFR1- 10x20L; GH_ER2- 4x20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 11

Test Organism Information:

Batch No.: 051618
Source: Tedis Trout Fish Farm, Campbell Lake
Loading Density: 1.42 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE107
Stock Solution ID: ~~May~~ 18501
Date Initiated: May 16, 2018
7-d EC50 (95% CL): 3.0 (2.8 - 3.2) mg/L SDS

Reference Toxicant Mean and Range: 4.3 (2.1 - 8.8) mg/L SDS
Reference Toxicant CV (%): 43

Test Results:

Embryo viability (mean ± SD)

	Sample ID		
	Control	FR_UFR1_WS_20180515091S_N	GH_ER2_WS_2018-05-15_N
EC25 % (v/v) (95% CL)			
EC50 % (v/v) (95% CL)	99.2 ± 1.7	98.3 ± 1.9	98.3 ± 1.9

Reviewed by: JCh

Date reviewed: June 6/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: various
Work Order #: 180717

Start Date & Time: May 16, 2018 @ 1835h
Stop Date & Time: May 23, 2018 @ 1100h
CER #: 3
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	10.1	10.0	10.1	10.2	10.0	10.2	9.9	10.1	9.9	10.1	9.8	10.2	10.1	10.0
pH	6.8	6.8	6.9	6.7	6.9	6.8	7.1	6.8	7.0	6.8	6.8	6.7	6.8	6.8
Cond. (µS/cm)	35	34		34		34		34		34		34		34
Initials	MM	MM		MM		A		A		MM		MM		MM

(FR_UFR1-WS_2018-05-15_N)

FR_UFR1 Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	9.9	10.0	9.9	10.0	10.1	9.9	10.1	10.0	9.9	9.8	10.1	10.1	10.0
pH	7.9	7.8	7.9	7.9	8.0	7.9	8.0	7.9	7.8	7.9	8.0	7.9	8.0	8.0
Cond. (µS/cm)	228	199		202		198		199		200		199		200
Initials	A	MM		MM		A		A		MM		MM		MM

(GH_ER2-WS_2018-05-15_N)

GH_ER2 Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0
DO (mg/L)	9.9	10.1	10.0	10.1	10.1	10.1	9.8	10.1	10.0	9.9	9.8	10.1	10.2	9.9
pH	7.9	7.9	8.1	7.9	8.1	7.9	7.9	7.9	8.0	7.9	8.1	7.8	8.2	8.1
Cond. (µS/cm)	281	276		250		263		261		269		267		264
Initials	A	MM		MM		A		A		MM		MM		MM

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: ~~temp3~~ **DO meter/probe:** 213 / 213 **pH meter/probe:** 213 / 213 **Conductivity meter/probe:** 213 / 213

	Control	FR_UFR1	GH_ER2	
Hardness*	10	190	220	
Alkalinity*	11	90	128	

* mg/L as CaCO3

Analysts: AWD, MM
Reviewed by: JOH
Date reviewed: June 6/18

Sample Description: FR_UFR1 - slightly yellow, clear, no odour, some particulates GH_ER2 - brownish yellow, slightly turbid, no odour, some particulates

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: various - See below
Work Order #: 180717

Start Date & Time: May 16, 2018 @ 1835h
Stop Date & Time: May 23, 2018 @ 1600h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	0	30	30
	2								0	0	29	29
	3								0	1	29	30
	4								0	0	30	30
FR_UFR1_WS_2018_05_15_N) FR_UFR1 100	1					↓			0	0	30	30
	2					1			1	0	29	30
	3					1			1	0	29	30
	4					0		↓	0	0	30	30
GH_ER2_WS_2018_05_15_N) GH_ER2 100	1					↑		1	1	0	29	30
	2							0	0	0	30	30
	3							0	0	0	30	30
	4	↓	↓	↓	↓	↓	↓	0	0	1	29	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		AR	MM	AR	AR	MM	MM	MM	MM	MM	MM	AM

Comments:

Reviewed by: JOL **Date reviewed:** June 6/18

CETIS Summary Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Batch ID:	06-7962-6723	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	16 May-18 18:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 May-18 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 16h	**Source:**	Ted's Trout, Campbell Lake	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	09-1139-7150	16 May-18	16 May-18	19h	Teck Coal	
FR_UFR1	16-7821-8189	15 May-18 09:15	16 May-18 09:20	33h (8.5 °C)		
GH_ER2	03-8891-5220	15 May-18 11:17	16 May-18 09:20	31h (11 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Control water	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_WS_201805150915_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2018-05-15_N		

Proportion Normal Summary

Sample Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	4	0.9917	0.9651	1	0.9667	1	0.008333	0.01667	1.68%	0.0%
FR_UFR1	4	0.9833	0.9527	1	0.9667	1	0.009623	0.01925	1.96%	0.84%
GH_ER2	4	0.9833	0.9527	1	0.9667	1	0.009623	0.01925	1.96%	0.84%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1	1	0.9667	1
FR_UFR1	1	0.9667	0.9667	1
GH_ER2	0.9667	1	1	0.9667

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	30/30	29/29	29/30	30/30
FR_UFR1	30/30	29/30	29/30	30/30
GH_ER2	29/30	30/30	30/30	29/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	10-3807-0716	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.8.7
Analyzed:	31 May-18 16:09	**Analysis:**	STP 2x2 Contingency Tables	**Official Results:**	Yes
Batch ID:	06-7962-6723	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	16 May-18 18:35	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	23 May-18 11:00	**Species:**	Oncorhynchus mykiss	**Brine:**	
Duration:	6d 16h	**Source:**	Ted's Trout, Campbell Lake	**Age:**	

Sample Code	Sample ID	Sample Date	Receive Date	Sample Age	Client Name	Project
Control	09-1139-7150	16 May-18	16 May-18	19h	Teck Coal	
FR_UFR1	16-7821-8189	15 May-18 09:15	16 May-18 09:20	33h (8.5 °C)		
GH_ER2	03-8891-5220	15 May-18 11:17	16 May-18 09:20	31h (11 °C)		

Sample Code	Material Type	Sample Source	Station Location	Latitude	Longitude
Control	Control water	Teck Coal	Control		
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_WS_201805150915_N		
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2018-05-15_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	Test Result
Untransformed		C > T	NA	NA	

Fisher Exact/Bonferroni-Holm Test

Sample	vs	Sample	Test Stat	P-Value	P-Type	Decision(α:5%)
Control		FR_UFR1	0.5032	1.0000	Exact	Non-Significant Effect
Control		GH_ER2	0.5032	1.0000	Exact	Non-Significant Effect

Data Summary

Sample Code		NR	R	NR + R	Prop NR	Prop R	%Effect
Control	Negative Contr	118	1	119	0.9916	0.008403	0.0%
FR_UFR1		118	2	120	0.9833	0.01667	0.83%
GH_ER2		118	2	120	0.9833	0.01667	0.83%

Proportion Normal Detail

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	1	1	0.9667	1
FR_UFR1	1	0.9667	0.9667	1
GH_ER2	0.9667	1	1	0.9667

Proportion Normal Binomials

Sample Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	30/30	29/29	29/30	30/30
FR_UFR1	30/30	29/30	29/30	30/30
GH_ER2	29/30	30/30	30/30	29/30

Client: Teck

W.O.#: 180717

Hardness and Alkalinity Datasheet

	Alkalinity							Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)		Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
FR-UFR1-WS-2018-05-15-N	May 16/18	May 16/18	50	4.7	4.9	90		10①	1.9	190	MB
GH-ER2-WS-2018-05-15-N	↓	↓	50	6.5	6.6	128		10①	2.2	220	MR
Dechlor	↓	↓	100	1.2	1.3	11		100	1.0	10	MR

Notes: ①Diluted to 100 mL w/ DI water

Reviewed by: JOh Date Reviewed: June 6/18

APPENDIX C – *Lemna minor* Toxicity Test Data

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 180708.

Start Date: May 3/18
Set up by: MLJ

Sample Information:

Sample ID: LC_LCOSSEC_WS_2017-04-24_N
Sample Date: April 30/18
Date Received: May 1/18
Sample Volume: 8x20L

Test Organism Information:

Culture Date: 042518
Age of culture (Day 0): 8 days.
>8X growth in APHA?: Y (36 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm159
Date Initiated: April 19/18

7-d No. of Fronds IC50 (95% CL): 3.4 (2.1-4.1) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.5 (2.9-4.3) g/L KCl CV (%): 10

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	51.1 (34.8-65.6)	51.7 (30.1-77.4)
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: June 5, 2018

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck	**Setup by:**	MLT
Sample ID:	LC-LCDSSLCC-WS-2017-04-24-N	**Test Date:**	May 3/18
Work Order No.:	180708	**CER #:**	1
Culture Source:	CPCC #490	**Test Species:**	*Lemna minor*
Test Culture Age:	8 days	**> 8X Growth? (Y/N):**	y (36 fronds)
Light Intensity Range:	4400 - 5200 lux	**Date Measured:**	May 2/18

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	24.0	26.0	26.0	26.0	25.5	25.5	26.0
Initials	MLT	MLT	RL	[illegible]	MLT	MLT	MLT	MLT

Sample Characteristics:	Initial Water Quality			Adjusted Water Quality
Temperature (°C)	25.0	Aeration?:	20 min	24.0
DO (mg/L)	8.2	Nutrients added?[1]:	y →	8.2
pH	8.1			8.1
Conductivity (µS)	707			1470

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	25.0	25.0	8.2	9.3	887
1.5	25.0	25.0	8.2	9.6	900
3	25.0	25.0	8.2	10.0	911
6.1	25.0	25.0	8.2	9.8	931
12.1	24.5	25.0	8.2	9.2	969
24.2	24.5	25.0	8.1	9.5	1043
48.5	24.0	25.0	8.1	9.4	~~12~~ MLT 1187
97	24.0	25.0	8.1	9.3	1470
Initials	MLT	JB	MLT	JB	MLT

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1 DO meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

Sample Description: clear, colourless, odourless, some brown particulates

Comments:

Reviewed: [signature] **Date Reviewed:** June 5, 2018

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC_LCDSSLCC_WS_2017-04-24_N
Work Order #: 180708

Start Date: May 3/18
Termination Date: May 10/18
Test set up by: ML

Concentration %(v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	107										ML
	B	6	122										"
	C	6	123										"
	D	6	126										"
1.5	A	6	129										"
	B	6	131										"
	C	6	122										"
	D	6	132										"
3	A	6	120										"
	B	6	106										"
	C	6	100										"
	D	6	119										"
6.1	A	6	110										"
	B	6	129										"
	C	6	103										"
	D	6	136										"
12.1	A	6	108										"
	B	6	119										"
	C	6	107										"
	D	6	112										"
24.2	A	6	112										"
	B	6	132										"
	C	6	114										"
	D	6	116										↓

Comments:

Reviewed by:

Date Reviewed: June 5, 2018

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LEDSSLEC-WS-2017-04-24
Work Order #: 180708

Start Date: May 3/18
Termination Date: May 10/18
Test set up by: MG

Concentration o/o(v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	88										MG
	B	6	90										
	C	6	97										
	D	6	111										
97	A	6	66			X							
	B	6	63			X							
	C	6	69			X							
	D	6	80			X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_LCD88LCC_WS_2017-04-24_N
WO #: 180708 LCD Black
Start Date: May 3/18
Termination Date: May 10/18
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
0% (v/v) Control	A	1	1138.12	1146.02	MB / MB
	B	2	1136.01	1145.33	
	C	3	1131.88	1142.02	
	D	4	1159.13	1168.52	
1.5	A	5	1145.03	1155.19	
	B	6	1125.05	1135.21	
	C	7	1124.03	1133.52	
	D	8	1123.54	1134.10	
3	A	9	1143.46	1152.38	
	B	10	1154.89	1162.71	
	C	11	1144.79	1151.38	
	D	12	1156.16	1166.22	
6.1	A	13	1131.90	1141.03	
	B	14	1162.62	1173.38	
	C	15	1142.97	1150.56	
	D	16	1143.31	1153.91	
12.1 ~~12.2~~ MB	A	17	1133.57	1141.24	
	B	18	1114.80	1123.81	
	C	19	1122.35	1130.81	
	D	20	1120.76	1128.64	
24.2	A	21	1120.24	1128.03	
	B	22	1139.46	1148.43	
	C	23	1134.00	1142.74	
	D	24	1125.09	1133.80	
48.5	A	25	1152.90	1159.51	
	B	26	1130.51	1137.58	
	C	27	1140.46	1147.81	
	D	28	1140.52	1148.92	

Comments: 10% Re-weigh pans: ~~#8~~ MB 5 (1155.18 mg), #8 (1134.21 mg), #28 (1149.05 mg), #1 (1145.85 mg)

Reviewed by: [signature] Date Reviewed: June 5, 2018

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_LCDSSLCC_WS_2017-04-24_N
WO #: 180708
LCD Black

Start Date: May 3/18
Termination Date: May 10/18
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	29	1151.08	1157.48	MB / MB
	B	30	1146.79	1152.02	
97	C	31	1142.27	1148.00	
	D	32	1139.65	1146.22	↓ ↓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	19-3302-1672	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 17:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-5246-0295	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	03 May-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	10 May-18	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	09-3479-9715	**Code:**	37B7E963	**Client:**	Teck Coal
Sample Date:	30 Apr-18 12:43	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	59h (6.5 °C)	**Station:**	LC_LCDSSLCC_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1103025	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.448	1.837	38.79	40.85	2.578	54.43
IC10	26.91	N/A	34.57	3.716	2.893	NA
IC15	33.62	24.25	53.74	2.975	1.861	4.123
IC20	41.93	29.63	60.69	2.385	1.648	3.375
IC25	51.07	34.85	65.57	1.958	1.525	2.869
IC40	80.48	66.54	100.9	1.243	0.9913	1.503
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	113.5	101	120	4.252	8.505	7.49%	0.0%
1.5		4	122.5	116	126	2.255	4.509	3.68%	-7.93%
3		4	105.3	94	114	4.922	9.845	9.35%	7.27%
6.1		4	113.5	97	130	7.773	15.55	13.7%	0.0%
12.1		4	105.5	101	113	2.723	5.447	5.16%	7.05%
24.2		4	112.5	106	126	4.573	9.147	8.13%	0.88%
48.5		4	90.5	82	105	5.204	10.41	11.5%	20.26%
97		4	63.5	57	74	3.708	7.416	11.68%	44.05%

Frond Count Detail

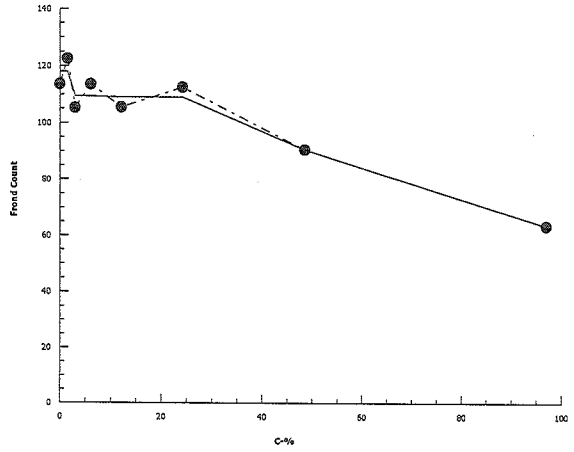
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	101	116	117	120
1.5		123	125	116	126
3		114	100	94	113
6.1		104	123	97	130
12.1		102	113	101	106
24.2		106	126	108	110
48.5		82	84	91	105
97		60	57	63	74

June 5/18

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	19-3302-1672	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 17:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 5/18

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-2202-9008	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 17:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	05-5246-0295	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	03 May-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	10 May-18	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	09-3479-9715	**Code:**	37B7E963	**Client:**	Teck Coal
Sample Date:	30 Apr-18 12:43	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	59h (6.5 °C)	**Station:**	LC_LCDSSLCC_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	359988	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.446	1.564	13.69	40.89	7.306	63.96
IC10	9.008	N/A	37.82	11.1	2.644	NA
IC15	28.85	N/A	53.46	3.467	1.87	NA
IC20	38.95	23.19	66.87	2.567	1.495	4.313
IC25	51.74	30.08	77.43	1.933	1.292	3.324
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	9.188	7.9	10.14	0.4676	0.9351	10.18%	0.0%
1.5		4	10.09	9.49	10.56	0.2218	0.4437	4.4%	-9.85%
3		4	8.347	6.59	10.06	0.7432	1.486	17.81%	9.14%
6.1		4	9.52	7.59	10.76	0.7405	1.481	15.56%	-3.62%
12.1		4	8.395	7.73	9.01	0.2622	0.5244	6.25%	8.63%
24.2		4	8.553	7.79	8.97	0.2607	0.5214	6.1%	6.91%
48.5		4	7.358	6.61	8.4	0.3795	0.759	10.32%	19.92%
97		4	5.982	5.23	6.57	0.3095	0.619	10.35%	34.88%

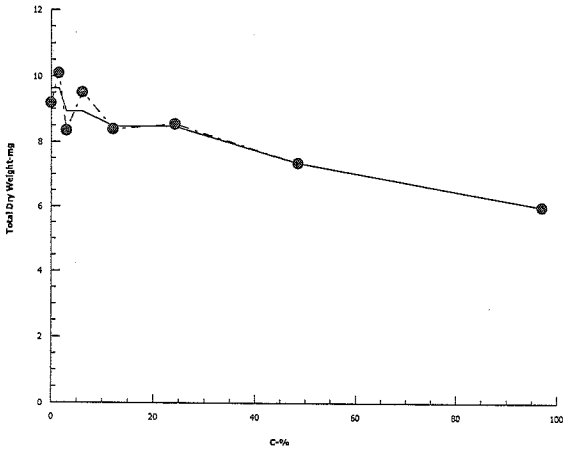
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	7.9	9.32	10.14	9.39
1.5		10.16	10.16	9.49	10.56
3		8.92	7.82	6.59	10.06
6.1		9.13	10.76	7.59	10.6
12.1		7.73	9.01	8.46	8.38
24.2		7.79	8.97	8.74	8.71
48.5		6.61	7.07	7.35	8.4
97		6.4	5.23	5.73	6.57

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-2202-9008	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 17:00	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: MG QA: June 5/18

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 180708

Start Date: May 2/18
Set up by: MLT

Sample Information:

Sample ID: LC-DCI-WS-2017-04-25-N
Sample Date: April 30/18
Date Received: May 1/18
Sample Volume: 5X20L

Test Organism Information:

Culture Date: 042518
Age of culture (Day 0): 7days.
>8X growth in APHA?: Y (36 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm159
Date Initiated: April 19/18

7-d No. of Fronds IC50 (95% CL): 3.4(2.1-4.1) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.5(2.9-4.3) g/L KCl CV (%): 10

Test Results:		Number of Fronds	Dry Weight
	IC25 %(v/v) (95% CL)	79.2 (N/A-N/A)	24.1 (9.8-N/A)
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]

Date reviewed: June 12, 2018

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck	**Setup by:**	MLT
Sample ID:	LC_DC1_WS_2017-04-25_N	**Test Date:**	May 2/18
Work Order No.:	180708	**CER #:**	1
Culture Source:	CPCC #490	**Test Species:**	*Lemna minor*
Test Culture Age:	7 days	**> 8X Growth? (Y/N):**	Y (36 Fronds)
Light Intensity Range:	4500 - 5200 lux.	**Date Measured:**	May 2/18

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	24.0	26.0	26.0	26.0	25.5	25.5
Initials	MLT	MLT	MLT	RC	A	MLT	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	25.0		25.0
DO (mg/L)	8.2	Aeration?: 20 min	8.0
pH	8.1	Nutrients added?[1]: Y	8.1
Conductivity (µS)	317	→	~~1139~~ 1134 MLT

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	25.0	25.0	8.2	9.0	879
1.5	25.0	25.0	8.2	9.1	889
3	25.0	25.0	8.2	9.5	894
6.1	25.0	25.0	8.2	9.3	902
12.1	25.0	25.0	8.2	9.3	918
24.2	25.0	25.0	8.1	9.4	950
48.5	25.0	25.0	8.1	9.3	1011
97	25.0	25.0	8.1	9.4	1134
Initials	MLT	MLT	MLT	MLT	MLT

Thermometer: 4 Light meter: 1 pH meter/probe: 1/1 DO meter/probe: 1/1 Conductivity meter/probe: 1/1

Sample Description: clear, colourless, odourless, some brown particulates.

Comments:

Reviewed: [signature] **Date Reviewed:** June 5, 2018

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC_DCL_WS_2017-04-25_2
Work Order #: 180708

Start Date: May 2/18
Termination Date: May 9/18
Test set up by: MLT

Concentration %(v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	118										MLT
	B	6	145										
	C	6	120										
	D	6	139										
1.5	A	6	121										
	B	6	133										
	C	6	137										
	D	6	142										
3	A	6	94										
	B	6	129										
	C	6	140										
	D	6	125										
6.1	A	6	116										
	B	6	143										
	C	6	14										
	D	6	125										
12.1	A	6	131										
	B	6	121										
	C	6	136										
	D	6	143										
24.2	A	6	121										
	B	6	127										
	C	6	121										
	D	6	72										

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-DCI-WS-2017-04-25-N
Work Order #: 180708

Start Date: May 2/18
Termination Date: May 9/18
Test set up by: MC

Concentration %(v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	102										MC
	B	6	125										
	C	6	110										
	D	6	115										
97	A	6	89			X							
	B	6	108			X							
	C	6	75			X							
	D	6	111										
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_DCI_WS_2017-04-25_N
WO #: 180708.
DCI Purple

Start Date: May 2/18
Termination Date: May 9/18.
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
0% (v/v) Control	A	1	1146.74	1155.90	MB / MB
	B	2	1156.71	1168.55	
	C	3	1127.74	1137.31	
	D	4	1140.12	1151.43	
1.5	A	5	1137.04	1146.49	
	B	6	1125.18	1135.54	
	C	7	1122.75	1133.10	
	D	8	1147.05	1157.56	
3	A	9	1132.85	1138.72	
	B	10	1124.40	1133.99	
	C	11	1137.13	1149.00	
	D	12	1122.86	1131.48	
6.1	A	13	1126.57	1135.58	
	B	14	1138.21	1149.50	
	C	15	1158.73	1168.42	
	D	16	1118.54	1128.30	
12.1	A	17	1132.60	1143.73	
	B	18	1141.73	1149.49	
	C	19	MB ~~1143.~~ 1144.02	1154.26	
	D	20	1149.30	1160.17	
24.2	A	21	1156.23	1165.64	
	B	22	1159.17	1168.48	
	C	23	1134.73	1143.56	
	D	24	1139.82	1143.49	
48.5	A	25	1135.62	1142.91	
	B	26	1114.88	1123.38	
	C	27	1118.49	1126.04	
	D	28	1127.66	1135.85	

Comments: 10% Re-weighed pans: #1 (1155.91 mg), #10 (1133.80 mg), #31 (1122.92 mg) MB, #2 (1168.56 mg)

Reviewed by: [signature]

Date Reviewed: June 5, 2018

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LS-DC1_WS_2017-04-25_N
WO #: 180708
DC1 Purple

Start Date: May 2/18
Termination Date: May 9/18
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v) 97	A	29	1145.42	1151.63	
	B	30	1125.90	1133.73	
	C	31	1117.79	1123.01	
	D	32	1160.87	1169.11	
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-2374-2111	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-18 12:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-3633-5113	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	02 May-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	09 May-18	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	12-8100-7018	**Code:**	4C5A9DAA	**Client:**	Teck Coal
Sample Date:	30 Apr-18 11:11	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (5.5 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1489013	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	13.75	N/A	24.62	7.274	4.062	NA
IC10	17.78	N/A	61.33	5.625	1.631	NA
IC15	22.91	10.62	86.09	4.365	1.162	9.42
IC20	60.18	N/A	N/A	1.662	NA	NA
IC25	79.21	N/A	N/A	1.262	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

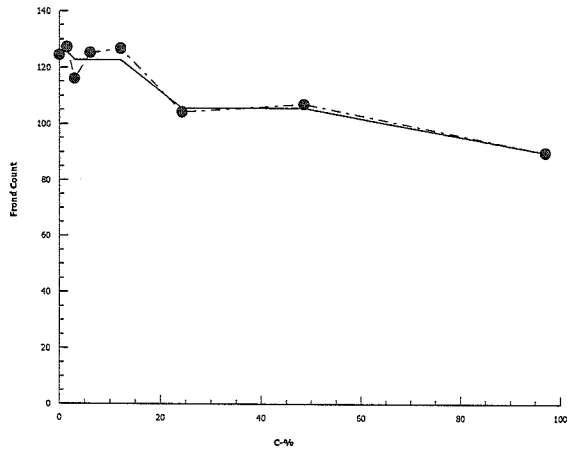
			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	124.5	112	139	6.764	13.53	10.87%	0.0%
1.5		4	127.3	115	136	4.479	8.958	7.04%	-2.21%
3		4	116	88	134	9.857	19.71	17.0%	6.83%
6.1		4	125.3	110	137	6.486	12.97	10.36%	-0.6%
12.1		4	126.8	115	137	4.626	9.251	7.3%	-1.81%
24.2		4	104.3	66	121	12.83	25.66	24.61%	16.27%
48.5		4	107	96	119	4.813	9.626	9.0%	14.06%
97		4	89.75	69	105	8.459	16.92	18.85%	27.91%

Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	112	139	114	133
1.5		115	127	131	136
3		88	123	134	119
6.1		110	137	135	119
12.1		125	115	130	137
24.2		115	121	115	66
48.5		96	119	104	109
97		83	102	69	105

Analysis ID:	10-2374-2111	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-18 12:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: MH QA: June 5/18

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-4916-8016	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-18 12:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	11-3633-5113	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	02 May-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	09 May-18	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	12-8100-7018	**Code:**	4C5A9DAA	**Client:**	Teck Coal
Sample Date:	30 Apr-18 11:11	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (5.5 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	927332	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.046	N/A	24.64	48.88	4.059	NA
IC10	13.18	N/A	34.8	7.585	2.874	NA
IC15	16.16	N/A	50.29	6.188	1.989	NA
IC20	19.76	8.266	98.56	5.06	1.015	12.1
IC25	24.12	9.81	N/A	4.146	NA	10.19
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	10.47	9.16	11.84	0.6525	1.305	12.46%	0.0%
1.5		4	10.17	9.45	10.51	0.242	0.4839	4.76%	2.89%
3		4	8.987	5.87	11.87	1.242	2.485	27.65%	14.16%
6.1		4	9.938	9.01	11.29	0.4815	0.963	9.69%	5.09%
12.1		4	10	7.76	11.13	0.7697	1.539	15.39%	4.49%
24.2		4	7.805	3.67	9.41	1.384	2.768	35.47%	25.45%
48.5		4	7.883	7.29	8.5	0.2795	0.559	7.09%	24.71%
97		4	6.875	5.22	8.24	0.7045	1.409	20.5%	34.34%

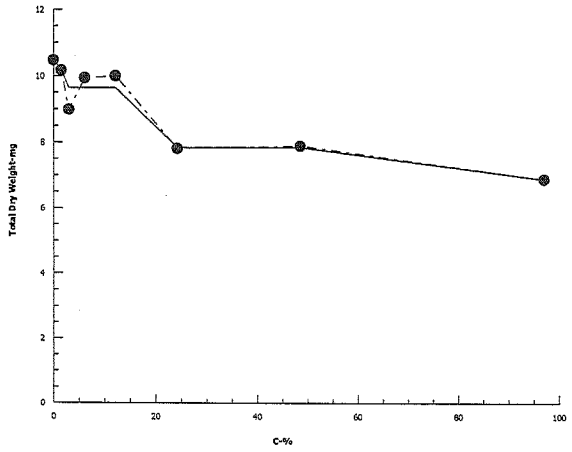
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	9.16	11.84	9.57	11.31
1.5		9.45	10.36	10.35	10.51
3		5.87	9.59	11.87	8.62
6.1		9.01	11.29	9.69	9.76
12.1		11.13	7.76	10.24	10.87
24.2		9.41	9.31	8.83	3.67
48.5		7.29	8.5	7.55	8.19
97		6.21	7.83	5.22	8.24

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-4916-8016	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	03 Jun-18 12:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 5/18

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 180708

Start Date: May2/18
Set up by: MT

Sample Information:

Sample ID: LC-FRDSDC_WS_2017-04-25_N
Sample Date: April 30/18
Date Received: May 1/18
Sample Volume: 5x20L

Test Organism Information:

Culture Date: 042518
Age of culture (Day 0): 7 days
>8X growth in APHA?: y (36 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm159
Date Initiated: April 19/18

7-d No. of Fronds IC50 (95% CL): 3.4 (2.1-4.1) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.5 (2.9-4.3) g/L KCl CV (%): 10

Test Results:		Number of Fronds	Dry Weight
	IC25 %(v/v) (95% CL)	>97	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: _____ Date reviewed: _____

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck	**Setup by:**	MLT
Sample ID:	LC-FRDSDC-WS-2017-04-25-N	**Test Date:**	May 2/18
Work Order No.:	180708	**CER #:**	1
Culture Source:	CPCC #490	**Test Species:**	*Lemna minor*
Test Culture Age:	7 days	**> 8X Growth? (Y/N):**	Y (36 Fronds)
Light Intensity Range:	4800 - 5100 lux.	**Date Measured:**	May 2/18

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	24.0	26.0	26.0	26.0	25.5	25.5
Initials	MLT	MLT	MLT	RL	A	MLT	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	25.0	Aeration?: 20 min	25.0
DO (mg/L)	8.2	Nutrients	8.0
pH	8.1	added?[1]: Y	8.1
Conductivity (µS)	626		1406

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration %(v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	25.0	25.0	8.2	8.6	879
1.5	25.0	25.0	8.2	9.3	894
3	25.0	25.0	8.2	9.5	903
6.1	25.0	25.0	8.1	9.4	921
12.1	25.0	25.0	8.1	9.3	955
24.2	25.0	25.0	8.1	9.6	1023
48.5	25.0	25.0	8.1	9.7	1154
97	25.0	25.0	8.1	9.2	1406
Initials	MLT	JB	MLT	JB	MLT

Thermometer: 4 Light meter: 1 pH meter/probe: 1/1 DO meter/probe: 1/1 Conductivity meter/probe: 1/1

Sample Description: clear, colourless, odourless, some brown particulates

Comments:

Reviewed: [signature] **Date Reviewed:** June 5, 2018

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-FRDSDC-WS-2017-04-25_N
Work Order #: 180708

Start Date: May 2/18
Termination Date: May 9/18
Test set up by: MB

Concentration %(v/v)	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
control	A	6	96										MB
	B	6	108										
	C	6	113										
	D	6	82										
1.5	A	6	104										
	B	6	80										
	C	6	110										
	D	6	107										
3	A	6	80										
	B	6	86										
	C	6	106										
	D	6	90										
6.1	A	6	106										
	B	6	80										
	C	6	98										
	D	6	97										
12.1	A	6	94										
	B	6	101										
	C	6	84										
	D	6	90										
24.2	A	6	78										
	B	6	97										
	C	6	97										
	D	6	102										

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC_FRDSDE_WS_2017-04-25_N
Work Order #: 180708

Start Date: May 2/18
Termination Date: May 9/18
Test set up by: MG

Concentration %(v/v)	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
48.5	A	6	82										MG
	B	6	111										
	C	6	88										
	D	6	97										
97	A	6	97										
	B	6	74		X								
	C	6	48		X	X							
	D	6	93										
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_FRDSDC_WS_2017-04-25_N
WO #: 180708
FRDSDC Brown

Start Date: May 2/18
Termination Date: May 9/18
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
0% (v/v) control	A	1	1134.47	1141.33	MB / MB
	B	2	1147.75	1155.32	
	C	3	1138.03	1145.60	
	D	4	1123.84	1129.77	
1.5	A	5	1118.34	1126.21	
	B	6	1121.15	1126.29	
	C	7	1133.47	1141.13	
	D	8	1139.97	1146.75	
3	A	9	1133.25	1138.87	
	B	10	1129.97	1135.11	
	C	11	1130.74	1137.95	
	D	12	1129.32	1135.42	
6.1	A	13	1121.60	1128.94	
	B	14	1143.74	1148.93	
	C	15	1153.37	1160.12	
	D	16	1131.13	1138.09	
12.1	A	17	1153.58	1159.64	
	B	18	1156.43	1162.89	
	C	19	1143.70	1148.66	
	D	20	1159.17	1164.73	
24.2	A	21	1140.50	1145.38	
	B	22	MB ~~1153.60~~ 1136.20	1142.02	
	C	23	1117.10	1123.33	
	D	24	1138.33	1144.90	
48.5	A	25	1138.35	1143.53	
	B	26	1131.82	1138.87	
	C	27	1147.10	1152.90	
	D	28	1137.06	1142.78	

Comments: 10% Re-weighed pans: #8 (1146.85 mg), #17 (1159.62 mg), #25 (1143.48 mg), #1 (1140.99)

Reviewed by: mg

Date Reviewed: June 5, 2018

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC-FRDSDC_WS-2017-04-25_N
WO #: 180708
FRDSDC Brown

Start Date: May 2/18
Termination Date: May 9/18.
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
%(v/v)	A	29	1135.38	1141.90	MB / MB
	B	30	1157.34	1163.91	
97	C	31	1132.34	1136.63	
	D	32	1138.55	1144.84	
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]
Date Reviewed: June 5, 2017

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	21-1462-6790	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 17:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-4307-3427	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	02 May-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	09 May-18	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	02-2000-4056	**Code:**	D1CFED8	**Client:**	Teck Coal
Sample Date:	30 Apr-18 10:33	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (4.7 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	384009	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.591	N/A	112.5	38.59	0.8888	NA
IC10	56.35	N/A	N/A	1.775	NA	NA
IC15	69.71	N/A	N/A	1.434	NA	NA
IC20	86.19	8.878	N/A	1.16	NA	11.26
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	92.25	76	107	7.33	14.66	15.89%	0.0%
1.5		4	94.25	74	104	6.86	13.72	14.56%	-2.17%
3		4	84.5	74	100	5.56	11.12	13.16%	8.4%
6.1		4	89.25	74	100	5.468	10.94	12.25%	3.25%
12.1		4	86.25	78	95	3.568	7.136	8.27%	6.5%
24.2		4	87.5	72	96	5.299	10.6	12.11%	5.15%
48.5		4	88.5	76	105	6.305	12.61	14.25%	4.07%
97		4	72	42	91	11.19	22.38	31.08%	21.95%

Frond Count Detail

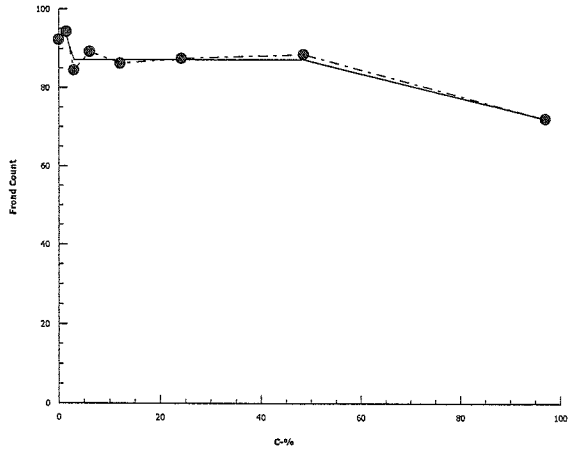
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	84	102	107	76
1.5		98	74	104	101
3		74	80	100	84
6.1		100	74	92	91
12.1		88	95	78	84
24.2		72	91	91	96
48.5		76	105	82	91
97		91	68	42	87

Jme 5/18

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	21-1462-6790	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 17:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: MT QA: June 5/18

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-1898-0583	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 17:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-4307-3427	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	02 May-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	09 May-18	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	02-2000-4056	**Code:**	D1CFED8	**Client:**	Teck Coal
Sample Date:	30 Apr-18 10:33	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	37h (4.7 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1517466	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.016	N/A	11.96	49.6	8.361	NA
IC10	6.147	N/A	N/A	16.27	NA	NA
IC15	10.95	N/A	N/A	9.135	NA	NA
IC20	>97	N/A	N/A	<1.031	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	6.982	5.93	7.57	0.3887	0.7774	11.13%	0.0%
1.5		4	6.863	5.14	7.87	0.6208	1.242	18.09%	1.72%
3		4	6.018	5.14	7.21	0.4432	0.8863	14.73%	13.82%
6.1		4	6.56	5.19	7.34	0.4727	0.9454	14.41%	6.05%
12.1		4	5.76	4.96	6.46	0.324	0.648	11.25%	17.51%
24.2		4	5.875	4.88	6.57	0.3654	0.7308	12.44%	15.86%
48.5		4	5.938	5.18	7.05	0.3956	0.7911	13.32%	14.97%
97		4	5.918	4.29	6.57	0.5459	1.092	18.45%	15.25%

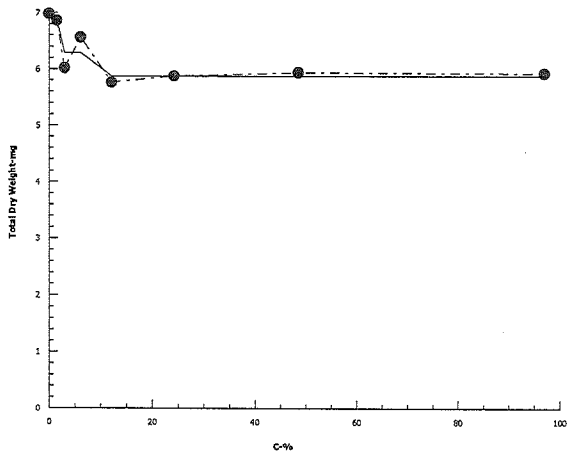
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.86	7.57	7.57	5.93
1.5		7.87	5.14	7.66	6.78
3		5.62	5.14	7.21	6.1
6.1		7.34	5.19	6.75	6.96
12.1		6.06	6.46	4.96	5.56
24.2		4.88	5.82	6.23	6.57
48.5		5.18	7.05	5.8	5.72
97		6.52	6.57	4.29	6.29

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-1898-0583	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 17:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 5/18

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 180708

Start Date: May 3/18
Set up by: MLT

Sample Information:

Sample ID: LC_DCDS_WS_2017-04-25N
Sample Date: April 30/18
Date Received: May 1/18
Sample Volume: 5x20L

Test Organism Information:

Culture Date: 042518
Age of culture (Day 0): 8 days
>8X growth in APHA?: y (36 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm159
Date Initiated: April 19/18

7-d No. of Fronds IC50 (95% CL): 3.4 (2.1-4.1) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.5 (2.9-4.3) g/L KCl CV (%): 10

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	>97	67.2 (N/A-N/A)
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: [signature]
Date reviewed: June 5, 2018

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck	**Setup by:**	MG
Sample ID:	LC_DCDS_WS_2017-04-25_N	**Test Date:**	May 3/18
Work Order No.:	180708	**CER #:**	1
Culture Source:	CPCC #490	**Test Species:**	*Lemna minor*
Test Culture Age:	8 days	**> 8X Growth? (Y/N):**	Y (36 Fronds)
Light Intensity Range:	4300-5100 lux.	**Date Measured:**	May 2/18

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	MG 25.0	24.0	26.0	26.0	26.0	25.5	25.5	26.0
Initials	MG	MG	LC	↑	MG	MG	MG	MG

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	25.0	Aeration?: 20 min	24.0
DO (mg/L)	8.2	Nutrients	8.7
pH	8.0	added?[1]: Y →	8.1
Conductivity (µS)	359		1162

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration %(v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.0	25.0	8.2	9.9	887
1.5	24.0	25.0	8.2	10.3	894
3	24.0	25.0	8.2	9.7	900
6.1	24.0	25.0	8.2	9.7	907
12.2 MG	24.0	25.0	8.2	9.9	923
24.2	24.0	25.0	8.1	10.0	957
48.5	24.0	25.0	8.1	9.6	1025
97	24.0	25.0	8.1	9.8	1162
Initials	MG	JB	MG	JB	MG

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1 DO meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

Sample Description: slightly turbid, colourless, odourless, brown particulates

Comments:

Reviewed: [signature] **Date Reviewed:** June 5, 2018

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-DCDS_WS-2017-04-25_N
Work Order #: 180708

Start Date: May 3/18
Termination Date: May 10/18
Test set up by: MG

Concentration o/o(v/v)	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
control	A	6	124										MG
	B	6	117										
	C	6	133										
	D	6	132										
1.5	A	6	128										
	B	6	131										
	C	6	134										
	D	6	120										
3	A	6	106										
	B	6	130										
	C	6	96										
	D	6	105										
6.1	A	6	109										
	B	6	110										
	C	6	115										
	D	6	114										
12.21 MG	A	6	106										
	B	6	100										
	C	6	121										
	D	6	129										
24.2 ~~48.5~~ MG	A	6	96										
	B	6	107										
	C	6	103										
	D	6	109										

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-DCDS-WS-2017-04-25N
Work Order #: 180708

Start Date: May 3/18
Termination Date: May 10/18
Test set up by: MG

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A		120										MG
	B		110										
	C		116										
	D		110										
97	A		94			X							
	B		103										
	C		107										
	D		108										
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_DCDS_WS_2017-04-25_N
WO #: 180708
DCDS orange

Start Date: May 3/18
Termination Date: May 10/18
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v)	A	1	1150.66	1161.29	MB / MB
	B	2	1138.25	1147.29	
Control	C	3	1170.37	1131.40	
	D	4	1124.29	1135.36	
	A	5	1127.05	1136.60	
1.5	B	6	1138.38	1148.90	
	C	7	1139.50	1149.67	
	D	8	1137.82	1145.65	
	A	9	1140.21	1148.09	
3	B	10	1121.02	1130.97	
	C	11	1142.55	1150.24	
	D	12	~~1140~~ MB 1140.99	1149.50	
	A	13	1123.73	1132.10	
6.1	B	14	1127.17	1135.21	
	C	15	1127.04	1135.72	
	D	16	1146.92	1154.65	
	A	17	1147.40	1154.72	
12.1	B	18	1144.08	1151.59	
	C	19	1115.30	1123.85	
	D	20	1136.53	1145.81	
	A	21	1141.86	1149.08	
24.2	B	22	1141.15	1149.73	
	C	23	1121.10	1128.65	
	D	24	1134.81	1142.71	
	A	25	1134.49	1143.61	
48.5	B	26	1147.16	1155.96	
	C	27	1149.82	1158.15	
	D	28	1135.65	1144.57	✓

Comments: 10% Re-weigh pans: # 9 (1148.19 mg), #17 (1154.73 mg) #24 (1142.71 mg) #18 (1151.42 mg)

Reviewed by: [signature]

Date Reviewed: June 5, 2018

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC-DCDS-WS-2017-04-25_N
WO #: 180708
DCDS orange

Start Date: May 3/18
Termination Date: May 10/18
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
0/0 (v/v)	A	29	1146.13	1152.54	NB / NB
	B	30	1149.67	1153.10	↓ ↓
97	C	31	1132.23	1140.13	
	D	32	1140.27	1148.00	✓ ✓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-4970-5709	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 May-18 18:44	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-9733-7606	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	03 May-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	10 May-18	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	19-5563-3815	**Code:**	74909A97	**Client:**	Teck Coal
Sample Date:	30 Apr-18 12:14	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	60h (5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1340291	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.001	1.209	3.679	49.98	27.18	82.69
IC10	2.602	1.842	21.5	38.44	4.651	54.29
IC15	22.57	N/A	105.8	4.431	0.9447	NA
IC20	95.87	N/A	N/A	1.043	NA	NA
IC25	>97	N/A	N/A	<1.031	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	120.5	111	127	3.753	7.506	6.23%	0.0%
1.5		4	122.3	114	128	3.01	6.021	4.93%	-1.45%
3		4	103.3	90	124	7.273	14.55	14.09%	14.32%
6.1		4	106	103	109	1.472	2.944	2.78%	12.03%
12.1		4	108	94	123	6.671	13.34	12.35%	10.37%
24.2		4	97.75	90	103	2.869	5.737	5.87%	18.88%
48.5		4	108	104	114	2.449	4.899	4.54%	10.37%
97		4	97	88	102	3.189	6.377	6.57%	19.5%

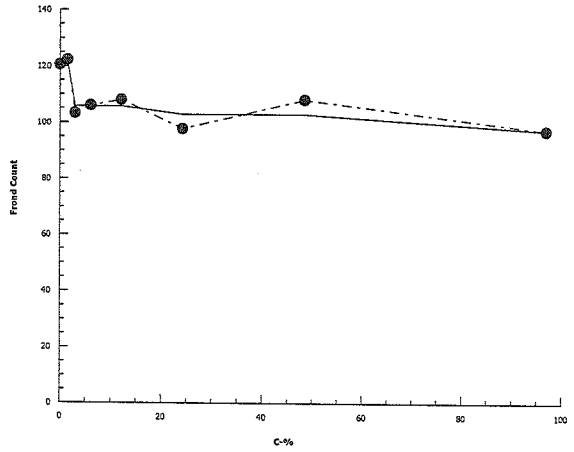
Frond Count Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	118	111	127	126
1.5		122	125	128	114
3		100	124	90	99
6.1		103	104	109	108
12.1		100	94	115	123
24.2		90	101	97	103
48.5		114	104	110	104
97		88	97	101	102

June 5/18

Analysis ID:	00-4970-5709	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 May-18 18:44	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 5/18

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	21-2618-7086	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 May-18 18:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	06-9733-7606	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	03 May-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	10 May-18	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	8d
Sample ID:	19-5563-3815	**Code:**	74909A97	**Client:**	Teck Coal
Sample Date:	30 Apr-18 12:14	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	60h (5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	225061	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.6774	N/A	3.497	147.6	28.6	NA
IC10	1.643	N/A	5.267	60.88	18.99	NA
IC15	2.369	N/A	84.32	42.2	1.186	NA
IC20	4.586	N/A	120.6	21.81	0.8291	NA
IC25	67.24	N/A	N/A	1.487	NA	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	10.44	9.04	11.07	0.4779	0.9558	9.15%	0.0%
1.5		4	9.518	7.83	10.52	0.5972	1.194	12.55%	8.86%
3		4	8.507	7.69	9.95	0.5118	1.024	12.03%	18.53%
6.1		4	8.205	7.73	8.68	0.2053	0.4106	5.0%	21.43%
12.1		4	8.165	7.32	9.28	0.4596	0.9192	11.26%	21.81%
24.2		4	7.812	7.22	8.58	0.2911	0.5821	7.45%	25.19%
48.5		4	8.792	8.33	9.12	0.1677	0.3353	3.81%	15.8%
97		4	7.367	6.41	7.9	0.3336	0.6672	9.06%	29.45%

Total Dry Weight-mg Detail

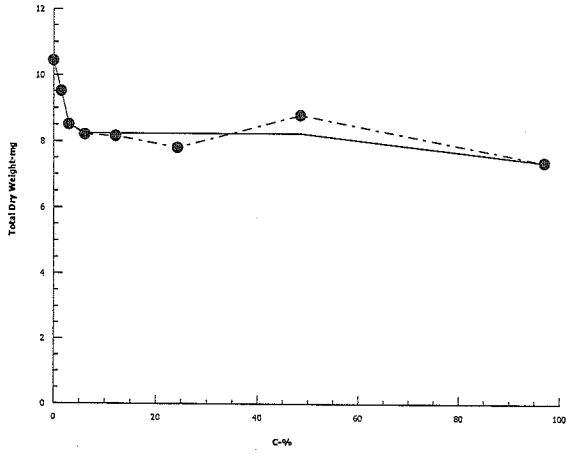
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	10.63	9.04	11.03	11.07
1.5		9.55	10.52	10.17	7.83
3		7.88	9.95	7.69	8.51
6.1		8.37	8.04	8.68	7.73
12.1		7.32	7.51	8.55	9.28
24.2		7.22	8.58	7.55	7.9
48.5		9.12	8.8	8.33	8.92
97		6.41	7.43	7.9	7.73

June 5/18

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	21-2618-7086	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	24 May-18 18:45	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: MB QA: June 5/18

Lemna minor Summary Sheet

Client: Teck
Work Order No.: 180708

Start Date: May 2/18
Set up by: MLT

Sample Information:

Sample ID: LC-LC5-WS-2017-04-24-N
Sample Date: April 30/18
Date Received: May 1/18
Sample Volume: 5x20L

Test Organism Information:

Culture Date: 042518
Age of culture (Day 0): 7 days
>8X growth in APHA?: y (36 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm159
Date Initiated: April 19/18

7-d No. of Fronds IC50 (95% CL): 3.4 (2.1-4.1) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.5 (2.9-4.3) g/L KCl CV (%): 10

Test Results:	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	69.3 (N/A - ~~169.5~~ 97) MLT	52.2 (N/A - ~~42.5~~ 97) MLT
IC50 %(v/v) (95% CL)	>97 ~~100~~	>97

Reviewed by: [signature]

Date reviewed: June 13, 2018

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck	**Setup by:**	MLT
Sample ID:	LC_LC5_WS_2017-04-24_N	**Test Date:**	May 2/18
Work Order No.:	180708	**CER #:**	1
Culture Source:	CPCC #490	**Test Species:**	*Lemna minor*
Test Culture Age:	7 days	**> 8X Growth? (Y/N):**	y (36 fronds)
Light Intensity Range:	4800 - 5400 lux	**Date Measured:**	May 2/18

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	24.0	26.0	26.0	26.0	25.5	25.5
Initials	MLT	MLT	MLT	RC	A	MLT	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	25.0		25.0
DO (mg/L)	8.2	Aeration?: 20 min	8.0
pH	8.2	Nutrients added?[1]: y →	8.2
Conductivity (µS)	615		1395

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration %(v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	25.0	26.0	8.2	8.9	879
1.5	25.0	26.0	8.2	8.8	896
3	25.0	26.0	8.2	9.3	905
6.1	25.0	26.0	8.2	9.2	922
12.1	25.0	26.0	8.2	9.2	955
24.2	25.0	26.0	8.2	9.3	1022
48.5	25.0	26.0	8.2	9.6	1151
97	25.0	26.0	8.2	9.2	1395
Initials	MLT	MLT	MLT	MLT	MLT

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1 DO meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

Sample Description: clear, colourless, odourless, some brown particulates

Comments:

Reviewed: [signature] **Date Reviewed:** June 5, 2018

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LCS-WS-2017-04-24-N
Work Order #: 180708

Start Date: May 2/18
Termination Date: May 9/18
Test set up by: ML

Concentration % (v/v)	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
control	A	6	88										ML
	B	6	126										
	C	6	150										
	D	6	128										
1.5	A	6	104										
	B	6	122										
	C	6	126										
	D	6	123										
3	A	6	105										
	B	6	120										
	C	6	119										
	D	6	124										
6.1	A	6	129										
	B	6	98										
	C	6	124										
	D	6	108										
12.1	A	6	103										
	B	6	122										
	C	6	90										
	D	6	120										
24.2	A	6	105										
	B	6	119										
	C	6	121										
	D	6	103										

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck
Sample ID: LC-LC5_WS_2019-64-24_N
Work Order #: 180708

Start Date: May 2/18
Termination Date: May 9/18
Test set up by: MG

Concentration %(v/v)	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
48.5	A	6	103										MG
	B	6	102										
	C	6	109										
	D	6	97										
97	A	6	88			X							
	B	6	84			X							
	C	6	80			X							
	D	6	89			X							
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LCLC5_WS_2017-04-24_N
WO #: 180708
LC5 Green

Start Date: May 2/18
Termination Date: May 9/18
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
0% (v/v) control	A	1	1137.79	1143.87	MB/MB
	B	2	1146.96	1156.46	
	C	3	1140.09	1151.55	
	D	4	1140.54	1150.58	
1.5	A	5	1130.35	1137.48	
	B	6	1135.92	1144.56	
	C	7	1141.95	1150.89	
	D	8	1144.32	1152.35	
3	A	9	1150.88	MB 1157.86	
	B	10	1158.22	1166.84	
	C	11	1130.48	1138.49	
	D	12	1154.97	1164.43 MB	
6.1	A	13	1122.04	1131.34	
	B	14	1135.62	1142.87	
	C	15	1136.44	1144.52	
	D	16	1136.71	1143.79	
12.1	A	17	1138.79	1145.95	
	B	18	1148.87	1156.69	
	C	19	1175.79	1131.80	
	D	20	1144.84	1153.12	
24.2	A	21	1152.00	1158.57	
	B	22	1150.32	1158.35	
	C	23	1142.09	1150.51	
	D	24	1136.09	1142.77	
48.5	A	25	1122.43	1128.90	
	B	26	1137.42	1145.39	
	C	27	1133.53	1140.97	✓
	D	28	1145.90	1152.36	✓

Comments: 10% Re-weighed pans: #7 (1150.78 mg), #21 (1158.66 mg), #27 (1140.90 mg), #16 (1143.77 mg)

Reviewed by: MB

Date Reviewed: June 5, 2018

7-d *Lemna minor* Weight Data Sheet

Client: Teck
Sample ID: LC_LC5_WS_2017-04-24_N
WO #: 180708
LC5 Green

Start Date: May 2/18
Termination Date: May 9/18
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
% (v/v) 97	A	29	1138.99	1141.89	MB / MB
	B	30	1144.01	1150.16	↓ ↓
	C	31	1141.83	1147.16	
	D	32	1149.24	1155.13	✓ ✓
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [signature]

Date Reviewed: June 5, 2018

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	09-4668-5484	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Jun-18 17:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	16-8889-1370	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	02 May-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	09 May-18	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	06-1759-8480	**Code:**	24CFCE10	**Client:**	Teck Coal
Sample Date:	30 Apr-18 13:40	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	34h (6 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	296348	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.842	N/A	49.34	35.19	2.027	NA
IC10	10.51	N/A	76.59	9.516	1.306	NA
IC15	37.97	N/A	78.57	2.633	1.273	NA
IC20	54.98	N/A	90.59	1.819	1.104	NA
IC25	69.33	N/A	110	1.442	0.9092	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Frond Count Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	117	82	144	12.87	25.74	22.0%	0.0%
1.5		4	112.8	98	120	4.99	9.979	8.85%	3.63%
3		4	111	99	118	4.143	8.287	7.47%	5.13%
6.1		4	108.8	92	123	7.157	14.31	13.16%	7.05%
12.1		4	102.8	84	116	7.565	15.13	14.73%	12.18%
24.2		4	106	97	115	4.655	9.309	8.78%	9.4%
48.5		4	96.75	91	103	2.462	4.924	5.09%	17.31%
97		4	79.25	74	83	2.056	4.113	5.19%	32.26%

Frond Count Detail

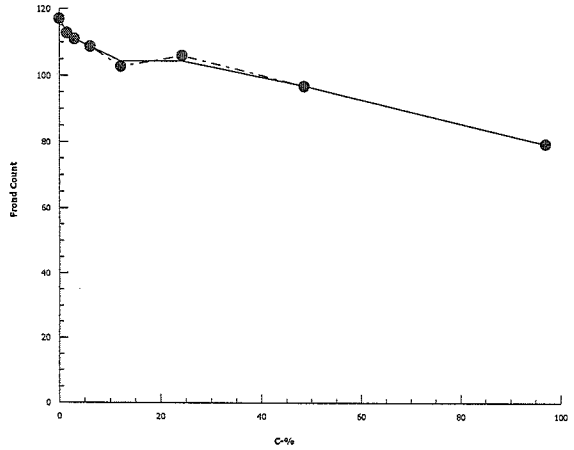
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	82	120	144	122
1.5		98	116	120	117
3		99	114	113	118
6.1		123	92	118	102
12.1		97	116	84	114
24.2		99	113	115	97
48.5		97	96	103	91
97		82	78	74	83

Analyst: MT QA: June 12/18

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	09-4668-5484	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Jun-18 17:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 12/18

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-4081-0408	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Jun-18 17:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	16-8889-1370	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	02 May-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	09 May-18	**Species:**	Lemna minor	**Brine:**	
Duration:	7d 0h	**Source:**	CPCC#490	**Age:**	7d
Sample ID:	06-1759-8480	**Code:**	24CFCE10	**Client:**	Teck Coal
Sample Date:	30 Apr-18 13:40	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	34h (6 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1891410	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.5022	0.04198	40.12	199.1	2.493	2382
IC10	1.257	0.006301	80.41	79.58	1.244	15870
IC15	6.486	N/A	96.1	15.42	1.041	NA
IC20	11.47	N/A	112.9	8.718	0.8859	NA
IC25	52.16	N/A	119.2	1.917	0.8391	NA
IC40	>97	N/A	N/A	<1.031	NA	NA
IC50	>97	N/A	N/A	<1.031	NA	NA

Total Dry Weight-mg Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	4	9.27	6.08	11.46	1.141	2.282	24.61%	0.0%
1.5		4	8.185	7.13	8.94	0.3994	0.7988	9.76%	11.7%
3		4	8.268	6.98	9.46	0.5221	1.044	12.63%	10.81%
6.1		4	7.928	7.08	9.3	0.5069	1.014	12.79%	14.48%
12.1		4	7.317	6.01	8.28	0.4927	0.9854	13.47%	21.06%
24.2		4	7.425	6.57	8.42	0.4692	0.9385	12.64%	19.9%
48.5		4	7.085	6.46	7.97	0.374	0.7479	10.56%	23.57%
97		4	5.818	5.33	6.15	0.1733	0.3465	5.96%	37.24%

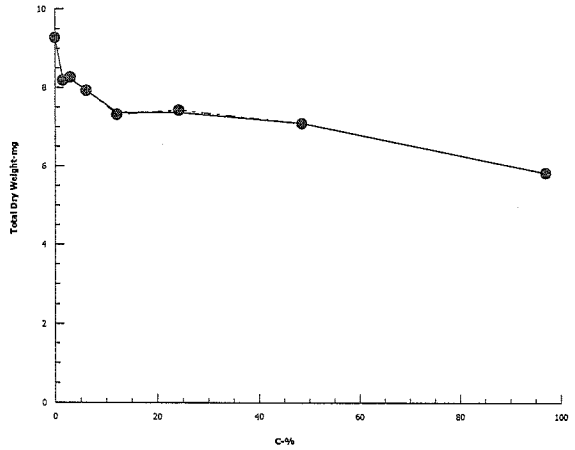
Total Dry Weight-mg Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4
0	Negative Control	6.08	9.5	11.46	10.04
1.5		7.13	8.64	8.94	8.03
3		6.98	8.62	8.01	9.46
6.1		9.3	7.25	8.08	7.08
12.1		7.16	7.82	6.01	8.28
24.2		6.57	8.03	8.42	6.68
48.5		6.47	7.97	7.44	6.46
97		5.9	6.15	5.33	5.89

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-4081-0408	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.8.7
Analyzed:	11 Jun-18 17:08	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 12/18

APPENDIX D – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck
Work Order No.: 180709

Start Date: May 1/18
Set up by: ML

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2017-04-24_N
Sample Date: April 30/18
Date Received: May 1
Sample Volume: 8x20L

Test Organism Information:

Culture Date: April 27/18
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC169
Stock Solution ID: 18Zn01
Date Initiated: April 20/18

72-h IC50 (95% CL): 28.8 (22.8-34.8) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 31.8 (26.1-38.7) ug/L Zn CV (%): 10

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 4, 2018

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MG

Sample ID: LC_LCOSSLCC_WS_2017-04-24_N | Test Date/Time: May 1/18 @ 1330h

Work Order No.: 180709 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: April 27/18 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 440 2 450 | Average: 445 | Culture Cell Density (c1): 445 x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 445x10⁴ cells/ml = 4.94mL

Time Zero Counts: 1 21 2 23 | Average: 22

No. of Cells/mL: 22x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10 000 cells/mL

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control	7.1	24.0	24.0	24.0	24.0	24.0	✓	✓	✓	✓
1.5	7.1	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.1	24.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.3	24.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.7	24.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.0	24.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.3	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.1 Well 2: 7.1

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 400 Date measured: May 1/18

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1

Sample Description: clear, colourless, odourless, some brown particulates

Comments:

Reviewed: [signature] Date reviewed: June 4, 2018

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: May 1/18 @ 1330h
Work Order #: 180709
Termination Date: May 4/18 @ 1330h
Sample ID: LC_LCDSBLCC-WS-2017-04-24-N
Test set up by: MG
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	32					MG
	B	38					
	C	35					
	D	33					
	E	35					
	F	31					
	G	20					
	H	33					
1.5	A	38					
	B	35					
	C	43					
	D	41					
3.0	A	40					
	B	41					
	C	44					
	D	43					
6.0	A	67					
	B	75					
	C	71					
	D	70					
11.9	A	127					
	B	121					
	C	130					
	D	125					
23.8	A	120					
	B	122					
	C	130					
	D	128					
47.6	A	150					
	B	139					
	C	144					
	D	130					
95.2	A	152					
	B	149					
	C	150					
	D	145					

Comments:

Reviewed by: [signature]
Date Reviewed: June 4 2018

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	1-May-18 @ 1330h		
WO#:	180709	Termination Date/Time	4-May-18 @ 1330h		
Sample ID:	LC_LCDSSLCC_WS_2017-04-24_N				
		Initial Cell Density:	10000 cell/mL		220000
					0.22
					0.01

Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10000
Control	A	32				32	31.0	mean	32.4
	B	38				38	37.0	SD	2.559994
	C	35				35	34.0	CV	7.907319
	D	33				33	32.0		
	E	35				35	34.0		
	F	31				31	30.0		
	G	30				30	29.0		
	H	33				33	32.0		
1.5	A	38				38	37.0		
	B	35				35	34.0		
	C	43				43	42.0		
	D	41				41	40.0		
3	A	40				40	39.0		
	B	41				41	40.0		
	C	44				44	43.0		
	D	43				43	42.0		
6	A	67				67	66.0		
	B	75				75	74.0		
	C	71				71	70.0		
	D	70				70	69.0		
11.9	A	127				127	126.0		
	B	121				121	120.0		
	C	130				130	129.0		
	D	125				125	124.0		
23.8	A	120				120	119.0		
	B	122				122	121.0		
	C	130				130	129.0		
	D	128				128	127.0		
47.6	A	150				150	149.0		
	B	139				139	138.0		
	C	144				144	143.0		
	D	130				130	129.0		
95.2	A	152				152	151.0		
	B	149				149	148.0		
	C	150				150	149.0		
	D	145				145	144.0		

Reviewed by: _____ Date reviewed: June 4, 2018

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-7247-4014	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	19-0023-5174	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 May-18 13:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 May-18 13:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	09-3479-9715	**Code:**	37B7E963	**Client:**	Teck Coal
Sample Date:	30 Apr-18 12:43	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	25h (6.5 °C)	**Station:**	LC_LCDSSLCC_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	229007	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.1855	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	32.38	29	37	0.9051	2.56	7.91%	0.0%
1.5		4	38.25	34	42	1.75	3.5	9.15%	-18.15%
3		4	41	39	43	0.9129	1.826	4.45%	-26.64%
6		4	69.75	66	74	1.652	3.304	4.74%	-115.4%
11.9		4	124.8	120	129	1.887	3.775	3.03%	-285.3%
23.8		4	124	119	129	2.38	4.761	3.84%	-283.0%
47.6		4	139.8	129	149	4.23	8.461	6.05%	-331.7%
95.2		4	148	144	151	1.472	2.944	1.99%	-357.1%

Cell Yield Detail

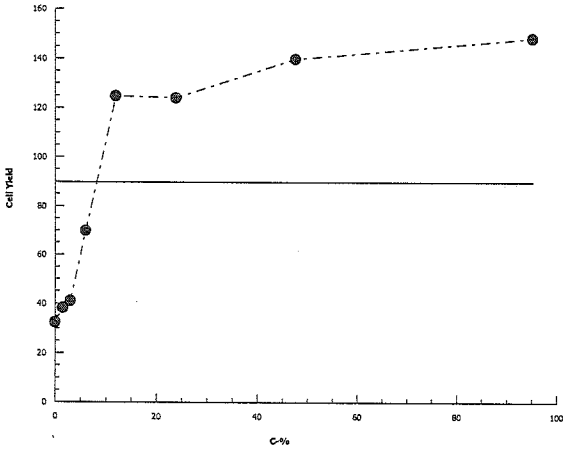
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	31	37	34	32	34	30	29	32
1.5		37	34	42	40				
3		39	40	43	42				
6		66	74	70	69				
11.9		126	120	129	124				
23.8		119	121	129	127				
47.6		149	138	143	129				
95.2		151	148	149	144				

Analyst: MT QA: June 4/18

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-7247-4014	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:29	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: MLT QA: June 4/18

CETIS Analytical Report

Test Code: 180709a | 05-8446-4965

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	20-7669-4494	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:29	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	19-0023-5174	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 May-18 13:30	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 May-18 13:30	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	09-3479-9715	**Code:**	37B7E963	**Client:**	Teck Coal
Sample Date:	30 Apr-18 12:43	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	25h (6.5 °C)	**Station:**	LC_LCDSSLCC_WS_2017-04-24_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	19.7%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	2.325	2.526	6.384	10	0.0759	CDF	Non-Significant Effect
		3*	3.413	2.526	6.384	10	0.0063	CDF	Significant Effect
		6*	14.79	2.526	6.384	10	<0.0001	CDF	Significant Effect
		11.9*	36.55	2.526	6.384	10	<0.0001	CDF	Significant Effect
		23.8*	36.26	2.526	6.384	10	<0.0001	CDF	Significant Effect
		47.6*	42.49	2.526	6.384	10	<0.0001	CDF	Significant Effect
		95.2*	45.75	2.526	6.384	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.1855	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	79745.43	11392.2	7	668.9	<0.0001	Significant Effect
Error	476.875	17.03125	28			
Total	80222.3		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	10.12	18.48	0.1818	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9772	0.9166	0.6497	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	32.38	30.23	34.52	32	29	37	0.9051	7.91%	0.0%
1.5		4	38.25	32.68	43.82	38.5	34	42	1.75	9.15%	-18.15%
3		4	41	38.09	43.91	41	39	43	0.9129	4.45%	-26.64%
6		4	69.75	64.49	75.01	69.5	66	74	1.652	4.74%	-115.4%
11.9		4	124.8	118.7	130.8	125	120	129	1.887	3.03%	-285.3%
23.8		4	124	116.4	131.6	124	119	129	2.38	3.84%	-283.0%
47.6		4	139.8	126.3	153.2	140.5	129	149	4.23	6.05%	-331.7%
95.2		4	148	143.3	152.7	148.5	144	151	1.472	1.99%	-357.1%

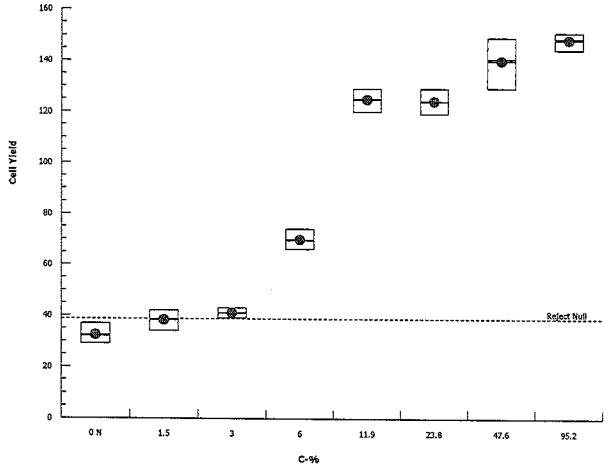
EC Alga Growth Inhibition Test — **Nautilus Environmental**

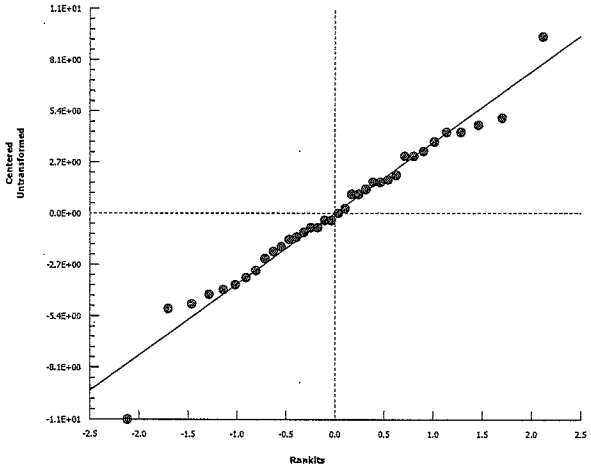
Analysis ID: 20-7669-4494 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 23 May-18 15:29 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	31	37	34	32	34	30	29	32
1.5		37	34	42	40				
3		39	40	43	42				
6		66	74	70	69				
11.9		126	120	129	124				
23.8		119	121	129	127				
47.6		149	138	143	129				
95.2		151	148	149	144				

Graphics





Analyst: MK QA: 9/18

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck
Work Order No.: 180709

Start Date: May 1/18
Set up by: ML

Sample Information:

Sample ID: LC-PCI-WS-2017-04-25_N
Sample Date: April 30/18
Date Received: May 1/18
Sample Volume: 5x20L

Test Organism Information:

Culture Date: April 27/18
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC169
Stock Solution ID: 18Zn01
Date Initiated: April 20/18

72-h IC50 (95% CL): 28.8 (22.8-34.8) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 31.8 (26.1-38.7) ug/L Zn CV (%): 10

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 4, 2018

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MG

Sample ID: LC_DCL_WS_2017-04-25_N | Test Date/Time: May 1/18 @ 1320h

Work Order No.: 180709 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Apr 27/18 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 440 2 450 | Average: 445 | Culture Cell Density (c1): 445 x 10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 445x10⁴ cells/ml = 4.94mL

Time Zero Counts: 1 21 2 23 | Average: 22

No. of Cells/mL: 22x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10 000 cells/mL

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control	7.1	24.0	24.0	24.0	24.0	24.0	✓	✓	✓	✓
1.5	7.1	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.3	24.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.5	24.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.7	24.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.0	24.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.1 Well 2: 7.1

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 3910 Date measured: May 1/18

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1

Sample Description: clear, colourless, odourless, some brown particulates

Comments:

Reviewed: [signature] Date reviewed: June 4, 2018

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck | Start Date/Time: May 1/18 @ 1320h
Work Order #: 180709 | Termination Date: May 4/18 @ 1320h
Sample ID: LC-DCI-WS_2017-04-25_N | Test set up by: MG
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	36					MG
	B	37					
	C	30					
	D	35					
	E	38					
	F	35					
	G	36					
	H	37					
1.5	A	34					
	B	36					
	C	43					
	D	39					
3.0	A	46					
	B	48					
	C	41					
	D	43					
6.0	A	51					
	B	53					
	C	48					
	D	45					
11.9	A	63					
	B	69					
	C	57					
	D	55					
23.8	A	106					
	B	108					
	C	105					
	D	100					
47.6	A	121					
	B	129					
	C	131					
	D	124					
95.2	A	143					
	B	150					
	C	140					
	D	138					

Comments:

Reviewed by: | Date Reviewed: June 4, 2018

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	1-May-18 @ 1320h		
WO#:	180709	Termination Date/Time	4-May-18 @ 1320h		
Sample ID:	LC_DC1_WS_2017-04-25_N				
		Initial Cell Density:	10000 cell/mL		220000
					0.22
					0.01

Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10000
Control	A	36				36	35.0	mean	34.5
	B	37				37	36.0	SD	2.44949
	C	30				30	29.0	CV	7.09997
	D	35				35	34.0		
	E	38				38	37.0		
	F	35				35	34.0		
	G	36				36	35.0		
	H	37				37	36.0		
1.5	A	34				34	33.0		
	B	36				36	35.0		
	C	43				43	42.0		
	D	39				39	38.0		
3	A	46				46	45.0		
	B	48				48	47.0		
	C	41				41	40.0		
	D	43				43	42.0		
6	A	51				51	50.0		
	B	53				53	52.0		
	C	48				48	47.0		
	D	45				45	44.0		
11.9	A	63				63	62.0		
	B	69				69	68.0		
	C	57				57	56.0		
	D	55				55	54.0		
23.8	A	106				106	105.0		
	B	108				108	107.0		
	C	105				105	104.0		
	D	100				100	99.0		
47.6	A	121				121	120.0		
	B	127				127	126.0		
	C	131				131	130.0		
	D	124				124	123.0		
95.2	A	143				143	142.0		
	B	150				150	149.0		
	C	140				140	139.0		
	D	138				138	137.0		

Reviewed by: _____ Date reviewed: June 4, 2018

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	18-6146-8842	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	00-9569-5153	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 May-18 13:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 May-18 13:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	12-8100-7018	**Code:**	4C5A9DAA	**Client:**	Teck Coal
Sample Date:	30 Apr-18 11:11	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	26h (5.5 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2036384	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9087	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	34.5	29	37	0.866	2.449	7.1%	0.0%
1.5		4	37	33	42	1.958	3.916	10.58%	-7.25%
3		4	43.5	40	47	1.555	3.109	7.15%	-26.09%
6		4	48.25	44	52	1.75	3.5	7.25%	-39.86%
11.9		4	60	54	68	3.162	6.325	10.54%	-73.91%
23.8		4	103.8	99	107	1.702	3.403	3.28%	-200.7%
47.6		4	124.8	120	130	2.136	4.272	3.42%	-261.6%
95.2		4	141.8	137	149	2.626	5.252	3.71%	-310.9%

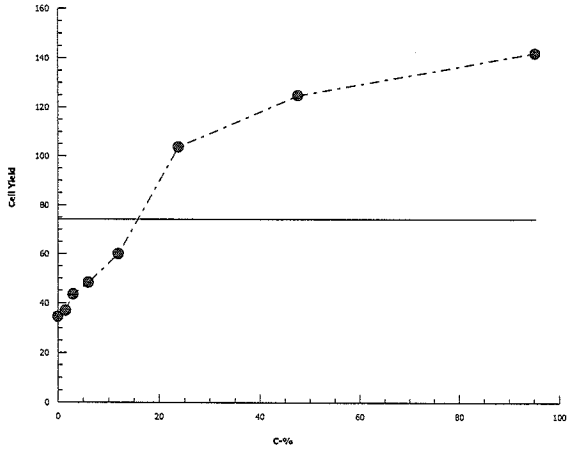
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	35	36	29	34	37	34	35	36
1.5		33	35	42	38				
3		45	47	40	42				
6		50	52	47	44				
11.9		62	68	56	54				
23.8		105	107	104	99				
47.6		120	126	130	123				
95.2		142	149	139	137				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	18-6146-8842	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:38	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: MH QA: June 4/18

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-9294-7806	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:38	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	00-9569-5153	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 May-18 13:20	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 May-18 13:20	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	12-8100-7018	**Code:**	4C5A9DAA	**Client:**	Teck Coal
Sample Date:	30 Apr-18 11:11	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	26h (5.5 °C)	**Station:**	LC_DC1_WS_2017-04-25_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	17.9%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.023	2.526	6.174	10	0.5397	CDF	Non-Significant Effect
		3*	3.682	2.526	6.174	10	0.0032	CDF	Significant Effect
		6*	5.626	2.526	6.174	10	<0.0001	CDF	Significant Effect
		11.9*	10.43	2.526	6.174	10	<0.0001	CDF	Significant Effect
		23.8*	28.33	2.526	6.174	10	<0.0001	CDF	Significant Effect
		47.6*	36.93	2.526	6.174	10	<0.0001	CDF	Significant Effect
		95.2*	43.88	2.526	6.174	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.9087	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	56676.22	8096.603	7	508.3	<0.0001	Significant Effect
Error	446	15.92857	28			
Total	57122.22		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	4.813	18.48	0.6827	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9696	0.9166	0.4151	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	34.5	32.45	36.55	35	29	37	0.866	7.1%	0.0%
1.5		4	37	30.77	43.23	36.5	33	42	1.958	10.58%	-7.25%
3		4	43.5	38.55	48.45	43.5	40	47	1.555	7.15%	-26.09%
6		4	48.25	42.68	53.82	48.5	44	52	1.75	7.25%	-39.86%
11.9		4	60	49.94	70.06	59	54	68	3.162	10.54%	-73.91%
23.8		4	103.8	98.33	109.2	104.5	99	107	1.702	3.28%	-200.7%
47.6		4	124.8	118	131.5	124.5	120	130	2.136	3.42%	-261.6%
95.2		4	141.8	133.4	150.1	140.5	137	149	2.626	3.71%	-310.9%

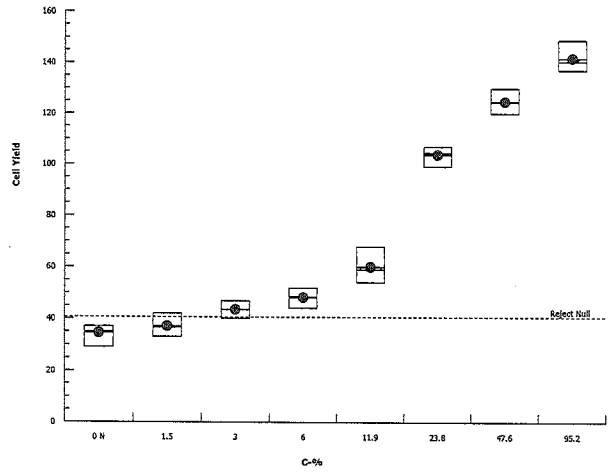
EC Alga Growth Inhibition Test — **Nautilus Environmental**

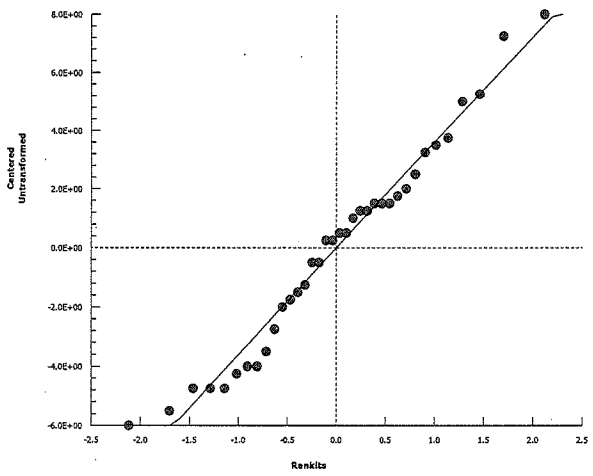
Analysis ID:	15-9294-7806	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:38	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	35	36	29	34	37	34	35	36
1.5		33	35	42	38				
3		45	47	40	42				
6		50	52	47	44				
11.9		62	68	56	54				
23.8		105	107	104	99				
47.6		120	126	130	123				
95.2		142	149	139	137				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck
Work Order No.: 180709

Start Date: May 1/18
Set up by: MLT

Sample Information:

Sample ID: LC_FRDSDC_WS-2017-04-25_N
Sample Date: April 30/18
Date Received: May 1/18
Sample Volume: 5x20L

Test Organism Information:

Culture Date: April 27/18
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC169
Stock Solution ID: 18Zn01
Date Initiated: April 20/18

72-h IC50 (95% CL): 28.8 (22.8-34.8) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 31.8 (26.1-38.7) ug/L Zn CV (%): 10

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: [signature]

Date reviewed: June 4, 2018

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck **Setup by:** MG

Sample ID: LC_FRDSDC_WS_2017-04-25_N **Test Date/Time:** May 1/18 @ 1315h

Work Order No.: 180709 **CER #:** 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: April 27/18 **Age of Culture:** 4d **Culture Health:** Good

Culture Count: 1 440 2 450 **Average:** 445 **Culture Cell Density (c1):** 445 X 10⁴ cells/mL

$$v1 = \frac{220{,}000 \text{ cells/ml} \times 100 \text{ ml}}{(c1)\quad 445 \times 10^4 \text{ cells/ml}} = 4.94 \text{mL}$$

Time Zero Counts: 1 21 2 23 **Average:** 22.

No. of Cells/mL: 22 X 10⁴ **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 10 000 cells/mL

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control	7.1	24.0	24.0	24.0	24.0	24.0	✓	✓	✓	✓
1.5	7.1	24.0	↓	↓	↓	↓	✓	✓	✓	✓
3.0	7.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.3	24.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.5	24.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.7	24.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.0	24.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.3	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.1 Well 2: 7.1

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 4080 **Date measured:** May 1/18

Thermometer: 4 **Light meter:** 1 **pH meter/probe:** 1 / 1

Sample Description: clear, colourless, odourless, some brown particulates.

Comments:

Reviewed: [signature] **Date reviewed:** June 4, 2018

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck | Start Date/Time: May 1/18 @ 1315h

Work Order #: 180709 | Termination Date: May 4/18 @ 1315h

Sample ID: LC_FRDSDC_WS_2017-0425 | Test set up by: MG

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	31					MG
	B	33					
	C	36					
	D	31					
	E	36					
	F	35					
	G	33					
	H	37					
1.5	A	45					
	B	38					
	C	39					
	D	38					
3.0	A	42					
	B	45					
	C	38					
	D	46					
6.0	A	68					
	B	63					
	C	70					
	D	64					
11.9	A	104					
	B	96					
	C	106					
	D	113					
23.8	A	140					
	B	130					
	C	138					
	D	127					
47.6	A	139					
	B	148					
	C	135					
	D	150					
95.2	A	138					
	B	143					
	C	132					
	D	130					

Comments:

Reviewed by: | Date Reviewed: June 4, 2018

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	1-May-18 @ 1315h		
WO#:	180709	Termination Date/Time	4-May-18 @ 1315h		
Sample ID:	LC_FRDSDC_WS_2017-04-25_N				
		Initial Cell Density:	10000 cell/mL		220000
					0.22
					0.01

Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10000
Control	A	31				31	30.0	mean	33.6
	B	38				38	37.0	SD	2.66927
	C	36				36	35.0	CV	7.938348
	D	31				31	30.0		
	E	36				36	35.0		
	F	35				35	34.0		
	G	33				33	32.0		
	H	37				37	36.0		
1.5	A	45				45	44.0		
	B	38				38	37.0		
	C	39				39	38.0		
	D	38				38	37.0		
3	A	42				42	41.0		
	B	45				45	44.0		
	C	38				38	37.0		
	D	46				46	45.0		
6	A	68				68	67.0		
	B	63				63	62.0		
	C	70				70	69.0		
	D	64				64	63.0		
11.9	A	104				104	103.0		
	B	96				96	95.0		
	C	106				106	105.0		
	D	113				113	112.0		
23.8	A	140				140	139.0		
	B	130				130	129.0		
	C	138				138	137.0		
	D	127				127	126.0		
47.6	A	139				139	138.0		
	B	148				148	147.0		
	C	135				135	134.0		
	D	150				150	149.0		
95.2	A	138				138	137.0		
	B	143				143	142.0		
	C	132				132	131.0		
	D	130				130	129.0		

Reviewed by: _____ Date reviewed: June 4, 2018

CETIS Analytical Report

Report Date:	23 May-18 15:35 (p 1 of 2)
Test Code:	180709c | 16-8133-9582

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-1280-4147	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:35	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Batch ID:	03-3853-6742	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 May-18 13:15	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 May-18 13:15	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d

Sample ID:	02-2000-4056	**Code:**	D1CFED8	**Client:**	Teck Coal
Sample Date:	30 Apr-18 10:33	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	27h (4.7 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	567502	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			1.0000	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	33.63	30	37	0.9437	2.669	7.94%	0.0%
1.5		4	39	37	44	1.683	3.367	8.63%	-15.99%
3		4	41.75	37	45	1.797	3.594	8.61%	-24.16%
6		4	65.25	62	69	1.652	3.304	5.06%	-94.05%
11.9		4	103.8	95	112	3.497	6.994	6.74%	-208.6%
23.8		4	132.8	126	139	3.119	6.238	4.7%	-294.8%
47.6		4	142	134	149	3.582	7.165	5.05%	-322.3%
95.2		4	134.8	129	142	2.955	5.909	4.39%	-300.7%

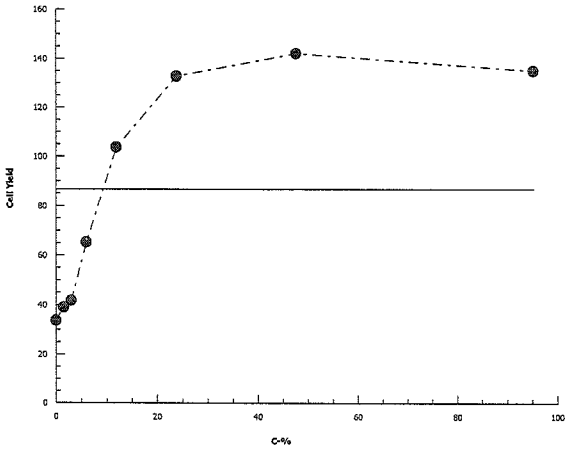
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	37	35	30	35	34	32	36
1.5		44	37	38	37				
3		41	44	37	45				
6		67	62	69	63				
11.9		103	95	105	112				
23.8		139	129	137	126				
47.6		138	147	134	149				
95.2		137	142	131	129				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-1280-4147	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:35	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/18

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-1171-3788	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:35	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	03-3853-6742	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 May-18 13:15	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 May-18 13:15	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	02-2000-4056	**Code:**	D1CFED8	**Client:**	Teck Coal
Sample Date:	30 Apr-18 10:33	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	27h (4.7 °C)	**Station:**	LC_FRDSDC_WS_2017-04-25_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	22.6%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	1.784	2.526	7.61	10	0.2031	CDF	Non-Significant Effect
		3*	2.697	2.526	7.61	10	0.0345	CDF	Significant Effect
		6*	10.5	2.526	7.61	10	<0.0001	CDF	Significant Effect
		11.9*	23.28	2.526	7.61	10	<0.0001	CDF	Significant Effect
		23.8*	32.9	2.526	7.61	10	<0.0001	CDF	Significant Effect
		47.6*	35.97	2.526	7.61	10	<0.0001	CDF	Significant Effect
		95.2*	33.57	2.526	7.61	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			1.0000	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	71385.59	10197.94	7	421.4	<0.0001	Significant Effect
Error	677.625	24.20089	28			
Total	72063.22		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	7.36	18.48	0.3924	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9806	0.9166	0.7665	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	33.63	31.39	35.86	34.5	30	37	0.9437	7.94%	0.0%
1.5		4	39	33.64	44.36	37.5	37	44	1.683	8.63%	-15.99%
3		4	41.75	36.03	47.47	42.5	37	45	1.797	8.61%	-24.16%
6		4	65.25	59.99	70.51	65	62	69	1.652	5.06%	-94.05%
11.9		4	103.8	92.62	114.9	104	95	112	3.497	6.74%	-208.6%
23.8		4	132.8	122.8	142.7	133	126	139	3.119	4.7%	-294.8%
47.6		4	142	130.6	153.4	142.5	134	149	3.582	5.05%	-322.3%
95.2		4	134.8	125.3	144.2	134	129	142	2.955	4.39%	-300.7%

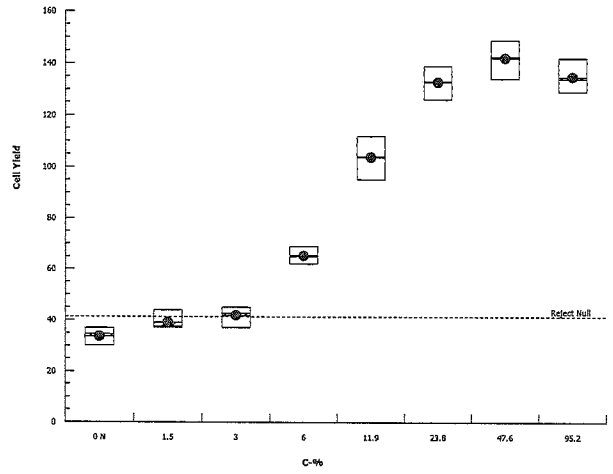
EC Alga Growth Inhibition Test — **Nautilus Environmental**

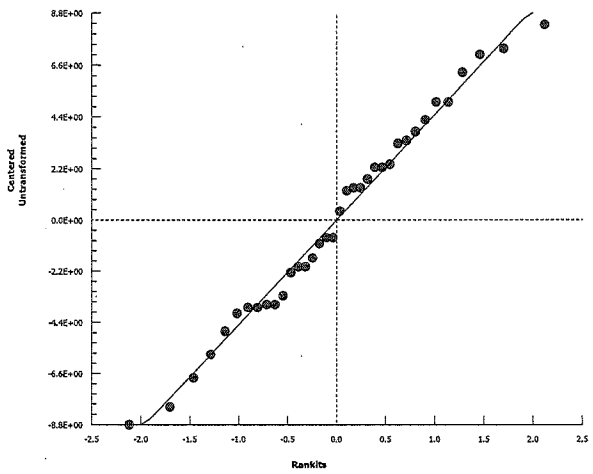
Analysis ID:	13-1171-3788	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:35	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	30	37	35	30	35	34	32	36
1.5		44	37	38	37				
3		41	44	37	45				
6		67	62	69	63				
11.9		103	95	105	112				
23.8		139	129	137	126				
47.6		138	147	134	149				
95.2		137	142	131	129				

Graphics





June 4/18

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck
Work Order No.: 180709

Start Date: May 1/18
Set up by: MLT

Sample Information:

Sample ID: LC_DCDS_WS_2017-04-25_N
Sample Date: April 30/18
Date Received: May 1/18
Sample Volume: 5x20L

Test Organism Information:

Culture Date: April 27/18
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC169
Stock Solution ID: 18Zn01 ~~April 20/18~~ MLT
Date Initiated: April 20/18

72-h IC50 (95% CL): 28.8 (22.8-34.8) mg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 31.8 (26.1-38.7) mg/L Zn CV (%): 10

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: _____ Date reviewed: _____

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MET

Sample ID: LC_DCDS_WS_2017-04-25_N | Test Date/Time: May 1/18 @ 1300h.

Work Order No.: 180709 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Apr 27/18 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 440 2 450 | Average: 445 | Culture Cell Density (c1): 445 x 10⁴ cells/mL

$v1 = \frac{220{,}000 \text{ cells/ml} \times 100 \text{ ml}}{(c1) \quad 445 \times 10^4 \quad \text{cells/ml}} = 4.94 \text{mL}$

Time Zero Counts: 1 21 2 23 | Average: 22

No. of Cells/mL: 22 x 10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10000 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.1	24.0	24.0	24.0	24.0	24.0	✓	✓	✓	✓
1.5	7.1	24.0	↓	↓	↓	↓	✓	✓	—	—
3.0	7.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
6.0	7.2	24.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.3	24.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.6	24.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	7.8	24.0	↓	↓	↓	↓	✓	✓	—	✓
95.2	8.1	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MET	MET	MET	MET	MET	MET	MET	MET	MET	MET

Initial control pH: Well 1: 7.1 | Well 2: 7.1

Final control pH: Well 1: 7.2 | Well 2: 7.2

Light intensity (lux): 4300 | Date measured: May 1/18

Thermometer: 4 | Light meter: 1 | pH meter/probe: 1 / 1

Sample Description: Slightly turbid, colourless, odourless, brown particulates

Comments:

Reviewed: [signature] | Date reviewed: June 4, 2018

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck | Start Date/Time: May 1/18 @1300h
Work Order #: 180709 | Termination Date: May 4/18 @ 1300h
Sample ID: LC-DCDS_WS_2017-04-25_N | Test set up by: MG
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	38					MG
	B	36					
	C	40					
	D	42					
	E	35					
	F	37					
	G	33					
	H	35					
1.5	A	43					
	B	47					
	C	50					
	D	44					
3.0	A	47					
	B	53					
	C	52					
	D	45					
6.0	A	57					
	B	50					
	C	63					
	D	55					
11.9	A	78					
	B	80					
	C	86					
	D	84					
23.8	A	110					
	B	114					
	C	109					
	D	100					
47.6	A	121					
	B	120					
	C	135					
	D	130					
95.8	A	140					
	B	157					
	C	152					
	D	148					

Comments:

Reviewed by: | Date Reviewed: June 4, 2018

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	1-May-18 @ 1300h		
WO#:	180709	Termination Date/Time	4-May-18 @ 1300h		
Sample ID:	LC_DCDS_WS_2017-04-25_N				
		Initial Cell Density:	10000 cell/mL		220000
					0.22
					0.01

Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		10000
Control	A	38				38	37.0	mean	36.0
	B	36				36	35.0	SD	2.9277
	C	40				40	39.0	CV	8.132501
	D	42				42	41.0		
	E	35				35	34.0		
	F	37				37	36.0		
	G	33				33	32.0		
	H	35				35	34.0		
1.5	A	43				43	42.0		
	B	47				47	46.0		
	C	50				50	49.0		
	D	44				44	43.0		
3	A	47				47	46.0		
	B	53				53	52.0		
	C	52				52	51.0		
	D	45				45	44.0		
6	A	57				57	56.0		
	B	50				50	49.0		
	C	63				63	62.0		
	D	55				55	54.0		
11.9	A	78				78	77.0		
	B	80				80	79.0		
	C	86				86	85.0		
	D	84				84	83.0		
23.8	A	110				110	109.0		
	B	114				114	113.0		
	C	109				109	108.0		
	D	100				100	99.0		
47.6	A	121				121	120.0		
	B	120				120	119.0		
	C	135				135	134.0		
	D	130				130	129.0		
95.2	A	140				140	139.0		
	B	157				157	156.0		
	C	152				152	151.0		
	D	148				148	147.0		

Reviewed by: _____ Date reviewed: June 4, 2018

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-2437-7512	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:41	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	02-6486-4755	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 May-18 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 May-18 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	19-5563-3815	**Code:**	74909A97	**Client:**	Teck Coal
Sample Date:	30 Apr-18 12:14	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	25h (5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1230240	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.1788	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	36	32	41	1.035	2.928	8.13%	0.0%
1.5		4	45	42	49	1.581	3.162	7.03%	-25.0%
3		4	48.25	44	52	1.931	3.862	8.01%	-34.03%
6		4	55.25	49	62	2.689	5.377	9.73%	-53.47%
11.9		4	81	77	85	1.826	3.651	4.51%	-125.0%
23.8		4	107.3	99	113	2.955	5.909	5.51%	-197.9%
47.6		4	125.5	119	134	3.617	7.234	5.76%	-248.6%
95.2		4	148.3	139	156	3.591	7.182	4.85%	-311.8%

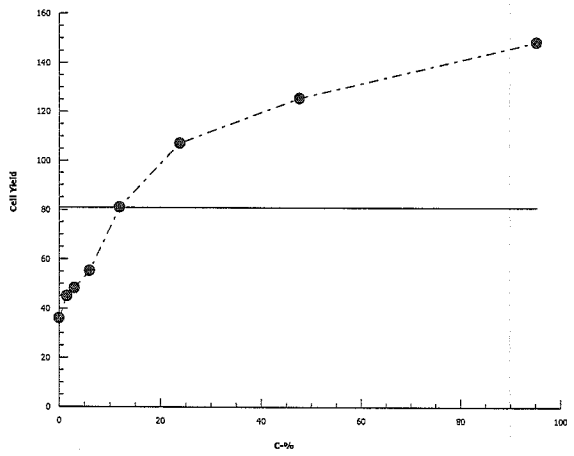
Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	37	35	39	41	34	36	32	34
1.5		42	46	49	43				
3		46	52	51	44				
6		56	49	62	54				
11.9		77	79	85	83				
23.8		109	113	108	99				
47.6		120	119	134	129				
95.2		139	156	151	147				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-2437-7512	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:41	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



Analyst: MLT QA: June 4/18

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-5506-0896	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:41	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	02-6486-4755	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 May-18 13:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 May-18 13:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	19-5563-3815	**Code:**	74909A97	**Client:**	Teck Coal
Sample Date:	30 Apr-18 12:14	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	25h (5 °C)	**Station:**	LC_DCDS_WS_2017-04-25_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	21.1%	<1.5	1.5	NA	>66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5*	2.987	2.526	7.612	10	0.0177	CDF	Significant Effect
		3*	4.065	2.526	7.612	10	0.0012	CDF	Significant Effect
		6*	6.388	2.526	7.612	10	<0.0001	CDF	Significant Effect
		11.9*	14.93	2.526	7.612	10	<0.0001	CDF	Significant Effect
		23.8*	23.64	2.526	7.612	10	<0.0001	CDF	Significant Effect
		47.6*	29.7	2.526	7.612	10	<0.0001	CDF	Significant Effect
		95.2*	37.25	2.526	7.612	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.1788	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	56133	8019	7	331.2	<0.0001	Significant Effect
Error	678	24.21428	28			
Total	56811		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	6.231	18.48	0.5131	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9869	0.9166	0.9387	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	36	33.55	38.45	35.5	32	41	1.035	8.13%	0.0%
1.5		4	45	39.97	50.03	44.5	42	49	1.581	7.03%	-25.0%
3		4	48.25	42.1	54.4	48.5	44	52	1.931	8.01%	-34.03%
6		4	55.25	46.69	63.81	55	49	62	2.689	9.73%	-53.47%
11.9		4	81	75.19	86.81	81	77	85	1.826	4.51%	-125.0%
23.8		4	107.3	97.85	116.7	108.5	99	113	2.955	5.51%	-197.9%
47.6		4	125.5	114	137	124.5	119	134	3.617	5.76%	-248.6%
95.2		4	148.3	136.8	159.7	149	139	156	3.591	4.85%	-311.8%

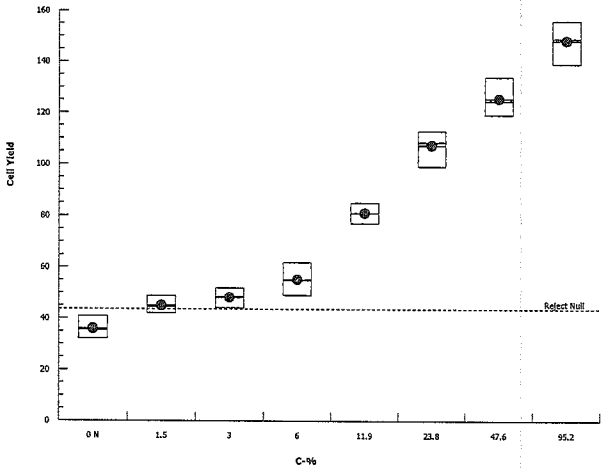
Analyst: MT QA: June 4/18

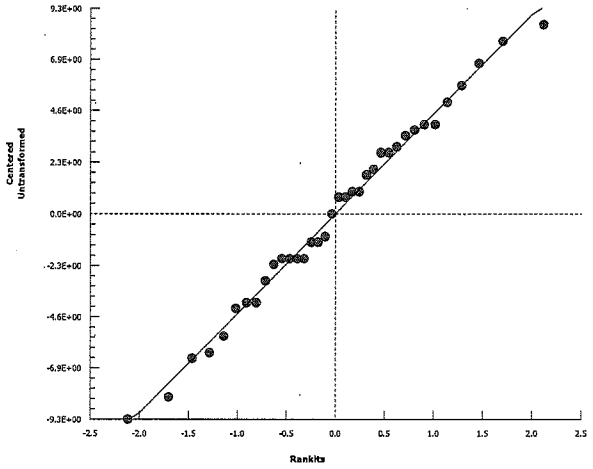
Analysis ID: 02-5506-0896 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 23 May-18 15:41 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	37	35	39	41	34	36	32	34
1.5		42	46	49	43				
3		46	52	51	44				
6		56	49	62	54				
11.9		77	79	85	83				
23.8		109	113	108	99				
47.6		120	119	134	129				
95.2		139	156	151	147				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck
Work Order No.: 180709

Start Date: May 1/18
Set up by: MLT

Sample Information:

Sample ID: LC_LC5_WS_2017-04-24_N
Sample Date: April 30/18
Date Received: May 1/18
Sample Volume: 5x20L

Test Organism Information:

Culture Date: April 27/18
Age of culture (Day 0): 4d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC169
Stock Solution ID: 18Zn01
Date Initiated: April 20/18

72-h IC50 (95% CL): 28.8 (22.8-34.8) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 31.8 (26.1-38.7) ug/L Zn CV (%): 10

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: _____ Date reviewed: _____

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MG

Sample ID: LC_LC5_WS_2017-04-24_N | Test Date/Time: May 1/18 @ 1305h

Work Order No.: 180709 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: April 27/18 | Age of Culture: 4d | Culture Health: Good

Culture Count: 1 440 2 450 | Average: 445 | Culture Cell Density (c1): 445x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 445x10⁴ cells/ml = 4.94mL

Time Zero Counts: 1 21 2 23 | Average: 22

No. of Cells/mL: 22x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 10000 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.1	24.0	24.0	24.0	24.0	24.0	✓	✓	✓	✓
1.5	7.1	24.0					✓	✓	✓	✓
3.0	7.2	24.0					✓	✓	✓	✓
6.0	7.3	24.0					✓	✓	✓	✓
11.9	7.5	24.0					✓	✓	✓	✓
23.8	7.7	24.0					✓	✓	✓	✓
47.6	8.0	24.0					✓	✓	✓	✓
95.2	8.3	24.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.1 Well 2: 7.1

Final control pH: Well 1: 7.2 Well 2: 7.2

Light intensity (lux): 4200 Date measured: May 1/18

Thermometer: 4 Light meter: 1 pH meter/probe: 1/1

Sample Description: clear, colourless, odourless, some brown particulates

Comments:

Reviewed: [signature] Date reviewed: June 4, 2018

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck
Start Date/Time: May 1/18 @ 1305h
Work Order #: 180709
Termination Date: May 4/18 @ 1305h
Sample ID: LC-LC5-WS-2017-04-24
Test set up by: MD
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	38					MD
	B	41					
	C	35					
	D	40					
	E	39					
	F	34					
	G	35					
	H	40					
1.5	A	36					
	B	37					
	C	43					
	D	44					
3.0	A	60					
	B	62					
	C	54					
	D	55					
6.0	A	79					
	B	75					
	C	81					
	D	84					
11.9	A	101					
	B	118					
	C	110					
	D	109					
23.8	A	139					
	B	141					
	C	140					
	D	135					
47.6	A	141					
	B	157					
	C	164					
	D	140					
95.2	A	153					
	B	165					
	C	157					
	D	160					

Comments:

Reviewed by: [signature]
Date Reviewed: June 4, 2018

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	1-May-18 @ 1305h		
WO#:	180709	Termination Date/Time	4-May-18 @ 1305h		
Sample ID:	LC_LC5_WS_2017-04-24_N				
		Initial Cell Density:	10000 cell/mL		220000
					0.22
					0.01

Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		
									10000
Control	A	38				38	37.0	mean	36.8
	B	41				41	40.0	SD	2.712405
	C	35				35	34.0	CV	7.380695
	D	40				40	39.0		
	E	39				39	38.0		
	F	34				34	33.0		
	G	35				35	34.0		
	H	40				40	39.0		
1.5	A	36				36	35.0		
	B	37				37	36.0		
	C	43				43	42.0		
	D	44				44	43.0		
3	A	60				60	59.0		
	B	62				62	61.0		
	C	54				54	53.0		
	D	55				55	54.0		
6	A	79				79	78.0		
	B	75				75	74.0		
	C	81				81	80.0		
	D	84				84	83.0		
11.9	A	101				101	100.0		
	B	118				118	117.0		
	C	110				110	109.0		
	D	109				109	108.0		
23.8	A	139				139	138.0		
	B	141				141	140.0		
	C	140				140	139.0		
	D	135				135	134.0		
47.6	A	141				141	140.0		
	B	157				157	156.0		
	C	164				164	163.0		
	D	140				140	139.0		
95.2	A	153				153	152.0		
	B	165				165	164.0		
	C	157				157	156.0		
	D	160				160	159.0		

Reviewed by: _____ Date reviewed: June 4, 2018

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-7321-4547	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:32	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes
Batch ID:	13-9220-3165	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 May-18 13:05	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 May-18 13:05	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	06-1759-8480	**Code:**	24CFCE10	**Client:**	Teck Coal
Sample Date:	30 Apr-18 13:40	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h (6 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1957189	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5540	Non-significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	N/A	N/A	<1.05	NA	NA
IC10	>95.2	N/A	N/A	<1.05	NA	NA
IC15	>95.2	N/A	N/A	<1.05	NA	NA
IC20	>95.2	N/A	N/A	<1.05	NA	NA
IC25	>95.2	N/A	N/A	<1.05	NA	NA
IC40	>95.2	N/A	N/A	<1.05	NA	NA
IC50	>95.2	N/A	N/A	<1.05	NA	NA

Cell Yield Summary

			Calculated Variate						
C-%	Control Type	Count	Mean	Min	Max	Std Err	Std Dev	CV%	%Effect
0	Negative Control	8	36.75	33	40	0.959	2.712	7.38%	0.0%
1.5		4	39	35	43	2.041	4.082	10.47%	-6.12%
3		4	56.75	53	61	1.931	3.862	6.81%	-54.42%
6		4	78.75	74	83	1.887	3.775	4.79%	-114.3%
11.9		4	108.5	100	117	3.476	6.952	6.41%	-195.2%
23.8		4	137.8	134	140	1.315	2.63	1.91%	-274.8%
47.6		4	149.5	139	163	5.951	11.9	7.96%	-306.8%
95.2		4	157.8	152	164	2.529	5.058	3.21%	-329.3%

Cell Yield Detail

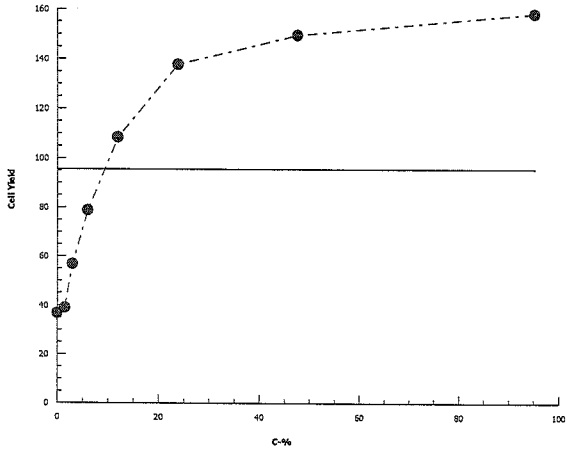
C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	37	40	34	39	38	33	34	39
1.5		35	36	42	43				
3		59	61	53	54				
6		78	74	80	83				
11.9		100	117	109	108				
23.8		138	140	139	134				
47.6		140	156	163	139				
95.2		152	164	156	159				

June 4/18

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	13-7321-4547	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:32	**Analysis:**	Linear Interpolation (ICPIN)	**Official Results:**	Yes

Graphics



June 4/18

CETIS Analytical Report

Test Code: 108709b | 16-1417-1531

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	17-5960-8172	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.8.7
Analyzed:	23 May-18 15:32	**Analysis:**	Parametric-Control vs Treatments	**Official Results:**	Yes
Batch ID:	13-9220-3165	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	01 May-18 13:05	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	04 May-18 13:05	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Duration:	72h	**Source:**	In-House Culture	**Age:**	4d
Sample ID:	06-1759-8480	**Code:**	24CFCE10	**Client:**	Teck Coal
Sample Date:	30 Apr-18 13:40	**Material:**	Water Sample	**Project:**	
Receive Date:	01 May-18 11:05	**Source:**	Teck Coal (TECK COAL)		
Sample Age:	23h (6 °C)	**Station:**	LC_LC5_WS_2017-04-24_N		

Data Transform	Zeta	Alt Hyp	Trials	Seed	PMSD	NOEL	LOEL	TOEL	TU
Untransformed	NA	C < T	NA	NA	23.3%	1.5	3	2.121	66.67

Dunnett Multiple Comparison Test

Control	vs	C-%	Test Stat	Critical	MSD	DF	P-Value	P-Type	Decision(α:5%)
Negative Control		1.5	0.6643	2.526	8.556	10	0.7140	CDF	Non-Significant Effect
		3*	5.905	2.526	8.556	10	<0.0001	CDF	Significant Effect
		6*	12.4	2.526	8.556	10	<0.0001	CDF	Significant Effect
		11.9*	21.18	2.526	8.556	10	<0.0001	CDF	Significant Effect
		23.8*	29.82	2.526	8.556	10	<0.0001	CDF	Significant Effect
		47.6*	33.29	2.526	8.556	10	<0.0001	CDF	Significant Effect
		95.2*	35.73	2.526	8.556	10	<0.0001	CDF	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend			0.5540	Non-significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	80995.39	11570.77	7	378.3	<0.0001	Significant Effect
Error	856.5	30.58928	28			
Total	81851.89		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance	13.68	18.48	0.0572	Equal Variances
Distribution	Shapiro-Wilk W Normality	0.9789	0.9166	0.7095	Normal Distribution

Cell Yield Summary

C-%	Control Type	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	Negative Control	8	36.75	34.48	39.02	37.5	33	40	0.959	7.38%	0.0%
1.5		4	39	32.5	45.5	39	35	43	2.041	10.47%	-6.12%
3		4	56.75	50.6	62.9	56.5	53	61	1.931	6.81%	-54.42%
6		4	78.75	72.74	84.76	79	74	83	1.887	4.79%	-114.3%
11.9		4	108.5	97.44	119.6	108.5	100	117	3.476	6.41%	-195.2%
23.8		4	137.8	133.6	141.9	138.5	134	140	1.315	1.91%	-274.8%
47.6		4	149.5	130.6	168.4	148	139	163	5.951	7.96%	-306.8%
95.2		4	157.8	149.7	165.8	157.5	152	164	2.529	3.21%	-329.3%

Analyst: MT QA: June 4/18

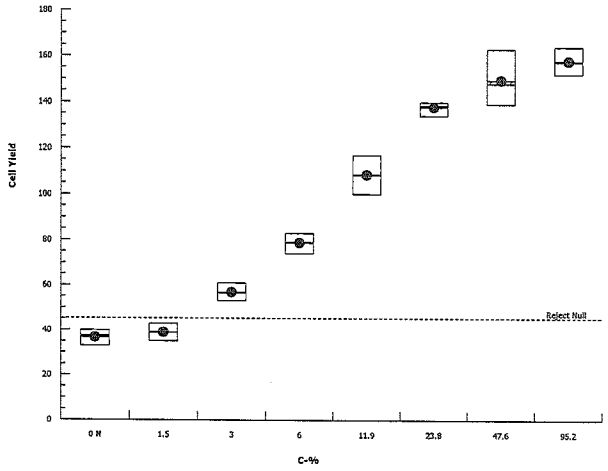
EC Alga Growth Inhibition Test — **Nautilus Environmental**

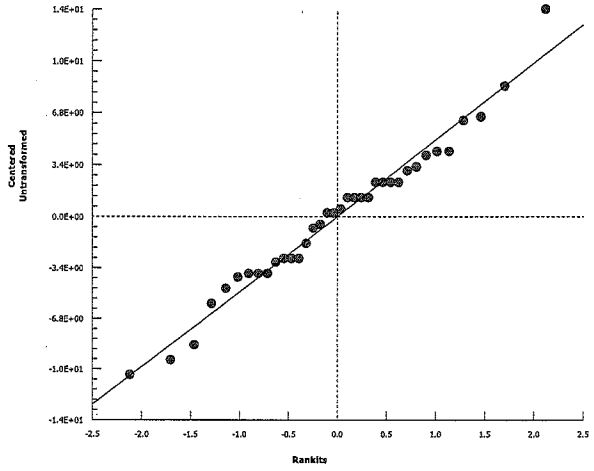
Analysis ID: 17-5960-8172 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.8.7
Analyzed: 23 May-18 15:32 **Analysis:** Parametric-Control vs Treatments **Official Results:** Yes

Cell Yield Detail

C-%	Control Type	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	Negative Control	37	40	34	39	38	33	34	39
1.5		35	36	42	43				
3		59	61	53	54				
6		78	74	80	83				
11.9		100	117	109	108				
23.8		138	140	139	134				
47.6		140	156	163	139				
95.2		152	164	156	159				

Graphics





APPENDIX E – Chain-of-Custody Forms

Teck

COC ID:	20180319-1201	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	Chris.Blurton@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	heidi.mettler@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			X
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	432106			
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED — Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	72h P. subcapitata P/F	7d C.dubia P/F	28 d Hyallella P/F	30 d rainbow trout early life stage P/F	7 day Rainbow trout P/F	Rainbow Trout Microbial Testing	30 d early life stage fathead minnow P/F (10 ug/l CU Treated)	30 d early life stage fathead minnow P/F (20 ug/l CU Treated)	7 d Cdubia dilution series	72hr Psubcapitata dilution series	7d L minor plant grown dilution series	7 d Rainbow Trout (O mykiss) development dilution series	T°C
LC_LCDSSLCC_WS_2017-04-24_N (1)	LC_LCDSSLCC	WS	N	30-Apr-18	12:43	G	8 8-7 x20L	x	x	x	x					x	x	x	x	6.5
LC_LC5_WS_2017-04-24_N (1)	LC_LC5	WS	N	30-Apr-18	13:40	G	5 x20L									x	x	x	x	6.0
LC_FRDSDC_WS_2017-04-25_N (1)	LC_FRDSDC	WS	N	30-Apr-18	10:33	G	5 x20L									x	x	x	x	4.7
LC_DC1_WS_2017-04-25_N (1)	LC_DC1	WS	N	30-Apr-18	11:11	G	5 x20L									x	x	x	x	5.5
LC_DCDS_WS_2017-04-25_N (2)	LC_DCDS	WS	N	30-Apr-18	12:14	G	5 x20L									x	x	x	x	5.0
LC_SLC_WS_2017-04-25_N (1)	LC_SLC	WS	N	30-Apr-18	11:44	G	6 x20L	x	x	x	x									4.8
								180711	180710	180713	180712					180706	180709	180708	180707	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Please provide prelimnary update as results are available	D.Tymstra/H.Mettler/T. Phillips	April 30, 2018	ANDREA WELSINK NAUTILUS BURNABY	MAY 1/18 @ 11:05

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	H. Mettler/ T. Phillips/D. Tymstra	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	[signature]	Date/Time	April 30, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

sample description: (1) clear, colourless, odourless, some brown particulates.
(2) slightly turbid, colourless, odourless, brown particulates.

Teck

COC ID:	20180515-1147	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1:	neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email				Email 2:	dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3:	chelsea.jensen@teck.com	X	X	X
								Email 4:	jason.gravelle@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 5:	teckcoal@equisonline.com			X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	1-250-865-5204			Phone Number	604-420-8773			PO number				

SAMPLE DETAILS / **ANALYSIS REQUESTED** — Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	28 Day H. azteca	30 d rainbow trout early life stage P/F	Rainbow Trout Microbial Testing	RBT embryo 7d p/f	T°C
①	FR_UFR1_WS_201805150915_N	FR_UFR1	WS		2018/05/15	09:15	G	10 x 20L	X	X	X	X	8.5
②	FR_FRCP1_WEK_~~2018-05-14_N~~ 201805151045_N	FR_FRCP1	WS		2018/05/15	10:45	G	5 x 20L	X	X	X		9.5

Filt. / PRESERV. / ANALYSIS

Mod 180712 a,b,c,d

Mod 180717

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
All metals samples must be shipped to ALS Burnaby for analysis	Chelsea Jensen/ Jason Gravelle	15-May-18	NAUTILUS BURNABY ANDREA WELSINK AW	MAY 16/18 @ 9:20
			Q2-WEEK3	

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	Chelsea Jensen/ Jason Gravelle	Mobile #	250 425 4729
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature	[signature]	Date/Time	May 15, 2018
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

sample desc: ① clear, light yellowish-brown, no odour, some particulates
② slightly turbid, light brown, no odour, some particulates

Teck

COC ID: **20180515-1210** | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name / Job#	Line Creek Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Chris Blurton			Lab Contact				Email 1:	drake.tymstra@teck.com	x	x	
Email	Chris.Blurton@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2:	chris.blurton@teck.com	x	x	
Address	Box 2003			Address	8664 Commerce Court			Email 3:	heidi.mettler@teck.com	x	x	
	15km North Hwy 43							Email 4:	teckcoal@equisonline.com			x
City	Sparwood	Province	BC	City	Burnaby	Province	BC	PO number	VPO00432106			
Postal Code	V0B 2G0	Country	Canada	Postal Code	V5A 4N7	Country	Canada					
Phone Number	250-425-3196			Phone Number	604-420-8773							

SAMPLE DETAILS / ANALYSIS REQUESTED (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Filt.	PRESERV.	ANALYSIS: 30 d rainbow trout early life stage P/F	28 d Hyallella P/F	7 d Rainbow Trout (O mykiss) development dilution series								T°C
1	LC_LC5_WS_2018-05-14_N	LC_LC5	WS	N	2018/05/15	12:15	G	4 X20L					X								9.5
2	LC_LCDSSLCC_WS_2018-05-14_N	LC_LCDSSLCC	WS	N	2018/05/15	10:48	G	7 X20L			X	X	X								10.0
3	LC_SLC_WS_2018-05-14_N	LC_SLC	WS	N	2018/05/15	9:50	G	4 3X20L			X	X									9.0
4	LC_DC1_WS_2018-05-14_N	LC_DC1	WS	N	2018/05/15	09:53	G	4 X20L					X								10.0
5	LC_DCDS_WS_2018-05-14_N	LC_DCDS	WS	N	2018/05/15	10:21	G	4 X20L					X								10.2
6	LC_FRDSDC_WS_2018-05-14_N	LC_FRDSDC	WS	N	2018/05/15	08:50	G	4 X20L					X								10.0

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS: Please provide prelimnary update as results are available

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
D.Tymstra/H.Mettler/T. Phillips	May 15, 2018	NAUTILUS BURNABY	MAY 16/18 @ 9:20
		ANDREA WELSINK AW	
		Q2-WORK3	

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	H. Mettler/ T. Phillips/D. Tymstra	Mobile #	
Sampler's Signature		Date/Time	May 15, 2018

sample desc: ① slightly turbid, brown, no odour, some particulates
② clear, no colour, no odour, some particulates

END OF REPORT

Toxicity testing on Line Creek Operation samples with *Ceriodaphnia dubia*, *Oncorhynchus mykiss*, *Lemna minor* and *Pseudokirchneriella subcapitata*

Fourth Quarter 2018 Results

Final Report

April 29, 2019

Submitted to: **Teck Coal Ltd.**
Sparwood, BC

8664 Commerce Court, Burnaby, BC V5A 4N7

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SIGNATURE PAGE



Report By:
Emma Marus, B. Sc.
Laboratory Biologist



Reviewed By:
James Elphick, R.P. Bio.
Environmental Toxicologist

This report has been prepared by Nautilus Environmental Company Inc. based on data and/or samples provided by our client and the results of this study are for their sole benefit. Any reliance on the data by a third party is at the sole and exclusive risk of that party. The results presented here relate only to the samples tested.

SUMMARY

Summaries of sample information and test results from the toxicity tests conducted on samples collected from the Line Creek Operations to meet requirements of the semi-annual toxicity testing program required under BC Ministry of Environment and Climate Change permit number 106970 in the fourth quarter of 2018 are provided in the tables below.

Sample and Test Type Information

Sample IDs	FR_UFR1*, GH_ER2*, LC_LCDSSLCC, LC_DC1, LC_FRDSDC, LC_DCDS, LC_LC5 and WL_BFWB_OUT_21
Sample collection date	October 30, 2018
Sample receipt date	October 31, 2018
Sample receipt temperatures	Ranged from 0.0 to 3.5°C
Test types	*Ceriodaphnia dubia* survival and reproduction 7-d rainbow trout *(Oncorhynchus mykiss)* embryo viability 7-d *Lemna minor* growth inhibition 72-h *Pseudokirchneriella subcapitata* growth inhibition

*Reference site; conducted as a single concentration toxicity test for *C. dubia, P. subcapitata* and *O. mykiss*.

Summary of Results

Endpoint	Point Estimate (with 95% CL) on percent sample basis					
	LC_LCDSSCLCC	LC_DC1	LC_FRDSDC	LC_DCDS	LC_LC5	WL_BFWB_OUT_SP21
Ceriodaphnia dubia						
Survival LC50	>100	>100	>100	>100	>100	35.4 (29.3 – 42.7)
Reproduction IC25	>100	>100	>100	>100	87.3 (51.5 – N/A)	29.1 (26.0 – 29.9)
Reproduction IC50	>100	>100	>100	>100	>100	35.0 (32.3 – 35.8)
Oncorhynchus mykiss						
Embryo viability EC25	>100	>100	>100	>100	>100	>100
Embryo viability EC50	>100	>100	>100	>100	>100	>100
Lemna minor						
Frond count IC25	82.3 (18.6 – N/A)	>97	67.3 (28.0 – 71.7)	5.8 (0.2 – 27.2)	1.2 (0.6 – 19.8)	4.0 (N/A – N/A)
Frond count IC50	>97	>97	>97	>97	78.4 (58.2 – 97)	>97
Dry weight IC25	>97	>97	>97	>97	1.5 (0.8 – N/A)	3.5 (N/A – N/A)
Dry weight IC50	>97	>97	>97	>97	>97	>97
Pseudokirchneriella subcapitata						
Growth IC25	>95.2	>95.2	>95.2	>95.2	>95.2	>95.2
Growth IC50	>95.2	>95.2	>95.2	>95.2	>95.2	>95.2

CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effective Concentration, N/A = Not Available

1.0 INTRODUCTION

Nautilus Environmental conducted toxicity tests for Teck Coal Ltd. on six samples collected from the Line Creek Operations as part of a toxicity testing program required under BC Ministry of Environment and Climate Change permit number 106970, Section 5.2. Test types included survival and reproduction of a cladoceran (*Ceriodaphnia dubia*), embryo development of rainbow trout (*Oncorhynchus mykiss*), growth of a freshwater plant (*Lemna minor*) and population growth of a unicellular green alga (*Pseudokirchneriella subcapitata*). The samples from Line Creek Operations were tested using serial dilutions of the sample using laboratory control water.

In addition to the Line Creek Operations samples, samples collected from FR_UFR1 and GH_ER2 were tested at full strength as site reference waters. FR_UFR1 and GH_ER2 are upstream reference locations that are not required as part of the Line Creek Operations testing program, but the data for these samples were included here as a basis for comparison to Line Creek Operations mine-influenced samples. These samples were tested in the *C. dubia, P. subcapitata* and *O. mykiss* embryo tests.

The toxicity tests that were conducted on the samples are summarized in Table 1. The locations of Line Creek Operations sample sites are shown in Figure 1. Samples were transported in 20-L plastic containers in coolers containing ice packs. Samples were received at temperatures ranging from 0.0 to 3.5°C and were stored in the dark at 4 ± 2°C prior to testing.

This report describes the results of the toxicity tests. Copies of laboratory data sheets and printouts of statistical analyses are provided in Appendices A through D. Results of analytical chemistry that was performed on the samples tested in this program have been uploaded to the BC Ministry of Environment and Sustainability web reporting system (EMS). Samples for water chemistry analysis were collected by Teck personnel at the same time the samples were collected for toxicity testing. The chain-of-custody forms are provided in Appendix E.

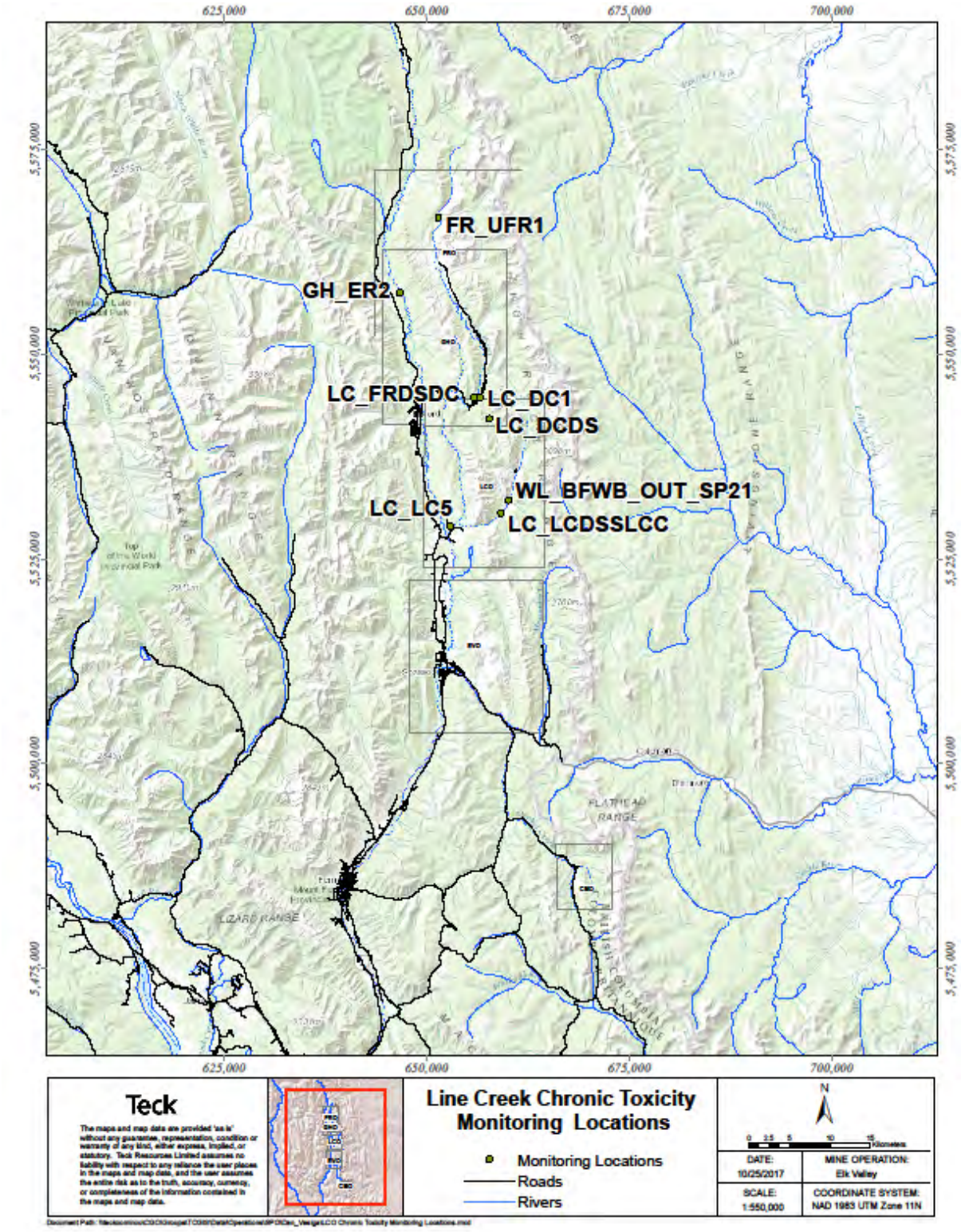
Table 1. Summary of toxicity testing program.

Sample ID	EMS #	Location Description	Species Tested	Sample Collection Date
FR_UFR1 *	216777	Fording River upstream of Henretta Creek	*C. dubia*, *O. mykiss*, and *P. subcapitata*	October 30, 2018
GH_ER2 *	200389	Elk River upstream of Greenhill Operations	*C. dubia*, *O. mykiss*, and *P. subcapitata*	October 30, 2018
LC_LCDSSLCC	297110	Line Creek downstream of South Line Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 30, 2018
LC_DC1	288270	Dry Creek near mouth	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 30, 2018
LC_FRDSDC	288272	Fording River downstream of Dry Creek	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 30, 2018
LC_DCDS	295210	Dry Creek downstream of sedimentation ponds	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 30, 2018
LC_LC5	200028	Lower Fording River (downstream of Line Creek)	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 30, 2018
WL_BFWB_OUT_SP21 #	291569	West Line Creek Active Water Treatment Facility Effluent Outfall	*C. dubia*, *O. mykiss*, *L. minor* and *P. subcapitata*	October 30, 2018

* Reference site, tested as a single concentration toxicity test.

\# Effluent sample, as opposed to the other samples which are ambient reference and receiving environment samples

Figure 1. Line Creek Operations chronic toxicity monitoring locations.



2.0 METHODS

Methods for the toxicity tests are summarized in Tables 2 through 5. Testing was conducted according to procedures described by Environment Canada protocols (2007a, 2007b; 2007c; 1998). The rainbow trout embryo viability test incorporated exposure methods described by Canaria et al. (1999), as approved by Environment Canada (1998). Statistical analyses for the tests were performed using CETIS (Tidepool Scientific Software, 2013).

Table 2. Test conditions: *Ceriodaphnia dubia* survival and reproduction test.

Test species	*Ceriodaphnia dubia*
Organism source	In-house culture
Organism age	<24 hour old neonates, produced within a 12 hour window
Test type	Static-renewal
Test duration	7 ± 1 day
Test vessel	20-mL glass test tube
Test volume	15 mL
Test solution depth	10 cm
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	10 per treatment
Number of organisms	1 per replicate
Control/dilution water	20% Perrier water and 80% deionized water + 5 µg/L Se and 2 µg/L vitamin B12
Test solution renewal	Daily (100% renewal)
Test temperature	25 ± 1°C
Feeding	Daily with *Pseudokirchneriella subcapitata* and YCT (3:1 ratio)
Light intensity	100 to 600 lux at water surface
Photoperiod	16 hours light / 8 hours dark
Aeration	None
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival and reproduction checked daily
Test protocol	Environment Canada (2007a), EPS 1/RM/21
Statistical software	CETIS Version 1.9.4.11
Test endpoints	Survival and reproduction
Test acceptability criteria for controls	≥80% survival; ≥15 young per surviving control producing three broods; ≥60% of controls producing three or more broods; no ephippia present
Reference toxicant	Sodium chloride (NaCl)

Table 3. Test conditions: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Test species	*Oncorhynchus mykiss*
Organism source	Ted's Trout (Campbell Lake), Little Fort, BC
Organism age	<30 minutes post fertilization, <24 hour old gametes
Test type	Static-renewal
Test duration	7 days
Test vessel	2-L plastic container
Test volume	2 L
Test solution depth	17 cm
Test concentrations	Five concentrations, plus laboratory control
Test replicates	4 per treatment
Number of organisms	30 per replicate
Control/dilution water	Dechlorinated Metro Vancouver municipal tap water
Test solution renewal	Daily (80% renewal)
Test temperature	14 ± 1°C
Feeding	None
Light intensity	Dark
Photoperiod	24 hours dark
Aeration	Continuous gentle aeration
Test measurements	Temperature, dissolved oxygen, pH and conductivity measured daily; hardness and alkalinity of undiluted sample measured at test initiation; survival checked daily
Test protocol	Environment Canada (1998), EPS 1/RM/28; Canaria et al. (1999)
Statistical software	CETIS Version 1.9.4.11
Test endpoints	Embryo viability
Test acceptability criteria for controls	Embryo viability ≥70%
Reference toxicant	Sodium dodecyl sulphate (SDS)

Table 4. Test conditions: *Lemna minor* growth inhibition test.

Test species	*Lemna minor*, strain CPCC# 490
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Centre, and originally isolated from Wainfleet, Stinking Barn, Niagara Peninsula, Ontario, Canada
Organism age	7- to 10-day old culture
Test type	Static
Test duration	7 days
Test vessel	250-mL glass container
Test volume	100 mL
Test solution depth	4 cm
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	4 per treatment
Number of organisms	Two 3-frond plants per replicate
Control/dilution water	Modified APHA media (deionized water plus 1% of each APHA stock solution A, B and C)
Test solution renewal	None
Test temperature	25 ± 2°C
Feeding	None
Light intensity	4000 to 5600 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature, pH and conductivity measured in all concentrations at test initiation; dissolved oxygen of highest concentration measured at test initiation; temperature and pH measured at test termination
Test protocol	Environment Canada (2007b), EPS 1/RM/37
Statistical software	CETIS Version 1.9.4.11
Test endpoints	Number of fronds and dry weight
Test acceptability criteria for controls	≥ 8-fold increase in number of fronds
Reference toxicant	Potassium chloride (KCl)

Table 5. Test conditions: *Pseudokirchneriella subcapitata* growth inhibition test.

Test species	*Pseudokirchneriella subcapitata*, strain CPCC# 37
Organism source	In-house axenic culture, obtained from Canadian Phycological Culture Center, and originally isolated from Nivelta River, Norway.
Organism age	3-to 7-day old culture in logarithmic growth phase
Test type	Static
Test duration	72 hours
Test vessel	Microplate
Test volume	220 µL
Test concentrations	Seven concentrations, plus laboratory control
Test replicates	4 per treatment; 8 for laboratory control
Number of organisms	10,000 cells/mL
Control/dilution water	Deionized water supplemented with nutrients
Test solution renewal	None
Test temperature	24 ± 2°C
Feeding	None
Light intensity	3600 to 4400 lux
Photoperiod	24 hours light
Aeration	None
Test measurements	Test area temperature measured daily; temperature and pH measured at test initiation; pH of two control wells measured at test termination
Test protocol	Environment Canada (2007c), EPS 1/RM/25
Statistical software	CETIS Version 1.9.4.11
Test endpoints	Algal cell growth inhibition
Test acceptability criteria for controls	>16-fold increase in number of algal cells; CV ≤ 20%; no trend when analyzed using Mann-Kendall test
Reference toxicant	Zinc (added as $ZnSO_4$)

3.0 RESULTS

Results of the toxicity tests and associated statistical analyses are provided in Appendices A through D, with the exception of data for FR_UFR1 and GH_ER2 (site reference waters) for *C. dubia* and *P. subcapitata*, which are reproduced here, but the raw data have been provided in a separate report (Nautilus Environmental, 2019). The statistical analyses for samples FR_UFR1 and GH_ER2 involved a comparison of performance in the site waters with the laboratory controls using a hypothesis test, since there were no dilutions tested for these samples. The results for all of the other samples are presented here on the basis of point estimates (e.g., IC25), since data were available for a range of test concentrations in these samples and this enabled statistical fitting of dose-response relationships. This approach is considered preferable to hypothesis testing in cases where the data allow, since it provides additional information about the degree of toxicity that is present in a sample. Hypothesis tests were conducted for all samples in the *P. subcapitata* test to identify stimulation in cell growth relative to the control, as specified in the test method for this species.

Results of the toxicity tests using *C. dubia* are provided in Table 6. There was no statistically significant difference in survival or reproduction for the site reference waters (FR_UFR1 and GH_ER2) relative to the laboratory control. There were adverse effects observed in two (LC_LC5 and WL_BFWB_OUT_SP21) of the six samples tested. While there was no effect on survival in sample LC_LC5, reproduction was inhibited resulting in an IC25 value of 87.3%. Both survival and reproduction was adversely effected in the effluent sample from WL_BFWB_OUT_SP21; the LC50, IC25 and IC50 values were 35.4, 29.1 and 35.0%, respectively.

Results of the toxicity tests using *O. mykiss* are provided in Table 7. There was no statistically significant difference in embryo viability for the site reference waters (FR_UFR1 and GH_ER2) compared to the laboratory control. There were no adverse effects on embryo viability in any of the samples tested.

Results of the toxicity tests using *L. minor* are provided in Table 8; the highest test concentration was 97% as a result of dilution associated with addition of nutrients, as required in the method. An adverse effect on frond count was observed in all samples except for sample LC_DC1; the IC25 values for LC_LCDSSLCC, LC_FRDSDC, LC_DCDS, LC_LC5 and WL_BFWB_OUT_SP21 were 82.3, 67.3, 5.8, 1.2 and 4.0%, respectively. An adverse effect on dry weight was observed in two samples; the IC25 values for LC_LC5 and WL_BFWB_OUT_SP21 were 1.5 and 3.5%, respectively. Although IC25 values less than 10% sample were observed in some samples, the dose-response curves were generally quite flat in these tests; only one test produced an IC50, which was for number of fronds in LC_LC5. Thus, the relatively low IC25 values, without considering the

context of the shape of the dose-response relationships, appears to overstate the degree of adverse response associated with the samples.

Results of the toxicity tests using *P. subcapitata* are provided in Table 9; the highest test concentration was 95.2% as a result of dilution associated with addition of nutrients, as required in the method. Growth enhancement was observed in all samples, including in the site reference waters (FR_UFR1 and GH_ER2); there was no statistically significant reduction in cell yield for the site reference waters relative to the laboratory control and the IC25 values for cell yield in the samples were all >95.2%. This finding is not unusual, since the higher ionic strength associated with the site waters would be expected to stimulate cell growth of this species relative to the very low ionic strength associated with the laboratory control water.

Table 6. Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	FR_UFR1		GH_ER2		LC_LCDSSLCC		LC_DC1	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	90	18.9 ± 4.1	90	18.9 ± 4.1	100	18.3 ± 4.1	100	22.9 ± 2.0
1.56	NT	NT	NT	NT	100	17.0 ± 4.3	100	23.0 ± 1.6
3.12	NT	NT	NT	NT	100	17.0 ± 5.1	100	23.2 ± 2.0
6.25	NT	NT	NT	NT	100	20.1 ± 4.1	100	24.2 ± 1.5
12.5	NT	NT	NT	NT	90	20.1 ± 4.1	100	24.2 ± 2.5
25	NT	NT	NT	NT	100	15.7 ± 5.4	100	24.0 ± 3.1
50	NT	NT	NT	NT	100	15.0 ± 4.9	100	23.4 ± 2.5
100	90	21.0 ±7.1	100	21.4 ±7.4	100	19.2 ± 2.0	100	20.6 ± 5.7
Test endpoint (% v/v) [with 95% CL]								
LC50	--	--	--	--	>100	--	>100	--
IC25	--	--	--	--	--	>100	--	>100
IC50	--	--	--	--	--	>100	--	>100

NT = Not Tested, SD = Standard Deviation, CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration,
% v/v = percent calculated on a volume by volume basis

Table 6 (continued). Results: *Ceriodaphnia dubia* survival and reproduction test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5		WL_BFWB_OUT_SP21	
	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)	Survival (%)	Reproduction (Mean ± SD)
Laboratory Control	100	21.8 ± 1.5	100	22.3 ± 1.1	100	20.3 ± 3.9	100	19.0 ± 3.2
1.56	100	20.3 ± 1.9	100	22.9 ± 2.1	100	21.7 ± 1.8	100	19.4 ± 5.0
3.12	90	17.1 ± 5.7	100	22.0 ± 5.9	100	20.7 ± 1.9	100	23.8 ± 3.5
6.25	100	17.4 ± 3.4	100	22.9 ± 2.2	100	21.2 ± 1.9	100	23.7 ± 3.1
12.5	90	17.9 ± 3.1	100	22.8 ± 2.3	100	19.2 ± 4.1	90	21.9 ± 8.6
25	100	20.8 ± 2.6	100	21.4 ± 7.2	100	21.8 ± 2.9	100	20.6 ± 4.6
50	100	21.0 ± 2.6	100	23.1 ± 4.6	100	18.8 ± 3.7	10	0.3 ± 0.9
100	100	18.8 ± 1.4	100	19.0 ± 4.3	100	15.0 ± 4.4	0	0.0 ± 0.0
Test endpoint (% v/v) [with 95% CL]								
LC50	>100	--	>100	--	>100	--	35.4 (29.3 – 42.7)	--
IC25	--	>100	--	>100	--	87.3 (51.5 – N/A)	--	29.1 (26.0 – 29.9)
IC50	--	>100	--	>100	--	>100	--	35.0 (32.3 – 35.8)

SD = Standard Deviation, CL = Confidence Limits, LC = Lethal Concentration, IC = Inhibition Concentration, N/A = Not Available.
% v/v = percent calculated on a volume by volume basis

Table 7. Results: rainbow trout (*Oncorhynchus mykiss*) embryo viability test.

Concentration (% v/v)	Embryo Viability (%) (Mean ± SD)							
	FR_UFR1	**GH_ER2**	**LC_LCDSSLCC**	**LC_DC1**	**LC_FRDSDC**	**LC_DCDS**	**LC_LC5**	**WL_BFWB_OUT_21**
Laboratory Control	90.8 ± 14.2	90.8 ± 14.2	89.2 ± 8.8	90.8 ± 9.6	91.7 ± 12.6	92.5 ± 6.9	85.0 ± 19.3	86.7 ± 22.4
6.25	NT	NT	90.0 ± 11.2	93.3 ± 11.2	89.2 ± 17.3	88.3 ± 12.9	89.2 ± 13.2	84.2 ± 18.9
12.5	NT	NT	92.5 ± 8.8	90.0 ± 13.6	91.7 ± 14.5	87.4 ± 18.5	89.7 ± 13.8	88.4 ± 16.9
25	NT	NT	90.8 ± 10.3	88.3 ± 12.9	86.7 ± 15.6	85.8 ± 12.9	89.2 ± 12.9	87.3 ± 13.0
50	NT	NT	86.7 ± 11.9	88.9 ± 11.4	88.1 ± 15.5	82.5 ± 18.1	88.3 ± 12.3	85.0 ± 27.8
100	85.0 ± 23.5	83.3 ± 17.8	87.5 ± 15.0	86.8 ± 11.2	81.8 ± 16.0	79.8 ± 2.4	89.2 ± 15.2	94.2 ± 9.6
Test endpoint (% v/v) [with 95% CL]								
EC25	--	--	>100	>100	>100	>100	>100	>100
EC50	--	--	>100	>100	>100	>100	>100	>100

NT = Not Tested, SD = Standard Deviation, EC = Effective Concentration, CL = Confidence Limits
% v/v = percent calculated on a volume by volume basis

Table 8. Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_LCDSSLCC		LC_DC1		LC_FRDSDC	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	50.2 ± 5.9	5.0 ± 0.4	84.8 ± 7.5	6.9 ± 0.6	87.2 ± 9.5	7.1 ± 0.9
1.5	46.8 ± 3.8	5.0 ± 0.6	94.2 ± 18.6	7.0 ± 1.0	97.8 ± 9.3 †	7.5 ± 0.9†
3.0	46.8 ± 3.6	4.6 ± 0.5	84.0 ± 10.4	6.4 ± 0.8	113.2 ± 9.8 †	8.4 ± 0.7 †
6.1	45.2 ± 5.4	4.5 ± 0.4	98.8 ± 19.8	7.6 ± 1.5	99.8 ± 10.4 †	7.8 ± 0.8 †
12.1	45.5 ± 3.9	4.7 ± 0.6	86.0 ± 13.2	7.0 ± 0.7	102.0 ± 9.4 †	7.9 ± 0.8 †
24.2	43.8 ± 3.7	4.3 ±0.2	85.8 ± 11.5	7.0 ± 0.7	91.5 ± 12.3 †	7.6 ± 0.8 †
48.5	41.5 ± 2.4	4.5 ± 0.3	65.2 ± 15.7	5.5 ± 1.5	83.2 ± 21.9	7.1 ± 2.0
97	36.5 ± 4.4	4.8 ± 0.1	71.0 ± 11.7	6.7 ± 0.9	45.5 ± 2.5	5.7 ± 0.4
Test endpoint (% v/v) [with 95% CL]						
IC25	82.3 (18.6 – N/A)	>97	>97	>97	67.3 (28.0 – 71.7)	>97
IC50	>97	>97	>97	>97	>97	>97

SD = Standard Deviation, CL = Confidence Limits, IC = Inhibition Concentration, N/A = Not Available

% v/v = percent calculated on a volume by volume basis

† = the data did not fit the hormesis regression model; therefore growth was adjusted to that of the control value and analyzed using linear interpolation

Table 8 (continued). Results: *Lemna minor* growth inhibition test.

Concentration (% v/v)	LC_DCDS		LC_LC5		WL_BFWB_OUT_SP21	
	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)	Fronds (Mean ± SD)	Dry Weight (mg) (Mean ± SD)
Laboratory Control	99.5 ± 18.6	7.5 ± 1.1	109.0 ± 14.8	8.4 ± 1.1	58.2 ± 11.8	5.9 ± 0.7
1.5	96.5 ± 11.0	7.7 ± 1.0	73.2 ± 8.7	6.0 ± 0.4	49.8 ± 2.4	4.6 ± 0.3
3.0	81.2 ± 14.6	6.5 ± 1.1	73.8 ± 14.2	6.2 ± 0.6	44.8 ± 2.8	4.4 ± 0.4
6.1	68.0 ± 6.5	5.6 ± 0.4	82.2 ± 12.3	6.6 ± 0.6	42.0 ± 4.1	4.2 ± 0.3
12.1	80.2 ± 11.4	6.7 ± 0.9	69.2 ± 3.9	6.2 ± 0.2	41.8 ± 3.6	4.0 ± 0.6
24.2	61.5 ± 3.3	5.8 ± 0.3	68.8 ± 2.1	6.1 ± 0.2	41.8 ± 6.2	4.4 ± 0.5
48.5	54.5 ± 5.4	5.4 ± 0.8	79.5 ± 11.9	6.9 ± 0.9	37.8 ± 7.9	3.9 ± 1.0
97	50.2 ± 6.0	6.1 ± 1.1	46.5 ± 3.9	5.8 ± 0.3	39.8 ± 8.8	4.8 ± 0.7
Test endpoint (% v/v) [with 95% CL]						
IC25	5.8 (0.2 – 27.2)	>97	1.2 (0.6 – 19.8)	1.5 (0.8 – N/A)	4.0 (N/A – N/A)	3.5 (N/A – N/A)
IC50	>97	>97	78.4 (58.2 – 97)	>97	>97	>97

SD = Standard Deviation, CL = Confidence Limits, IC = Inhibition Concentration, N/A = Not Available
% v/v = percent calculated on a volume by volume basis

Table 9. Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	FR_UFR1		GH_ER2		LC_LCDSSLCC		LC_DC1	
	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)	Cell Yield x10^4 (Mean ± SD)	Stimulation (%)
Laboratory Control	28.8 ± 2.1	--	28.8 ± 2.1	--	29.1 ± 2.7	--	29.2 ± 2.1	--
1.5	NT	NT	NT	NT	41.8 ± 3.6	43.4	40.0 ± 4.1	36.8
3.0	NT	NT	NT	NT	47.8 ± 1.7	64.0	49.5 ± 3.9	69.2
6.0	NT	NT	NT	NT	72.8 ± 4.4	149.8	64.5 ± 3.7	120.5
11.9	NT	NT	NT	NT	113.0 ± 7.0	288.0	97.8 ± 8.5	234.2
23.8	NT	NT	NT	NT	111.0 ± 4.8	281.1	138.2 ± 7.5	372.6
47.6	NT	NT	NT	NT	100.0 ± 4.3	243.3	139.2 ± 8.0	376.1
95.2	109.1 ± 6.8	--	104.8 ± 6.0	--	87.8 ± 5.2	201.3	122.2 ± 5.4	317.9
Test endpoint (% v/v)								
IC25	--	--	--	--	>95.2	--	>95.2	--
IC50	--	--	--	--	>95.2	--	>95.2	--

NT = Not Tested, SD = Standard Deviation, IC = Inhibition Concentration
% v/v = percent calculated on a volume by volume basis

Table 9 (continued). Results: *Pseudokirchneriella subcapitata* growth inhibition test.

Concentration (% v/v)	LC_FRDSDC		LC_DCDS		LC_LC5		WL_BFWB_OUT_SP21	
	Cell Yield $x10^4$ (Mean ± SD)	Stimulation (%)	Cell Yield $x10^4$ (Mean ± SD)	Stimulation (%)	Cell Yield $x10^4$ (Mean ± SD)	Stimulation (%)	Cell Yield $x10^4$ (Mean ± SD)	Stimulation (%)
Laboratory Control	29.6 ± 2.0	--	31.2 ± 3.0	--	29.5 ± 2.1	--	29.1 ± 2.2	--
1.5	44.2 ± 3.3	49.4	37.8 ± 3.3	20.8	41.2 ± 3.6	39.8	54.0 ± 3.7	85.4
3.0	49.5 ± 6.5	67.1	49.0 ± 2.9	56.8	50.2 ± 3.0	70.3	78.2 ± 5.9	168.7
6.0	60.0 ± 3.9	102.5	59.2 ± 3.9	89.6	69.0 ± 1.8	133.9	112.8 ± 12.6	287.1
11.9	103.2 ± 5.5	248.5	101.2 ± 6.2	224.0	104.2 ± 9.0	253.4	127.2 ± 5.4	336.9
23.8	107.0 ± 13.3	261.2	119.8 ± 3.8	283.2	128.8 ± 2.6	336.4	123.2 ± 5.0	323.2
47.6	114.2 ± 9.1	285.7	120.5 ± 2.6	285.6	137.8 ± 2.2	366.9	112.5 ± 3.4	286.3
95.2	99.8 ± 6.2	236.7	100.8 ± 8.3	222.4	101.8 ± 3.8	244.9	73.8 ± 12.5	153.2
Test endpoint (% v/v)								
IC25	>95.2	--	>95.2	--	>95.2	--	>95.2	--
IC50	>95.2	--	>95.2	--	>95.2	--	>95.2	--

SD = Standard Deviation, IC = Inhibition Concentration
% v/v = percent calculated on a volume by volume basis

4.0 QA/QC

The health histories of the test organisms used in the exposures were acceptable and met the requirements of the Environment Canada protocols. The tests met all control acceptability criteria and water quality parameters remained within the ranges specified in the protocols throughout the tests. Uncertainty associated with these tests is best described by the standard deviations around the means.

The eggs in the rainbow trout embryo test were exposed using a blocked design (i.e., eggs from one fish was used for replicate A of each test concentration, eggs from the second fish for replicate B, and so on); this approach deviates from the Environment Canada test method, which indicates that the eggs should be pooled prior to testing. This modification was considered appropriate because it reduces the risk of non-viable eggs affecting the test results, and can allow for exclusion of all data in a particular replicate during statistical analysis. There were no other deviations from the test methodologies.

Results of the reference toxicant tests conducted during the testing program are summarized in Table 10. Results for these tests fell within the acceptable range for organism performance of mean and two standard deviations, based on historical results obtained by the laboratory with these tests. Thus, the sensitivity of the organisms used in these tests was appropriate. The reference toxicant tests were performed under the same conditions as those used for the samples.

Table 10. Reference toxicant test results.

Test Species	Endpoint	Historical Mean (2 SD Range)	CV (%)	Test Date
C. dubia	Survival (LC50): 1.4 g/L NaCl	1.5 (1.1 – 2.1)	11	November 14, 2018
	Reproduction (IC50): 1.4 g/L NaCl	1.3 (0.9 – 1.7)	10	
O. mykiss	Viability (EC50): 3.0 mg/L SDS	4.1 (2.1– 7.9)	34	October 31, 2018
L. minor	Number of fronds (IC50): 3.6 g/L KCl	3.5 (2.9 – 4.2)	10	October 22, 2018
P. subcapitata	Growth (IC50): 34.8 µg/L Zn	30.9 (25.8 – 37.0)	9	October 22, 2018

SD = Standard Deviation, CV = Coefficient of Variation, LC = Lethal Concentration, IC = Inhibition Concentration, EC = Effect Concentration

5.0 REFERENCES

Canaria EC, Elphick JR, Bailey HC. 1999. A simplified procedure for conducting small-scale short-term embryo toxicity tests with salmonids. Environ Toxicol 14:301-307.

Environment Canada. 1998. Biological test method: toxicity tests using early life stages of salmonid fish (rainbow trout). Environmental Protection Series EPS 1/RM/28. Second Edition, July 1998. Environment Canada, Method Development and Application Section, Environmental Technology Centre, Ottawa, ON. 102 pp.

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Environment Canada. 2007b. Biological test method: tests for measuring the inhibition of growth using the freshwater macrophyte, *Lemna minor*. Environmental Protection Series, Report EPS 1/RM/37. Second Edition. January 2007. Environment Canada, Method Development and Application Section, Environmental Technology Centre, Ottawa, ON. 112 pp.

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Nautilus Environmental. 2019. Toxicity testing on Elk Valley samples with *Ceriodaphnia dubia, Pseudokirchneriella subcapitata, Hyalella azteca, Pimephales promelas* and *Oncorhynchus mykiss*: Fourth Quarter 2018 results. Final Report, April 29, 2019.

Tidepool Scientific Software. 2013. CETIS comprehensive environmental toxicity information system, version 1.9.4.11 Tidepool Scientific Software, McKinleyville, CA. 222 pp.

APPENDIX A – *Ceriodaphnia dubia* Toxicity Test Data

Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 1819-0383-01

Start Date/Time: 2018/11/01 1510
Set up by: ST

Sample Information:

Sample ID: LC-LCDSSLCC
Sample Date: 2018/10/30
Date Received: 2018/11/01
Sample Volume: 3 x 2L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: Thursday B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 22
Mortality (%) in previous 7 d: 0
Individual female # used ≥8 young on test day: 11

NaCl Reference Toxicant Results:

Reference Toxicant ID: ~~NA~~ QA241
Stock Solution ID: N/A
Date Initiated: 2018/11/14

7-d LC50 (95% CL): 1.4 (1.0-2.0) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.4-1.4) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 1.5 (1.1-2.1) g/L NaCL CV (%): 10.9
7-d IC50 Reference Toxicant Mean and Historical Range: 1.3 (0.9-1.7) g/L NaCL CV (%): 10.1

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: [illegible]
Date reviewed: 2019/02/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAn104 Reference 1819-0383-01

Test Log

Date	Day	Time	Technician	Chem. Cart Used	Daily Data Review	Subsample Used	
2018/11/01	0	1510	ST	2	ED	Days 0 - 2	✓
2018/11/02	1	0950	AP	2	IW	Days 0 - 2	✓
2018/11/03	2	1145	MW	2	CB	Days 0 - 2	✓
2018/11/04	3	1115	LF	2	AP	Days 3 - 5	✓
2018/11/05	4	1100	FO	2	LF	Days 3 - 5	✓
2018/11/06	5	1150	MW	3	AP	Days 3 - 5	✓
2018/11/07	6	0815	NC	2	ED	Days 6 - 8	✓
2018/11/08	7	1030	LF	2	IW	Days 6 - 8	✓ LF
	8					-	

Sample Information

Initial pH: 8.1
Initial EC (µS/cm): 300
Initial DO (mg/L): 9.9
Initial Temp (°C): 20.2

Filtered with 60 µm nitex screen Yes/No

Sample pre-aerated/hardness/pH adjust: Yes/No

*if yes, describe procedure, rate and duration

Test Specifics

Food expiration: 11/25

Dilution water vessel and preparation date: #4 10/28 ; #5 10/29, #3 10/31, #2 10/31 #4 11/01, #5 11/03, #4 11/05

Control Validity Day 7

Cup	Number of Young	Number of Broods
1	21	3
2	18	↓
3	21	↓
4	19	↓
5	11	2
6	19	3
7	19	↓
8	23	↓
9	11	2
10	21	3

Average # of Young: 18

% with ≥ 3 Broods: 80

Control Mortality: 0.1
(must be ≤20%)

Reproduction Validity Criteria: the average number of young produced in first three broods is ≥ 15, when 60% of control organsims had 3 or more broods: **Yes** / **No**

Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAU104 Reference 1819-0383-01

Chemistry

pH (units) (range: 6.5-8.5)

Conc. (%)	New Solutions								Old Solutions							
Day	CTL	1.6	3.1	6.3	13	25	50	100	CTL	1.6	3.1	6.3	13	25	50	100
0	8.1	8.2	8.2	8.2	8.2	8.2	8.2	8.1								
1	8.0	8.1	8.1	8.1	8.1	8.2	8.2	8.3	8.3	8.2	8.2	8.2	8.2	8.3	8.3	8.3
2	8.0	8.1	8.1	8.1	8.1	8.2	8.3	8.3	8.2	8.1	8.2	8.2	8.2	8.3	8.3	8.4
3	8.1	8.1	8.1	8.2	8.2	8.2	8.3	8.3	8.1	8.1	8.1	8.1	8.1	8.2	8.3	8.4
4	8.1	8.0	8.1	8.1	8.0	8.0	8.3	8.3	8.4	8.1	8.1	8.1	8.1	8.0	8.0	8.3
5	8.0	8.0	8.0	8.1	8.1	8.2	8.2	8.2	8.0	8.0	8.0	8.0	8.0	8.1	8.2	8.2
6	7.9	7.9	8.0	8.0	8.0	8.0	8.1	8.2	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.1
7									7.9	8.0	8.0	8.0	8.0	8.1	8.1	8.1
8																

Conductance (µS/cm)

Day	New Solutions								Old Solutions							
0	203	218	229	249	271	369	511	780								
1	214	216	224	251	299	374	511	790	229	228	235	253	293	369	512	781
2	188	203	214	237	283	367	522	815	210	220	232	255	302	378	526	797
3	201	219	231	252	298	381	541	842	204	209	219	242	284	362	510	785
4	200	216	228	254	295	378	533	800	212	225	236	266	315	368	540	788
5	201	213	226	250	294	380	540	823	203	217	232	256	300	387	550	830
6	202	217	229	254	297	380	539	803	213	227	239	251	288	371	521	781
7									206	221	232	256	301	382	530	816
8																

Dissolved Oxygen (mg/L) (40-100% saturation)

Day	New Solutions								Old Solutions							
0	7.3	7.3	7.3	7.3	7.3	7.3	8.0	8.5								
1	7.3	7.3	7.3	7.3	7.4	7.4	7.5	7.5	7.3	7.3	7.3	7.5	7.5	7.5	7.5	7.5
2	7.3	7.3	7.3	7.3	7.6	7.6	7.7	7.7	7.3	7.3	7.4	7.5	7.5	7.4	7.4	7.5
3	7.5	7.6	7.5	7.5	7.3	7.3	7.3	7.3	7.2	7.2	7.1	7.1	7.0	7.0	7.0	7.1
4	7.5	7.5	7.5	7.5	7.5	7.5	7.6	7.7	7.2	7.2	7.2	7.2	7.0	7.0	7.2	7.1
5	7.6	7.7	7.8	7.8	7.8	7.8	7.8	7.8	7.3	7.3	7.3	7.2	7.2	7.1	7.1	7.1
6	7.2	7.3	7.3	7.8	7.8	8.0	8.1	8.1	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
7									7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.2
8																

Temperature 24 - 26 (°C)

Day	New Solutions								Old Solutions							
0	24	24	24	24	24	24	24	24								
1	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
4	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
7									24	24	24	24	24	24	24	24
8																

DO Levels (40-100% saturation)* -
2.9 to 7.3 mg/L at 24°C
2.9 to 7.2 mg/L at 25°C
2.8 to 7.1 mg/L at 26°C

*corrected for altitude

Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

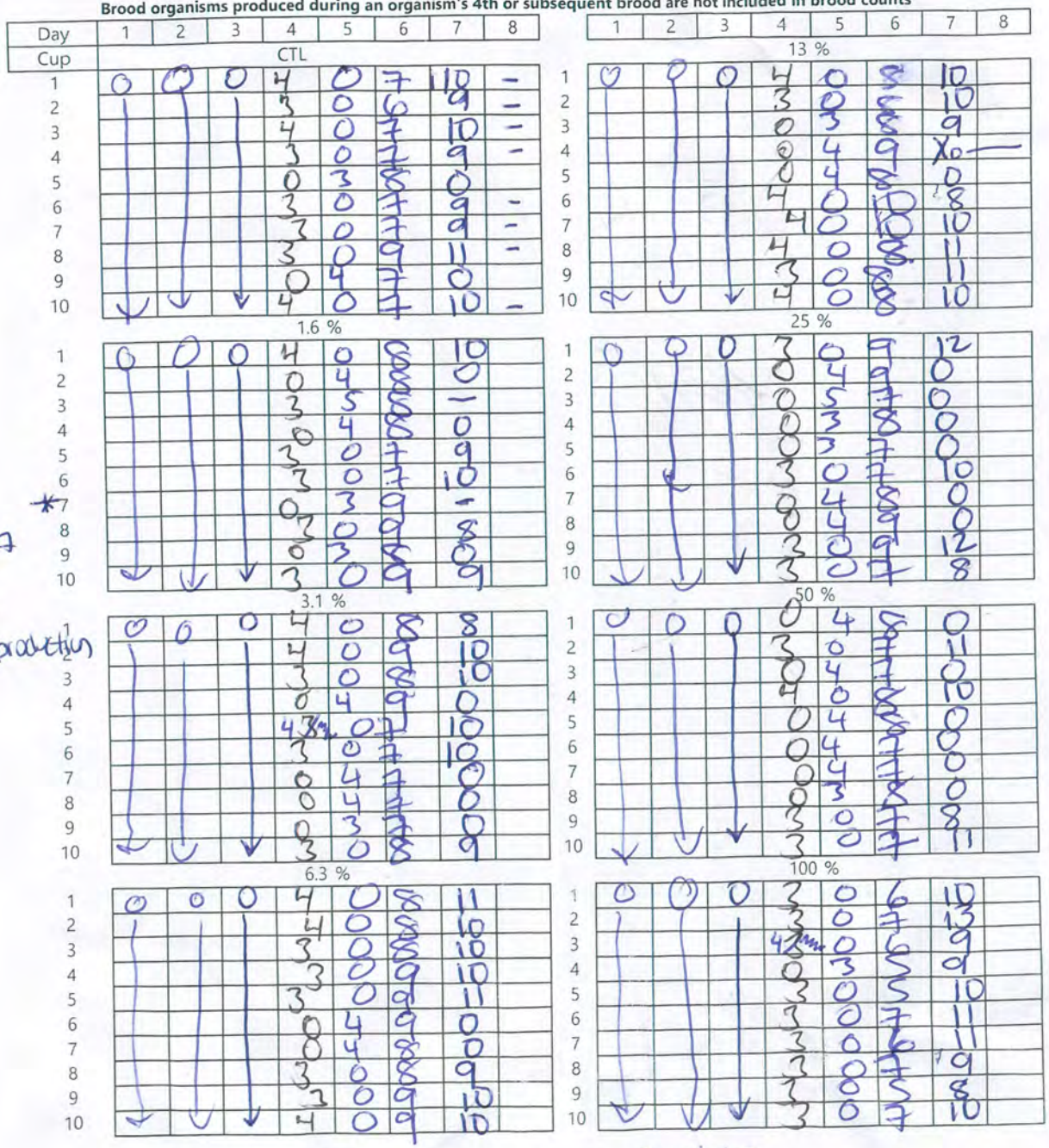
Ceriodaphnia Bench Sheet

Method CDD Client NAU104 Reference 1819-0383-01

Biology

(#, young produced; 0, no young; X, dead; X#, young produced-dead; —,young produced after 3rd brood)

Brood organisms produced during an organism's 4th or subsequent brood are not included in brood counts



rep not counted day 7 to exclude from reproduction stats.

Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Test Organism Information

Client: NAU 004

Culture history for adults used in the test for sample reference: 1819-0383-01

Day Used: 2018 11 01

Test organisms appeared healthy before use: (Yes)/No

Number of young produced per brood adult within first three broods:

Brood	row/replicate	A2	A3	A6	B1	B2	B3	B4	B5			

Culture(s) Used for Testing: Thursday B 20150921

number of young	4 ST										
number of young	ST 64	4	3	3	4	3	4	5			
number of young	6	8	7	8	9	6	9	9			
number of young	11	14	10	11	9	8	11	10			

Number of Adults Alive in Culture	7 days prior: 25	day used: 25

Notes: all cups have 1 adult

Average No. of young in first 3 broods: 22
(must be ≥15)

Culture % mortality (7-days prior to testing): 0/.
(must be ≤20%)

Number of young produced by each brood organism in last complete brood: 11
(must be ≥8)

Reviewed By: JP Date Reviewed: 2018/11/13

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	14-5364-1048	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Nov-18 7:32	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	02-7397-3348	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sara Thiessen
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	08 Nov-18	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24
Sample ID:	04-3112-3815	**Code:**	1819-0383-01	**Project:**	
Sample Date:	30 Oct-18	**Material:**	Water Sample	**Source:**	Nautilus Environmental
Receipt Date:	01 Nov-18	**CAS (PC):**		**Station:**	LC_LCDSSLCC
Sample Age:	48h (16 °C)	**Client:**	Nautilus Environmental		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	662263	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
LC5	>100	n/a	n/a	<1	n/a	n/a
LC10	>100	n/a	n/a	<1	n/a	n/a
LC15	>100	n/a	n/a	<1	n/a	n/a
LC20	>100	n/a	n/a	<1	n/a	n/a
LC25	>100	n/a	n/a	<1	n/a	n/a
LC40	>100	n/a	n/a	<1	n/a	n/a
LC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	N	10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
1.6		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
3.2		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
6.3		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
12		10	0.9000	0.0000	1.0000	0.3162	35.14%	10.0%	9/10	0.975	2.5%
25		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.975	2.5%
50		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.975	2.5%
100		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.975	2.5%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.6		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3.2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12		1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

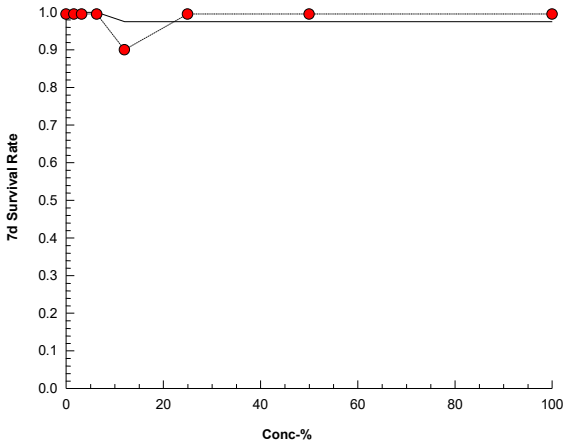
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.6		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12		1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	14-5364-1048	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Nov-18 7:32	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	02-5306-3146	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4		
Analyzed:	23 Nov-18 13:35	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1		
Batch ID:	02-7397-3348	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sara Thiessen		
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	Mod-Hard Synthetic Water		
Ending Date:	08 Nov-18	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	04-3112-3815	**Code:**	1819-0383-01	**Project:**			
Sample Date:	30 Oct-18	**Material:**	Water Sample	**Source:**	Nautilus Environmental		
Receipt Date:	01 Nov-18	**CAS (PC):**		**Station:**	LC_LCDSSLCC		
Sample Age:	48h (16 °C)	**Client:**	Nautilus Environmental				

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1743479	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	1.997	3.302	1.0000	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	17.33	0.6863	n/a	5.771	n/a	145.7
IC10	24.84	2.576	n/a	4.026	n/a	38.81
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Reproduction Summary

			Calculated Variate						Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**Mean**	**%Effect**
0	N	10	18.3	11	23	4.111	22.46%	0.0%	18.5	0.0%
1.6		9	17	11	22	4.33	25.47%	7.1%	18.5	0.0%
3.2		10	17	10	23	5.077	29.87%	7.1%	18.5	0.0%
6.3		10	20.1	12	23	4.122	20.51%	-9.84%	18.5	0.0%
12		10	20.1	12	24	4.149	20.64%	-9.84%	18.5	0.0%
25		10	15.7	10	24	5.355	34.11%	14.21%	16.63	10.09%
50		10	15	11	22	4.853	32.36%	18.03%	16.63	10.09%
100		10	19.2	16	23	1.989	10.36%	-4.92%	16.63	10.09%

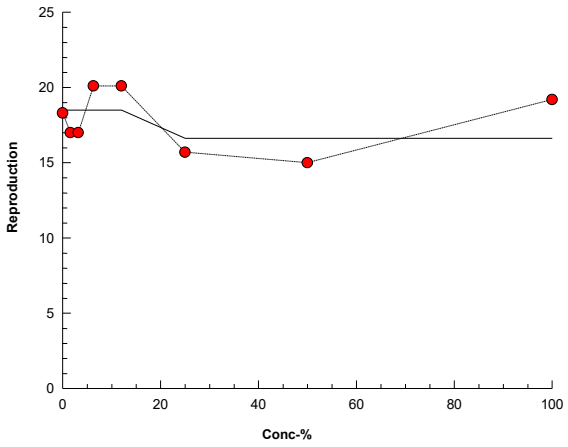
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	21	18	21	19	11	19	19	23	11	21
1.6		22	12	16	12	19	20	20	11	21	
3.2		20	23	21	13	21	20	11	11	10	20
6.3		23	22	21	22	23	13	12	20	22	23
12		22	21	20	13	12	22	24	23	22	22
25		24	13	12	11	10	20	12	13	24	18
50		12	21	11	22	12	11	11	11	18	21
100		19	23	19	17	18	21	20	19	16	20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	02-5306-3146	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	23 Nov-18 13:35	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 1819-0383-02

Start Date/Time: 2018/11/01 1525
Set up by: CB

Sample Information:

Sample ID: LC-LCS
Sample Date: 2018/10/30
Date Received: 2018/11/01
Sample Volume: 3 x 2L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: Thursday B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 22
Mortality (%) in previous 7 d: 0%
Individual female # used ≥8 young on test day: 11

NaCl Reference Toxicant Results:

Reference Toxicant ID: QA241
Stock Solution ID: NIA
Date Initiated: 2018/11/14

7-d LC50 (95% CL): 1.4 (1.0 - 2.0) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.4 - 1.4) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 1.5 (1.1-2.1) g/L NaCL CV (%): 10.9
7-d IC50 Reference Toxicant Mean and Historical Range: 1.3 (0.9-1.7) g/L NaCL CV (%): 10.1

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		87.3 (51.5-NA)
IC50 % (v/v) (95% CL)		>100

Reviewed by: [illegible]
Date reviewed: 2019/02/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method COD Client NAU104 Reference 1819-0383-02

Test Log

Date	Day	Time	Technician	Chem. Cart Used	Daily Data Review	Subsample Used	
2018/11/01	0	1525	CB	2	KU	Days 0 - 2	✓
2018/11/02	1	0850	MM	2	KU	Days 0 - 2	✓
2018/11/03	2	1100	MM	2	CB	Days 0 - 2	✓
2018/11/04	3	1415	AP	2	ST	Days 3 - 5	✓
2018/11/05	4	1120	ED	2	LF	Days 3 - 5	✓
2018/11/06	5	1130	KU	2	AP	Days 3 - 5	✓
2018/11/07	6	1105	AP	2	ST	Days 6 - 8	✓
2018/11/08	7	1020	ST	2	AP	Days 6 - 8	✓ AP
	8					-	

Sample Information

Initial pH: 8.2
Initial EC (µS/cm): 703
Initial DO (mg/L): 9.2
Initial Temp (°C): 20.0
Filtered with 60 µm nitex screen Yes/No
Sample pre-aerated/hardness/pH adjust: Yes/No
*if yes, describe procedure, rate and duration

Test Specifics

Food expiration: 11/25

Dilution water vessel and preparation date: #4 10/28 #5 10/29, #3 10/31, 2 10/31 #4 11/01, #5 11/03, #4 11/05

Cup	Control Validity Day 7 Number of Young	Number of Broods
1	22	3
2	21	3
3	24	3
4	16	3
5	23	3
6	20	3
7	11	2
8	21	3
9	22	3
10	23	3

Average # of Young: 20

% with ≥ 3 Broods: 90 %

Control Mortality: 0 %
(must be ≤20%)

Reproduction Validity Criteria: the average number of young produced in first three broods is ≥ 15, when 60% of control organsims had 3 or more broods: **Yes** / **No**

Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAU104 Reference 1819-0383-02

Chemistry

pH (units) (range: 6.5-8.5)

Conc. (%) / Day	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
0	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1								
1	8.1	8.1	8.1	8.1	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2
2	8.1	8.1	8.1	8.1	8.2	8.2	8.2	8.2	8.3	8.3	8.2	8.3	8.3	8.3	8.3	8.2
3	8.1	8.1	8.1	8.1	8.1	8.1	8.2	8.2	8.2	8.1	8.1	8.1	8.1	8.1	8.2	8.1
4	8.1	8.1	8.1	8.1	8.1	8.1	8.2	8.2	8.0	8.2	8.2	8.1	8.1	8.1	8.1	8.1
5	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.0	8.0	8.0	8.0	8.1	8.1	8.0
6	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.1	7.9	8.0	8.0	8.0	8.0	8.0	8.0	8.0
7	7.8	7.9*							7.8	7.9	7.9	7.9	7.9	8.0	8.0	8.0
8																

Conductance (µS/cm)

Conc. (%) / Day	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
0	249	251	234	244	280	343	469	688								
1	223	218	225	242	281	350	468	684	226	224	230	265	281	344	464	684
2 mm	147	142	207	212					214	219	231	250	284	355	481	703 mm
2	187	201	215	240	269	337	472	714	202	205	213	231	267	333	454	668
3	201	205	225	244	280	344	471	730	209	210	215	244	285	348	466	689
4 mm	202	214	225	242	280	344	472	734	213	219	231	248	286	353	481	695
5	196	213	225	243	283	346	470	708	204	217	228	247	281	350	470	689
6	203	217	227	245	280	350	472	685	205	219	230	250	282	348	468	703
7	205	219*														
8																

Dissolved Oxygen (mg/L) (40-100% saturation)

Conc. (%) / Day	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
0	7.3	7.5	7.7	7.8	7.8	7.8	7.7	7.9								
1	7.3	7.3	7.3	7.3	7.3	7.7	7.3	7.8	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
2	7.3	7.3	7.3	7.3	7.3	7.6	7.7	7.9	7.3	7.3	7.3	7.3	7.3	7.4	7.4	7.4
3	7.4	7.4	7.4	7.4	7.5	7.4	7.4	7.4	7.4	7.4	7.4	7.3	7.3	7.3	7.3	7.3
4	7.5	7.5	7.5	7.5	7.5	7.4	7.5	7.5	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
5	7.5	7.5	7.5	7.6	7.7	7.8	7.8	7.8	7.0	7.0	7.0	7.0	7.0	7.0	6.9	6.9
6	7.4	7.4	7.5	7.7	7.7	7.7	7.8	7.9	7.1	7.2	7.3	7.3	7.3	7.3	7.3	7.3
7	7.2*								7.2	7.0	7.0	7.0	7.0	7.0	6.9	7.1
8																

Temperature 24 - 26 (°C)

Conc. (%) / Day	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
0	24	24	24	24	24	24	24	24								
1	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
4	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
7	24	24							24	24	24	24	24	24	24	25
8																

DO Levels (40-100% saturation)* -
2.9 to 7.3 mg/L at 24°C
2.9 to 7.2 mg/L at 25°C
2.8 to 7.1 mg/L at 26°C

*corrected for altitude

Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

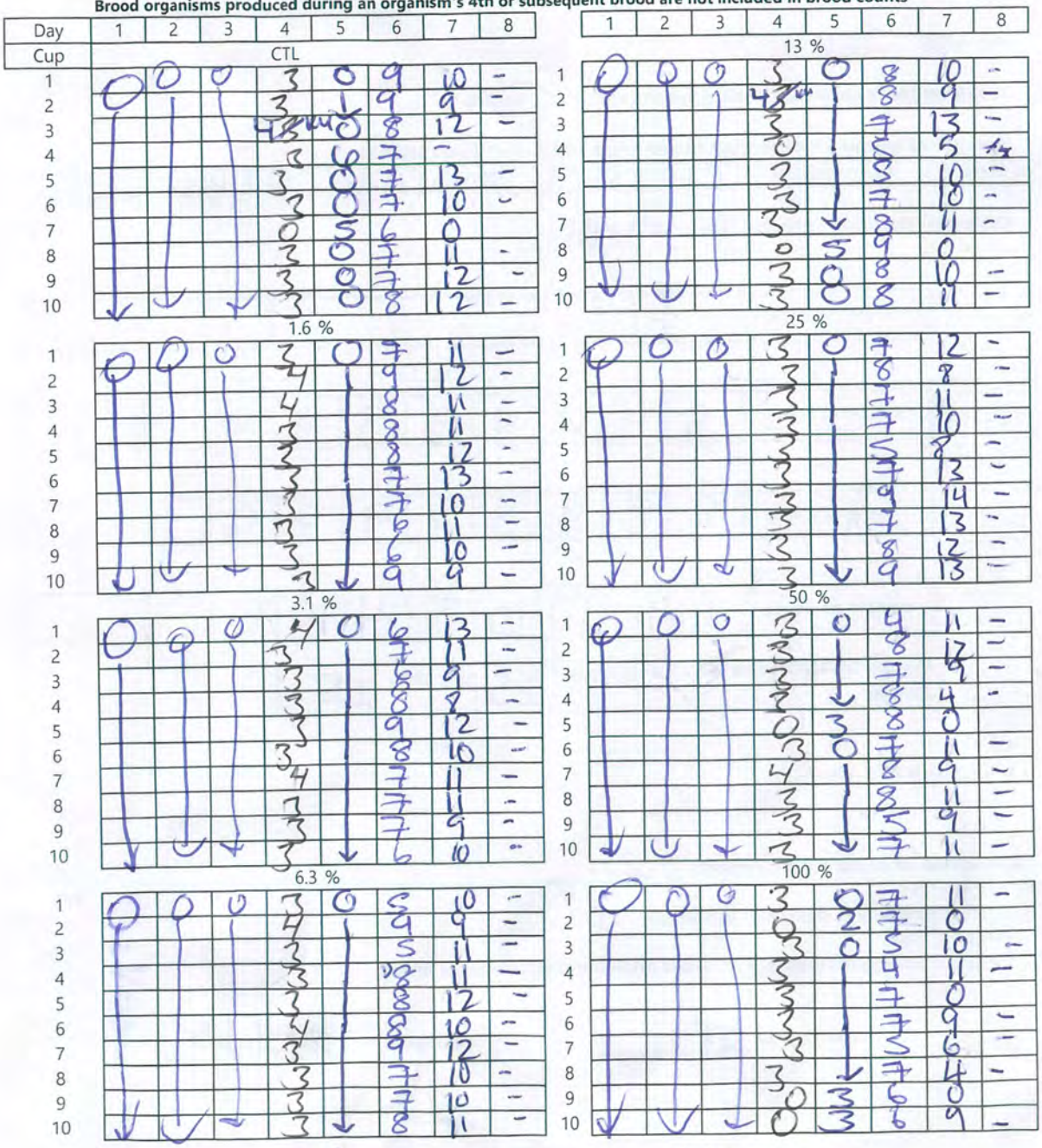
Ceriodaphnia Bench Sheet

Method CDD Client NAUIOY Reference 1819-0383-02

Biology

(#, young produced; 0, no young; X, dead; X#, young produced-dead; —,young produced after 3rd brood)

Brood organisms produced during an organism's 4th or subsequent brood are not included in brood counts



Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Test Organism Information

Client: NAV104

Culture history for adults used in the test for sample reference: 1819-0383-02

Day Used: 2018/11/01

Test organisms appeared healthy before use: (Yes)/No

Number of young produced per brood adult within first three broods:

Brood	row/replicate											
		C1	D3	C5	D4	D1	E4	C2	C4			

Culture(s) Used for Testing: Thursday B

number of young											
number of young	5	4	4	4	3	3	4	4			
number of young	8	8	9	5	7	9	7	9			
number of young	11	11	10	10	8	14	10	11			

Number of Adults Alive in Culture

7 days prior:	day used:
25	25

Notes: all cups have 1 adult

Average No. of young in first 3 broods: 22
(must be ≥15)

Culture % mortality (7-days prior to testing): 0%
(must be ≤20%)

Number of young produced by each brood organism in last complete brood: 11
(must be ≥8)

Reviewed By: JP Date Reviewed: 2018/11/13.

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	09-9250-5368	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4		
Analyzed:	15 Nov-18 7:40	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1		
Batch ID:	00-3020-4480	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sara Thiessen		
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	Mod-Hard Synthetic Water		
Ending Date:	08 Nov-18	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	13-8050-1745	**Code:**	1819-0383-02	**Project:**			
Sample Date:	30 Oct-18	**Material:**	Water Sample	**Source:**	Nautilus Environmental		
Receipt Date:	01 Nov-18	**CAS (PC):**		**Station:**	LC_LC5		
Sample Age:	48h (15.8 °C)	**Client:**	Nautilus Environmental				

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1745447	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
LC5	>100	n/a	n/a	<1	n/a	n/a
LC10	>100	n/a	n/a	<1	n/a	n/a
LC15	>100	n/a	n/a	<1	n/a	n/a
LC20	>100	n/a	n/a	<1	n/a	n/a
LC25	>100	n/a	n/a	<1	n/a	n/a
LC40	>100	n/a	n/a	<1	n/a	n/a
LC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	N	10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
1.6		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
3.2		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
6.3		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
12.5		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
25		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
50		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
100		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.6		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3.2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

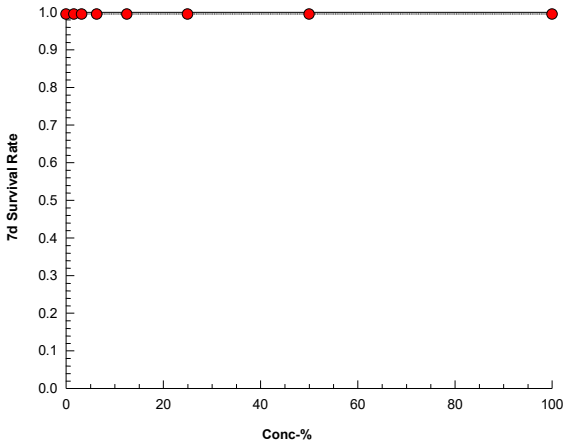
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.6		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	09-9250-5368	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Nov-18 7:40	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	08-9085-5561	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4		
Analyzed:	15 Nov-18 7:44	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1		
Batch ID:	00-3020-4480	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sara Thiessen		
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	Mod-Hard Synthetic Water		
Ending Date:	08 Nov-18	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	13-8050-1745	**Code:**	1819-0383-02	**Project:**			
Sample Date:	30 Oct-18	**Material:**	Water Sample	**Source:**	Nautilus Environmental		
Receipt Date:	01 Nov-18	**CAS (PC):**		**Station:**	LC_LC5		
Sample Age:	48h (15.8 °C)	**Client:**	Nautilus Environmental				

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1464728	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	2.985	3.306	0.1734	No Outliers Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	31.33	2.524	53.83	3.192	1.858	39.61
IC10	48.02	12.26	63.78	2.083	1.568	8.155
IC15	59.5	33.99	85.55	1.681	1.169	2.942
IC20	72.07	42.51	n/a	1.387	n/a	2.352
IC25	87.26	51.54	n/a	1.146	n/a	1.94
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Reproduction Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	10	20.3	11	24	3.945	19.44%	0.0%	21	0.0%
1.6		10	21.7	19	25	1.829	8.43%	-6.9%	21	0.0%
3.2		10	20.7	18	24	1.947	9.40%	-1.97%	20.95	0.24%
6.3		10	21.2	18	24	1.874	8.84%	-4.43%	20.95	0.24%
12.5		10	19.2	10	23	4.131	21.52%	5.42%	20.5	2.38%
25		10	21.8	16	26	2.936	13.47%	-7.39%	20.5	2.38%
50		10	18.8	11	23	3.676	19.55%	7.39%	18.8	10.48%
100		10	15	9	21	4.447	29.65%	26.11%	15	28.57%

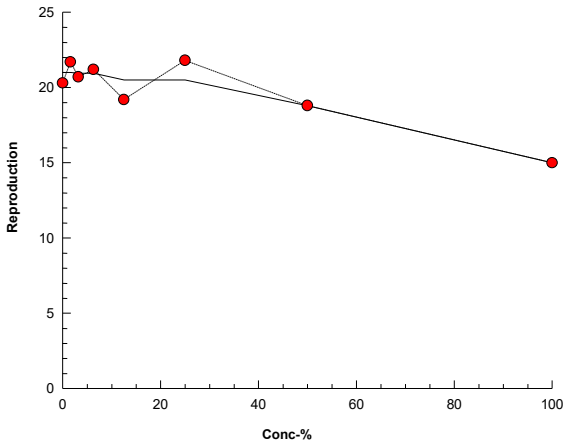
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	22	21	24	16	23	20	11	21	22	23
1.6		21	25	23	22	23	23	20	20	19	21
3.2		23	21	18	19	24	21	22	21	19	19
6.3		18	22	19	22	23	22	24	20	20	22
12.5		21	21	23	10	18	20	22	14	21	22
25		22	19	21	20	16	23	26	23	23	25
50		18	23	19	15	11	21	21	22	17	21
100		21	9	18	18	10	19	14	14	9	18

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	08-9085-5561	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Nov-18 7:44	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 1819-0383-03

Start Date/Time: 2018/11/01 13:45
Set up by: AP

Sample Information:

Sample ID: LC-DC1
Sample Date: 2018/10/30
Date Received: 2018/11/01
Sample Volume: 3 x 2L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: Thursday A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 21
Mortality (%) in previous 7 d: 0.1
Individual female # used ≥8 young on test day: 1H

NaCl Reference Toxicant Results:

Reference Toxicant ID: QA2H1
Stock Solution ID: N/A
Date Initiated: 2018/11/1H

7-d LC50 (95% CL): 1.H (1.0 - 2.0) g/L NaCL
7-d IC50 (95% CL): 1.H (1.H - 1.H) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 1.5 (1.1 - 2.1) g/L NaCL CV (%): 10.9
7-d IC50 Reference Toxicant Mean and Historical Range: 1.3 (0.9 - 1.7) g/L NaCL CV (%): 10.1

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: LO
Date reviewed: 2018/02/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAU104 Reference 1819-0383-03

Test Log

Date	Day	Time	Technician	Chem. Cart Used	Daily Data Review	Subsample Used	
2018/11/01	0	1345	AP	2	KW	Days 0 - 2	✓
2018/11/02	1	1230	ED	3	KW	Days 0 - 2	✓
2018/11/03	2	0930	CB	2	FP	Days 0 - 2	✓
2018/11/04	3	1140	LF	2	AP	Days 3 - 5	✓
2018/11/05	4	1090	LF	2	KW	Days 3 - 5	✓
2018/11/06	5	1340	ST	2	AP	Days 3 - 5	✓
2018/11/07	6	0920	MW	2	FP	Days 6 - 8	✓
2018/11/08	7	1050	LF	2	KW	Days 6 - 8	—
	8					-	

Sample Information

Initial pH: 8.2
Initial EC (µS/cm): 475
Initial DO (mg/L): 9.0
Initial Temp (°C): 19.9
Filtered with 60 µm nitex screen Yes/No
Sample pre-aerated/hardness/pH adjust: Yes/No
*if yes, describe procedure, rate and duration

Test Specifics

Food expiration: 11/25

Dilution water vessel and preparation date: #4 10/28, #3 10/31 #2 10/31 #4 11/01, #3 11/03, #4 11/05

Control Validity Day 7

Cup	Number of Young	Number of Broods
1	22	3
2	20	
3	23	
4	25	
5	20	
6	25	
7	26	
8	23	
9	22	
10	23	

Average # of Young: 23

% with ≥ 3 Broods: 100

Control Mortality: 0
(must be ≤20%)

Reproduction Validity Criteria: the average number of young produced in first three broods is ≥ 15, when 60% of control organsims had 3 or more broods: (Yes) / No

Reviewed By: _____ Date Reviewed: _____

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAU104 Reference 1819-0383-03

Chemistry

pH (units) (range: 6.5-8.5)

Day	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
0	8.1	8.1	8.2	8.2	8.2	8.2	8.2	8.2								
1	7.9	8.0	8.1	8.1	8.1	8.1	8.2	8.2	8.0	8.1	8.1	8.2	8.2	8.2	8.3	8.3
2	8.0	8.0	8.0	8.0	8.0	8.1	8.2	8.2	8.1	8.1	8.1	8.1	8.1	8.2	8.2	8.3
3	8.0	8.1	8.1	8.1	8.1	8.2	8.2	8.3	8.1	8.1	8.0	8.0	8.1	8.1	8.2	8.2
4	8.2	8.2	8.2	8.2	8.2	8.2	8.3	8.3	8.2	8.1	8.1	8.1	8.2	8.2	8.3	8.2
5	7.9	8.1	8.1	8.1	8.2	8.2	8.2	8.3	8.1	8.1	8.1	8.1	8.1	8.2	8.3	8.2
6	8.0	8.0	8.1	8.1	8.1	8.1	8.2	8.2	8.1	8.1	8.1	8.1	8.1	8.2	8.2	8.1
7									8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.1
8																

Conductance (µS/cm)

Day	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
0	200	211	215	223	263	280	342	460								
1	210	215	200	205	245	288	340	465	208	211	217	232	255	285	348	466
2	186	194	199	210	232	264	335	481	208	213	218	226	247	245	346	468
3	205	211	216	225	244	280	353	488	203	202	206	215	234	267	338	460
4	200	208	214	224	241	279	348	494*	209	210	216	226	246	276	348	467
5	193	206	213	223	240	276	342	471	198	209	216	226	245	277	346	471
6	203	209	215	225	243	278	350	496	205	210	214	224	243	276	345	465
7									222	217	219	227	245	280	347	465
8																

day 4 1001. *494

Dissolved Oxygen (mg/L) (40-100% saturation)

Day	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
0	7.3	7.3	7.3	7.4	7.5	7.7	7.7	8.0								
1	7.5	7.5	7.5	7.5	7.5	7.6	7.7	7.7	7.4	7.4	7.4	7.3	7.3	7.3	7.3	7.3
2	7.3	7.3	7.3	7.7	7.7	7.9	7.7	7.7	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3
3	7.3	7.5	7.5	7.5	7.6	7.6	7.5	7.6	7.3	7.3	7.3	7.2	7.2	7.2	7.2	7.2
4	7.3	7.6	7.6	7.6	7.5	7.6	7.6	7.6	7.3	7.3	7.3	7.3	7.3	7.3	7.2	7.2
5	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.2	7.2	7.2
6	7.3	7.3	7.5	7.6	7.6	7.6	7.6	7.7	7.3	7.3	7.4	7.5	7.4	7.5	7.4	7.3
7									7.3	7.3	7.3	7.3	7.3	7.2	7.2	7.0
8																

Temperature 24 - 26 (°C)

Day	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
0	24	24	24	24	24	24	24	24								
1	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
4	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
7									24	24	24	24	24	24	24	24
8																

DO Levels (40-100% saturation)* -
2.9 to 7.3 mg/L at 24°C
2.9 to 7.2 mg/L at 25°C
2.8 to 7.1 mg/L at 26°C

*corrected for altitude

Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAVI04 Reference 1819-0383-03

Biology

(#, young produced; 0, no young; X, dead; X#, young produced-dead; —,young produced after 3rd brood)

Brood organisms produced during an organism's 4th or subsequent brood are not included in brood counts

Day	1	2	3	4	5	6	7	8
Cup	CTL							
1	0	0	0	4	8	0	10	-
2				4	6	0	10	-
3				4	8	0	11	-
4				4	9	0	12	-
5				4	0	5	11	-
6				5	8	0	12	-
7				3	10		13	-
8				4	8		11	-
9				3	7		12	-
10				5	9		10	-

Day	1	2	3	4	5	6	7	8
Cup	13 %							
1	0	0	0	3	9	0	12	-
2				4	8		11	-
3				4	10		14	-
4				3	7		10	-
5				4	8		15	-
6				4	6		12	-
7				4	9		10	-
8				3	9		15	-
9				5	10		12	-
10				3	9		12	-

Day	1	2	3	4	5	6	7	8
Cup	1.6 %							
1	0	0	0	4	8	7	11	-
2				5	8	7	11	-
3				4	8	0	10	-
4				5	8	8	11	-
5				4	8	9	11	-
6				4	9	0	9	-
7				4	8	10	12	-
8				3	8	8	10	-
9				4	7	0	12	-
10				3	9	0	12	-

Day	1	2	3	4	5	6	7	8
Cup	25 %							
1	0	0	0	4	9	0	13	-
2				3	8	7	8	-
3				5	9	0	12	-
4				3*	8	7	9	-
5				3	8	0	11	-
6				3	9	0	13	-
7				4	8	9	12	-
8				3	10	0	12	-
9				4	9	0	12	-
10				5	9	0	14	-

Day	1	2	3	4	5	6	7	8
Cup	3.1 %							
1	0	0	0	4*	8	0	8	-
2				4	8	0	10	-
3				4*	X#	→		
4				4	9	0	13	-
5				4	0	6	11	-
6				5	9	0	12	-
7				4	10	0	11	-
8				4	8*	10	9	-
9				4	8	0	10	-
10				3	9	0	11	-

Day	1	2	3	4	5	6	7	8
Cup	50 %							
1	0	0	0	4	9	0	12	-
2				4	10		14	-
3				3	8		11	-
4				3	6		12	-
5				4	8	↓	15	-
6				4	0	6	11	-
7				5	8	9	10	-
8				4	8		10	-
9				4	7		10	-
10				4	8	↓	12	-

* killed by tech ↳ do not include in stats.

Day	1	2	3	4	5	6	7	8
Cup	6.3 %							
1	0	0	0	3	0	9	11	-
2				5	9	0	12	-
3				3	8	0	11	-
4				4	0	8	13	-
5				4	X#	9	11	-
6				4	0	8	10	-
7				5	9	6	14	-
8				3	9	0	13	-
9				3	9	0	12	-
10				3	11	0	12	-

Day	1	2	3	4	5	6	7	8
Cup	100 %							
1	0	0	0	3	9	0	12	-
2				4	8	0	13	-
3				3	0#	0	6	
4				3	10	6	11	-
5				4	9	8	11	-
6				4	9	0	13	-
7				0	5	7	0	
8				4	8	0	11	-
9				3	8	0	11	-
10				3	8	0	10	-

Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Test Organism Information

Client: NAU104

Culture history for adults used in the test for sample reference: 1819-0383-03

Day Used: 2018/~~10~~ AP 11/01

Test organisms appeared healthy before use: (Yes)/No

Number of young produced per brood adult within first three broods:

Brood	row/replicate											
		G4	C5	D1	D2	D4	D5	E2				

Culture(s) Used for Testing: Thursday A

number of young	3	4	2	4	4	3	4				
number of young	8	6	7	6	6	7	6				
number of young	13	12	11	10	10	11	10				
number of young	15	11	14	17	11	13	15				

Number of Adults Alive in Culture	7 days prior:	day used:
	25	25

Notes: all cups have 1 adult

Average No. of young in first 3 broods: 21
(must be ≥15)

Culture % mortality (7-days prior to testing): 0%
(must be ≤20%)

Number of young produced by each brood organism in last complete brood: 14
(must be ≥8)

Reviewed By: ~~JP~~ Date Reviewed: 2018/11/13

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	20-9607-0797	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Nov-18 7:49	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	16-4921-2088	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sara Thiessen
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	08 Nov-18	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24
Sample ID:	09-0064-0309	**Code:**	1819-0383-03	**Project:**	
Sample Date:	30 Oct-18	**Material:**	Water Sample	**Source:**	Nautilus Environmental
Receipt Date:	01 Nov-18	**CAS (PC):**		**Station:**	LC_DC1
Sample Age:	48h (15.6 °C)	**Client:**	Nautilus Environmental		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	232436	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
LC5	>100	n/a	n/a	<1	n/a	n/a
LC10	>100	n/a	n/a	<1	n/a	n/a
LC15	>100	n/a	n/a	<1	n/a	n/a
LC20	>100	n/a	n/a	<1	n/a	n/a
LC25	>100	n/a	n/a	<1	n/a	n/a
LC40	>100	n/a	n/a	<1	n/a	n/a
LC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	N	10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
1.6		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
3.2		9	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	9/9	1	0.0%
6.3		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
12.5		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
25		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
50		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
100		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.6		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3.2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	
6.3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

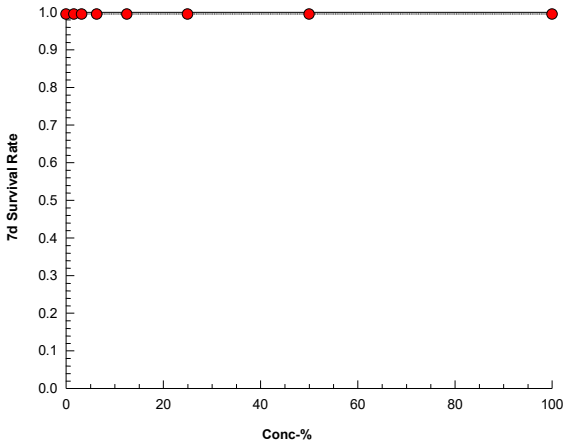
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.6		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	
6.3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	20-9607-0797	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Nov-18 7:49	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	16-6600-1162	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4		
Analyzed:	15 Nov-18 7:54	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1		
Batch ID:	16-4921-2088	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sara Thiessen		
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	Mod-Hard Synthetic Water		
Ending Date:	08 Nov-18	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	09-0064-0309	**Code:**	1819-0383-03	**Project:**			
Sample Date:	30 Oct-18	**Material:**	Water Sample	**Source:**	Nautilus Environmental		
Receipt Date:	01 Nov-18	**CAS (PC):**		**Station:**	LC_DC1		
Sample Age:	48h (15.6 °C)	**Client:**	Nautilus Environmental				

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	43972	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	4.195	3.302	6.6E-04	Outlier Detected

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	63.97	40.52	n/a	1.563	n/a	2.468
IC10	85.64	59.47	n/a	1.168	n/a	1.682
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Reproduction Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	10	22.9	20	26	2.025	8.84%	0.0%	23.59	0.0%
1.6		10	23	21	26	1.563	6.80%	-0.44%	23.59	0.0%
3.2		9	23.22	21	26	1.986	8.55%	-1.41%	23.59	0.0%
6.3		10	24.2	22	26	1.476	6.10%	-5.68%	23.59	0.0%
12.5		10	24.2	20	28	2.486	10.27%	-5.68%	23.59	0.0%
25		10	24	18	28	3.055	12.73%	-4.8%	23.59	0.0%
50		10	23.4	21	28	2.547	10.89%	-2.18%	23.4	0.79%
100		10	20.6	9	26	5.661	27.48%	10.04%	20.6	12.66%

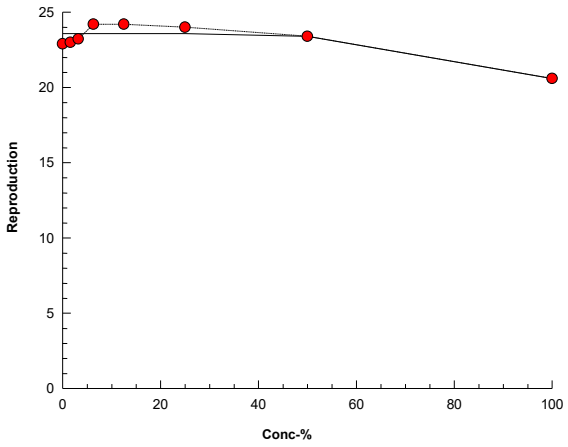
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	22	20	23	25	20	25	26	23	22	23
1.6		22	23	22	24	24	21	26	21	23	24
3.2		21	22	26	21	26	25	23	22	23	
6.3		23	26	22	25	24	22	25	25	24	26
12.5		24	23	28	20	24	22	23	27	27	24
25		26	18	26	20	22	25	25	25	25	28
50		25	28	22	21	27	21	23	22	21	24
100		24	25	9	20	24	26	12	23	22	21

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	16-6600-1162	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	15 Nov-18 7:54	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 1819-0383-OH

Start Date/Time: 2018/11/01 1245
Set up by: KK

Sample Information:

Sample ID: LC-FRDSDC
Sample Date: 2018/10/30
Date Received: 2018/11/01
Sample Volume: 3 x 2L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: Thursday A + Thursday B
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 23
Mortality (%) in previous 7 d: 0%
Individual female # used ≥8 young on test day: 12

NaCl Reference Toxicant Results:

Reference Toxicant ID: QA241
Stock Solution ID: N/A
Date Initiated: 2018/11/14

7-d LC50 (95% CL): 1.4 (1.0-2.0) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.4-1.4) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 1.5 (1.1-2.1) g/L NaCL CV (%): 10.9
7-d IC50 Reference Toxicant Mean and Historical Range: 1.3 (0.9-1.7) g/L NaCL CV (%): 10.1

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: LD
Date reviewed: 2019/02/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAV104 Reference 1019-0383-04

Test Log

Date	Day	Time	Technician	Chem. Cart Used	Daily Data Review	Subsample Used	
2018/11/01	0	1245	KK	2	AP	Days 0 - 2	✓
2018/11/02	1	1030	MW	2	KK	Days 0 - 2	✓
2018/11/03	2	1300	FD	2	MW	Days 0 - 2	✓
2018/11/04	3	1225	ST	2	KK	Days 3 - 5	✓
2018/11/05	4	1100	KK	2	KK	Days 3 - 5	✓
2018/11/06	5	0945	AP	2	KK	Days 3 - 5	✓
2018/11/07	6	0830	FD	2	2	Days 6 - 8	✓
2018/11/08	7	0815	AP	2	MW	Days 6 - 8	—
	8					-	

Sample Information

Initial pH: 8.0
Initial EC (µS/cm): 738
Initial DO (mg/L): 9.1
Initial Temp (°C): 19.9

Filtered with 60 µm nitex screen
Yes/(No)

Sample pre-aerated/hardness/pH adjust:
Yes/(No)

*if yes, describe procedure, rate and duration

Test Specifics

Food expiration: 11/25

Dilution water vessel and preparation date: #1 10/29, #6 10/30, #2 10/31, #4 11/01, #5 11/03

Control Validity
Day 7

Cup	Number of Young	Number of Broods
1	24	3
2	32	
3	20	
4	24	
5	20	
6	21	
7	24	
8	23	
9	22	↓
10	21	2

Average # of Young: 22

% with ≥ 3 Broods: 90%

Control Mortality: 0%
(must be ≤20%)

Reproduction Validity Criteria: the average number of young produced in first three broods is ≥ 15, when 60% of control organsims had 3 or more broods: (Yes) / No

Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAVIGY Reference 1819-03803-04

Chemistry

Conc. (%)	New Solutions								Old Solutions							
Day	CTL	1.6	3.1	6.3	13	25	50	100	CTL	1.6	3.1	6.3	13	25	50	100

pH (units) (range: **6.5-8.5**)

Day	New Solutions								Old Solutions							
0	7.9	7.9	8.0	8.0	8.0	8.0	8.1	8.0	8.2	8.2	8.2	8.2	8.2	8.3	8.3	8.3
1	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.3	8.2	8.2	8.2	8.2	8.0	8.2	8.3	8.3
2	8.1	8.1	8.1	8.1	8.1	8.1	8.2	8.0	8.1	8.1	8.1	8.1	8.2	8.2	8.1	8.0
3	8.0	8.0	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.2	8.2	8.2	8.2	8.2	8.0
4	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.2	8.1	8.0	8.0	8.0	8.0	8.1	8.1	8.0
5	7.9	7.9	8.0	8.0	8.0	8.0	8.1	8.2	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.0
6	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.1	8.0	8.0	8.0	8.0	8.0	8.0	8.0
7																
8																

Conductance (µS/cm)

Day	New Solutions								Old Solutions							
0	197	209	224	240	277	350	486	755	205	221	231	247	286	356	487	740
1	206	219	231	249	284	361	506	761	207	216	234	242	280	353	481	745
2	201	211	221	238	275	366	504	771	209	222	229	249	290	369	502	739
3	229	229	229	247	287	359	497	741	207	210	207	247	286	357	479	707
4	250	216	222	246	285	353	484	750	214	224	229	248	284	350	470	714
5	204	214	224	243	283	351	484	728	215	220	228	246	285	361	488	708
6	202	216	225	253	287	363	493	764	218	225	232	250	292	359	496	720
7																
8																

Dissolved Oxygen (mg/L) (**40-100% saturation**)

Day	New Solutions								Old Solutions							
0	7.6	7.6	7.7	7.5	7.6	7.6	7.7	7.9	7.3	7.4	7.4	7.4	7.3	7.4	7.5	7.5
1	7.3	7.3	7.5	7.5	7.4	7.4	7.4	7.4	7.3	7.3	7.3	7.4	7.4	7.4	7.4	7.5
2	7.4	7.4	7.5	7.5	7.6	7.6	7.6	7.6	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.2
3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.2	7.2	7.3	7.3	7.4	7.3	7.2	7.2
4	7.6	7.6	7.6	7.5	7.5	7.6	7.6	7.5	7.3	7.3	7.4	7.4	7.4	7.4	7.3	7.3
5	7.5	7.5	7.5	7.5	7.5	7.7	7.7	7.7	7.3	7.4	7.4	7.6	7.6	7.6	7.6	7.6
6	7.5	7.5	7.8	7.8	7.8	7.8	7.8	8.0	7.1	7.1	7.0	7.0	7.1	7.0	7.0	6.9
7																
8																

Temperature **24 - 26 (°C)**

Day	New Solutions								Old Solutions							
0	24	24	24	24	24	24	24	24	25	25	25	25	25	25	25	25
1	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
4	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
6	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
7									24	24	24	24	24	24	24	24
8																

DO Levels (40-100% saturation)* -
2.9 to 7.3 mg/L at 24°C
2.9 to 7.2 mg/L at 25°C
2.8 to 7.1 mg/L at 26°C

*corrected for altitude

Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method COD Client WAU104 Reference 1819-0383-04

Biology

(#, young produced; 0, no young; X, dead; X#, young produced-dead; —,young produced after 3rd brood)

Brood organisms produced during an organism's 4th or subsequent brood are not included in brood counts

Day	1	2	3	4	5	6	7	8
Cup	CTL							
1	0	0	0	3	8	0	0	
2				4	0	6	12	
3				3	7	0	10	
4				4	8	0	12	
5				3	0	6	11	
6				3	0	6	12	
7				5	8	6	11	
8				4	9	0	10	
9				4	8	0	10	
10				0	8	0	13	

Day	1	2	3	4	5	6	7	8
Cup	13 %							
1	0	0	0	3	6	0	10	
2				3	0	6	11	
3				4	0	X6	→	
4				3	7	0	8	
5				3	0	6	12	
6				3	—	6	10	
7				3	—	6	7	
8				3	↓	6	10	
9				2	8	0	10	
10				4	6	0	7	

Day	1	2	3	4	5	6	7	8
Cup	1.6 %							
1	0	0	0	3	0	6	9	
2				3	8	0	10	
3				3	9	0	10	
4				3	8	0	8	
5				3	0	6	10	
6				3	7	0	8	
7				4	8	0	8	
8				3	0	7	12	
9				3	8	0	9	
10				4	8	0	12	

Day	1	2	3	4	5	6	7	8
Cup	25 %							
1	0	0	0	4	6	0	9	
2				3	7	0	8	
3				5	8	0	10	
4				3	0	7	9	
5				3	0	7	8	
6				3	8	0	13	
7				3	0	7	12	
8				3	7	0	8	
9				3	8	0	13	
10				4	8	0	11	

Day	1	2	3	4	5	6	7	8
Cup	3.1 %							
1	0	0	0	X4				
2				2	0	6	9	
3				3	8	0	11	
4				2	8	0	14	
5				6	2	6	10	
6				4	0	7	0	
7				3	0	8	8	
8				5	0	6	8	
9				4	0	6	10	
10				3	0	7	9	

Day	1	2	3	4	5	6	7	8
Cup	50 %							
1	0	0	0	2	0	6	13	
2				2	8	0	7	
3				3	0	6	13	
4				3	0	7	11	
5				2	0	7	11	
6				4	—	7	6	
7				4	—	6	12	
8				2	—	7	12	
9				3	↓	8	13	
10				4	8	0	13	

Day	1	2	3	4	5	6	7	8
Cup	6.3 %							
1	0	0	0	3	0	6	8	
2				3	0	7	9	
3				3	7	0	10	
4				3	0	6	10	
5				2	0	6	8	
6				2	8	6	10	
7				3	7	0	11	
8				3	0	6	8	
9				2	0	6	8	
10				2	8	6	7	

Day	1	2	3	4	5	6	7	8
Cup	100 %							
1	0	0	0	3	0	6	10	
2				3	0	7	8	
3				3	0	6	10	
4				2	7	6	9	
5				3	6	0	9	
6				3	0	6	13	
7				2	—	6	9	
8				2	—	6	9	
9				3	—	6	10	
10				3	↓	6	11	

Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Test Organism Information

Client: NAU104

Culture history for adults used in the test for sample reference: 1819-0383-04

Day Used: 2018/11/01

Test organisms appeared healthy before use: (Yes) No

Number of young produced per brood adult within first three broods:

Brood	row/replicate	A1	A2	A3	A4	D5	E3	E4	E5			
		THUSA				THUSB						
	number of young	4	4	4	4							
	number of young	8	8	9	7	3	4	5 yes 4	4			
	number of young	11	12	12	11	7	8	6 yes 8	9			
	number of young	13	14	12	14	8	15	11 15 14	12			

Culture(s) Used for Testing:

Number of Adults Alive in Culture	7 days prior: 50	day used: 50

Notes: all cups have 1 adult

Average No. of young in first 3 broods: 23
(must be ≥15)

Culture % mortality (7-days prior to testing): 0%
(must be ≤20%)

Number of young produced by each brood organism in last complete brood: 12
(must be ≥8)

Reviewed By: JP Date Reviewed: 2018/11/13

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	02-1550-1011	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-18 7:35	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	12-0481-9420	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sara Thiessen
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	08 Nov-18	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24
Sample ID:	01-4801-1479	**Code:**	1819-0383-04	**Project:**	
Sample Date:	30 Oct-18	**Material:**	Water Sample	**Source:**	Nautilus Environmental
Receipt Date:	01 Nov-18	**CAS (PC):**		**Station:**	LC_FRDSDC
Sample Age:	48h (16.2 °C)	**Client:**	Nautilus Environmental		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	886826	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
LC5	>100	n/a	n/a	<1	n/a	n/a
LC10	>100	n/a	n/a	<1	n/a	n/a
LC15	>100	n/a	n/a	<1	n/a	n/a
LC20	>100	n/a	n/a	<1	n/a	n/a
LC25	>100	n/a	n/a	<1	n/a	n/a
LC40	>100	n/a	n/a	<1	n/a	n/a
LC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	N	10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
1.6		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
3.2		10	0.9000	0.0000	1.0000	0.3162	35.14%	10.0%	9/10	0.9667	3.33%
6.3		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.9667	3.33%
12.5		10	0.9000	0.0000	1.0000	0.3162	35.14%	10.0%	9/10	0.9667	3.33%
25		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.9667	3.33%
50		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.9667	3.33%
100		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.9667	3.33%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.6		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3.2		0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

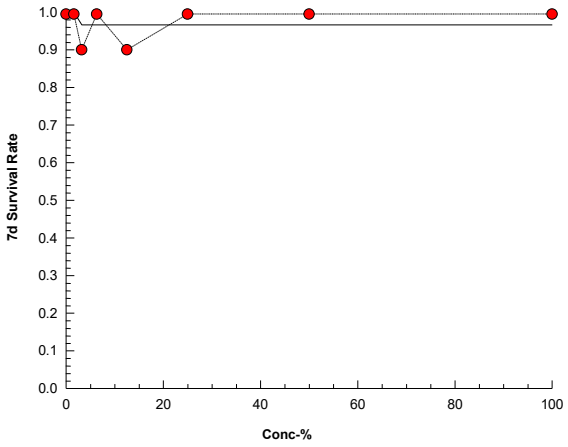
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.6		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.2		0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	02-1550-1011	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-18 7:35	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	05-1925-3798	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4		
Analyzed:	20 Nov-18 7:41	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1		
Batch ID:	12-0481-9420	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sara Thiessen		
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	Mod-Hard Synthetic Water		
Ending Date:	08 Nov-18	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	01-4801-1479	**Code:**	1819-0383-04	**Project:**			
Sample Date:	30 Oct-18	**Material:**	Water Sample	**Source:**	Nautilus Environmental		
Receipt Date:	01 Nov-18	**CAS (PC):**		**Station:**	LC_FRDSDC		
Sample Age:	48h (16.2 °C)	**Client:**	Nautilus Environmental				

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	68300	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	4.448	3.306	1.5E-04	Outlier Detected
Control Trend	Mann-Kendall Trend Test	4.448	1.96	1.0000	Non-Significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	1.002	0.4447	2.411	99.76	41.47	224.9
IC10	2.251	1.087	94.41	44.43	1.059	91.99
IC15	>100	n/a	n/a	<1	n/a	n/a
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Reproduction Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	10	21.8	20	24	1.476	6.77%	0.0%	21.8	0.0%
1.6		10	20.3	18	24	1.947	9.59%	6.88%	20.3	6.88%
3.2		10	17.1	4	24	5.744	33.59%	21.56%	18.84	13.58%
6.3		10	17.4	9	21	3.438	19.76%	20.18%	18.84	13.58%
12.5		10	17.9	10	21	3.143	17.56%	17.89%	18.84	13.58%
25		10	20.8	18	24	2.616	12.58%	4.59%	18.84	13.58%
50		10	21	17	25	2.582	12.30%	3.67%	18.84	13.58%
100		10	18.8	17	22	1.398	7.44%	13.76%	18.8	13.76%

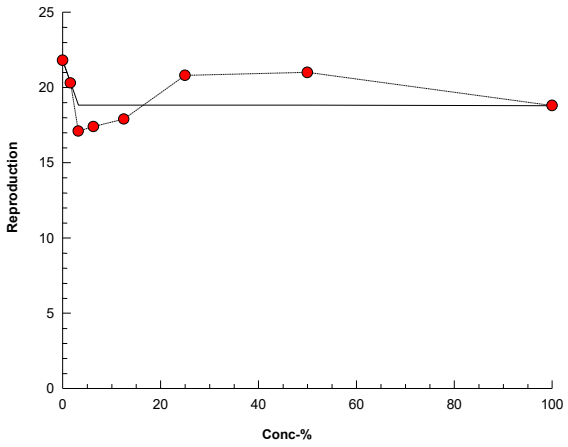
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	21	22	20	24	20	21	24	23	22	21
1.6		18	21	22	19	19	18	20	22	20	24
3.2		4	17	22	24	18	11	19	17	20	19
6.3		17	19	20	19	16	20	21	9	16	17
12.5		19	20	10	18	21	19	16	19	20	17
25		19	18	23	19	18	24	22	18	24	23
50		21	17	22	21	20	17	22	21	24	25
100		19	18	19	18	18	22	17	18	19	20

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	05-1925-3798	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-18 7:41	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 1819-0383-05

Start Date/Time: 2018/11/01 1250
Set up by: ST

Sample Information:

Sample ID: LC-DCDS
Sample Date: 2018/10/30
Date Received: 2018/11/01
Sample Volume: 3x 2L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: Thursday A
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 22
Mortality (%) in previous 7 d: 0%
Individual female # used ≥8 young on test day 12

NaCl Reference Toxicant Results:

Reference Toxicant ID: QA241
Stock Solution ID: NIA
Date Initiated: 2018/11/14

7-d LC50 (95% CL): 1.4 (1.0-2.0) g/L NaCL
7-d IC50 (95% CL): 1.4 (1.4-1.4) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 1.5 (1.1-2.1) g/L NaCL CV (%): 10.9
7-d IC50 Reference Toxicant Mean and Historical Range: 1.3 (0.9-1.7) g/L NaCL CV (%): 10.1

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	>100	
IC25 % (v/v) (95% CL)		>100
IC50 % (v/v) (95% CL)		>100

Reviewed by: LO
Date reviewed: 2019/02/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAW04 Reference 1819-0383-05

Test Log

Date	Day	Time	Technician	Chem. Cart Used	Daily Data Review	Subsample Used		Sample Information
2018/11/01	0	1250	ST	2	KL	Days 0 - 2	✓	Initial pH: 8.3
2018/11/02	1	1015	KK	2	MW	Days 0 - 2	✓	Initial EC (µS/cm): 565
2018/11/03	2	0945	AP	2	CB	Days 0 - 2	✓	Initial DO (mg/L): 9.9
2018/11/04	3	1420	ST	2	AP	Days 3 - 5	✓	Initial Temp (°C): 19.7
2018/11/05	4	1115	LF	2	KL	Days 3 - 5	✓	Filtered with 60 µm nitex screen
2018/11/06	5	1200	KL	2	AP	Days 3 - 5	✓	Yes / No
2018/11/07	6	1100	KK	2	ST	Days 6 - 8	✓	Sample pre-aerated/hardness/pH adjust:
2018/11/08	7	1130	MW	2	KL	Days 6 - 8	✓	Yes / No
	8					-		*if yes, describe procedure, rate and duration

Test Specifics

Food expiration: 11/25

Dilution water vessel and preparation date: #4 10/28, #5 10/29, #3 10/31
#1 11/01 #4 11/01, #3 11/03, #4 11/05

Cup	Control Validity Day 7 Number of Young	Number of Broods
1	22	3
2	23	3
3	23	3
4	24 23	3
5	24	3
6	23	3
7	21	3
8	21	3
9	21	3
10	22	3

Average # of Young: 22

% with ≥ 3 Broods: 100%

Control Mortality: 0%
(must be ≤20%)

Reproduction Validity Criteria: the average number of young produced in first three broods is ≥ 15, when 60% of control organsims had 3 or more broods: (Yes) / No

Reviewed By: OP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAU104 Reference 1819-0383-05

Chemistry

pH (units) (range: 6.5-8.5)

Conc. (%)	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
Day 0	8.0	8.1	8.1	8.1	8.1	8.2	8.2	8.3								
1	7.9	8.0	8.0	8.1	8.1	8.1	8.2	8.2	8.2	8.1	8.1	8.1	8.2	8.2	8.2	8.3
2	8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.2	8.1	8.1	8.1	8.1	8.2	8.2	8.2	8.3
3	8.0	8.1	8.1	8.1	8.1	8.2	8.2	8.3	8.1	8.0	8.0	8.1	8.1	8.1	8.2	8.3
4	7.9	8.1	8.1	8.1	8.2	8.2	8.2	8.3	8.1	8.1	8.1	8.1	8.1	8.3	8.2	8.3
5	8.0	8.0	8.1	8.1	8.1	8.2	8.2	8.3	8.1	8.1	8.1	8.1	8.1	8.1	8.1	8.3
6	7.9	8.0	8.0	8.0	8.0	8.1	8.2	8.2	8.0	8.0	8.0	8.0	8.0	8.1	8.1	8.2
7									8.0	8.0	8.0	8.0	8.1	8.1	8.1	8.2
8																

Conductance (µS/cm)

	Conc. (%)	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
	Day 0	195	211	219	231	258	304	391	569								
* 26d	1	200	214	221	234	261	323	410	592	203	215	222	235	260	300	394	571
	2	198	208	209	220	248	301	388	558	210	214	219	235	263	309	399	569
	3	201	210	217	231	268	317	410	597	191	202	207	223	252	305	404	578
	4	208	211	219	231	257	311	415	589	212	213	218	231	260	325	414	597
	5	204	212	219	234	258	309	410	596	202	211	220	234	261	314	402	570
	6	207	215	222	236	266	315	418	6000	199	211	219	234	260	306	402	585
	7									208	222	222	237	266	317	417	611
	8									MW 212							

Dissolved Oxygen (mg/L) (40-100% saturation)

	Conc. (%)	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
	Day 0	7.3	7.3	7.3	7.3	7.3	7.3	7.3	8.2								
	1	7.5	7.5	7.5	7.5	7.8	7.9	7.9	7.9	7.8	7.6	7.5	7.5	7.5	7.8	7.4	7.5
	2	7.6	7.6	7.6	7.5	7.8	7.6	7.6	7.7	7.4	7.4	7.4	7.4	7.5	7.5	7.5	7.5
	3	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.2	7.1	7.1	7.1	7.1	7.1	7.2
	4	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.2	7.1	7.1	7.1	7.1
	5	7.3	7.3	7.6	7.6	7.7	7.6	7.7	7.9	7.3	7.3	7.3	7.3	7.3	7.3	7.3	7.4
	6	8.0	8.0	8.0	8.0	7.9	7.9	7.8	7.9	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4
	7									7.4	7.4	7.4	7.3	7.3	7.3	7.2	7.2
	8																

Temperature 24 - 26 (°C)

	Conc. (%)	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
	Day 0	24	24	24	24	24	24	24	24								
	1	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
	2	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
	3	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25
	4	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
	5	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
	6	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
	7									24	24	24	24	24	24	24	24
	8																

DO Levels (40-100% saturation)* -
2.9 to 7.3 mg/L at 24°C
2.9 to 7.2 mg/L at 25°C
2.8 to 7.1 mg/L at 26°C

*corrected for altitude

Reviewed By: OP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAN104 Reference 1819-0383-05

Biology

(#, young produced; 0, no young; X, dead; X#, young produced-dead; —,young produced after 3rd brood)

Brood organisms produced during an organism's 4th or subsequent brood are not included in brood counts

Day	1	2	3	4	5	6	7	8
Cup	CTL							
1	0	0	0	3	8	0	11	
2	↓	↓	↓	4	7	0	12	
3				4	0	6	13	
4				4	7	6	12	
5				3	8	↓	13	
6				4	8		11	
7				3	7		11	
8				4	7	↓	10	
9				4	0	7	10	
10	↓	↓	↓	3	8	0	11	

Day	1	2	3	4	5	6	7	8
Cup	13 %							
1	0	0	0	3	6	0	11	
2	↓	↓	↓	4	0	8	13	
3				4	0	8	14	
4				4	7	0	15	
5				3	0	6	12	
6				4	0	7	12	
7				4	0	7	10	
8				4	0	7	13	
9				4	0	5	11	
10	↓	↓	↓	4	0	6	12	

Day	1	2	3	4	5	6	7	8
Cup	1.6 %							
1	0	0	0	4	8	0	12	
2	↓	↓	↓	5	0	7	14	
3				3	1	6	12	
4				4	↓	8	10	
5				4	7	0	13	
6				4	0	9	12	
7				4	6	7	13	
8				3	5	0	11	
9				3	0	8	11	
10	↓	↓	↓	4	0	6	12	

Day	1	2	3	4	5	6	7	8
Cup	25 %							
1	0	0	0	4	9	0	15	
2	↓	↓	↓	4	7	0	16	
3				4	0	8	12	
4				4	7	0	14	
5				4	7	0	15	
6				0	J8	0	12	
7				3	0	7	12	
8				0	3	0	0	
9				4	7	8	9	
10	↓	↓	↓	3	6	8	10	

Day	1	2	3	4	5	6	7	8
Cup	3.1 %							
1	0	0	0	4	0	7	14	
2	↓	↓	↓	4	5	0	0 15	
3				4	9	0	13	
4				0	0	6	0	
5				3	0	8	12	
6				4	6	0	11	
7				4	8	6	12	
8				3	0	9	15	
9				3	0	8	13	
10	↓	↓	↓	4	7	0	11	

Day	1	2	3	4	5	6	7	8
Cup	50 %							
1	0	0	0	4	0	7	14	
2	↓	↓	↓	4	7	0	16	
3				4	0	7	14	
4				3	8	0	13	
5				4	0	8	13	
6				3	7	0	11	
7				4	0	9	13	
8				0	3	8	0	
9				3	0	7	12	
10	↓	↓	↓	5	8	0	12	

Day	1	2	3	4	5	6	7	8
Cup	6.3 %							
1	0	0	0	4	5	0	10	
2				4	0	7	12	
3				4	6	0	10	
4				4	8	8	14	
5				3	0	8	13	
6				4	0	7	12	
7				4	8	0	14	
8				3	0	8	12	
9				4	0	6	13	
10	↓	↓	↓	4	0	7	11	

Day	1	2	3	4	5	6	7	8
Cup	100 %							
1	0	0	0	3	0	0	1	
2				0	3	7	8	
3				3	0	7	15	
4				0	0	3	11	
5				4	7	0	12	
6				3	0	8	8	
7				0	0	3	11	
8				3	0	7	13	
9				0	0	3	10	
10	↓	↓	↓	0	0	4	15	

Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Test Organism Information

Client: NAU104

Culture history for adults used in the test for sample reference: 1819-0383-05

Day Used: 2018/11/01

Test organisms appeared healthy before use: (Yes)/No

Number of young produced per brood adult within first three broods:

Brood	row/replicate	A10	B6	B7	B8	B9	B10	C7	C8			
	number of young	4	4	4	4	4	3	4	4			
	number of young	7	7	7	7	7	8	6	7			
	number of young	11	11	9	9	11	12	12	11			
	number of young	10	15	15	14	14	8	10	13			

Culture(s) Used for Testing: ThursdayA 20150821

Number of Adults Alive in Culture	7 days prior: 25	day used: 25

Notes: all cups have 1 adult

Average No. of young in first 3 broods: 22
(must be ≥15)

Culture % mortality (7-days prior to testing): 0.
(must be ≤20%)

Number of young produced by each brood organism in last complete brood: 12
(must be ≥8)

Reviewed By: JP Date Reviewed: 2018/11/13

CETIS Analytical Report

Test Code/ID: 1819-0383-05 CD / 18-6218-1495

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	14-3866-1123	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4		
Analyzed:	20 Nov-18 7:45	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1		
Batch ID:	11-6284-6134	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sara Thiessen		
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	Mod-Hard Synthetic Water		
Ending Date:	08 Nov-18	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	01-8174-1587	**Code:**	1819-0383-05	**Project:**			
Sample Date:	30 Oct-18	**Material:**	Water Sample	**Source:**	Nautilus Environmental		
Receipt Date:	01 Nov-18	**CAS (PC):**		**Station:**	LC_DCDS		
Sample Age:	48h (16.2 °C)	**Client:**	Nautilus Environmental				

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	565643	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
LC5	>100	n/a	n/a	<1	n/a	n/a
LC10	>100	n/a	n/a	<1	n/a	n/a
LC15	>100	n/a	n/a	<1	n/a	n/a
LC20	>100	n/a	n/a	<1	n/a	n/a
LC25	>100	n/a	n/a	<1	n/a	n/a
LC40	>100	n/a	n/a	<1	n/a	n/a
LC50	>100	n/a	n/a	<1	n/a	n/a

7d Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	N	10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
1.6		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
3.2		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
6.3		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
12.5		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
25		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
50		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
100		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.6		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3.2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
100		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000

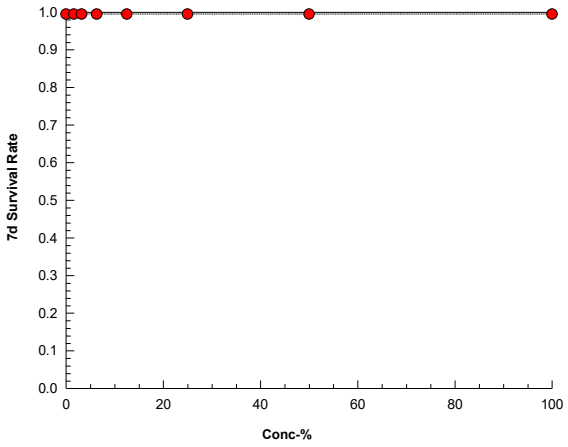
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.6		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
100		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	14-3866-1123	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-18 7:45	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



CETIS Analytical Report

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	21-0155-6105	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-18 7:49	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	11-6284-6134	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sara Thiessen
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	08 Nov-18	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24
Sample ID:	01-8174-1587	**Code:**	1819-0383-05	**Project:**	
Sample Date:	30 Oct-18	**Material:**	Water Sample	**Source:**	Nautilus Environmental
Receipt Date:	01 Nov-18	**CAS (PC):**		**Station:**	LC_DCDS
Sample Age:	48h (16.2 °C)	**Client:**	Nautilus Environmental		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1132800	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	4.573	3.306	7.0E-05	Outlier Detected
Control Trend	Mann-Kendall Trend Test	4.573	1.96	0.0374	Significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	59.09	2.845	73.97	1.692	1.352	35.14
IC10	75.2	19.9	n/a	1.33	n/a	5.026
IC15	95.64	52.12	n/a	1.046	n/a	1.919
IC20	>100	n/a	n/a	<1	n/a	n/a
IC25	>100	n/a	n/a	<1	n/a	n/a
IC40	>100	n/a	n/a	<1	n/a	n/a
IC50	>100	n/a	n/a	<1	n/a	n/a

Reproduction Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	10	22.3	21	24	1.059	4.75%	0.0%	22.6	0.0%
1.6		10	22.9	19	26	2.079	9.08%	-2.69%	22.6	0.0%
3.2		10	22	6	27	5.925	26.93%	1.35%	22.57	0.15%
6.3		10	22.9	19	26	2.234	9.75%	-2.69%	22.57	0.15%
12.5		10	22.8	20	26	2.348	10.30%	-2.24%	22.57	0.15%
25		10	21.4	3	28	7.183	33.57%	4.04%	22.25	1.55%
50		10	23.1	11	27	4.606	19.94%	-3.59%	22.25	1.55%
100		10	19	13	25	4.269	22.47%	14.8%	19	15.93%

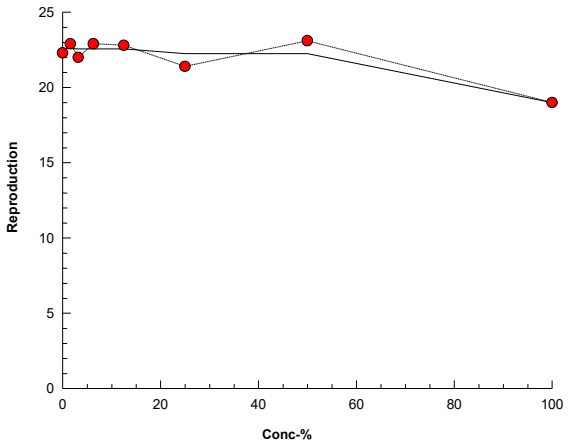
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	22	23	23	23	24	23	21	21	21	22
1.6		24	26	21	22	24	25	24	19	22	22
3.2		25	24	26	6	23	21	22	27	24	22
6.3		19	23	20	26	24	23	26	23	23	22
12.5		20	25	26	26	21	23	21	24	20	22
25		28	27	24	25	26	20	22	3	20	19
50		25	27	25	24	25	21	26	11	22	25
100		22	18	25	14	23	19	14	23	13	19

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	21-0155-6105	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-18 7:49	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Ceriodaphnia dubia Summary Sheet

Client: Teck Coal
Work Order No.: 1819-0383-06

Start Date/Time: 2018/11/01 1H10
Set up by: KK

Sample Information:

Sample ID: WL-BFWB_OUT_SP21
Sample Date: 2018/10/30
Date Received: 2018/11/01
Sample Volume: 3 x 2L

Test Validity Criteria:

1) Mean survival of first generation controls is ≥80 %
2) At least 60% of controls have produced three broods within 8 days
3) An average of ≥15 live young produced per surviving female in the control solutions during the first three broods.
4) Invalid if ephippia observed in any control solution at any time.

WQ Ranges:

T (°C) = 25 ± 1; DO (mg/L) = 3.3 to 8.4 ; pH = 6.0 to 8.5

Test Organism Information:

Broodstock No.: Tuesday B1 . Tuesday B2
Age of young (Day 0): <24-h (within 12-h)
Avg No. young in first 3 broods of previous 7 d: 23
Mortality (%) in previous 7 d: 0%
Individual female # used ≥8 young on test day: 11

NaCl Reference Toxicant Results:

Reference Toxicant ID: QA2H1
Stock Solution ID: N/A
Date Initiated: 2018/11/1H

7-d LC50 (95% CL): 1.H (1.0-2.0) g/L NaCL
7-d IC50 (95% CL): 1.H (1.H - 1.H) g/L NaCL

7-d LC50 Reference Toxicant Mean and Historical Range: 1.5 (1.1-2.1) g/L NaCL CV (%): 10.9
7-d IC50 Reference Toxicant Mean and Historical Range: 1.3 (0.9-1.7) g/L NaCL CV (%): 10.1

Test Results:

	Survival	Reproduction
LC50 % (v/v) (95% CL)	35.H (29.3-H27)	
IC25 % (v/v) (95% CL)		29.1 (26.0 - 29.9)
IC50 % (v/v) (95% CL)		35.0 (32.3-35.8)

Reviewed by: LD
Date reviewed: 2019/12/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDO Client NEW104 Reference 189-0383-06

Test Log

Date	Day	Time	Technician	Chem. Cart Used	Daily Data Review	Subsample Used	
2018/11/01	0	1410	KL	2	AP	Days 0 - 2	✓
2018/11/02	1	1115	MW	2	KL	Days 0 - 2	✓
2018/11/03	2	1500	MW	2	FD	Days 0 - 2	✓
2018/11/04	3	1340	ST	2	LF	Days 3 - 5	✓
2018/11/05	4	0935	KL	2	LF	Days 3 - 5	✓
2018/11/06	5	0910	AP	2	KL	Days 3 - 5	✓
2018/11/07	6	1015	CB	2	FD	Days 6 - 8	✓
2018/11/08	7	0840	AP	2	MW	Days 6 - 8	✓
	8					-	

Sample Information

Initial pH: 7.9
Initial EC (µS/cm): 2330
Initial DO (mg/L): 9.3
Initial Temp (°C): 20.0
Filtered with 60 µm nitex screen (Yes/No)
Sample pre-aerated/hardness/pH adjust: Yes/(No)
*if yes, describe procedure, rate and duration

Test Specifics

Food expiration: 11/25

Dilution water vessel and preparation date: #1 10/29, #6 10/30, #1 11/01 #4 11/01, LFS 11/03 #4 11/05

Control Validity Day 7

Cup	Number of Young	Number of Broods
1	17	3
2	20	↓
3	18	↓
4	12	2
5	21	3
6	17	↓
7	20	↓
8	20	↓
9	23	↓
10	22	↓

Average # of Young: 19

% with ≥ 3 Broods: 90 %

Control Mortality: 0 %
(must be ≤20%)

Reproduction Validity Criteria: the average number of young produced in first three broods is ≥ 15, when 60% of control organsims had 3 or more broods: (Yes) / No

Reviewed By: JP Date Reviewed: 2018/11/13.

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAU104 Reference 1619-0883-06

Chemistry

pH (units) (range: 6.5-8.5)

Day	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
0	8.0	8.1	8.1	8.1	8.1	8.0	8.0	7.9								
1	8.2	8.2	8.2	8.2	8.3	8.3	8.3	8.2	8.3	8.2	8.3	8.3	8.3	8.3	8.3	8.2
2	8.2	8.2	8.2	8.3	8.3	8.3	8.3		8.2	8.2	8.2	8.3	8.3	8.4	8.4	8.4
3	7.8	8.1	8.1	8.1	7.2	8.2	8.3		8.2	8.1	8.1	8.2	8.2	8.3	8.4	
4	8.1	8.1	8.1	8.1	8.2	8.2	8.3		8.1	8.1	8.1	8.1	8.2	8.2	8.3	
5	8.1	8.1	8.1	8.1	8.1	8.2	8.2		8.2	8.1	8.1	8.1	8.2	8.3	8.4	
6	8.0	8.0	8.0	8.1	8.1	8.2	8.2		7.9	7.9	7.9	8.0	8.1	8.2	8.3	
7									7.9	7.9	8.0	8.0	8.0	8.2	8.3	
8																

Conductance (µS/cm)

Day	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
0	239	252	280	359	512	776	1254	2220								
1	203	249	298	368	525	806	1314	2340	207	251	294	367	513	784	1275	2300
2	205	250	293	376	534	823	1354		265	254	300	371	519	802	1309	2200
3	204	253	299	384	549	850	1387		223	256	293	372	534	807	1308	
4	197	249	290	388	559	854	1354		209	250	296	383	535	831	1314	
5	210	254	298	380	546	813	1310		211	262	317	379	529	821	1284	
6	200	250	293	376	530	808	1329		222	261	300	381	541	813	1357	
7									203	254	299	377	532	818	1312	
8																

Dissolved Oxygen (mg/L) (40-100% saturation)

Day	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
0	7.5	7.5	7.5	7.5	7.6	7.6	7.7	7.7								
1	7.3	7.3	7.5	7.6	7.7	7.7	7.7	7.6	7.3	7.3	7.5	7.5	7.5	7.6	7.6	7.6
2	7.3	7.3	7.4	7.4	7.5	7.6	7.6		7.3	7.3	7.4	7.4	7.4	7.5	7.4	7.5
3	7.3	7.3	7.3	7.3	7.3	7.3	7.3		7.3	7.2	7.2	7.2	7.2	7.2	7.2	
4	7.3	7.3	7.3	7.2	7.3	7.3	7.3		7.2	7.2	7.2	7.2	7.2	7.2	7.2	
5	7.3	7.3	7.3	7.2	7.3	7.3	7.3		7.3	7.3	7.3	7.3	7.3	7.3	7.3	
6	7.3	7.6	7.8	7.8	7.8	7.8	7.8		7.3	7.2	7.0	6.9	7.0	7.0	7.0	
7									7.0	7.0	6.9	6.9	6.9	6.9	6.9	
8																

Temperature 24 - 26 (°C)

Day	New Solutions CTL	1.6	3.1	6.3	13	25	50	100	Old Solutions CTL	1.6	3.1	6.3	13	25	50	100
0	24	24	24	24	24	24	24	24								
1	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24	24
2	24	24	24	24	24	24	24		24	24	24	24	24	24	24	24
3	24	24	24	24	24	24	24		24	25	25	25	25	25	25	
4	24	24	24	24	24	24	24		24	24	24	24	24	24	24	
5	24	24	24	24	24	24	24		24	24	24	24	24	24	24	
6	24	24	24	24	24	24	24		24	25	25	26	26	26	26	
7									24	24	24	24	24	24	24	
8																

DO Levels (40-100% saturation)* -
2.9 to 7.3 mg/L at 24°C
2.9 to 7.2 mg/L at 25°C
2.8 to 7.1 mg/L at 26°C

*corrected for altitude

Reviewed By: JP Date Reviewed: 2018/11/13

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Method CDD Client NAUIOY Reference 1819-0383-06

Biology

(#, young produced; 0, no young; X, dead; X#, young produced-dead; —,young produced after 3rd brood)

Brood organisms produced during an organism's 4th or subsequent brood are not included in brood counts

Day	1	2	3	4	5	6	7	8
Cup	CTL							
1	0	0	0	3	0	6	8	
2				3	0	7	10	
3				4	0	6	8	
4				4	5	7	8	
5				4	0	8	9	
6				3		6	8	
7				4		7	9	
8				4		7	9	
9				4		8	11	
10				4		8	10	

1.6 %

Day	1	2	3	4	5	6	7	8
Cup	13 %							
1	0	0	0	4	6	10	16	
2				4		9	13	
3				4		9	13	
4				4		10	13	
5		X0						
6		0	0	4	0	9	13	
7				4	0	7	11	
8				4	0	10	13	
9				3	8	9	1	
10				4	0	8	13	

25 %

Day	1	2	3	4	5	6	7	8
Cup								
1	0	0	0	4	0	7	10	
2				4	0	7	9	
3				2	0	7	3	
4				4	0	10	11	
5				4	0	9	10	
6				3		7	10	
7				4		16	0	
8				4		7	9	
9				4		7	12	
10				4		8	9	

3.1 %

Day	1	2	3	4	5	6	7	8
Cup								
1	0	0	0	4	0	7	10	
2				4		7	7	
3				4		7	10	
4				3	3	10	10	
5				3	0	8	13	
6				3		6	9	
7				4		10	14	
8				4		9	13	
9				3		7	10	
10				2		6	0	7

50 %

Day	1	2	3	4	5	6	7	8
Cup								
1	0	0	0	3	0	6	9	
2				4		8	12	
3				5		9	11	
4				3		7	10	
5				5		8	13	
6				5		8	12	
7				5		9	11	
8				3		7	10	
9				6		11	13	
10				3		10	12	

6.3 %

Day	1	2	3	4	5	6	7	8
Cup								
1	0	X0						
2	0	X0						
3	X0							
4	0	X0						
5	0	X0						
6	0	X0						
7	0	X0						
8	0	X0						
9	X0							
10	X0							

100 %

Reviewed By: JP Date Reviewed: 2018/11/13.

NAUTILUS ENVIRONMENTAL

Ceriodaphnia Bench Sheet

Test Organism Information

Client: NAU104

Culture history for adults used in the test for sample reference: 1819-0383-06

Day Used: 2018/11/01

Test organisms appeared healthy before use: (Yes)/No

Number of young produced per brood adult within first three broods:

Brood	row/replicate	E2	E3	E4	E5	E1	A4	C5	E5			
		TUES B1					TUES B2					
	number of young	3	3	3	3	3	3	3	4			
	number of young	9	8	9	9	9	8	10	7			
	number of young	12	13	14	12	8	14	8	9			
	number of young	14	14	13	9	10	11	10	8			

Culture(s) Used for Testing:

Number of Adults Alive in Culture	7 days prior: 50	day used: 50

Notes: all cups have 1 adult

Average No. of young in first 3 broods: 23
(must be ≥15)

Culture % mortality (7-days prior to testing): 0%
(must be ≤20%)

Number of young produced by each brood organism in last complete brood: 11
(must be ≥8)

Reviewed By: JP Date Reviewed: 2018/11/13

Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	03-5820-1538	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-18 7:58	**Analysis:**	Untrimmed Spearman-Kärber	**Status Level:**	1
Batch ID:	21-0512-3943	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sara Thiessen
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	Mod-Hard Synthetic Water
Ending Date:	08 Nov-18	**Species:**	Ceriodaphnia dubia	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture **Age:** <24
Sample ID:	21-0514-5799	**Code:**	1819-0383-06	**Project:**	
Sample Date:	30 Oct-18	**Material:**	Water Sample	**Source:**	Nautilus Environmental
Receipt Date:	01 Nov-18	**CAS (PC):**		**Station:**	WL_BFWB_OUT_SP21
Sample Age:	48h (15.9 °C)	**Client:**	Nautilus Environmental		

Spearman-Kärber Estimates

Threshold Option	Threshold	Trim	Mu	Sigma	LC50	95% LCL	95% UCL
Control Threshold	0	0.00%	1.549	0.04088	35.36	29.29	42.69

7d Survival Rate Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	**Code**	**Count**	**Mean**	**Min**	**Max**	**Std Dev**	**CV%**	**%Effect**	**A/B**	**Mean**	**%Effect**
0	N	10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
1.6		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
3.2		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
6.3		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	1	0.0%
12.5		10	0.9000	0.0000	1.0000	0.3162	35.14%	10.0%	9/10	0.95	5.0%
25		10	1.0000	1.0000	1.0000	0.0000	0.00%	0.0%	10/10	0.95	5.0%
50		10	0.1000	0.0000	1.0000	0.3162	316.20%	90.0%	1/10	0.1	90.0%
100		10	0.0000	0.0000	0.0000	0.0000		100.0%	0/10	0	100.0%

7d Survival Rate Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
1.6		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
3.2		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
6.3		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
12.5		1.0000	1.0000	1.0000	1.0000	0.0000	1.0000	1.0000	1.0000	1.0000	1.0000
25		1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
50		0.0000	0.0000	0.0000	0.0000	0.0000	1.0000	0.0000	0.0000	0.0000	0.0000
100		0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000

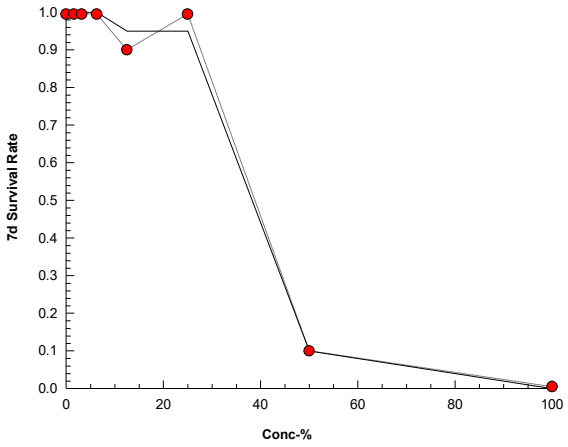
7d Survival Rate Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
1.6		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
3.2		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
6.3		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
12.5		1/1	1/1	1/1	1/1	0/1	1/1	1/1	1/1	1/1	1/1
25		1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1	1/1
50		0/1	0/1	0/1	0/1	0/1	1/1	0/1	0/1	0/1	0/1
100		0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1	0/1

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	03-5820-1538	**Endpoint:**	7d Survival Rate	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-18 7:58	**Analysis:**	Untrimmed Spearman-Kärber	**Status Level:**	1

Graphics



Ceriodaphnia 7-d Survival and Reproduction Test — **Nautilus Environmental Calgary**

Analysis ID:	19-4316-2815	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4		
Analyzed:	20 Nov-18 8:05	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1		
Batch ID:	21-0512-3943	**Test Type:**	Reproduction-Survival (7d)	**Analyst:**	Sara Thiessen		
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/21	**Diluent:**	Mod-Hard Synthetic Water		
Ending Date:	08 Nov-18	**Species:**	Ceriodaphnia dubia	**Brine:**			
Test Length:	7d 0h	**Taxon:**	Branchiopoda	**Source:**	In-House Culture	**Age:**	<24
Sample ID:	21-0514-5799	**Code:**	1819-0383-06	**Project:**			
Sample Date:	30 Oct-18	**Material:**	Water Sample	**Source:**	Nautilus Environmental		
Receipt Date:	01 Nov-18	**CAS (PC):**		**Station:**	WL_BFWB_OUT_SP21		
Sample Age:	48h (15.9 °C)	**Client:**	Nautilus Environmental				

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	895104	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Extreme Value	Grubbs Extreme Value Test	5.264	3.306	2.7E-07	Outlier Detected
Control Trend	Mann-Kendall Trend Test	5.264	1.96	0.1447	Non-Significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	25.1	7.916	25.92	3.984	3.859	12.63
IC10	26.05	9.889	26.87	3.838	3.722	10.11
IC15	27.04	12.3	27.85	3.698	3.591	8.131
IC20	28.06	23.85	28.86	3.564	3.464	4.193
IC25	29.12	25.95	29.92	3.434	3.342	3.854
IC40	32.53	29.61	33.31	3.074	3.003	3.377
IC50	35.02	32.33	35.77	2.856	2.796	3.093

Reproduction Summary			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	10	19	12	23	3.162	16.64%	0.0%	21.56	0.0%
1.6		10	19.4	10	25	4.971	25.62%	-2.11%	21.56	0.0%
3.2		10	23.8	18	30	3.521	14.80%	-25.26%	21.56	0.0%
6.3		10	23.7	20	29	3.057	12.90%	-24.74%	21.56	0.0%
12.5		10	21.9	0	30	8.556	39.07%	-15.26%	21.56	0.0%
25		10	20.6	13	28	4.624	22.44%	-8.42%	20.6	4.45%
50		10	0.3	0	3	0.9487	316.20%	98.42%	0.3	98.61%
100		10	0	0	0	0		100.0%	0	100.0%

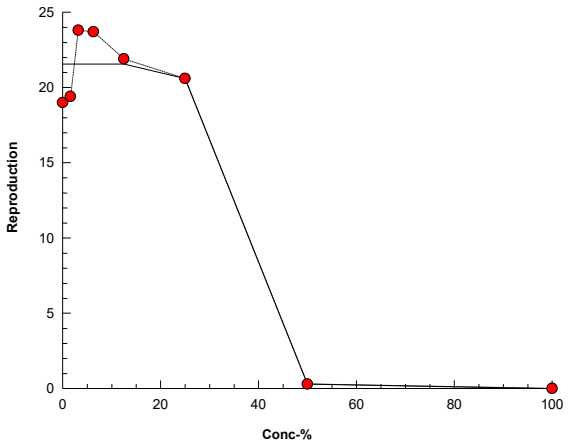
Reproduction Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8	Rep 9	Rep 10
0	N	17	20	18	12	21	17	20	20	23	22
1.6		21	20	11	25	23	20	10	20	23	21
3.2		18	24	25	20	26	25	25	20	30	25
6.3		26	27	25	21	24	29	23	22	20	20
12.5		30	26	26	27	0	26	22	17	20	25
25		20	21	21	13	24	18	28	26	20	15
50		0	0	0	0	0	3	0	0	0	0
100		0	0	0	0	0	0	0	0	0	0

Ceriodaphnia 7-d Survival and Reproduction Test **Nautilus Environmental Calgary**

Analysis ID:	19-4316-2815	**Endpoint:**	Reproduction	**CETIS Version:**	CETISv1.9.4
Analyzed:	20 Nov-18 8:05	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



APPENDIX B – Rainbow trout embryo *(Oncorhynchus mykiss)* Toxicity Test Data

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: October 31, 2018 @1530h

Work Order No.: 181876

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: FR_UFR1_WS_2018-10-30_N ; GH-ER2_WS-2018-10-30_N

Sample Date: October 30, 2018

Date Received: October 31, 2018

Sample Volume: FR_UFR1: 3 x 20L ; GH_ER2: 7 x 20L

Dilution Water:

Type: Dechlorinated Tap Water

Hardness (mg/L $CaCO_3$): 10

Alkalinity (mg/L $CaCO_3$): 9

Test Organism Information:

Batch No.: 103118

Source: Lyndon Fish Hatcheries, New Dundee, ON

Loading Density: 1.10 g/L

Number of male broodstock used: 3

Number of female broodstock used: 4

Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE112

Stock Solution ID: 18502

Date Initiated: October 31, 2018

7-d EC50 (95% CL): 3.0 (2.8-3.1) mg/L SDS

4.1 (2.1-7.9)

Reference Toxicant Mean and Range: ~~3.0 (2.8-3.1)~~ mg/L SDS

Reference Toxicant CV (%): 34

Test Results: Embryo viability (mean ± SD)

	Sample ID		
	Control	FR_UFR1_WS-2018-10-30_N	GH_ER2_WS-2018-10-30_N
EC25 % (v/v) (95% CL)			
EC50 % (v/v) (95% CL)	90.8 ± 14.2	85.0 ± 23.5	82.3 ± 17.8

Reviewed by: [signature]

Date reviewed: Dec. 12/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: (see below)
Work Order #: 181876

Start Date & Time: October 31 2018 @ 1530h
Stop Date & Time: November 7, 2018 @ 1030h
CER #: 3
Test Species: *Oncorhynchus mykiss*

Control Concentration (%v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	13.5	14.0
DO (mg/L)	10.1	10.1	9.9	10.1	10.0	10.2	10.1	10.2	9.8	10.1	10.0	10.1	10.2	10.1
pH	7.0	6.9	7.0	7.0	7.1	7.0	7.2	7.0	6.9	7.1	7.1	7.1	7.2	7.2
Cond. (µS/cm)	37	38		36		37		37		37		37		38
Initials	YM	YM		YM		A		A		YM		YM		

(FR_UFR1-WS-2018-10-30-N)

FR_UFR1 Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	13.5	14.0
DO (mg/L)	10.3	10.3	10.0	10.2	9.9	10.1	10.0	10.1	9.9	10.0	10.0	10.0	10.1	10.1
pH	8.0	8.0	8.1	8.0	8.1	8.2	8.2	8.0	8.1	8.0	8.2	8.0	8.2	8.2
Cond. (µS/cm)	354	345		348		349		348		365		350		356
Initials	YM	YM		YM		A		A		YM		YM		YM

(GH_ER2-WS-2018-10-30-N)

GH_ER2 Concentration 100	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	14.0	13.5	14.0
DO (mg/L)	10.3	10.2	10.0	10.1	10.0	10.2	10.0	10.2	9.8	10.0	10.0	10.1	10.2	10.1
pH	8.0	8.1	8.1	7.9	8.1	8.1	8.1	8.1	8.2	8.1	8.2	8.0	8.2	8.2
Cond. (µS/cm)	311	304		306		305		305		316		315		312
Initials	YM	YM		YM		A		A		YM		YM		YM

Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)														
DO (mg/L)														
pH														
Cond. (µS/cm)														
Initials														

Thermometer: CER#3 **DO meter/probe:** 213 / 213 **pH meter/probe:** 213 / 213 **Conductivity meter/probe:** 213 / 213

	Control	FR_UFR1	GH_ER2	
Hardness*	10	564	240	
Alkalinity*	9	184	132	

* mg/L as CaCO3

Analysts: AWD, YM(
Reviewed by: JOL
Date reviewed: Dec. 12/18

Sample Description: FR_UFR1 - clear, no colour, no odour, no particulates
GH_ER2 - clear, no colour, no odour, some particulates

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: (see below)
Work Order #: 181876

Start Date & Time: October 31, 2018 @ 1530h
Stop Date & Time: November 7, 2018 @ 1030h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	0	30	30
	2	1	↓	↓	↓	0	1	↓	1	1	28	30
	3	0	↓	↓	↓	0	1	↓	0	0	30	30
	4	0	↓	↓	↓	1	1	1	6	3	21	30
FR UFR1 100	1	0	↓	↓	↓	0	1	0	1	0	29	30
	2	0	↓	↓	↓	0	0	1	0	2	28	30
	3	0	↓	↓	1	0	0	↓	0	0	30	30
	4	1	↓	↓	8	1	2	1	13	2	15	30
GM-ER2 100	1	0	↓	↓	0	0	0	1	1	1	28	30
	2	0	↓	↓	1	1	0	0	2	0	28	30
	3	1	↓	↓	0	0	0	0	1	2	27	30
	4	0	↓	↓	0	1	1	1	9	4	17	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: JOH **Date reviewed:** Dec. 12/18

CETIS Summary Report

Report Date: 03 Dec-18 15:33 (p 1 of 1)
Test Code/ID: 181876 / 19-2460-8649

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Batch ID:	00-6433-8166	**Test Type:**	Development	**Analyst:**	
Start Date:	31 Oct-18 15:30	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Nov-18 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	6d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	07-2637-5525	31 Oct-18	31 Oct-18	16h	Teck Coal	
FR_UFR1	09-0464-6301	30 Oct-18 09:56	31 Oct-18 11:50	30h (0 °C)		
GH_ER2	15-7965-2256	30 Oct-18 11:30	31 Oct-18 11:50	28h (1.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	control	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_WS_2018-10-30	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2018-10-30_	

Single Comparison Summary

Analysis ID	Endpoint	Comparison Method	P-Value	Comparison Result	S
08-2739-4401	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2343	Control passed proportion normal	1
08-2739-4401	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2343	FR_UFR1 passed proportion normal	1
08-2739-4401	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.2343	GH_ER2 passed proportion normal	1
08-2739-4401	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0613	Control passed proportion normal	1
08-2739-4401	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0613	FR_UFR1 passed proportion normal	1
08-2739-4401	Proportion Normal	Fisher Exact/Bonferroni-Holm Test	0.0613	GH_ER2 passed proportion normal	1

Proportion Normal Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Min	Max	Std Err	Std Dev	CV%	%Effect
Control	N	4	0.9083	0.6817	1.0000	0.7000	1.0000	0.0712	0.1424	15.68%	0.00%
FR_UFR1		4	0.8500	0.4762	1.0000	0.5000	1.0000	0.1175	0.2349	27.64%	6.42%
GH_ER2		4	0.8333	0.5493	1.0000	0.5667	0.9333	0.0892	0.1785	21.42%	8.26%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	N	1.0000	0.9333	1.0000	0.7000
FR_UFR1		0.9667	0.9333	1.0000	0.5000
GH_ER2		0.9333	0.9333	0.9000	0.5667

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	N	30/30	28/30	30/30	21/30
FR_UFR1		29/30	28/30	30/30	15/30
GH_ER2		28/30	28/30	27/30	17/30

Analyst: NM QA: JCL Dec. 12/18

CETIS Analytical Report

Test Code/ID: 181876 / 19-2460-8649

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	08-2739-4401	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:32	**Analysis:**	STP 2xK Contingency Tables	**Status Level:**	1
Batch ID:	00-6433-8166	**Test Type:**	Development	**Analyst:**	
Start Date:	31 Oct-18 15:30	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Nov-18 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	6d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample Code	Sample ID	Sample Date	Receipt Date	Sample Age	Client Name	Project
Control	07-2637-5525	31 Oct-18	31 Oct-18	16h	Teck Coal	
FR_UFR1	09-0464-6301	30 Oct-18 09:56	31 Oct-18 11:50	30h (0 °C)		
GH_ER2	15-7965-2256	30 Oct-18 11:30	31 Oct-18 11:50	28h (1.5 °C)		

Sample Code	Material Type	Sample Source	Station Location	Lat/Long
Control	control	Teck Coal	Control	
FR_UFR1	Water Sample	Teck Coal	FR_UFR1_WS_2018-10-30	
GH_ER2	Water Sample	Teck Coal	GH_ER2_WS_2018-10-30_	

Fisher Exact/Bonferroni-Holm Test

Sample I	vs	Sample II	Test Stat	P-Type	P-Value	Decision(α:5%)
Negative Control		FR_UFR1	0.1172	Exact	0.2343	Non-Significant Effect
		GH_ER2	0.0613	Exact	0.0613	Non-Significant Effect

Data Summary

Conc-%	Code	NR	R	NR + R	Prop NR	Prop R	%Effect
Control	N	109	11	120	0.9083	0.09167	0.0%
FR_UFR1		102	18	120	0.85	0.15	6.42%
GH_ER2		100	20	120	0.8333	0.1667	8.26%

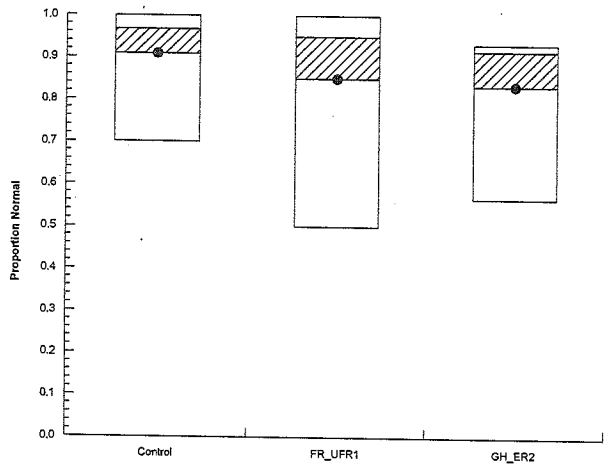
Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	N	1.0000	0.9333	1.0000	0.7000
FR_UFR1		0.9667	0.9333	1.0000	0.5000
GH_ER2		0.9333	0.9333	0.9000	0.5667

Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
Control	N	30/30	28/30	30/30	21/30
FR_UFR1		29/30	28/30	30/30	15/30
GH_ER2		28/30	28/30	27/30	17/30

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: October 31, 2018 @ 1530h

Work Order No.: 181882

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC-LCDSSLCC_WS_2018-10-30_N
Sample Date: October 30, 2018
Date Received: October 31, 2018
Sample Volume: 9 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 9

Test Organism Information:

Batch No.: 103118
Source: Lyndon Fish Hatcheries, New Dundee, ON
Loading Density: 1.10 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE112
Stock Solution ID: 18 SOZ
Date Initiated: October 31, 2018
7-d EC50 (95% CL): 3.0 (2.8 - 3.1) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.1 - 7.9) mg/L SDS
Reference Toxicant CV (%): 34

Test Results:

	Sample ID		
	LC-LCDSSLCC_WS_2018-10-30_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCh

Date reviewed: Dec. 12/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-LCDSSLCC_WS-2018-10-30-N
Work Order #: 181882

Start Date & Time: October 31, 2018 @ 1530h
Stop Date & Time: November 7, 2018 @ 1030h
CER #: 9
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.1	10.2	10.0	10.2	10.2	10.2	10.1	10.2	10.1	10.1	10.0	10.2	10.1	10.2
pH	7.0	6.8	6.8	6.8	7.0	6.9	7.0	7.1	6.9	7.1	7.1	7.1	7.2	7.2
Cond. (µS/cm)	37	38		37		36		37		37		37		37
Initials														

6.25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.2	10.2	10.1	10.2	10.1	10.2	10.1	10.2	10.2	10.1	10.0	10.2	10.1	10.1
pH	7.3	7.1	7.2	6.9	7.1	6.9	7.2	7.3	7.4	7.2	7.2	7.3	7.3	7.4
Cond. (µS/cm)	75	90		91		104		96		87		96		93
Initials														

25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.2	10.2	10.1	10.3	10.1	10.2	10.1	10.2	10.0	10.1	10.1	10.2	10.1	10.1
pH	7.2	7.6	7.8	7.3	7.6	7.3	7.6	7.6	7.7	7.5	7.6	7.6	7.7	7.5
Cond. (µS/cm)	271	283		268		289		263		265		262		262
Initials														

100 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.3	10.1	10.1	10.2	10.2	10.2	10.1	10.1	10.1	10.2	10.0	10.2	10.2	10.2
pH	8.1	8.0	8.1	8.0	8.0	8.0	7.9	8.1	8.2	8.0	8.1	8.0	8.1	8.2
Cond. (µS/cm)	833	838		836		849		832		837		837		841
Initials														

Thermometer: CER-9 DO meter/probe: 213 / 213 pH meter/probe: 213 / 213 Conductivity meter/probe: 213 / 213

	Control	100%		
Hardness*	10	620		
Alkalinity*	9	154		

* mg/L as CaCO3

Analysts: AWD, MM
Reviewed by: JCh
Date reviewed: Dec-12/18

Sample Description: clear, no colour, no odour, some particulates

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_LCDSSLCC_WS_2018-10-30-N
Work Order #: 181882
Start Date & Time: October 31, 2018 @ 1530h
Stop Date & Time: November 7, 2018 @ 1030h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	5	5	1	24	30
	2							0	0	1	29	30
	3							0	0	1	29	30
	4						2	1	3	2	25	30
6.25	1						0	0	0	2	28	30
	2							0	0	1	29	30
	3							0	0	1	28	29
	4						2	5	7	1	22	30
12.5	1						0	0	0	0	30	30
	2						1	0	0	1	29	30
	3							0	0	2	28	30
	4						4	10	4	2	24	30
25	1						0	0	0	0	30	30
	2						1	0	1	0	29	30
	3						0	0	0	3	27	30
	4						4	1	5	2	23	30
50	1						0	0	0	2	28	30
	2						0	1	0	4	26	30
	3						0		0	1	29	30
	4						8		8	1	21	30
100	1						0		0	0	30	30
	2						0		0	0	30	30
	3						0		0	6	24	30
	4						2	5	7	2	21	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: [signature] **Date reviewed:** Dec. 12/18

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	16-8548-9254	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:13	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	01-1504-3703	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	31 Oct-18 15:30	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Nov-18 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	6d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**
Sample ID:	00-6371-2345	**Code:**	3CC2C59	**Project:**	
Sample Date:	30 Oct-18 11:43 ✓	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50 ✓	**CAS (PC):**		**Station:**	LC_LCDSSLCC_WS_2018-10-30_N
Sample Age:	28h (1.4 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1690064	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	n/a	n/a	<1	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	N	4	0.8917	0.8000	0.9667	0.0877	9.83%	0.0%	107/120	0.9062	0.0%
6.25		4	0.8997	0.7333	0.9667	0.1120	12.45%	-0.9%	107/119	0.9062	0.0%
12.5		4	0.9250	0.8000	1.0000	0.0877	9.48%	-3.74%	111/120	0.9062	0.0%
25		4	0.9083	0.7667	1.0000	0.1032	11.36%	-1.87%	109/120	0.9062	0.0%
50		4	0.8667	0.7000	0.9667	0.1186	13.69%	2.8%	104/120	0.8708	3.9%
100		4	0.8750	0.7000	1.0000	0.1500	17.14%	1.87%	105/120	0.8708	3.9%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.8000	0.9667	0.9667	0.8333
6.25		0.9333	0.9667	0.9655	0.7333
12.5		1.0000	0.9667	0.9333	0.8000
25		1.0000	0.9667	0.9000	0.7667
50		0.9333	0.8667	0.9667	0.7000
100		1.0000	1.0000	0.8000	0.7000

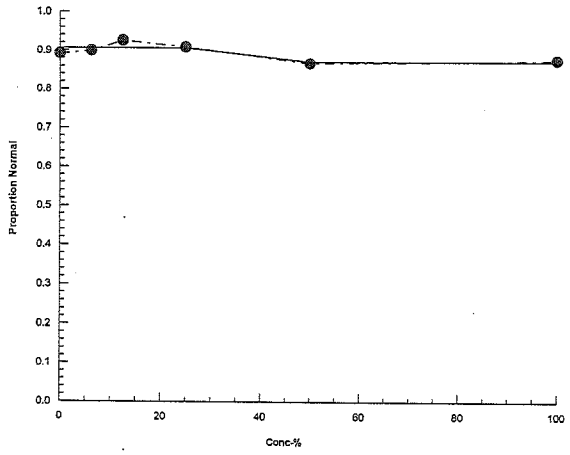
Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	24/30	29/30	29/30	25/30
6.25		28/30	29/30	28/29	22/30
12.5		30/30	29/30	28/30	24/30
25		30/30	29/30	27/30	23/30
50		28/30	26/30	29/30	21/30
100		30/30	30/30	24/30	21/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	16-8548-9254	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:13	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: October 31, 2018 @ 1530h

Work Order No.: 181882

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DC1_WS_2018-10-30_N
Sample Date: October 30, 2018
Date Received: October 31, 2018
Sample Volume: 5 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 9

Test Organism Information:

Batch No.: 103118
Source: Lyndon Fish Hatcheries, New Dundee, ON
Loading Density: 1.10 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE112
Stock Solution ID: 18S02
Date Initiated: October 31, 2018
7-d EC50 (95% CL): 3.0 (2.8 - 3.1) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.1 - 7.9) mg/L SDS
Reference Toxicant CV (%): 34

Test Results:

	Sample ID		
	LC_DC1_WS_2018-10-30_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCH

Date reviewed: Dec 13/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-DC1_WS_2018-10-30_N
Work Order #: 181882

Start Date & Time: October 31, 2018 @1530h
Stop Date & Time: November 7, 2018@1030h
CER #: 9
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.6	13.6	13.5	13.6	13.6	13.6	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.1	10.2	10.1	10.2	10.3	10.1	10.1	10.2	10.0	10.1	9.9	10.2	10.1	10.1
pH	7.0	6.8	7.1	6.8	7.1	7.0	7.0	7.1	6.9	7.1	7.2	7.1	7.1	7.2
Cond. (µS/cm)	37	38		37		36		38		37		37		37
Initials														

6.25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.6	13.6	13.5	13.6	13.6	13.6	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.2	10.2	10.2	10.1	10.2	10.2	10.2	10.1	10.1	10.0	10.0	10.1	10.2	10.2
pH	7.2	7.1	7.4	7.1	7.2	7.0	7.2	7.2	7.3	7.2	7.4	7.2	7.2	7.4
Cond. (µS/cm)	63	73		70		68		67		64		67		69
Initials														

25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.6	13.5	13.5	13.6	13.5	13.6	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.3	10.3	10.1	10.1	10.2	10.2	10.2	10.0	10.1	10.1	10.0	10.1	10.1	10.1
pH	7.6	7.5	7.8	7.5	7.6	7.3	7.4	7.4	7.6	7.6	7.7	7.6	7.7	7.7
Cond. (µS/cm)	168	161		160		160		155		161		143		157
Initials														

100 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	13.6	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.3	10.3	10.1	10.1	10.2	10.2	10.2	10.1	10.1	10.1	10.1	10.2	10.1	10.0
pH	8.0	7.9	8.1	8.0	8.0	8.0	7.9	8.1	8.2	8.0	8.1	8.0	8.0	8.1
Cond. (µS/cm)	478	476		479		485		489		480		478		473
Initials														

Thermometer: CER#9 **DO meter/probe:** 213 / 213 **pH meter/probe:** 213 / 213 **Conductivity meter/probe:** 213 / 213

	Control	100%		
Hardness*	10	282		
Alkalinity*	9	180		

* mg/L as CaCO3

Analysts: AWD, MM
Reviewed by: JM
Date reviewed: Dec 13/18

Sample Description: clear, no colour, no odour, some particulates.

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC-DCi_WS_2018-10-30N
Work Order #: 181882
Start Date & Time: October 31, 2018 @ 1530h
Stop Date & Time: November 7, 2018 @ 1030h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	1	1	0	29	30
	2	1	↓	↓	↓	↓	↓	0	1	1	28	30
	3	0	↓	↓	↓	↓	↓	0	0	1	29	30
	4	↓	↓	↓	↓	↓	2	3	5	2	23	30
6.25	1	↓	↓	↓	↓	↓	0	0	0	0	30	30
	2	↓	↓	↓	↓	↓	↓	0	0	0	30	30
	3	↓	↓	↓	↓	↓	↓	0	0	1	29	30
	4	↓	↓	↓	↓	↓	↓	3	3	4	23	30
12.5	1	↓	↓	↓	↓	2	↓	0	2	0	28	30
	2	↓	↓	↓	↓	0	↓	0	0	0	30	30
	3	↓	↓	↓	↓	0	↓	0	0	1	29	30
	4	↓	↓	↓	↓	0	3	4	7	2	21	30
25	1	↓	↓	↓	↓	0	0	0	0	0	30	30
	2	↓	↓	↓	—	0	↓	↓	0	2	28	30
	3	↓	↓	↓	1	1	↓	↓	2	1	27	30
	4	↓	↓	↓	0	0	1	↓	1	2	21	30
50	1	↓	↓	↓	0	1	0	↓	1	0	29	30
	2	↓	↓	↓	0	0	↓	↓	0	1	29	30
	3	↓	↓	↓	1	1	↓	↓	2	1	27	30
	4	↓	↓	↓	0	0	3	2	5	3	21	29
100	1	↓	↓	↓	↓	0/1	2	0	2	3	26	31
	2	↓	↓	↓	↓	0	0	0	0	0	29	29
	3	↓	↓	↓	↓	0	1	1	2	1	27	30
	4	↓	↓	↓	↓	1	1	3	5	3	22	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: JGh **Date reviewed:** Dec. 13/18

CETIS Analytical Report

Test Code/ID: 181882c / 01-4611-5714

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	01-0406-0607	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:20	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	03-3867-4082	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	31 Oct-18 15:30	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Nov-18 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	6d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**
Sample ID:	17-0132-9431	**Code:**	65683A17	**Project:**	
Sample Date:	30 Oct-18 10:30	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_DC1_WS_2018-10-30_N
Sample Age:	29h (0 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1580172	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	75.91	n/a	n/a	1.317	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	N	4	0.9083	0.7667	0.9667	0.0957	10.54%	0.0%	109/120	0.9208	0.0%
6.25		4	0.9333	0.7667	1.0000	0.1122	12.02%	-2.75%	112/120	0.9208	0.0%
12.5		4	0.9000	0.7000	1.0000	0.1361	15.12%	0.92%	108/120	0.9	2.26%
25		4	0.8833	0.7000	1.0000	0.1291	14.62%	2.75%	106/120	0.8864	3.75%
50		4	0.8894	0.7241	0.9667	0.1145	12.88%	2.09%	106/119	0.8864	3.75%
100		4	0.8680	0.7333	1.0000	0.1117	12.87%	4.44%	104/120	0.868	5.74%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	0.9667	0.9333	0.9667	0.7667
6.25		1.0000	1.0000	0.9667	0.7667
12.5		0.9333	1.0000	0.9667	0.7000
25		1.0000	0.9333	0.9000	0.7000
50		0.9667	0.9667	0.9000	0.7241
100		0.8387	1.0000	0.9000	0.7333

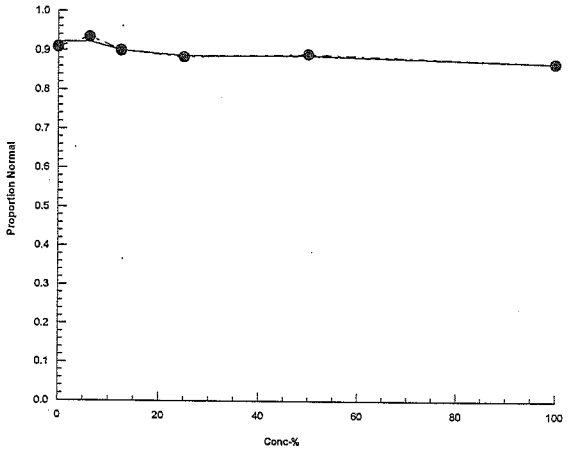
Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	29/30	28/30	29/30	23/30
6.25		30/30	30/30	29/30	23/30
12.5		28/30	30/30	29/30	21/30
25		30/30	28/30	27/30	21/30
50		29/30	29/30	27/30	21/29
100		26/31	29/29	27/30	22/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	01-0406-0607	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:20	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Analyst: [signature] QA: JGL Dec. 13/18

Rainbow Trout Early Life Stage Summary Sheet

Client: TRCK

Start Date/Time: October 31, 2018 @ 1530h

Work Order No.: 181882

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC-FRDSDC-WS-2018-10-30-N
Sample Date: October 30, 2018
Date Received: October 31, 2018
Sample Volume: 5 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 9

Test Organism Information:

Batch No.: 103118
Source: Lyndon Fish Hatcheries, New Dundee, ON
Loading Density: 1.10 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE112
Stock Solution ID: 18502
Date Initiated: October 31, 2018
7-d EC50 (95% CL): 3.0 (2.8-3.1) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.1-7.9) mg/L SDS
Reference Toxicant CV (%): 34

Test Results:

	Sample ID		
	LC-FRDSDC-WS-2018-10-30-N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JBM

Date reviewed: Dec. 13/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-FRDSDC-WS-2018-10-30-N
Work Order #: 1831882
Start Date & Time: October 31, 2018 @ 1530h
Stop Date & Time: November 7, 2018 @ 1030h
CER #: 9
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.1	10.2	10.0	10.2	10.2	10.1	10.1	10.2	10.0	10.1	10.1	10.2	10.0	10.1
pH	7.0	6.8	7.1	6.8	7.1	7.0	7.0	7.1	7.0	7.1	7.2	7.1	7.2	7.2
Cond. (µS/cm)	37	38		37		36		38		37		37		37
Initials														

6.25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.1	10.2	10.1	10.2	10.2	10.1	10.2	10.2	10.1	10.0	10.2	10.1	10.2	10.2
pH	7.2	7.0	7.4	7.1	7.3	7.0	7.1	7.2	7.2	7.2	7.3	7.2	7.4	7.3
Cond. (µS/cm)	73	89		86		91		86		85		88		89
Initials														

25 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.2	10.2	10.1	10.2	10.2	10.2	10.2	10.2	10.2	10.0	10.1	10.2	9.9	10.2
pH	7.3	7.5	7.8	7.4	7.6	7.3	7.4	7.5	7.6	7.6	7.6	7.6	7.7	7.7
Cond. (µS/cm)	253	255		258		271		253		251		249		252
Initials														

100 Concentration

	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.3	10.3	10.1	10.2	10.3	10.2	10.2	10.3	10.1	10.0	10.2	10.1	10.0	10.2
pH	8.0	8.0	8.2	8.0	8.1	8.0	7.9	8.0	8.1	7.9	8.1	8.0	8.1	8.2
Cond. (µS/cm)	788	784		778		787		773		780		774		784
Initials														

Thermometer: CER#9 **DO meter/probe:** 213 / 213 **pH meter/probe:** 213 / 213 **Conductivity meter/probe:** 213 / 213

	Control	100%		
Hardness*	10	510		
Alkalinity*	9	190		

* mg/L as CaCO3

Analysts: AWD, MM
Reviewed by: JCh
Date reviewed: Dec-13/18

Sample Description: clear, no colour, no odour, some particulates

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Start Date & Time: October 31, 2018 @ 1530h
Sample ID: LC-FRD SDC-WS-2018-10-30-N
Stop Date & Time: November 7, 2018 @ 1030h
Work Order #: 181882
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	0	30	30
	2	↓	↓	↓	↓	1	↓	↓	1	1	28	30
	3	↓	↓	↓	↓	0	↓	↓	0	0	30	30
	4	↓	↓	↓	↓	↓	2	3	5	3	22	30
6.25	1	↓	↓	↓	↓	↓	0	0	0	1	29	30
	2	↓	↓	↓	↓	↓	↓	~~1~~ 1	1	0	29	30
	3	↓	↓	↓	↓	↓	↓	0	0	0	30	30
	4	↓	↓	↓	↓	↓	4	6	10	1	19	30
12.5	1	↓	↓	↓	↓	↓	0	0	0	0	30	30
	2	↓	↓	↓	↓	↓	↓	1	1	0	~~30~~ 29	~~30~~ 30
	3	↓	↓	↓	↓	↓	↓	0	0	0	30	30
	4	↓	↓	↓	↓	↓	7	0	7	2	21	30
25	1	↓	↓	↓	↓	↓	0	1	1	0	29	30
	2	↓	↓	↓	↓	↓	↓	0	0	2	28	30
	3	↓	↓	↓	↓	↓	↓	0	0	2	28	30
	4	↓	↓	↓	↓	↓	3	6	9	2	19	30
50	1	↓	↓	↓	↓	↓	0	0	0	1	29	30
	2	↓	↓	↓	↓	↓	↓	1	0	3	27	30
	3	↓	↓	↓	↓	↓	↓	↓	0	0	30	30
	4	↓	↓	↓	↓	↓	6	5	11	0	21	32
100	1	↓	↓	↓	1/~	↓	~~2~~ 1	↓	3	0	28	31
	2	↓	↓	↓	0/~	↓	3	5	8	2	20	35
	3	↓	↓	↓	0/~	↓	↓	↓	0	0	29	29
	4	~	~	↓	~~2~~ ~	↑	7	1	9	0	21	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments:

Reviewed by: [illegible] **Date reviewed:** Dec. 13/18

CETIS Analytical Report

Report Date: 13 Dec-18 12:05 (p 1 of 2)
Test Code/ID: 181882d / 10-5469-7875

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	14-4671-8434	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:22	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Batch ID:	17-9005-2230	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	31 Oct-18 15:30	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Nov-18 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	6d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample ID:	17-7246-8808	**Code:**	69A5BA48	**Project:**	
Sample Date:	30 Oct-18 09:50	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_FRDSDC_WS_2018-10-30_N
Sample Age:	30h (0.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	598431	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	50.65	n/a	n/a	1.974	n/a	n/a
EC10	90.1	n/a	n/a	1.11	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	N	4	0.9167	0.7333	1.0000	0.1262	13.77%	0.0%	110/120	0.9167	0.0%
6.25		4	0.8917	0.6333	1.0000	0.1729	19.39%	2.73%	107/120	0.9042	1.36%
12.5		4	0.9167	0.7000	1.0000	0.1453	15.85%	0.0%	110/120	0.9042	1.36%
25		4	0.8667	0.6333	0.9667	0.1563	18.04%	5.46%	104/120	0.8737	4.69%
50		4	0.8807	0.6562	1.0000	0.1553	17.64%	3.92%	107/122	0.8737	4.69%
100		4	0.8175	0.6667	1.0000	0.1604	19.62%	10.82%	98/120	0.8175	10.82%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	0.9333	1.0000	0.7333
6.25		0.9667	0.9667	1.0000	0.6333
12.5		1.0000	0.9667	1.0000	0.7000
25		0.9667	0.9333	0.9333	0.6333
50		0.9667	0.9000	1.0000	0.6562
100		0.9032	0.6667	1.0000	0.7000

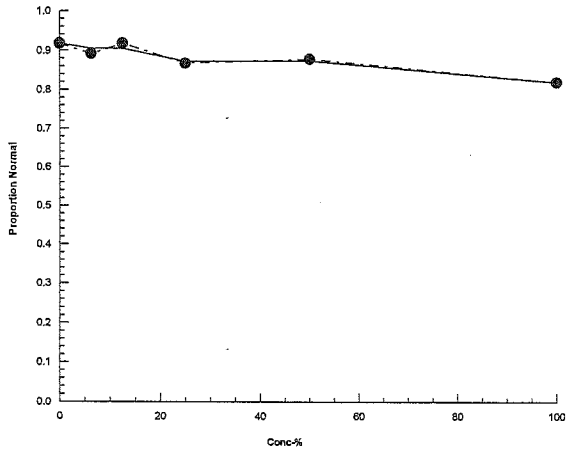
Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	30/30	28/30	30/30	22/30
6.25		29/30	29/30	30/30	19/30
12.5		30/30	29/30	30/30	21/30
25		29/30	28/30	28/30	19/30
50		29/30	27/30	30/30	21/32
100		28/31	20/30	29/29	21/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	14-4671-8434	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:22	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: October 31, 2018 @ 1530h

Work Order No.: 181882

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_DCDS_WS_2018-10-30_N
Sample Date: October 30, 2018
Date Received: October 31, 2018
Sample Volume: 9 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 9

Test Organism Information:

Batch No.: 103118
Source: Lyndon Fish Hatcheries, New Dundee, ON
Loading Density: 1.10 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE112
Stock Solution ID: 18502
Date Initiated: October 31, 2018
7-d EC50 (95% CL): 3.0 (2.8 - 3.1) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.1-7.9) mg/L SDS
Reference Toxicant CV (%): 34

Test Results:

	Sample ID		
	LC_DCDS_WS_2018-10-30_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JBh

Date reviewed: Dec 13/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: LC-DCDS-WS-2018-10-30-N
Work Order #: 181882

Start Date & Time: ~~November~~ YML October 31, 2018 @ 1530h
Stop Date & Time: November 7, 2018 @ 1030h
CER #: 9
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.1	10.2	10.1	10.2	10.1	10.1	10.1	10.2	10.1	10.1	10.0	10.2	10.1	10.2
pH	7.0	6.8	7.0	6.8	7.1	6.9	7.0	7.1	7.0	7.1	7.2	7.1	7.2	7.2
Cond. (µS/cm)	37	38		37		36		38		37		37		39
Initials	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]

6.25 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.2	10.1	10.2	10.2	10.2	10.1	10.2	10.1	10.1	10.1	10.0	10.2	10.0	10.1
pH	7.3	7.2	7.4	7.0	7.2	7.2	7.2	7.2	7.4	7.2	7.3	7.2	7.4	7.4
Cond. (µS/cm)	59	80		77		74		72		73		77		79
Initials	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]

25 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.3	10.1	10.1	10.2	10.2	10.2	10.2	10.1	10.0	10.2	10.0	10.1	10.0	10.2
pH	7.8	7.9 ~~8.0~~	8.0	7.5	7.6	7.3	7.4	7.6	7.7	7.6	7.6	7.5	7.7	7.7
Cond. (µS/cm)	202	207		195		187		190		189		186		187
Initials	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]

100 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.3	10.1	10.0	10.2	10.2	10.2	10.2	10.0	10.2	10.2	10.0	10.1	10.0	10.1
pH	8.1	8.0	8.3	8.0	8.0	7.8	7.9	8.1	8.2	8.0	8.0	8.1	8.2	8.1
Cond. (µS/cm)	602	596		603		609		595		602		601		604
Initials	[illegible]	[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]		[illegible]

Thermometer: CER#9 **DO meter/probe:** 213 / 213 **pH meter/probe:** 213 / 213 **Conductivity meter/probe:** 213 / 213

	Control	100%		
Hardness*	10	330		
Alkalinity*	9	140		

* mg/L as CaCO3

Analysts: AWD, YML

Reviewed by: JGL
Date reviewed: Dec. 13/18

Sample Description: clear, no colour, no odour, some particulates

Comments:

Version 1.2 Issued July 19, 2017

Nautilus Environmental Company Inc.

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC-DCDS-WS-2018-10-30-N
Work Order #: 181882
Start Date & Time: October 31, 2018 @ 1530h
Stop Date & Time: November 7, 2018 @ 1030h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	0	30	30
	2							1	1	1	29	31
	3							1	1	1	27	29
	4						1	3	4	1	25	30
6.25	1						0	0	0	0	30	30
	2							0	0	2	28	30
	3							1	1	2	27	30
	4						4	3	7	2	21	30
12.5	1						0	0	0	0	30	30
	2						1	0	0	1	29	30
	3					1	1	0	1	1	27	29
	4					0	5	6	11	1	18	30
25	1						0	1	1	1	28	30
	2						1	0	1	2	27	30
	3						1	1	2	0	28	30
	4						2	7	9	1	20	30
50	1				1	1	0	1	2	0	28	30
	2				0	1	1	1	~~1~~ X2	3	25	30
	3					0	1	0	0	1	29	30
	4					1	2	6	8	5	17	30
100	1					1	0	0	0	0	30	30
	2				1	1	1	1	1	1	28	30
	3				2	1	1	1	3	3	25	31
	4	1	1	1	0	2	5	6	13	4	14	31
	1				X							
	2				X, A							
	3				X							
	4				X							
	1											
	2											
	3											
	4											
Tech Initials		AA	AA	AA	AA	MM	MM	MM	MM	MM	MM	MM

Comments:

Reviewed by: JM **Date reviewed:** Dec. 13/18

CETIS Analytical Report

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	12-3499-4960	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:25	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	02-5857-4791	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	31 Oct-18 15:30	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Nov-18 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	6d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**
Sample ID:	20-9207-3304	**Code:**	7CB28158	**Project:**	
Sample Date:	30 Oct-18 11:45	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_DCDS_WS_2018-10-30_N
Sample Age:	28h (0.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	894610	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	8.822	n/a	n/a	11.33	n/a	n/a
EC10	42.83	n/a	n/a	2.335	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	N	4	0.9250	0.8333	1.0000	0.0687	7.43%	0.0%	111/120	0.925	0.0%
6.25		4	0.8833	0.7000	1.0000	0.1291	14.62%	4.5%	106/120	0.8833	4.5%
12.5		4	0.8744	0.6000	1.0000	0.1851	21.17%	5.46%	104/119	0.8744	5.46%
25		4	0.8583	0.6667	0.9333	0.1287	15.00%	7.2%	103/120	0.8583	7.2%
50		4	0.8250	0.5667	0.9667	0.1813	21.98%	10.81%	99/120	0.825	10.81%
100		4	0.7978	0.4516	1.0000	0.2444	30.63%	13.74%	97/122	0.7978	13.74%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	0.9355	0.9310	0.8333
6.25		1.0000	0.9333	0.9000	0.7000
12.5		1.0000	0.9667	0.9310	0.6000
25		0.9333	0.9000	0.9333	0.6667
50		0.9333	0.8333	0.9667	0.5667
100		1.0000	0.9333	0.8065	0.4516

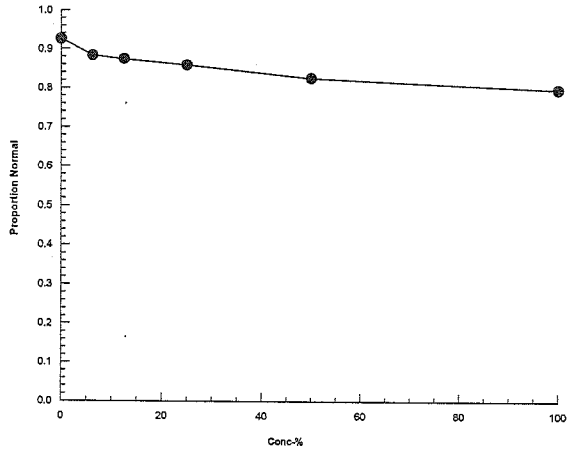
Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	30/30	29/31	27/29	25/30
6.25		30/30	28/30	27/30	21/30
12.5		30/30	29/30	27/29	18/30
25		28/30	27/30	28/30	20/30
50		28/30	25/30	29/30	17/30
100		30/30	28/30	25/31	14/31

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	12-3499-4960	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:25	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: October 31, 2018 @ 1530h

Work Order No.: 181882

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: LC_LCS_WS_2018-10-30_N
Sample Date: October 30, 2018
Date Received: October 31, 2018
Sample Volume: 9 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 9

Test Organism Information:

Batch No.: 103118
Source: Lyndon Fish Hatcheries, New Dundee, ON
Loading Density: 1.10 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE112
Stock Solution ID: 18502
Date Initiated: October 31, 2018
7-d EC50 (95% CL): 3.0 (2.8 - 3.1) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.1 - 7.9) mg/L SDS
Reference Toxicant CV (%): 34

Test Results:

	Sample ID		
	LC_LCS_WS_2018-10-30_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: JCh

Date reviewed: Dec. 13/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: TCK
Sample ID: LC-LCS-WS-2018-10-30-N
Work Order #: 1818821

Start Date & Time: October 31, 2018 @ 1530h
Stop Date & Time: November 7, 2018 @ 1030h
CER #: 9
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.1	10.2	10.1	10.2	10.2	10.2	10.1	10.2	10.1	10.1	10.0	10.2	10.1	10.1
pH	7.0	6.8	7.0	6.8	7.1	6.9	7.0	7.1	7.0	7.1	7.2	7.1	7.1	7.1
Cond. (µS/cm)	37	38		37		36		38		37		37		37
Initials														

6.25 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.2	10.2	10.1	10.2	10.2	10.2	10.1	10.1	10.0	9.9	10.1	10.2	10.1	10.1
pH	7.3	6.9	7.4	7.0	7.3	7.2	7.2	7.2	7.3	7.3	7.3	7.2	7.2	7.3
Cond. (µS/cm)	76	87		90		89		88		90		87		90
Initials														

25 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.2	10.2	10.1	10.1	10.1	10.2	10.2	10.1	10.1	10.0	10.1	10.2	10.0	10.1
pH	7.6	7.3	7.9	7.4	7.6	7.4	7.6	7.7	7.8	7.6	7.7	7.6	7.7	7.7
Cond. (µS/cm)	231	258		238		244		246		234		248		244
Initials														

100 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.3	10.3	10.0	10.2	10.1	10.2	10.2	10.1	10.2	10.1	10.1	9.9	10.0	10.1
pH	8.0	7.9	8.1	8.1	8.1	8.0	8.1	8.1	8.2	8.0	8.1	8.1	8.2	8.1
Cond. (µS/cm)	747	743		747		754		745		751		743		748
Initials														

Thermometer: CER 9 **DO meter/probe:** 213 / 213 **pH meter/probe:** 213 / 213 **Conductivity meter/probe:** 213 / 213

	Control	100%		
Hardness*	10	840		
Alkalinity*	9	174		

* mg/L as CaCO3

Analysts: AWD, MC
Reviewed by: [signature]
Date reviewed: Dec-13/18

Sample Description: clear, no colour, no odour, some particulates

Comments:

Embryo Toxicity Test
Daily Mortality

Client: Teck
Sample ID: LC_LCS_WS_2018-10-30_N
Work Order #: 181882

Start Date & Time: October 31, 2018 @ 1530h
Stop Date & Time: November 7, 2018 @ 1030h
Test Species: *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities 1	2	3	4	5	6	7	Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
Control	1	0	0	0	0	0	0	0	0	0	30	30
	2								0	3	27	30
	3								0	2	28	30
	4						4	4	8	5	17	30
6.25	1						0	0	0	0	30	30
	2							1	1	1	28	30
	3							1	1	1	28	30
	4						4	3	7	2	21	30
12.5	1						0	0	0	1	28	29
	2							1	1	0	29	30
	3							0	0	1	29	30
	4						1	6	7	2	20	29
25	1						0	0	0	1	29	30
	2							0	0	1	29	30
	3							0	0	2	28	30
	4					1	3	3	7	2	21	30
50	1					0	0	0	0	2	28	30
	2							0	0	1	29	30
	3							0	0	2	28	30
	4						5	4	9	0	21	30
100	1						0	0	0	0	30	30
	2							0	0	1	29	30
	3							0	0	2	28	30
	4					1	5	2	8	2	20	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Comments:

Reviewed by: [illegible]

Date reviewed: Dec. 13/18

CETIS Analytical Report

Report Date: 03 Dec-18 15:17 (p 1 of 2)
Test Code/ID: 181882b / 11-8557-0713

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	07-3117-4768	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:17	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Batch ID:	18-5133-2884	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	31 Oct-18 15:30	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Nov-18 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	6d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample ID:	14-1928-9377	**Code:**	5498A321	**Project:**	
Sample Date:	30 Oct-18 14:44	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_LC5_WS_2018-10-30_N
Sample Age:	25h (2 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1035362	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	n/a	n/a	<1	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	N	4	0.8500	0.5667	1.0000	0.1934	22.75%	0.0%	102/120	0.8842	0.0%
6.25		4	0.8917	0.7000	1.0000	0.1316	14.76%	-4.9%	107/120	0.8842	0.0%
12.5		4	0.8971	0.6897	0.9667	0.1383	15.42%	-5.54%	106/118	0.8842	0.0%
25		4	0.8917	0.7000	0.9667	0.1287	14.44%	-4.9%	107/120	0.8842	0.0%
50		4	0.8833	0.7000	0.9667	0.1232	13.95%	-3.92%	106/120	0.8842	0.0%
100		4	0.8917	0.6667	1.0000	0.1524	17.10%	-4.9%	107/120	0.8842	0.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	0.9000	0.9333	0.5667
6.25		1.0000	0.9333	0.9333	0.7000
12.5		0.9655	0.9667	0.9667	0.6897
25		0.9667	0.9667	0.9333	0.7000
50		0.9333	0.9667	0.9333	0.7000
100		1.0000	0.9667	0.9333	0.6667

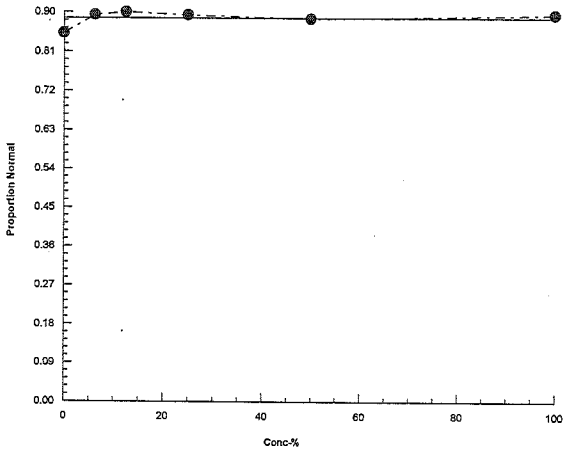
Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	30/30	27/30	28/30	17/30
6.25		30/30	28/30	28/30	21/30
12.5		28/29	29/30	29/30	20/29
25		29/30	29/30	28/30	21/30
50		28/30	29/30	28/30	21/30
100		30/30	29/30	28/30	20/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	07-3117-4768	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:17	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Analyst: [signature] QA: [signature] Dec. 13/18

Rainbow Trout Early Life Stage Summary Sheet

Client: Teck

Start Date/Time: October 31, 2018@1530h

Work Order No.: 181882

Test Species: *Oncorhynchus mykiss*

Sample Information:

Sample ID: WL_BFWB_OUT_SP21_2018-10-30_N
Sample Date: October 30, 2018
Date Received: October 31, 2018
Sample Volume: 5 x 20L

Dilution Water:

Type: Dechlorinated Tap Water
Hardness (mg/L $CaCO_3$): 10
Alkalinity (mg/L $CaCO_3$): 9

Test Organism Information:

Batch No.: 103118
Source: Lyndon Fish Hatcheries, New Dundee, ON
Loading Density: 1.10 g/L

Number of male broodstock used: 3
Number of female broodstock used: 4
Sperm motility check: Verification of sperm motility using a compound microscope

SDS Reference Toxicant Results:

Reference Toxicant ID: RTE112
Stock Solution ID: 18S02
Date Initiated: October 31, 2018
7-d EC50 (95% CL): 3.0 (2.8 - 3.1) mg/L SDS

Reference Toxicant Mean and Range: 4.1 (2.1 - 7.9) mg/L SDS
Reference Toxicant CV (%): 34

Test Results:

	Sample ID		
	WL_BFWB_OUT_SP21_2018-10-30_N		
EC25 % (v/v) (95% CL)	>100		
EC50 % (v/v) (95% CL)	>100		

Reviewed by: KM

Date reviewed: Dec. 13/18

7-d Chronic Freshwater Toxicity Test
Initial and Final Water Quality Measurements

Client: Teck
Sample ID: ~~LC-WTF-OUT~~ WL-BFWB-OUT-SP21-2018-10-30-N
Work Order #: 191882
Start Date & Time: October 31, 2018 @ 1530h
Stop Date & Time: November 7, 2018 @ 1030h
CER #: 9
Test Species: *Oncorhynchus mykiss*

Control Concentration (% v/v)	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.1	10.2	10.0	10.2	10.1	10.1	10.1	10.2	10.1	10.1	10.2	10.2	10.0	10.1
pH	7.0	6.8	7.0	6.8	7.0	7.0	7.0	7.1	6.9	7.1	7.2	7.1	7.2	7.2
Cond. (µS/cm)	37	38		37		36		38		37		37		39
Initials														

6.25 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	14.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.2	10.3	10.0	10.2	10.1	10.2	10.2	10.1	10.0	10.0	10.2	10.1	9.9	10.1
pH	7.2	7.3	7.1	7.1	7.2	7.1	7.1	7.2	7.1	7.2	7.3	7.2	7.3	7.4
Cond. (µS/cm)	171	201		209		237		220		223		205		218
Initials														

25 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.3	10.3	10.1	10.3	10.1	10.2	10.2	10.1	10.1	10.0	10.2	10.1	9.9	10.1
pH	7.6	7.6	7.6	7.5	7.7	7.82	7.85	7.4	7.4	7.4	7.7	7.5	7.7	7.7
Cond. (µS/cm)	780	745		763		748		767		763		742		755
Initials														

100 Concentration	Days													
	0	1		2		3		4		5		6		7
	init.	new	old	new	old	new	old	new	old	new	old	new	old	final
Temperature (°C)	13.0	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5	13.5
DO (mg/L)	10.3	10.3	10.1	10.2	10.2	10.2	10.2	10.0	10.1	9.9	10.2	10.0	10.0	10.1
pH	8.1	8.0	8.1	8.0	8.3	7.85	7.80	7.9	8.1	7.8	8.2	7.9	8.1	8.2
Cond. (µS/cm)	2430	2430		2430		2460		2450		2450		2440		2420
Initials														

Thermometer: [illegible] **DO meter/probe:** 213 / 213 **pH meter/probe:** 213 / 213 **Conductivity meter/probe:** 213 / 213

	Control	100%		
Hardness*	10	1470		
Alkalinity*	9	302		

* mg/L as CaCO3

Analysts: AWD, YHC
Reviewed by: JCH
Date reviewed: Dec. 13/18

Sample Description: clear, no colour, no odour, slight particulates

Comments:

Embryo Toxicity Test
Daily Mortality

Client: ~~Control~~ Teck **Start Date & Time:** October 31, 2018 @ 1530h
Sample ID: ~~LC LCOSSLEE~~ WL-BFWB- **Stop Date & Time:** November 7, 2018 @ 1030h
Work Order #: 181882 OUT_SP21-2018-10-30-N **Test Species:** *Oncorhynchus mykiss*

Concentration (% v/v)	Rep	Day of Test - No. of Mortalities							Total Dead Eggs	Total Undeveloped	Total No. Embryo	Total Exposed
		1	2	3	4	5	6	7				
Control	1	0	0	0	0	0	0	0	0	0	30	30
	2								0	0	30	30
	3								0	2	28	30
	4						7	4	11	3	16	~~24~~ 30
6.25	1						0	1	1	0	29	30
	2						1	0	0	4	26	30
	3						1	0	0	1	29	30
	4						7	4	11	2	17	30
12.5	1						0	0	0	0	30	30
	2						1	1	1	0	30	31
	3						1	0	0	2	28	30
	4		1			1	4	5	9	2	19	30
25	1		1			1	1	1	4	2	23	29
	2		0			0	0	0	0	1	29	30
	3						0	0	0	0	30	30
	4						7	1	8	0	22	30
50	1						0	0	0	0	30	30
	2						1	1	1	0	29	30
	3						1	0	0	0	30	30
	4						8	4	12	5	13	30
100	1						0	0	0	0	30	30
	2						1	1	0	0	30	30
	3						1	1	0	1	29	30
	4	1	1	1	1	1	1	1	1	~~29~~ 28	~~2~~ 284	30
	1											
	2											
	3											
	4											
	1											
	2											
	3											
	4											
Tech Initials												

Comments:

Reviewed by: JCh **Date reviewed:** Dec. 13/18

CETIS Analytical Report

Report Date: 03 Dec-18 15:27 (p 1 of 2)
Test Code/ID: 181882f / 20-4976-7221

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-5406-7898	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:27	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Batch ID:	11-6410-1080	**Test Type:**	Development	**Analyst:**	Yvonne Lam
Start Date:	31 Oct-18 15:30	**Protocol:**	EC/EPS 1/RM/28	**Diluent:**	Dechlorinated Tap Water
Ending Date:	07 Nov-18 10:30	**Species:**	Oncorhynchus mykiss	**Brine:**	
Test Length:	6d 19h	**Taxon:**	Actinopterygii	**Source:**	Lyndon Fish Hatcheries **Age:**

Sample ID:	16-4680-7015	**Code:**	622847E7	**Project:**	
Sample Date:	30 Oct-18 11:30	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	WL_BFWB_OUT_SP21_2018-10-30_
Sample Age:	28h (3.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1144244	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
EC5	>100	n/a	n/a	<1	n/a	n/a
EC10	>100	n/a	n/a	<1	n/a	n/a
EC15	>100	n/a	n/a	<1	n/a	n/a
EC20	>100	n/a	n/a	<1	n/a	n/a
EC25	>100	n/a	n/a	<1	n/a	n/a
EC40	>100	n/a	n/a	<1	n/a	n/a
EC50	>100	n/a	n/a	<1	n/a	n/a

Proportion Normal Summary

			Calculated Variate(A/B)							Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	A/B	Mean	%Effect
0	N	4	0.8667	0.5333	1.0000	0.2244	25.90%	0.0%	104/120	0.8761	0.0%
6.25		4	0.8417	0.5667	0.9667	0.1893	22.49%	2.89%	101/120	0.8761	0.0%
12.5		4	0.8836	0.6333	1.0000	0.1691	19.13%	-1.95%	107/121	0.8761	0.0%
25		4	0.8733	0.7333	1.0000	0.1301	14.90%	-0.76%	104/119	0.8761	0.0%
50		4	0.8500	0.4333	1.0000	0.2782	32.73%	1.92%	102/120	0.8761	0.0%
100		4	0.9417	0.8000	1.0000	0.0957	10.17%	-8.65%	113/120	0.8761	0.0%

Proportion Normal Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	1.0000	1.0000	0.9333	0.5333
6.25		0.9667	0.8667	0.9667	0.5667
12.5		1.0000	0.9677	0.9333	0.6333
25		0.7931	0.9667	1.0000	0.7333
50		1.0000	0.9667	1.0000	0.4333
100		1.0000	1.0000	0.9667	0.8000

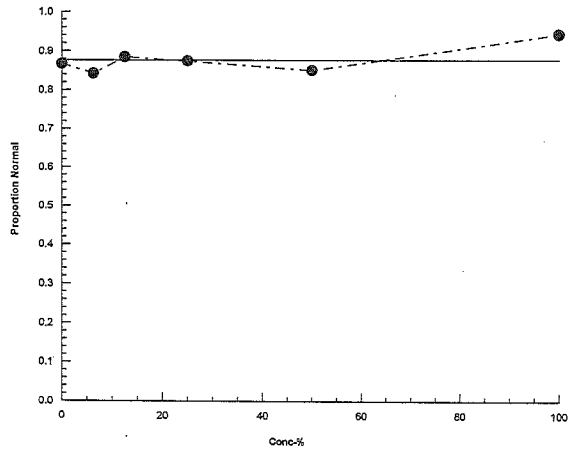
Proportion Normal Binomials

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	30/30	30/30	28/30	16/30
6.25		29/30	26/30	29/30	17/30
12.5		30/30	30/31	28/30	19/30
25		23/29	29/30	30/30	22/30
50		30/30	29/30	30/30	13/30
100		30/30	30/30	29/30	24/30

Salmonid Embryo Survival and Development Test — **Nautilus Environmental**

Analysis ID:	11-5406-7898	**Endpoint:**	Proportion Normal	**CETIS Version:**	CETISv1.9.4
Analyzed:	03 Dec-18 15:27	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Client: Teck

W.O.#: 191876

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Dechlor	Oct 31/18	Oct 31/18	100	1.1	1.3	9	100	1.0	10	YM
FR_UFR1_WS_2018-10-30_N			50	9.4	9.6	184	50	28.2	564	KL
FR_ER2_WS_2018-10-30_N	↓	↓	50	6.8	7.0	132	50	12.0	240	KL

Notes:

Reviewed by: JGH Date Reviewed: Dec. 12/18

Client: Teck

W.O.#: 181882

Hardness and Alkalinity Datasheet

	Alkalinity						Hardness			
Sample ID	Subsample Date	Date Measured	Sample Volume (mL)	(mL) 0.02N HCL/H_2SO_4 used to pH 4.5	(mL) of 0.02N HCL/H_2SO_4 used to pH 4.2	Total Alkalinity ($mg/LCaCO_3$)	Sample Volume (mL)	Volume of 0.01M EDTA Used (mL)	Total Hardness ($mg/L\ CaCO_3$)	Technician
Dechlor	Dec 31/18	Dec 31/18	100	1.1	1.3	9	100	1.0	10	MM
LC_LCDSSLCC			50	7.9	8.1	154	10①	6.2	620	KL
WS_2018-10-30-N										
LC_LCS_			50	8.9	9.1	~~15~~ 174	10①	8.4	840	KL
WS_2018-10-30-N										
LC_DCI_			50	9.2	9.4	180	50	14.1	282	MM
WS_2018-10-30-N										
LC_FRDSDC_			50	9.7	9.9	190	10①	5.1	510	MM
WS_2018-10-30-N										
LC_DCDS_			50	7.2	7.4	140	50	16.5	330	KL
WS_2018-10-30-N										
WL_BFWB_OUT_			50	15.4	15.7	302	10①	14.7	1470	MM
SPZL_2018-10-30-N										

Notes: ① Diluted to 100 mL w/ DI water

Reviewed by: JCh Date Reviewed: Dec. 12/18

APPENDIX C – *Lemna minor* Toxicity Test Data

Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 181881

Start Date: Nov 1/18
Set up by: MG

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2018-10-30_N
Sample Date: Oct 30/18
Date Received: Oct 31/18
Sample Volume: 9x20L

Test Organism Information:

Culture Date: 102518
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (46 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm165
Date Initiated: Oct 22/18

7-d No. of Fronds IC50 (95% CL): 3.6 (3.5-3.8) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.5 (2.9-4.2) g/L KCl CV (%): 10

* 82.3 (18.6-n/a)

Test Results:	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	* ~~797~~ MG	>97
IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JGW

Date reviewed: Feb. 14/19

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck Coal	**Setup by:**	MLJ
Sample ID:	LC_LCDSSLCC_WS_2018-10-30_N	**Test Date:**	NOV 1/18
Work Order No.:	181881	**CER #:**	1
Culture Source:	CPCC #490	**Test Species:**	*Lemna minor*
Test Culture Age:	7 days	**> 8X Growth? (Y/N):**	Y (46 Fronds)
Light Intensity Range:	4600–5100 lux	**Date Measured:**	NOV 1/18

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Initials	MLJ	MLJ	MLJ	MLJ	MLJ	MLJ	MLJ	MLJ

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.0	Aeration?: 20 min	24.0
DO (mg/L)	8.4	Nutrients added?[1]:	MLJ 7.8.0
pH	8.4	Y	8.4
Conductivity (µS)	829	→	1564

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.0	24.0	8.3	8.3	866
1.5	24.0	24.0	8.3	8.7	879
3	24.0	24.0	8.3	8.7	892
6.1	24.0	24.0	8.4	9.2	916
12.1	24.0	24.0	8.4	9.0	966
24.2	24.0	24.0	8.4	8.2	1058
48.5	24.0	24.0	8.4	9.1	1228
97	24.0	24.0	8.4	8.8	1564
Initials	MLJ	CW	MLJ	CW	MLJ

Thermometer: 4 **Light meter:** 1 **pH meter/probe:** 1 / 1 **DO meter/probe:** 1 / 1 **Conductivity meter/probe:** 1 / 1

Sample Description: clear, colourless, odourless, some particulates

Comments:

Reviewed: JCM **Date Reviewed:** Feb 7/19

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck Coal
Sample ID: LC.LEDSBLCC_WS_2018-10-30_N
Work Order #: 181881

Start Date: Nov 1/18
Termination Date: NOV 8/18
Test set up by: MK

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	58										MK
	B	6	48										
	C	6	57										
	D	6	62										
1.5	A	6	57										
	B	6	52										
	C	6	54										
	D	6	48										
3	A	6	51										
	B	6	52										
	C	6	50										
	D	6	58										
6.1	A	6	50										
	B	6	45										
	C	6	52										
	D	6	58										
12.1	A	6	50										
	B	6	48										
	C	6	51										
	D	6	57										
24.2	A	6	50										
	B	6	54										
	C	6	45										
	D	6	50										

Comments:

Reviewed by: JGh

Date Reviewed: Feb. 1/19

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck coal
Sample ID: LC_LEOSSLCC_WS_2018-10-30
Work Order #: 18188

Start Date: Nov 1/18
Termination Date: Nov 8/18
Test set up by: MB

Concentration % v/v	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
48.5	A	6	49										MB
	B	6	45										
	C	6	50										
	D	6	46										
97	A	6	39		X								
	B	6	41		X								
	C	6	49		X								
	D	6	41		X								
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGh

Date Reviewed: Feb. 1/19

7-d *Lemna minor* Weight Data Sheet

Client: Teck Coal
Start Date: Nov 1/18
Sample ID: LC-LCDSSLCC_WS_2018-10-30
Termination Date: Nov 8/18
WO #: 181881
Balance ID: Bal - 1

% (v/v) Q4 Black

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
Control	A	1	1021.66	1026.32	SSK
	B	2	1018.36	1022.97	SSK
	C	3	1015.21	1020.32	SSK
	D	4	1038.80	1044.36	SSK
1.5	A	5	1024.80	1029.29	SSK
	B	6	1023.95	1029.26	SSK
	C	7	1030.50	1036.30	SSK
	D	8	1017.12	1021.67	SSK
3	A	9	1023.63	1028.14	SSK
	B	10	1043.81	1048.30	SSK
	C	11	1024.24	1028.48	SSK
	D	12	1043.24	1048.55	SSK
6.1	A	13	1014.00	1018.40	SSK
	B	14	1003.05	1007.77	SSK
	C	15	1024.63	1028.69	SSK
	D	16	1013.01	1017.92	SSK
12.1	A	17	1020.34	1025.01	SSK
	B	18	1019.15	1022.95	SSK
	C	19	1001.90	1006.87	SSK
	D	20	1027.26	1032.51	SSK
24.2	A	21	1009.63	1013.97	SSK
	B	22	1003.83	1008.38	SSK
	C	23	1023.56	1027.57	SSK
	D	24	1005.63	~~1006~~ 1010.07	SSK
48.5	A	25	1032.75	1037.22	SSK
	B	26	1014.86	1018.94	SSK
	C	27	1005.56	1010.41	SSK
	D	28	1014.05	1018.64	SSK

Comments: 10% re-weigh: Pan # 10 : 1048.23 mg, Pan # 21 : 1013.92 mg, Pan # 28 : 1018.53 mg

Reviewed by: JGu
Date Reviewed: Feb-1/19

7-d *Lemna minor* Weight Data Sheet

Client: Teck Coal
Sample ID: LL-LCDSSLCC_WS_2018-1030_N
WO #: 181881
Start Date: Nov 1/18
Termination Date: Nov 8/18
Balance ID: Bal - 1

%(v/v)
Q4 Black

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	1020.39	1025.02	[illegible]
	B	30	1024.02	1028.74	[illegible]
	C	31	1015.18	1020.04	[illegible]
	D	32	1005.65	1010.48	[illegible]
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% re-weigh: Pan #32: 1010.35 mg

Reviewed by: [illegible]
Date Reviewed: Feb. 1/19

CETIS Analytical Report

Report Date: 14 Feb-19 16:31 (p 1 of 2)
Test Code/ID: 181881a / 10-2710-7768

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-7899-2587	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 16:29	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Batch ID:	04-8329-2839	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran		
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA		
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**			
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490	**Age:**	7d

Sample ID:	00-6371-2345	**Code:**	3CC2C59	**Project:**	
Sample Date:	30 Oct-18 11:43	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_LCDSSLCC_WS_2018-10-30_N
Sample Age:	36h (1.4 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	871566	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.9305	0.03595	40.78	107.5	2.452	2782
IC10	12.92	n/a	75.45	7.743	1.325	n/a
IC15	33.4	n/a	96.05	2.994	1.041	n/a
IC20	58.12	n/a	n/a	1.721	n/a	n/a
IC25	82.33	18.61	n/a	1.215	n/a	5.372
IC40	>97	n/a	n/a	<1.031	n/a	n/a
IC50	>97	n/a	n/a	<1.031	n/a	n/a

Frond Count Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	50.25	42	56	5.909	11.76%	0.0%	50.25	0.0%
1.5		4	46.75	42	51	3.775	8.08%	6.97%	46.75	6.97%
3		4	46.75	44	52	3.594	7.69%	6.97%	46.75	6.97%
6.1		4	45.25	39	52	5.377	11.88%	9.95%	45.38	9.7%
12.1		4	45.5	42	51	3.873	8.51%	9.45%	45.38	9.7%
24.2		4	43.75	39	48	3.686	8.42%	12.94%	43.75	12.94%
48.5		4	41.5	39	44	2.38	5.74%	17.41%	41.5	17.41%
97		4	36.5	33	43	4.435	12.15%	27.36%	36.5	27.36%

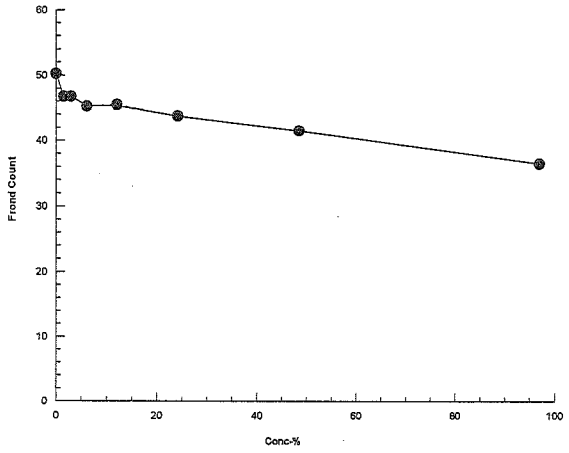
Frond Count Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	52	42	51	56
1.5		51	46	48	42
3		45	46	44	52
6.1		44	39	46	52
12.1		44	42	45	51
24.2		44	48	39	44
48.5		43	39	44	40
97		33	35	43	35

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-7899-2587	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 16:29	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Analyst: MLT QA: JGH Feb. 14/19

CETIS Analytical Report

Test Code/ID: 181881a / 10-2710-7768

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-7830-7647	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 16:30	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	04-8329-2839	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490 **Age:** 7d
Sample ID:	00-6371-2345	**Code:**	3CC2C59	**Project:**	
Sample Date:	30 Oct-18 11:43	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_LCDSSLCC_WS_2018-10-30_N
Sample Age:	36h (1.4 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1474045	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	2.426	n/a	n/a	41.22	n/a	n/a
IC10	>97	n/a	n/a	<1.031	n/a	n/a
IC15	>97	n/a	n/a	<1.031	n/a	n/a
IC20	>97	n/a	n/a	<1.031	n/a	n/a
IC25	>97	n/a	n/a	<1.031	n/a	n/a
IC40	>97	n/a	n/a	<1.031	n/a	n/a
IC50	>97	n/a	n/a	<1.031	n/a	n/a

Total Dry Weight-mg Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	4.985	4.61	5.56	0.4444	8.92%	0.0%	5.011	0.0%
1.5		4	5.038	4.49	5.8	0.6307	12.52%	-1.05%	5.011	0.0%
3		4	4.638	4.24	5.31	0.4649	10.02%	6.97%	4.638	7.46%
6.1		4	4.522	4.06	4.91	0.3733	8.26%	9.28%	4.597	8.26%
12.1		4	4.672	3.8	5.25	0.628	13.44%	6.27%	4.597	8.26%
24.2		4	4.335	4.01	4.55	0.233	5.38%	13.04%	4.531	9.59%
48.5		4	4.497	4.08	4.85	0.3203	7.12%	9.78%	4.531	9.59%
97		4	4.76	4.63	4.86	0.1055	2.22%	4.51%	4.531	9.59%

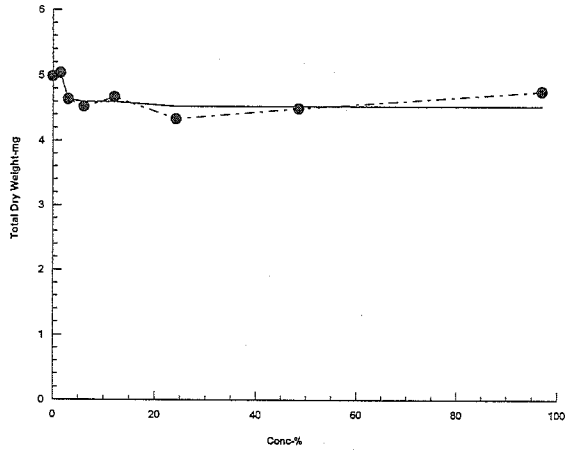
Total Dry Weight-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	4.66	4.61	5.11	5.56
1.5		4.49	5.31	5.8	4.55
3		4.51	4.49	4.24	5.31
6.1		4.4	4.72	4.06	4.91
12.1		4.67	3.8	4.97	5.25
24.2		4.34	4.55	4.01	4.44
48.5		4.47	4.08	4.85	4.59
97		4.63	4.72	4.86	4.83

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	16-7830-7647	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 16:30	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Analyst: MLT QA: Feb. 14/19

Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 181881
Start Date: Nov 1/18
Set up by: MLG

Sample Information:

Sample ID: LC-DCL-WS-2018-10-30-N
Sample Date: Oct 30/18
Date Received: Oct 31/18
Sample Volume: 5x20L

Test Organism Information:

Culture Date: 102518
Age of culture (Day 0): 7 days
>8X growth in APHA?: y (46 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm165
Date Initiated: Oct 22/18

7-d No. of Fronds IC50 (95% CL): 3.6 (3.5-3.8) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.5 (2.9-4.2) g/L KCl CV (%): 10

Test Results:

	Number of Fronds MLG	Dry Weight
IC25 %(v/v) (95% CL)	797 ~~88 (39-97)~~	>97
IC50 %(v/v) (95% CL)	797	>97

Reviewed by: JM
Date reviewed: Feb. 7/19

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck	**Setup by:**	MLT
Sample ID:	LE-DC1-WS_2018-10-30_N	**Test Date:**	Nov 1/18
Work Order No.:	181881	**CER #:**	1
Culture Source:	CPCC #490	**Test Species:**	*Lemna minor*
Test Culture Age:	7 days	**> 8X Growth? (Y/N):**	Y (4L Fronds)
Light Intensity Range:	4600-5100 lux	**Date Measured:**	Nov 1/18

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.0	Aeration?: 20 min	24.0
DO (mg/L)	8.3	Nutrients added?[1]:	8.0
pH	8.4	4	8.4
Conductivity (µS)	478	→	1252

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration (%(v/v))	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.0	24.0	8.3	4.5	867
1.5	24.0	24.0	8.3	9.5	874
3	24.0	24.0	8.3	9.3	881
6.1	24.0	24.0	8.4	9.5	895
~~12.1~~ MLT	24.0	24.0	8.4	9.6	921
24.2	24.0	24.0	8.4	9.6	969
48.5	24.0	24.0	8.4	10.1	1061
97	24.0	24.0	8.4	9.5	1252
Initials	MLT	CW	MLT	CW	MLT

Thermometer: 4 Light meter: 1 pH meter/probe: 1/1 DO meter/probe: 1/1 Conductivity meter/probe: 1/1

Sample Description: clear, colourless, odourless, some particulates

Comments:

Reviewed: JCh **Date Reviewed:** Feb. 7/19

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck Coal
Sample ID: LC-DCL WS-2018-10-30_N
Work Order #: 181881

Start Date: Nov 1/18
Termination Date: Nov 8/18
Test set up by: MLT

Concentration %(v/v)	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
Control	A	6	89										MLT
	B	6	98										
	C	6	81										
	D	6	95										
1.5	A	6	107										
	B	6	119										
	C	6	100										
	D	6	75										
3	A	6	104										
	B	6	80										
	C	6	85										
	D	6	91										
6.1	A	6	122										
	B	6	117										
	C	6	78										
	D	6	102										
12.1	A	6	89										
	B	6	93										
	C	6	109										
	D	6	77										
24.2	A	6	107										
	B	6	81										
	C	6	85										
	D	6	94										

Comments:

Reviewed by: JOM

Date Reviewed: Feb. 7/19

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck Coal
Sample ID: LL-DC1-WS-2018-10-30_w
Work Order #: 181881

Start Date: NOV 1/18
Termination Date: NOV 8/18
Test set up by: MS

Concentration o/o (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	52										MS
	B	6	85										
	C	6	65										
	D	6	83										
97	A	6	93										
	B	6	74										
	C	6	65										
	D	6	76										
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGM

Date Reviewed: Feb. 7/19

7-d *Lemna minor* Weight Data Sheet

Client: Teck Coal
Sample ID: LC_DC1_WS_2018-10-30_N
WO #: 181881
% (v/v) Q4 Bine
Start Date: Nov 1/18
Termination Date: Nov 8/18
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	1023.57	1030.14	SSK
	B	2	1007.07	1015.50	SSK
	C	3	1004.94	1011.17	SSK
	D	4	1013.74	1020.84	SSK
1.5	A	5	1031.00	1038.61	SSK
	B	6	1016.32	1024.34	SSK
	C	7	1008.52	1015.25	SSK
	D	8	1015.70	1021.50	SSK
3	A	9	1026.46	1033.72	SSK
	B	10	1016.35	1021.99	SSK
	C	11	1011.75	1017.56	SSK
	D	12	1011.59	1018.52	SSK
6.1	A	13	1025.87	1034.45	SSK
	B	14	1017.11	1025.74	SSK
	C	15	1025.07	1030.53	SSK
	D	16	1025.14	1032.68	SSK
12.1	A	17	1027.57	1034.58	SSK
	B	18	1016.18	1023.47	SSK
	C	19	1012.64	1020.33	SSK
	D	20	1021.71	1027.79	SSK
24.2	A	21	1019.71	1027.49	SSK
	B	22	1014.09	1020.21	SSK
	C	23	1023.46	1030.22	SSK
	D	24	1015.08	1022.25	SSK
48.5	A	25	1021.05	1024.44	SSK
	B	26	1030.39	1037.32	SSK
	C	27	1023.64	1029.15	SSK
	D	28	1001.08	1007.29	SSK

Comments: 10% re-weigh: Pan #: 8 : 1021.59 mg, Pan # 18 : 1023.37 mg, Pan # 23 : 1030.12 mg; Pan # 28: 1007.22 mg

Reviewed by: JSA Date Reviewed: Feb. 7/19

7-d *Lemna minor* Weight Data Sheet

Client: Teck Coal
Start Date: Nov 1/18
Sample ID: LC-DCL_WS_2018-10-30
Termination Date: Nov 8/18
WO #: 181881
Balance ID: Bal - 1
%(v/v) 04 Blnc

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	990.59	1006.39	SSK
	B	30	1024.41	1030.50	SSK
	C	31	1019.86	1025.67	SSK
	D	32	1029.54	1036.71	SSK
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: JSm
Date Reviewed: Feb. 7/19

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	17-9965-7381	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 17:24	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	17-3529-2309	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490 **Age:** 7d
Sample ID:	17-0132-9431	**Code:**	65683A17	**Project:**	
Sample Date:	30 Oct-18 10:30	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_DC1_WS_2018-10-30_N
Sample Age:	38h (0 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1693984	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	15.34	n/a	40.09	6.52	2.494	n/a
IC10	28.78	n/a	45.37	3.475	2.204	n/a
IC15	34.41	n/a	94.87	2.906	1.054	n/a
IC20	41.1	20.15	n/a	2.433	n/a	4.963
IC25	>97	n/a	n/a	<1.031	n/a	n/a
IC40	>97	n/a	n/a	<1.031	n/a	n/a
IC50	>97	n/a	n/a	<1.031	n/a	n/a

Frond Count Summary

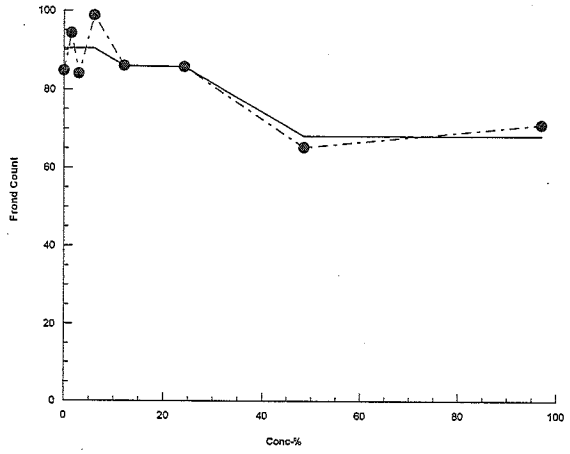
			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	84.75	75	92	7.5	8.85%	0.0%	90.44	0.0%
1.5		4	94.25	69	113	18.57	19.70%	-11.21%	90.44	0.0%
3		4	84	74	98	10.36	12.33%	0.89%	90.44	0.0%
6.1		4	98.75	72	116	19.75	20.00%	-16.52%	90.44	0.0%
12.1		4	86	71	103	13.22	15.37%	-1.48%	86	4.91%
24.2		4	85.75	75	101	11.53	13.44%	-1.18%	85.75	5.18%
48.5		4	65.25	46	79	15.67	24.02%	23.01%	68.12	24.67%
97		4	71	59	87	11.69	16.47%	16.22%	68.12	24.67%

Frond Count Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	83	92	75	89
1.5		101	113	94	69
3		98	74	79	85
6.1		116	111	72	96
12.1		83	87	103	71
24.2		101	75	79	88
48.5		46	79	59	77
97		87	68	59	70

Analysis ID:	17-9965-7381	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 17:24	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	03-9255-5189	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 17:24	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	17-3529-2309	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490 **Age:** 7d
Sample ID:	17-0132-9431	**Code:**	65683A17	**Project:**	
Sample Date:	30 Oct-18 10:30	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_DC1_WS_2018-10-30_N
Sample Age:	38h (0 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1767368	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	31.71	n/a	n/a	3.154	n/a	n/a
IC10	42.25	n/a	n/a	2.367	n/a	n/a
IC15	>97	n/a	n/a	<1.031	n/a	n/a
IC20	>97	n/a	n/a	<1.031	n/a	n/a
IC25	>97	n/a	n/a	<1.031	n/a	n/a
IC40	>97	n/a	n/a	<1.031	n/a	n/a
IC50	>97	n/a	n/a	<1.031	n/a	n/a

Total Dry Weight-mg Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	6.883	6.23	7.63	0.6136	8.92%	0.0%	6.981	0.0%
1.5		4	7.04	5.8	8.02	0.9864	14.01%	-2.29%	6.981	0.0%
3		4	6.41	5.64	7.26	0.8054	12.56%	6.87%	6.981	0.0%
6.1		4	7.553	5.46	8.63	1.483	19.63%	-9.74%	6.981	0.0%
12.1		4	7.018	6.08	7.69	0.6845	9.75%	-1.96%	6.981	0.0%
24.2		4	6.957	6.12	7.78	0.6981	10.03%	-1.09%	6.957	0.33%
48.5		4	5.51	3.39	6.93	1.528	27.72%	19.94%	6.114	12.42%
97		4	6.717	5.81	7.8	0.9298	13.84%	2.4%	6.114	12.42%

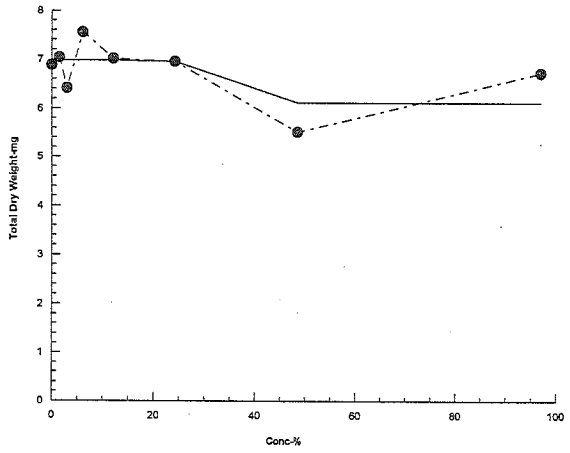
Total Dry Weight-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	6.57	7.63	6.23	7.1
1.5		7.61	8.02	6.73	5.8
3		7.26	5.64	5.81	6.93
6.1		8.58	8.63	5.46	7.54
12.1		7.01	7.29	7.69	6.08
24.2		7.78	6.12	6.76	7.17
48.5		3.39	6.93	5.51	6.21
97		7.8	6.09	5.81	7.17

Lemna Growth Inhibition Test **Nautilus Environmental**

Analysis ID:	03-9255-5189	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 17:24	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 181881

Start Date: Nov 1/18
Set up by: MG

Sample Information:

Sample ID: LC-FRDSDC-WS-2018-10-30_J
Sample Date: Oct 30/18
Date Received: Oct 31/18
Sample Volume: 5x2L

Test Organism Information:

Culture Date: 102518
Age of culture (Day 0): 7 day
>8X growth in APHA?: Y (46 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm165
Date Initiated: Oct 22/18

7-d No. of Fronds IC50 (95% CL): 3.6 (3.5 - 3.8) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.5 (2.9 - 4.2) g/L KCl CV (%): 10

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	67.3 (28.0 - 71.7)	>97
	IC50 %(v/v) (95% CL)	>97	>97

Reviewed by: JKh

Date reviewed: Feb. 14/19

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck	**Setup by:**	MLT
Sample ID:	LC-FRDSDC-WS-2018-10-30N	**Test Date:**	Nov 1/18
Work Order No.:	181881	**CER #:**	1
Culture Source:	CPCC #490	**Test Species:**	*Lemna minor*
Test Culture Age:	7 days.	**> 8X Growth? (Y/N):**	y (46 fronds)
Light Intensity Range:	4600 - 5100 lux	**Date Measured:**	Nov 1/18

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.0	Aeration?: 20 min	24.0
DO (mg/L)	8.3	Nutrients	8.1
pH	8.3	added?[1]: Y	8.4
Conductivity (µS)	772	→	1518

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration %(v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.0	24.0	8.3	8.8	866
1.5	24.0	24.0	8.3	8.8	880
3	24.0	24.0	8.3	8.5	891
6.1	24.0	24.0	8.3	8.5	914
12.1	24.0	24.0	8.4	8.6	959
24.2	24.0	24.0	8.4	8.7	1046
48.5	24.0	24.0	8.4	8.7	1208
97	24.0	24.0	8.4	8.7	1518
Initials	MLT	CW	MLT	CW	MLT

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1 DO meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

Sample Description: clear, colourless, odourless, some particulates

Comments:

Reviewed: JCh **Date Reviewed:** Feb. 8/19

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck Coal
Sample ID: LC-FRDSDE-WS-2018-10-30-N
Work Order #: 181881

Start Date: Nov 1/18
Termination Date: Nov 8/18
Test set up by: MG

Concentration %(v/v)	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
control	A	6	91										MG
	B	6	107										
	C	6	90										
	D	6	85										
1.5	A	6	106										
	B	6	97										
	C	6	116										
	D	6	96										
3	A	6	115										
	B	6	132										
	C	6	109										
	D	6	121										
6.1	A	6	99										
	B	6	97										
	C	6	120										
	D	6	107										
12.1	A	6	117										
	B	6	95										
	C	6	112										
	D	6	108										
24.2	A	6	113										
	B	6	97										
	C	6	83										
	D	6	97										

Comments:

Reviewed by: [signature]

Date Reviewed: Feb. 8/19

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck Coal
Sample ID: LE-FRO3DC-WS-2018-10-30_N
Work Order #: 181881

Start Date: Nov 1/18
Termination Date: Nov 8/18
Test set up by: MG

Concentration o/o(v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	60										MG
	B	6	112										
	C	6	97										
	D	6	88										
97	A	6	55		X								
	B	6	49		X								
	C	6	51		X								
	D	6	51		X								
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JOR

Date Reviewed: Feb. 8/19

7-d *Lemna minor* Weight Data Sheet

Client: Teck Coal
Start Date: Nov 1/18
Sample ID: LC-FRDSDC-WS-2018-1030-N
Termination Date: Nov 8/18
WO #: 181881
Balance ID: Bal - 1
0/0 (v/v)
T1 Blue

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
Control	A	1	1012.86	1019.64	SSK
	B	2	1021.16	1029.59	SSK
	C	3	1010.92	1017.75	SSK
	D	4	1031.19	1037.59	SSK
1.5	A	5	1034.17	1042.13	SSK
	B	6	1020.91	1027.81	SSK
	C	7	1024.75	1033.~~18~~20 SSK	SSK
	D	8	1014.63	1021.15	SSK
3	A	9	1005.93	1014.37	SSK
	B	10	1010.60	1019.98	SSK
	C	11	1034.51	1042.16	SSK
	D	12	1016.63	1024.95	SSK
6.1	A	13	1009.49	1016.69	SSK
	B	14	1029.48	1036.77	SSK
	C	15	1021.23	1030.16	SSK
	D	16	1027.16	1035.06	SSK
12.1	A	17	1026.84	1035.~~60~~80	SSK
	B	18	1029.85	1036.85	SSK
	C	19	1030.88	1039.17	SSK
	D	20	1023.29	1030.92	SSK
24.2	A	21	1025.60	1034.12	SSK
	B	22	1018.71	1026.21	SSK
	C	23	1019.25	1025.87	SSK
	D	24	1023.86	1031.47	SSK
48.5	A	25	1012.52	1016.83	SSK
	B	26	1014.80	1023.94	SSK
	C	27	1014.34	1022.~~98~~80 ①	SSK
	D	28	1016.90	1023.84	SSK

① 1022.18

Comments: 10% re-weigh: Pan# 1: 1019.74 mg, Pan# 7: 1033.20 mg, Pan# 15: 1030.04 mg, Pan# 27: 1022.18 mg

Reviewed by: JM
Date Reviewed: Feb. 14/19

7-d *Lemna minor* Weight Data Sheet

Client: Teck Coal
Sample ID: LL-FRDSDC_WS_2018-10-30_N
WO #: 181881
T1 Blue

Start Date: Nov 1/18
Termination Date: Nov 8/18
Balance ID: Bal - 1

Concentration (%(v/v))	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	1022.45	1028.53	[illegible]
	B	30	1016.66	1022.20	[illegible]
	C	31	1004.96	1010.15	[illegible]
	D	32	1018.32	1024.19	[illegible]
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments:

Reviewed by: [illegible]

Date Reviewed: Feb. 8/19

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-6335-3983	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 16:49	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	02-1848-9306	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490 **Age:** 7d
Sample ID:	17-7246-8808	**Code:**	69A5BA48	**Project:**	
Sample Date:	30 Oct-18 09:50	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_FRDSDC_WS_2018-10-30_N
Sample Age:	38h (0.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	630153	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	18.25	n/a	68.52	5.48	1.46	n/a
IC10	27.49	9.194	68.56	3.638	1.459	10.88
IC15	41.9	8.825	65.88	2.387	1.518	11.33
IC20	51.5	17.07	66.51	1.942	1.504	5.857
IC25	56.47	23.56	70.63	1.771	1.416	4.244
IC40	74.39	47.43	84.37	1.344	1.185	2.108
IC50	89.34	77.61	96.58	1.119	1.035	1.288

Frond Count Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	87.25	79	101	9.535	10.93%	0.0%	100	0.0%
1.5		4	97.75	90	110	9.323	9.54%	-12.03%	100	0.0%
3		4	113.2	103	126	9.811	8.66%	-29.8%	100	0.0%
6.1		4	99.75	91	114	10.44	10.46%	-14.33%	100	0.0%
12.1		4	102	89	111	9.416	9.23%	-16.91%	100	0.0%
24.2		4	91.5	77	107	12.26	13.40%	-4.87%	91.5	8.5%
48.5		4	83.25	54	106	21.87	26.27%	4.59%	83.25	16.75%
97		4	45.5	43	49	2.517	5.53%	47.85%	45.5	54.5%

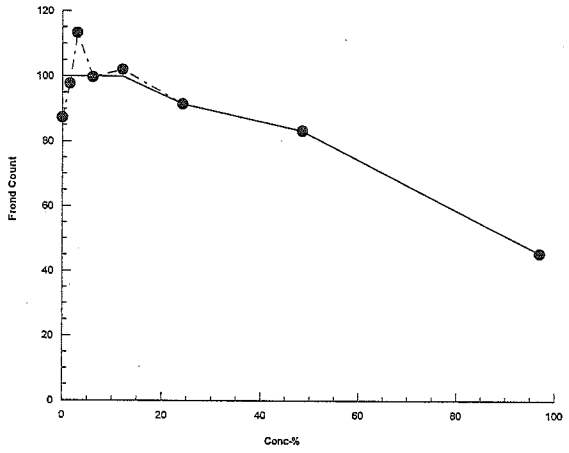
Frond Count Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	85	101	84	79
1.5		100	91	110	90
3		109	126	103	115
6.1		93	91	114	101
12.1		111	89	106	102
24.2		107	91	77	91
48.5		54	106	91	82
97		49	43	45	45

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	07-6335-3983	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 16:49	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



CETIS Analytical Report

Test Code/ID: 181881d (adj) / 01-4939-8344

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-7428-4244	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 17:17	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	06-8057-3403	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490 **Age:** 7d
Sample ID:	17-7246-8808	**Code:**	69A5BA48	**Project:**	
Sample Date:	30 Oct-18 09:50	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_FRDSDC_WS_2018-10-30_N
Sample Age:	38h (0.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	924267	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	48.83	n/a	54.22	2.048	1.844	n/a
IC10	52.92	n/a	58.11	1.89	1.721	n/a
IC15	57.35	10.51	62.28	1.744	1.606	9.512
IC20	62.14	19.53	66.81	1.609	1.497	5.121
IC25	67.32	28	71.73	1.485	1.394	3.571
IC40	85.58	60.25	89.09	1.169	1.122	1.66
IC50	>97	n/a	n/a	<1.031	n/a	n/a

Frond Count Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	87.25	79	101	9.535	10.93%	0.0%	87.25	0.0%
1.5		4	87.25	79	101	9.535	10.93%	0.0%	87.25	0.0%
3		4	87.25	79	101	9.535	10.93%	0.0%	87.25	0.0%
6.1		4	87.25	79	101	9.535	10.93%	0.0%	87.25	0.0%
12.1		4	87.25	79	101	9.535	10.93%	0.0%	87.25	0.0%
24.2		4	87.25	79	101	9.535	10.93%	0.0%	87.25	0.0%
48.5		4	83.25	54	106	21.87	26.27%	4.59%	83.25	4.59%
97		4	45.5	43	49	2.517	5.53%	47.85%	45.5	47.85%

Frond Count Detail

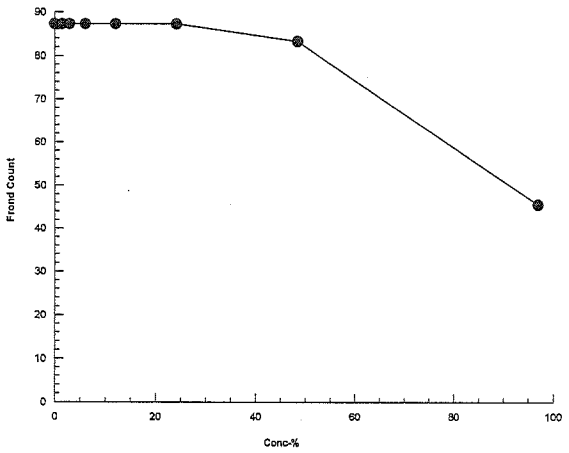
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	85	101	84	79
1.5		85	101	84	79
3		85	101	84	79
6.1		85	101	84	79
12.1		85	101	84	79
24.2		85	101	84	79
48.5		54	106	91	82
97		49	43	45	45

Analyst: MT QA: Feb 14/19

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-7428-4244	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 17:17	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Analyst: MG QA: Feb. 14/19

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-6363-6781	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 16:52	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	02-1848-9306	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490 **Age:** 7d
Sample ID:	17-7246-8808	**Code:**	69A5BA48	**Project:**	
Sample Date:	30 Oct-18 09:50	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_FRDSDC_WS_2018-10-30_N
Sample Age:	38h (0.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1379398	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	31.88	n/a	70.59	3.136	1.417	n/a
IC10	50.6	11.14	73.34	1.976	1.363	8.976
IC15	61.41	14.5	84.2	1.628	1.188	6.898
IC20	74.48	14.66	96.24	1.343	1.039	6.823
IC25	90.28	15.68	n/a	1.108	n/a	6.378
IC40	>97	n/a	n/a	<1.031	n/a	n/a
IC50	>97	n/a	n/a	<1.031	n/a	n/a

Total Dry Weight-mg Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	7.11	6.4	8.43	0.9007	12.67%	0.0%	7.753	0.0%
1.5		4	7.458	6.52	8.45	0.8994	12.06%	-4.89%	7.753	0.0%
3		4	8.447	7.65	9.38	0.7122	8.43%	-18.81%	7.753	0.0%
6.1		4	7.83	7.2	8.93	0.7965	10.17%	-10.13%	7.753	0.0%
12.1		4	7.92	7	8.76	0.7688	9.71%	-11.39%	7.753	0.0%
24.2		4	7.562	6.62	8.52	0.777	10.27%	-6.36%	7.562	2.46%
48.5		4	7.062	4.31	9.14	2.045	28.95%	0.67%	7.062	8.91%
97		4	5.67	5.19	6.08	0.3896	6.87%	20.25%	5.67	26.87%

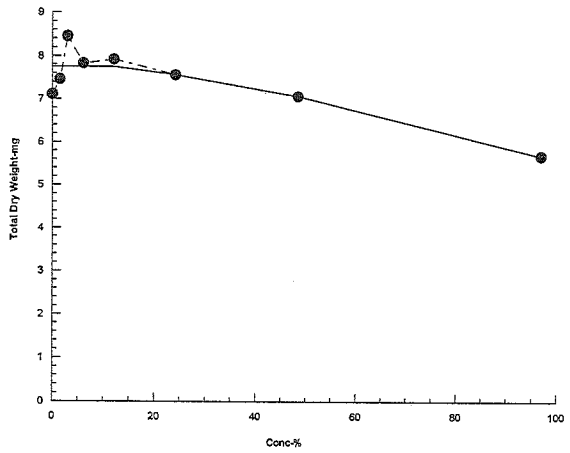
Total Dry Weight-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	6.78	8.43	6.83	6.4
1.5		7.96	6.9	8.45	6.52
3		8.44	9.38	7.65	8.32
6.1		7.2	7.29	8.93	7.9
12.1		8.76	7	8.29	7.63
24.2		8.52	7.5	6.62	7.61
48.5		4.31	9.14	7.86	6.94
97		6.08	5.54	5.19	5.87

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-6363-6781	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 16:52	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Analyst: MD QA: Feb. 14/19

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	17-8181-6562	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 17:17	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	06-8057-3403	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490 **Age:** 7d
Sample ID:	17-7246-8808	**Code:**	69A5BA48	**Project:**	
Sample Date:	30 Oct-18 09:50	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_FRDSDC_WS_2018-10-30_N
Sample Age:	38h (0.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	447507	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	56.57	n/a	60.43	1.768	1.655	n/a
IC10	67.54	n/a	75.87	1.481	1.318	n/a
IC15	80.59	1.152	96.76	1.241	1.033	86.77
IC20	96.14	6.625	n/a	1.04	n/a	15.09
IC25	>97	n/a	n/a	<1.031	n/a	n/a
IC40	>97	n/a	n/a	<1.031	n/a	n/a
IC50	>97	n/a	n/a	<1.031	n/a	n/a

Total Dry Weight-mg Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	7.11	6.4	8.43	0.9007	12.67%	0.0%	7.11	0.0%
1.5		4	7.11	6.4	8.43	0.9007	12.67%	0.0%	7.11	0.0%
3		4	7.11	6.4	8.43	0.9007	12.67%	0.0%	7.11	0.0%
6.1		4	7.11	6.4	8.43	0.9007	12.67%	0.0%	7.11	0.0%
12.1		4	7.11	6.4	8.43	0.9007	12.67%	0.0%	7.11	0.0%
24.2		4	7.11	6.4	8.43	0.9007	12.67%	0.0%	7.11	0.0%
48.5		4	7.062	4.31	9.14	2.045	28.95%	0.67%	7.062	0.67%
97		4	5.67	5.19	6.08	0.3896	6.87%	20.25%	5.67	20.25%

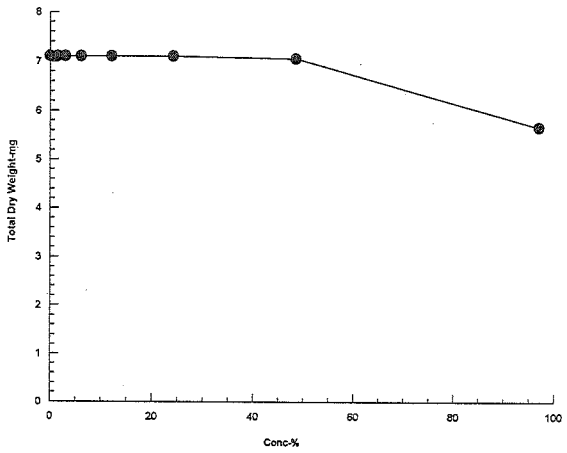
Total Dry Weight-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	6.78	8.43	6.83	6.4
1.5		6.78	8.43	6.83	6.4
3		6.78	8.43	6.83	6.4
6.1		6.78	8.43	6.83	6.4
12.1		6.78	8.43	6.83	6.4
24.2		6.78	8.43	6.83	6.4
48.5		4.31	9.14	7.86	6.94
97		6.08	5.54	5.19	5.87

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	17-8181-6562	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 17:17	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



16a

Analyst: MC QA: Feb-14/19

Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 181881
Start Date: Nov 1/18
Set up by: MG

Sample Information:

Sample ID: LC_DCDS_WS_2018-10-30_N
Sample Date: Oct 30/18
Date Received: Oct 31/18.
Sample Volume: 9x20L

Test Organism Information:

Culture Date: 102518
Age of culture (Day 0): 7 days
>8X growth in APHA?: 4 (46 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm165
Date Initiated: Oct 22/18

7-d No. of Fronds IC50 (95% CL): 3.6 (3.5-3.8) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.5 (2.9-4.2) g/L KCl CV (%): 10

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	5.8 (0.2-27.2)	>97
IC50 %(v/v) (95% CL)	797	797

Reviewed by: JM
Date reviewed: Feb. 14/19

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck Coal	**Setup by:**	MG
Sample ID:	LC_DCDS_WS_2018-10-30_N	**Test Date:**	Nov 1/18
Work Order No.:	181881	**CER #:**	1
Culture Source:	CREC #490	**Test Species:**	*Lemna minor*
Test Culture Age:	7 days	**> 8X Growth? (Y/N):**	Y (46 Fronds)
Light Intensity Range:	4600-5100 lux	**Date Measured:**	Nov 1/18

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Initials	MG	MG	MG	MG	MG	MG	MG	MG

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.0	Aeration?: 20 min	24.0
DO (mg/L)	8.3	Nutrients added?[1]: Y	8.0
pH	8.5	→	8.5
Conductivity (µS)	599		1360

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.0	24.0	8.3	8.9	866
1.5	24.0	24.0	8.3	9.1	876
3	24.0	24.0	8.4	9.1	884
6.1	24.0	24.0	8.4	9.4	896
12.1	24.0	24.0	8.4	9.0	934
24.2	24.0	24.0	8.4	9.0	997
48.5	24.0	24.0	8.4	9.1	1120
97	24.0	24.0	8.5	9.1	1360
Initials	MG	CW	MG	CW	MG

Thermometer: 4 Light meter: 1 pH meter/probe: 1/1 DO meter/probe: 1/1 Conductivity meter/probe: 1/1

Sample Description: clear, colourless, odourless, some particulates

Comments:

Reviewed: JCh **Date Reviewed:** Feb. 8/19

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck Coal
Sample ID: LC-DCDS_WS_2018-10-30_2
Work Order #: 181881

Start Date: Nov 1/18
Termination Date: Nov 8/18
Test set up by: MG

Concentration o/o(v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
control	A	6	85										MG
	B	6	104										
	C	6	102										
	D	6	120										
1.5	A	6	111										
	B	6	98										
	C	6	89										
	D	6	112										
3	A	6	108										
	B	6	84										
	C	6	83										
	D	6	74										
6.1	A	6	79										
	B	6	67										
	C	6	70										
	D	6	80										
12.1	A	6	95										
	B	6	84										
	C	6	71										
	D	6	95										
24.2	A	6	67										
	B	6	72										
	C	6	64										
	D	6	67										

Comments:

Reviewed by: JBL

Date Reviewed: Feb. 8/19

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck Coal
Sample ID: LE-DED3-WS-2018-10-30_r1
Work Order #: 181881

Start Date: Nov 1/18
Termination Date: Nov 8/18
Test set up by: MLT

Concentration % (v/v)	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
48.5	A	6	55		X								MLT
	B	6	60										
	C	6	68										
	D	6	59		X								
97	A	6	56										
	B	6	48										
	C	6	62										
	D	6	59		X								
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JGH

Date Reviewed: Feb. 8/19

7-d *Lemna minor* Weight Data Sheet

Client: Teck Coal
Sample ID: EC-DCDS_WS_2018-10-30_N
WO #: 181881
% (v/v) T2 Red
Start Date: Nov 1/18
Termination Date: Nov 8/18
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	1016.63	1022.92	SSK
	B	2	1022.63	1030.27	SSK
	C	3	1029.74	1037.03	SSK
	D	4	1023.16	1032.08	SSK
1.5	A	5	1011.75	1020.481 emn	SSK
	B	6	1033.83	1041.08	SSK
	C	7	1036.44	1042.94	SSK
	D	8	1013.42	1021.76	SSK
3	A	9	1026.54	1034.53	SSK
	B	10	1019.65	1025.65	SSK
	C	11	1029.20	1035.48	SSK
	D	12	1019.13	1024.68	SSK
6.1	A	13	1026.73	1032.~~436~~	SSK
	B	14	1038.94	1044.02	SSK
	C	15	1020.86	1026.29	SSK
	D	16	1017.51	1023.59	SSK
12.1	A	17	1037.27	1044.53	SSK
	B	18	1037.03	1043.78	SSK
	C	19	1017.97	1023.37	SSK
	D	20	1023.27	1030.70	SSK
24.2	A	21	1026.19	1031.84	SSK
	B	22	1008.05	1014.29	SSK
	C	23	1018.71	1024.24	SSK
	D	24	1034.23	1040.02	SSK
48.5	A	25	1009.58	1014.26	SSK
	B	26	1026.11	1031.20	SSK
	C	27	1033.94	1040.58	SSK
	D	28	1027.37	1032.64	SSK

Comments: 10% re-weigh: Pan # 6: 1041.15 mg, Pan # 12: 1024.73 mg, Pan # 22: 1014.31 mg

Reviewed by: JCM Date Reviewed: Feb. 14/19

7-d *Lemna minor* Weight Data Sheet

Client: Teck Coal
Sample ID: LC_DCDS_WS_2018-10-30_N
WO #: 181881
Start Date: Nov 1/18
Termination Date: Nov 8/18
Balance ID: Bal - 1

Concentration (%(v/v))	Rep	Pan No. (T2 Red)	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	1022.04	1028.62	SSK
	B	30	1023.25	1027.86	SSK
	C	31	1028.17	1035.25	SSK
	D	32	1014.57	1020.68	SSK
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% reweigh: Pan # 30 : 1027.90 mg

Reviewed by: [signature]
Date Reviewed: Feb. 8/19

CETIS Analytical Report

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	14-7152-8976	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	29 Nov-18 19:52	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	18-2726-0624	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490 **Age:** 7d
Sample ID:	20-9207-3304	**Code:**	7CB28158	**Project:**	
Sample Date:	30 Oct-18 11:45	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_DCDS_WS_2018-10-30_N
Sample Age:	36h (0.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	393914	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	1.657	n/a	4.131	60.35	24.21	n/a
IC10	2.097	n/a	5.179	47.68	19.31	n/a
IC15	2.61	0.1824	7.133	38.31	14.02	548.2
IC20	3.568	0.5777	21.38	28.02	4.677	173.1
IC25	5.82	0.1576	27.2	17.18	3.677	634.6
IC40	28.98	7.119	78.83	3.451	1.269	14.05
IC50	>97	n/a	n/a	<1.031	n/a	n/a

Frond Count Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	99.5	79	124	18.56	18.65%	0.0%	99.5	0.0%
1.5		4	96.5	83	106	11.03	11.43%	3.02%	96.5	3.02%
3		4	81.25	68	102	14.55	17.90%	18.34%	81.25	18.34%
6.1		4	68	61	74	6.481	9.53%	31.66%	74.12	25.5%
12.1		4	80.25	65	89	11.41	14.22%	19.35%	74.12	25.5%
24.2		4	61.5	58	66	3.317	5.39%	38.19%	61.5	38.19%
48.5		4	54.5	49	62	5.447	9.99%	45.23%	54.5	45.23%
97		4	50.25	42	56	6.021	11.98%	49.5%	50.25	49.5%

Frond Count Detail

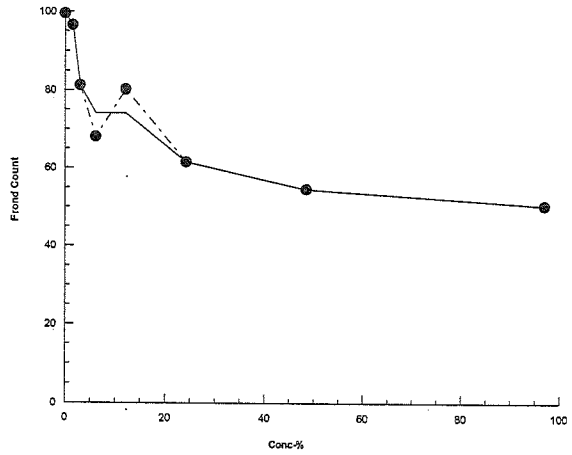
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	79	99	96	124
1.5		105	92	83	106
3		102	78	77	68
6.1		73	61	64	74
12.1		89	78	65	89
24.2		61	66	58	61
48.5		49	54	62	53
97		50	42	56	53

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	14-7152-8976	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	29 Nov-18 19:52	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



CETIS Analytical Report

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	16-5727-0477	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	29 Nov-18 19:53	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	18-2726-0624	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490 **Age:** 7d
Sample ID:	20-9207-3304	**Code:**	7CB28158	**Project:**	
Sample Date:	30 Oct-18 11:45	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_DCDS_WS_2018-10-30_N
Sample Age:	36h (0.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	41685	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	1.918	n/a	4.654	52.13	21.49	n/a
IC10	2.406	0.2536	5.913	41.55	16.91	394.4
IC15	2.976	1.234	26.01	33.6	3.844	81.07
IC20	13.28	n/a	n/a	7.53	n/a	n/a
IC25	>97	n/a	n/a	<1.031	n/a	n/a
IC40	>97	n/a	n/a	<1.031	n/a	n/a
IC50	>97	n/a	n/a	<1.031	n/a	n/a

Total Dry Weight-mg Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	7.535	6.29	8.92	1.086	14.41%	0.0%	7.611	0.0%
1.5		4	7.688	6.5	8.66	0.9955	12.95%	-2.02%	7.611	0.0%
3		4	6.455	5.55	7.99	1.067	16.52%	14.33%	6.455	15.19%
6.1		4	5.555	5.08	6.08	0.4173	7.51%	26.28%	6.133	19.43%
12.1		4	6.71	5.4	7.43	0.9199	13.71%	10.95%	6.133	19.43%
24.2		4	5.803	5.53	6.24	0.3104	5.35%	22.99%	5.803	23.76%
48.5		4	5.42	4.68	6.64	0.85	15.68%	28.07%	5.757	24.36%
97		4	6.095	4.61	7.08	1.066	17.49%	19.11%	5.757	24.36%

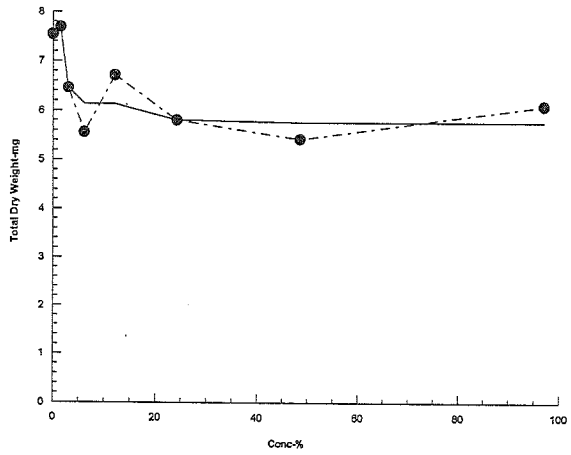
Total Dry Weight-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	6.29	7.64	7.29	8.92
1.5		8.66	7.25	6.5	8.34
3		7.99	6	6.28	5.55
6.1		5.63	5.08	5.43	6.08
12.1		7.26	6.75	5.4	7.43
24.2		5.65	6.24	5.53	5.79
48.5		4.68	5.09	6.64	5.27
97		6.58	4.61	7.08	6.11

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	16-5727-0477	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	29 Nov-18 19:53	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 181881

Start Date: Nov 1/18
Set up by: ML

Sample Information:

Sample ID: LLL65_WS_2018-10-30_N
Sample Date: Oct 30/18
Date Received: Oct 31/18
Sample Volume: 5 x 20L

Test Organism Information:

Culture Date: 102518
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (46 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm165
Date Initiated: Oct 22/18

7-d No. of Fronds IC50 (95% CL): 3.6 (3.5-3.8) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.5 (2.9-4.2) g/L KCl CV (%): 10

Test Results:

	Number of Fronds	Dry Weight
IC25 %(v/v) (95% CL)	1.2 (0.6-19.8)	1.5 (0.8-N/A)
IC50 %(v/v) (95% CL)	78.4 (58.2-97)	>97

Reviewed by: JOL

Date reviewed: Feb 8/19

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck Coal	**Setup by:**	MLT
Sample ID:	LC_LOT_WS_2018-10-30_N	**Test Date:**	Nov 1/18
Work Order No.:	181881	**CER #:**	1
Culture Source:	CPCC #490	**Test Species:**	*Lemna minor*
Test Culture Age:	7 days	**> 8X Growth? (Y/N):**	Y (46 Fronds)
Light Intensity Range:	4700 ~~5000~~ 5100 lux	**Date Measured:**	Nov 1/18

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Initials	MLT	MLT	MLT	MLT	MLT	MLT	MLT	MLT

Sample Characteristics:	Initial Water Quality		Adjusted Water Quality
Temperature (°C)	24.0	Aeration?: 20 min	24.0
DO (mg/L)	8.4	Nutrients added?[1]:	8.0
pH	8.4	Y	8.4
Conductivity (µS)	737	→	1483

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration %(v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.0	24.0	8.3	9.4	866
1.5	24.0	24.0	8.3	9.1	877
3	24.0	24.0	8.3	9.1	888
6.1	24.0	24.0	8.4	9.3	908
~~7~~ 12.1	24.0	24.0	8.4	9.5	949
24.2	24.0	24.0	8.4	9.8	1027
48.5	24.0	24.0	8.4	9.6	1190
97	24.0	24.0	8.4	9.0	1483
Initials	MLT	CW	MLT	CW	MLT

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1 DO meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

Sample Description: clear, colourless, odourless, some particulates

Comments:

Reviewed: JCH **Date Reviewed:** Feb. 8/19

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck Cool
Sample ID: LC_LC5_WS_2018-10-30_N
Work Order #: 18188|

Start Date: NOV 1/18
Termination Date: NOV 8/18
Test set up by: MG

Concentration %(v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
cntrl	A	6	96										MG
	B	6	131										
	C	6	121										
	D	6	112										
1.5	A	6	77										
	B	6	69										
	C	6	81										
	D	6	90										
3	A	6	83										
	B	6	65										
	C	6	98										
	D	6	73										
6.1	A	6	87										
	B	6	104										
	C	6	74										
	D	6	88										
12.1	A	6	73										
	B	6	79										
	C	6	71										
	D	6	78										
24.2	A	6	76										
	B	6	73										
	C	6	77										
	D	6	73										

Comments:

Reviewed by: JM

Date Reviewed: Feb. 8/19

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck Coal
Sample ID: LC_LC5_WS_2018-10-30_N
Work Order #: 18188 1

Start Date: Nov 1/18
Termination Date: Nov 8/18
Test set up by: ML

Concentration % (v/v)	Rep	No. of fronds Day 0	No. of fronds Day 7	Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
48.5	A	6	79										ML
	B	6	83										
	C	6	77										
	D	6	103										
97	A	6	54										
	B	6	53										
	C	6	47										
	D	6	56										
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JOL

Date Reviewed: Feb. 8/19

7-d *Lemna minor* Weight Data Sheet

Client: Teck Coal
Start Date: Nov 1/18
Sample ID: LC-LCS_WS_2018-10-30_N
Termination Date: Nov 8/18
WO #: 18188
Balance ID: Bal - 1
% (v/v) T4 Black

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
control	A	1	1029.22	1036.18	SSK
	B	2	1037.68	1047.06	SSK
	C	3	1032.79	1041.80	SSK
	D	4	1009.55	1017.00	SSK
1.5	A	5	1014.44	1020.09	SSK
	B	6	1020.67	1026.89	SSK
	C	7	1023.15	1028.85	SSK
	D	8	1030.48	1036.87	SSK
3	A	9	1029.99	1036.44	SSK
	B	10	1010.58	1015.91	SSK
	C	11	1023.68	1030.43	SSK
	D	12	1030.57	1036.74	SSK
6.1	A	13	1043.12	1049.67	SSK
	B	14	1016.85	1024.20	SSK
	C	15	1011.92	1017.95	SSK
	D	16	1017.33	1023.70	SSK
12.1	A	17	1016.96	1022.86	SSK
	B	18	1025.52	1031.99	SSK
	C	19	1013.38	1019.62	SSK
	D	20	1017.67	1024.04	SSK
24.2	A	21	1018.96	1024.85	SSK
	B	22	1017.88	1024.10	SSK
	C	23	1016.35	1022.34	SSK
	D	24	1000.68	1007.01	SSK
48.5	A	25	1016.34	1022.35	SSK
	B	26	1013.33	1020.14	SSK
	C	27	1004.21	1010.84	SSK
	D	28	1021.82	1030.08	SSK

Comments: 10% re-weight: Pan # 9 : 1036.47 mg, Pan # 19 : 1019.64 mg, Pan # 22 : 1024.15 mg

Reviewed by: [signature] Date Reviewed: Feb. 8/19

7-d *Lemna minor* Weight Data Sheet

Client: Teck Coal
Sample ID: LC-LCT_WS_2018-10-30_N
WO #: 181881
%(v/v) T4 Black

Start Date: Nov 1/18
Termination Date: Nov 8/18
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
97	A	29	1022.89	1028.97	SK
	B	30	1030.31	1035.98	SK
	C	31	1020.35	1025.70	SK
	D	32	1013.27	1019.33	SK
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				
	A				
	B				
	C				
	D				

Comments: 10% re-weigh: Pan # 29 : 1028.99 mg

Reviewed by: JGh

Date Reviewed: Feb: 8/19

CETIS Analytical Report

Report Date: 29 Nov-18 20:16 (p 1 of 2)
Test Code/ID: 181881b / 16-4763-0324

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	20-4941-0219	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	29 Nov-18 20:12	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Batch ID:	19-2866-8592	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran		
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA		
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**			
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490	**Age:**	7d

Sample ID:	14-1928-9377	**Code:**	5498A321	**Project:**	
Sample Date:	30 Oct-18 14:44	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_LC5_WS_2018-10-30_N
Sample Age:	33h (2 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	388403	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.1656	0.1007	0.3587	603.8	278.8	992.7
IC10	0.3587	0.21	0.8321	278.8	120.2	476.1
IC15	0.5837	0.3283	1.455	171.3	68.73	304.6
IC20	0.846	0.4559	10.6	118.2	9.436	219.4
IC25	1.152	0.593	19.84	86.82	5.039	168.6
IC40	58.65	n/a	79.65	1.705	1.255	n/a
IC50	78.43	58.22	105.4	1.275	0.9488	1.718

Frond Count Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	109	90	125	14.85	13.63%	0.0%	109	0.0%
1.5		4	73.25	63	84	8.732	11.92%	32.8%	76.42	29.89%
3		4	73.75	59	92	14.22	19.28%	32.34%	76.42	29.89%
6.1		4	82.25	68	98	12.28	14.94%	24.54%	76.42	29.89%
12.1		4	69.25	65	73	3.862	5.58%	36.47%	72.5	33.49%
24.2		4	68.75	67	71	2.062	3.00%	36.93%	72.5	33.49%
48.5		4	79.5	71	97	11.93	15.01%	27.06%	72.5	33.49%
97		4	46.5	41	50	3.873	8.33%	57.34%	46.5	57.34%

Frond Count Detail

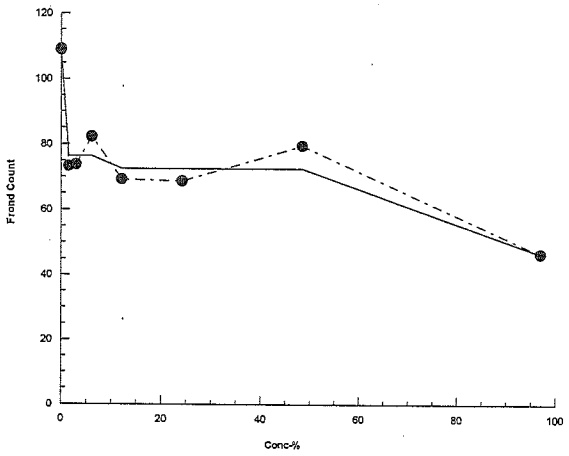
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	90	125	115	106
1.5		71	63	75	84
3		77	59	92	67
6.1		81	98	68	82
12.1		67	73	65	72
24.2		70	67	71	67
48.5		73	77	71	97
97		48	47	41	50

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	20-4941-0219	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	29 Nov-18 20:12	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



CETIS Analytical Report

Test Code/ID: 181881b / 16-4763-0324

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-4874-8409	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	29 Nov-18 20:15	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	19-2866-8592	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490 **Age:** 7d
Sample ID:	14-1928-9377	**Code:**	5498A321	**Project:**	
Sample Date:	30 Oct-18 14:44	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_LC5_WS_2018-10-30_N
Sample Age:	33h (2 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1159326	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.201	0.127	0.4569	497.4	218.9	787.4
IC10	0.4425	0.2681	1.098	226	91.08	373
IC15	0.7325	0.4243	17.63	136.5	5.673	235.7
IC20	1.081	0.5966	109.5	92.53	0.9128	167.6
IC25	1.499	0.7859	n/a	66.71	n/a	127.2
IC40	>97	n/a	n/a	<1.031	n/a	n/a
IC50	>97	n/a	n/a	<1.031	n/a	n/a

Total Dry Weight-mg Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	8.45	6.96	9.38	1.064	12.60%	0.0%	8.45	0.0%
1.5		4	5.99	5.65	6.39	0.3709	6.19%	29.11%	6.337	25.01%
3		4	6.2	5.33	6.75	0.6279	10.13%	26.63%	6.337	25.01%
6.1		4	6.575	6.03	7.35	0.5598	8.52%	22.19%	6.337	25.01%
12.1		4	6.22	5.9	6.37	0.222	3.57%	26.39%	6.337	25.01%
24.2		4	6.107	5.89	6.33	0.2027	3.32%	27.72%	6.337	25.01%
48.5		4	6.927	6.01	8.26	0.9521	13.74%	18.02%	6.337	25.01%
97		4	5.79	5.35	6.08	0.3488	6.02%	31.48%	5.79	31.48%

Total Dry Weight-mg Detail

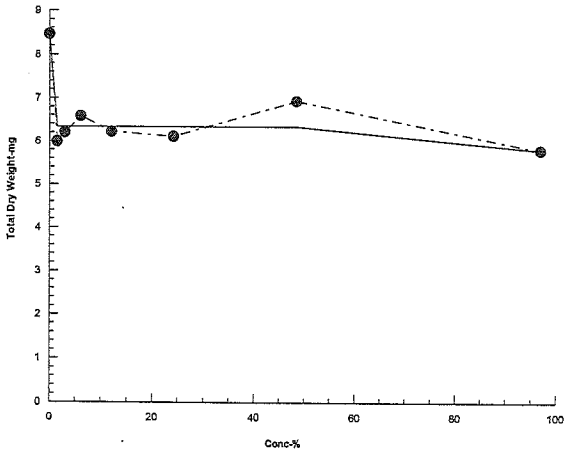
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	6.96	9.38	9.01	8.45
1.5		5.65	6.22	5.7	6.39
3		6.55	5.33	6.75	6.17
6.1		6.55	7.35	6.03	6.37
12.1		5.9	6.37	6.24	6.37
24.2		5.89	6.22	5.99	6.33
48.5		6.01	6.81	6.63	8.26
97		6.08	5.67	5.35	6.06

Lemna Growth Inhibition Test

Nautilus Environmental

Analysis ID:	02-4874-8409	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	29 Nov-18 20:15	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



Lemna minor Summary Sheet

Client: Teck Coal
Work Order No.: 181831

Start Date: Nov 1/18
Set up by: MLJ

Sample Information:

Sample ID: WL_BFWB_OUT_SP21_2018-10-30
Sample Date: Oct 30/18
Date Received: Oct 31/18
Sample Volume: 5X20L

Test Organism Information:

Culture Date: ~~Oct 25/18~~ MLJ 102518
Age of culture (Day 0): 7 days
>8X growth in APHA?: Y (46 Fronds)

KCl Reference Toxicant Results:

Reference Toxicant ID: Lm 165
Date Initiated: Oct 22/18

7-d No. of Fronds IC50 (95% CL): 3.6 (3.5-3.8) g/L KCl

7-d No. Fronds IC50 Reference Toxicant Mean (2 SD Range): 3.5 (2.9-4.2) g/L KCl CV (%): 10.

MLJ R* 4.0 (n/a-n/a)

		Number of Fronds	Dry Weight
Test Results:	IC25 %(v/v) (95% CL)	* ~~7.1 (1.8-24.4)~~ MLJ	3.5 (~~N/E~~ N/A - N/A)
	IC50 %(v/v) (95% CL)	>97	MLJ >97

Reviewed by: JSm

Date reviewed: Feb. 14/19

Plant Growth Inhibition Toxicity Test
Water Quality Measurements

Client :	Teck	**Setup by:**	MG
Sample ID:	~~LC-WFF-OUT~~ WFF WL_BFWB_OUT_SP21_2018-10-30_N MG	**Test Date:**	Nov 1/18
Work Order No.:	181881	**CER #:**	1
Culture Source:	CPCC #490	**Test Species:**	*Lemna minor*
Test Culture Age:	7 days	**> 8X Growth? (Y/N):**	y (46 Fronds)
Light Intensity Range:	9600-5100 lux	**Date Measured:**	Nov 1/18

Day	0	1	2	3	4	5	6	7
Shelf Temp (°C)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Initials	MG	MG	MG	MG	MG	MG	MG	MG

Sample Characteristics:	Initial Water Quality			Adjusted Water Quality
Temperature (°C)	24.0	Aeration?:	20 min	24.0
DO (mg/L)	8.3	Nutrients added?[1]:	Y	8.1
pH	8.2			8.4
Conductivity (µS)	240			3050

[1] 10 mL of each APHA stock (A,B and C) added to 970 mL sample.

Concentration % (v/v)	Temperature (°C)		pH		Conductivity (µS)
	Day 0	Day 7	Day 0	Day 7	0 h
Control	24.0	24.0	8.3	8.4	868
1.5	24.0	24.0	8.3	9.3	912
3	24.0	24.0	8.3	9.4	954
6	24.0	24.0	8.4	9.0	1042
11.9	24.0	24.0	8.4	9.1	1198
23.8	24.0	24.0	8.4	8.9	1494
47.6	24.0	24.0	8.4	9.7	2050
95.2	24.0	24.0	8.4	9.1	3050
Initials	MG	CW	MG	CW	MG

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1 DO meter/probe: 1 / 1 Conductivity meter/probe: 1 / 1

Sample Description: clear, colourless, odourless, slight particulates

Comments:

Reviewed: JGM **Date Reviewed:** Feb.

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck Coal
Sample ID: ~~LC WTE OUT~~ MG WL_BFWB_OUT_SP21_2018-10-30.n
Work Order #: 18188 1

Start Date: Nov 1/18
Termination Date: Nov 8/18
Test set up by: MG

Concentration % (v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
cntrl	A	6	64										MG
	B	6	81										
	C	6	56										
	D	6	56										
1.5	A	6	59										
	B	6	56										
	C	6	54										
	D	6	54										
3	A	6	54										
	B	6	49										
	C	6	52										
	D	6	48										
6.1	A	6	42										
	B	6	51										
	C	6	49										
	D	6	50										
12.1	A	6	51										
	B	6	50										
	C	6	43										
	D	6	47										
24.2	A	6	54										
	B	6	44										
	C	6	41										
	D	6	52										

Comments:

Reviewed by: JM

Date Reviewed: Feb. 8/19

Lemna minor Toxicity Test Data Sheet - 7-d Frond Counts

Client: Teck Coal
Sample ID: ~~LC-NOTE-OUT~~ WL_BFWB_OUT_SP21_2018-10-30_N
Work Order #: 18188|

Start Date: Nov 1/18
Termination Date: Nov 8/18
Test set up by: ML

Concentration %(v/v)	Rep	No. of fronds		Chlorosis	Necrosis	Yellow	Abnormal size	Gibbosity	Single fronds	Root destruction	Loss of buoyancy	Comments	Initials
		Day 0	Day 7										
48.5	A	6	32										ML
	B	6	49										
	C	6	47										
	D	6	47										
97	A	6	48										
	B	6	57										
	C	6	37										
	D	6	41										
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												
	A												
	B												
	C												
	D												

Comments:

Reviewed by: JCo

Date Reviewed: Feb. 8/19

7-d *Lemna minor* Weight Data Sheet

Client: Teck Coal
Sample ID: MQ ~~LC-WTF-OUT~~ WL_BFWB_OUT_SP2L_2018-10-30_N
WO #: 0/0(V/J) T3 Green 181881
Start Date: Nov 1/18
Termination Date: Nov 8/18
Balance ID: Bal - 1

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
Cntrl	A	1	1030.76	1036.19	SSK
	B	2	1014.16	1021.10	SSK
	C	3	1034.00	1039.58	SSK
	D	4	1019.52	1025.10	SSK
1.5	A	5	1028.95	1033.85	SSK
	B	6	1016.38	1021.09	SSK
	C	7	1027.02	1031.64	SSK
	D	8	1015.06	1019.36	SSK
3	A	9	1026.13	1031.13	SSK
	B	10	1026.98	1031.12	SSK
	C	11	1016.93	1021.23	SSK
	D	12	1028.51	1032.87	SSK
6.1	A	13	1021.44	1025.31	SSK
	B	14	1020.11	1024.45	SSK
	C	15	1014.02	1017.92	SSK
	D	16	1022.27	1026.80	SSK
12.1	A	17	1012.08	1016.50	SSK
	B	18	1011.19	1015.72	SSK
	C	19	1028.48	1031.86	SSK
	D	20	1021.49	1025.21	SSK
24.2	A	21	1024.62	1029.20	SSK
	B	22	1004.18	1008.10	SSK
	C	23	1026.14	1030.10	SSK
	D	24	1033.01	1038.05	SSK
48.5	A	25	1028.61	1030.96	SSK
	B	26	1015.40	1019.84	SSK
	C	27	1012.53	1017.03	SSK
	D	28	1017.88	1022.17	SSK

Comments: 10% re-weigh: Pan # 2: 1021.23 mg, Pan # 10: 1031.16 mg, Pan # 17: 1016.53 mg
Pan # 25: 1030.95 mg

Reviewed by: JM Date Reviewed: Feb. 8/19

7-d *Lemna minor* Weight Data Sheet

Client: Teck Coal
Start Date: Nov 1/18
Sample ID: MG ~~LCWTF_OUT~~ WL_BFWB_OUT_SP21_2018-10-30_N
Termination Date: Nov 8/18
WO #: 181881
Balance ID: Bal - 1
o/o(v/v)
T3 Green

Concentration	Rep	Pan No.	Pan weight (mg)	Pan + plant (mg)	Initials
97 ~~control~~ MG	A	29	1012.53	1017.07	SSK
	B	30	1025.50	1031.28	SSK
	C	31	1019.55	1023.68	SSK
	D	32	1010.32	1015.07	SSK
~~1.5~~ MG	A				
	B				
	C				
	D				
~~3~~ MG	A				
	B				
	C				
	D				
~~6.1~~ MG	A				
	B				
	C				
	D				
~~12.1~~ MG	A				
	B				
	C				
	D				
~~24.2~~ MG	A				
	B				
	C				
	D				
~~48.5~~ MG	A				
	B				
	C				
	D				

Comments:

Reviewed by: JGh
Date Reviewed: Feb. 8/19

CETIS Analytical Report

Test Code/ID: 181881f / 21-1669-3295

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	21-3644-5604	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 16:59	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	11-4968-1284	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490 **Age:** 7d
Sample ID:	16-4680-7015	**Code:**	622847E7	**Project:**	
Sample Date:	30 Oct-18 11:30	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	WL_BFWB_OUT_SP21_2018-10-30_
Sample Age:	37h (3.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1380912	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.3688	0.06719	3.339	271.1	29.95	1488
IC10	0.8737	0.1048	4.768	114.5	20.97	954.5
IC15	1.556	0.09705	9.601	64.25	10.42	1030
IC20	2.362	0.08838	n/a	42.35	n/a	1131
IC25	3.993	n/a	n/a	25.05	n/a	n/a
IC40	>97	n/a	n/a	<1.031	n/a	n/a
IC50	>97	n/a	n/a	<1.031	n/a	n/a

Frond Count Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	58.25	50	75	11.79	20.23%	0.0%	58.25	0.0%
1.5		4	49.75	48	53	2.363	4.75%	14.59%	49.75	14.59%
3		4	44.75	42	48	2.754	6.15%	23.18%	44.75	23.18%
6.1		4	42	36	45	4.082	9.72%	27.9%	42	27.9%
12.1		4	41.75	37	45	3.594	8.61%	28.33%	41.75	28.33%
24.2		4	41.75	35	48	6.238	14.94%	28.33%	41.75	28.33%
48.5		4	37.75	26	43	7.89	20.90%	35.19%	38.75	33.48%
97		4	39.75	31	51	8.77	22.06%	31.76%	38.75	33.48%

Frond Count Detail

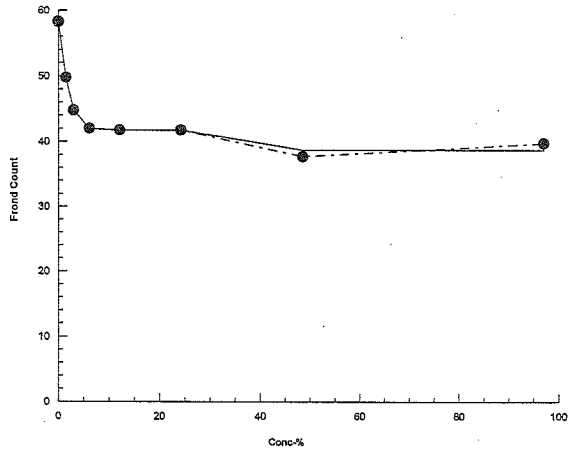
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	58	75	50	50
1.5		53	50	48	48
3		48	43	46	42
6.1		36	45	43	44
12.1		45	44	37	41
24.2		48	38	35	46
48.5		26	43	41	41
97		42	51	31	35

Analyst: MT QA: Feb-14/19

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	21-3644-5604	**Endpoint:**	Frond Count	**CETIS Version:**	CETISv1.9.4
Analyzed:	14 Feb-19 16:59	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



CETIS Analytical Report

Test Code/ID: 181881f / 21-1669-3295

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-3364-0144	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	09 Dec-18 14:53	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	11-4968-1284	**Test Type:**	Lemna Growth	**Analyst:**	Mimi Tran
Start Date:	01 Nov-18	**Protocol:**	EC/EPS 1/RM/37	**Diluent:**	Modified APHA
Ending Date:	08 Nov-18	**Species:**	Lemna minor	**Brine:**	
Test Length:	7d 0h	**Taxon:**	Tracheophyta	**Source:**	CPCC#490 **Age:** 7d
Sample ID:	16-4680-7015	**Code:**	622847E7	**Project:**	
Sample Date:	30 Oct-18 11:30	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	WL_BFWB_OUT_SP21_2018-10-30_
Sample Age:	37h (3.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	26129	200	Yes	Two-Point Interpolation

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	0.2406	0.1248	0.4903	415.6	204	801.6
IC10	0.5391	0.26	1.198	185.5	83.5	384.6
IC15	0.9095	0.4051	2.349	110	42.58	246.9
IC20	1.369	0.5585	8.778	73.05	11.39	179.1
IC25	3.469	n/a	n/a	28.83	n/a	n/a
IC40	>97	n/a	n/a	<1.031	n/a	n/a
IC50	>97	n/a	n/a	<1.031	n/a	n/a

Total Dry Weight-mg Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	4	5.882	5.43	6.94	0.7086	12.05%	0.0%	5.882	0.0%
1.5		4	4.633	4.3	4.9	0.2505	5.41%	21.25%	4.633	21.25%
3		4	4.45	4.14	5	0.3782	8.50%	24.35%	4.45	24.35%
6.1		4	4.16	3.87	4.53	0.3271	7.86%	29.28%	4.252	27.71%
12.1		4	4.012	3.38	4.53	0.5536	13.80%	31.79%	4.252	27.71%
24.2		4	4.395	3.92	5.04	0.5481	12.47%	25.29%	4.252	27.71%
48.5		4	3.895	2.35	4.5	1.034	26.54%	33.79%	4.252	27.71%
97		4	4.8	4.13	5.78	0.7022	14.63%	18.4%	4.252	27.71%

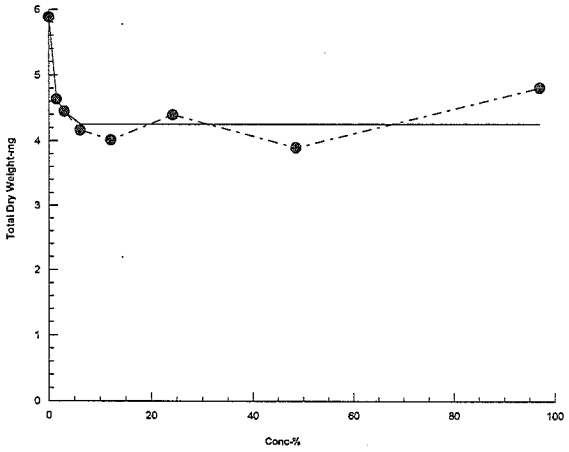
Total Dry Weight-mg Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4
0	N	5.43	6.94	5.58	5.58
1.5		4.9	4.71	4.62	4.3
3		5	4.14	4.3	4.36
6.1		3.87	4.34	3.9	4.53
12.1		4.42	4.53	3.38	3.72
24.2		4.66	3.92	3.96	5.04
48.5		2.35	4.44	4.5	4.29
97		4.54	5.78	4.13	4.75

Lemna Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-3364-0144	**Endpoint:**	Total Dry Weight-mg	**CETIS Version:**	CETISv1.9.4
Analyzed:	09 Dec-18 14:53	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



APPENDIX D – *Pseudokirchneriella subcapitata* Toxicity Test Data

Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 181879

Start Date: Nov 2/18
Set up by: ML

Sample Information:

Sample ID: LC_LCDSSLCC_WS_2018-10-30_N
Sample Date: Oct 30/18
Date Received: Oct 31/18
Sample Volume: 9x20L

Test Organism Information:

Culture Date: Oct 26/18
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC175
Stock Solution ID: 18mOt
Date Initiated: Oct 22/18

72-h IC50 (95% CL): 34.8 (31.9 - 37.6) µg/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.9 (25.8 - 37.0) µg/L Zn CV (%): 9.

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGL

Date reviewed: Feb. 1/19

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck

Setup by: MG

Sample ID: LC.LCDSSLCC_WS_2018-10-30_N

Test Date/Time: Nov 2/18 @ 0815h

Work Order No.: 181879

CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 26/18

Age of Culture: 7d

Culture Health: Good

Culture Count: 1 400 2 375

Average: 387.5

Culture Cell Density (c1): 387.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 387.5 x 10^4 cells/ml = 5.68 mL

Time Zero Counts: 1 21 2 20

Average: 20.5

No. of Cells/mL: 20.5 x 10^4

Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality pH	Water Quality Temp (°C)	Incubator Temperature (°C)				Microplates rotated 2X per day?			
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3	7.3	23.0	↓	↓	↓	↓	✓	✓	✓	✓
6	7.4	23.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.7	23.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.9	23.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 7.1 Well 2: 7.1

Light intensity (lux): 4000

Date measured: Nov 2/18

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1

Sample Description: clear, colourless, colourless, some particulates.

Comments:

Reviewed: JGL

Date reviewed: Feb. 1/19

Version 1.3; Issued July 19, 2017

Nautilus Environmental Company Inc.

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck coal Start Date/Time: Nov 2/18 @ 0815h
Work Order #: 181879 Termination Date: Nov 5/18 @ 0815h
Sample ID: LC LCD88LCC_WS_2018-10-30_N Test set up by: MLG

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	30					MLG
	B	27					
	C	28					
	D	33					
	E	34					
	F	30					
	G	32					
	H	27					
1.5	A	46					
	B	38					
	C	42					
	D	45					
3	A	49					
	B	47					
	C	51					
	D	48					
6	A	78					
	B	77					
	C	69					
	D	71					
11.9	A	117					
	B	120					
	C	115					
	D	104					
23.8	A	109					
	B	107					
	C	115					
	D	117					
47.6	A	95					
	B	103					
	C	105					
	D	101					
95.2	A	85					
	B	84					
	C	95					
	D	91					

Comments:

Reviewed by: JGK Date Reviewed: Feb. 1/19

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	2-Nov-18 @ 0815h
WO#:	181879	Termination Date/Time	5-Nov-18 @ 0815h
Sample ID:	LC_LCDSSLCC_WS_2018-10-30_N		
		Initial Cell Density:	9318 cell/mL

									205000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9318.182
Control	A	30				30	29.1	mean	29.2
	B	27				27	26.1	SD	2.695896
	C	28				28	27.1	CV	9.234678
	D	33				33	32.1		
	E	34				34	33.1		
	F	30				30	29.1		
	G	32				32	31.1		
	H	27				27	26.1		
1.5	A	46				46	45.1		
	B	38				38	37.1		
	C	42				42	41.1		
	D	45				45	44.1		
3	A	49				49	48.1		
	B	47				47	46.1		
	C	51				51	50.1		
	D	48				48	47.1		
6	A	78				78	77.1		
	B	77				77	76.1		
	C	69				69	68.1		
	D	71				71	70.1		
11.9	A	117				117	116.1		
	B	120				120	119.1		
	C	115				115	114.1		
	D	104				104	103.1		
23.8	A	109				109	108.1		
	B	107				107	106.1		
	C	115				115	114.1		
	D	117				117	116.1		
47.6	A	95				95	94.1		
	B	103				103	102.1		
	C	105				105	104.1		
	D	101				101	100.1		
95.2	A	85				85	84.1		
	B	84				84	83.1		
	C	95				95	94.1		
	D	91				91	90.1		

Reviewed by: JOh

Date reviewed: Feb-1/19

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-5547-8825	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 17:59	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	21-4260-9298	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	02 Nov-18 08:15	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	05 Nov-18 08:15	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d
Sample ID:	00-6371-2345	**Code:**	3CC2C59	**Project:**	
Sample Date:	30 Oct-18 11:43	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_LCDSSLCC_WS_2018-10-30_N
Sample Age:	69h (1.4 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1170624	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			1.0000	Non-Significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	n/a	n/a	<1.05	n/a	n/a
IC10	>95.2	n/a	n/a	<1.05	n/a	n/a
IC15	>95.2	n/a	n/a	<1.05	n/a	n/a
IC20	>95.2	n/a	n/a	<1.05	n/a	n/a
IC25	>95.2	n/a	n/a	<1.05	n/a	n/a
IC40	>95.2	n/a	n/a	<1.05	n/a	n/a
IC50	>95.2	n/a	n/a	<1.05	n/a	n/a

Cell Yield Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	8	29.12	26	33	2.696	9.26%	0.0%	75.39	0.0%
1.5		4	41.75	37	45	3.594	8.61%	-43.35%	75.39	0.0%
3		4	47.75	46	50	1.708	3.58%	-63.95%	75.39	0.0%
6		4	72.75	68	77	4.425	6.08%	-149.8%	75.39	0.0%
11.9		4	113	103	119	6.976	6.17%	-288.0%	75.39	0.0%
23.8		4	111	106	116	4.761	4.29%	-281.1%	75.39	0.0%
47.6		4	100	94	104	4.32	4.32%	-243.3%	75.39	0.0%
95.2		4	87.75	83	94	5.188	5.91%	-201.3%	75.39	0.0%

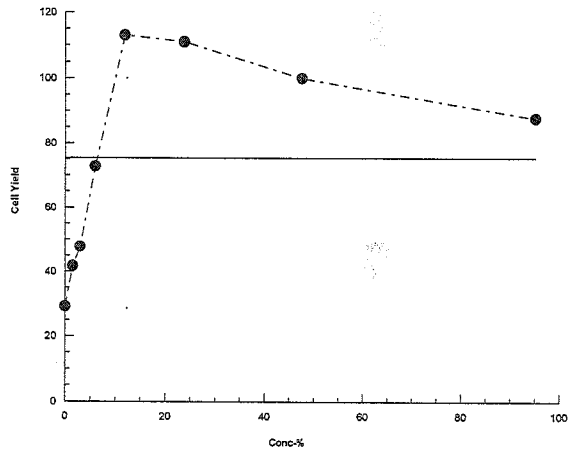
Cell Yield Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	29	26	27	32	33	29	31	26
1.5		45	37	41	44				
3		48	46	50	47				
6		77	76	68	70				
11.9		116	119	114	103				
23.8		108	106	114	116				
47.6		94	102	104	100				
95.2		84	83	94	90				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	04-5547-8825	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 17:59	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



CETIS Analytical Report

Test Code/ID: 181879a / 17-8282-0059

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	06-6742-4976	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 17:59	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	21-4260-9298	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	02 Nov-18 08:15	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	05 Nov-18 08:15	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d
Sample ID:	00-6371-2345	**Code:**	3CC2C59	**Project:**	
Sample Date:	30 Oct-18 11:43	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_LCDSSLCC_WS_2018-10-30_N
Sample Age:	69h (1.4 °C)	**Client:**	Teck Coal		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C < T	<1.5	1.5	n/a	>66.67	22.62%

Dunnett Multiple Comparison Test

Control vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	1.5*	4.841	2.526	6.588	10	CDF	1.4E-04	Significant Effect
	3*	7.141	2.526	6.588	10	CDF	<1.0E-37	Significant Effect
	6*	16.73	2.526	6.588	10	CDF	<1.0E-37	Significant Effect
	11.9*	32.16	2.526	6.588	10	CDF	<1.0E-37	Significant Effect
	23.8*	31.39	2.526	6.588	10	CDF	<1.0E-37	Significant Effect
	47.6*	27.18	2.526	6.588	10	CDF	<1.0E-37	Significant Effect
	95.2*	22.48	2.526	6.588	10	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			1.0000	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	37546.9	5363.84	7	295.7	<1.0E-37	Significant Effect
Error	507.875	18.1384	28			
Total	38054.8		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	6.964	18.48	0.4326	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9634	0.9166	0.2727	Normal Distribution

Cell Yield Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	8	29.12	26.87	31.38	29	26	33	0.9531	9.26%	0.00%
1.5		4	41.75	36.03	47.47	42.5	37	45	1.797	8.61%	-43.35%
3		4	47.75	45.03	50.47	47.5	46	50	0.8539	3.58%	-63.95%
6		4	72.75	65.71	79.79	73	68	77	2.213	6.08%	-149.79%
11.9		4	113	101.9	124.1	115	103	119	3.488	6.17%	-287.98%
23.8		4	111	103.4	118.6	111	106	116	2.38	4.29%	-281.12%
47.6		4	100	93.13	106.9	101	94	104	2.16	4.32%	-243.35%
95.2		4	87.75	79.49	96.01	87	83	94	2.594	5.91%	-201.29%

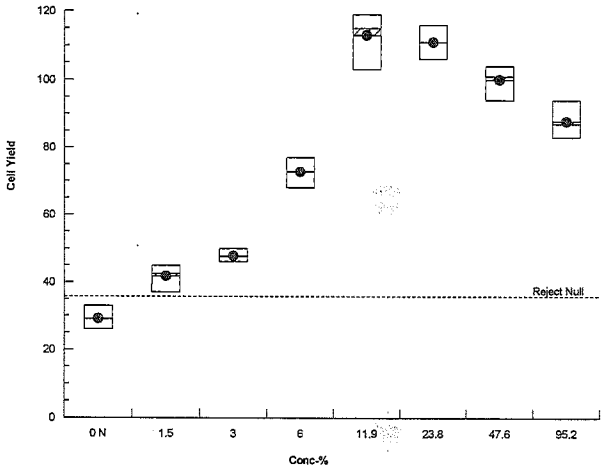
EC Alga Growth Inhibition Test — **Nautilus Environmental**

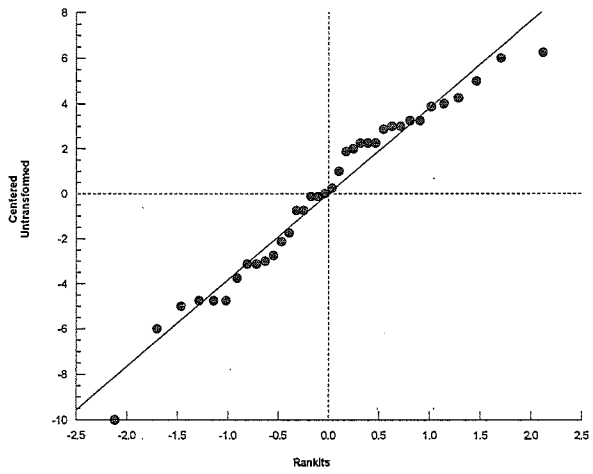
Analysis ID:	06-6742-4976	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 17:59	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Cell Yield Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	29	26	27	32	33	29	31	26
1.5		45	37	41	44				
3		48	46	50	47				
6		77	76	68	70				
11.9		116	119	114	103				
23.8		108	106	114	116				
47.6		94	102	104	100				
95.2		84	83	94	90				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 181879

Start Date: Nov 2/18
Set up by: MG

Sample Information:

Sample ID: LC-DCI_WS_2018-10-30_N
Sample Date: Oct 30/18
Date Received: Oct 31/18
Sample Volume: 5x20L.

Test Organism Information:

Culture Date: Oct 26/18
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC175
Stock Solution ID: 18Zn05
Date Initiated: Oct 22/18

72-h IC50 (95% CL): 34.8 (31.9 - 37.6) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.9 (25.8 - 37.0) ug/L Zn CV (%): 9.

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	~~>97~~ MG >95.2
IC50 %(v/v) (95% CL)	~~>97~~ MG >95.2

Reviewed by: JOL

Date reviewed: Feb-1/19

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck

Setup by: ~~No~~ MG MG

Sample ID: LC-DC1-WS-2018-10-30-N

Test Date/Time: Nov 2/18 @ 0835h

Work Order No.: 181879

CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 26/18

Age of Culture: 7d

Culture Health: Good

Culture Count: 1 400 2 375

Average: 387.5

Culture Cell Density (c1): 387.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 387.5 x 10^4 cells/ml = 5.68 mL

Time Zero Counts: 1 21 2 20

Average: 20.5

No. of Cells/mL: 20.5 x 10^4

Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality pH	Water Quality Temp (°C)	Incubator Temperature (°C)				Microplates rotated 2X per day?			
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.2	23.0					✓	✓	✓	✓
3	7.3	23.0					✓	✓	✓	✓
6	7.5	23.0					✓	✓	✓	✓
11.9	7.6	23.0					✓	✓	✓	✓
23.8	8.0	23.0					✓	✓	✓	✓
47.6	8.2	23.0					✓	✓	✓	✓
95.2	8.4	23.0					✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 7.1 Well 2: 7.1

Light intensity (lux): 4090

Date measured: Nov 2/18

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1

Sample Description: clear, colourless, odourless, some particulates.

Comments:

Reviewed: JGL

Date reviewed: Feb. 1/19

Version 1.3; Issued July 19, 2017

Nautilus Environmental Company Inc.

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: Nov 2/18 @ 0835h
Work Order #: 181879 Termination Date: Nov 5/18 @ 0835h
Sample ID: LE-DC1-WS-2018-1030 Test set up by: ML
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	30					ML
	B	34					
	C	28					
	D	29					
	E	30					
	F	32					
	G	31					
	H	28					
1.5	A	45					
	B	33					
	C	37					
	D	44					
3	A	47					
	B	50					
	C	49					
	D	56					
6	A	68					
	B	61					
	C	64					
	D	69					
11.9	A	104					
	B	107					
	C	90					
	D	93					
23.8	A	148					
	B	141					
	C	130					
	D	138					
47.6	A	133					
	B	145					
	C	149					
	D	134					
95.2	A	123					
	B	131					
	C	120					
	D	119					

Comments:

Reviewed by: JGu Date Reviewed: Feb. 1/19

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 181879
Sample ID: LC_DC1_WS_2018-10-30_N

Start Date/Time: 2-Nov-18 @ 0835h
Termination Date/Time: 5-Nov-18 @ 0835h

Initial Cell Density: 9318 cell/mL

									205000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9318.182
Control	A	30				30	29.1	mean	29.3
	B	34				34	33.1	SD	2.052873
	C	28				28	27.1	CV	7.002046
	D	29				29	28.1		
	E	30				30	29.1		
	F	32				32	31.1		
	G	31				31	30.1		
	H	28				28	27.1		
1.5	A	45				45	44.1		
	B	38				38	37.1		
	C	37				37	36.1		
	D	44				44	43.1		
3	A	47				47	46.1		
	B	50				50	49.1		
	C	49				49	48.1		
	D	56				56	55.1		
6	A	68				68	67.1		
	B	61				61	60.1		
	C	64				64	63.1		
	D	69				69	68.1		
11.9	A	105				105	104.1		
	B	107				107	106.1		
	C	90				90	89.1		
	D	93				93	92.1		
23.8	A	148				148	147.1		
	B	141				141	140.1		
	C	130				130	129.1		
	D	138				138	137.1		
47.6	A	133				133	132.1		
	B	145				145	144.1		
	C	149				149	148.1		
	D	134				134	133.1		
95.2	A	123				123	122.1		
	B	131				131	130.1		
	C	120				120	119.1		
	D	119				119	118.1		

Reviewed by: _____

Date reviewed: Feb. 1/19

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-3628-9780	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:04	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	01-8213-5568	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	02 Nov-18 08:35	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	05 Nov-18 08:35	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d
Sample ID:	17-0132-9431	**Code:**	65683A17	**Project:**	
Sample Date:	30 Oct-18 10:30	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_DC1_WS_2018-10-30_N
Sample Age:	70h (0 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2050422	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.7232	Non-Significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	n/a	n/a	<1.05	n/a	n/a
IC10	>95.2	n/a	n/a	<1.05	n/a	n/a
IC15	>95.2	n/a	n/a	<1.05	n/a	n/a
IC20	>95.2	n/a	n/a	<1.05	n/a	n/a
IC25	>95.2	n/a	n/a	<1.05	n/a	n/a
IC40	>95.2	n/a	n/a	<1.05	n/a	n/a
IC50	>95.2	n/a	n/a	<1.05	n/a	n/a

Cell Yield Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	8	29.25	27	33	2.053	7.02%	0.0%	85.09	0.0%
1.5		4	40	36	44	4.082	10.21%	-36.75%	85.09	0.0%
3		4	49.5	46	55	3.873	7.82%	-69.23%	85.09	0.0%
6		4	64.5	60	68	3.697	5.73%	-120.5%	85.09	0.0%
11.9		4	97.75	89	106	8.5	8.70%	-234.2%	85.09	0.0%
23.8		4	138.2	129	147	7.455	5.39%	-372.6%	85.09	0.0%
47.6		4	139.2	132	148	7.974	5.73%	-376.1%	85.09	0.0%
95.2		4	122.2	118	130	5.439	4.45%	-317.9%	85.09	0.0%

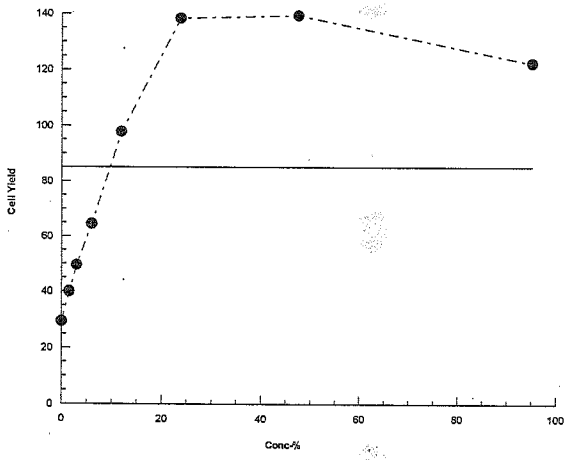
Cell Yield Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	29	33	27	28	29	31	30	27
1.5		44	37	36	43				
3		46	49	48	55				
6		67	60	63	68				
11.9		104	106	89	92				
23.8		147	140	129	137				
47.6		132	144	148	133				
95.2		122	130	119	118				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	02-3628-9780	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:04	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	15-5375-2171	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:04	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	01-8213-5568	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	02 Nov-18 08:35	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	05 Nov-18 08:35	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d
Sample ID:	17-0132-9431	**Code:**	65683A17	**Project:**	
Sample Date:	30 Oct-18 10:30	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_DC1_WS_2018-10-30_N
Sample Age:	70h (0 °C)	**Client:**	Teck Coal		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C < T	<1.5	1.5	n/a	>66.67	28.77%

Dunnett Multiple Comparison Test

Control	vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		1.5*	3.227	2.526	8.415	10	CDF	0.0100	Significant Effect
		3*	6.079	2.526	8.415	10	CDF	4.1E-06	Significant Effect
		6*	10.58	2.526	8.415	10	CDF	<1.0E-37	Significant Effect
		11.9*	20.56	2.526	8.415	10	CDF	<1.0E-37	Significant Effect
		23.8*	32.72	2.526	8.415	10	CDF	<1.0E-37	Significant Effect
		47.6*	33.02	2.526	8.415	10	CDF	<1.0E-37	Significant Effect
		95.2*	27.92	2.526	8.415	10	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.7232	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	67657.1	9665.29	7	326.6	<1.0E-37	Significant Effect
Error	828.5	29.5893	28			
Total	68485.6		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	11.52	18.48	0.1176	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9757	0.9166	0.6000	Normal Distribution

Cell Yield Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	8	29.25	27.53	30.97	29	27	33	0.7258	7.02%	0.00%
1.5		4	40	33.5	46.5	40	36	44	2.041	10.21%	-36.75%
3		4	49.5	43.34	55.66	48.5	46	55	1.936	7.82%	-69.23%
6		4	64.5	58.62	70.38	65	60	68	1.848	5.73%	-120.51%
11.9		4	97.75	84.22	111.3	98	89	106	4.25	8.70%	-234.19%
23.8		4	138.2	126.4	150.1	138.5	129	147	3.728	5.39%	-372.65%
47.6		4	139.2	126.6	151.9	138.5	132	148	3.987	5.73%	-376.07%
95.2		4	122.2	113.6	130.9	120.5	118	130	2.72	4.45%	-317.95%

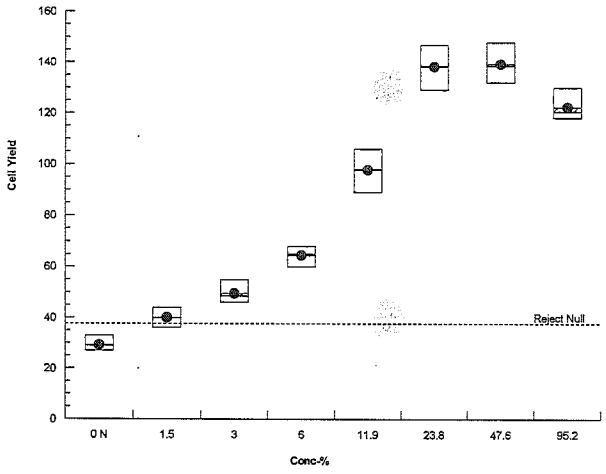
EC Alga Growth Inhibition Test — **Nautilus Environmental**

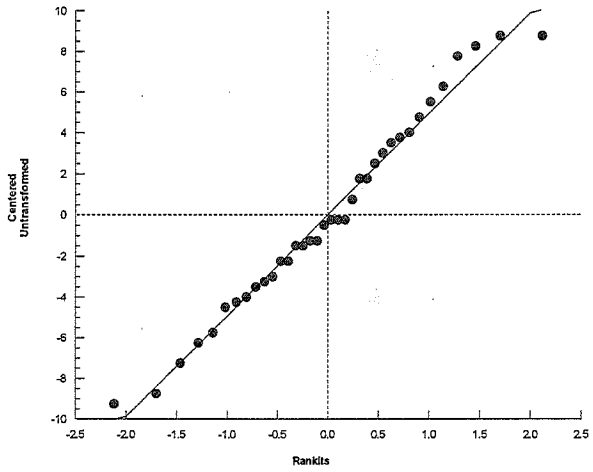
Analysis ID:	15-5375-2171	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:04	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Cell Yield Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	29	33	27	28	29	31	30	27
1.5		44	37	36	43				
3		46	49	48	55				
6		67	60	63	68				
11.9		104	106	89	92				
23.8		147	140	129	137				
47.6		132	144	148	133				
95.2		122	130	119	118				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 181879

Start Date: Nov 2/18
Set up by: ML

Sample Information:

Sample ID: LC_FRDSDC_WS_2018_10-30_1
Sample Date: Oct 30/18
Date Received: Oct 31/18
Sample Volume: 5x20L

Test Organism Information:

Culture Date: Oct 26/18
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC175
Stock Solution ID: 18Zn05
Date Initiated: Oct 22/18

72-h IC50 (95% CL): 34.8 (31.9 - 37.6) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.9 (25.8 - 37.0) ug/L Zn CV (%): 9

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	>95.2

Reviewed by: JGh

Date reviewed: Feb-1/19

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MG

Sample ID: LC-FRDSDC_INS_2018-10-30_N | Test Date/Time: Nov 2/18 @ 0850h

Work Order No.: 181879 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 26/18 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 400 2 375 | Average: 387.5 | Culture Cell Density (c1): 387.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 387.5 x 10^4 cells/ml = 5.68 mL

Time Zero Counts: 1 21 2 20 | Average: 20.5

No. of Cells/mL: 20.5 x 10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3	7.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
6	7.4	23.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.5	23.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.7	23.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.3	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.0 | Well 2: 7.0

Final control pH: Well 1: 7.1 | Well 2: 7.1

Light intensity (lux): 3800 | Date measured: Nov 2/18

Thermometer: 4 | Light meter: 1 | pH meter/probe: 1 / 1

Sample Description: clear, colourless, odourless, some particulates

Comments:

Reviewed: JCK | Date reviewed: Feb 1/19

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: Nov 2/18 @ 0850h

Work Order #: 181879 Termination Date: Nov 5/18 @ 0850h

Sample ID: LR-FRDSDE-WS-2018-1079 Test set up by: ML

%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	32					ML
	B	30					
	C	28					
	D	29					
	E	34					
	F	31					
	G	29					
	H	32					
1.5	A	49					
	B	46					
	C	45					
	D	41					
3	A	49					
	B	55					
	C	56					
	D	42					
6	A	59					
	B	62					
	C	66					
	D	57					
11.9	A	97					
	B	109					
	C	108					
	D	103					
23.8	A	96					
	B	97					
	C	120					
	D	119					
47.6	A	107					
	B	108					
	C	125					
	D	121					
95.2	A	95					
	B	102					
	C	109					
	D	97					

Comments:

Reviewed by: JGH Date Reviewed: Feb. 1/19

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	2-Nov-18 @ 0850h
WO#:	181879	Termination Date/Time	5-Nov-18 @ 0850h
Sample ID:	LC_FRDSDC_WS_2018-10-30_N		
		Initial Cell Density:	9318 cell/mL

									205000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9318.182
Control	A	32				32	31.1	mean	29.7
	B	30				30	29.1	SD	1.995531
	C	28				28	27.1	CV	6.720501
	D	29				29	28.1		
	E	34				34	33.1		
	F	31				31	30.1		
	G	29				29	28.1		
	H	32				32	31.1		
1.5	A	49				49	48.1		
	B	46				46	45.1		
	C	45				45	44.1		
	D	41				41	40.1		
3	A	49				49	48.1		
	B	55				55	54.1		
	C	56				56	55.1		
	D	42				42	41.1		
6	A	59				59	58.1		
	B	62				62	61.1		
	C	66				66	65.1		
	D	57				57	56.1		
11.9	A	97				97	96.1		
	B	109				109	108.1		
	C	108				108	107.1		
	D	103				103	102.1		
23.8	A	96				96	95.1		
	B	97				97	96.1		
	C	120				120	119.1		
	D	119				119	118.1		
47.6	A	107				107	106.1		
	B	108				108	107.1		
	C	125				125	124.1		
	D	121				121	120.1		
95.2	A	95				95	94.1		
	B	102				102	101.1		
	C	109				109	108.1		
	D	97				97	96.1		

Reviewed by: _____ Date reviewed: _____

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	19-5002-3897	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:06	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	06-4275-9822	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	02 Nov-18 08:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	05 Nov-18 08:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d
Sample ID:	17-7246-8808	**Code:**	69A5BA48	**Project:**	
Sample Date:	30 Oct-18 09:30	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_FRDSDC_WS_2018-10-30_N
Sample Age:	71h (0.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	2002794	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			1.0000	Non-Significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	n/a	n/a	<1.05	n/a	n/a
IC10	>95.2	n/a	n/a	<1.05	n/a	n/a
IC15	>95.2	n/a	n/a	<1.05	n/a	n/a
IC20	>95.2	n/a	n/a	<1.05	n/a	n/a
IC25	>95.2	n/a	n/a	<1.05	n/a	n/a
IC40	>95.2	n/a	n/a	<1.05	n/a	n/a
IC50	>95.2	n/a	n/a	<1.05	n/a	n/a

Cell Yield Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	8	29.62	27	33	1.996	6.74%	0.0%	75.95	0.0%
1.5		4	44.25	40	48	3.304	7.47%	-49.37%	75.95	0.0%
3		4	49.5	41	55	6.455	13.04%	-67.09%	75.95	0.0%
6		4	60	56	65	3.916	6.53%	-102.5%	75.95	0.0%
11.9		4	103.2	96	108	5.5	5.33%	-248.5%	75.95	0.0%
23.8		4	107	95	119	13.29	12.42%	-261.2%	75.95	0.0%
47.6		4	114.2	106	124	9.106	7.97%	-285.7%	75.95	0.0%
95.2		4	99.75	94	108	6.238	6.25%	-236.7%	75.95	0.0%

Cell Yield Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	31	29	27	28	33	30	28	31
1.5		48	45	44	40				
3		48	54	55	41				
6		58	61	65	56				
11.9		96	108	107	102				
23.8		95	96	119	118				
47.6		106	107	124	120				
95.2		94	101	108	96				

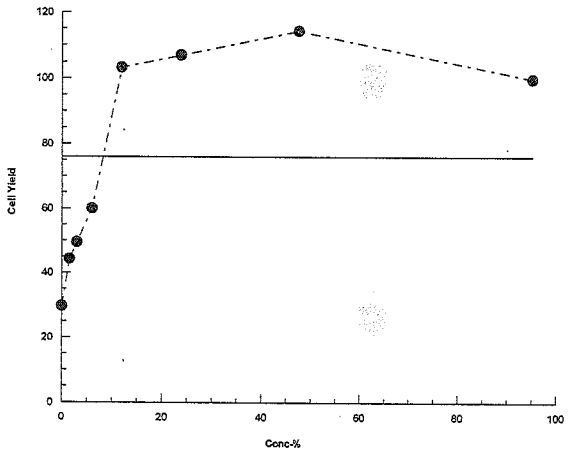
Analyst: MLT QA: Jon Feb-1/19

EC Alga Growth Inhibition Test

Nautilus Environmental

Analysis ID:	19-5002-3897	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:06	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	12-8687-8696	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:07	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	06-4275-9822	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	02 Nov-18 08:50	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	05 Nov-18 08:50	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d
Sample ID:	17-7246-8808	**Code:**	69A5BA48	**Project:**	
Sample Date:	30 Oct-18 09:30	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_FRDSDC_WS_2018-10-30_N
Sample Age:	71h (0.5 °C)	**Client:**	Teck Coal		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C < T	<1.5	1.5	n/a	>66.67	34.44%

Dunnett Multiple Comparison Test

Control vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	1.5*	3.621	2.526	10.2	10	CDF	0.0037	Significant Effect
	3*	4.921	2.526	10.2	10	CDF	1.2E-04	Significant Effect
	6*	7.521	2.526	10.2	10	CDF	<1.0E-37	Significant Effect
	11.9*	18.23	2.526	10.2	10	CDF	<1.0E-37	Significant Effect
	23.8*	19.16	2.526	10.2	10	CDF	<1.0E-37	Significant Effect
	47.6*	20.95	2.526	10.2	10	CDF	<1.0E-37	Significant Effect
	95.2*	17.36	2.526	10.2	10	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			1.0000	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	39021.8	5574.54	7	128.2	<1.0E-37	Significant Effect
Error	1217.88	43.4955	28			
Total	40239.6		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	17.4	18.48	0.0150	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9861	0.9166	0.9218	Normal Distribution

Cell Yield Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	8	29.62	27.96	31.29	29.5	27	33	0.7055	6.74%	0.00%
1.5		4	44.25	38.99	49.51	44.5	40	48	1.652	7.47%	-49.37%
3		4	49.5	39.23	59.77	51	41	55	3.227	13.04%	-67.09%
6		4	60	53.77	66.23	59.5	56	65	1.958	6.53%	-102.53%
11.9		4	103.2	94.5	112	104.5	96	108	2.75	5.33%	-248.52%
23.8		4	107	85.85	128.1	107	95	119	6.646	12.42%	-261.18%
47.6		4	114.2	99.76	128.7	113.5	106	124	4.553	7.97%	-285.65%
95.2		4	99.75	89.82	109.7	98.5	94	108	3.119	6.25%	-236.71%

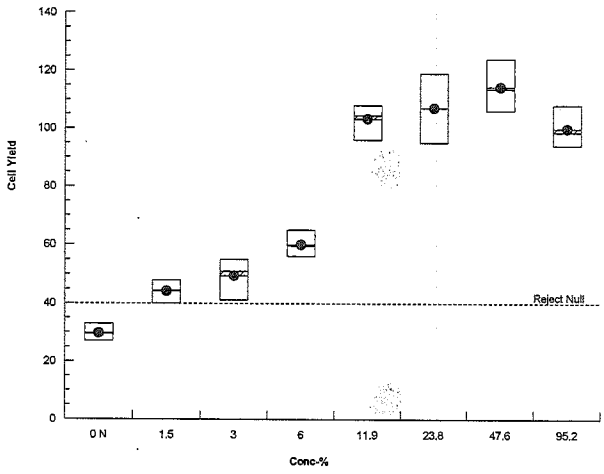
EC Alga Growth Inhibition Test — **Nautilus Environmental**

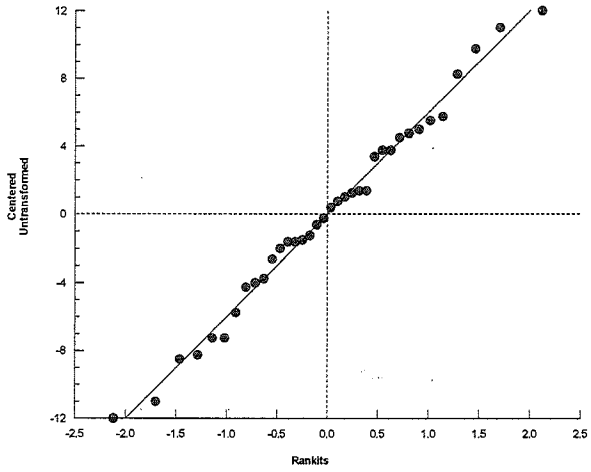
Analysis ID:	12-8687-8696	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:07	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Cell Yield Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	31	29	27	28	33	30	28	31
1.5		48	45	44	40				
3		48	54	55	41				
6		58	61	65	56				
11.9		96	108	107	102				
23.8		95	96	119	118				
47.6		106	107	124	120				
95.2		94	101	108	96				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 181879

Start Date: Nov 2/18
Set up by: ML

Sample Information:

Sample ID: LC-DCDS-WS-2018-10-30-N
Sample Date: Oct 30/18
Date Received: Oct 31/18
Sample Volume: 9x20L

Test Organism Information:

Culture Date: Oct 26/18
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC175
Stock Solution ID: 18Zn05
Date Initiated: Oct 22/18

72-h IC50 (95% CL): 34.8 (31.9 - 37.6) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.9 (25.8 - 37.0) ug/L Zn CV (%): 9

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	795.2

Reviewed by: JOH
Date reviewed: Feb. 1/19

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client : Teck **Setup by:** MG

Sample ID: LC_DCDS_WS_2018-10-30_N **Test Date/Time:** Nov 2/18 @ 0900h

Work Order No.: 181879 **CER #:** 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 26/18 **Age of Culture:** 7d **Culture Health:** Good

Culture Count: 1 4000 2 375 **Average:** 387.5 **Culture Cell Density (c1):** 387.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 387.5 x 10^4 cells/ml = 5.68 mL

Time Zero Counts: 1 21 2 20 **Average:** 20.5

No. of Cells/mL: 20.5 x 10^4 **Initial Density:** # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3	7.3	23.0	↓	↓	↓	↓	✓	✓	✓	✓
6	7.5	23.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.7	23.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.8	23.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.3	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 7.1 Well 2: 7.1

Light intensity (lux): 3950 **Date measured:** Nov 2/18

Thermometer: 4 **Light meter:** 1 **pH meter/probe:** 1/1

Sample Description: clear, colourless, odourless, some particulates.

Comments:

Reviewed: JGn **Date reviewed:** Feb. 1/19

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal | Start Date/Time: Nov 2/18 @ 0900h
Work Order #: 181879 | Termination Date: Nov 5/18 @ 0900h
Sample ID: LC-DCDS-RS_2018-10-30 | Test set up by: MG
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	32					MG
	B	38					
	C	33					
	D	30					
	E	31					
	F	35					
	G	30					
	H	29					
1.5	A	43					
	B	38					
	C	35					
	D	39					
3	A	48					
	B	53					
	C	52					
	D	47					
6	A	58					
	B	56					
	C	64					
	D	63					
11.9	A	101					
	B	103					
	C	95					
	D	110					
23.8	A	122					
	B	120					
	C	125					
	D	116					
47.6	A	118					
	B	123					
	C	124					
	D	121					
95.2	A	92					
	B	107					
	C	118					
	D	98					

Comments:

Reviewed by: JGh | Date Reviewed: Feb. 1/19

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 181879
Sample ID: LC_DCDS_WS_2018-10-30_N

Start Date/Time: 2-Nov-18 @ 0900h
Termination Date/Time: 5-Nov-18 @ 0900h

Initial Cell Density: 9318 cell/mL

									205000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9318.182
Control	A	32				32	31.1	mean	31.3
	B	38				38	37.1	SD	3.011881
	C	33				33	32.1	CV	9.617037
	D	30				30	29.1		
	E	31				31	30.1		
	F	35				35	34.1		
	G	30				30	29.1		
	H	29				29	28.1		
1.5	A	43				43	42.1		
	B	38				38	37.1		
	C	35				35	34.1		
	D	39				39	38.1		
3	A	48				48	47.1		
	B	53				53	52.1		
	C	52				52	51.1		
	D	47				47	46.1		
6	A	58				58	57.1		
	B	56				56	55.1		
	C	64				64	63.1		
	D	63				63	62.1		
11.9	A	101				101	100.1		
	B	103				103	102.1		
	C	95				95	94.1		
	D	110				110	109.1		
23.8	A	122				122	121.1		
	B	120				120	119.1		
	C	125				125	124.1		
	D	116				116	115.1		
47.6	A	118				118	117.1		
	B	123				123	122.1		
	C	124				124	123.1		
	D	121				121	120.1		
95.2	A	92				92	91.1		
	B	107				107	106.1		
	C	110				110	109.1		
	D	98				98	97.1		

Reviewed by: JOh

Date reviewed: Feb. 1/19

CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-7398-3517	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:09	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	18-5374-8528	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	02 Nov-18 09:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	05 Nov-18 09:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d
Sample ID:	20-9207-3304	**Code:**	7CB28158	**Project:**	
Sample Date:	30 Oct-18 11:45	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_DCDS_WS_2018-10-30_N
Sample Age:	69h (0.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1045119	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.1087	Non-Significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	n/a	n/a	<1.05	n/a	n/a
IC10	>95.2	n/a	n/a	<1.05	n/a	n/a
IC15	>95.2	n/a	n/a	<1.05	n/a	n/a
IC20	>95.2	n/a	n/a	<1.05	n/a	n/a
IC25	>95.2	n/a	n/a	<1.05	n/a	n/a
IC40	>95.2	n/a	n/a	<1.05	n/a	n/a
IC50	>95.2	n/a	n/a	<1.05	n/a	n/a

Cell Yield Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	8	31.25	28	37	3.012	9.64%	0.0%	77.44	0.0%
1.5		4	37.75	34	42	3.304	8.75%	-20.8%	77.44	0.0%
3		4	49	46	52	2.944	6.01%	-56.8%	77.44	0.0%
6		4	59.25	55	63	3.862	6.52%	-89.6%	77.44	0.0%
11.9		4	101.2	94	109	6.185	6.11%	-224.0%	77.44	0.0%
23.8		4	119.8	115	124	3.775	3.15%	-283.2%	77.44	0.0%
47.6		4	120.5	117	123	2.646	2.20%	-285.6%	77.44	0.0%
95.2		4	100.8	91	109	8.261	8.20%	-222.4%	77.44	0.0%

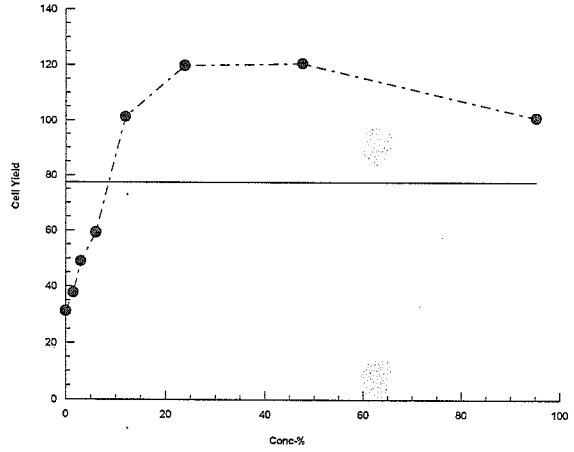
Cell Yield Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	31	37	32	29	30	34	29	28
1.5		42	37	34	38				
3		47	52	51	46				
6		57	55	63	62				
11.9		100	102	94	109				
23.8		121	119	124	115				
47.6		117	122	123	120				
95.2		91	106	109	97				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	01-7398-3517	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:09	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



CETIS Analytical Report

Report Date: 06 Dec-18 18:09 (p 1 of 2)
Test Code/ID: 181879e / 11-6750-1068

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	00-2495-6845	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:09	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1

Batch ID:	18-5374-8528	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	02 Nov-18 09:00	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	05 Nov-18 09:00	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d

Sample ID:	20-9207-3304	**Code:**	7CB28158	**Project:**	
Sample Date:	30 Oct-18 11:45	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_DCDS_WS_2018-10-30_N
Sample Age:	69h (0.5 °C)	**Client:**	Teck Coal		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C < T	1.5	3	2.121	66.67	21.95%

Dunnett Multiple Comparison Test

Control vs	Conc-%	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	1.5	2.394	2.526	6.858	10	CDF	0.0659	Non-Significant Effect
	3*	6.539	2.526	6.858	10	CDF	5.2E-07	Significant Effect
	6*	10.31	2.526	6.858	10	CDF	<1.0E-37	Significant Effect
	11.9*	25.79	2.526	6.858	10	CDF	<1.0E-37	Significant Effect
	23.8*	32.6	2.526	6.858	10	CDF	<1.0E-37	Significant Effect
	47.6*	32.88	2.526	6.858	10	CDF	<1.0E-37	Significant Effect
	95.2*	25.6	2.526	6.858	10	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.1087	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	45997.4	6571.06	7	334.4	<1.0E-37	Significant Effect
Error	550.25	19.6518	28			
Total	46547.6		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	7.871	18.48	0.3441	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9889	0.9166	0.9709	Normal Distribution

Cell Yield Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	8	31.25	28.73	33.77	30.5	28	37	1.065	9.64%	0.00%
1.5		4	37.75	32.49	43.01	37.5	34	42	1.652	8.75%	-20.80%
3		4	49	44.32	53.68	49	46	52	1.472	6.01%	-56.80%
6		4	59.25	53.1	65.4	59.5	55	63	1.931	6.52%	-89.60%
11.9		4	101.2	91.41	111.1	101	94	109	3.092	6.11%	-224.00%
23.8		4	119.8	113.7	125.8	120	115	124	1.887	3.15%	-283.20%
47.6		4	120.5	116.3	124.7	121	117	123	1.323	2.20%	-285.60%
95.2		4	100.8	87.6	113.9	101.5	91	109	4.131	8.20%	-222.40%

JGk

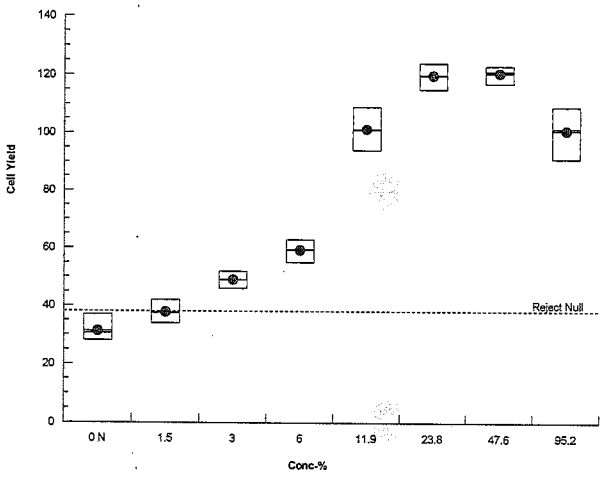
EC Alga Growth Inhibition Test — **Nautilus Environmental**

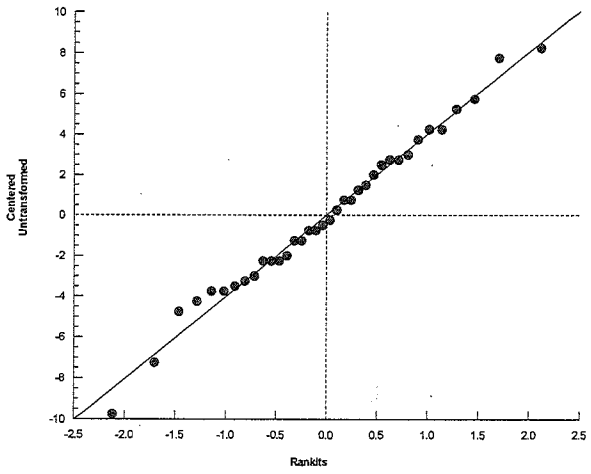
Analysis ID: 00-2495-6845 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 06 Dec-18 18:09 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Cell Yield Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	31	37	32	29	30	34	29	28
1.5		42	37	34	38				
3		47	52	51	46				
6		57	55	63	62				
11.9		100	102	94	109				
23.8		121	119	124	115				
47.6		117	122	123	120				
95.2		91	106	109	97				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 181879

Start Date: Nov 2/18
Set up by: MG

Sample Information:

Sample ID: LC-LC5-WS-2018-10-30-N
Sample Date: Oct 30/18
Date Received: Oct 31/18
Sample Volume: 5x20L

Test Organism Information:

Culture Date: Oct 26/18
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC175
Stock Solution ID: 18Zn05
Date Initiated: Oct 22/18

72-h IC50 (95% CL): 34.8 (31.9 - 37.6) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.9 (25.8 - 37.0) ug/L Zn CV (%): 9.

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	~~97~~ MG >95.2
IC50 %(v/v) (95% CL)	~~97~~ MG >95.2

Reviewed by: JBu

Date reviewed: Feb. 1/19

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck | Setup by: MG

Sample ID: LC-LC5-WS_2018-10-30_N | Test Date/Time: Nov 2/18 @ 0825h

Work Order No.: 181879 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 26/18 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 400 2 375 | Average: 387.5 | Culture Cell Density (c1): 387.5 x10⁴ cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 387.5 x10⁴ cells/ml = 5.68 mL

Time Zero Counts: 1 21 2 20 | Average: 20.5

No. of Cells/mL: 20.5 x10⁴ | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality		Incubator Temperature (°C)				Microplates rotated 2X per day?			
	pH	Temp (°C)								
	0 h	0 h	0 h	24 h	48 h	72 h	0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3	7.4	23.0	↓	↓	↓	↓	✓	✓	✓	✓
6	7.5	23.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.7	23.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	8.0	23.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.4	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 7.1 Well 2: 7.1

Light intensity (lux): 4050. Date measured: Nov 2/18

Thermometer: 4 Light meter: 7 pH meter/probe: 1 / 1

Sample Description: clear, colourless, odourless, some particulates

Comments:

Reviewed: JCh Date reviewed: Feb. 1/19

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal Start Date/Time: Nov 2/18 @ 0825h
Work Order #: 181879 Termination Date: Nov 5/18 @ 0825h
Sample ID: Leach_WS_2018-10-30_N Test set up by: MG
%(v/v)

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	28					MG
	B	34					
	C	29					
	D	32					
	E	30					
	F	32					
	G	28					
	H	31					
1.5	A	37					
	B	43					
	C	45					
	D	44					
3.0	A	52					
	B	48					
	C	50					
	D	55					
6.0	A	68					
	B	72					
	C	71					
	D	69					
MG 11.9	A	93					
	B	109					
	C	114					
	D	105					
23.8	A	126					
	B	132					
	C	130					
	D	131					
47.6	A	140					
	B	136					
	C	138					
	D	141					
95.2	A	102					
	B	98					
	C	109					
	D	104					

Comments:

Reviewed by: JRH Date Reviewed: Feb. 1/19

Pseudokirchneriella subcapitata Algal Counts

Client: Teck Coal
WO#: 181879
Sample ID: LC_LC5_WS_2018-10-30_N

Start Date/Time: 2-Nov-18 @ 0825h
Termination Date/Time: 5-Nov-18 @ 0825h

Initial Cell Density: 9318 cell/mL

									205000
									0.22
									0.01
Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9318.182
Control	A	28				28	27.1	mean	29.6
	B	34				34	33.1	SD	2.13809
	C	29				29	28.1	CV	7.23105
	D	32				32	31.1		
	E	30				30	29.1		
	F	32				32	31.1		
	G	28				28	27.1		
	H	31				31	30.1		
1.5	A	37				37	36.1		
	B	43				43	42.1		
	C	45				45	44.1		
	D	44				44	43.1		
3	A	52				52	51.1		
	B	48				48	47.1		
	C	50				50	49.1		
	D	55				55	54.1		
6	A	68				68	67.1		
	B	72				72	71.1		
	C	71				71	70.1		
	D	69				69	68.1		
11.9	A	93				93	92.1		
	B	109				109	108.1		
	C	114				114	113.1		
	D	105				105	104.1		
23.8	A	126				126	125.1		
	B	132				132	131.1		
	C	130				130	129.1		
	D	131				131	130.1		
47.6	A	140				140	139.1		
	B	136				136	135.1		
	C	138				138	137.1		
	D	141				141	140.1		
95.2	A	102				102	101.1		
	B	98				98	97.1		
	C	107				107	106.1		
	D	104				104	103.1		

Reviewed by: JOH

Date reviewed: Feb-1/19

CETIS Analytical Report

Test Code/ID: 181879b / 02-9593-5845

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	18-5797-4733	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:01	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	19-5110-4933	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	02 Nov-18 08:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	05 Nov-18 08:25	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d
Sample ID:	14-1928-9377	**Code:**	5498A321	**Project:**	
Sample Date:	30 Oct-18 14:44	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_LC5_WS_2018-10-30_N
Sample Age:	66h (2 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1161231	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.9061	Non-Significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	>95.2	n/a	n/a	<1.05	n/a	n/a
IC10	>95.2	n/a	n/a	<1.05	n/a	n/a
IC15	>95.2	n/a	n/a	<1.05	n/a	n/a
IC20	>95.2	n/a	n/a	<1.05	n/a	n/a
IC25	>95.2	n/a	n/a	<1.05	n/a	n/a
IC40	>95.2	n/a	n/a	<1.05	n/a	n/a
IC50	>95.2	n/a	n/a	<1.05	n/a	n/a

Cell Yield Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	8	29.5	27	33	2.138	7.25%	0.0%	82.81	0.0%
1.5		4	41.25	36	44	3.594	8.71%	-39.83%	82.81	0.0%
3		4	50.25	47	54	2.986	5.94%	-70.34%	82.81	0.0%
6		4	69	67	71	1.826	2.65%	-133.9%	82.81	0.0%
11.9		4	104.2	92	113	8.958	8.59%	-253.4%	82.81	0.0%
23.8		4	128.8	125	131	2.63	2.04%	-336.4%	82.81	0.0%
47.6		4	137.8	135	140	2.217	1.61%	-366.9%	82.81	0.0%
95.2		4	101.8	97	106	3.775	3.71%	-244.9%	82.81	0.0%

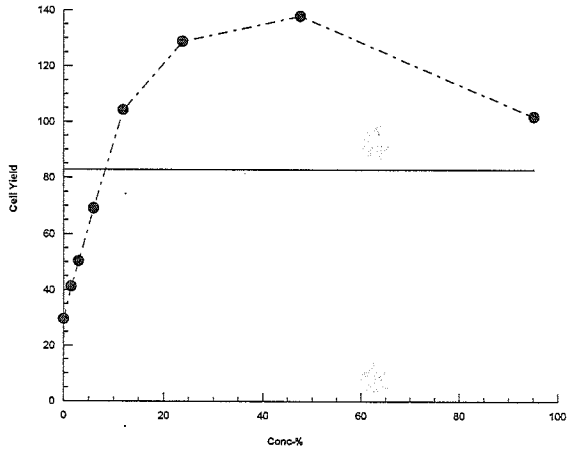
Cell Yield Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	27	33	28	31	29	31	27	30
1.5		36	42	44	43				
3		51	47	49	54				
6		67	71	70	68				
11.9		92	108	113	104				
23.8		125	131	129	130				
47.6		139	135	137	140				
95.2		101	97	106	103				

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	18-5797-4733	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:01	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	10-2541-7992	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:02	**Analysis:**	Parametric-Control vs Treatments	**Status Level:**	1
Batch ID:	19-5110-4933	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	02 Nov-18 08:25	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	05 Nov-18 08:25	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d
Sample ID:	14-1928-9377	**Code:**	5498A321	**Project:**	
Sample Date:	30 Oct-18 14:44	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	LC_LC5_WS_2018-10-30_N
Sample Age:	66h (2 °C)	**Client:**	Teck Coal		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C < T	<1.5	1.5	n/a	>66.67	20.47%

Dunnett Multiple Comparison Test

Control vs	Control II	Test Stat	Critical	MSD	DF	P-Type	P-Value	Decision(α:5%)
Negative Control	1.5*	4.916	2.526	6.038	10	CDF	1.2E-04	Significant Effect
	3*	8.682	2.526	6.038	10	CDF	<1.0E-37	Significant Effect
	6*	16.53	2.526	6.038	10	CDF	<1.0E-37	Significant Effect
	11.9*	31.28	2.526	6.038	10	CDF	<1.0E-37	Significant Effect
	23.8*	41.53	2.526	6.038	10	CDF	<1.0E-37	Significant Effect
	47.6*	45.29	2.526	6.038	10	CDF	<1.0E-37	Significant Effect
	95.2*	30.23	2.526	6.038	10	CDF	<1.0E-37	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.9061	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	57175.1	8167.87	7	536.2	<1.0E-37	Significant Effect
Error	426.5	15.2321	28			
Total	57601.6		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	14.39	18.48	0.0447	Equal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9272	0.9166	0.0206	Normal Distribution

Cell Yield Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	8	29.5	27.71	31.29	29.5	27	33	0.7559	7.25%	0.00%
1.5		4	41.25	35.53	46.97	42.5	36	44	1.797	8.71%	-39.83%
3		4	50.25	45.5	55	50	47	54	1.493	5.94%	-70.34%
6		4	69	66.09	71.91	69	67	71	0.9129	2.65%	-133.90%
11.9		4	104.2	90	118.5	106	92	113	4.479	8.59%	-253.39%
23.8		4	128.8	124.6	132.9	129.5	125	131	1.315	2.04%	-336.44%
47.6		4	137.8	134.2	141.3	138	135	140	1.109	1.61%	-366.95%
95.2		4	101.8	95.74	107.8	102	97	106	1.887	3.71%	-244.92%

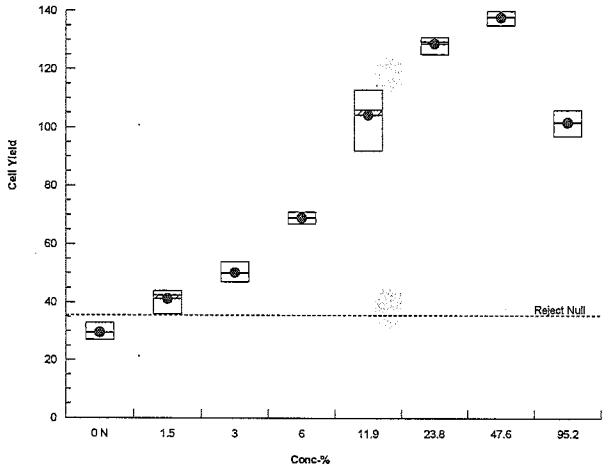
EC Alga Growth Inhibition Test — **Nautilus Environmental**

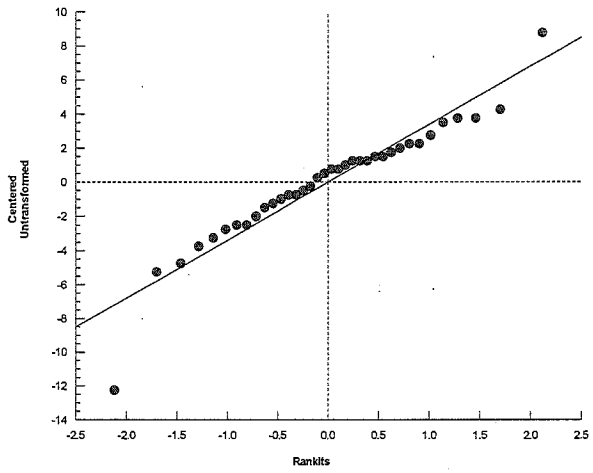
Analysis ID: 10-2541-7992 **Endpoint:** Cell Yield **CETIS Version:** CETISv1.9.4
Analyzed: 06 Dec-18 18:02 **Analysis:** Parametric-Control vs Treatments **Status Level:** 1

Cell Yield Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	27	33	28	31	29	31	27	30
1.5		36	42	44	43				
3		51	47	49	54				
6		67	71	70	68				
11.9		92	108	113	104				
23.8		125	131	129	130				
47.6		139	135	137	140				
95.2		101	97	106	103				

Graphics





Pseudokirchneriella subcapitata Summary Sheet

Client: Teck Coal
Work Order No.: 181879
Start Date: Nov 2/18
Set up by: MG

Sample Information:

Sample ID: WL-BFWB_OMT_SP21_2018-10-30_N
Sample Date: Oct 30/18
Date Received: Oct 31/18
Sample Volume: 5x20L

Test Organism Information:

Culture Date: Oct 26/18
Age of culture (Day 0): 7d

Zinc Reference Toxicant Results:

Reference Toxicant ID: SC175
Stock Solution ID: 18Zn05
Date Initiated: Oct 22/18

72-h IC50 (95% CL): 34.8 (31.9 - 37.6) ug/L Zn

72-h IC50 Reference Toxicant Mean and Range: 30.9 (25.8 - 37.0) ug/L Zn CV (%): 9.

Test Results:

	Algal Growth
IC25 %(v/v) (95% CL)	>95.2
IC50 %(v/v) (95% CL)	795.2

Reviewed by: JGM
Date reviewed: Feb. 1/19

72-h Algal Growth Inhibition Toxicity Test
Water Quality Measurements

Client: Teck Coal | Setup by: MG

Sample ID: ~~LC-WTF-OUT~~ MG | Test Date/Time: Nov 2/18 @ 0840h

Work Order No.: WL-BFNB-OUT-SP21-2018-10-30-N 181879 | CER #: 4

Test Species: *Pseudokirchneriella subcapitata*

Culture Date: Oct 26/18 | Age of Culture: 7d | Culture Health: Good

Culture Count: 1 400 2 375 | Average: 387.5 | Culture Cell Density (c1): 387.5 x 10^4 cells/mL

v1 = 220,000 cells/ml x 100 ml / (c1) 387.5 x 10^4 cells/ml = 5.68mL

Time Zero Counts: 1 21 2 20 | Average: 20.5

No. of Cells/mL: 20.5 x 10^4 | Initial Density: # cells/mL ÷ 220 µL x 10 µL = 9318 cells/mL

Concentration %(v/v)	Water Quality pH 0 h	Water Quality Temp (°C) 0 h	Incubator Temperature (°C) 0 h	24 h	48 h	72 h	Microplates rotated 2X per day? 0 h	24 h	48 h	72 h
Control	7.0	23.0	25.0	25.0	25.0	25.0	✓	✓	✓	✓
1.5	7.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
3	7.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
6	7.3	23.0	↓	↓	↓	↓	✓	✓	✓	✓
11.9	7.6	23.0	↓	↓	↓	↓	✓	✓	✓	✓
23.8	7.8	23.0	↓	↓	↓	↓	✓	✓	✓	✓
47.6	8.1	23.0	↓	↓	↓	↓	✓	✓	✓	✓
95.2	8.2	23.0	↓	↓	↓	↓	✓	✓	✓	✓
Initials	MG	MG	MG	MG	MG	MG	MG	MG	MG	MG

Initial control pH: Well 1: 7.0 Well 2: 7.0

Final control pH: Well 1: 7.1 Well 2: 7.1

Light intensity (lux): 4100 Date measured: Nov 2/18

Thermometer: 4 Light meter: 1 pH meter/probe: 1 / 1

Sample Description: clear, colourless, odourless, slight particulates.

Comments:

Reviewed: JM Date reviewed: Feb. 1/19

Pseudokirchneriella subcapitata Toxicity Test Data Sheet
72-h Algal Cell Counts

Client: Teck Coal | Start Date/Time: Nov 2/18 @ 0840h
Work Order #: 181879 | Termination Date: Nov 5/18 @ 0840h
Sample ID: ~~LC-WFF-OUT~~ ML | Test set up by: ML
%(v/v) WL_BFWB_OUT_SP21_2018-10-30_N

Concentration	Rep	Count 1	Count 2	Count 3	Count 4	Comments	Initials
Control	A	29					ML
	B	34					
	C	30					
	D	28					
	E	30					
	F	28					
	G	29					
	H	33					
1.5	A	51					
	B	~~57~~					
	C	53					
	D	59					
3	A	81					
	B	78					
	C	86					
	D	72					
6	A	123					
	B	126					
	C	105					
	D	107					
11.9	A	125					
	B	123					
	C	135					
	D	130					
23.8	A	120					
	B	125					
	C	131					
	D	121					
47.6	A	115 ~~121~~ ML					
	B	117 ~~135~~ ML					
	C	109					
	D	113					
95.2	A	96	89				
	B	69					
	C	65					
	D	72					

Comments:

Reviewed by: JCH | Date Reviewed: Feb. 1/19

Pseudokirchneriella subcapitata Algal Counts

Client:	Teck Coal	Start Date/Time:	2-Nov-18 @ 0840h		
WO#:	181879	Termination Date/Time	5-Nov-18 @ 0840h		
Sample ID:	WL_BFWB_OUT_SP21_2018-10-30_N				
		Initial Cell Density:	9318 cell/mL		205000
					0.22
					0.01

Concentration %(v/v)	Rep	Count 1 (x 10^4)	Count 2 (x 10^4)	Count 3 (x 10^4)	Count 4 (x 10^4)	Mean (x 10^4)	Cell Yield (x 10^4) cell/mL		9318.182
Control	A	29				29	28.1	mean	29.2
	B	34				34	33.1	SD	2.232071
	C	30				30	29.1	CV	7.645866
	D	28				28	27.1		
	E	30				30	29.1		
	F	28				28	27.1		
	G	29				29	28.1		
	H	33				33	32.1		
1.5	A	51				51	50.1		
	B	57				57	56.1		
	C	53				53	52.1		
	D	59				59	58.1		
3	A	81				81	80.1		
	B	78				78	77.1		
	C	86				86	85.1		
	D	72				72	71.1		
6	A	123				123	122.1		
	B	126				126	125.1		
	C	105				105	104.1		
	D	101				101	100.1		
11.9	A	125				125	124.1		
	B	123				123	122.1		
	C	135				135	134.1		
	D	130				130	129.1		
23.8	A	120				120	119.1		
	B	125				125	124.1		
	C	131				131	130.1		
	D	121				121	120.1		
47.6	A	115				115	114.1		
	B	117				117	116.1		
	C	109				109	108.1		
	D	113				113	112.1		
95.2	A	96	89			92.5	91.6		
	B	69				69	68.1		
	C	65				65	64.1		
	D	72				72	71.1		

Reviewed by: JCW

Date reviewed: Feb. 1/19

CETIS Analytical Report

Test Code/ID: 181879f / 00-3583-5583

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	09-8508-6502	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:11	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1
Batch ID:	14-2752-7599	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	02 Nov-18 08:40	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	05 Nov-18 08:40	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d
Sample ID:	16-4680-7015	**Code:**	622847E7	**Project:**	
Sample Date:	30 Oct-18 11:30	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	WL_BFWB_OUT_SP21_2018-10-30_
Sample Age:	69h (3.5 °C)	**Client:**	Teck Coal		

Linear Interpolation Options

X Transform	Y Transform	Seed	Resamples	Exp 95% CL	Method
Log(X+1)	Linear	1800202	200	Yes	Two-Point Interpolation

Residual Analysis

Attribute	Method	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.7305	Non-Significant Trend in Controls

Point Estimates

Level	%	95% LCL	95% UCL	TU	95% LCL	95% UCL
IC5	57.18	52.09	96.69	1.749	1.034	1.92
IC10	68.65	56.8	n/a	1.457	n/a	1.76
IC15	82.39	61.68	n/a	1.214	n/a	1.621
IC20	>95.2	n/a	n/a	<1.05	n/a	n/a
IC25	>95.2	n/a	n/a	<1.05	n/a	n/a
IC40	>95.2	n/a	n/a	<1.05	n/a	n/a
IC50	>95.2	n/a	n/a	<1.05	n/a	n/a

Cell Yield Summary

			Calculated Variate						Isotonic Variate	
Conc-%	Code	Count	Mean	Min	Max	Std Dev	CV%	%Effect	Mean	%Effect
0	N	8	29.12	27	33	2.232	7.66%	0.0%	91.02	0.0%
1.5		4	54	50	58	3.651	6.76%	-85.41%	91.02	0.0%
3		4	78.25	71	85	5.852	7.48%	-168.7%	91.02	0.0%
6		4	112.8	100	125	12.58	11.16%	-287.1%	91.02	0.0%
11.9		4	127.2	122	134	5.377	4.23%	-336.9%	91.02	0.0%
23.8		4	123.2	119	130	4.992	4.05%	-323.2%	91.02	0.0%
47.6		4	112.5	108	116	3.416	3.04%	-286.3%	91.02	0.0%
95.2		4	73.75	64	92	12.5	16.95%	-153.2%	73.75	18.97%

Cell Yield Detail

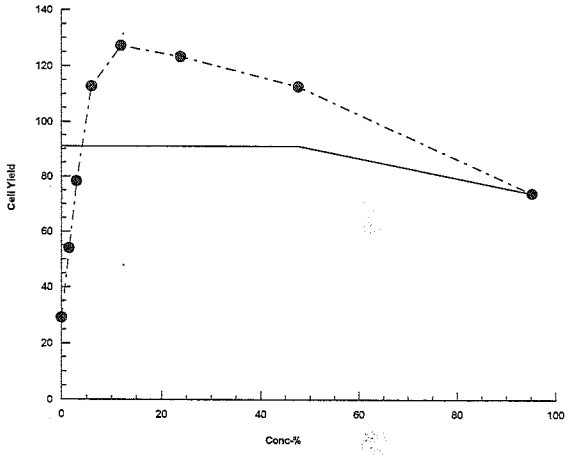
Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	28	33	29	27	29	27	28	32
1.5		50	56	52	58				
3		80	77	85	71				
6		122	125	104	100				
11.9		124	122	134	129				
23.8		119	124	130	120				
47.6		114	116	108	112				
95.2		92	68	64	71				

Analyst: MG QA: Feb. 1/19

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	09-8508-6502	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:11	**Analysis:**	Linear Interpolation (ICPIN)	**Status Level:**	1

Graphics



CETIS Analytical Report

EC Alga Growth Inhibition Test — **Nautilus Environmental**

Analysis ID:	11-7140-8875	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:12	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1
Batch ID:	14-2752-7599	**Test Type:**	Cell Growth	**Analyst:**	Mimi Tran
Start Date:	02 Nov-18 08:40	**Protocol:**	EC/EPS 1/RM/25	**Diluent:**	Deionized Water + nutrients
Ending Date:	05 Nov-18 08:40	**Species:**	Pseudokirchneriella subcapitata	**Brine:**	
Test Length:	72h	**Taxon:**	Chlorophyta	**Source:**	In-House Culture **Age:** 7d
Sample ID:	16-4680-7015	**Code:**	622847E7	**Project:**	
Sample Date:	30 Oct-18 11:30	**Material:**	Water Sample	**Source:**	Teck Coal (TECK COAL)
Receipt Date:	31 Oct-18 11:50	**CAS (PC):**		**Station:**	WL_BFWB_OUT_SP21_2018-10-30_
Sample Age:	69h (3.5 °C)	**Client:**	Teck Coal		

Data Transform	Alt Hyp	NOEL	LOEL	TOEL	TU	PMSD
Untransformed	C < T	<1.5	1.5	n/a	>66.67	37.68%

Wilcoxon/Bonferroni Adj Test

Control	vs	Control II	Test Stat	Critical	Ties	DF	P-Type	P-Value	Decision(α:5%)
Negative Control		1.5*	10	n/a	0	10	Exact	0.0141	Significant Effect
		3*	10	n/a	0	10	Exact	0.0141	Significant Effect
		6*	10	n/a	0	10	Exact	0.0141	Significant Effect
		11.9*	10	n/a	0	10	Exact	0.0141	Significant Effect
		23.8*	10	n/a	0	10	Exact	0.0141	Significant Effect
		47.6*	10	n/a	0	10	Exact	0.0141	Significant Effect
		95.2*	10	n/a	0	10	Exact	0.0141	Significant Effect

Auxiliary Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:5%)
Control Trend	Mann-Kendall Trend Test			0.7305	Non-Significant Trend in Controls

ANOVA Table

Source	Sum Squares	Mean Square	DF	F Stat	P-Value	Decision(α:5%)
Between	48328.6	6904.09	7	146.7	<1.0E-37	Significant Effect
Error	1317.62	47.058	28			
Total	49646.2		35			

Distributional Tests

Attribute	Test	Test Stat	Critical	P-Value	Decision(α:1%)
Variances	Bartlett Equality of Variance Test	18.61	18.48	0.0095	Unequal Variances
Distribution	Shapiro-Wilk W Normality Test	0.9691	0.9166	0.4018	Normal Distribution

Cell Yield Summary

Conc-%	Code	Count	Mean	95% LCL	95% UCL	Median	Min	Max	Std Err	CV%	%Effect
0	N	8	29.12	27.26	30.99	28.5	27	33	0.7892	7.66%	0.00%
1.5		4	54	48.19	59.81	54	50	58	1.826	6.76%	-85.41%
3		4	78.25	68.94	87.56	78.5	71	85	2.926	7.48%	-168.67%
6		4	112.8	92.73	132.8	113	100	125	6.29	11.16%	-287.12%
11.9		4	127.2	118.7	135.8	126.5	122	134	2.689	4.23%	-336.91%
23.8		4	123.2	115.3	131.2	122	119	130	2.496	4.05%	-323.18%
47.6		4	112.5	107.1	117.9	113	108	116	1.708	3.04%	-286.27%
95.2		4	73.75	53.86	93.64	69.5	64	92	6.25	16.95%	-153.22%

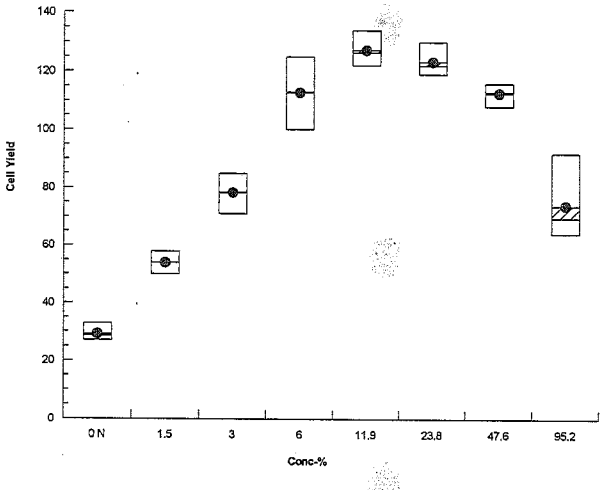
EC Alga Growth Inhibition Test — **Nautilus Environmental**

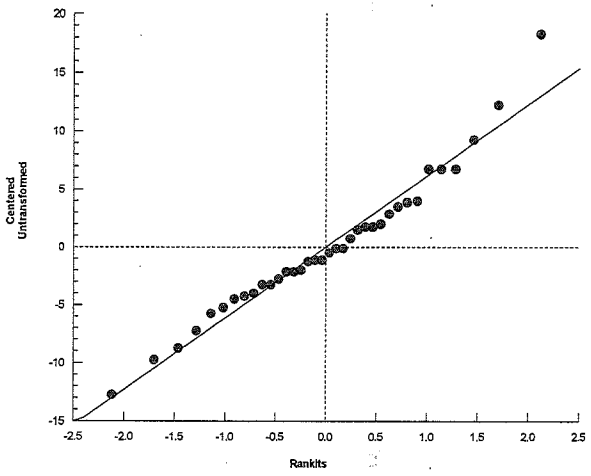
Analysis ID:	11-7140-8875	**Endpoint:**	Cell Yield	**CETIS Version:**	CETISv1.9.4
Analyzed:	06 Dec-18 18:12	**Analysis:**	Nonparametric-Multiple Comparison	**Status Level:**	1

Cell Yield Detail

Conc-%	Code	Rep 1	Rep 2	Rep 3	Rep 4	Rep 5	Rep 6	Rep 7	Rep 8
0	N	28	33	29	27	29	27	28	32
1.5		50	56	52	58				
3		80	77	85	71				
6		122	125	104	100				
11.9		124	122	134	129				
23.8		119	124	130	120				
47.6		114	116	108	112				
95.2		92	68	64	71				

Graphics





APPENDIX E – Chain-of-Custody Forms

Teck

Page 1 of 1

COC ID: 20181030-1225 | **TURNAROUND TIME:** | **RUSH:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Fording River Operation			Lab Name	Nautilus Environmental - BC			Report Format / Distribution	Excel	PDF	EDD
Project Manager	Neil MacDonald			Lab Contact				Email 1: neil.macdonald@teck.com	X	X	X
Email	Neil.MacDonald@teck.com			Email	BCinfo@nautilusenvironmental.ca			Email 2: dylan.begin@teck.com	X	X	X
Address	PO Box 100			Address	8664 Commerce Court			Email 3: chelsea.jensen@teck.com	X	X	X
City	Elkford	Province	BC	City	Burnaby	Province	BC	Email 4: jason.gravelle@teck.com	X	X	X
Postal Code	V0B 1H0	Country	Canada	Postal Code	V5A 4N7	Country	Canada	Email 5: scott.roughead@teck.com	X	X	X
Phone Number	1-250-865-5204			Phone Number	604-420-8773			Email 6: teckcoal@equisonline.com			X
								PO number			

SAMPLE DETAILS | **ANALYSIS REQUESTED** (Filtered - F: Field, L: Lab, FL: Field & Lab, N: None)

Sample ID	Sample Location (s/s_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	7-d C.dubia P/F	7-d C.dubia P/F (EDTA)	72-hr P. subcapitata P/F	30-d embryo EA P/F	30-d embryo EA P/F (40 ug/L Cu)	30-d embryo EA P/F (20 ug/L Cu)	7-d embryo P/F	28-d Hyalella P/F	28-d Hyalella P/F (EDTA)	30d FHM P/F - 10 µg/L Cu Conducted in Calgary	30d FHM P/F - 20 µg/L Cu Conducted in Calgary.	Temp (°C)
(2) FR_FRABCH_WS_2018-10-30_NP	FR_FRABCH	WS		2018/10/30	09:30	G	6x2L	X	X	X	X				X	X	X	X	1.0
(1) FR_FRCP1_WS_2018-10-30_N	FR_FRCP1	WS		2018/10/30	11:00	G	6x2L	X	X	X	X				X	X	X	X	0.5
(3) FR_UFR1_WS_2018-10-30_N	FR_UFR1	WS		2018/10/30	09:56	G	TH 3.3 Barrels	X		X	X	X	X	X	X		X		0.0
WO #								181871	181871	181870	181873	181874	181875	181876	181872	181872	181877	181878	

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

(3) Clear, colourless, odourless, no particulates
(2) Clear, colourless, odourless, some particulates
(1) ~~Clear~~, turbid, colourless, hydrocarbon odour, no particulates

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Chelsea Jensen/Jason Gravelle	30-Oct-18	Nautilus - Burnaby	Oct 31/18 @ 11:50
		NY - Nan Yamamoto	Q4 - week 1

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Chelsea Jensen/Jason Gravelle	Mobile #	250 425 4729
Sampler's Signature		Date/Time	October 30, 2018

Teck

COC ID:	Q4 Chronic TOX_Naut	TURNAROUND TIME:	regular	RUSH:	

PROJECT/CLIENT INFO

Facility Name	Greenhills Operations		
Project Manager	Leigh Stickney		
Email	leigh.stickney@teck.com		
Address	PO Box 5000		
City	Elkford	Province	BC
Postal Code	V0B 1H0	Country	Canada
Phone Number	250 865 3274		

LABORATORY

Lab Name	Nautilus Environmental		
Lab Contact	Emma Marus		
Email			
Address	8664 Commerce Court		
City	Burnaby	Province	BC
Postal Code	V5A 4N7	Country	Can
Phone Number			

OTHER INFO

EDD delivery:

Site: leigh.stickney@teck.com EQuIS: GHO

Report Format / Distribution

Yes PDF *Yes* Excel

Email 1: leigh.stickney@teck.com

Email 2: jennifer.kropp@teck.com

Email 3: jeremy.enns@teck

PO number

SAMPLE DETAILS

ANALYSIS REQUESTED

Please indicate below Filtered, Perserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	ANALYSIS	#N/A 72h P. subcapitata P/F	#N/A 7d C.dubia P/F	#N/A 28-d Hyallella P/F	#N/A 30-d embryo EA P/F	#N/A 30-d embryo EA P/F (20 ug/L Cu)	#N/A 30-d embryo EA P/F (40 ug/L Cu)	#N/A 7-d embryo EA P/F	#N/A 30d FHM P/F 10 ug/L Cu Conducted in Calgary	#N/A 30d FHM P/F 20 ug/L Cu Conducted in Calgary	#N/A	#N/A	#N/A Temp (°C)
GH_FR1_WS_2018-10-30_N	GH_FR1	WS	N	30-Oct-18	15:05	G	3x20L	WO# 181870	x	x	x	x	x	x		x	x			0.0
GH_ER2_WS_2018-10-30_N	GH_ER2	WS	N	30-Oct-18	11:30	G	7x20L	181871	x	x	x	x			x	x				1.5
GH_ERC_WS_2018-10-30_N	GH_ERC	WS	N	30-Oct-18	13:30	G	7x20L	181872	x	x	x	x			✓					2.0
								181873												
								181874												
								181875												
								181876												
								181877												
								181878												

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Clear, colourless, odourless, some particulates

RELINQUISHED BY/AFFILIATION

	Date	Time	Accepted By/Affiliation	Date	Time
4:00			Nautilus - Burnaby	Oct 31/18	11:50
			N4 - Nair Yamamoto	Q4 - week 1	

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Jaydon Francis	Mobile #	
Sampler's Signature		Date/Time	

Teck

Page 1 of 1

COC ID: 2018-10-30_Chronic_Tox_SP21 **TURNAROUND TIME:** REGULAR **RUSH:**

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO				
Facility Name	WLC AWTF			Lab Name	Nautilus Environmental			Report Format / Distribution		Excel	PDF	EDD
Project Manager	Thomas Davidson			Lab Contact	Jacklyn Pool			Email 1:	thomas.davidson@teck.com	X	X	X
Email	thomas.davidson@teck.com			Email	Jacklyn@NautilusEnvironmental.ca			Email 2:	teckcoal@equisonline.com			X
Address	15 Km North HWY 43			Address	#4, 6125 - 12 Street SE			Email 3:	teckwlelab@epcor.com	X	X	X
								Email 4:	Marty.Hafke@teck.com	X	X	X
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5:	colin.lynch@teck.com			X
Postal Code	V0B 2G0	Country	Canada	Postal Code	T2H 2K1	Country	Canada	Email 6:	jocelyn.traverse@teck.com	X	X	X
Phone Number	(250) 603 - 9417			Phone Number	+1.403.253.7121			PO number	VPO00513230			

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Please indicate below Filtered, Preserved or both (F, P, F/P)

Sample ID	Sample Location	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	7 d Cdubia dilution series	72hr Psubcapitata dilution series	7d L minor plant growth dilution series	7 d O mykis development dilution series	EXTRA	Temp (°C)
WL_BFWB_OUT_SP21_2018-10-30_N	WL_BFWB_OUT_SP21	WS		10/30/2018	1130	G	5x2L	X	X	X	X	X	3.5
								WO# 181880	181879	181881	181882		

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	Date	Time	Accepted By/Affiliation	Date	Time
				Nautilus - Burnaby NY - Nan Yamamoto	Oct 31/18	11:50

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Errin DeBoer	**Mobile #**	
Sampler's Signature		**Date/Time**	30-Oct-18

Q4-week1

Sample desc- clear, no colour no odour slight particulates

Teck

COC ID:	20181030 Chronix tox	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Line Creek Operation		
Project Manager	Chris Blurton		
Email	Chris.Blurton@teck.com		
Address	Box 2003		
	15km North Hwy 43		
City	Sparwood	Province	BC
Postal Code	V0B 2G0	Country	Canada
Phone Number	250-425-3196		

LABORATORY

Lab Name	Nautilus Environmental - BC		
Lab Contact			
Email	BCinfo@nautilusenvironmental.ca		
Address	8664 Commerce Court		
City	Burnaby	Province	BC
Postal Code	V5A 4N7	Country	Canada
Phone Number	604-420-8773		

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	drake.tymstra@teck.com	x	x	
Email 2:	chris.blurton@teck.com	x	x	
Email 3:	kirsten.campbell@teck.com	x	x	
Email 4:	teckcoal@equisonline.com			X
PO number	VPO00432106			

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Filtered - F: Field, L: Lab, FL: Field & Lab, N: None

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	7-d C.dubia P/F (181871)	72-hr P. subcapitata P/F (181870)	30-d embryo EA P/F (181873)	28-d Hyalella P/F (181872)	7-d C. dubia dilution series (181880)	72-hr P. subcapitata dilution series (181879)	7-d L. minor dilution series (181881)	7-d embryo dilution series (181882)				Temp (°C)
1	LC_LCDSSLCC_WS_2018-10-30_N	LC_LCDSSLCC	WS	N	30-Oct	11:43	G	9 x 20L	X	X	X	X	X	X	X	X				1.4
1	LC_SLC_WS_2018-10-30_N	LC_SLC	WS	N	30-Oct	10:07	G	5 x 20L	X	X	X	X								0.5
1	LC_LC3_WS_2018-10-30_N	LC_LC3	WS	N	30-Oct	13:38	G	5 x 20L	X	X	X	X								1.9
1	LC_LC5_WS_2018-10-30_N	LC_LC5	WS	N	30-Oct	14:44	G	9 x 20L	X	X	X	X	X	X	X	X				2.0

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Please provide prelimnary update as results are available

1 clear, colourless, odourless, ~~no~~ some particulates

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
		Nautilus - Burnaby	Oct 31/18 @ 11:50
		NY - Nair Yamamoto	Q4 - week 1

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	Drake Tymstra	Mobile #	
Sampler's Signature		Date/Time	Oct 30, 2018

Teck

COC ID: 20181030-0945 | TURNAROUND TIME: | RUSH:

PROJECT/CLIENT INFO

Facility Name / Job#	Line Creek Operation
Project Manager	Chris Blurton
Email	Chris.Blurton@teck.com
Address	Box 2003
	15km North Hwy 43
City	Sparwood
Province	BC
Postal Code	V0B 2G0
Country	Canada
Phone Number	250-425-3196

LABORATORY

Lab Name	Nautilus Environmental - BC
Lab Contact	
Email	BCinfo@nautilusenvironmental.ca
Address	8664 Commerce Court
City	Burnaby
Province	BC
Postal Code	V5A 4N7
Country	Canada
Phone Number	604-420-8773

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	drake.tymstra@teck.com	x	x	
Email 2:	chris.blurton@teck.com	x	x	
Email 3:	kirsten.campbell@teck.com	x	x	
Email 4:	teckcoal@equisonline.com			x
PO number	VPO00432106			

SAMPLE DETAILS / ANALYSIS REQUESTED

Filtered - F, Field, L, Lab, FL, Field & Lab, N, Non

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	PREC/LOT #	181880	181879	181881	181882	181871	181870	181873	181872				
									ANALYSIS	7-d C. dubia dilution series	72-hr P. subcapitata dilution series	7-d L. minor dilution series	7-d embryo dilution series	7-d C.dubia P/F	72-hr P. subcapitata P/F	30-d embryo EA P/F	28-d Hyalella P/F				Temp (°C)
1	LC_DC1_WS_2018-10-30_N	LC_DC1	WS	N	30-Oct	10:30	G	5x2L		X	X	X	X								0.0
2	LC_FRDSDC_WS_2018-10-30_N	LC_FRDSDC	WS	N	30-Oct	09:50	G	5x2L		X	X	X	X								0.5
3	LC_DCDS_WS_2018-10-30_N	LC_DCDS	WS	N	30-Oct	11:45	G	9x2L		X	X	X	X	X	X	X	X				0.5

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Please provide preliminary update as results are available

0 clear, colourless, odourless, some particulates

RELINQUISHED BY/AFFILIATION

DATE/TIME

ACCEPTED BY/AFFILIATION

Nautilus - Burnaby

NY - Nair Yamamoto

DATE/TIME

Oct 31/18 @ 11:50

Q4 - week 1

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name		Mobile #	
Sampler's Signature		Date/Time	

TESTING LOCATION (Please Circle)

NAUTILUS ENVIRONMENTAL

Burnaby
8664 Commerce Court
Burnaby, British Columbia, Canada
V5A 4N7
Phone 604.420.8773

Calgary
#4 6125 12th St S.E.
Calgary, Alberta, Canada
T2H 2K1
Phone 403.253.7121

Chain of Custody

Date_____ Page__ of__

Report to:		**Invoice To:**	
Company	Nautilus Environmental	**Company**	
Address	Burnaby, BC	**Address**	
City/State/Zip		**City/State/Zip**	
Contact	Emma Marus	**Contact**	
Phone	604-420-8773	**Phone**	
Email	emma@nautilusenvironmental.ca	**Email**	
		PO No.	

Sample Collection By: **Sample Type:** Grab ○ **OR** Composite ○

	SAMPLE ID 1819-0383	DATE	TIME	MATRIX	# OF CONTAINERS AND VOLUME (e.g. 1 x 20 L)	COMMENTS	ANALYSES REQUIRED: 7-d Ceriodaphnia dubia dilutions	Receipt Temperature (°C)
1	LC_LCDSSLCC -01	30-Oct-18	16.0°C	water	3 x 2-L	2018/10/01	x	
2	LC_LC5 -02	30-Oct-18	16.8°C	water	3 x 2-L	~~0810~~ 08:30	x	
3	LC_DC1 -03	30-Oct-18	15.6°C	water	3 x 2-L	Perolator	x	
4	LC_FRDSDC -04	30-Oct-18	16.2°C	water	3 x 2-L	J.C	x	
5	LC_DCDS -05	30-Oct-18	16.2°C	water	3 x 2-L	18x2 L Jars (plastic)	x	
6	WL_BFWB_OUT_SP21-06	30-Oct-18	15.9°C	water	3 x 2-L	NaS/NaI	x	
7						~~Good condition~~		
8						Jar #2 for LC_DC1		
9						leaked all contents		
10						during shipping → additional bottle received 2018/11/02		

SPECIAL INSTRUCTIONS/COMMENTS (CLIENT)	**SAMPLE RECEIPT DETAILS (LABORATORY)**				**SAMPLE DESCRIPTION AND COMMENTS (LABORATORY)**
see attached COCs for sample collection times	1. Total No. of Containers		4. Ice Present in Cooler?	Y / N	
Teck (Line Creek) Chronic Program	2. Courier		5. Seal Present on Cooler?	Y / N	
	3. Good Condition?	Y / N	6. Initials Present on Seal?	Y / N	

RELINQUISHED BY (CLIENT)	**RECEIVED BY (LABORATORY)**
(Printed Name) (Signature)	(Printed Name) (Signature)
(Company) (Date and Time)	(Company) (Date and Time)

Additional costs may be required for sample disposal or storage. Payment net 30 unless otherwise contracted.

END OF REPORT

Attachment G2 Water Quality Screening

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q2	Q4	Q2	Q4	Q2	Q4	Q2	Q4
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	05-May-15	26-Oct-15	27-Apr-16	17-Oct-16	24-Apr-17	02-Oct-17	30-Apr-18	30-Oct-18
Field Measured												
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.4	8.5	8.4	8.5	8.5	8.6	8.5	8.1
Temperature	°C	-	-	-	6.9	3.3	4.5	4.9	5.8	5.5	3.9	5.1
Conventional Parameters												
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.5	7.9	8.3	8.4	8.4	8.2	8.4	8.4
Hardness, as $CaCO_3$	mg/L	-	-	-	300	424	285	356	375	388	346	393
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	-	167	167	153	176	183	146	159	189
Total dissolved solids	mg/L	-	-	-	368	440	359	441	495	525	394	495
Total suspended solids	mg/L	-	-	-	5.1	<1.0	16	<1.0	8.2	1.0	40	<1.0
Total organic carbon	mg/L	-	-	-	1.4	1.2	2.2	0.95	2.1	0.86	4.6	<0.5
Dissolved organic carbon	mg/L	-	-	-	1.2	0.84	1.6	0.58	1.9	1.0	4.4	<0.5
Turbidity	NTU	-	-	-	1.1	0.35	4.2	0.46	5.8	0.27	22	0.30
Conductivity	us/cm	-	-	-	576	627	540	649	698	652	613	743
Oxidation-reduction potential	mv	-	-	-	491	376	378	357	342	291	271	388
Acidity To pH 8.3, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Bicarbonate, as $CaCO_3$	mg/l	-	-	-	159	167	148	173	174	146	150	181
Carbonate, as $CaCO_3$	mg/l	-	-	-	8.2	<1.0	4.8	3.0	9.2	<1.0	8.6	8.0
Hydroxide, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Major Ions												
Bromide	mg/L	-	-	-	<0.05	<0.05	<0.05	<0.25	<0.05	<0.05	<0.05	<0.05
Calcium	mg/L	-	-	-	73	102	69	88	90	92	83	91
Chloride	mg/L	150	600	-	1.5	1.5	1.5	2.5	2.7	2.9	1.9	2.4
Fluoride	mg/L	-	1.8 - 1.9[b]	-	0.19	0.17	0.20	0.21	0.15	0.16	0.20	0.22
Magnesium	mg/L	-	-	-	29	41	27	33	36	39	34	40
Potassium	mg/L	-	-	-	0.97	1.1	0.89	1.1	1.3	1.1	1.2	1.1
Sodium	mg/L	-	-	-	2.0	2.7	1.9	2.5	2.8	3.1	2.4	3.3
Sulphate	mg/L	429[b, c]	-	481[b]	120	178	105	154	172	185	140	184
Major anion sum	meq/l	-	-	-	6.4	7.8	5.7	7.4	8.0	7.5	6.6	8.3
Major cation sum	meq/l	-	-	-	6.1	8.6	5.8	7.3	7.6	7.9	7.0	8.0
Nutrients												
Nitrate	mg-N/L	3.0	33	8.6 - 13[d]	**6.7[(Mn)]**	**9.8[(Mn)]**	**5.9[(Mn)]**	**7.9[(Mn)]**	**9.5[(Mn)]**	**8.9[(Mn)]**	**6.9[(Mn)]**	**8.6[(Mn)]**
Nitrite	mg-N/L	0.020 - 0.040[e]	0.060 - 0.12[e]	-	0.0037	<0.001	0.0012	<0.005	0.0047	0.0041	0.0036	0.0031
Total ammonia	mg-N/L	0.31 - 0.94[f]	1.6 - 4.9[g]	-	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	0.0084	0.016
Total Kjeldahl nitrogen	mg-N/L	-	-	-	<0.05	<0.05	0.22	<0.05	0.68	0.58	0.54	0.14
Orthophosphate	mg-P/L	-	-	-	0.0012	0.0010	<0.001	<0.001	0.0041	<0.001	0.0014	0.0022
Phosphorus	mg-P/L	-	-	-	0.0076	0.063	0.016	<0.002	0.019	<0.002	0.051	0.012
Total Metals												
Aluminum	mg/L	-	-	-	0.022	<0.015	0.12	0.0068	0.069	<0.003	0.39	0.0038
Antimony	mg/L	0.0090	-	-	0.00014	<0.0005	0.00024	0.00013	0.00014	0.00012	0.00018	0.00012
Arsenic	mg/L	-	0.0050	-	0.00013	<0.0005	0.00018	0.00011	0.00021	0.00014	0.00040	0.00013
Barium	mg/L	1.0	-	-	0.079	0.11	0.071	0.089	0.093	0.10	0.081	0.10
Beryllium	mg/L	0.00013	-	-	<0.0001	<0.0005[(DL>Mn)]	<0.0001	<0.00002	<0.00002	<0.00002	0.000029	<0.00002
Bismuth	mg/L	-	-	-	<0.00005	<0.00025	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	1.2	-	-	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	0.010
Cadmium	mg/L	-	-	-	0.000034	0.000040	0.000063	0.000038	0.000047	0.000025	0.00010	0.000037
Calcium	mg/L	-	-	-	75	99	71	85	86	93	80	91
Chromium	mg/L	0.0010[h]	-	-	0.00021	<0.0005	0.00038	0.00018	0.00023	<0.0003	0.00076	0.00017
Cobalt	mg/L	0.0040	0.11	-	<0.0001	<0.0005	0.00011	<0.0001	0.00011	<0.0001	0.00035	<0.0001
Copper	mg/L	-	-	-	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	0.0011	<0.0005
Iron	mg/L	-	1.0	-	0.031	<0.05	0.17	<0.01	0.12	<0.01	0.59	<0.01
Lead	mg/L	0.015 - 0.020[b]	0.31 - 0.42[b]	-	<0.00005	<0.00025	0.00012	<0.00005	0.000098	<0.00005	0.00043	<0.00005
Lithium	mg/L	-	-	-	0.014	0.019	0.015	0.020	0.020	0.022	0.018	0.022
Magnesium	mg/L	-	-	-	30	43	28	38	36	40	32	42
Manganese	mg/L	1.9 - 2.5[b]	3.4[b]	-	0.0026	<0.0005	0.0090	0.00083	0.0093	0.00041	0.029	0.00036
Mercury	mg/L	0.000010	-	-	<0.000005	<0.000005	-	-	-	-	-	-
Molybdenum	mg/L	1.0	2.0	-	0.0011	0.0011	0.0010	0.0011	0.0010	0.0011	0.0012	0.0012
Nickel	mg/L	0.005[i]	-	-	0.0017	<0.0025	0.0020	0.0015	0.0015	0.0013	0.0030	0.0012
Potassium	mg/L	-	-	-	1.00	1.2	0.98	1.1	1.2	1.2	1.2	1.2
Selenium	mg/L	0.0020	-	0.019	**0.027[(Mn, E)]**	**0.038[(Mn, E)]**	**0.022[(Mn, E)]**	**0.029[(Mn, E)]**	**0.034[(Mn, E)]**	**0.039[(Mn, E)]**	**0.033[(Mn, E)]**	**0.042[(Mn, E)]**
Silicon	mg/L	-	-	-	1.9	2.2	2.2	2.1	2.3	2.1	2.9	2.2
Silver	mg/L	0.0015[b]	0.0030[b]	-	<0.00001	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Sodium	mg/L	-	-	-	2.1	3.1	2.0	2.8	2.7	3.3	2.2	3.6
Strontium	mg/L	-	-	-	0.13	0.17	0.12	0.15	0.15	0.17	0.13	0.18
Thallium	mg/L	0.00080	-	-	<0.00001	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	0.000018	<0.00001
Tin	mg/L	-	-	-	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	-	<0.01	<0.01	0.014	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	0.0085	-	-	0.0016	0.0021	0.0016	0.0021	0.0019	0.0021	0.0018	0.0023
Vanadium	mg/L	-	-	-	<0.0005	<0.0025	0.00063	<0.0005	0.00056	<0.0005	0.0020	<0.0005
Zinc	mg/L	0.15 - 0.19	0.18 - 0.28	-	<0.003	<0.015	0.0040	<0.003	0.016	<0.003	0.0065	<0.003
Dissolved Metals												
Aluminum	mg/L	0.050[j]	0.10[j]	-	0.0041	<0.005	<0.003	<0.003	0.0065	<0.003	<0.003	<0.003
Antimony	mg/L	-	-	-	0.00012	<0.0005	0.00015	0.00012	0.00012	0.00012	<0.0001	0.00011
Arsenic	mg/L	-	-	-	0.00011	<0.0005	0.00011	<0.0001	<0.0001	0.00015	0.00013	<0.0001
Barium	mg/L	-	-	-	0.077	0.11	0.069	0.089	0.10	0.099	0.080	0.099
Beryllium	mg/L	-	-	-	<0.0001	<0.0005	<0.0001	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Bismuth	mg/L	-	-	-	<0.00005	<0.00025	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	-	-	-	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	0.00046[b]	0.0017 - 0.0026[b]	0.00032[k]	0.000035	<0.000025	0.000022	0.000016	0.000018	0.0000082	0.000027	0.000020
Chromium	mg/L	-	-	-	0.00016	<0.0005	0.00011	<0.0001	<0.0001	<0.0001	<0.0001	0.00011
Cobalt	mg/L	-	-	-	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Copper	mg/L	0.0004 - 0.0031[l]	0.0021 - 0.0184[l]	-	<0.0005	<0.001[(DL>Mn)]	<0.0005	<0.0005	<0.0002	<0.0005	<0.0005	<0.0005[(DL>Mn)]
Iron	mg/L	-	0.35	-	0.013	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Lead	mg/L	-	-	-	<0.00005	<0.00025	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium	mg/L	-	-	-	0.014	0.019	0.015	0.019	0.021	0.020	0.017	0.020
Manganese	mg/L	-	-	-	0.0025	<0.0005	0.00058	0.00028	0.0013	<0.0001	0.00041	0.00012
Mercury	mg/L	-	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Molybdenum	mg/L	-	-	-	0.0011	0.0010	0.0010	0.0011	0.0011	0.0011	0.0012	0.0012
Nickel	mg/L	-	-	-	0.0013	<0.0025	0.0016	0.0013	0.0012	0.00095	0.0016	0.0011
Selenium	mg/L	-	-	-	0.026	0.038	0.022	0.029	0.041	0.044	0.031	0.050
Silicon	mg/L	-	-	-	1.8	2.2	2.0	2.0	2.1	2.1	2.2	2.0
Silver	mg/L	-	-	-	<0.00001	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Strontium	mg/L	-	-	-	0.12	0.17	0.11	0.16	0.16	0.17	0.14	0.17
Thallium	mg/L	-	-	-	<0.00001	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Tin	mg/L	-	-	-	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	-	<0.01	<0.01	0.013	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	-	-	-	0.0016	0.0021	0.0016	0.0020	0.0017	0.0024	0.0018	0.0023
Vanadium	mg/L	-	-	-	<0.0005	<0.0025	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005	<0.0005
Zinc	mg/L	-	-	-	0.0032	<0.005	<0.003	<0.003	<0.001	<0.003	<0.001	<0.001
∑ Toxic Units												
WQGs	-	-	-	-	5.79	11.9	5.09	5.43	5.43	5.50	5.99	5.96
WQGs/EVWQP Benchmarks	-	-	-	-	5.03	10.2	4.48	4.24	3.91	4.01	5.00	4.51

(a) = guideline is a minimum value, unless the background concentration or value is lower.

(b) = guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (285 to 424 mg/L). The guideline is calculated based on the individual hardness value for each sample.

(c) = for some samples, water hardness was greater than 250 mg/L. At this hardness, no BC ENV water quality guideline has been established for sulphate; however, the observed data were screened against the guideline for very hard water (i.e., 429 mg/L) for comparative purposes.

(d) = the EVWQP benchmark for nitrate is hardness dependent and applies within a hardness range of 67 to 500 mg/L. The guideline range shown is based on the hardness range observed in the dataset (285 to 424 mg/L). The guideline is calculated based on the individual hardness value for each sample and was calculated using the Elk River intercept. The minimum EVWQP guideline is 3 mg/L.

(e) = guideline is chloride dependent. The guideline range shown is based on the chloride concentration range observed in the dataset (1.9 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(f) = the ammonia guideline is pH and temperature dependent. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

(g) = the ammonia guideline is pH and temperature dependent. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

(h) = guideline is for chromium VI.

(i) = guideline is based on site-specific testing conducted in the Elk Valley with *C. dubia* and *H. azteca.*

(j) = guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (8.1 to 8.6). The guideline is calculated based on the individual pH for each sample.

(k) = the EVWQP benchmark for dissolved cadmium is hardness dependent and applies up to a hardness range of 285 mg/L. The guideline is calculated based on the individual hardness value for each sample.

(l) = the guideline for dissolved copper was calculated using the BC ENV Biotic Ligand Model (BLM) tool using the full model, quick normalization approach. Humic acid content of 10% was assumed based on guidance from BC ENV (2019).

(Mn) = concentration is higher than the 30-day mean BC ENV guideline or outside the recommended pH, DO or total alkalinity range.

(E) = concentration is higher than the EVWQP benchmarks guideline.

Bolded concentrations are higher than water quality guidelines.

Shaded concentrations are higher than the EVWQP benchmark (e.g., for nitrate, total selenium, dissolved cadmium or sulphate).

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision after comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Concentrations were screened against available Working and Approved British Columbia Ministry of Environment and Climate Change Strategy (BC ENV) Water Quality Guidelines for the Protection of Aquatic Life; Accessed January 2020 from: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines.

- = no guideline or no data

BC ENV = British Columbia Ministry of Environment & Climate Change Strategy; EVWQP = Elk Valley Water Quality Plan guidelines; *C. dubia* = *Ceriodaphnia dubia* ; *P. subcapitata* = *Pseudokirchneriella subcapitata* ; *H. azteca* = *Hyallela azteca* ; *P. promelas* = *Pimephales promelas* ; *O. mykiss* = *Oncorhynchus mykiss* ; CV = coefficient of variation; ∑ = sum of; WQGs = Water Quality Guidelines; CaCO3 = calcium carbonate; mg/L = milligrams per litre; µs/cm = microsiemens per centimeter; NTU = nephelometric turbidity units; mg-N/L = milligrams of Nitrogen per litre; mg=P/L = milligrams of Phosphorus per litre.

BC ENV (B.C. Ministry of Climate Chande Strategy). 2019. Copper Water Quality guideline for the Protection of Aquatic Life-Technical Report. Water Quality Guideline Series, WQG-03-1. Prov. B.C., Victoria B.C.

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q2	Q4	Q2	Q4	Q2	Q4	Q2	Q4
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	05-May-15	26-Oct-15	27-Apr-16	18-Oct-16	24-Apr-17	02-Oct-17	30-Apr-18	30-Oct-18
Field Measured												
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.2	8.5	8.3	8.4	8.3	8.5	8.2	8.6
Temperature	°C	-	-	-	4.8	1.9	3.4	3.1	2.0	6.1	1.9	2.1
Conventional Parameters												
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.3	8.0	8.2	8.2	8.1	8.3	8.1	8.4
Hardness, as $CaCO_3$	mg/L	-	-	-	96	150	100	139	97	202	182	308
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	-	92	133	89	131	96	142	104	164
Total dissolved solids	mg/L	-	-	-	114	140	114	171	90	248	229	388
Total suspended solids	mg/L	-	-	-	3.9	4.2	6.5	10	8.0	2.2	25	3.7
Total organic carbon	mg/L	-	-	-	2.9	2.7	3.1	3.3	4.3	2.2	6.7	2.6
Dissolved organic carbon	mg/L	-	-	-	2.2	2.3	2.6	2.1	3.4	2.4	3.4	2.0
Turbidity	NTU	-	-	-	11	1.9	9.3	22	10	2.0	38	1.8
Conductivity	us/cm	-	-	-	189	251	192	268	190	373	364	603
Oxidation-reduction potential	mv	-	-	-	367	367	369	328	375	250	280	331
Acidity To pH 8.3, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	2.1	<1.0	<1.0	<1.0
Bicarbonate, as $CaCO_3$	mg/l	-	-	-	92	133	89	131	96	142	104	156
Carbonate, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	8.0
Hydroxide, as $CaCO_3$	mg/l	-	-	-	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0	<1.0
Major Ions												
Bromide	mg/L	-	-	-	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05	<0.05
Calcium	mg/L	-	-	-	25	37	25	35	25	51	46	74
Chloride	mg/L	150	600	-	1.1	<0.5	0.19	1.4	0.56	4.1	3.3	9.0
Fluoride	mg/L	-	1.3 - 1.8[b]	-	0.093	0.075	0.098	0.10	0.070	0.073	0.12	0.10
Magnesium	mg/L	-	-	-	8.3	14	8.9	13	8.3	18	16	30
Potassium	mg/L	-	-	-	0.81	1.1	0.86	1.2	0.99	1.6	2.0	2.3
Sodium	mg/L	-	-	-	0.59	0.69	0.45	0.93	0.58	0.97	1.3	1.8
Sulphate	mg/L	309 - 429[b, c]	-	309 - 481[b]	8.7	13	8.0	19	6.8	43	43	94
Major anion sum	meq/l	-	-	-	2.1	2.9	2.0	3.1	2.1	4.2	3.7	6.8
Major cation sum	meq/l	-	-	-	2.0	3.1	2.1	2.9	2.0	4.1	3.7	6.3
Nutrients												
Nitrate	mg-N/L	3.0	33	1.4 - 4.7[d]	0.24	<0.005	0.40	0.47	0.54	**4.4**[Mn, E]	**8.5**[Mn, E]	**19**[Mn, E]
Nitrite	mg-N/L	0.020 - 0.10[e]	0.060 - 0.30[e]	-	<0.001	0.0012	<0.001	0.0077	0.0014	**0.062**[Mn]	**0.088**[Mn]	0.037
Total ammonia	mg-N/L	0.32 - 0.78[f]	1.7 - 4.0[g]	-	<0.005	0.0094	<0.005	0.020	0.027	0.088	0.17	0.036
Total Kjeldahl nitrogen	mg-N/L	-	-	-	0.14	<0.05	0.13	0.25	0.27	0.67	0.71	0.46
Orthophosphate	mg-P/L	-	-	-	0.031	0.0012	0.032	0.021	0.032	0.0063	0.028	0.0014
Phosphorus	mg-P/L	-	-	-	0.048	0.017	0.048	0.050	0.060	0.011	0.070	0.017
Total Metals												
Aluminum	mg/L	-	-	-	0.18	<0.015	0.19	0.17	0.10	0.024	0.25	0.0064
Antimony	mg/L	0.0090	-	-	0.00019	<0.0005	0.00027	0.00036	0.00025	0.00032	0.00059	0.00055
Arsenic	mg/L	-	0.0050	-	0.00036	<0.0005	0.00035	0.00042	0.00041	0.00033	0.00064	0.00033
Barium	mg/L	1.0	-	-	0.096	0.15	0.086	0.14	0.10	0.18	0.14	0.27
Beryllium	mg/L	0.00013	-	-	<0.0001	<0.0005[E(L>Mn)]	<0.0001	0.000024	<0.00002	<0.00002	0.000024	<0.00002
Bismuth	mg/L	-	-	-	<0.00005	<0.00025	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	1.2	-	-	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	-	-	-	0.000067	0.000060	0.000076	0.00013	0.000095	0.000055	0.00020	0.000089
Calcium	mg/L	-	-	-	25	36	25	36	27	48	44	76
Chromium	mg/L	0.0010[h]	-	-	0.00042	<0.0005	0.00047	0.00043	0.00024	0.00018	**0.0011**[Mn]	<0.0001
Cobalt	mg/L	0.0040	0.11	-	<0.0001	<0.0005	0.00012	0.00021	0.00016	0.00013	0.00092	0.00021
Copper	mg/L	-	-	-	0.00059	<0.0025	0.00062	0.0011	0.00063	<0.0005	0.0015	<0.0005
Iron	mg/L	-	1.0	-	0.14	<0.05	0.22	0.25	0.15	0.021	0.46	<0.01
Lead	mg/L	0.0063 - 0.017[b]	0.077 - 0.34[b]	-	0.00013	<0.00025	0.00016	0.00033	0.00014	<0.00005	0.00054	<0.00005
Lithium	mg/L	-	-	-	0.0051	0.0072	0.0051	0.0079	0.0053	0.0089	0.0096	0.013
Magnesium	mg/L	-	-	-	8.4	14	8.8	13	8.6	18	15	30
Manganese	mg/L	1.0 - 2.0[b]	1.6 - 3.4[b]	-	0.0025	0.00077	0.0045	0.0089	0.012	0.0029	0.031	0.0058
Mercury	mg/L	0.000010	-	-	<0.000005	<0.000005	-	-	-	-	-	-
Molybdenum	mg/L	1.0	2.0	-	0.00083	0.0010	0.00088	0.0014	0.0013	0.0018	0.0036	0.0038
Nickel	mg/L	0.005[i]	-	-	0.0010	<0.0025	0.0011	0.0017	0.0018	0.0011	**0.0056**[Mn]	**0.0057**[Mn]
Potassium	mg/L	-	-	-	0.87	1.2	0.91	1.3	1.1	1.6	1.8	2.4
Selenium	mg/L	0.0020	-	0.019	0.0014	0.0016	0.0017	**0.0023**[Mn]	0.0013	**0.0083**[Mn]	**0.013**[Mn]	**0.027**[Mn, E]
Silicon	mg/L	-	-	-	2.8	1.6	2.8	2.7	2.7	2.4	2.8	1.9
Silver	mg/L	0.000050 - 0.0015[b]	0.00010 - 0.0030[b]	-	<0.00001	<0.00005	0.000010	0.000015	<0.00001	<0.00001	0.000021	<0.00001
Sodium	mg/L	-	-	-	0.58	0.73	0.46	0.94	0.59	0.93	1.2	1.9
Strontium	mg/L	-	-	-	0.033	0.049	0.033	0.050	0.038	0.066	0.071	0.12
Thallium	mg/L	0.00080	-	-	0.000012	<0.00005	0.000015	0.000027	0.000017	0.000012	0.000035	0.000014
Tin	mg/L	-	-	-	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	-	<0.01	<0.01	0.010	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	0.0085	-	-	0.00020	0.00033	0.00020	0.00048	0.00029	0.00074	0.00074	0.0016
Vanadium	mg/L	-	-	-	0.0021	<0.0025	0.0024	0.0022	0.0021	0.0013	0.0033	0.0013
Zinc	mg/L	0.012 - 0.17	0.037 - 0.20	-	0.0034	<0.015	0.0037	0.0050	0.0056	<0.003	0.0082	<0.003
Dissolved Metals												
Aluminum	mg/L	0.050[j]	0.10[j]	-	0.029	<0.005	0.023	0.027	0.027	0.013	0.018	<0.003
Antimony	mg/L	-	-	-	0.00015	<0.0005	0.00018	0.00021	0.00023	0.00029	0.00051	0.00054
Arsenic	mg/L	-	-	-	0.00027	<0.0005	0.00028	0.00028	0.00035	0.00030	0.00038	0.00032
Barium	mg/L	-	-	-	0.093	0.14	0.084	0.13	0.097	0.18	0.14	0.25
Beryllium	mg/L	-	-	-	<0.0001	<0.0005	<0.0001	<0.00002	<0.00002	<0.00002	<0.00002	<0.00002
Bismuth	mg/L	-	-	-	<0.00005	<0.00025	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Boron	mg/L	-	-	-	<0.01	<0.05	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Cadmium	mg/L	0.00020 - 0.00046[b]	0.00056 - 0.0019[b]	0.00013 - 0.00032[k]	0.000039	<0.000025	0.000037	0.000041	0.000049	0.000032	0.000074	0.000039
Chromium	mg/L	-	-	-	0.00012	<0.0005	0.00011	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Cobalt	mg/L	-	-	-	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	0.00011	0.00040	0.00011
Copper	mg/L	0.0012 - 0.0021[l]	0.0071 - 0.0128[l]	-	<0.0005	<0.001	<0.0005	<0.0005	0.00027	<0.0005	<0.0005	<0.0005
Iron	mg/L	-	0.35	-	0.014	<0.05	0.014	0.014	0.027	<0.01	<0.01	<0.01
Lead	mg/L	-	-	-	<0.00005	<0.00025	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005	<0.00005
Lithium	mg/L	-	-	-	0.0051	0.0074	0.0052	0.0084	0.0050	0.0080	0.0094	0.012
Manganese	mg/L	-	-	-	0.00080	<0.0005	0.0013	0.00047	0.0078	0.00066	0.014	0.00015
Mercury	mg/L	-	-	-	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005	<0.000005
Molybdenum	mg/L	-	-	-	0.00078	0.0011	0.00087	0.0014	0.0011	0.0018	0.0036	0.0038
Nickel	mg/L	-	-	-	0.00064	<0.0025	0.00079	0.00077	0.0014	0.0011	0.0035	0.0048
Selenium	mg/L	-	-	-	0.0013	0.0016	0.0017	0.0024	0.0013	0.0088	0.014	0.030
Silicon	mg/L	-	-	-	2.4	1.4	2.5	2.5	2.5	2.4	2.5	1.6
Silver	mg/L	-	-	-	<0.00001	<0.00005	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001	<0.00001
Strontium	mg/L	-	-	-	0.032	0.047	0.033	0.047	0.035	0.066	0.073	0.11
Thallium	mg/L	-	-	-	<0.00001	<0.00005	<0.00001	<0.00001	<0.00001	0.000012	0.000016	0.000013
Tin	mg/L	-	-	-	<0.0001	<0.0005	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001	<0.0001
Titanium	mg/L	-	-	-	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Uranium	mg/L	-	-	-	0.00018	0.00031	0.00019	0.00045	0.00023	0.00077	0.00071	0.0016
Vanadium	mg/L	-	-	-	0.0013	<0.0025	0.0014	0.0011	0.0014	0.0012	0.0014	0.00096
Zinc	mg/L	-	-	-	<0.003	0.011	<0.003	<0.003	0.0017	<0.003	0.0013	<0.001
∑ Toxic Units												
WQGs	-	-	-	-	4.24	7.33	3.70	3.56	3.19	4.52	9.99	9.69
WQGs/EVWQP Benchmarks	-	-	-	-	4.34	7.38	3.80	3.64	3.33	4.52	10.1	7.44

(a) = guideline is a minimum value, unless the background concentration or value is lower.

(b) = guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (96 to 308 mg/L). The guideline is calculated based on the individual hardness value for each sample.

(c) = for some samples, water hardness was greater than 250 mg/L. At this hardness, no BC ENV water quality guideline has been established for sulphate; however, the observed data were screened against the guideline for very hard water (i.e., 429 mg/L) for comparative purposes.

(d) = the EVWQP benchmark for nitrate is hardness dependent and applies within a hardness range of 67 to 500 mg/L. The guideline is calculated based on the individual hardness value for each sample and was calculated using the Elk River intercept.

(e) = guideline is chloride dependent. The guideline range shown is based on the chloride concentration range observed in the dataset (0.61 to 11.7 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(f) = the ammonia guideline is pH and temperature dependent. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

(g) = the ammonia guideline is pH and temperature dependent. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

(h) = guideline is for chromium VI.

(i) = guideline is based on site-specific testing conducted in the Elk Valley with *C. dubia* and *H. azteca.*

(j) = guideline is pH dependent. The guideline range shown is based on the pH range observed in the dataset (8.2 to 8.6). The guideline is calculated based on the individual pH for each sample.

(k) = the EVWQP benchmark for dissolved cadmium is hardness dependent and applies up to a hardness range of 285 mg/L. The guideline is calculated based on the individual hardness value for each sample.

(l) = the guideline for dissolved copper was calculated using the BC ENV Biotic Ligand Model (BLM) tool using the full model, quick normalization approach. Humic acid content of 10% was assumed based on guidance from BC ENV (2019).

(Mn) = concentration is higher than the 30-day mean BC ENV guideline or outside the recommended pH, DO or total alkalinity range.

(E) = concentration is higher than the EVWQP benchmarks guideline.

Bolded concentrations are higher than water quality guidelines.

Shaded concentrations are higher than the EVWQP benchmark (e.g., for nitrate, total selenium, dissolved cadmium or sulphate).

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision after comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Concentrations were screened against available Working and Approved British Columbia Ministry of Environment and Climate Change Strategy (BC ENV) Water Quality Guidelines for the Protection of Aquatic Life; Accessed January 2020 from: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines.

- = no guideline or no data

BC ENV = British Columbia Ministry of Environment & Climate Change Strategy; EVWQP = Elk Valley Water Quality Plan guidelines; *C. dubia* = *Ceriodaphnia dubia* ; *P. subcapitata* = *Pseudokirchneriella subcapitata* ; *H. azteca* = *Hyallela azteca* ; *P. promelas* = *Pimephales promelas* ; *O. mykiss* = *Oncorhynchus mykiss* ; CV = coefficient of variation; ∑ = sum of; WQGs = Water Quality Guidelines; CaCO3 = calcium carbonate; mg/L = milligrams per litre; µs/cm = microsiemens per centimeter; NTU = nephelometric turbidity units; mg-N/L = milligrams of Nitrogen per litre; mg=P/L = milligrams of Phosphorus per litre.

BC ENV (B.C. Ministry of Climate Chande Strategy). 2019. Copper Water Quality guideline for the Protection of Aquatic Life-Technical Report. Water Quality Guideline Series, WQG-03-1. Prov. B.C., Victoria B.C.

Parameter	Unit	Guidelines for the protection of Aquatic Life			Q2
		30-day mean (BC ENV)	Maximum (BC ENV)	EVWQP Benchmarks	May 5, 2015
Field Measured					
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.1
Temperature	°C	-	-	-	4.7
Conventional Parameters					
pH	-	6.5 - 9.0	6.5 - 9.0	-	8.3
Hardness, as $CaCO_3$	mg/L	-	-	-	401
Total alkalinity, as $CaCO_3$	mg/L	20[a]	-	-	168
Total dissolved solids	mg/L	-	-	-	519
Total suspended solids	mg/L	-	-	-	1.1
Total organic carbon	mg/L	-	-	-	0.77
Dissolved organic carbon	mg/L	-	-	-	0.74
Turbidity	NTU	-	-	-	0.42
Conductivity	us/cm	-	-	-	760
Oxidation-reduction potential	mv	-	-	-	492
Acidity To pH 8.3, as $CaCO_3$	mg/l	-	-	-	1.9
Bicarbonate, as $CaCO_3$	mg/l	-	-	-	165
Carbonate, as $CaCO_3$	mg/l	-	-	-	2.5
Hydroxide, as $CaCO_3$	mg/l	-	-	-	<1.0
Major Ions					
Bromide	mg/L	-	-	-	<0.1
Calcium	mg/L	-	-	-	93
Chloride	mg/L	150	600	-	1.9
Fluoride	mg/L	-	1.9[b]	-	0.21
Magnesium	mg/L	-	-	-	41
Potassium	mg/L	-	-	-	1.3
Sodium	mg/L	-	-	-	4.9
Sulphate	mg/L	429[b, c]	-	481[b]	197
Major anion sum	meq/l	-	-	-	8.4
Major cation sum	meq/l	-	-	-	8.3
Nutrients					
Nitrate	mg-N/L	3.0	33	12[d]	**12[Mn]**
Nitrite	mg-N/L	0.020[e]	0.060[e]	-	<0.002
Total ammonia	mg-N/L	0.94[f]	4.9[g]	-	<0.005
Total Kjeldahl nitrogen	mg-N/L	-	-	-	<0.05
Orthophosphate	mg-P/L	-	-	-	0.0025
Phosphorus	mg-P/L	-	-	-	0.0034
Total Metals					
Aluminum	mg/L	-	-	-	0.011
Antimony	mg/L	0.0090	-	-	0.00030
Arsenic	mg/L	-	0.0050	-	0.00015
Barium	mg/L	1.0	-	-	0.035
Beryllium	mg/L	0.00013	-	-	<0.0001
Bismuth	mg/L	-	-	-	<0.00005
Boron	mg/L	1.2	-	-	0.012
Cadmium	mg/L	-	-	-	0.00038
Calcium	mg/L	-	-	-	93
Chromium	mg/L	0.0010[h]	-	-	0.00019
Cobalt	mg/L	0.0040	0.11	-	0.00011
Copper	mg/L	-	-	-	<0.0005
Iron	mg/L	-	1.0	-	<0.01
Lead	mg/L	0.020[b]	0.42[b]	-	<0.00005
Lithium	mg/L	-	-	-	0.030
Magnesium	mg/L	-	-	-	41
Manganese	mg/L	2.4[b]	3.4[b]	-	0.00030
Mercury	mg/L	0.000010	-	-	<0.000005
Molybdenum	mg/L	1.0	2.0	-	0.0017
Nickel	mg/L	0.005[i]	-	-	**0.0092[Mn]**
Potassium	mg/L	-	-	-	1.3
Selenium	mg/L	0.0020	-	0.019	**0.050[Mn, E]**
Silicon	mg/L	-	-	-	2.0
Silver	mg/L	0.0015[b]	0.0030[b]	-	<0.00001
Sodium	mg/L	-	-	-	5.1
Strontium	mg/L	-	-	-	0.16
Thallium	mg/L	0.00080	-	-	0.000014
Tin	mg/L	-	-	-	<0.0001
Titanium	mg/L	-	-	-	<0.01
Uranium	mg/L	0.0085	-	-	0.0034
Vanadium	mg/L	-	-	-	<0.0005
Zinc	mg/L	0.19	0.27	-	0.017
Dissolved Metals					
Aluminum	mg/L	0.050[j]	0.10[j]	-	<0.003
Antimony	mg/L	-	-	-	0.00029
Arsenic	mg/L	-	-	-	0.00013
Barium	mg/L	-	-	-	0.035
Beryllium	mg/L	-	-	-	<0.0001
Bismuth	mg/L	-	-	-	<0.00005
Boron	mg/L	-	-	-	0.012
Cadmium	mg/L	0.00046[b]	0.0025[b]	0.00032[k]	**0.00035[E]**
Chromium	mg/L	-	-	-	0.00017
Cobalt	mg/L	-	-	-	0.00010
Copper	mg/L	0.0005[l]	0.003[l]	-	<0.0005
Iron	mg/L	-	0.35	-	<0.01
Lead	mg/L	-	-	-	<0.00005
Lithium	mg/L	-	-	-	0.030
Manganese	mg/L	-	-	-	0.00010
Mercury	mg/L	-	-	-	<0.000005
Molybdenum	mg/L	-	-	-	0.0017
Nickel	mg/L	-	-	-	0.0088
Selenium	mg/L	-	-	-	0.050
Silicon	mg/L	-	-	-	2.0
Silver	mg/L	-	-	-	<0.00001
Strontium	mg/L	-	-	-	0.16
Thallium	mg/L	-	-	-	0.000013
Tin	mg/L	-	-	-	<0.0001
Titanium	mg/L	-	-	-	<0.01
Uranium	mg/L	-	-	-	0.0033
Vanadium	mg/L	-	-	-	<0.0005
Zinc	mg/L	-	-	-	0.017
∑ Toxic Units					
WQGs	-	-	-	-	10.5
WQGs/EVWQP Benchmarks	-	-	-	-	7.74

(a) = guideline is a minimum value, unless the background concentration or value is lower.

(b) = guideline is hardness dependent. The guideline range shown is based on the hardness range observed in the dataset (401 mg/L). The guideline is calculated based on the individual hardness value for each sample.

(c) = for some samples, water hardness was greater than 250 mg/L. At this hardness, no BC ENV water quality guideline has been established for sulphate; however, the observed data were screened against the guideline for very hard water (i.e., 429 mg/L) for comparative purposes.

(d) = the EVWQP benchmark for nitrate is hardness dependent and applies within a hardness range of 67 to 500 mg/L. The guideline is calculated based on the individual hardness value for each sample and was calculated using the Elk River intercept.

(e) = guideline is chloride dependent. The guideline range shown is based on the chloride concentration range observed in the dataset (1.9 mg/L). The guideline is calculated based on the individual chloride concentration in each sample.

(f) = the ammonia guideline is pH and temperature dependent. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

(g) = the ammonia guideline is pH and temperature dependent. The guideline is calculated based on the individual field pH and temperature measurements for each sample.

(h) = guideline is for chromium VI.

(i) = guideline is based on site-specific testing conducted in the Elk Valley with *C. dubia* and *H. azteca.*

(j) = guideline is pH dependent. The guideline range shown is based on the pH observed in the dataset (8.1). The guideline is calculated based on the individual pH for each sample.

(k) = the EVWQP benchmark for dissolved cadmium is hardness dependent and applies up to a hardness range of 285 mg/L. The guideline is calculated based on the individual hardness value for each sample.

(l) = the guideline for dissolved copper was calculated using the BC ENV Biotic Ligand Model (BLM) tool using the full model, quick normalization approach. Humic acid content of 10% was assumed based on guidance from BC ENV (2019).

(Mn) = concentration is higher than the 30-day mean BC ENV guideline or outside the recommended pH, DO or total alkalinity range.

(E) = concentration is higher than the EVWQP benchmarks guideline.

Bolded concentrations are higher than water quality guidelines.

Shaded concentrations are higher than the EVWQP benchmark (e.g., for nitrate, total selenium, dissolved cadmium or sulphate).

Water quality data and guidelines shown in this table were rounded to reflect laboratory or field instrument precision after comparisons to guidelines. Therefore, values slightly above guidelines may be displayed as being equal to the guidelines and identified as exceedances. Concentrations equal to the guideline values were not identified as exceedances.

Concentrations were screened against available Working and Approved British Columbia Ministry of Environment and Climate Change Strategy (BC ENV) Water Quality Guidelines for the Protection of Aquatic Life; Accessed January 2020 from: https://www2.gov.bc.ca/gov/content/environment/air-land-water/water/water-quality/water-quality-guidelines.

- = no guideline or no data

BC ENV = British Columbia Ministry of Environment & Climate Change Strategy; EVWQP = Elk Valley Water Quality Plan guidelines; *C. dubia* = *Ceriodaphnia dubia* ; *P. subcapitata* = *Pseudokirchneriella subcapitata* ; *H. azteca* = *Hyallela azteca* ; *P. promelas* = *Pimephales promelas* ; *O. mykiss* = *Oncorhynchus mykiss* ; CV = coefficient of variation; ∑ = sum of; WQGs = Water Quality Guidelines; CaCO3 = calcium carbonate; mg/L = milligrams per litre; µs/cm = microsiemens per centimeter; NTU = nephelometric turbidity units; mg-N/L = milligrams of Nitrogen per litre; mg=P/L = milligrams of Phosphorus per litre

BC ENV (B.C. Ministry of Climate Chande Strategy). 2019. Copper Water Quality guideline for the Protection of Aquatic Life-Technical Report. Water Quality Guideline Series, WQG-03-1. Prov. B.C., Victoria B.C.



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