Line Creek Operations
2023 Annual Water Report
Permit 5353

March 31, 2024

Teck

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Executive Summary

The 2023 Annual Report was completed in accordance with Section 4.3 of Effluent Permit 5353 (amended July 22, 2021), issued to Line Creek Operations under the provisions of the *Environmental Management Act*.

Maintenance activities of authorized works were conducted at Line Creek Operations in 2023, which included sediment/material cleanout of the Rail Loop Ponds, the No Name Creek Pond and Steam Bay Ponds. Additional maintenance activities include upgrades to the Sewage Treatment System and the Dry Creek flocculant station.

Two incidents related to water quality occurred in 2023, an acute toxicity failure related to a discharge of toxic water in 2022 from the Mine Service Extension Pit sump and a failure to follow the operation procedure for pond refilling at the Dry Creek Sedimentation Pond.

Line Creek Operations had 15 non-compliances, 10 of these non-compliances were associated with unauthorized discharges of plant process water from the coal preparation plant that discharged into a storm water ditch rather than the authorized location of the Rail Loop Ponds. Other non-compliances included three extractable petroleum hydrocarbons exceedances at Oil/Water Separators, one freeboard exceedance at the Rail Loop Ponds, and one non-compliance for not complying with the procedures specified in Addendum 2 of the Operations, Maintenance and Surveillance manual while refilling Dry Creek Sediment Pond 1.

There were no missed samples and monitoring requirement results are summarized in Table 1. A total of 23 exceedances occurred with the majority related to total selenium in Horseshoe Ridge Pit. All unattainable data was due to frozen or dry streams. There was no discharge from the No Name Creek Pond and the Contingency Treatment Pond system was not used.

Throughout the year a total of 105 sets of duplicates samples were collected, resulting in 210 parameters being evaluated for relative percent difference. Of the 210 parameters evaluated, six did not meet acceptable relative percent difference assessment criteria. A total of 101 sets of field blank samples were collected, resulting in 202 parameters being evaluated. Of the 202 parameters evaluated, there were no results above analytical method detection limits.

Line Creek Operations had 14 quality assurance and quality control issues; eight were related to hold-time exceedances and six were related to relative percent difference failures.

Monitoring was conducted for total suspended solids, turbidity, and extractable petroleum hydrocarbons at the authorized works. Three effluent discharges from the heavy-duty wash bay did not meet the extractable petroleum hydrocarbon limit, as a result, effluent from the wash bay was transported offsite to an approved disposal location. The sewage treatment system was not operational as it was undergoing system upgrades, therefore no effluent quality data is available. All other samples collected for total suspended solids, turbidity and extractable petroleum hydrocarbons meet permit limits.

Discharge of stored pit water from Horseshoe Ridge Pit was conducted periodically throughout the year. Pumping from Mine Service Extension Pit occurred briefly in the first quarter of 2023.

All other parameters are monitored in accordance with Permit 107517 and are reported in the 107517 annual water report.

Table 1. Exceedances of permit limits and Water Quality Guidelines for Protection of Aquatic Life (BCWQG) in site receiving waters.

EMS ID	Location Code	Parameter	Permit Limits	BCWQG	Frequency of Exceedance (%)
E102494	LC_LC11*	Flow-Daily	45 m^3/day	-	0/0 (0%)
E102494	LC_LC11*	Biochemical Oxygen Demand, Five Day	130 mg/L	-	0/0 (0%)
E102494	LC_LC11*	Total Suspended Solids, Lab	130 mg/L	-	0/0 (0%)
E288269	LC_SBPIN**	EPH (C10-C32)	15 mg/L	-	3/6 (50%)
E288269	LC_SBPIN**	Flow- Daily Average	150 m^3/day	-	0/87 (0%)
E216144	LC_LC7	Total Suspended Solids, Lab	50 mg/L	-	0/15 (0%)
E219411	LC_LC8*	Total Suspended Solids, Lab	50 mg/L	-	0/0 (0%)
E221268	LC_LC9*	Total Suspended Solids, Lab	50 mg/L	-	0/0 (0%)
E210372	LC_EPOUT	Freeboard	>1 m	-	120/365 (33%)***
E295211	LC_SPDC	Total Suspended Solids, Lab	50 mg/L	-	0/62 (0%)
E295211	LC_SPDC	Flow- Continuous	1.8 m3/s	-	0/365 (0%)
E308146	LC_HSP	Total Suspended Solids, Lab	50 mg/L	-	0/19 (0%)
E308146	LC_HSP	Dissolved Oxygen - minimum	-	<5 mg/L	0/19 (0%)
E308146	LC_HSP	Dissolved Oxygen – 30-day average	-	<8 mg/L	0/19 (0%)
E308146	LC_HSP	Total Iron	-	1 ug/L	0/19 (0%)
E308146	LC_HSP	Mercury	-	0.00125 ug/L	0/19 (0%)
E308146	LC_HSP	Nitrite- Nitrogen as N	-	0.2 mg/L****	0/19 (0%)
E308146	LC_HSP	Total Selenium	-	2 ug/L	19/19 (100%)
E308146	LC_HSP	Temperature (field)	-	15 ºC	0/19 (0%)
E308147	LC_MSAWCULV	Total Suspended Solids, Lab	50 mg/L	-	0/2 (0%)
-	LC_LVWB	EPH (C10-C32)	15 mg/L	-	0/9 (0%)

*No discharge throughout the year

**Discharge variable throughout the year, see section 5.2.2 for details

*** LCO had one freeboard exceedance which occurred from March 2, 2023, to June 30, 2023

****Guideline is variable and dependant on chloride. Value referenced is for low chloride water

1 Description of Mine Operation and Discharges

1.1 Introduction

Teck Coal Limited (Teck) – Line Creek Operations (LCO) is located within the front ranges of the southern Canadian Rocky Mountains, approximately 18 kilometers northeast of Sparwood, British Columbia, and is comprised of 4,587 hectares of permitted land. Mining operations at LCO commenced in 1981, with the primary focus on producing steelmaking coal, although a lesser amount of thermal coal is also produced. In 2023, LCO produced 2,964,899 metric tonnes clean coal (MTCC); 44,555,586 million bank cubic meters (MBCM) of waste rock; and 1,300,000 BCM of coarse coal refuse (CCR) was sent to the East Rejects Extension (ERX) CCR spoil.

As of December 31, 2023, total surface development at LCO was 2,833.4 ha with 644.6 ha reclaimed**.** Mine development at LCO in 2023 resulted in 62.3 ha of new disturbance and 5.6 ha of reclamation re-disturbance. The majority of the new disturbance occurred in the Mount Michael pit, Burnt Ridge North pit, and Dry Creek waste rock spoil.

Current mining operations associated with Permit 5353 occurred within the Line Creek and Dry Creek drainages. Line Creek joins the Fording River which then flows into the Elk River. Five main tributaries (beginning at the headwaters and moving downstream) feed Line Creek: Tornado Creek, No Name Creek, West Line Creek, South Line Creek and Teepee Creek. Dry Creek is a tributary that drains to the north into the Fording River, which then flows into the Elk River.

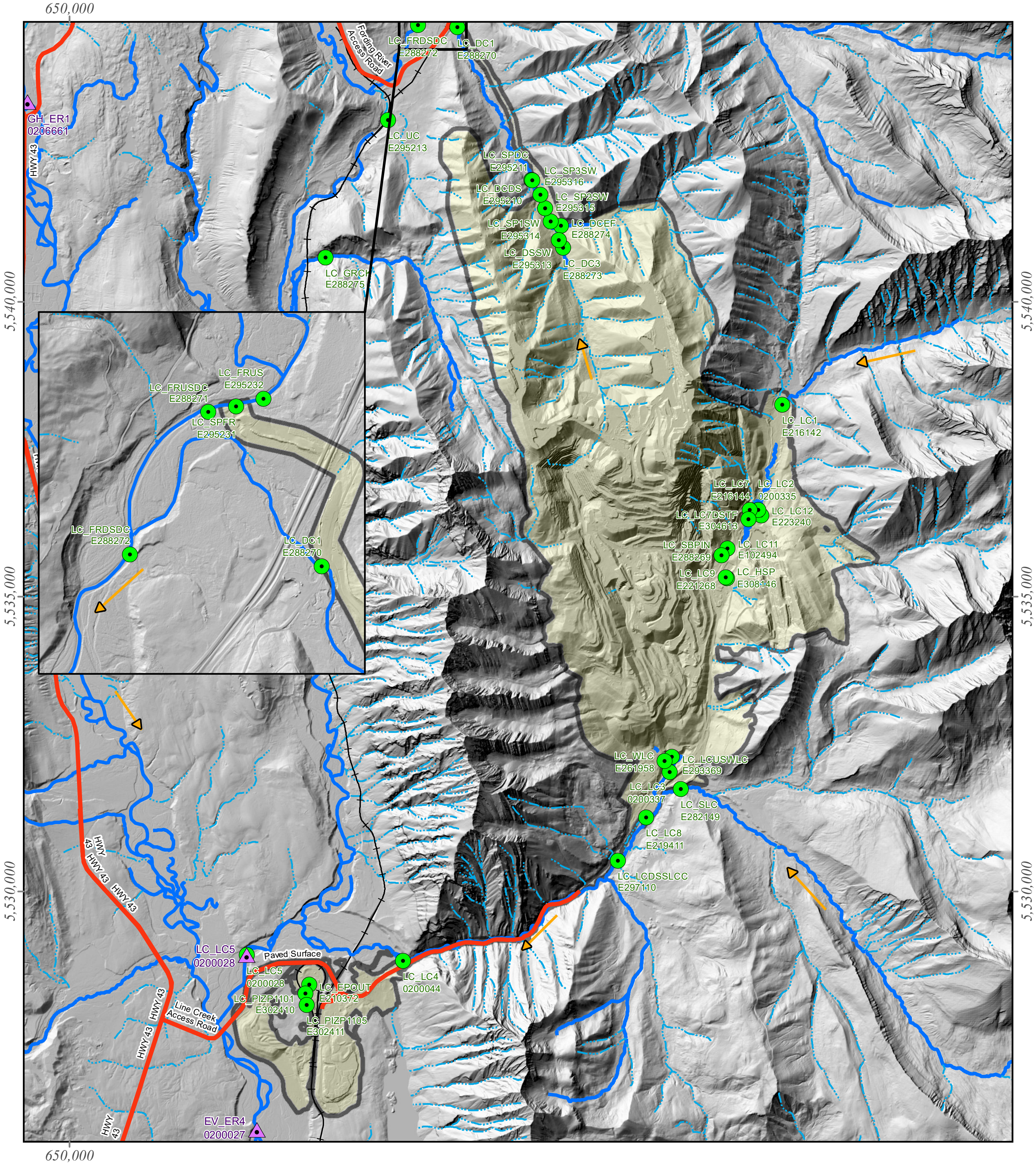
1.2 Overview of Operations

In 2023, LCO operated in accordance with Permit 5353 (amended July 22, 2021) and issued to LCO under the provisions of the *Environmental Management Ac*t. This annual report reflects the requirements outlined in Section 4.3 of Permit 5353 and in the Annual Status Form (ASF) located in Appendix A. All sampling data presented is for 2023 unless otherwise stated. Sampling locations are referenced in this report by LCO Site Identifications provided in Table 2.

Currently, 15 discharge and 20 receiving sites are identified in Permit 5353 as monitoring locations, as shown in Figure 1 and Table 2. Of those sites, two discharge sites and two receiving sites are not actively monitored under Permit 5353 as they are either not constructed or not in use (LC_SP3SW and LC_SPFR), or do not have associated monitoring requirements (LC_FRUS, and LC_FRUSDC). The bypass to the Contingency Treatment System (CTS) (LC_LC8), which diverts Line Creek (downstream of LC_LC3) into the pond system to treat suspended solids, remained closed through 2023 and was not utilized. Surface water runoff of the mining areas and roads at LCO are managed in accordance with the Mine Water Management Plan, an updated version of this Plan was submitted to regulators November 29, 2023.

Mine development in the Line Creek Phase II area resulted in 62.2 ha of new disturbance primarily in the Mount Michael (MTM) pit, Burnt Ridge North (BRN) pit, and Dry Creek waste rock spoil. Construction projects in the Line Creek Phase I area also occurred at the East Refuse Extension (ERX) coarse coal refuse (CCR) tailings storage facility (TSF), West Line Creek Active Water Treatment Facility (WLC AWTF), and West Line Creek spoil. The Burnt Ridge Extension (BRX) and Mine Services Area Extension (MSX) pits were completed in 2023 and MTM and BRN pits will remain active until end of mine life for Line Creek Operations.

Access remained periodically limited to upstream areas of the Mine Service Area North (MSAN) Settling Ponds (LC_LC7) system due to geotechnical safety restrictions. This access restriction did not affect access to conduct sampling at LC_LC7.



Teck

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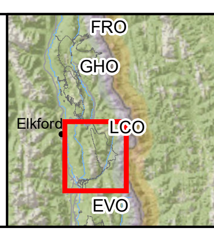

Map 1 - Line Creek Operations
Surface Water Sampling Sites

- Order Station
- Monitoring Location
- Permit Boundary
- FacilityLocations
- Flow Direction
- Paved Surface
- Railway
- Stream
- Intermittent Stream

N

0 500 1,000 2,000 Metres

MINE OPERATION: Line Creek	DATE: 3/27/2023	GIS NUMBER: XXXXXX
SCALE: 1:85,000	COORDINATE SYSTEM: NAD 1983 UTM Zone 11N	

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Figure 1. Surface Water Monitoring Locations.

Table 2. Summary of Permitted Sampling Sites.

EMS ID	Site ID	UTM		Type	Description
		Northing	Easting		
E102494	LC_LC11	5535808	661072	Discharge	Mine Service Sewage Effluent to Ground
E216144	LC_LC7	5536472	661436	Discharge	MSA North Ponds Effluent to Line Creek
E219411	LC_LC8	5531255	659692	Discharge	Contingency Treatment System Effluent to Line Creek
E221268	LC_LC9	5535328	661033	Discharge	No Name Creek Pond Effluent to Line Creek
E288269	LC_SBPIN	5535623	660991	Discharge	Wash Bay Effluent Discharge to Steam Bay Ponds to Ground
E302410	LC_PIZP1101	5528264	653956	Discharge	Rail Loop Ponds Effluent to Ground
E302411	LC_PIZP1105	5528075	653984	Discharge	Rail Loop Ponds Effluent to Ground
E308146	LC_HSP	5535319	661042	Discharge	Discharge of stored pit water from Horseshoe Pit
E295211	LC_SPDC	5542042	657821	Discharge	Dry Creek Sedimentation Pond effluent to Dry Creek
E295231	LC_SPFR	n/a	n/a	Discharge	Dry Creek Sediment Ponds effluent to Fording River
E295313	LC_DSSW	5541049	658225	Discharge	Diversion Structure Spillway
E295314	LC_SP1SW	5541366	658085	Discharge	Sedimentation Pond 1 Spillway
E295315	LC_SP2SW	5514710	655646	Discharge	Sedimentation Pond 2 Spillway
E295316	LC_SP3SW	n/a	n/a	Discharge	Sedimentation Pond 3 Spillway
E308147*	LC_MSAWCULV	5535205	660702	Discharge	Discharge of stored pit water from MSAW Pit (in accordance with MSX Pit Pumping Plan)
0200028	LC_LC5	5528919	652976	Receiving	Fording River downstream of Line Creek
0200044	LC_LC4	5528823	655604	Receiving	Line Creek upstream of Process Plant
0200337	LC_LC3	5532022	660090	Receiving	Line Creek downstream of West Line Creek
0200335	LC_LC2	5536473	661579	Receiving	Line Creek upstream of Rock Drain
E223240	LC_LC12	5536374	661629	Receiving	North Horseshoe Creek Near Mouth
E216142	LC_LC1	5538253	661978	Receiving	Line Creek upstream of MSA North Pit
E282149	LC_SLC	5531737	660271	Receiving	South Line Creek
E293369	LC_LCUSWLC	5532280	660124	Receiving	Line Creek upstream of WLC below Rock Drain
E261958	LC_WLC	5532208	660004	Receiving	West Line Creek
E297110	LC_LCDSSLCC	5530522	659218	Receiving	Line Creek immediately downstream of South Line Creek Confluence
E288274	LC_DCEF	5541295	658260	Receiving	East Tributary of Dry Creek
E295210	LC_DCDS	5542073	657766	Receiving	Dry Creek Downstream of sedimentation ponds
E288270	LC_DC1	5544658	656520	Receiving	Dry Creek near mouth (at bridge)
E295213	LC_UC	5543086	655351	Receiving	Unnamed Creek
E288275	LC_GRCK	5540755	654303	Receiving	Grace Creek upstream of the CP rail tracks
E295232	LC_FRUS	5545243	656317	Receiving	Fording River 100m upstream of conveyance outfall
E288271	LC_FRUSDC	5545195	656126	Receiving	Fording River upstream of Dry Creek, 100m downstream of conveyance outfall
E288272	LC_FRDSDC	5544699	655856	Receiving	Fording River downstream of Dry Creek
E295214	RC_CH1	5552839	655796	Receiving	Chauncey Creek
E288273	LC_DC3	5540918	658294	Receiving	Dry Creek upstream of East Tributary Creek

**Monitored in accordance with the MSX Pit Pumping Plan*

1.3 Maintenance of Works

This section provides a summary of maintenance activities of authorized works (e.g., sediment removal, culvert maintenance, etc.). Ongoing inspections of authorized works occurred throughout 2023; inspection programs are conducted in part to determine whether maintenance of works is required. Maintenance of works conducted in 2023 is described below.

Sediment was removed from the Rail Loop Settling Ponds (Rail Loop Pond B), No Name Creek Diversion and Sediment Ponds, and the Steam Bay Ponds to maintain their design performance (Table 3). Sediment was disposed of in accordance with LCO's approved *Sediment Management Plan* (2015). Final reports for all sediment characterization tests are provided in Appendix B.

No infrastructure changes were made to the authorized works for the MSAN Ponds (LC_LC7) or the CTS (LC_LC8).

Line Creek Operations continued work on upgrading the Sewage Treatment System (LC_LC11) to incorporate a membrane bioreactor (MBR) wastewater treatment unit to supplement the existing system. This upgrade work was initiated with Qualified Professional (QP) discussions in Q2 2021 and continued in 2022-2023 with significant overhauls of the electrical and mechanical/piping systems. During this time, the system was not in operation and sewage was routinely removed from the septic tanks by contractor vacuum trucks to be disposed of off-site. Upgrades to the Sewage Treatment System were completed in Q1 2024 and the system is now fully operational.

The Dry Creek flocculant addition station underwent system repairs and maintenance (i.e., plumbing, programmable logic control (PLC) work and system winterization) in addition to general upgrades (Table 3).

Table 3. Maintenance of Works Summary.

Notification Date	EMS ID	Site ID	Location	Maintenance Complete
May 2021	E102494	LC_LC11	Sewage Treatment System	Installation of electrical and mechanical components along with additional upgrades and maintenance preformed inside MBR. Upgrades were completed in Q1 of 2024.
August 30, 2022	E288269	LC_SBPIN	Steam Bay Pond	February 2023 - sediment cleanout completed
August 30, 2022	E221268	LC_LC9	No Name Creek Diversion and Sediment Pond Bypass	February 2023 - sediment cleanout completed
May 30, 2023	-	LC_DCHP	Dry Creek Head Pond	Temporary herptile mitigation fence constructed at Dry Creek Head Pond.
June – October 2023	E295211	LC_SPDC	Dry Creek Flocculant Addition Station	Conducted repairs and maintenance in preparation for operation in 2024 including: flocculant station communication upgrades, generator maintenance, and winterization.
August 2023	-	LC_DCHP	Dry Creek Head Pond	Temporary upgrades to herptile egress within the intake structure and access restrictions added to exterior of structure.
September 2023	E210372	LC_RLPB	Rail Loop Pond B	November 2023 – sediment cleanout (approximately 16,000m3)
Q3 – Q4, 2023	-	-	No Name Creek (NNC)	Continued construction of the NNC clean water diversion project to increase treatment capacity and water quality in Line Creek. Further construction will occur throughout 2024.
Q4 2023	E308146	LC_HSP	Horseshoe Ridge Pit	Conducted upgrades to improve the operation and control (of flow rates) during dewatering from HSP: added piping, floats, screens, and controls. Further construction will occur throughout 2024.

2 Incidents and Compliance Summary

2.1 Incidents Summary

Incidents resulting in the release of unauthorized effluent to the environment or resulting in non-compliance, including spills, discharges that bypassed authorized treatment works, and unscheduled and emergency release are tracked and reported. A summary of incidents is provided in Table 5.

The *Spill Reporting Regulation* is followed for reporting spills occurring onsite. Emergency Management B.C. (EMBC) provides a reference number (Dangerous Goods Incident Report (DGIR) number), which is included in additional incident reporting to external agencies. A summary of spills and incidents reported to EMBC is provided in Appendix C.

2.1.1 INCIDENTS RELATED TO WATER QUALITY

2.1.1.1 ACUTE TOXICITY FAILURES

Mine Service Extension Pit Acute Toxicity Failure – January 19, 2023 and February 2, 2023

Line Creek Operations is providing the following update for the reportable spill of effluent showing acute toxicity to rainbow trout in lab testing from the Mine Service Extension (MSX) pit sump (LC_MSXS). After receiving acutely toxic results (> 50% mortality) from November 17, 2022 monitoring of LC_MSXS a spill was reported to EMBC on November 28, 2022 (DGIR #223310). Teck submitted a 30-day update report on December 15, 2022, however sampling continued into 2023 and this spill event remained active.

Samples collected on January 19, 2023 and February 2, 2023, resulted in 90% and 70% mortality respectively to rainbow trout in the standard pass/fail acute toxicity test after 96 hours, A second test (i.e., pH stabilized) was recommended by qualified professionals (QP) from Nautilus Environmental Ltd. during the toxicity identification evaluation (TIE) to confirm the likely toxicant. Results from the pH stabilized test showed 10%, and 20% mortalities for the January 19, 2023 and February 2, 2023, samples. This suggested the likely cause of toxicity in the samples collected from the MSX Pit sump to be caused by nitrite.

Laboratory results from the MSX Pit sump, the downstream Mine Services Area West (MSAW) backfilled pit, and the downstream receiving location (LC_LCUSWLC) were compared for nitrite and chloride concentrations. The analyses determined the risk of nitrite toxicity that is observed from these pH stabilized rainbow trout acute toxicity failures upstream in the MSX Pit decreases downstream. Specifically in the MSAW backfilled pit, the risk of the release of effluent observed to be failing acute toxicity rainbow trout testing decreases in two ways: 1) acute toxicity to rainbow trout has not been observed in the MSAW backfilled pit since acute toxicity testing began on January 25, 2022, and 2) there has been a reduction in nitrite concentrations, and an increase in chloride concentrations at MSAW backfilled pit (LC_MSAW6) and the downstream LC_LCUSWLC sampling location. Chloride concentrations have an influencing effect on the freshwater short term acute toxicity of nitrite as outlined in the British Columbia Water Quality Guidelines.

A final 30-day update report was provided on February 9, 2023 and the spill event has been closed.

2.1.1.2 DRY CREEK SEDIMENTATION PONDS – MAY 2, 2023

On May 1, 2023, LCO initiated refilling of the Dry Creek Water Management System (Sediment Pond 1) and work was conducted in accordance with Addendum 2 of the Dry Creek Water Management System (DCWMS) Operations, Maintenance and Surveillance (OMS) manual. As specified in the procedures, refilling the pond requires stopping the refilling at 25%, 50%, and 75% of pond capacity for 24 hours.

On May 2, 2023, Sedimentation Pond 1 reached 100% capacity and the pond began discharging into Dry Creek. Line Creek Operations reported a noncompliance on May 3, 2023 with Section 2.9.4 for not complying with the procedures specified in the submitted operations manual for refilling of the ponds.

2.1.2 ALL OTHER REPORTABLE SPILLS AND INCIDENTS

Reporting of spills is done in accordance with the *Spill Reporting Regulation*. In 2023, a total of 104 spills and incidents occurred at LCO and were reported to EMBC. A summary of all spills and incidents reported to EMBC can be found in Appendix C.

2.2 Compliance Summary

Effluent monitoring is conducted in accordance with the monitoring schedule identified in Appendix A of Permit 5353, and summarized in Section 4.1, Table 9 of this report. Monitoring results are compared to applicable permit requirements and limits, summarized in Table 4 below.

Table 4. Summary of Site Permit Limits.

EMS ID	Site ID	Parameter	Permit Limit Value
E102494	LC_LC11	Biochemical Oxygen Demand (Maximum)	130 mg/L
E102494	LC_LC11	Total Suspended Solids (Maximum)	130 mg/L
E102494	LC_LC11	Flow (Maximum)	45 m^3/day
E288269	LC_SBPIN	EPH (Maximum)	15 mg/L
E288269	LC_SBPIN	Flow (Average)	150 m^3/day
E216144	LC_LC7	Total Suspended Solids (Maximum)	50 mg/L
E216144	LC_LC7	Flow	0.84 m^3/sec
E219411	LC_LC8	Total Suspended Solids (Maximum)	50 mg/L
E219411	LC_LC8	Flow	3 m^3/sec
E221268	LC_LC9	Total Suspended Solids (Maximum)	50 mg/L
E221268	LC_LC9	Flow	2.3 m^3/sec
E210372	LC_EPOUT	Freeboard	>1 m
-	Miscellaneous Oil/Water Separators	EPH (Maximum)	15 mg/L
E308146	LC_HSP	Total Suspended Solids (Maximum)	50 mg/L*
E308146	LC_HSP	Water Quality Characteristics	As per dewatering plan*
E308147	LC_MSAWCULV	Total Suspended Solids (Maximum)	50 mg/L*
E295211	LC_SPDC	Total Suspended Solids	50 mg/L
E295211	LC_SPDC	Flow	1.8 m^3/sec
E295231	LC_SPFR	Total Suspended Solids	50 mg/L
E295231	LC_SPFR	Flow	1.8 m^3/sec

*Permit limit is in effect for E308146 and E308147 when pit pumping is occurring.

2.2.1 NON-COMPLIANCES

There were 15 non-compliances reported by LCO related to Heavy Duty Wash Bay (HDWB) effluent, Rail Loop Pond freeboard levels and unauthorized discharges of plant process water or clarified water (Table 5).

Table 5. Summary of non-compliances.

#	EMS ID	Site ID	Date	Parameters	Description/Corrective Actions
1-3	E288269	LC_SBPIN	2/23/2023 3/16/2023 12/14/2023	EPH Exceedance	Condition 1.6.2 of Permit 5353 states that the characteristics of the discharge of effluent from the Heavy-Duty Wash Bay (HDWB) to the Steam Bay Ponds (LC_SBPIN; E288269) must not exceed 15 mg/L for extractable petroleum hydrocarbons (EPH). The routine water samples collected on February 23, 2023, and March 16, 2023, had an EPH result of 17.1 mg/L and 17.8 mg/L, respectively. Discharge to the receiving environment was ceased. The recycle system was locked out (closed) to ensure no further discharge. Vacuum trucks were used to dispose of wash water offsite at a hazardous waste facility while an investigation into the cause of the exceedance proceeded. Findings from the investigation found inadequate clean out of the HDWB Oil Water Separator (OWS) while operating and potential ineffective removal of hydrocarbons through the HDWB Oil Water Separator system. The existing OWS clean out procedure was reviewed and updated. Additional training was given to HDWB operators focusing on filter change out frequency requirements and sufficient sump cleanout to maintain system operation. On December 7, 2023, after a period of eight months where EPH values were consistently below the detection limit of <0.4mg/L, discharge was restored from the HDWB into the Steam Bay Ponds. A routine sample collected on December 14, 2023, returned a result of 64.1mg/L. Discharge to the receiving environment was ceased and vacuum trucks were used to dispose of wash water offsite at a hazardous waste facility while an investigation into the cause of the exceedance proceeded. Corrective actions that followed from the Q4 2023 investigation were to immediately restrict the use of the ineffective soaps within the HDWB (through supply controls via the LCO warehouse) and update the work procedures and ensure ongoing inspections of the HDWB to ensure cartridge filter changes of the oil water separator are occurring on a weekly basis. Discharge valves of the HDWB were also locked out (closed) to prevent discharge. In Q1 2024, Line Creek will be adding two holding tanks to the HDWB system. The holding tanks will be used to test filtered water prior to discharge. Water that does not meet permit limits will be removed with vacuum trucks and disposed offsite. Discharge will not be restored until system upgrades are in place. The significance of this incident was low as the duration/impact was short-term and the effluent discharged to an isolated holding pond which does not directly discharge to a receiving environment.
4	E210372	LC_RLPC	3/02/2023 - 6/30/2023	Freeboard Exceedance	Condition 1.1.1 in Permit 5353 states that the freeboard in Rail Loop Settling Pond C must be greater than one metre at all times. Condition 2.5 in Permit 5353 states that freeboard is defined as the difference in elevation between the top of the dyke and the level of the liquid impounded by the dyke. On March 2, 2023, water level sensor data and field observations showed the freeboard in Rail Loop Settling Pond C was less than 1 m. Following visual observations of water level in Rail Loop Pond C (Pond C), the processing plant implemented processing water use restrictions. These

#	EMS ID	Site ID	Date	Parameters	Description/Corrective Actions
					restrictions remained in place until the freeboard returned within typical operational levels (June 30, 2023). The LCO coal preparation plant prioritized the use of recycled water returned from the Rail Loop Ponds (RLP) until water levels in Pond C returned to compliance. Other actions included switching deposition ponds (i.e., Pond B to Pond A) to allow for more capacity before flowing into Pond C, breaking up the ice dam around the pond pump that was causing reduced return flow (back to the processing plant), changing out several valves (internal to the processing plant) that were causing higher rates of flow to the ponds, painting process water valves that need to remain closed for easier identification, using Pond D to prevent further loss of freeboard in Pond C, and replacing nine valves in the processing plant. Investigation into the incident determined that the primary root cause was that there are gaps in understanding in plant operations personnel on how plant operations can affect the Rail Loop Settling Ponds systems. A corrective action was developed to improve plant training procedures and to update key documents related to pond operation, including the OMS manual for the RLP. Additional corrective actions were developed to review the location and type of water level sensors, establish an emailed alarm for high water levels in Pond C, and extend the level of the staff gauge in Pond C. Significance was low as water level was closely monitored, did not spill over the pond embankments, and did not compromise the integrity of the dam structure.
5-14	--	LC_PLTSPILL	2/25/2023 2/28/2023 3/18/2023 4/18/2023 6/3/2023 7/7/2023 7/30/2023 10/4/2023 10/10/2023 12/11/2023	Unauthorized Discharge	Condition 1.1 of Permit 5353 authorizes the discharge of effluent to ground from a coal preparation plant into four Rail Loop Ponds (E210372). Condition 2.1 of Permit 5353 (dated July 22, 2021) states that in the event of a condition or emergency that leads to unauthorized discharge, the permittee must (i) comply with all applicable statutory requirements, including the Spill Reporting Regulation; (ii) immediately contact the director, or an officer designated by the director, by email and telephone; and (iii) take appropriate remedial action for the prevention or mitigation of pollution. The non compliances in 2023 were the result of various operational malfunctions that led to water from the coal preparation plant overflowing through an access door and outside the building, resulting in spills ranging from 500 L to 10,000 L of clarified and/or process water. Spilled materials flowed to a nearby roadside ditch. As the coal preparation plant clarified and process water were not discharged into the four Rail Loop Ponds, these were all considered unauthorized discharges and reported as per Condition 2.1. At the time of the incident(s), vacuum trucks were mobilized to recover the spilled material present within the ditch. Internal investigations were completed and are ongoing to understand the root cause of these individual events. Corrective actions for each independent incident are further explained in Appendix D. Significance is low as water reported to plant water management infrastructure (ditch) used to manage mine-contact water, and vacuum trucks were mobilized for immediate cleanup during each event to decrease impact to environment.
15	E295211	LC_SPDC	5/5/2023	Rate of refilling Sediment Pond 1	Section 2.2.3 of Permit 5353 (July 22, 2021) states that bypass of the authorized works (the Dry Creek Sedimentation Ponds) via the bypass is authorized on a seasonal basis in accordance with the updated DCWMS OMS manual required by Section 2.9.4. The updated OMS manual addendum submitted on April 29, 2021, included procedures for the

#	EMS ID	Site ID	Date	Parameters	Description/Corrective Actions
					refilling of the sedimentation ponds. As specified in these procedures, refilling of the pond requires stopping the refilling at 25%, 50%, and 75% of pond capacity for 24 hours. May 2, 2023, Sedimentation Pond 1 reached 100% capacity and the pond was discharging into Dry Creek. LCO reported a noncompliance on May 3, 2023, with Section 2.9.4 for not complying with the procedures specified in the submitted operations manual for refilling of the ponds. Internal investigation determined the root cause to be inadequate controls when specifically with the refilling procedure outlined in the DCWMS OMS manual addendum, lacking use of a well-defined stage-volume relationship of the Dry Creek sedimentation ponds and means to monitor increase in pond levels to inform refilling. Following the incident monitoring was conducted in accordance with the DCWMS OMS manual addendum. Water quality (including acute toxicity and selenium speciation) was collected from the water contained within Pond 1 (LC_SP1D) on April 25, 2023. Acute toxicity results showed 0% mortality in both Rainbow trout and Daphnia magna. During the refilling on May 1, 2023, the third-party Environmental Monitor (Lotic) collected flows, measurement of field parameters and water levels, and conducted ongoing fish stranding surveys along LCO Dry Creek to monitor (and respond to) potential effects of flow changes. On May 2, 2023, water quality (including selenium speciation) was collected from pond discharge (LC_SPDC) with water quality (and speciation) collected at all other permitted locations in LCO Dry Creek. On May 3, water quality (and selenium speciation) was collected upstream of the DCWMS (at LC_DC3) and at the discharge to LCO Dry Creek (LC_SPDC). An event-driven dam safety inspection was completed by the site Senior Tailings Engineer on May 3, 2023Corrective actions that were identified to improve procedures and better inform the pond refilling process included; installing additional staff gauges in the pond to allow for measurement of pond water levels during refilling (Completed July 25, 2023), develop relationship between the new staff gauges and stage-storage curves for the pond, and update the LCO DCWMS OMS manual document to incorporate the new staff gauges and stage-storage relationships to inform dewatering steps prior to the 2024 pond refilling. Significance of event was found to be low as any changes to water quality at LC_SPDC would be consistent with plan to refill and discharge from the pond (i.e. just occurred sooner), it did not compromise the integrity of the dam structure, and there were no decreased flow conditions in LCO Dry with no fish strandings discovered along the influenced Dry Creek area.

2.2.2 MISSING AND UNATTAINABLE DATA

Potential causes of missed samples are human error or issues with the Sample Planning Module (SPM) of Teck's Environmental Quality Information System (EQuIS) database. Data categorized as unattainable occurs when circumstances prevent the collection of water samples from authorized discharges and/or receiving environment sampling sites throughout the calendar year. Such circumstances are generally out of Teck's control and include, but are not necessarily limited to, unsafe sampling conditions for personnel, no flow due to freezing conditions, or cessation of discharge activities.

Missed or unattainable data from monitoring programs is presented in Table 6. There was no missed data in 2023.

Table 6. Summary of Unattainable Data.

EMS ID	Site ID[1]	Date	Parameters	Reason
E216142	LC_LC1	Q1 2023	All parameters	No flow (frozen)
		Q4 - December 2023	All parameters	No flow (frozen)
E219411	LC_LC8	Q1 2023	All parameters	No flow (not discharging)
		Q2 2023	All parameters	No flow (not discharging)
		Q3 2023	All parameters	No flow (not discharging)
		Q4 2023	All parameters	No flow (not discharging)
E221268	LC_LC9	Q1 2023	All parameters	No flow (not discharging)
		Q2 2023	All parameters	No flow (not discharging)
		Q3 2023	All parameters	No flow (not discharging)
		Q4 2023	All parameters	No flow (not discharging)
E102494	LC_LC11	Q1 2023	All parameters	No flow (not discharging). Ongoing system upgrades. See LCO's Noncompliance Mitigation Updates section for details.
		Q2 2023	All parameters	No flow (not discharging). Ongoing system upgrades. See LCO's Noncompliance Mitigation Updates section for details.
		Q3 2023	All parameters	No flow (not discharging). Ongoing system upgrades. See LCO's Noncompliance Mitigation Updates section for details.
		Q4 2023	All parameters	No flow (not discharging). Ongoing system upgrades. See LCO's Noncompliance Mitigation Updates section for details.
E223240	LC_LC12	Q1 2023	All parameters	No flow (not discharging)
		Q2 - April 2023	All Parameters	No flow (not discharging)
		Q3 2023	All parameters	No flow (not discharging)
		Q4 2023	All parameters	No flow (not discharging)
E288269	LC_SBPIN	Q2 2023	All parameters	No flow (not discharging). Material taken offsite for disposal
		Q3 2023	All parameters	No flow (not discharging). Material taken offsite for disposal
		Q4 - October 2023	All parameters	No flow (not discharging). Material taken offsite for disposal.
		Q4 - November 2023	All parameters	No flow (not discharging). Material taken offsite for disposal
E288275	LC_GRCK	Q1 2023	Flow	No flow (partially frozen, staff gauge above water)
		Q2 - April 2023	All Parameters	No flow (staff gauge above water)
		Q4 - November 2023	Flow	Partially frozen
		Q4 - December 2023	Flow	Partially frozen
E288270	LC_DC1	Q1 2023	Flow	Partially frozen
		Q4 - October 2023	Flow	Malfunction of in-situ flowmeter pressure sensor
E288274	LC_DCEF	Q1 2023	Flow	Partially frozen
E288273	LC_DC3	Q1 - January 2023	Flow	Partially frozen
		Q1 - February 2023	Flow	Partially frozen
		Q1 - March 13, 2023	Flow	Partially frozen
E216144	LC_LC7	Q1 - March 13, 2023	Flow	Partially frozen

[1]Note in flow was absent (no flow, not discharging), a result was uploaded to EMS as a zero flow and the water quality parameters were therefore not attainable.

3 Data Quality Assurance and Quality Control

3.1 Quality Assurance and Quality Control Program

In accordance with Section 3.1.3.3 of Permit 5353, LCO has implemented a Quality Assurance and Quality Control (QA/QC) Program in accordance with the *Environmental Data Quality Assurance Regulation* and guidance provided in the *British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples (2013)* and the *British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air (2007).* A summary of LCO's QA/QC program is provided below.

3.1.1 PERSONNEL TRAINING

Line Creek Operations personnel are trained using Teck Standard Practices & Procedures (SP&P), hands-on training, and mentoring from more senior or experienced personnel. Training covers environmental monitoring (including sampling procedures, shipping methods, and equipment calibration procedures), data management, and reporting activities. Teck Coal Limited's operations employ a dedicated Training Department and utilize a Training History system for scheduling reviews of SP&at set frequencies and tracking records of training.

3.1.2 EQUIPMENT CALIBRATION

Equipment used for measuring real-time field parameters include a flow meter, turbidity meter and three multi-parameter meters that are used to measure pH, temperature, conductivity, oxidation-reduction potential, dissolved oxygen, and turbidity. All meters are calibrated with the methodology and frequency recommended in the manufacturers' manuals. All in-house calibrations are conducted using certified calibration solutions per manufacturers' recommendations. Records of calibration and any required remedial actions are recorded in the equipment logbook. The calibration requirements for these instruments were met for 2023 (Table 7).

Table 7. Equipment Calibration Summary.

Equipment	Model	Calibration Frequency	Last Calibration	Due Date
Field Parameter Meter	YSI Exo 3	Daily/Weekly	Mar 15, 2022	Prior to scheduled sampling event**
Field Parameter Meter	Pro DSS	Daily/Weekly	Dec 27, 2023	Prior to scheduled sampling event
Field Parameter Meter	Pro DSS	Daily/Weekly	Dec 27, 2023	Prior to scheduled sampling event
Field Parameter Meter	YSI Pro Plus	Daily/ Weekly	Mar 15, 2022	Prior to scheduled sampling event**
Hach Company, Flow Meter	Hach Model FH950.1	As required* (Completed by Manufacturer upon purchase in October 2020)	Oct 2020	As required*
KROHNE; Electromagnetic Flowmeter	Tidalflux X300F	As required by manufacturer	Dec 6, 2023	As required

*There is no manufacturer specification on calibration frequency; instrument is calibrated as needed.

3.1.3 RECORD KEEPING

Data quality is maintained by storing all sampling data in a controlled database. The data management application at LCO is EQuIS. User-defined rules are applied to the uploading of data to ensure quality is maintained. Additionally, all data is compared to applicable limits or guidelines (e.g., *British Columbia Water Quality Guidelines, 2023*). If a value entered exceeds a limit or guideline, the user is advised in an automated report generated by the database. This enables users to determine if the value is entered incorrectly, if there is a laboratory error, or if values have exceeded the applicable standards.

3.1.4 SAMPLE ANALYSIS

In 2023, third-party analysis was conducted by:

- ALS Laboratory Group
  8081 Lougheed HWY
  Suite 100
  Burnaby, B.C. V5A 1W9

- ALS Laboratory Group
  2559 29 Street Northeast
  Calgary, AB T1Y 7B5

- Nautilus Environmental Company Inc.
  8664 Commerce Court
  Burnaby, B.C. V5A 4N7

- Nautilus Environmental Company Inc.
  10823 27 Street SE
  Calgary, AB. T2Z 3V9

3.1.5 FIELD DUPLICATES

To measure the overall precision of sampling and analysis and to confirm environmental homogeneity, Teck collects duplicate samples in the field and calculates relative percent difference (RPD) as defined in the *British Columbia Field Sampling Manual, 2013*. RPD is the arithmetic difference between two samples, divided by the mean of those samples, then multiplied by one hundred to express the result as a percentage:

$$\mathrm{RPD} = \left(\frac{(a - b)}{(a + b) / 2} \right) \times 100\%$$

Field Duplicate sample precision was evaluated using RPD where four criteria were used to evaluate each set of duplicate samples:

- RPD of < 20% = Pass
- RPD of >20% with results < 5 times the detection limit = Pass-1
- RPD of > 20% and <50% with results > 5 times the detection limit = Pass-2
- RPD of >50% with results > 5 times the detection limit = Fail

Throughout 2023 there were a total of 105 sets of duplicate samples collected, resulting in 210 parameters being evaluated for RPD. Of the 210 parameters evaluated, 6 (2.86%) did not meet acceptable RPD assessment criteria. Refer to Appendix E for results.

3.1.6 BLANK SAMPLES

A total of 108 sets of trip blank samples were collected in 2023. A total of 216 parameters were analyzed with no results above the analytical method detection limit (100% non-detect). Refer to Appendix F for results.

Throughout 2023, a total of 101 sets of field blank samples were collected. A total of 202 parameters were analyzed with no results above the analytical method detection limit (100% non-detect). Refer to Appendix F for results.

3.2 Quality Assurance and Quality Control Issues

Teck monitors QA/QC results to identify any potential issues with laboratory precision or sample contamination. In accordance with the QA/QC Program concerns identified in the field and/or laboratories are documented and tracked. Table 8 summarizes all QA/QC concerns.

In 2023, Line Creek Operations had 14 quality assurance and quality control issues; eight were related to hold-time exceedances and six were related to relative percent difference failures.

Teck continues to address the causes of hold-time exceedances by working with laboratories to improve the timely reporting of issues such as equipment malfunctions, sample volumes, shipping delays, and laboratory resources. Timely reporting of these issues to Teck often provides field samplers enough time to resample to meet permit requirements.

Table 8. Summary of QA/QC Issues.

Date	EMD ID	Location Code	Parameter	Reason
1/14/2023	0200044	LC_LC4	Turbidity, Lab	EHTR
4/16/2023	E295211	LC_SPDC	Turbidity, Lab	EHTR
6/12/2023	E216142	LC_LC1	TOTAL SUSPENDED SOLIDS, LAB	EHT
6/12/2023	E216142	LC_LC1	TURBIDITY, LAB	EHT
6/12/2023	E223240	LC_LC12	TOTAL SUSPENDED SOLIDS, LAB	EHT
6/12/2023	E223240	LC_LC12	TURBIDITY, LAB	EHT
6/12/2023	0200335	LC_LC2	TOTAL SUSPENDED SOLIDS, LAB	EHT
6/12/2023	0200335	LC_LC2	TURBIDITY, LAB	EHT
6/26/2023	0200337	LC_LC3	TOTAL SUSPENDED SOLIDS, LAB	Outside RPD acceptable criteria
6/26/2023	0200337	LC_LC3	TURBIDITY, LAB	Outside RPD acceptable criteria
7/31/2023	E293369	LC_LCUSWLC	TURBIDITY, LAB	Outside RPD acceptable criteria
10/23/2023	E293369	LC_LCUSWLC	TOTAL SUSPENDED SOLIDS, LAB	Outside RPD acceptable criteria
10/23/2023	E293369	LC_LCUSWLC	TURBIDITY, LAB	Outside RPD acceptable criteria
11/13/2023	0200337	LC_LC3	TURBIDITY, LAB	Outside RPD acceptable criteria

EHTR Exceeded ALS recommended hold-time prior to sample receipt.
EHTL Exceeded ALS recommended hold-time prior to analysis. Sample was received less than 24 hours prior to expiry.
EHT Exceeded recommended hold-time prior to analysis.
HTD Hold-time exceeded for re-analysis, but initial testing was conducted within hold-time.
RPD Relative Percent Difference

4 Water Monitoring Program Description

4.1 Water Quality and Quantity Monitoring Requirements

In 2023, monitoring was conducted in accordance with the sampling sites, frequencies and parameters defined in Permit 5353. Permit monitoring requirements are summarized belowTable 9. A complete list of required parameters can be found in Table 5 of Appendix A in Permit 5353.

Additional sampling was conducted in accordance with LCO's *Horseshoe Ridge Pit Dewatering Plan* (2022 and 2023) and *MSX Pit Pumping Plan* (2022); monitoring requirements for these plans are presented in Table 10. A complete list of required parameters can be found in Section 2.3.3 of the *Horseshoe Ridge Pit Dewatering Plan* and Section 3.1 of the *MSX Pit Pumping Plan*.

Table 9. Monitoring Requirements.

EMS ID	Site ID	Permitted location since	Parameters								
			Permit Limit	Permit Limit	Permit Limit	Permit Limit	Field Parameters*	Conventional Parameters*	Major Ions*	Nutrients*	Metals Scan*
			Flow	EPH	TSS & Turbidity	BOD					
E102494	LC_LC11	1981	Q	-	Q	Q	-	-	-	-	-
E288269	LC_SBPIN	2012	M	M	-	-	M	M	M	M	M
E216144	LC_LC7	1991	W/M	Q	-	-	-	-	-	-	-
E219411	LC_LC8	1994	W/M	-	-	-	-	-	-	-	-
E221268	LC_LC9	1994	W/M	Q	-	-	-	-	-	-	-
E302410	LC_PIZP1101	2015	-	Q	-	-	Q	Q	Q	-	Q
E302411	LC_PIZP1105	2015	-	Q	-	-	Q	Q	Q	-	Q
E292521	LC_SPDC	2021	C	-	BP-W/M	-	-	-	-	-	-
E295231	LC_SPFR	2021	C	-	W/M	-	-	-	-	-	-
E293113	LC_DSSW	2021	D*/W	-	D*/W	-	-	-	-	-	-
E295314	LC_SP1SW	2021	D*/W	-	D*/W	-	-	-	-	-	-
E295315	LC_SP2SW	2021	D*/W	-	D*/W	-	-	-	-	-	-
E295316	LC_SP3SW	2021	D*/W	-	D*/W	-	-	-	-	-	-
0200028	LC_LC5	1981	-	-	W/M	-	-	-	-	-	-
0200044	LC_LC4	1981	-	-	W/M	-	-	-	-	-	-
0200337	LC_LC3	1981	-	-	W/M	-	-	-	-	-	-
0200335	LC_LC2	1981	-	Q	W/M	-	-	-	-	-	-
E293369	LC_LCUSWLC	2014	-	-	M	-	-	-	-	-	-
E216142	LC_LC1	1991	-	-	W/M	-	-	-	-	-	-
E282149	SLC	2012	-	-	M	-	-	-	-	-	-
E297110	LC_LCDSSLCC	2014	-	-	M	-	-	-	-	-	-
E261958	LC_WLC	2012	-	Q	M	-	-	-	-	-	-

EMS ID	Site ID	Permitted location since	Parameters								
			Permit Limit	Permit Limit	Permit Limit	Permit Limit	Field Parameters*	Conventional Parameters*	Major Ions*	Nutrients*	Metals Scan*
			Flow	EPH	TSS & Turbidity	BOD					
E223240	LC_LC12	1996	-	-	W/M	-	-	-	-	-	-
E288274	LC_DCEF	2021	Gauged Flows (hourly)	-	-	-	-	-	-	-	-
E288273	LC_DC3	2021	C	-	-	-	-	-	-	-	-
E295210	LC_DCDS	2021	BP-W/M	-	-	-	-	-	-	-	-
E288270	LC_DC1	2021	C	-	-	-	-	-	-	-	-
E295213	LC_UC	2021	M	-	-	-	-	-	-	-	-
E288275	LC_GRCK	2021	M	-	-	-	-	-	-	-	-
E295232	LC_FRUS	2021	-	-	-	-	-	-	-	-	-
E288272	LC_FRDSDC	2021	-	-	-	-	-	-	-	-	-
E295214	RG_CH1	2021	M	-	-	-	-	-	-	-	-

**A complete list of parameters can be found in Appendix A of Permit 5353*
M – Monthly Frequency
Q – Quarterly frequency
W – Weekly frequency
W/M – Weekly frequency for March 15 – July 15, monthly during the rest of the year
C – Continuous
BP-W/M -- Weekly frequency March 15 to at least August 31 during bypass of DCWMS, monthly during the rest of depending on unexpected monitoring results that indicate potential ortho-P uptake or the generation of organic selenium species
D/W One sample within the first 24 hours when actively discharging at spillway, then weekly*

Table 10. HSP Dewatering Plan and MSX Pit Pumping Plan Monitoring Requirements.

EMS ID	Site ID	Parameters								
		Flow	Turbidity	Field Parameters*	Conventional Parameters*	Major Ions*	Nutrients*	Metals Scan*	Acute Toxicity*	Selenium Speciation*
E308146	LC_HSP*	W (Total volume)	W	W	W	W	W	W	M	M
n/a	LC_MSXS*	W	W	W	W	W	W	W	M	M
n/a	LC_MSAW6**	-	M	M	M	M	M	M	M***	M
E3081479	LC_MSAWCULV**	-	M	M	M	M	M	M	M	M
E293369	LC_LCUSWLC	-	M	M	M	M	M	M	M	M

**A complete list of parameters can be found in Section 2.3 of the HSP Dewatering Plan and Section 3.1 of the LCO MSX Pit Pumping Plan.*
***Monitoring required only during period when MSX pit pumping is occurring*
****Monitoring only required if sample from MSAW cannot be obtained, or if specified by Tigger Action Response Plan (TARP)*
M – Monthly Frequency
Q – Quarterly frequency
W – Weekly frequency

Please note Table 10 refers to sampling frequencies specified in the relevant pit pumping plans used in 2023. For Mine Service Area Extension (MSX) pit, pumping activities were dictated by the 2022 plan. Pumping activities from HSP were dictated by the 2022 plan on and before April 30, 2023, and by the 2023 plan from October 20, 2023 onward.

4.2 Sampling Methodology

All samples are collected in accordance with procedures in *British Columbia Field Sampling Manual – For Continuous Monitoring and the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment and Biological Samples* (2013). A summary of detection limits is provided in Appendix G.

5 Monitoring Results

5.1 Water Quality Results

All water quality results are from samples collected in 2023 unless otherwise specified. Monitored parameters are compared to applicable permit limits listed in Table 4. Exceedances of permit water quality limits are trended for further assessment. Water quality data is provided in Appendix H.

5.2 Authorized Discharges

5.2.1 MINE SERVICE AREA SEWAGE TREATMENT SYSTEM EFFLUENT TO GROUND (LC_LC11)

The Sewage Treatment System did not discharge in 2023 as a result of ongoing upgrades and therefore no water quantity data is compared to applicable permit limits. As no discharge occurred in 2023, no samples were collected from this location.

Line Creek Operations implemented actions to cease discharge from the Sewage Treatment System in Q4 2021. This involved engaging a contractor (a vacuum truck service) to remove wastewater from the septic tank and transport it offsite for disposal. The contractor was on a recurring schedule throughout 2023 to remove loads of wastewater from the septic tank as required until Q1 2024 when the upgraded system had been fully commissioned. Further information on the sewage treatment system upgrades is outlined in Table 3.

5.2.2 HEAVY DUTY WASH BAY EFFLUENT DISCHARGE TO STEAM BAY PONDS (LC_SBPIN)

The concentration of discharge of effluent from the Heavy-Duty Wash Bay (HDWB) to the Steam Bay Ponds must not exceed 15 mg/L for extractable petroleum hydrocarbons (EPH). The HDWB system did not discharge into the receiving environment for the majority of 2023 due to ongoing efforts to manage EPH compliance.

Line Creek Operations ceased discharge from the HDWB on March 3, 2023, following receipt of EPH laboratory results of 17.1 mg/L from a routine water sample collected on February 23, 2023. Additional water samples were collected on March 9, 2023, and EPH concentrations were less than 15 mg/L. As the result was below the permit limit discharge from the HDWB into the Steam Bay Ponds was restored on March 12, 2023. Discharge was ceased from the HDWB on March 20, 2023, upon receipt of EPH laboratory results of 17.8 mg/L from a routine water sample collected on March 16, 2023.

Between the dates of March 20, 2023, and December 7, 2023, 19 effluent samples were analyzed while material was removed and taken offsite for disposal (Appendix H). All EPH concentrations were less than the permit limit of 15 mg/L. Discharge from the HDWB into the Steam Bay Ponds was restored on December 7, 2023.

A routine water sample collected on December 14, 2023, had an EPH result of 64.1 mg/L. Discharge was ceased from the HDWB on December 22, 2023, upon receipt of the analytical results. The discharge valves of the HDWB recycle system were locked out (closed) to prevent discharge until an investigation into the cause is finalized and effluent quality has been confirmed to meet compliance standards.

Samples were collected throughout year when the system was discharging and when material was removed and taken offsite for disposal to evaluate system performance. Laboratory sample results for EPH are provided in Figure 2

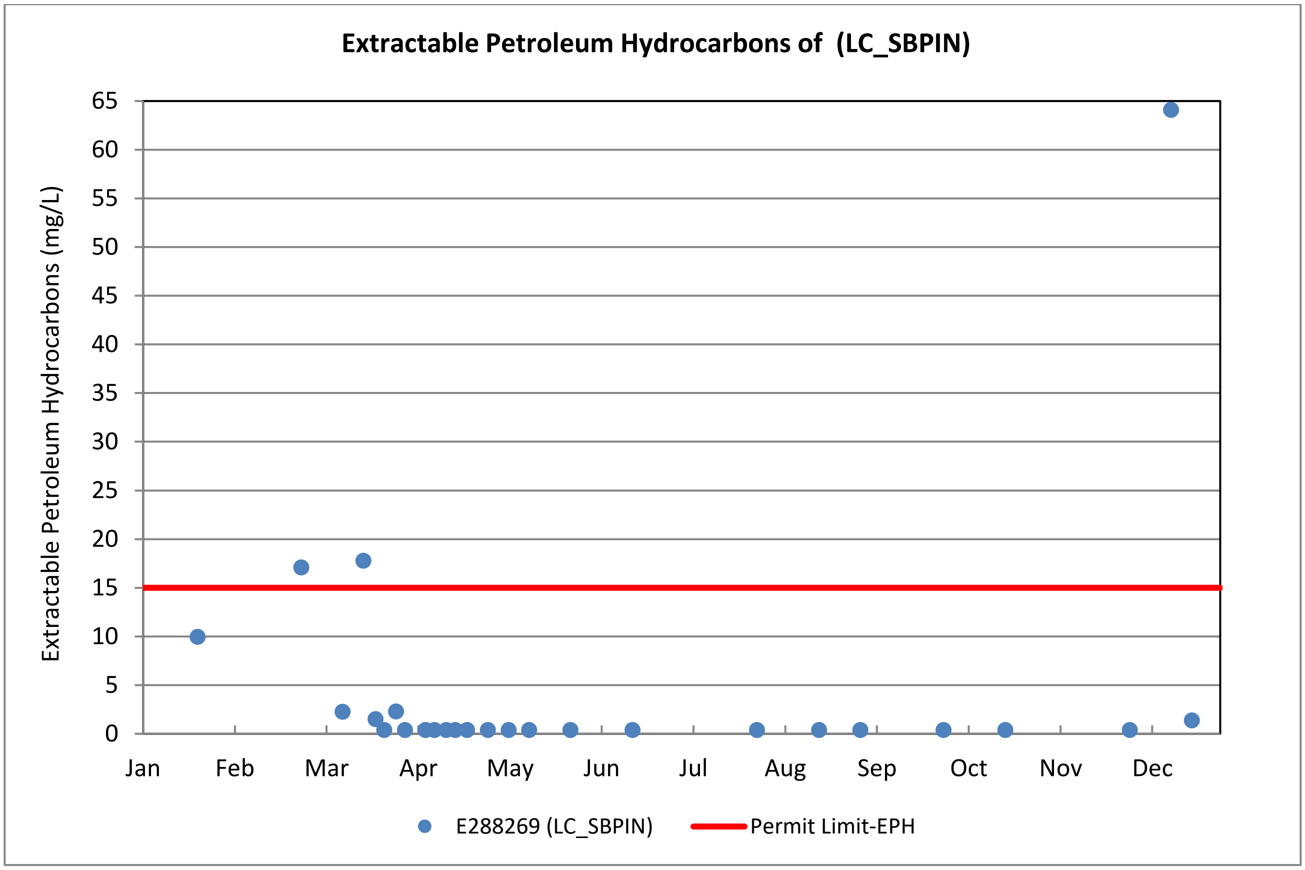

Figure 2. Extractable Petroleum Hydrocarbon results from the Heavy-Duty Wash Bay (LC_SPBIN).

5.2.3 MISCELLANEOUS OIL WATER SEPARATORS TO GROUND (LC_LVWB)

Samples were collected throughout the year from the Light Vehicle Wash Bay (LC_LVWB), which discharges to ground via the Steam Bay Ponds. All samples were below the EPH permit limit of 15 mg/L (Figure 3).

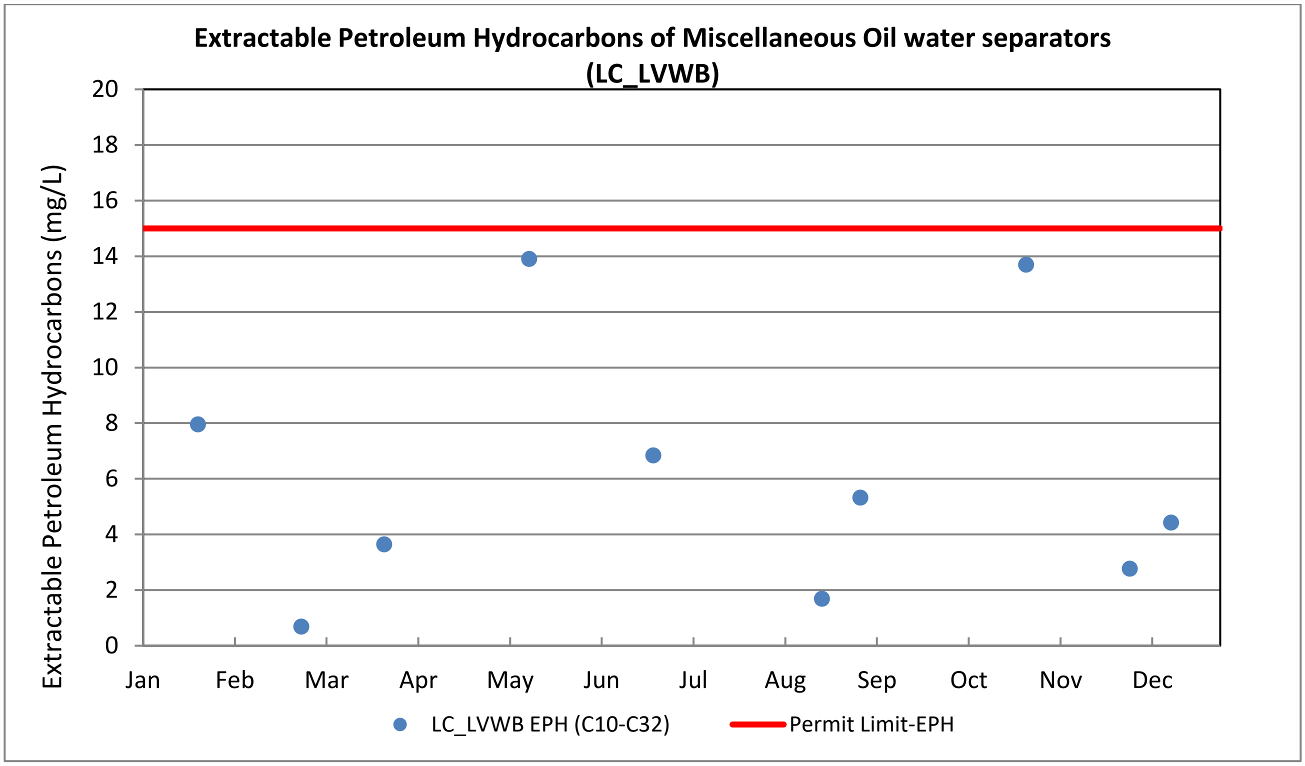

Figure 3. Extractable Petroleum Hydrocarbon results from the Light Vehicle Wash Bay Effluent (LC_LVWB).

5.2.4 MINE SERVICE AREA NORTH PONDS EFFLUENT TO LINE CREEK (LC_LC7)

The MSAN Ponds were in compliance with the TSS permit limit (50 mg/L) for the year (Figure 4).

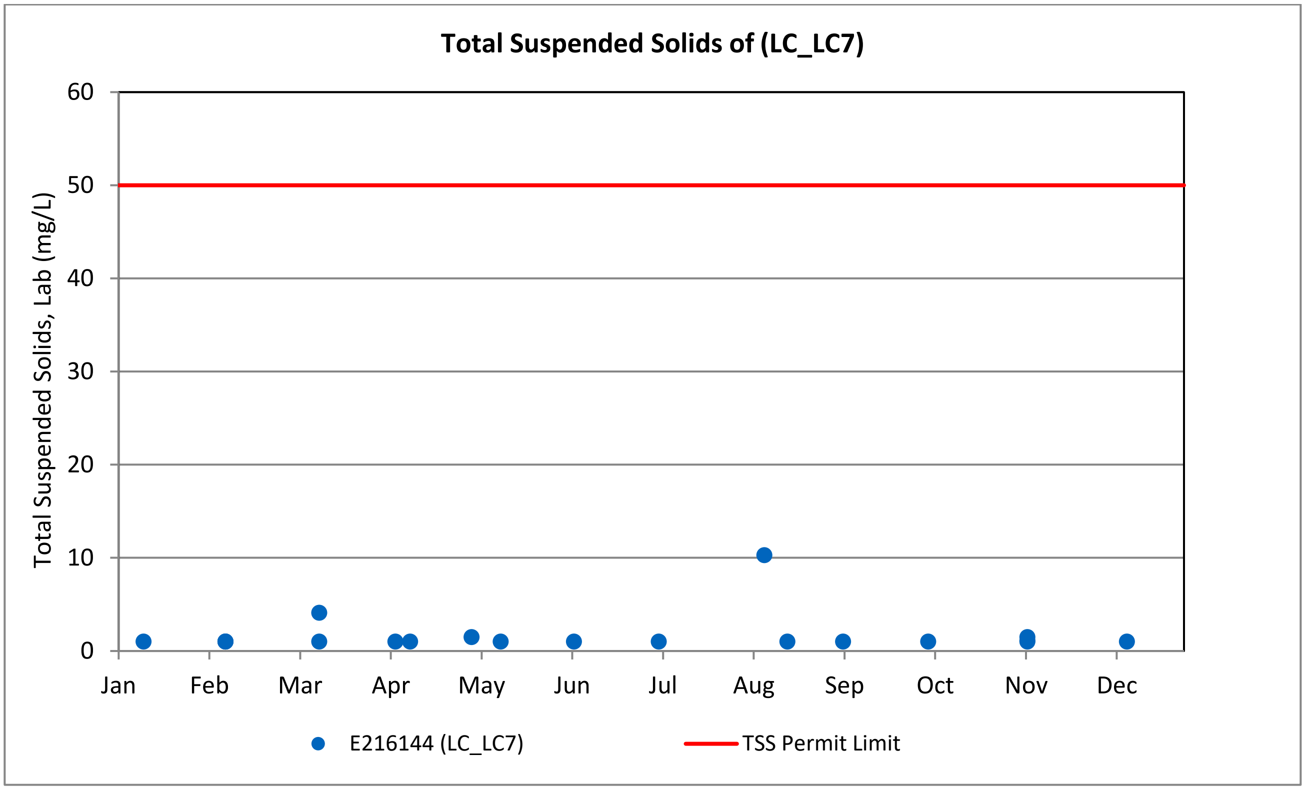

Figure 4. Total Suspended Solids results from the MSA North Ponds Effluent (LC_LC7).

5.2.5 CONTINGENCY TREATMENT SYSTEM EFFLUENT TO LINE CREEK (LC_LC8)

The CTS was not utilized for managing TSS in 2023. The pond system did not discharge and therefore no water quality data is available to be compared to applicable permit limits or trends.

5.2.6 NO NAME CREEK POND EFFLUENT TO LINE CREEK (LC_LC9)

In Q1 2023, sediment removal was continued from work started in Q4 2022 for the No Name Creek Ponds to re-establish retention time and increase pond capacity to improve sediment removal. The No Name Creek Pond did not discharge in 2023 and therefore no water quality data is available to be compared to applicable permit limits or trended.

5.2.7 RAIL LOOP PONDS EFFLUENT TO GROUND (LC_PIZP1101 AND LC_PIZP1105)

The Rail Loop Ponds effluent to ground were sampled in all quarters of 2023. All parameters, with the exception of EPH, are discussed in the groundwater monitoring report submitted under separate cover (titled "*2023 Annual Report: Elk Valley Regional and Site-Specific Groundwater Monitoring Programs*"). All EPH values at these two locations were found to be below the method detection limits for EPH (0.4 mg/L) (Figure 5).

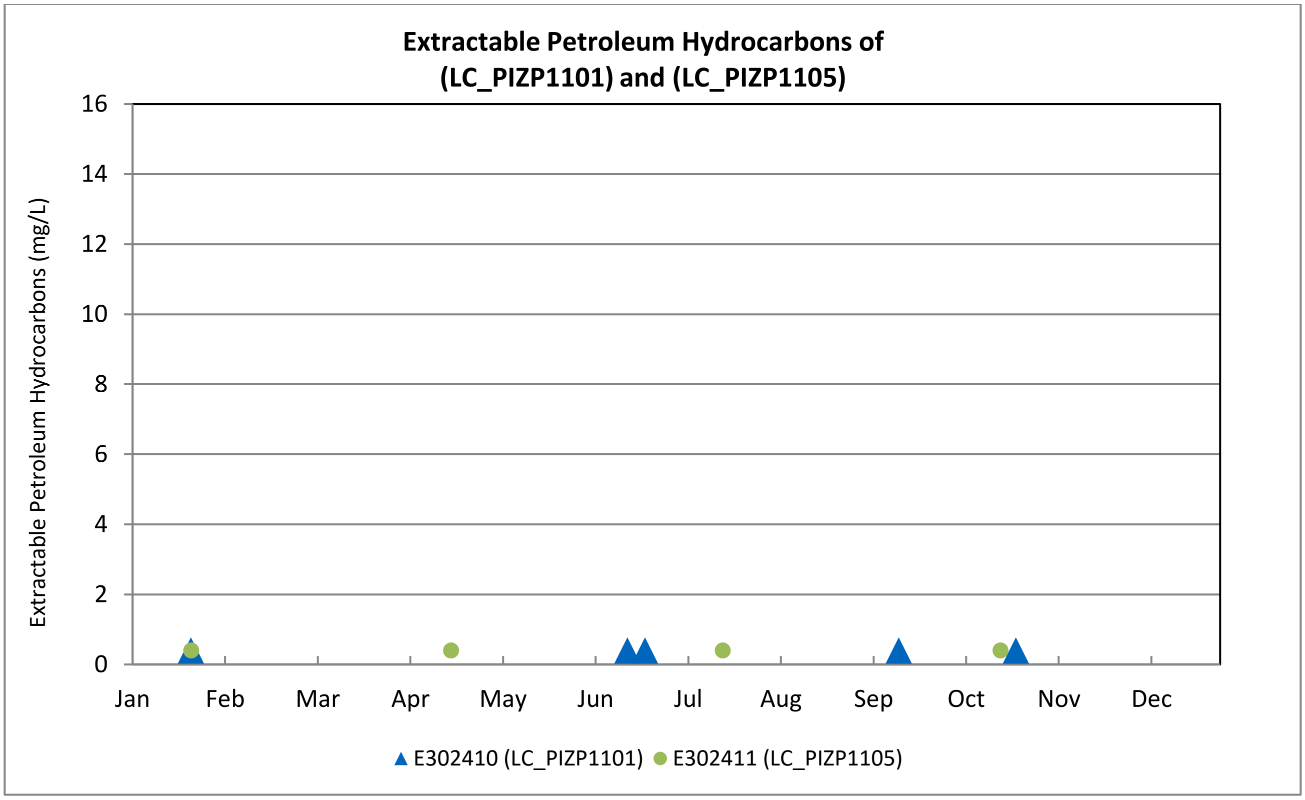

Figure 5. Extractable Petroleum Hydrocarbons results from Rail Loop Ponds Effluent to Ground (LC_PIZP1101 and LC_PIZP1105).

5.2.8 HORSESHOE RIDGE PIT DISCHARGE TO LINE CREEK (LC_HSP)

Discharge of stored pit water from Horseshoe Ridge Pit (HSP) occurred between January 1, 2023 to March 3, 2023; from April 26, 2023 to April 30, 2023; and from October 20, 2023 to December 16, 2023. This discharge was sampled in accordance with LCO's *Horseshoe Ridge Pit Dewatering Plans* (2022 & 2023). Acute toxicity tests for *Daphnia magna* and Rainbow trout taken from the discharge from HSP all remained at 0% mortality (Figure 6). Total suspended solids at the discharge from HSP remained below the limit of 50 mg/L for 2023 (Figure 7).

In addition to the 5353 permit limit for TSS specified in Section 1.8, the *Horseshoe Ridge Pit Dewatering Plan* (2023) identified the following parameters as constituents of potential concern (COPC): ammonia, cobalt (total), cadmium (dissolved), copper (dissolved), mercury (total), nickel (total), nitrate, nitrite, dissolved oxygen, phosphorus (total), selenium (total), and sulphate (dissolved). Selenium speciation was also assessed but was not considered as a COPC. A discussion on the results of the water quality monitoring, and comparison to relevant water quality thresholds (including BCWQG, Site Performance Objectives and Permit Limits) for HSP dewatering is provided in Section 6.4 and Appendix M.

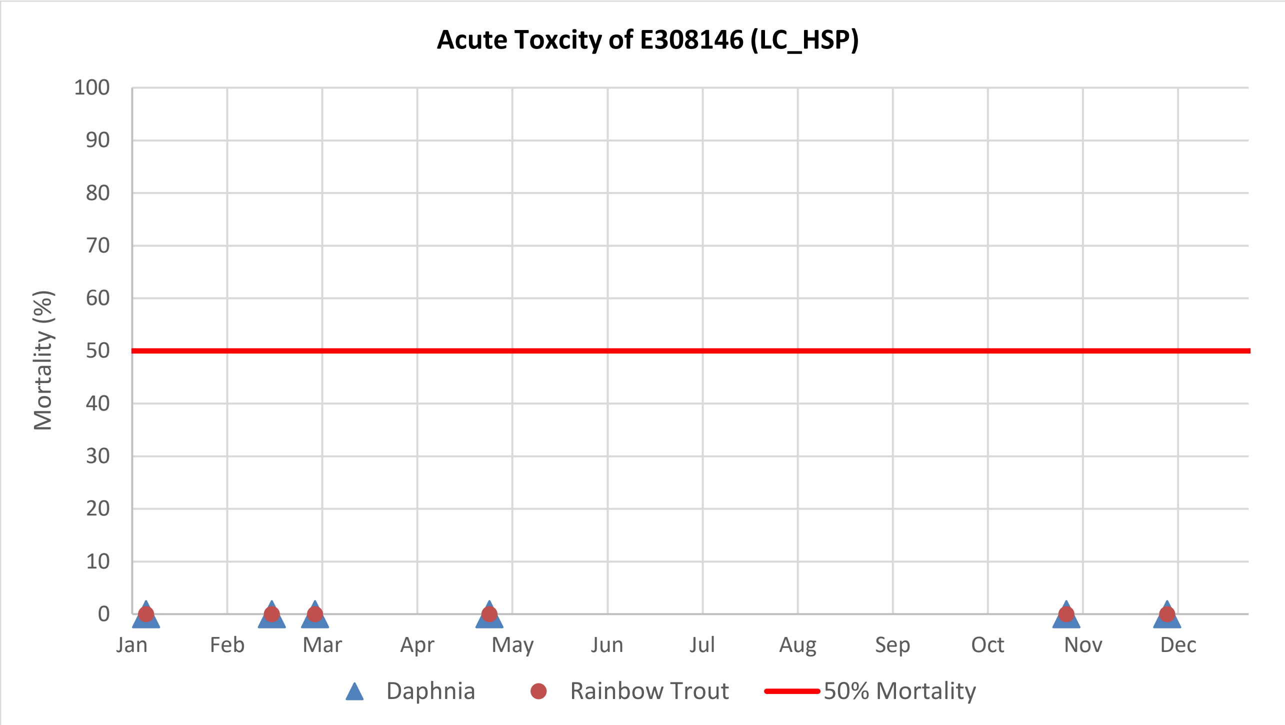

Figure 6. Acute Toxicity results from Horseshoe Ridge Pit Discharge to Line Creek (LC_HSP).

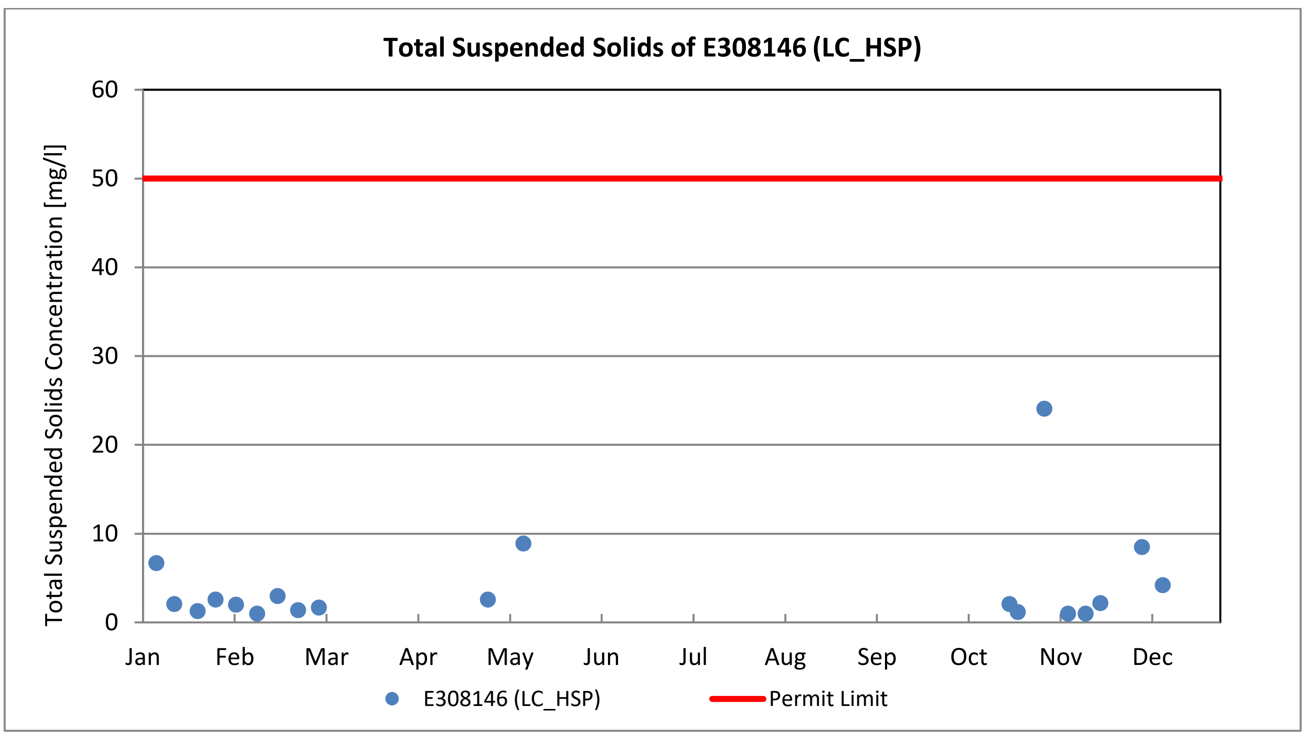

Figure 7. Total Suspended Solids (Lab) results from Horseshoe Ridge Pit Discharge to Line Creek (LC_HSP).

5.2.9 MINE SERVICE AREA WEST PIT DISCHARGE TO LINE CREEK (LC_MSAWCULV)

The discharge of Mine Service Area West (MSAW) pit water to Line Creek is influenced by two factors: natural upstream flows of the No Name Creek Rock Drain and management of water from the upstream MSX pit. Further details of the management of water from the MSX pit can be found in Section 6.4.3.

In 2023, the discharge of the MSAW Pit was sampled in accordance with LCO's *MSX Pit Pumping Plan* (2022). Total suspended solids at the discharge from MSAW Pit while pumping was ongoing at MSX Pit in 2023 and laboratory results remained below the limit of 50 mg/L (Figure 1Figure 8). Dewatering of MSX Pit occurred briefly in Q1 of 2023 and did not proceed past February 8, 2023 for the remainder of the year.

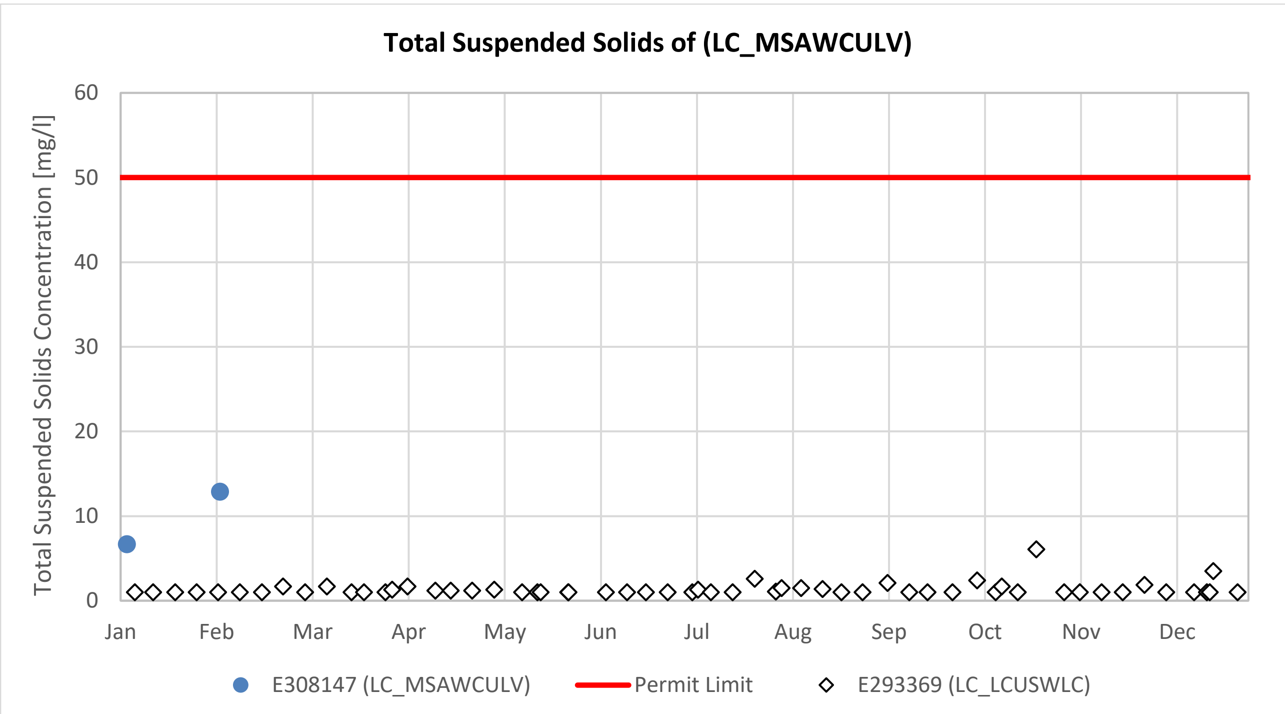

Figure 8. Total Suspended Solids from MSAW Pit Discharge to Line Creek (LC_MSAWCULV) sampled while pumping was ongoing at MSX Pit.

5.3 Receiving Environment

Receiving environment locations are monitored for TSS, turbidity and EPH. A summary of the 2023 results at each receiving environment location for TSS, turbidity and/or EPH is detailed below. Water quality data is provided in Appendix H.

5.3.1 LINE CREEK UPSTREAM MINE SERVICE AREA NORTH PIT (LC_LC1)

Monitoring conducted in 2023 at Line Creek upstream of the MSA North Pit shows TSS remained below 4.6 mg/L and turbidity was below 1 NTU (Figure 9 and Figure 10).

5.3.2 LINE CREEK UPSTREAM OF ROCK DRAIN (LC_LC2)

Monitoring conducted in 2023 from Line Creek Upstream of the Rock Drain indicates TSS remained below 2 mg/L and turbidity was below 1 NTU (Figure 9 and Figure 10).

5.3.3 NORTH HORSESHOE CREEK NEAR MOUTH (LC_LC12)

Monitoring conducted in 2023 at North Horseshoe Creek near the Mouth shows TSS remained below 1.1 mg/L and turbidity was below 1 NTU (Figure 9 and Figure 10). Although this location is mine affected, there was no active mining in the area in 2023. The sample site was observed to be dry (zero flow) for most of the year.

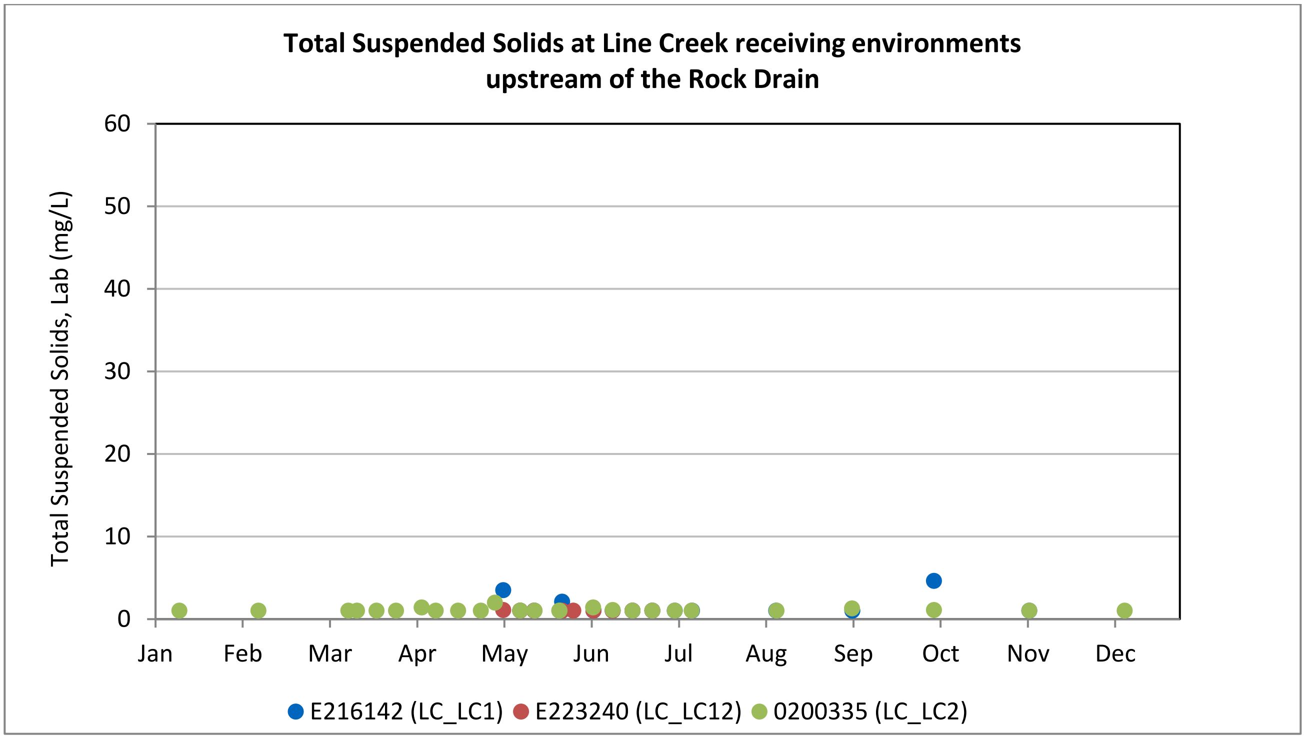

Figure 9. Total Suspended Solid results from Line Creek receiving environments upstream of the Rock Drain (LC_LC1, LC_LC2 and LC_LC12).

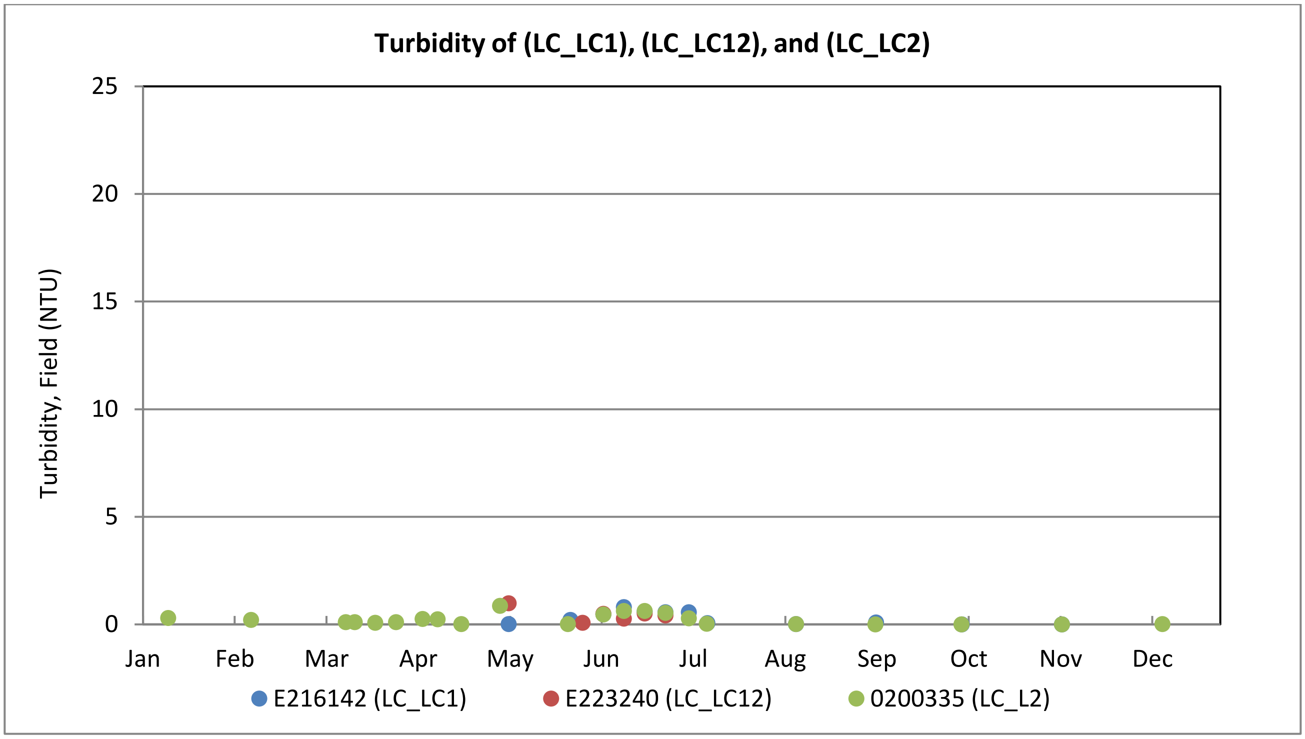

Figure 10. Turbidity results from Line Creek receiving environments upstream of the Rock Drain (LC_LC1, LC_LC2 and LC_LC12).

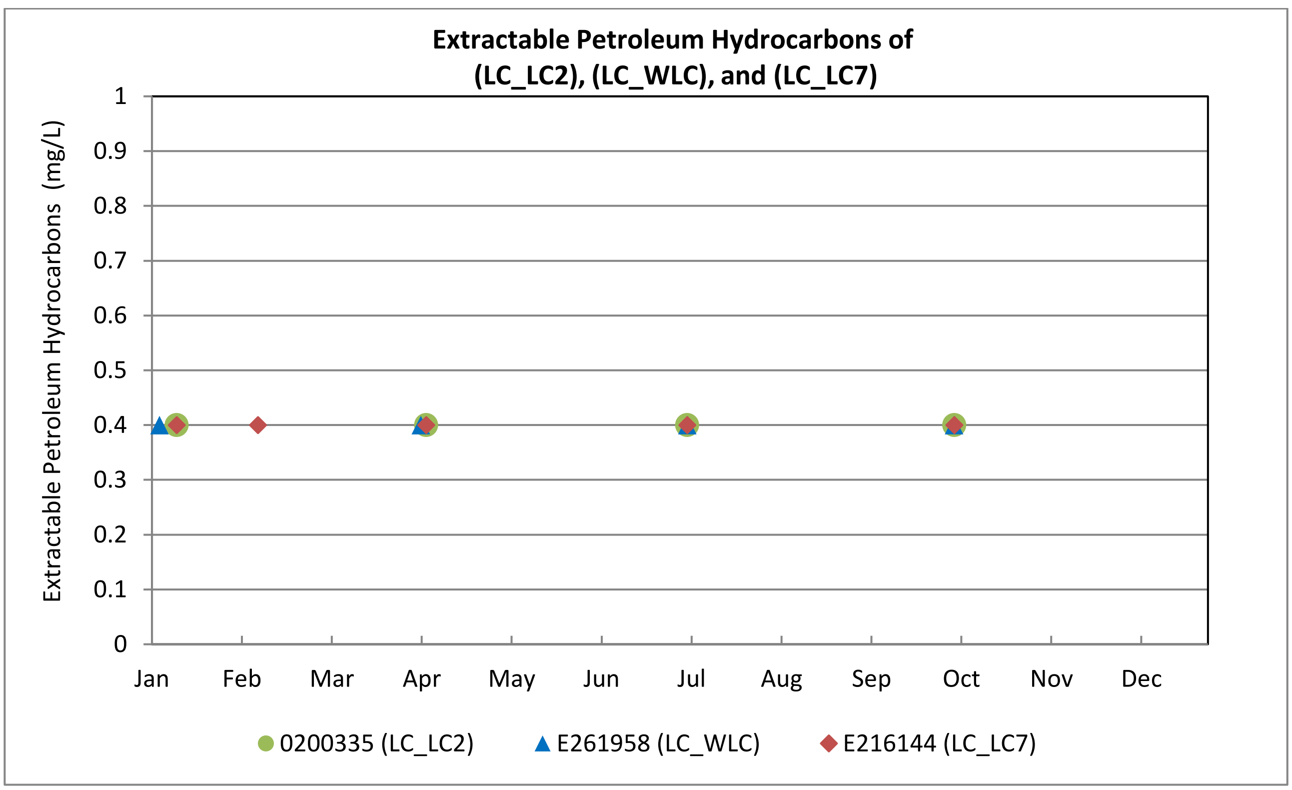

Figure 11. Extractable Petroleum Hydrocarbon results from Line Creek upstream of Rock Drain and West Line Creek receiving environments (LC_LC2, LC_WLC and LC_LC7).

5.3.4 LINE CREEK UPSTREAM OF WEST LINE CREEK BELOW ROCK DRAIN (LC_LCUSWLC)

Line Creek upstream of West Line Creek below the Rock Drain remained below 3 mg/L for TSS and 4 NTU for turbidity (Figure 12 and Figure **13**).

5.3.5 WEST LINE CREEK (LC_WLC)

West Line Creek remained below 2 mg/L for TSS and 2 NTU for turbidity for all of 2023 (Figure 12 and Figure **13**). Although West Line Creek is a mine-affected area, the only mining activities that occurred in 2023 in the West Line Creek drainage was reclamation of spoil surfaces. All EPH results remained below the detection limit (0.4 mg/L) in 2023 (Figure 11).

5.3.6 LINE CREEK DOWNSTREAM OF WEST LINE CREEK (LC_LC3)

Line Creek downstream of West Line Creek did not exceed 2 mg/L for TSS and 5 NTU for turbidity (Figure 12 and Figure **13**).

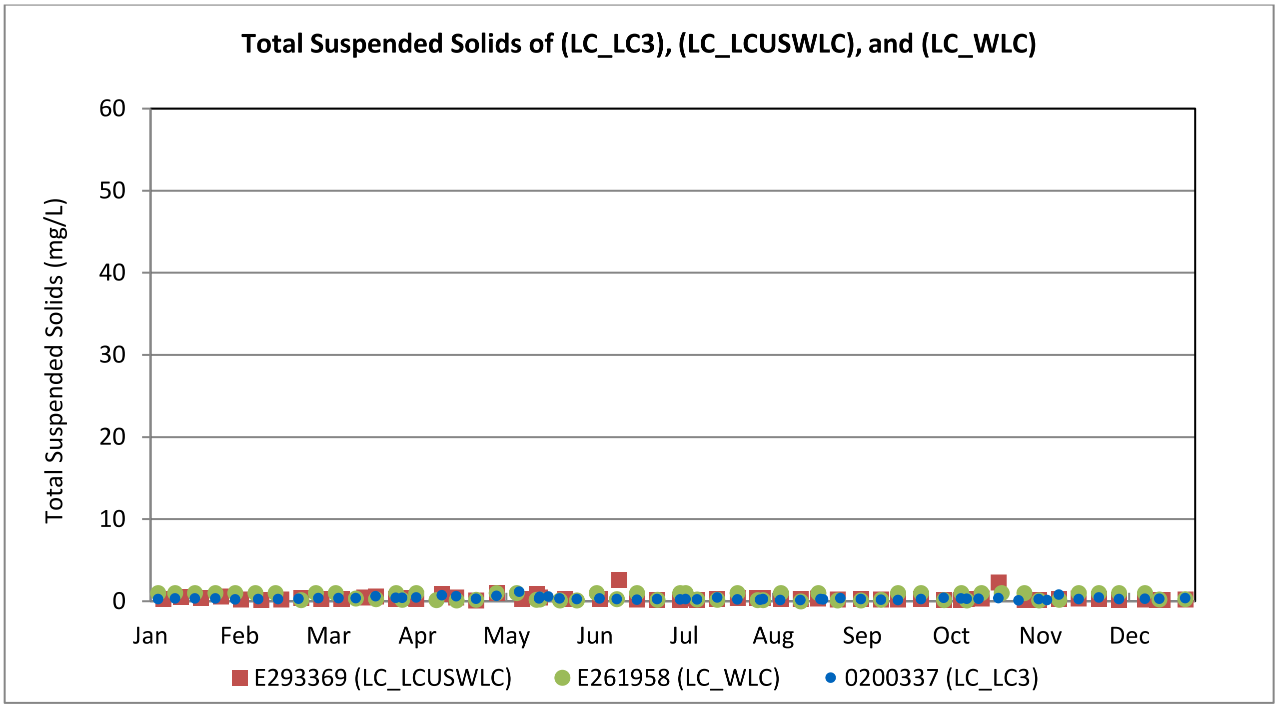

Figure 12. Total Suspended Solids results from Line Creek and West Line Creek receiving environments below the Rock Drains (LC_LCUSWLC, LC_WLC and LC_LC3).

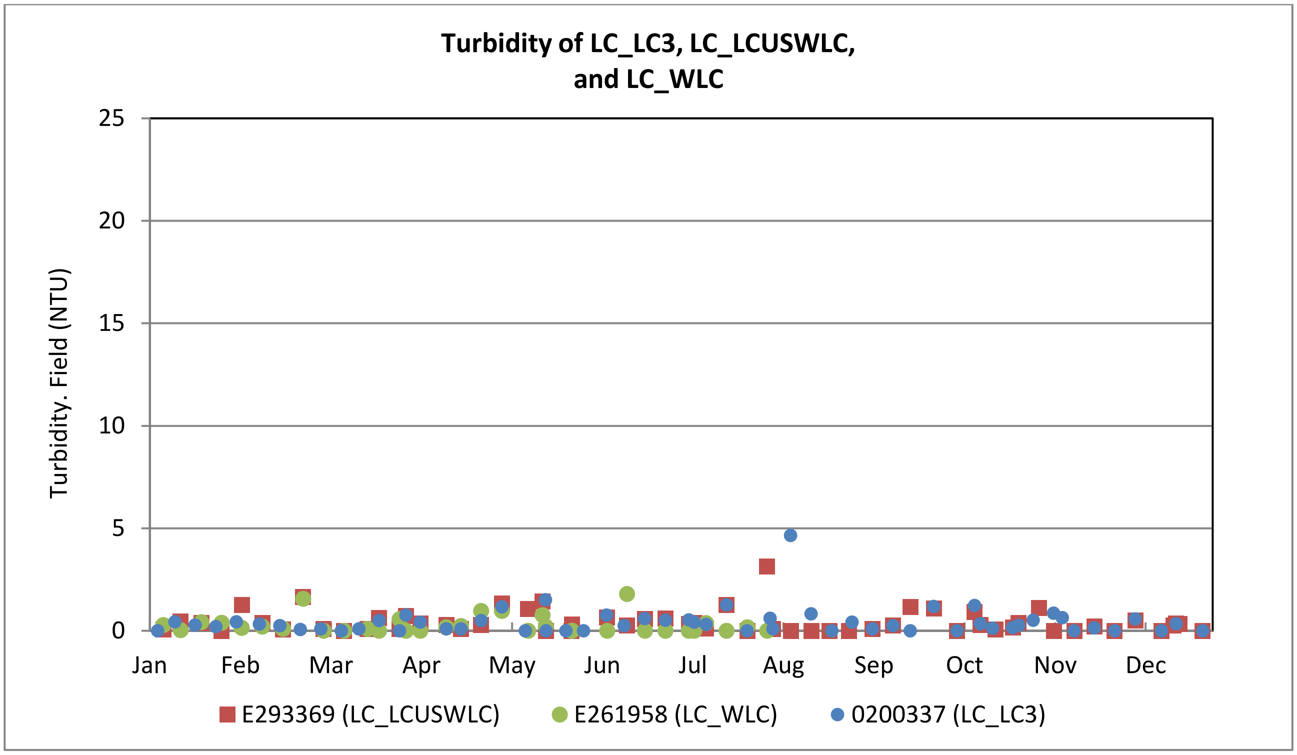

Figure 13. Turbidity results from Line Creek and West Line Creek receiving environments below the Rock Drains (LC_LCUSWLC, LC_WLC and LC_LC3).

5.3.7 SOUTH LINE CREEK (LC_SLC)

South Line Creek data indicated that TSS did not exceed 6 mg/L and turbidity remained below 5 NTU (Figure 14 and Figure **15**). South Line Creek is non-mine affected and believed to be representative of natural conditions.

5.3.8 LINE CREEK IMMEDIATELY DOWNSTREAM OF SOUTH LINE CREEK CONFLUENCE (LC_LCDSSLCC)

Line Creek immediately downstream of South Line Creek Confluence typically remained below 5 mg/L for TSS with a turbidity below 8 NTU (Figure 14 and Figure **15**).

5.3.9 LINE CREEK UPSTREAM OF PROCESS PLANT (LC_LC4)

Line Creek upstream of the Process Plant remained below 14 mg/L for TSS with turbidity below 9 NTU (Figure 14 and Figure **15**).

5.3.10 FORDING RIVER DOWNSTREAM OF LINE CREEK (LC_LC5)

Fording River downstream of Line Creek remained below 34 mg/L for TSS and turbidity below 22 NTU (Figure 14 and Figure **15**). This location is influenced by discharges from Fording River Operations and Greenhills Operations, in addition to Line Creek Operations.

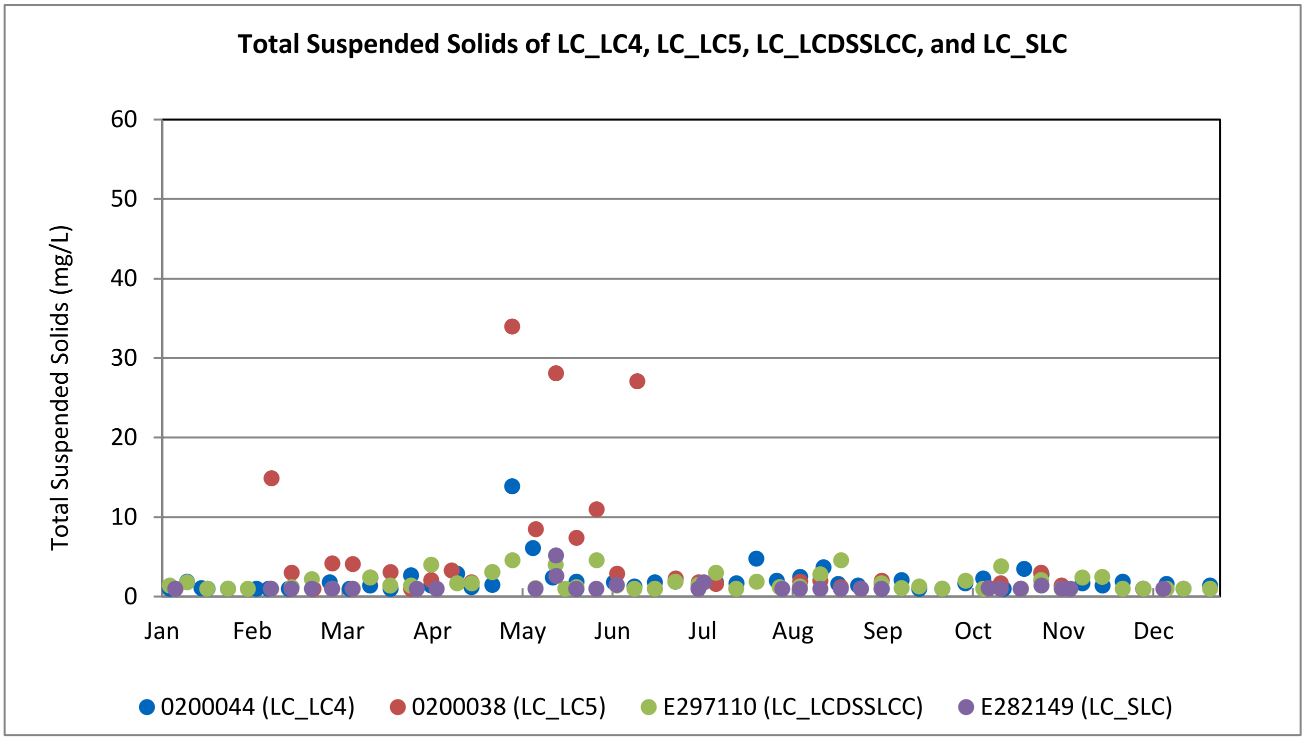

Figure 14. Total Suspended Solid results from South Line Creek, Line Creek downstream of confluence with South Line Creek, Line Creek upstream of Process Plant and Fording River downstream of Line Creek (LC_LC4, LC_LC5, LC_LCDSSLCC and LC_SLC).

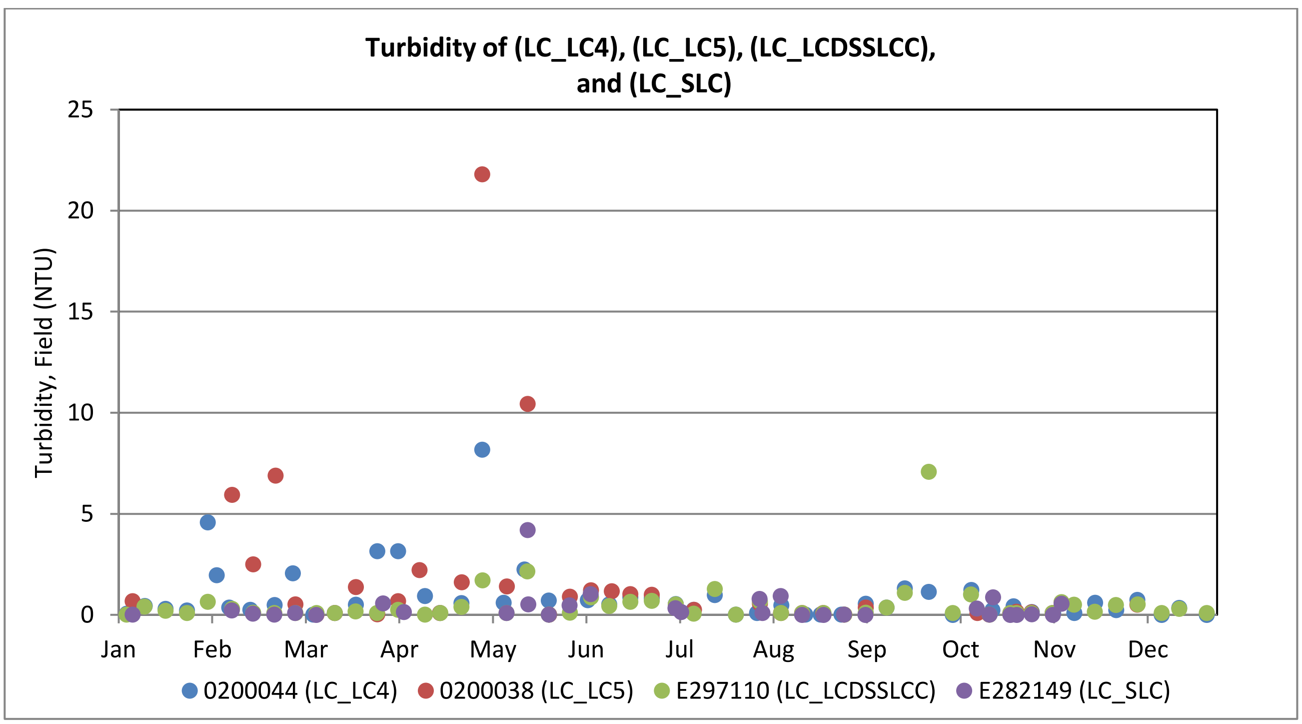

Figure 15. Turbidity results from South Line Creek, Line Creek downstream of confluence with South Line Creek, Line Creek upstream of Process Plant and Fording River downstream of Line Creek (LC_LC4, LC_LC5, LC_LCDSSLCC and LC_SLC).

5.4 Water Quantity Results

Flow measurement monitoring requirements are shown in Table 9. Flow is monitored at each authorized discharge and evaluated against applicable permit limits in Table 4. These results are also used to develop Stage-Discharge Relationships (SDR) at specific locations validated by a third-party Qualified Professional (QP). These details can be found in the Kerr Wood Leidal Hydrometric Monitoring Report (2023) (Appendix L). Flow results collected by LCO can also be found in Appendix H.

5.4.1 RAIL LOOP SETTLING PONDS (LC_EPOUT)

The freeboard in Rail Loop Settling Pond C must be greater than 1 m at all times (Condition 1.1.1). Freeboard exceeded limits a total of 90 days throughout 2023 as mentioned in Table 1. (Figure **16**). The exceeded limits only occurred between of March 2 and June 30, 2023. Note that the freeboard measurements from March 15 to April 11, 2023, were unavailable due to sensor error. On April 11, 2023, manual readings were obtained until sensor was back online June 30, 2023. Freeboard was measured to be in exceedance of the freeboard limit during this time with the exception of June 30, 2023. A non-compliance report was submitted to ENV, EMLI (Energy, Mines and Low Carbon Innovation) and KNC (Ktunaxa Nation Council) on February 3, 2023, reporting the freeboard exceedance (see Section 2.2.1 for more details).

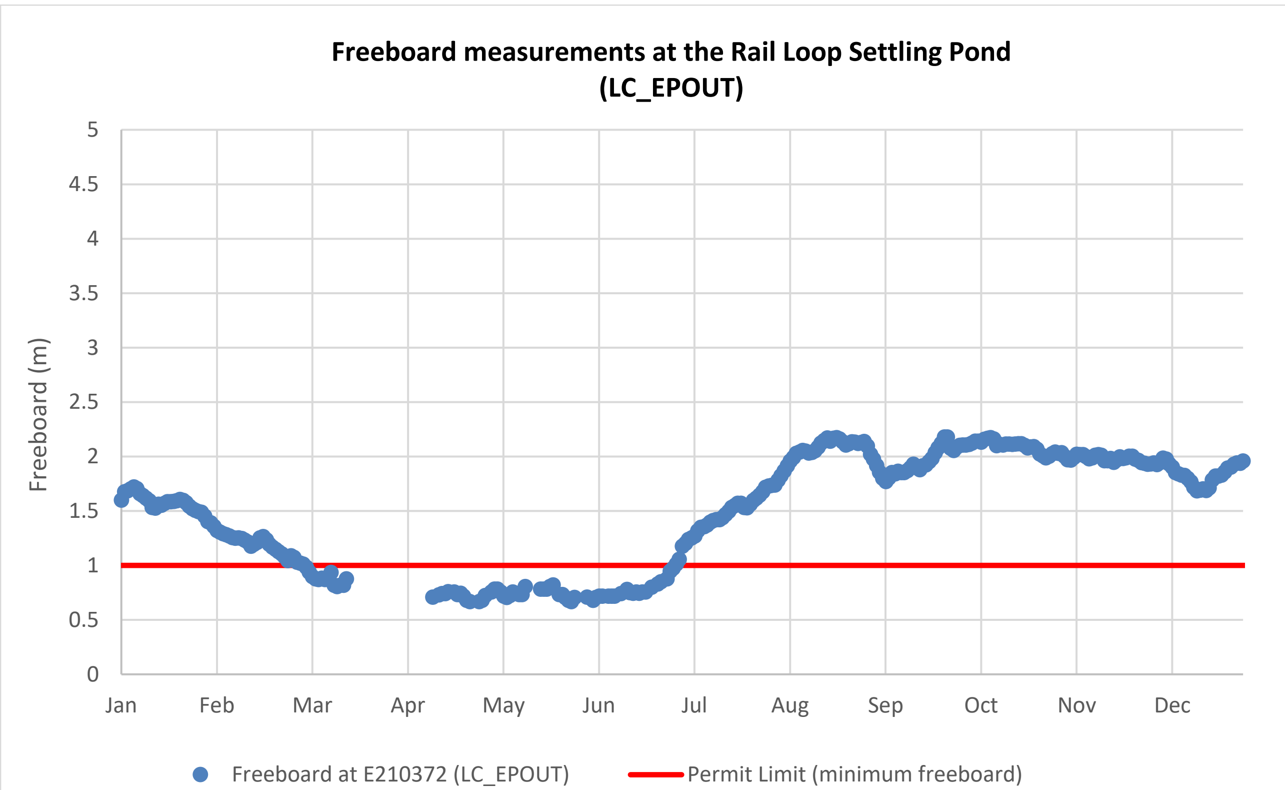

Figure 16**. Freeboard measurements at the Rail Loop Settling Ponds (LC_EPOUT)**

5.4.2 MINE SERVICE AREA SEWAGE EFFLUENT TO GROUND (LC_LC11)

The MSA Sewage Treatment System has a maximum daily flow limit of 45 m^3/day (condition 1.2.1). The system did not discharge throughout 2023 due to ongoing upgrades. As mentioned in 5.2.1, all MSA sewage was taken off-site via third party contractors.

5.4.3 HEAVY DUTY WASH BAY EFFLUENT DISCHARGE TO STEAM BAY PONDS (LC_SBPIN)

The HDWB effluent was below the daily maximum flow limit of 150 m^3/day (Figure **17**). There was no discharge from March 3 to March 12, from March 20 to December 7, and from December 22 onwards for 2023, due to maintenance upgrades. All material was taken off-site by third-party contractors.

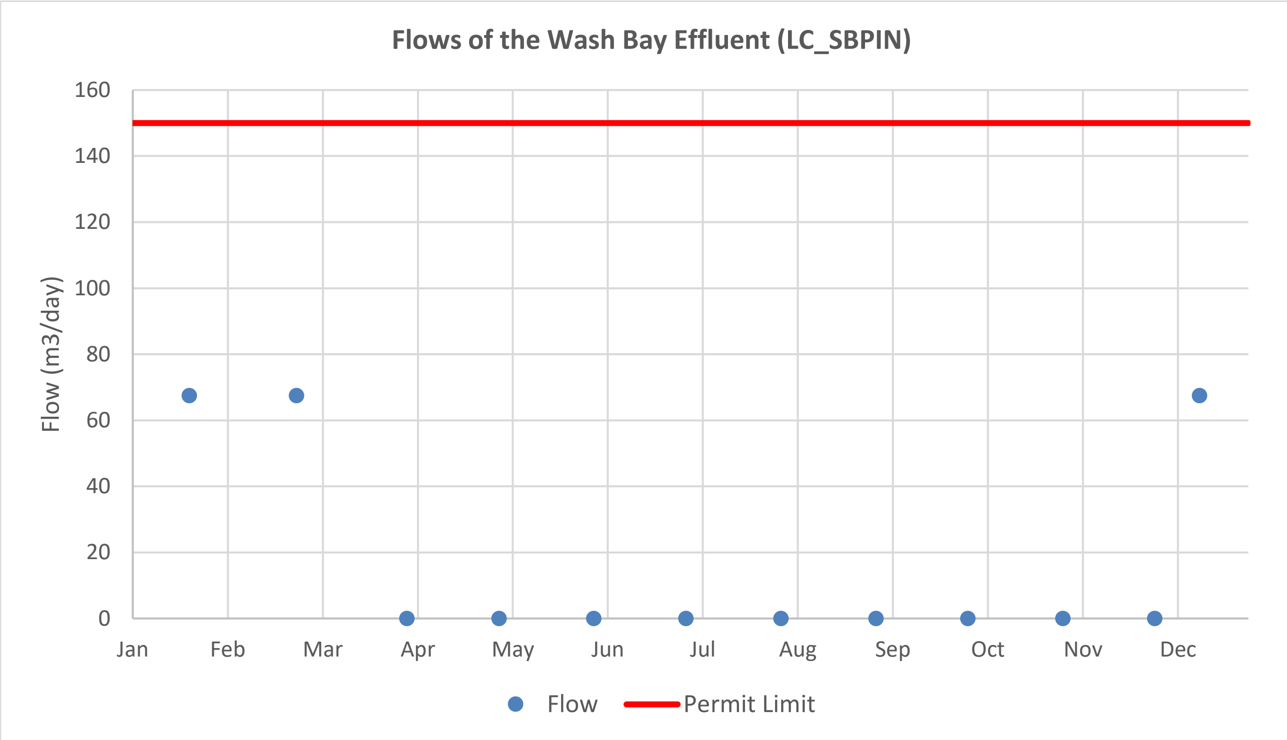

Figure 17. Flows at the Wash Bay Effluent (LC_SBPIN)

5.4.4 MINE SERVICE AREA NORTH PONDS EFFLUENT TO LINE CREEK (LC_LC7)

The MSA North Ponds were below the Q10 flow (0.84 m^3/s) throughout 2023, freeboard remained greater than 0.5 m and there was no bypass of the MSA North Ponds (Figure 18).

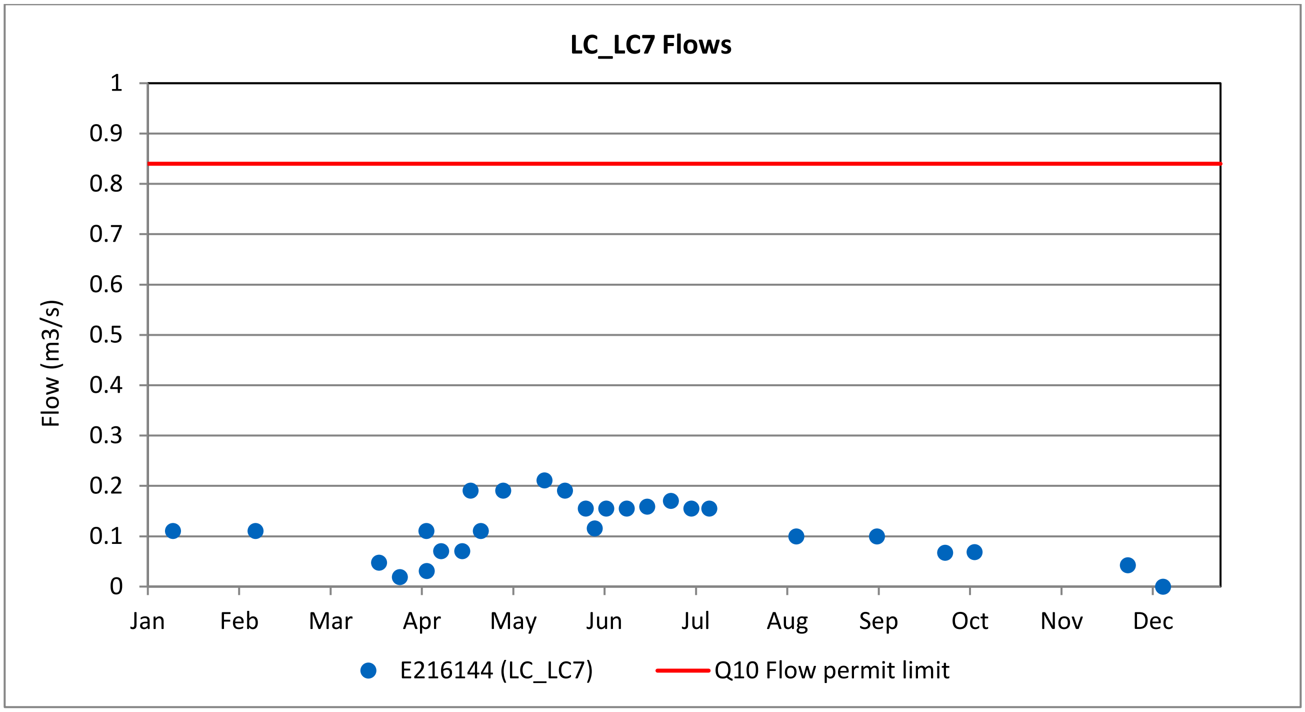

Figure 18. Flows at the MSA North Ponds Effluent (LC_LC7).

5.4.5 DRY CREEK SEDIMENTATION POND EFFLUENT TO DRY CREEK VIA THE RETURN CHANNEL (LC_SPDC)

Dry Creek Sedimentation Pond Effluent to Dry Creek via the Return Channel was below the Q10 flow (1.8 m^3/s) throughout 2023 (Figure 19).

Dry Creek Sedimentation Pond Effluent to Dry Creek via the Return Channel did not exceed 13 mg/L for TSS and 12 NTU for turbidity. Dry Creek Sedimentation Pond effluent to Dry Creek was in compliance for the TSS permit limit (50 mg/L) for the year (Figure 20).

5.4.6 DRY CREEK SEDIMENTATION PONDS RECORD OF BYPASS:

Seasonal bypass of the Dry Creek Sedimentation Ponds was first initiated in July 2020. This practice has continued through 2021, 2022, and 2023. Notification of refilling and upcoming discharge of water from the sedimentation ponds was provided via email on May 1, 2023. Refilling of Dry Creek Sedimentation Pond 1 was initiated May 1, 2023, and was completed May 2, 2023, at which point the bypass of the Dry Creek Sedimentation Ponds ceased. A noncompliance was reported in relation to this refill; details of the noncompliance is provided in Section 2.2.1 (Non-Compliances).

Bypass of the LCO Dry Creek Sedimentation Ponds began on July 11, 2023, and remained ongoing for the remainder of the year. Notification of commencement of the bypass was provided via email initially on July 7, 2023, with a revised notification on July 10, 2023. Dewatering of Dry Creek Sedimentation Pond 1 began on July 11, 2023, and was completed by July 14, 2023.

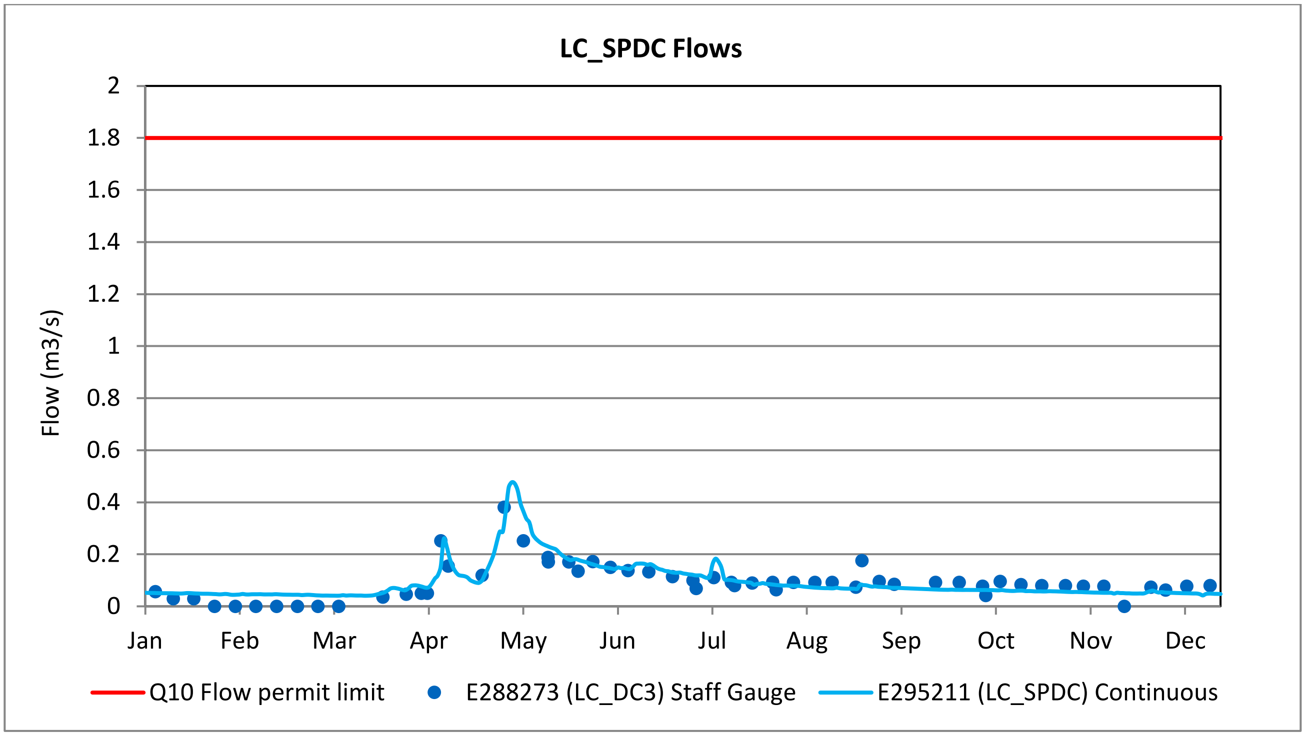

Figure 19. Flows at the Dry Creek Sedimentation Pond Effluent to Dry Creek via the Return Channel (LC_SPDC)

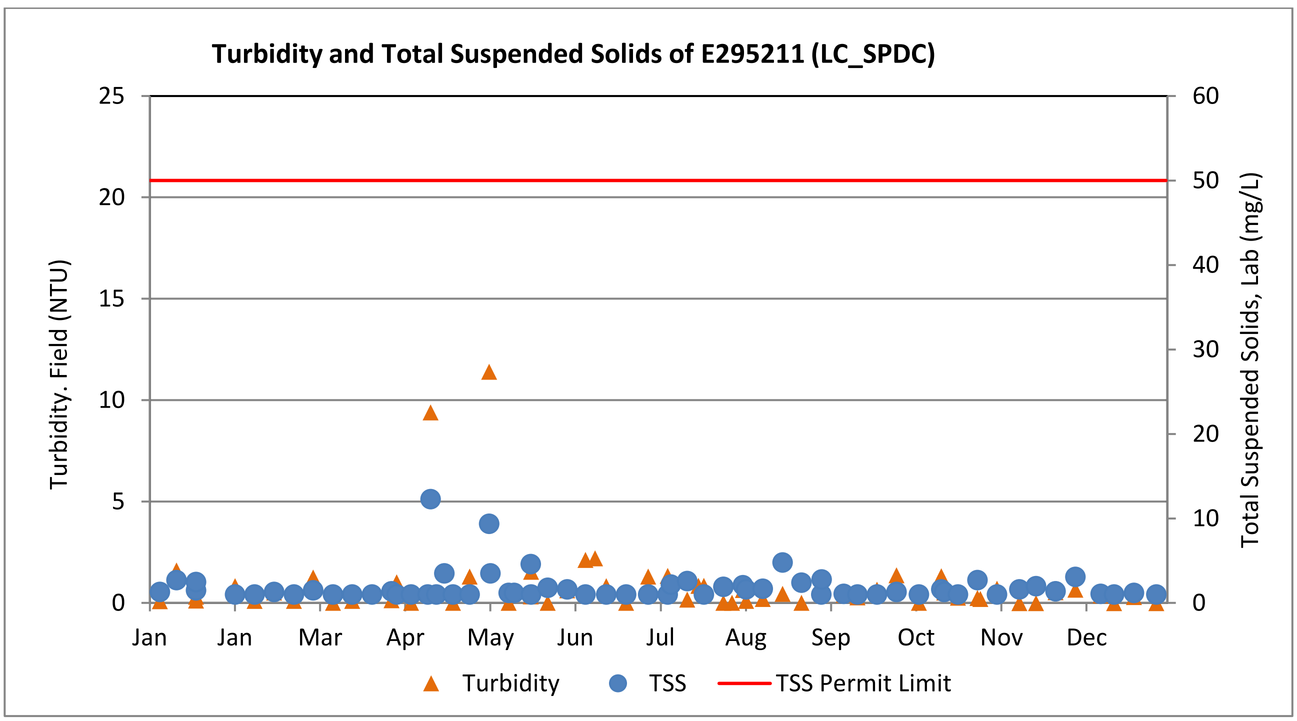

Figure 20. Total Suspended Solids and Turbidity results from the Dry Creek Sedimentation Pond Effluent to Dry Creek via the return Channel (LC_SPDC)

5.4.7 CONTINGENCY TREATMENT SYSTEM EFFLUENT TO LINE CREEK (LC_LC8)

Total suspended solids measured in Line Creek immediately upstream of the CTS (LC_LC3) remained below 50 mg/L in 2023 (Sections 5.3.5 and 5.3.6); as a result, the CTS was not utilized in 2023 for TSS management therefore no water quantity data is compared to applicable permit limits or trends. As water elevations did not reach the discharge point elevation, it is reasonable to state that the minimum freeboard limit of 0.5 m was maintained.

5.4.8 NO NAME CREEK POND EFFLUENT TO LINE CREEK (LC_LC9)

The No Name Creek Ponds were not bypassed and did not discharge in 2023; therefore, flows remained below the Q10 flow (2.3 m^3/s) in 2023. Additionally, as water elevations did not reach the discharge point elevation, it is reasonable to state that the minimum freeboard limit of 0.5 m was maintained.

5.4.9 HORSESHOE RIDGE PIT DISCHARGE TO LINE CREEK (LC_HSP)

Discharge of stored pit water from HSP occurred between January 1, 2023, to March 3, 2023, April 26, 2023, to April 30, 2023, and October 20, 2023, to December 16, 2023. Discharge flow rates throughout the year from HSP did not exceed the prescribed maximum daily discharge rate of 25,000 m^3/day stated in the *Horseshoe Ridge Pit Dewatering Plan* (Figure **21**). More stringent dewatering rates were also applied through the year in accordance with the processes and procedures defined in the *Horseshoe Ridge Pit Dewatering Plan* (2022 and 2023). More details can be found in Section 6.4 and Appendix M.

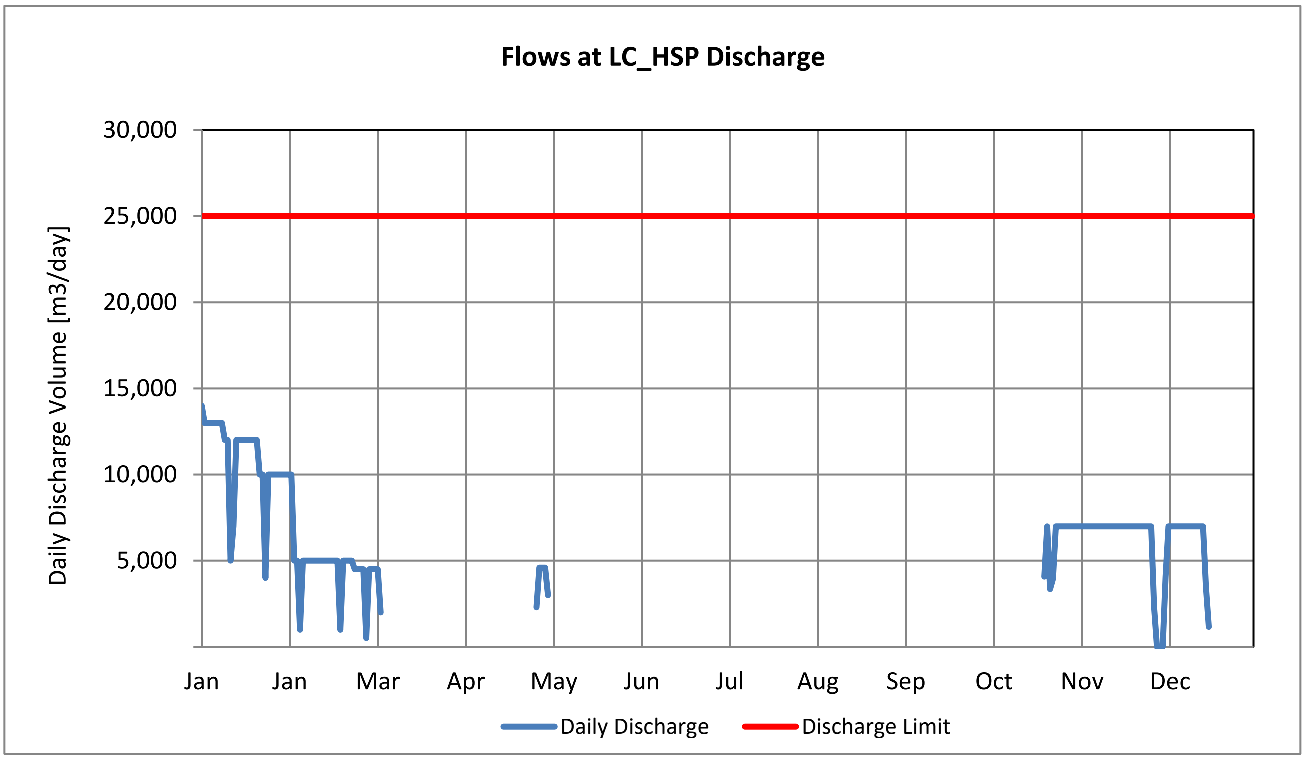

Figure 21. Flows at the HSP Discharge (LC_HSP)

5.5 Temporary Paired Sampling at the MSA North Ponds

On December 17, 2015, an amendment to Permit 5353 was issued to temporarily allow use of E304613 (LC_LC7DSTF) as the LC7 alternate location for the collection of water samples when access to E216144

(LC_LC7) was restricted. This restriction was due to safety concerns associated with the progression of the MSX short dump and the position of MSA North (MSAN) Ponds below the potential runout zone of the dump.

Paired sampling was conducted three times in 2023 for E304613 (LC_LC7DSTF) and E216144 (LC_LC7). These results have been incorporated into the sample dataset (2013-2023) and compared using the method of statistical evaluation (T-Test) previously provided in the Teck Memorandum on October 27, 2015 (Appendix G). As the LC_LC7DSTF alternate monitoring site is located approximately 400 m downstream (in a safe sampling zone) of the original sampling location (MSAN Pond, LC_LC7), a comparison of the water quality was required to ensure there is not a significant difference between the two sampling sites. In all cases, the P- values were less than the corresponding critical P-value, which verifies acceptance of the null hypothesis that no significant difference exists between the two datasets.

A summary of that evaluation is provided in Appendix J.

5.6 Subsurface Drainage Originating from the ERX/Coarse Coal Rejects

Subsurface drainage originating from the ERX/CCR dump daylights down gradient of the dump where it infiltrates to ground. Results of the water quality analysis conducted from three samples collected in 2023 were compared against the BCWQG for the protection of wildlife. All parameters were below the applicable guidelines. These results show a decrease in concentrations from previous years (2020-2022), as presented in Figure 22. Water quality data for LC_ERX is included in Appendix K. Further interpretation of water quality, including selenium, for this location is provided in the groundwater monitoring report submitted under a separate cover (titled "*2023 Annual Report: Elk Valley Regional and Site-Specific Groundwater Monitoring Programs*").

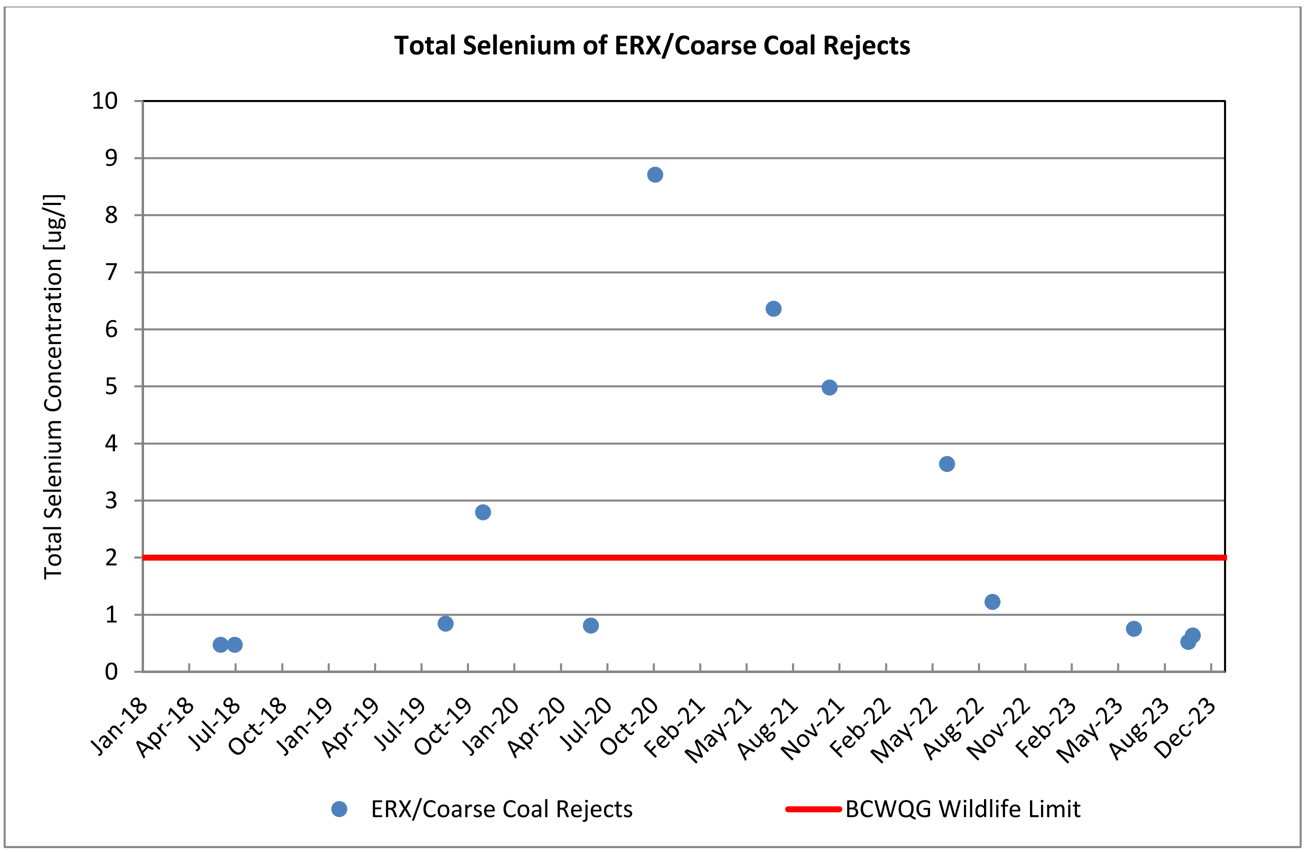

Figure 22. Total Selenium from Drainage of ERX (LC_ERX).

5.7 Capture of Mine Affected Water in the Dry Creek Water Management System

The DCWMS is designed to reduce seepage loss from the mine-affected water collection system. Condition 4.3 viii of Permit 5353 requires that Annual Reporting include the following:

> *An estimate of the proportion of mine-affected water (surface and subsurface) that is not captured by the Dry Creek Water Management System.*

To address the above condition, in 2016 Golder updated a three-dimensional FEFLOW model to assess potential seepage pathways from the spoil pile in the upper Dry Creek basin in a report titled, *Groundwater Flow Modeling to Evaluate Potential Seepage Bypass.* The model showed that all groundwater seepage through the waste rock daylights at the toe of the pile due to upward gradients in the underlying bedrock and valley fill sediments. Consequently, all seepage from the spoil pile is predicted to report to the diversion structure head pond. An estimate of the proportion of mine-affected water (surface and subsurface) that was not captured by the system can be assessed by comparing the average flows from the underdrains to the average flows measured upstream of the head pond. Each pond in the DCWMS has a dedicated underdrain system whose purpose is to direct water in a manner which protects the liner system of each pond. In 2023 average flow rates measured from the Head Pond underdrain and upstream of the Head Pond (LC_DC3) were 0.00151 m^3/s and 0.105 m^3/s, respectively. This indicates 98.56% of mine-affected water (surface and sub-surface) is captured by the water management system.

6 Management Plan Summary

6.1 Mine Water Management Plan

Line Creek Operations maintains a comprehensive Mine Water Management Plan (MWMP) whose purpose is to describe how water is managed at site. The MWMP includes information to provide employees, regulators, and agencies with an accurate understanding of how mine contact and noncontact water is managed and conveyed at the site and support with understanding of the potential impacts to the receiving environment. This document is expected to guide site personnel in making informed operational water management decisions to maintain compliance with applicable permits, authorizations, and regulations. The MWMP was originally submitted to EMLI, ENV, and KNC on June 30, 2020, and was recently updated on November 29, 2023. In addition, a water management plan is in place specifically for Dry Creek, entitled the Dry Creek Water Management Plan (DCWMP), that was initially submitted on December 22, 2014 and updated May 26, 2021.

6.2 Flocculant Management Plan

Line Creek Operations is authorized to use flocculant products in accordance with its *Flocculant Management Plan,* which was approved by the Director on May 28, 2015. Flocculants may be used when needed to enhance removal of TSS within settling ponds such that effluent discharged is compliant with permit limits for TSS. No liquid flocculants or Water Lynx Blocks 360 were dispensed at any of the settling ponds in 2023.

TSS Determination

Total suspended solids and turbidity regressions were revised at the end of the 2017 field season and provided to ENV on April 30, 2018 in an updated report (appended to the *Q1 2018 Elk Valley Regional Water Quality Report)*. Additional data was collected in 2023 and the revised *TSS Determination* report is provided in Appendix I.

6.3 Pit Pumping and Dewatering Plans

6.3.1 BACKGROUND

Line Creek Operations has submitted two plans with respect to dewatering and/or operational pit pumping:

- The *Horseshoe Ridge Pit Dewatering Plan* was submitted on September 13, 2022, and an updated plan was submitted on August 18, 2023. The updated plan was then resubmitted on November 1, 2023.
- The *MSX Pit Pumping Plan* was originally submitted on February 28, 2020, and updated on July 15, 2021. The latest update to the MSX Pit Pumping Plan was submitted December 21, 2022.

Both plans include a water quality evaluation to characterize the quality of the water to be discharged, a process for determining dewatering/pumping rates, monitoring plan, and discharge management triggers.

In 2023, pumping from Horseshoe Ridge Pit (LC_HSP) occurred from January 1 to March 3, 2023, and then again from April 26 to April 30, 2023. Pumping during this period was conducted in accordance with the *2022 Horseshoe Ridge Pit Dewatering Plan* (2022). Pumping from Horseshoe Ridge Pit in 2023 also occurred from October 20 to December 16, 2023. Pumping during this period was conducted in accordance with the *2023 Horseshoe Ridge Pit Dewatering Plan* (2023). All required notifications (14-day and 24-hour) in 2023 were submitted in accordance with Section 2.13 of EMA Permit 5353, as summarized below:

- March 3, 2023 – Notification within 24-hours of completing pumping.
- April 17, 2023 – Notification at least 24-hours prior to discharge.
- May 1, 2023 – Notification within 24-hours of completing pumping.
- August 18, 2023 – 14-day Notification for submission of the *2023 Horseshoe Ridge Pit Dewatering Plan* (2023).
- October 19, 2023 – Notification at least 24-hours prior to discharge.
- November 1, 2023 – 14-day Notification for re-submission of the 2023 HSP Dewatering Plan.
- November 14, 2023 – Notification at least 24-hours prior to switching to re-submitted pumping plan (served as both within 24-hours of completing pumping, and as at least 24-hour prior to discharge notifications).
- December 17, 2023 – Notification within 24-hours of completing pumping.

In 2023 pumping from MSX Pit to backfilled MSAW Pit occurred intermittently from January 1, 2023 until March 14, 2023. Pumping from January 1, 2023 to January 4, 2023 was conducted in accordance with the *2021 MSX Pit Pumping Plan* (2021). Pumping from January 5, 2023 to March 14, 2023 was conducted in accordance with the *2022 MSX Pit Pumping Plan* (2022). All required notifications (14-day and 24-hour) in 2023 were submitted in accordance with Section 2.13 of EMA Permit 5353, as summarized below:

- January 5, 2023 – Notification within 24-hours of completing pumping (under 2021 plan).
- January 5, 2023 – Notification at least 24-hous prior to discharge (under 2022 plan).
- March 14, 2023 – Notification within 24-hours of completing pumping (under 2022 plan).

6.3.2 HORSESHOE RIDGE PIT WATER QUALITY MONITORING RESULTS

Discharge of stored pit water from Horseshoe Ridge Pit (LC_HSP) occurred between January 1, 2023 to March 3, 2023; April 26, 2023 to April 30, 2023; and October 20, 2023 to December 16, 2023. Further discussion of the pumping processes and quantity, results of the water quality monitoring, and comparison to relevant water quality thresholds (including BCWQG, Site Performance Objectives and Permit Limits) for HSP dewatering is provided in Appendix M.

6.3.3 MINE SERVICE AREA EXTENSION PIT WATER QUALITY MONITORING RESULTS

Pumping of water from the MSX Pit sump (LC_MSXS) to the backfilled MSAW Pit (E308147) occurred intermittently from January 1, 2023 to March 14, 2023. Further discussion of the pumping processes and quantity, results of the water quality monitoring, and comparison to relevant water quality thresholds (including BCWQG, Site Performance Objectives and Permit Limits) for MSX pumping is provided in Appendix M.

6.3.4 WATER QUALITY PREDICTIONS

A comparison of predicted water quality against actual monitoring results is provided in Appendix M for Horseshoe Ridge Pit Dewatering and MSX Pit Pumping. These evaluations also include potential opportunities for improvements to the dewatering tools.

7 Summary and Conclusions

This annual report reflects the requirements of effluent Permit 5353 (amended July 22, 2021), issued to Line Creek Operations under the provisions of the *Environmental Management Act.* All monitoring events occurred in accordance with the schedule provided in Appendix A of Permit 5353 for all parameters listed.

Maintenance activities of authorized works were conducted which included sediment/material cleanout of the Rail Loop Ponds, the No Name Creek Pond and Steam Bay Ponds. Additional maintenance activities include upgrades to the Sewage Treatment System and the Dry Creek flocculant system.

Two incidents related to water quality occurred in 2023, an acute toxicity failure at the analytical laboratory testing water discharged from the Mine Service Extension Pit sump, and a failure to follow the operation procedure for pond refilling at the Dry Creek Sedimentation Pond.

Line Creek Operations had 15 non-compliances, ten of these non-compliances were associated with the unauthorized discharge of plant process water to ground from the coal preparation plant. Other non-compliances included three extractable petroleum hydrocarbons exceedances at Oil/Water Separators, freeboard exceedance at the Rail Loop Ponds, and one for not complying with the procedures specified in the operations manual while refilling Dry Creek Sediment Pond 1.

There were no missed samples, and all unattainable data was due to frozen or dry streams. There was no discharge from the No Name Creek Pond and the Contingency Treatment Pond system was not used.

Line Creek Operations had 14 quality assurance and quality control issues; eight were related to hold-time exceedances and six were related to relative percent difference failures.

Results of the Rail Loop Ponds effluent to ground is discussed in the *2023 Annual Report: Elk Valley Regional and Site-Specific Groundwater Monitoring Programs*. In 2023, dewatering occurred in Horseshoe Ridge Pit and monitoring of the water discharged was done in accordance with LCO’s *Horseshoe Ridge Pit Dewatering Plan*. Line Creek Operations pumped water in MSX Pit to the MSAW backfilled pit in January and monitoring of this discharge was conducted in accordance with LCO’s *MSX Pit Pumping Plan*.

In 2024, LCO will continue to collect samples in accordance with the Permit 5353 monitoring schedule, and where requirements cannot be met, the alternative locations will be used in accordance with conditions identified in the aforementioned ENV approval.

References

British Columbia Ministry of Environment and Climate Change Strategy (BC ENV). 2013. *British Columbia Field Sampling Manual*. Accessed from: https://www2.gov.bc.ca/gov/content/environment/research-monitoringreporting/monitoring/laboratory-standards-quality-assurance/bc-field-sampling-manual

British Columbia Ministry of Environment and Climate Change Strategy (BC ENV). 2023. *British Columbia Environmental Laboratory Manual*. Accessed from: https://www2.gov.bc.ca/gov/content/environment/research-monitoring-reporting/monitoring/laboratory-standards-quality-assurance/bc-environmental-laboratory-manual

British Columbia Ministry of Environment and Climate Change Strategy (BC ENV). 2021a. British Columbia Approved Water Quality Guidelines: Aquatic Life, Wildlife & Agriculture – Guideline Summary. Water Quality Guidelines Series, WQG-20. Province of British Columbia, Victoria BC. Accessed from https://www2.gov.bc.ca/assets/gov/environment/air-landwater/water/waterquality/water-quality-guidelines/approvedwqgs/wqg_summary_aquaticlife_wildlife_agri.pdf

Teck 2022. *LCO Sediment Management Plan.* December 24, 2015.

Teck 2022. *Horseshoe Ridge Pit Dewatering Plan.* September 13, 2022.

Teck 2023. *Horseshoe Ridge Pit Dewatering Plan.* November 1, 2023.

Teck 2021. *MSX Pit Pumping Plan.* July 21, 2022.

Teck 2022. *MSX Pit Pumping Plan.* December 21, 2022.

Teck 2023. *Annual Report: Permit 107517 Surface Water Quality Monitoring 2023 Report.* March 31, 2023.

Teck 2023. *Annual Report: Elk Valley Regional and Site Specific Groundwater Monitoring Programs.* March 31, 2023.

Appendix A – Annual Status Form

Annual Compliance Status Form

AUTHORIZATION NUMBER: 5353

AUTHORIZATION TYPE: Permit

LEGAL AUTHORIZATION HOLDER NAME: Teck Coal Limited

PERIOD OF COMPLIANCE STATUS ASSESSMENT: 2023/01/01 to 2023/12/31

AUTHORIZED PERSON NAME: Joda Hamilton

AUTHORIZED PERSON SIGNATURE: J Hamilton

SIGNATURE DATE: March 28, 2024

I understand that it is an offense to mislead a government official, and I declare that all of the information presented is accurate and true.
I have been given the authority by the authorization holder to sign this form.

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
1.1.1	The freeboard in Rail Loop Settling Pond C must always be greater than 1 m unless a reduced freeboard is authorized in writing by the director.	No	Freeboard measurements of Rail Loop Pond C exceeded 1m for various periods of times throughout 2023.	Refer to Section 5.4.1
1.2.1	The discharge of effluent from the Sewage Treatment System serving the Mine Service Building to the ground, must not exceed the maximum authorized rate of 45m3/day.	Yes	The LCO Mine Service Building Sewage Treatment System did not discharge throughout 2023 due to ongoing upgrades.	Refer to Section 1.3 and 5.2.1
1.2.2	The characteristics of the effluent from Sewage Treatment System serving the Mine Service Building to the ground, must not exceed Total Suspended Solids (TSS) of 130mg/l or Biological Oxygen Demand of 130mg/l.	Yes	As mentioned under section 1.3 The LCO MSB Sewage Treatment System did not discharge throughout 2023. Work is underway to incorporate a membrane bioreactor (MBR) wastewater treatment system to supplement the existing system. All discharge from the Sewage treatment system serving the MSB was discharged at an external facility through ongoing use of vac trucks to take the sewage offsite for suitable treatment.	Refer to Sections 1.3 and 5.2.1

1.3.1	The characteristics of the effluent from No Name Creek Diversion and Sediment Pond to the Line Creek Rock Drain, must not exceed TSS of 50 mg/l for discharge rates up to the Q10 flow of 2.3m3/second.	Yes	The No Name Creek Ponds did not discharge in 2023.	Refer to Section 5.2.6 and 5.4.8

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
1.4.1	The characteristics of the effluent from MSA North Ponds to Line Creek, must not exceed TSS of 50 mg/l for discharge rates up to the Q10 flow of 0.84m3/second	Yes	Samples collected from the MSA North Ponds effluent location illustrate TSS remains below 50mg/L limit. Additionally, flows measured at the MSA North Ponds discharge through the stage discharge relationship show discharge rates were below the Q10 flows.	Refer to Sections 5.2.4 and 5.3.1
1.5.1	The characteristics of the effluent from Contingency Treatment System to the Line Creek, must not exceed TSS of 50 mg/l for discharge rates up to 3m3/second.	Yes	The Contingency Treatment System to the Line Creek did not discharge in 2023.	Refer to Section 5.2.5
1.5.2	The designated treatment works must be used when Line Creek exhibits total suspended solids above 50 mg/L	Yes	There were no exceedances for TSS in 2023.	Refer to Section 5.3
1.6.1	The effluent from the Heavy-Duty Wash Bays to the Steam Bay Ponds must not exceed the average authorized rate of discharge of 150m3/day.	Yes	The Heavy-Duty Wash Bay Effluent was below the daily maximum flow limit of 150 m3/day for all of 2023.	Refer to Section 5.4.3
1.6.2	The characteristics of the discharge from the Heavy-Duty Wash Bays to the Steam Bay Ponds must not exceed Extractable Petroleum Hydrocarbons (EPH) of 15mg/l.	No	There were 3 discharges from the Heavy-Duty Wash Bay into the Steam Bay Ponds that had an EPH exceedance. These occurred on February 23, 2023, March 16, 2023, and December 14, 2023.	Refer to Sections 2.2.1 and 5.2.2

1.7.1	The characteristics of discharge of contaminants from Miscellaneous Oil/Water Separators (OWS) at LCO to ground must not exceed EPH of 15mg/l prior to discharge to ground.	Yes	There was no non-compliance discharge of contaminants from the Miscellaneous Oil/Water separators (OWS) in 2023.	Refer to Section 5.2.3

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1.8.1	The discharge of stored pit water from Horseshoe Pit and MSAW Pit to Line Creek must not exceed the authorized daily rate specified in the applicable pumping plan.	Yes	The discharge flow rates from HSP and MSX did not exceed the maximum daily discharge rates prescribed by the processes in their respective pit pumping plans in 2023.	Refer to Sections 5.2.8, 5.2.9, 5.4.9 and 6.4.3
1.8.2	The characteristics of the effluent from Horseshoe Pit and MSAW Pit to Line Creek, must not exceed TSS of 50 mg/l and water quality prescribed in the applicable pumping plan.	Yes	There were no TSS exceedances associated with pit pumping in relation to Horseshoe Pit and MSAW in 2023.	Refer to Sections 5.2.8 and 5.2.9
1.10.1	The maximum authorized rate of discharge of effluent from a return channel from the Dry Creek Sedimentation Ponds to Dry Creek is the QIO flow of 1.8 cubic meters per second.	Yes	Discharge measurements from the outflow of the Dry Creek Sedimentation ponds were below the Q10 flow for 2023.	Refer to Section 5.4.5
1.10.2	Characteristics of discharge must not exceed Total Suspended Solids (TSS) of 50 mg/L	Yes	For all of 2023, TSS measures from the Dry Creek Sedimentation Pond Effluent to Dry Creek via the Return Channel (E295211/LC_SPDC) did not exceed 20 mg/L, which is less than the permit limit of 50mg/L.	Refer to Section 5.4.5
1.11.1	The maximum authorized rate of discharge of effluent from a diffuser and conveyance pipeline from the Dry Creek Sedimentation Ponds to the Fording River is the Q10 flow of 1.8 cubic meters per second.	ND	The diffuser and conveyance pipeline from Dry Creek Sedimentation Ponds to the Fording River are not yet constructed.	N/A
1.11.2	Characteristics of discharge must not exceed Total Suspended Solids (TSS) of 50 mg/L	ND	The diffuser and conveyance pipeline from Dry Creek Sedimentation Ponds to the Fording River are not yet constructed.	N/A
2.1	The permittee must inspect the authorized works regularly and maintain them in good working order. In the event of a condition or emergency comply with all applicable statutory requirements including Spill Reporting Regulation, immediately contact the Director or designated officer by email or telephone and take appropriate remedial action for the prevention or mitigation of pollution.	Yes	Ongoing inspections of authorized works occurred throughout 2023 and were often the trigger for any maintenance requirements.	Refer to section 1.3

2.2.1	Bypass of the authorized works (with the exception of Contingency Treatment System and MSA North Ponds and Dry Creek Sedimentation Ponds seasonally during non-freshet flows) is prohibited unless the prior approval of the Director is obtained and confirmed in writing.	Yes	No unauthorized bypass occurred in 2023.	N/A
2.2.2	Pursuant to 2.2.1, characteristics of the effluent bypassing No Name Creek Diversion and Sedimentation Pond and MSA North Ponds are <50mg/l TSS and measured once per day during the bypass.	Yes	In 2023 there was no bypass of No Name Creek Diversion and Sedimentation Ponds or the MSA Noth Ponds.	Refer to Sections 5.4.4 and 5.4.8

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2.2.3	Pursuant to subsection 2.2.1, bypass of the authorized works in section 1.10, the Dry Creek Sedimentation Ponds, via the bypass works is authorized on a seasonal basis, during non-freshet flows to reduce or avoid the generation of bioavailable selenium, in accordance with the updated DCWMS operations manual required by section 2.9.4. The permittee must notify the director within 48 hours of commencement of the bypass and of commencement of refilling the sedimentation ponds. The permittee must notify the director 48 hours prior to discharge of water accumulated in the sedimentation ponds during operation of the bypass. A record of bypass of the Dry Creek Sedimentation Ponds must be maintained for inspection and presented in the quarterly and annual reports.	Yes	Bypass of the Dry Creek sedimentation ponds occurred in 2023 and notification was provided within 48 hrs. of commencing both the bypass (July 11, 2023) and refill (May 1, 2023).	Refer to section 5.4.6
2.3	The permittee must develop and validate, at minimum on an annual basis a tool for field analysis of TSS value and procedures for additional TSS sampling for discharges referenced in Section 1 of this permit and any effluent discharge to surface water from the mine property. The TSS determination method must be approved by the Director.	Yes	TSS/turbidity regressions were revised at the end of the field season and provided to the ENV on April 30, in an updated report (appended to the Q1 2018 Elk Valley Regional Water Quality Report). Additional data was collected in 2023 and the revised TSS Determination report.	Refer to section 6.3 and Appendix I
2.4	The permittee must notify the director in writing, prior to implementing changes to any process that may adversely affect the quality and/or quantity of the discharge. Notwithstanding notification under this section, permitted levels must not be exceeded.	Yes	No changes were implemented to any processes which may affect quantity and/or quality of discharge.	N/A
2.5	A minimum 0.5m of freeboard must be maintained in the sedimentation ponds. Settled solids which have accumulated in all settling ponds must be removed as required to maintain their design performance. The Director must be notified prior to removing solids.	Yes	A minimum freeboard was maintained, and notification was provided to ENV for maintenance of works, identified in Section 1.3, Table 3.	Refer to Sections 5.4.4
2.6	Sediment characterization, removal and disposal must be managed in accordance with the mine Sediment Management Plan covering the authorized works in sections 1.1 (Rail Loop Ponds), 1.3 (No Name Ponds), 1.4 (MSAN Ponds), and 1.6 (Steam Bay Ponds). The plan may be modified as required by the Director. The Sediment Management Plan must be prepared and signed by a qualified professional. Updates to the Sediment Management Plan must be submitted to the director within 30 days of adoption.	Yes	Sediment characterization and removal/disposal from the Rail Loop, Steam Bay, and No Name Creek Ponds in 2023 followed the guidance from the approved LCO Sediment Management Plan (2015). Note that an updated Sediment Management Plan was submitted to ENV for review on December 23, 2022. The review and approval process with Teck and regulators was ongoing throughout 2023.	Refer to section 1.3

2.7.1	The permittee may use flocculants to maintain the level of total suspended solids equal to or less than the permit limits in the discharges from settling ponds and other structures identified in the plan. These flocculants must be used in accordance with the "Flocculant Management Plan" provided by Teck Line Creek Operations, approved by the Director on May 28, 2015, as updated from time to time. Any updates to the plan must be developed by a qualified professional and submitted to the director within 30 days of adoption. The Director may impose additional requirements for the use of flocculants for the protection of the environment.	Yes	Flocculant was not used in the LCO Dry Creek in 2023.	Refer to Section 6.2

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
2.7.2	The permittee shall maintain a record of the use of all flocculants(s) for sediment control on site. The permittee shall record daily, when flocculants are used, the type(s) of flocculant used, the weight applied, and application rate (mg/L/day) and type of application system used. The permittee shall maintain records on site for inspection for a period of five years.	Yes	Full records of Flocculant used for sediment control can be found in Section 6.2	Refer to Section 6.2
2.8.1	Surface water runoff from process areas and roads must be managed through a Mine Water Management Plan. The plan must be modified as required by the director.	Yes	In 2023, Line Creek operated under the Mine Water Management Plan versions from 2022 and the latest update will be on November 29, 2023. Both versions include information on surface water management for process area and roads (in addition to other areas of the mine)	Section 6.1
2.8.1.1	The Permittee must develop and implement measures to divert surface runoff from undisturbed or reclaimed areas away from disturbed and non-reclaimed areas to prevent erosion, sedimentation or overtopping of water control or storage structures. Works should be designed to convey all flows up to a 1-in-10-year 24 hr. storm event.	Yes	LCO maintains several diversions, including the No Name Creek Diversion, Access Road Clean Water Interceptor Ditches, 3KM Drainage, and Horseshoe Creek Rock Drain. Details on these can be found in LCO's Mine Water Management Plan.	Section 6.1
2.8.1.2	The Permittee must develop and implement measures to prevent sediment transport into watercourses during construction and operation of any mine structures or facilities. The Director may specify and require implementation of additional measures to prevent sedimentation of water courses caused by construction or an operational activity at the site.	Yes	LCO utilizes several measures to prevent sediment transport, including but not limited to sedimentation ponds, sumps, ditches, backfilled pits, and rock drains. Details on these and other erosion and sediment control measures can be found in LCO's Mine Water Management Plan. These measures are used to inform the development of project specific controls incorporated into Environmental Protection Work Plans (EPWP), Environmental Protection Plans (EPP) and/or Construction Environmental Management Plans.	Section 6.1
2.8.2	The locations of infiltration ditches and sumps at the ERX Coarse Coal Rejects (ERX/CCR) dumps shall be documented in the Mine Water Management Plan	Yes	The locations of infiltration ditches and sumps at the ERX Coarse Coal Rejects (ERX/CCR) dumps are documented in the Mine Water Management Plan.	Section 6.1
2.9.1	The Permittee shall implement a Water Management & Erosion Control Plan for the construction of the DCWMS. This plan must be submitted to the Director, Environmental Protection prior to the initiation of construction of works.	Yes	A Water Management and Erosion Control Plan was submitted to ENV on May 10, 2014, for the construction of the DCWMS.	N/A

Authorized Person Initial: JH　　　Date: March 28, 2024

2.9.2	Additional Sedimentation Pond	Yes	The contingency option of a third sedimentation pond within the DCWMS has not yet been pursued. There remains existing land to develop this contingency if required to increase effectiveness of the DCWMS.	N/A
2.9.3	The Permittee must ensure the operating plan for the DCWMS addresses the design and operation of the sedimentation ponds such that normal operation level of the pond(s) will leave buffering capacity in the pond to dissipate instantaneous peak flow and maintain permit requirements.	Yes	N/A	N/A
2.9.4	An operational manual for the authorized works must be submitted to the director four months prior to waste rock placement in the Dry Creek watershed. The operations manual shall include but not necessarily be limited to: i Procedures for operation, monitoring, inspection, and maintenance for the authorized works in section l of this permit; ii Measures to ensure that the authorized works are operated at all times within specifications and in a manner to ensure compliance with this permit and applicable legislation; iii Records management procedures; iv Communications and reporting procedures pursuant to requirements in section 4 of this permit; v Emergency Response and Contingency Plan; and vi Procedures for operation and monitoring during seasonal bypass of the sedimentation ponds, water quality objectives and targets used to make operational decisions, management of accumulating water, sediment removal, timing of initiation of bypass, refilling of the ponds, and contingency measures. The plan must also include procedures to ensure that natural downstream flow is maintained, and ramping criteria are met downstream of the DCWMS during initiation of bypass, draining of the ponds and filling of the ponds.	Yes	The Dry Creek Water Management System (DCWMS) Operation, Maintenance and Surveillance (OMS) Manual has undergone various updates throughout the operation of the DCWMS, the latest version was provided to ENV and KNC in April 2021. While minor internal updates continue, the procedures of operation of the DCWMS have not changed. Details of pond refilling can be found in Section 5.4.6	Refer to section 5.4.6
2.9.5	The final design for the Dry Creek Water Management System must include calcite controls to prevent calcification in the works. Characterization of the final effluent quality, with an assessment of risks to the receiving environment from the calcite treatment process, must be submitted to the Director, Environmental Protection by June 30, 2014.	Yes	A Calcite Management Plan for LCO was submitted on May 9, 2014. In addition, the LCO Dry Creek Calcite Antiscalant. Additionally, it has been in full operation since May 2021.	N/A

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
2.10.1	Authorized works must be complete and in operation while discharging or as required seasonally to maintain water quality and/or water management needs (flocculant addition, pumping equipment).	Yes	All authorized works were operational.	N/A
2.11	The ten-year return flood flow or Q10 referenced in section 1 is defined as the average calculated flood flow in cubic meters per second (m3/s) over a 24-hour period that can be expected to occur once in a ten-year return period for a specified drainage basin.	Yes	All discharges were below the Q10 flow in 2023.	Refer to section 5.4 and Appendix H

2.12	All documents submitted to the Director by a Qualified Professional must be signed by the author(s).	Yes	Updated documents that were submitted to the director that were written by a Qualified Professional in 2023 include: Mine Water Management Plan (Teck) Horseshoe Ridge Pit Dewatering Plan Water Quality Evaluation – 2023 Water Quality Update (SRK)	Refer to sections 1.2, 1.3, and 6.4.1
2.13.1	The permittee must notify the director, in writing, 14 days prior to discharge of effluent commencing from the pits listed in section 1.8. The notification must include a pumping plan that outlines the quality of the pit water, the total volume to be pumped to Line Creek, general time frame and conditions under which the prescribed pumping plan is valid, sampling and monitoring schedule, discharge location, any prescribed water treatment, the pumping duration and rates, and the predicted water quality at downstream permitted monitoring locations and the nearest PE107517 compliance point.	Yes	All required 14-day notifications and pit pumping plans in 2023 were submitted in accordance with Section 2.13.1 of EMA Permit 5353.	Refer to Section 6.4
2.13.2	Water quality predictions must be made using a water quality model specific to the Line Creek mine site. The director may require additional assessments, monitoring, and/or treatment following notification of pit pumping.	Yes	As part of the HSP dewatering plan and MSX pit pumping plan water quality assessments, deterministic excel based mass balance tools were developed to inform dewatering rates and predict influence on downstream water quality. A comparison of predicted water quality against actual monitoring results was completed by SRK for the Horseshoe Pit dewatering and MSX pit pumping, the results for which are included as Appendix M to the annual report.	See section 6.4
2.13.3	Notification under section 1.13.1 is required 30 days prior to commencing when the pit pumping plan prescribes pre-discharge water treatment works other than the works specified in section 1.8.3 and/or flocculants identified in the approved Flocculant Management Plan.	Yes	As detailed in the submitted pit pumping plans for HSP and MSX, no notification was required as the pit pumping plans did not prescribe any pre-discharge treatment. Refer to Section 6.4 for detail on written notifications provided.	See section 6.4
2.13.4	The permittee must submit an updated mine water management plan by April 30, 2020. The director may require modifications to the plan to accommodate pit pumping and the protection of the receiving environment.	Yes	An updated version of the Mine Water Management Plan was submitted to ENV, EMLI, KNC and Tobacco Plains on November 29, 2023	See section 6.1

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2.13.5	The permittee must notify the director, in writing, at least 24 hours in advance of the starting of pit pumping and again within 24 hours of the completion of pit pumping.	Yes	Notifications of the start of pit pump and cessation of pit pumping from HSP and MSX were provided in accordance with Permit 5353 in 2023.	See section 6.4
2.13.6	If monitoring results indicate a limit in permit 107517 is expected to be exceeded at Compliance Point E297110 or Order Station 0200028 and that pumping may need to be suspended, the director must be notified immediately via email: ENVSECOAL@gov.bc.ca.	Yes	Pumping of MSX to MSAW pit and HSP pit pumping to the Line Creek Rock Drain in 2023 were completed successfully in accordance with their plans and were not responsible for any permit limit exceedances at Compliance Point E297110 or Order Station 0200028.	See section 6.4
3.1.2	The permittee is required to conduct the monitoring program identified in Appendix 2A, Tables 2 and 3. Details of sampling schedule are included in Appendix 2A.	Yes	N/A	N/A
3.1.2.1	At least twice per year during the duration of the MSX Short Dump Project, paired samples shall be taken from site E304613 and E216144 when safe access is available to E216144. The results shall be compared in the Annual Report.	Yes	Paired sampling was conducted two times in 2023 for E304613 (LC_LC7DSTF) and E216144 (LC_LC7). The 2023 results have been incorporated into the sample dataset (2013-2023) and compared using the method of statistical evaluation (T-Test) previously provided in section 5.3.	Refer to section 5.5
3.1.3.1	Sampling is to be carried out in accordance with the procedures described in the most recent edition of the "British Columbia Field Sampling Manual for Continuous Monitoring Plus the Collection of Air, Air-Emission, Water, Wastewater, Soil, Sediment, and Biological Samples," or by suitable alternative procedures as authorized by the Director.	Yes	The sampling was completed according to the referenced documents.	Refer to section 4.2
3.1.3.1	Analyses are to be carried out in accordance with procedures described in the most recent edition of the "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air," or by suitable alternative procedures as authorized by the director.	Yes	Analyses were completed according to the referenced documents.	Refer to section 4.2
3.1.3.3	The permittee must implement a Quality Assurance and Quality Control plan in accordance with the Environmental Data Quality Assurance Regulation and guidance provided in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air- Emissions, Water, Wastewater, Soil, Sediment, and biological Samples," and "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air."	Yes	QA/QC was impended according to the referenced documents.	Refer to section 3.1
3.1.3.1	Analyses are to be carried out in accordance with procedures described in the most recent edition of the "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air," or by suitable alternative procedures as authorized by the director.	Yes	Analyses were completed according to the referenced documents.	Refer to section 3.1 and 3.1.4

AUTHORIZATION CLAUSE NUMBER	AUTHORIZATION CLAUSE DESCRIPTION	COMPLIANT? (Yes/No/ND)	RATIONALE FOR YOUR COMPLIANCE DETERMINATION	LOCATION OF SUPPORTING INFORMATION IN ANNUAL REPORT
	The permittee must implement a Quality Assurance and Quality Control plan in accordance with the Environmental Data Quality Assurance Regulation and guidance provided in the "British Columbia Field Sampling Manual for Continuous Monitoring and the Collection of Air, Air- Emissions, Water, Wastewater, Soil, Sediment, and biological Samples," and "British Columbia Laboratory Methods Manual for the Analysis of Water, Wastewater, Sediment, Biological Materials and Discrete Ambient Air."	Yes	QA/QC was impended according to the referenced documents.	Refer to section 3.1
3.1.3.4	Flow calculation methods for receiving streams or creeks must be based on a regional hydrological evaluation, and recommendations made and implemented by a qualified professional. Appropriate current and historical stream gauging data should be utilized. Methods must be updated at frequency and recommended by a qualified professional. Flow gauging stations required by permit for discharge stations must be evaluated and documented to illustrate gauging method, consistency and relative accuracy and must be operated according to recommendations from a qualified professional. Reports on methods, evaluations and recommendations must be made available to the director on request.	Yes	Refer to Appendix L, 2023 Line Creek Operations Hydrometric Program Final Report	Refer to section 5.4 and Appendix L
4.3	The permittee must prepare annually a report or series of reports summarizing activities, incidents, and discharge/receiving environment monitoring results. The report(s) must include but is not limited to: i. A map of monitoring locations with EMS and Teck descriptors; ii. A summary of non-compliances with the permit conditions for the previous calendar year. This shall include interpretation of significance, and the status of corrective actions and/or ongoing investigations; iii. A summary of environmental incidents reported during the previous calendar year, including corrective status; iv. A summary of measured parameters, including appropriate graphs and comparison of results to permit limits, Approved and Working Water Quality Guidelines, Site Performance Objectives, or other criteria and benchmarks as specified by the director; v. A summary of flocculants used at each pond location, in accordance with the approved Flocculent Management Plan, including types and trade names, concentrations and volumes of each type dosed, and frequency and duration of dosing; vi. A summary of any QA/QC problems during the year; and, vii. A summary of annual pit pumping results including comparisons of predicted water quality and actual monitoring results and any changes needed to improve water quality predictions for pit pumping in the upcoming year. viii. An estimate of the proportion of mine-affected water (surface and subsurface) not captured by the Dry Creek Water Management System. The Annual Report must be submitted to the director on March 31st of each year following the data collection calendar year.	Yes	Acknowledged. Refer to Line Creek Operations 2023 Annual Water Report for Permit 5353, submitted March 31, 2023	N/A

Authorized Person Initial: JH

Date: March 28, 2024

Appendix B – LCO Sediment Characterization

ALS Canada Ltd.

CERTIFICATE OF ANALYSIS

Work Order	: **CG2310296**	Page	: 1 of 10
Client	: **Teck Coal Limited**	Laboratory	: ALS Environmental - Calgary
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 28-Jul-2023 09:35
PO	: VPO00877747	Date Analysis Commenced	: 31-Jul-2023
C-O-C number	: RLPB PLTSPILL SO 20230727	Issue Date	: 04-Aug-2023 17:01
Sampler	: K. Lindenbach		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 7		
No. of samples analysed	: 7		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
George Huang	Supervisor - Inorganic	Metals, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Metals, Calgary, Alberta
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Joshua Stessun	Laboratory Analyst	Organics, Calgary, Alberta
Rosalie Van Deelen	Laboratory Assistant	Organics, Calgary, Alberta
Sorina Motea	Laboratory Analyst	Organics, Calgary, Alberta
Vishnu Patel		Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances

LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
RRV	*Reported result verified by repeat analysis.*
SMI	*Surrogate recovery could not be measured due to sample matrix interference.*

Analytical Results

Sub-Matrix: Soil
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_RLPB_SO_ July-2023_NP1	LC_RLPB_SO_ July-2023_NP2	LC_RLPB_SO_ July-2023_NP3	LC_RLPB_SO_ July-2023_NP4	LC_RLPB_SO_ July-2023_NP5
Client sampling date / time					27-Jul-2023 10:40	27-Jul-2023 10:45	27-Jul-2023 10:50	27-Jul-2023 10:55	27-Jul-2023 11:00
					CG2310296-001	CG2310296-002	CG2310296-003	CG2310296-004	CG2310296-005
					Result	Result	Result	Result	Result
Physical Tests									
Moisture	----	E144/CG	0.25	%	16.6	28.5	26.0	25.7	20.7
pH (1:2 soil:water)	----	E108/CG	0.10	pH units	6.44	6.67	6.79	6.94	5.61
Metals									
Aluminum	7429-90-5	E440/CG	50	mg/kg	1740	2120	1990	2230	1590
Antimony	7440-36-0	E440/CG	0.10	mg/kg	0.81	0.83	0.76	0.83	0.60
Arsenic	7440-38-2	E440/CG	0.10	mg/kg	1.66	2.10	1.84	1.80	1.28
Barium	7440-39-3	E440/CG	0.50	mg/kg	344	339	342	402	258
Beryllium	7440-41-7	E440/CG	0.10	mg/kg	0.57	0.66	0.63	0.57	0.63
Bismuth	7440-69-9	E440/CG	0.20	mg/kg	0.32	0.64	0.42	0.42	0.34
Boron	7440-42-8	E440/CG	5.0	mg/kg	13.6	11.2	11.0	12.4	9.0
Cadmium	7440-43-9	E440/CG	0.020	mg/kg	0.811	0.859	0.847	0.860	0.805
Calcium	7440-70-2	E440/CG	50	mg/kg	1460	2340	2310	2260	3080
Chromium	7440-47-3	E440/CG	0.50	mg/kg	3.32	5.06	4.37	4.49	3.65
Cobalt	7440-48-4	E440/CG	0.10	mg/kg	1.93	3.09	3.01	3.03	2.09
Copper	7440-50-8	E440/CG	0.50	mg/kg	15.1	17.9	16.8	17.0	17.2
Iron	7439-89-6	E440/CG	50	mg/kg	6300	9100	6780	6690	9670
Lead	7439-92-1	E440/CG	0.50	mg/kg	6.38	8.08	7.45	7.57	6.47
Lithium	7439-93-2	E440/CG	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
Magnesium	7439-95-4	E440/CG	20	mg/kg	191	351	387	507	329
Manganese	7439-96-5	E440/CG	1.0	mg/kg	52.2	85.0	66.5	61.6	88.2
Mercury	7439-97-6	E510/CG	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	<0.0500
Molybdenum	7439-98-7	E440/CG	0.10	mg/kg	2.75	3.13	2.88	2.92	2.35
Nickel	7440-02-0	E440/CG	0.50	mg/kg	7.78	11.4	10.9	11.2	7.97
Phosphorus	7723-14-0	E440/CG	50	mg/kg	615	606	660	741	472
Potassium	7440-09-7	E440/CG	100	mg/kg	420	550	480	540	370
Selenium	7782-49-2	E440/CG	0.20	mg/kg	2.48	3.18	2.62	2.48	3.44
Silver	7440-22-4	E440/CG	0.10	mg/kg	0.20	0.22	0.18	0.19	0.15
Sodium	7440-23-5	E440/CG	50	mg/kg	<50	<50	<50	65	60
Strontium	7440-24-6	E440/CG	0.50	mg/kg	159	130	134	142	115
Sulfur	7704-34-9	E440/CG	1000	mg/kg	1300	<1000	1300	1100	<1000

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_RLPB_SO_ July-2023_NP1	LC_RLPB_SO_ July-2023_NP2	LC_RLPB_SO_ July-2023_NP3	LC_RLPB_SO_ July-2023_NP4	LC_RLPB_SO_ July-2023_NP5
Client sampling date / time					27-Jul-2023 10:40	27-Jul-2023 10:45	27-Jul-2023 10:50	27-Jul-2023 10:55	27-Jul-2023 11:00
					CG2310296-001	CG2310296-002	CG2310296-003	CG2310296-004	CG2310296-005
					Result	Result	Result	Result	Result
Metals									
Thallium	7440-28-0	E440/CG	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Tin	7440-31-5	E440/CG	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	<2.0
Titanium	7440-32-6	E440/CG	1.0	mg/kg	22.8	29.1	23.7	21.0	36.4
Tungsten	7440-33-7	E440/CG	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	<0.50
Uranium	7440-61-1	E440/CG	0.050	mg/kg	0.824	0.992	0.896	0.913	0.848
Vanadium	7440-62-2	E440/CG	0.20	mg/kg	24.7	26.2	24.5	24.7	19.4
Zinc	7440-66-6	E440/CG	2.0	mg/kg	42.1	55.1	52.3	56.1	34.6
Zirconium	7440-67-7	E440/CG	1.0	mg/kg	2.8	3.7	3.4	3.4	3.2
Aggregate Organics									
Waste oil content (BC HWR 41.1)	----	EC569SG/VA	0.10	%	<0.10	<0.10	<0.10	<0.10	<0.10
Waste oil content (BC HWR)	----	E569SG.A/VA	1000	mg/kg wwt	<1000	<1000	<1000	<1000	<1000
Volatile Organic Compounds [Fuels]									
Benzene	71-43-2	E611A/CG	0.0050	mg/kg	0.222	2.19	0.863	0.733	0.0705
Ethylbenzene	100-41-4	E611A/CG	0.015	mg/kg	0.301	1.89	0.939	0.624	0.187
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A/CG	0.200	mg/kg	<0.200	<0.200	<0.200	<0.200	<0.200
Styrene	100-42-5	E611A/CG	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	<0.050
Toluene	108-88-3	E611A/CG	0.050	mg/kg	1.28	10.0	4.92	4.43	0.451
Xylene, m+p-	179601-23-1	E611A/CG	0.030	mg/kg	2.90	19.2	9.89	6.80	1.94
Xylene, o-	95-47-6	E611A/CG	0.030	mg/kg	1.06	6.27	3.30	1.95	1.09
Xylenes, total	1330-20-7	E611A/CG	0.050	mg/kg	3.96	25.5	13.2	8.75	3.03
Hydrocarbons									
EPH (C10-C19)	----	E601A/CG	200	mg/kg	1120	1400	1240	1170	1120
EPH (C19-C32)	----	E601A/CG	200	mg/kg	960	1120	1050	960	950
VHs (C6-C10)	----	E581.VH+F1/ CG	10	mg/kg	66	205	107	90	130
HEPHs	----	EC600A/CG	200	mg/kg	960	1120	1040	960	950
LEPHs	----	EC600A/CG	200	mg/kg	1100	1370	1210	1140	1100
VPHs	----	EC580A/CG	10	mg/kg	60	165	87	76	126
Hydrocarbons Surrogates									
Bromobenzotrifluoride, 2- (EPH surrogate)	392-83-6	E601A/CG	1.0	%	121	118	129	115	129

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_RLPB_SO_July-2023_NP1	LC_RLPB_SO_July-2023_NP2	LC_RLPB_SO_July-2023_NP3	LC_RLPB_SO_July-2023_NP4	LC_RLPB_SO_July-2023_NP5
				Client sampling date / time	27-Jul-2023 10:40	27-Jul-2023 10:45	27-Jul-2023 10:50	27-Jul-2023 10:55	27-Jul-2023 11:00
					CG2310296-001	CG2310296-002	CG2310296-003	CG2310296-004	CG2310296-005
					Result	Result	Result	Result	Result
Hydrocarbons Surrogates									
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/CG	1.0	%	89.9	84.8	81.3	87.9	91.8
Volatile Organic Compounds Surrogates									
Bromofluorobenzene, 4-	460-00-4	E611A/CG	0.10	%	73.6	74.1	70.4	75.3	72.8
Difluorobenzene, 1,4-	540-36-3	E611A/CG	0.10	%	73.9	80.8	77.2	75.6	80.5
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	83-32-9	E641A-L/CG	0.0050	mg/kg	1.34	1.53	1.63	1.46	1.41
Acenaphthylene	208-96-8	E641A-L/CG	0.0050	mg/kg	0.373	0.449	0.409	0.398	0.289
Acridine	260-94-6	E641A-L/CG	0.010	mg/kg	2.08	2.68	2.75	2.64	1.45
Anthracene	120-12-7	E641A-L/CG	0.0040	mg/kg	0.414	0.488	0.485	0.435	0.0832
Benz(a)anthracene	56-55-3	E641A-L/CG	0.010	mg/kg	0.925	1.20	1.10	1.09	0.951
Benzo(a)pyrene	50-32-8	E641A-L/CG	0.010	mg/kg	0.388	0.498	0.493	0.484	0.272
Benzo(b+j)fluoranthene	n/a	E641A-L/CG	0.010	mg/kg	1.01	1.29	1.24	1.15	0.946
Benzo(b+j+k)fluoranthene	n/a	E641A-L/CG	0.015	mg/kg	1.03	1.31	1.26	1.17	0.965
Benzo(g,h,i)perylene	191-24-2	E641A-L/CG	0.010	mg/kg	0.325	0.426	0.423	0.390	0.173
Benzo(k)fluoranthene	207-08-9	E641A-L/CG	0.010	mg/kg	0.017	0.017	0.021	0.020	0.019
Chrysene	218-01-9	E641A-L/CG	0.010	mg/kg	2.80	3.61	3.49	3.18	3.53
Dibenz(a,h)anthracene	53-70-3	E641A-L/CG	0.0050	mg/kg	0.144	0.237	0.225	0.220	0.167
Fluoranthene	206-44-0	E641A-L/CG	0.010	mg/kg	0.561	0.720	0.683	0.619	0.725
Fluorene	86-73-7	E641A-L/CG	0.010	mg/kg	2.89	3.73	3.71	3.57	1.89
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L/CG	0.010	mg/kg	0.100	0.146	0.154	0.134	0.104
Methylnaphthalene, 1-	90-12-0	E641A-L/CG	0.010	mg/kg	15.2	20.9	19.6	18.4	13.3
Methylnaphthalene, 2-	91-57-6	E641A-L/CG	0.010	mg/kg	21.0	31.7	29.6	28.1	15.5
Naphthalene	91-20-3	E641A-L/CG	0.010	mg/kg	5.48	9.43	8.36	7.74	4.20
Phenanthrene	85-01-8	E641A-L/CG	0.010	mg/kg	15.7	19.4	17.9	16.9	20.2
Pyrene	129-00-0	E641A-L/CG	0.010	mg/kg	1.05	1.33	1.16	1.06	1.26
Quinoline	91-22-5	E641A-L/CG	0.010	mg/kg	<0.010	<0.010	0.099	0.077	0.048
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L/CG	0.020	mg/kg	0.768	1.04	1.01	0.979	0.678
IACR (CCME)	----	E641A-L/CG	0.150	-	12.3	16.0	15.3	14.5	12.1
Polycyclic Aromatic Hydrocarbons Surrogates									

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

				Client sample ID	LC_RLPB_SO_ July-2023_NP1	LC_RLPB_SO_ July-2023_NP2	LC_RLPB_SO_ July-2023_NP3	LC_RLPB_SO_ July-2023_NP4	LC_RLPB_SO_ July-2023_NP5
				Client sampling date / time	27-Jul-2023 10:40	27-Jul-2023 10:45	27-Jul-2023 10:50	27-Jul-2023 10:55	27-Jul-2023 11:00
Analyte	*CAS Number*	*Method/Lab*	*LOR*	*Unit*	**CG2310296-001**	**CG2310296-002**	**CG2310296-003**	**CG2310296-004**	**CG2310296-005**
					Result	Result	Result	Result	Result
Polycyclic Aromatic Hydrocarbons Surrogates									
Acridine-d9	34749-75-2	E641A-L/CG	0.1	%	70.4	76.6	78.2	72.9	Not Determined SMI
Chrysene-d12	1719-03-5	E641A-L/CG	0.1	%	90.9	92.0	92.7	87.1	71.7
Naphthalene-d8	1146-65-2	E641A-L/CG	0.1	%	91.0	95.3	86.4	90.4	91.8
Phenanthrene-d10	1517-22-2	E641A-L/CG	0.1	%	90.0	90.4	87.3	89.2	86.5

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_RLPB_SO_July-2023_NP6	LC_PLTSPILL_SO_July-2023_NP	----	----	----
				Client sampling date / time	27-Jul-2023 11:05	27-Jul-2023 11:30	----	----	----
					CG2310296-006	CG2310296-007	--------	--------	--------
					Result	Result	----	----	----
Physical Tests									
Moisture	----	E144/CG	0.25	%	28.7	18.8	----	----	----
pH (1:2 soil:water)	----	E108/CG	0.10	pH units	6.15	7.76	----	----	----
Metals									
Aluminum	7429-90-5	E440/CG	50	mg/kg	1980	1250	----	----	----
Antimony	7440-36-0	E440/CG	0.10	mg/kg	0.87	1.15	----	----	----
Arsenic	7440-38-2	E440/CG	0.10	mg/kg	1.86	1.27	----	----	----
Barium	7440-39-3	E440/CG	0.50	mg/kg	368	232	----	----	----
Beryllium	7440-41-7	E440/CG	0.10	mg/kg	0.66	1.35	----	----	----
Bismuth	7440-69-9	E440/CG	0.20	mg/kg	0.51	1.56	----	----	----
Boron	7440-42-8	E440/CG	5.0	mg/kg	12.9	12.4	----	----	----
Cadmium	7440-43-9	E440/CG	0.020	mg/kg	0.788	0.402	----	----	----
Calcium	7440-70-2	E440/CG	50	mg/kg	2240	1990	----	----	----
Chromium	7440-47-3	E440/CG	0.50	mg/kg	3.82	6.71	----	----	----
Cobalt	7440-48-4	E440/CG	0.10	mg/kg	2.87	4.80	----	----	----
Copper	7440-50-8	E440/CG	0.50	mg/kg	18.5	10.8	----	----	----
Iron	7439-89-6	E440/CG	50	mg/kg	10000	87600	----	----	----
Lead	7439-92-1	E440/CG	0.50	mg/kg	8.18	5.84	----	----	----
Lithium	7439-93-2	E440/CG	2.0	mg/kg	<2.0	<2.0	----	----	----
Magnesium	7439-95-4	E440/CG	20	mg/kg	394	423	----	----	----
Manganese	7439-96-5	E440/CG	1.0	mg/kg	91.8	522	----	----	----
Mercury	7439-97-6	E510/CG	0.0500	mg/kg	<0.0500	<0.0500	----	----	----
Molybdenum	7439-98-7	E440/CG	0.10	mg/kg	2.81	2.00	----	----	----
Nickel	7440-02-0	E440/CG	0.50	mg/kg	9.89	6.16	----	----	----
Phosphorus	7723-14-0	E440/CG	50	mg/kg	583	408	----	----	----
Potassium	7440-09-7	E440/CG	100	mg/kg	490	240	----	----	----
Selenium	7782-49-2	E440/CG	0.20	mg/kg	3.14	1.65	----	----	----
Silver	7440-22-4	E440/CG	0.10	mg/kg	0.20	<0.10	----	----	----
Sodium	7440-23-5	E440/CG	50	mg/kg	<50	65	----	----	----
Strontium	7440-24-6	E440/CG	0.50	mg/kg	148	113	----	----	----
Sulfur	7704-34-9	E440/CG	1000	mg/kg	1300	<1000	----	----	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_RLPB_SO_ July-2023_NP6	LC_PLTSPILL_ SO_July-2023_ NP	----	----	----
				Client sampling date / time	27-Jul-2023 11:05	27-Jul-2023 11:30	----	----	----
					CG2310296-006	CG2310296-007	--------	--------	--------
					Result	Result	----	----	----
Metals									
Thallium	7440-28-0	E440/CG	0.050	mg/kg	<0.050	<0.050	----	----	----
Tin	7440-31-5	E440/CG	2.0	mg/kg	<2.0	6.8 RRV	----	----	----
Titanium	7440-32-6	E440/CG	1.0	mg/kg	30.0	94.4	----	----	----
Tungsten	7440-33-7	E440/CG	0.50	mg/kg	<0.50	1.08	----	----	----
Uranium	7440-61-1	E440/CG	0.050	mg/kg	0.875	0.545	----	----	----
Vanadium	7440-62-2	E440/CG	0.20	mg/kg	24.7	36.2	----	----	----
Zinc	7440-66-6	E440/CG	2.0	mg/kg	50.7	52.5	----	----	----
Zirconium	7440-67-7	E440/CG	1.0	mg/kg	3.3	2.3	----	----	----
Aggregate Organics									
Waste oil content (BC HWR 41.1)	----	EC569SG/VA	0.10	%	<0.10	<0.10	----	----	----
Waste oil content (BC HWR)	----	E569SG.A/VA	1000	mg/kg wwt	<1000	<1000	----	----	----
Volatile Organic Compounds [Fuels]									
Benzene	71-43-2	E611A/CG	0.0050	mg/kg	1.56	0.152	----	----	----
Ethylbenzene	100-41-4	E611A/CG	0.015	mg/kg	1.32	0.431	----	----	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A/CG	0.200	mg/kg	<0.200	<0.200	----	----	----
Styrene	100-42-5	E611A/CG	0.050	mg/kg	<0.050	<0.050	----	----	----
Toluene	108-88-3	E611A/CG	0.050	mg/kg	8.81	0.797	----	----	----
Xylene, m+p-	179601-23-1	E611A/CG	0.030	mg/kg	14.2	5.20	----	----	----
Xylene, o-	95-47-6	E611A/CG	0.030	mg/kg	3.61	2.69	----	----	----
Xylenes, total	1330-20-7	E611A/CG	0.050	mg/kg	17.8	7.89	----	----	----
Hydrocarbons									
EPH (C10-C19)	----	E601A/CG	200	mg/kg	1600	700	----	----	----
EPH (C19-C32)	----	E601A/CG	200	mg/kg	1280	580	----	----	----
VHs (C6-C10)	----	E581.VH+F1/ CG	10	mg/kg	128	64	----	----	----
HEPHs	----	EC600A/CG	200	mg/kg	1270	580	----	----	----
LEPHs	----	EC600A/CG	200	mg/kg	1570	680	----	----	----
VPHs	----	EC580A/CG	10	mg/kg	98	55	----	----	----
Hydrocarbons Surrogates									
Bromobenzotrifluoride, 2- (EPH surrogate)	392-83-6	E601A/CG	1.0	%	106	139	----	----	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	LC_RLPB_SO_July-2023_NP6	LC_PLTSPILL_SO_July-2023_NP	----	----	----
				Client sampling date / time	27-Jul-2023 11:05	27-Jul-2023 11:30	----	----	----
Analyte	*CAS Number*	*Method/Lab*	*LOR*	*Unit*	CG2310296-006	CG2310296-007	--------	--------	--------
					Result	Result	----	----	----
Hydrocarbons Surrogates									
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/CG	1.0	%	96.9	70.3	----	----	----
Volatile Organic Compounds Surrogates									
Bromofluorobenzene, 4-	460-00-4	E611A/CG	0.10	%	71.0	72.4	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611A/CG	0.10	%	72.8	79.6	----	----	----
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	83-32-9	E641A-L/CG	0.0050	mg/kg	1.96	1.10	----	----	----
Acenaphthylene	208-96-8	E641A-L/CG	0.0050	mg/kg	0.504	0.267	----	----	----
Acridine	260-94-6	E641A-L/CG	0.010	mg/kg	3.35	1.58	----	----	----
Anthracene	120-12-7	E641A-L/CG	0.0040	mg/kg	0.543	0.279	----	----	----
Benz(a)anthracene	56-55-3	E641A-L/CG	0.010	mg/kg	1.35	0.710	----	----	----
Benzo(a)pyrene	50-32-8	E641A-L/CG	0.010	mg/kg	0.608	0.314	----	----	----
Benzo(b+j)fluoranthene	n/a	E641A-L/CG	0.010	mg/kg	1.50	0.719	----	----	----
Benzo(b+j+k)fluoranthene	n/a	E641A-L/CG	0.015	mg/kg	1.52	0.739	----	----	----
Benzo(g,h,i)perylene	191-24-2	E641A-L/CG	0.010	mg/kg	0.513	0.247	----	----	----
Benzo(k)fluoranthene	207-08-9	E641A-L/CG	0.010	mg/kg	0.022	0.020	----	----	----
Chrysene	218-01-9	E641A-L/CG	0.010	mg/kg	4.12	2.06	----	----	----
Dibenz(a,h)anthracene	53-70-3	E641A-L/CG	0.0050	mg/kg	0.277	0.136	----	----	----
Fluoranthene	206-44-0	E641A-L/CG	0.010	mg/kg	0.786	0.458	----	----	----
Fluorene	86-73-7	E641A-L/CG	0.010	mg/kg	4.54	2.24	----	----	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L/CG	0.010	mg/kg	0.158	0.096	----	----	----
Methylnaphthalene, 1-	90-12-0	E641A-L/CG	0.010	mg/kg	26.5	14.3	----	----	----
Methylnaphthalene, 2-	91-57-6	E641A-L/CG	0.010	mg/kg	44.1	18.1	----	----	----
Naphthalene	91-20-3	E641A-L/CG	0.010	mg/kg	13.2	4.16	----	----	----
Phenanthrene	85-01-8	E641A-L/CG	0.010	mg/kg	20.7	11.8	----	----	----
Pyrene	129-00-0	E641A-L/CG	0.010	mg/kg	1.42	0.682	----	----	----
Quinoline	91-22-5	E641A-L/CG	0.010	mg/kg	0.135	0.043	----	----	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L/CG	0.020	mg/kg	1.23	0.628	----	----	----
IACR (CCME)	----	E641A-L/CG	0.150	-	18.5	9.26	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid)**

					Client sample ID	LC_RLPB_SO_July-2023_NP6	LC_PLTSPILL_SO_July-2023_NP	----	----	----
					Client sampling date / time	27-Jul-2023 11:05	27-Jul-2023 11:30	----	----	----
Analyte	*CAS Number*	*Method/Lab*	*LOR*	*Unit*		**CG2310296-006**	**CG2310296-007**	--------	--------	--------
						Result	Result	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates										
Acridine-d9	34749-75-2	E641A-L/CG	0.1	%		75.4	75.9	----	----	----
Chrysene-d12	1719-03-5	E641A-L/CG	0.1	%		84.7	98.0	----	----	----
Naphthalene-d8	1146-65-2	E641A-L/CG	0.1	%		81.0	95.4	----	----	----
Phenanthrene-d10	1517-22-2	E641A-L/CG	0.1	%		79.2	92.2	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	:CG2310296	Page	: 1 of 15
Client	:Teck Coal Limited	Laboratory	: ALS Environmental - Calgary
Contact	:Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	:PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	:2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:250-433-8467	Telephone	:+1 403 407 1800
Project	:LINE CREEK OPERATION	Date Samples Received	: 28-Jul-2023 09:35
PO	: VPO00877747	Issue Date	: 04-Aug-2023 17:02
C-O-C number	:RLPB PLTSPILL SO 20230727		
Sampler	:K. Lindenbach		
Site	:----		
Quote number	:Teck Coal Master Quote		
No. of samples received	:7		
No. of samples analysed	:7		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Matrix Spike outliers occur.
- Laboratory Control Sample (LCS) outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Soil/Solid**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Laboratory Control Sample (LCS) Recoveries								
Metals	QC-MRG2-1070053 002	----	Lithium	7439-93-2	E440	121 % MES	80.0-120%	Recovery greater than upper control limit
Metals	QC-MRG2-1070053 002	----	Phosphorus	7723-14-0	E440	121 % MES	80.0-120%	Recovery greater than upper control limit

Result Qualifiers

Qualifier	*Description*
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_July-2023_NP	E569SG.A	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	40 days	1 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP1	E569SG.A	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	40 days	1 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP2	E569SG.A	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	40 days	1 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP3	E569SG.A	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	40 days	1 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP4	E569SG.A	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	40 days	1 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP5	E569SG.A	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	40 days	1 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP6	E569SG.A	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	40 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_July-2023_NP	E601A	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP1	E601A	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP2	E601A	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP3	E601A	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP4	E601A	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP5	E601A	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP6	E601A	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_PLTSPILL_SO_July-2023_NP	E581.VH+F1	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_July-2023_NP1	E581.VH+F1	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_July-2023_NP2	E581.VH+F1	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_July-2023_NP3	E581.VH+F1	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_July-2023_NP4	E581.VH+F1	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_July-2023_NP5	E581.VH+F1	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_July-2023_NP6	E581.VH+F1	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_July-2023_NP	E510	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	21 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP1	E510	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	21 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP2	E510	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	21 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP3	E510	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	21 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP4	E510	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	21 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP5	E510	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	21 days	1 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP6	E510	27-Jul-2023	03-Aug-2023	28 days	7 days	✓	04-Aug-2023	21 days	1 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_July-2023_NP	E440	27-Jul-2023	03-Aug-2023	180 days	7 days	✓	03-Aug-2023	173 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP1	E440	27-Jul-2023	03-Aug-2023	180 days	7 days	✓	03-Aug-2023	173 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP2	E440	27-Jul-2023	03-Aug-2023	180 days	7 days	✓	03-Aug-2023	173 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP3	E440	27-Jul-2023	03-Aug-2023	180 days	7 days	✓	03-Aug-2023	173 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP4	E440	27-Jul-2023	03-Aug-2023	180 days	7 days	✓	03-Aug-2023	173 days	0 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP5	E440	27-Jul-2023	03-Aug-2023	180 days	7 days	✓	03-Aug-2023	173 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP6	E440	27-Jul-2023	03-Aug-2023	180 days	7 days	✓	03-Aug-2023	173 days	0 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_July-2023_NP	E144	27-Jul-2023	----	----	----		31-Jul-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP1	E144	27-Jul-2023	----	----	----		31-Jul-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP2	E144	27-Jul-2023	----	----	----		31-Jul-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP3	E144	27-Jul-2023	----	----	----		31-Jul-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP4	E144	27-Jul-2023	----	----	----		31-Jul-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP5	E144	27-Jul-2023	----	----	----		31-Jul-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP6	E144	27-Jul-2023	----	----	----		31-Jul-2023	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_July-2023_NP	E108	27-Jul-2023	04-Aug-2023	30 days	8 days	✓	04-Aug-2023	22 days	0 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP1	E108	27-Jul-2023	04-Aug-2023	30 days	8 days	✓	04-Aug-2023	22 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP2	E108	27-Jul-2023	04-Aug-2023	30 days	8 days	✓	04-Aug-2023	22 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP3	E108	27-Jul-2023	04-Aug-2023	30 days	8 days	✓	04-Aug-2023	22 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP4	E108	27-Jul-2023	04-Aug-2023	30 days	8 days	✓	04-Aug-2023	22 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP5	E108	27-Jul-2023	04-Aug-2023	30 days	8 days	✓	04-Aug-2023	22 days	0 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP6	E108	27-Jul-2023	04-Aug-2023	30 days	8 days	✓	04-Aug-2023	22 days	0 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_July-2023_NP	E641A-L	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP1	E641A-L	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP2	E641A-L	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP3	E641A-L	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP4	E641A-L	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP5	E641A-L	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_July-2023_NP6	E641A-L	27-Jul-2023	31-Jul-2023	14 days	4 days	✓	01-Aug-2023	40 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_PLTSPILL_SO_July-2023_NP	E611A	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_July-2023_NP1	E611A	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_July-2023_NP2	E611A	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_July-2023_NP3	E611A	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_July-2023_NP4	E611A	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_July-2023_NP5	E611A	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_July-2023_NP6	E611A	27-Jul-2023	31-Jul-2023	40 days	4 days	✓	01-Aug-2023	36 days	1 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BC PHCs - EPH by GC-FID	E601A	1063637	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1063649	1	20	5.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1070053	1	20	5.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1070054	1	20	5.0	5.0	✓
Moisture Content by Gravimetry	E144	1063639	1	20	5.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	1063638	1	20	5.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1072077	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1063650	1	20	5.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	1069379	1	12	8.3	5.0	✓
Laboratory Control Samples (LCS)							
BC PHCs - EPH by GC-FID	E601A	1063637	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1063649	1	20	5.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1070053	2	20	10.0	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1070054	2	20	10.0	10.0	✓
Moisture Content by Gravimetry	E144	1063639	1	20	5.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	1063638	1	20	5.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1072077	2	20	10.0	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1063650	1	20	5.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	1069379	1	12	8.3	5.0	✓
Method Blanks (MB)							
BC PHCs - EPH by GC-FID	E601A	1063637	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1063649	1	20	5.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1070053	1	20	5.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1070054	1	20	5.0	5.0	✓
Moisture Content by Gravimetry	E144	1063639	1	20	5.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	1063638	1	20	5.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1063650	1	20	5.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	1069379	1	12	8.3	5.0	✓
Matrix Spikes (MS)							
BC PHCs - EPH by GC-FID	E601A	1063637	1	20	5.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1063649	1	20	5.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	1063638	1	20	5.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by “mod”).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 ALS Environmental - Calgary	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 ALS Environmental - Calgary	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 ALS Environmental - Calgary	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 ALS Environmental - Calgary	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A ALS Environmental - Vancouver	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A silica gel treated petroleum ether sample extract is evaporated to dryness. The weight of the residue is determined gravimetrically. For classification of samples as waste oil under the HWR, Waste Oil Content is reported by weight on an as-received basis.
VH and F1 by Headspace GC-FID	E581.VH+F1 ALS Environmental - Calgary	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry’s law. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Test results are expressed on a dry weight basis. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
BC PHCs - EPH by GC-FID	E601A ALS Environmental - Calgary	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
BTEX by Headspace GC-MS	E611A ALS Environmental - Calgary	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L ALS Environmental - Calgary	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are extracted with hexane/acetone and analyzed by GC-MS. If reported, IACR (index of additive cancer risk, unitless) and B(a)P toxic potency equivalent (in soil concentration units) are calculated as per CCME PAH Soil Quality Guidelines fact sheet (2010) or ABT1.
Waste Oil Content (BC HWR 41.1) by Gravimetry	EC569SG ALS Environmental - Vancouver	Soil/Solid	unit conversion	Convert waste oil content from sample wet weight basis to dry weight basis by using moisture. For assessment of compliance of the Total Oil standard under section 41.1 of the HWR (Standards for Management of Hydrocarbon Contaminated Soils), Waste Oil Content is reported on a dry weight basis.
VPH: VH-BTEX-Styrene	EC580A ALS Environmental - Calgary	Soil/Solid	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VH-BTEX = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A ALS Environmental - Calgary	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Calgary	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 ALS Environmental - Calgary	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Waste Oil Content (BC HWR) Extraction for Gravimetry	EP569SG ALS Environmental - Vancouver	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A subsample is dried by magnesium sulfate and extracted with petroleum ether in Soxhlet. The extract is dried with sodium sulfate and treated with silica gel.
VOCs Methanol Extraction for Headspace Analysis	EP581 ALS Environmental - Calgary	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 ALS Environmental - Calgary	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	:**CG2310296**	Page	: 1 of 14
Client	:Teck Coal Limited	Laboratory	:ALS Environmental - Calgary
Contact	:Tom Jeffery	Account Manager	:Lyudmyla Shvets
Address	:PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	:2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	:+1 403 407 1800
Project	:LINE CREEK OPERATION	Date Samples Received	:28-Jul-2023 09:35
PO	:VPO00877747	Date Analysis Commenced	:31-Jul-2023
C-O-C number	:RLPB PLTSPILL SO 20230727	Issue Date	:04-Aug-2023 17:01
Sampler	:K. Lindenbach 250-433-8467		
Site	:----		
Quote number	:Teck Coal Master Quote		
No. of samples received	:7		
No. of samples analysed	:7		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
George Huang	Supervisor - Inorganic	Calgary Metals, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Metals, Calgary, Alberta
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Joshua Stessun	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Rosalie Van Deelen	Laboratory Assistant	Calgary Organics, Calgary, Alberta
Sorina Motea	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Vishnu Patel		Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1063639)											
CG2310296-001	LC_RLPB_SO_July-2023_NP1	Moisture	----	E144	0.25	%	16.6	18.0	7.99%	20%	----
Physical Tests (QC Lot: 1072077)											
CG2310296-001	LC_RLPB_SO_July-2023_NP1	pH (1:2 soil:water)	----	E108	0.10	pH units	6.44	6.39	0.779%	5%	----
Metals (QC Lot: 1070053)											
CG2310296-001	LC_RLPB_SO_July-2023_NP1	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 1070054)											
CG2310296-001	LC_RLPB_SO_July-2023_NP1	Aluminum	7429-90-5	E440	50	mg/kg	1740	1870	7.32%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	0.81	0.82	0.370%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	1.66	1.64	1.01%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	344	378	9.47%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.57	0.52	0.05	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	0.32	0.30	0.02	Diff <2x LOR	----
		Boron	7440-42-8	E440	5.0	mg/kg	13.6	13.7	0.1	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	0.811	0.805	0.778%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	1460	1440	1.23%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	3.32	3.37	1.36%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	1.93	1.95	1.25%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	15.1	15.1	0.0213%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	6300	6340	0.564%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	6.38	6.22	2.66%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	20	mg/kg	191	205	6.66%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	52.2	54.1	3.68%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	2.75	2.59	6.24%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	7.78	7.84	0.748%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	615	667	8.10%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	420	430	10	Diff <2x LOR	----
		Selenium	7782-49-2	E440	0.20	mg/kg	2.48	2.51	1.45%	30%	----

Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 1070054) - continued											
CG2310296-001	LC_RLPB_SO_July-2023_NP1	Silver	7440-22-4	E440	0.10	mg/kg	0.20	0.20	0.0002	Diff <2x LOR	----
		Sodium	7440-23-5	E440	50	mg/kg	<50	<50	0	Diff <2x LOR	----
		Strontium	7440-24-6	E440	0.50	mg/kg	159	165	3.83%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	1300	1000	300	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	<2.0	<2.0	0	Diff <2x LOR	----
		Titanium	7440-32-6	E440	1.0	mg/kg	22.8	24.1	5.64%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	0.824	0.793	3.86%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	24.7	24.6	0.490%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	42.1	38.8	8.30%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.8	2.7	0.1	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1069379)											
CG2310296-001	LC_RLPB_SO_July-2023_NP1	Waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	<1000	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1063649)											
CG2310296-001	LC_RLPB_SO_July-2023_NP1	Benzene	71-43-2	E611A	0.0050	mg/kg	0.222	0.232	4.55%	40%	----
		Ethylbenzene	100-41-4	E611A	0.015	mg/kg	0.301	0.311	3.28%	40%	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		Styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.050	mg/kg	1.28	1.33	3.62%	40%	----
		Xylene, m+p-	179601-23-1	E611A	0.030	mg/kg	2.90	2.96	2.01%	40%	----
		Xylene, o-	95-47-6	E611A	0.030	mg/kg	1.06	1.08	1.38%	40%	----
Hydrocarbons (QC Lot: 1063637)											
CG2310296-001	LC_RLPB_SO_July-2023_NP1	EPH (C10-C19)	----	E601A	200	mg/kg	1120	1090	2.91%	40%	----
		EPH (C19-C32)	----	E601A	200	mg/kg	960	920	30	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1063650)											
CG2310296-001	LC_RLPB_SO_July-2023_NP1	VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	66	55	17.5%	40%	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 1063638)											
CG2310296-001	LC_RLPB_SO_July-2023_NP1	Acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	1.34	1.30	3.60%	50%	----
		Acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	0.373	0.368	1.22%	50%	----
		Acridine	260-94-6	E641A-L	0.010	mg/kg	2.08	1.97	5.43%	50%	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Polycyclic Aromatic Hydrocarbons (QC Lot: 1063638) - continued											
CG2310296-001	LC_RLPB_SO_July-2023_ NP1	Anthracene	120-12-7	E641A-L	0.0040	mg/kg	0.414	0.365	12.5%	50%	----
		Benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	0.925	0.845	9.04%	50%	----
		Benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.388	0.366	5.84%	50%	----
		Benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	1.01	0.940	6.91%	50%	----
		Benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.325	0.319	1.83%	50%	----
		Benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	0.017	0.016	0.0008	Diff <2x LOR	----
		Chrysene	218-01-9	E641A-L	0.010	mg/kg	2.80	2.74	1.83%	50%	----
		Dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.144	0.168	14.8%	50%	----
		Fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.561	0.543	3.24%	50%	----
		Fluorene	86-73-7	E641A-L	0.010	mg/kg	2.89	2.72	6.04%	50%	----
		Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.100	0.106	5.52%	50%	----
		Methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	15.2	14.4	5.72%	50%	----
		Methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	21.0	19.2	8.82%	50%	----
		Naphthalene	91-20-3	E641A-L	0.010	mg/kg	5.48	4.82	12.7%	50%	----
		Phenanthrene	85-01-8	E641A-L	0.010	mg/kg	15.7	15.6	0.585%	50%	----
		Pyrene	129-00-0	E641A-L	0.010	mg/kg	1.05	1.02	3.53%	50%	----
		Quinoline	91-22-5	E641A-L	0.010	mg/kg	<0.010	<0.010	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1063639)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1070053)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1070054)						
Aluminum	7429-90-5	E440	50	mg/kg	<50	----
Antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
Arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
Barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
Beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
Bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
Boron	7440-42-8	E440	5	mg/kg	<5.0	----
Cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
Calcium	7440-70-2	E440	50	mg/kg	<50	----
Chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
Cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
Copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
Iron	7439-89-6	E440	50	mg/kg	<50	----
Lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
Lithium	7439-93-2	E440	2	mg/kg	<2.0	----
Magnesium	7439-95-4	E440	20	mg/kg	<20	----
Manganese	7439-96-5	E440	1	mg/kg	<1.0	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
Nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440	50	mg/kg	<50	----
Potassium	7440-09-7	E440	100	mg/kg	<100	----
Selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
Silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E440	50	mg/kg	<50	----
Strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
Sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
Thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440	2	mg/kg	<2.0	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1070054) - continued						
Titanium	7440-32-6	E440	1	mg/kg	<1.0	----
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
Uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440	2	mg/kg	<2.0	----
Zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Aggregate Organics (QCLot: 1069379)						
Waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	----
Volatile Organic Compounds (QCLot: 1063649)						
Benzene	71-43-2	E611A	0.005	mg/kg	<0.0050	----
Ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	<0.040	----
Styrene	100-42-5	E611A	0.05	mg/kg	<0.050	----
Toluene	108-88-3	E611A	0.05	mg/kg	<0.050	----
Xylene, m+p-	179601-23-1	E611A	0.03	mg/kg	<0.030	----
Xylene, o-	95-47-6	E611A	0.03	mg/kg	<0.030	----
Hydrocarbons (QCLot: 1063637)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
Hydrocarbons (QCLot: 1063650)						
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	----
Polycyclic Aromatic Hydrocarbons (QCLot: 1063638)						
Acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
Acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
Acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
Anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
Benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
Benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
Benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	<0.010	----
Benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
Benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
Chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
Dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
Fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
Fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 1063638) - continued						
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
Methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
Methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
Naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
Phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
Pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
Quinoline	91-22-5	E641A-L	0.01	mg/kg	<0.010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1063639)									
Moisture	----	E144	0.25	%	50 %	97.8	90.0	110	----
Physical Tests (QCLot: 1072077)									
pH (1:2 soil:water)	----	E108	----	pH units	7 pH units	100	97.0	103	----
Metals (QCLot: 1070053)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	99.0	80.0	120	----
Metals (QCLot: 1070054)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	102	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	108	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	109	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	110	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	104	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	108	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	106	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	109	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	103	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	102	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	98.0	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	120	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	108	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	# 121	80.0	120	MES
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	113	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	102	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	103	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	104	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	# 121	80.0	120	MES
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	106	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	106	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	102	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	107	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	105	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	81.3	80.0	120	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Metals (QCLot: 1070054) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	103	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	108	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	102	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	101	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	99.5	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	103	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	102	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	104	80.0	120	----
Aggregate Organics (QCLot: 1069379)									
Waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	4250 mg/kg wwt	81.2	70.0	130	----
Volatile Organic Compounds (QCLot: 1063649)									
Benzene	71-43-2	E611A	0.005	mg/kg	2.5 mg/kg	96.5	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.015	mg/kg	2.5 mg/kg	96.4	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	2.5 mg/kg	91.9	70.0	130	----
Styrene	100-42-5	E611A	0.05	mg/kg	2.5 mg/kg	96.0	70.0	130	----
Toluene	108-88-3	E611A	0.05	mg/kg	2.5 mg/kg	88.6	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.03	mg/kg	5 mg/kg	96.7	70.0	130	----
Xylene, o-	95-47-6	E611A	0.03	mg/kg	2.5 mg/kg	99.7	70.0	130	----
Hydrocarbons (QCLot: 1063637)									
EPH (C10-C19)	----	E601A	200	mg/kg	1002.5 mg/kg	125	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	515.625 mg/kg	115	70.0	130	----
Hydrocarbons (QCLot: 1063650)									
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	3.438 mg/kg	94.4	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 1063638)									
Acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	105	60.0	130	----
Acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	93.8	60.0	130	----
Acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	87.1	60.0	130	----
Anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	94.8	60.0	130	----
Benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	98.6	60.0	130	----
Benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	94.4	60.0	130	----
Benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	0.5 mg/kg	96.9	60.0	130	----
Benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	84.0	60.0	130	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Spike	Recovery (%)	Recovery Limits (%)		
					Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 1063638) - continued									
Benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
Chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	103	60.0	130	----
Dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	83.3	60.0	130	----
Fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	97.2	60.0	130	----
Fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	90.6	60.0	130	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	92.7	60.0	130	----
Methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	104	60.0	130	----
Methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	106	60.0	130	----
Naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	105	50.0	130	----
Phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	98.5	60.0	130	----
Pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	97.9	60.0	130	----
Quinoline	91-22-5	E641A-L	0.01	mg/kg	0.5 mg/kg	90.7	60.0	130	----

Laboratory Control Sample (LCS) Report

Qualifiers

Qualifier	*Description*
MES	*Data Quality Objective was marginally exceeded (by < 10% absolute) for < 10% of analytes in a Multi-Element Scan / Multi-Parameter Scan (considered acceptable as per OMOE & CCME).*

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 1063649)										
CG2310296-001	LC_RLPB_SO_July-2023_NP1	Benzene	71-43-2	E611A	3.28 mg/kg	3.4375 mg/kg	82.3	60.0	140	----
		Ethylbenzene	100-41-4	E611A	3.18 mg/kg	3.4375 mg/kg	79.7	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	3.38 mg/kg	3.4375 mg/kg	84.9	60.0	140	----
		Styrene	100-42-5	E611A	3.33 mg/kg	3.4375 mg/kg	83.6	60.0	140	----
		Toluene	108-88-3	E611A	3.30 mg/kg	3.4375 mg/kg	82.8	60.0	140	----
		Xylene, m+p-	179601-23-1	E611A	6.49 mg/kg	6.875 mg/kg	81.4	60.0	140	----
		Xylene, o-	95-47-6	E611A	3.38 mg/kg	3.4375 mg/kg	84.9	60.0	140	----
Hydrocarbons (QCLot: 1063637)										
CG2310296-001	LC_RLPB_SO_July-2023_NP1	EPH (C10-C19)	----	E601A	ND mg/kg	1002.5 mg/kg	ND	60.0	140	----
		EPH (C19-C32)	----	E601A	ND mg/kg	515.625 mg/kg	ND	60.0	140	----
Polycyclic Aromatic Hydrocarbons (QCLot: 1063638)										
CG2310296-001	LC_RLPB_SO_July-2023_NP1	Acenaphthene	83-32-9	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Acenaphthylene	208-96-8	E641A-L	0.213 mg/kg	0.5 mg/kg	57.2	50.0	140	----
		Acridine	260-94-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Anthracene	120-12-7	E641A-L	0.265 mg/kg	0.5 mg/kg	71.2	50.0	140	----
		Benz(a)anthracene	56-55-3	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Benzo(a)pyrene	50-32-8	E641A-L	0.197 mg/kg	0.5 mg/kg	53.0	50.0	140	----
		Benzo(b+j)fluoranthene	n/a	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Benzo(g,h,i)perylene	191-24-2	E641A-L	0.215 mg/kg	0.5 mg/kg	57.8	50.0	140	----
		Benzo(k)fluoranthene	207-08-9	E641A-L	0.320 mg/kg	0.5 mg/kg	86.0	50.0	140	----
		Chrysene	218-01-9	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Dibenz(a,h)anthracene	53-70-3	E641A-L	0.205 mg/kg	0.5 mg/kg	55.2	50.0	140	----
		Fluoranthene	206-44-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Fluorene	86-73-7	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.251 mg/kg	0.5 mg/kg	67.7	50.0	140	----
		Methylnaphthalene, 1-	90-12-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Methylnaphthalene, 2-	91-57-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Naphthalene	91-20-3	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Phenanthrene	85-01-8	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Pyrene	129-00-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Quinoline	91-22-5	E641A-L	0.304 mg/kg	0.5 mg/kg	81.8	50.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Physical Tests (QCLot: 1072077)									
	RM	pH (1:2 soil:water)	----	E108	8.06 pH units	98.8	96.0	104	----
Metals (QCLot: 1070053)									
	RM	Mercury	7439-97-6	E510	0.062 mg/kg	80.4	70.0	130	----
Metals (QCLot: 1070054)									
	RM	Aluminum	7429-90-5	E440	9817 mg/kg	95.5	70.0	130	----
	RM	Antimony	7440-36-0	E440	3.99 mg/kg	107	70.0	130	----
	RM	Arsenic	7440-38-2	E440	3.73 mg/kg	92.8	70.0	130	----
	RM	Barium	7440-39-3	E440	105 mg/kg	102	70.0	130	----
	RM	Beryllium	7440-41-7	E440	0.349 mg/kg	108	70.0	130	----
	RM	Boron	7440-42-8	E440	8.5 mg/kg	118	40.0	160	----
	RM	Cadmium	7440-43-9	E440	0.91 mg/kg	102	70.0	130	----
	RM	Calcium	7440-70-2	E440	31082 mg/kg	98.3	70.0	130	----
	RM	Chromium	7440-47-3	E440	101 mg/kg	102	70.0	130	----
	RM	Cobalt	7440-48-4	E440	6.9 mg/kg	99.2	70.0	130	----
	RM	Copper	7440-50-8	E440	123 mg/kg	95.6	70.0	130	----
	RM	Iron	7439-89-6	E440	23558 mg/kg	101	70.0	130	----
	RM	Lead	7439-92-1	E440	267 mg/kg	101	70.0	130	----
	RM	Lithium	7439-93-2	E440	9.5 mg/kg	115	70.0	130	----
	RM	Magnesium	7439-95-4	E440	5509 mg/kg	107	70.0	130	----
	RM	Manganese	7439-96-5	E440	269 mg/kg	99.7	70.0	130	----
	RM	Molybdenum	7439-98-7	E440	1.03 mg/kg	103	70.0	130	----
	RM	Nickel	7440-02-0	E440	26.7 mg/kg	100	70.0	130	----
	RM	Phosphorus	7723-14-0	E440	752 mg/kg	103	70.0	130	----
	RM	Potassium	7440-09-7	E440	1587 mg/kg	99.0	70.0	130	----
	RM	Silver	7440-22-4	E440	4.06 mg/kg	87.9	70.0	130	----
	RM	Sodium	7440-23-5	E440	797 mg/kg	92.8	70.0	130	----
	RM	Strontium	7440-24-6	E440	86.1 mg/kg	102	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	High	Qualifier
Metals (QCLot: 1070054) - continued									
	RM	Thallium	7440-28-0	E440	0.0786 mg/kg	108	40.0	160	----
	RM	Tin	7440-31-5	E440	10.6 mg/kg	102	70.0	130	----
	RM	Titanium	7440-32-6	E440	839 mg/kg	101	70.0	130	----
	RM	Uranium	7440-61-1	E440	0.52 mg/kg	95.4	70.0	130	----
	RM	Vanadium	7440-62-2	E440	32.7 mg/kg	97.6	70.0	130	----
	RM	Zinc	7440-66-6	E440	297 mg/kg	98.1	70.0	130	----
	RM	Zirconium	7440-67-7	E440	5.73 mg/kg	101	70.0	130	----

Teck

Page 1 of 1

COC ID: RLPB PLTSPILL SO 20230727 | **TURNAROUND TIME:** | **RUSH:**

Environmental Division
Calgary
Work Order Reference
CG2310296

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	ALS Calgary			Report Format / Distribution		Excel	P
Project Manager	Tom Jeffery			Lab Contact	Lyudmyla Shvets			Email 1:	tom.jeffery@teck.com	x	x
Email	tom.jeffery@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:	teckcoal@equisonline.cor		
Address	Box 2003			Address	2559 29 Street NE			Email 3:	drake.tymstra@teck.com	x	x
	15km North Hwy 43							Email 4:	Kyra.lindenbach@teck.co	x	x
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5:	coleen.o'neill@teck.com	x	x
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada	PO number	VPO00877747		
Phone Number	250-425-8478			Phone Number	403 407 1794						

SAMPLE DETAILS / ANALYSIS REQUESTED

	Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Metals	LEPH_HEPH	Total Oil	BTEX & VPH (N, Methanol)
1	LC_RLPB_SO_July-2023_NP1	LC_RLPB	SO	No	7/27/2023	10:40	G	8	2	2	2	2
2	LC_RLPB_SO_July-2023_NP2	LC_RLPB	SO	No	7/27/2023	10:45	G	8	2	2	2	2
3	LC_RLPB_SO_July-2023_NP3	LC_RLPB	SO	No	7/27/2023	10:50	G	8	2	2	2	2
4	LC_RLPB_SO_July-2023_NP4	LC_RLPB	SO	No	7/27/2023	10:55	G	8	2	2	2	2
5	LC_RLPB_SO_July-2023_NP5	LC_RLPB	SO	No	7/27/2023	11:00	G	8	2	2	2	2
6	LC_RLPB_SO_July-2023_NP6	LC_RLPB	SO	No	7/27/2023	11:05	G	8	2	2	2	2
7	LC_PLTSPILL_SO_July-2023_NP	LC_PLTSPILL	SO	No	7/27/2023	11:30	G	8	2	2	2	2

Environmental Division
Calgary
Work Order Reference
CG2310296

Telephone : +1 403 407 1800

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Be sure to measure for: total benzene, total ethylbenzene, total toluene, total xylene	D.Tymstra/ K. Lindenbach	27-Jul-23		7/28 935

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	K. Lindenbach	Mobile #	
Priority (2-3 business days) - 50% surcharge		Sampler's Signature		Date/Time	July 27, 2023
Emergency (1 Business Day) - 100% surcharge					
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

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CERTIFICATE OF ANALYSIS

Work Order	: **CG2312417**	Page	: 1 of 6
Client	: **Teck Coal Limited**	Laboratory	: ALS Environmental - Calgary
Contact	: Tom Jeffery	Account Manager	: Justine Buma-a
Address	: PO Box 2003 Sparwood BC Canada V0B 2G0	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 08-Sep-2023 10:15
PO	: VPO00877747	Date Analysis Commenced	: 11-Sep-2023
C-O-C number	: PLTSPILL SO 20230907	Issue Date	: 15-Sep-2023 16:06
Sampler	: K. Lindenbach		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Cynthia Bauer	Organic Supervisor	Organics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Metals, Calgary, Alberta
Marsha Calero	Laboratory Assistant	Organics, Calgary, Alberta
Mervat Lamose	Lab Assistant	Inorganics, Calgary, Alberta
Ophelia Chiu	Department Manager - Organics	Organics, Burnaby, British Columbia
Sorina Motea	Laboratory Analyst	Organics, Calgary, Alberta
Zakieh Lalonde		Metals, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_PLTSPILL_SO_2023-09-07_NP	----	----	----	----
				Client sampling date / time	07-Sep-2023 11:30	----	----	----	----
					CG2312417-001	--------	--------	--------	--------
					Result	----	----	----	----
Physical Tests									
Moisture	----	E144/CG	0.25	%	27.0	----	----	----	----
pH (1:2 soil:water)	----	E108/CG	0.10	pH units	8.68	----	----	----	----
Metals									
Aluminum	7429-90-5	E440/CG	50	mg/kg	2250	----	----	----	----
Antimony	7440-36-0	E440/CG	0.10	mg/kg	0.84	----	----	----	----
Arsenic	7440-38-2	E440/CG	0.10	mg/kg	2.14	----	----	----	----
Barium	7440-39-3	E440/CG	0.50	mg/kg	227	----	----	----	----
Beryllium	7440-41-7	E440/CG	0.10	mg/kg	0.62	----	----	----	----
Bismuth	7440-69-9	E440/CG	0.20	mg/kg	0.45	----	----	----	----
Boron	7440-42-8	E440/CG	5.0	mg/kg	7.4	----	----	----	----
Cadmium	7440-43-9	E440/CG	0.020	mg/kg	0.718	----	----	----	----
Calcium	7440-70-2	E440/CG	50	mg/kg	28600	----	----	----	----
Chromium	7440-47-3	E440/CG	0.50	mg/kg	5.13	----	----	----	----
Cobalt	7440-48-4	E440/CG	0.10	mg/kg	2.52	----	----	----	----
Copper	7440-50-8	E440/CG	0.50	mg/kg	12.7	----	----	----	----
Iron	7439-89-6	E440/CG	50	mg/kg	26800	----	----	----	----
Lead	7439-92-1	E440/CG	0.50	mg/kg	5.43	----	----	----	----
Lithium	7439-93-2	E440/CG	2.0	mg/kg	2.0	----	----	----	----
Magnesium	7439-95-4	E440/CG	20	mg/kg	3810	----	----	----	----
Manganese	7439-96-5	E440/CG	1.0	mg/kg	237	----	----	----	----
Mercury	7439-97-6	E510/CG	0.0500	mg/kg	<0.0500	----	----	----	----
Molybdenum	7439-98-7	E440/CG	0.10	mg/kg	1.70	----	----	----	----
Nickel	7440-02-0	E440/CG	0.50	mg/kg	6.74	----	----	----	----
Phosphorus	7723-14-0	E440/CG	50	mg/kg	691	----	----	----	----
Potassium	7440-09-7	E440/CG	100	mg/kg	540	----	----	----	----
Selenium	7782-49-2	E440/CG	0.20	mg/kg	1.42	----	----	----	----
Silver	7440-22-4	E440/CG	0.10	mg/kg	0.11	----	----	----	----
Sodium	7440-23-5	E440/CG	50	mg/kg	82	----	----	----	----

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_PLTSPILL_SO_2023-09-07_NP	----	----	----	----
				Client sampling date / time	07-Sep-2023 11:30	----	----	----	----
					CG2312417-001	--------	--------	--------	--------
					Result	----	----	----	----
Metals									
Strontium	7440-24-6	E440/CG	0.50	mg/kg	122	----	----	----	----
Sulfur	7704-34-9	E440/CG	1000	mg/kg	<1000	----	----	----	----
Thallium	7440-28-0	E440/CG	0.050	mg/kg	0.068	----	----	----	----
Tin	7440-31-5	E440/CG	2.0	mg/kg	2.3	----	----	----	----
Titanium	7440-32-6	E440/CG	1.0	mg/kg	21.7	----	----	----	----
Tungsten	7440-33-7	E440/CG	0.50	mg/kg	<0.50	----	----	----	----
Uranium	7440-61-1	E440/CG	0.050	mg/kg	0.662	----	----	----	----
Vanadium	7440-62-2	E440/CG	0.20	mg/kg	23.1	----	----	----	----
Zinc	7440-66-6	E440/CG	2.0	mg/kg	66.2	----	----	----	----
Zirconium	7440-67-7	E440/CG	1.0	mg/kg	2.1	----	----	----	----
Aggregate Organics									
Waste oil content (BC HWR 41.1)	----	EC569SG/VA	0.10	%	<0.10	----	----	----	----
Waste oil content (BC HWR)	----	E569SG.A/VA	1000	mg/kg wwt	<1000	----	----	----	----
Volatile Organic Compounds [Fuels]									
Benzene	71-43-2	E611A/CG	0.0050	mg/kg	0.794	----	----	----	----
Ethylbenzene	100-41-4	E611A/CG	0.015	mg/kg	0.721	----	----	----	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A/CG	0.200	mg/kg	<0.200	----	----	----	----
Styrene	100-42-5	E611A/CG	0.050	mg/kg	<0.050	----	----	----	----
Toluene	108-88-3	E611A/CG	0.050	mg/kg	4.86	----	----	----	----
Xylene, m+p-	179601-23-1	E611A/CG	0.030	mg/kg	8.53	----	----	----	----
Xylene, o-	95-47-6	E611A/CG	0.030	mg/kg	2.10	----	----	----	----
Xylenes, total	1330-20-7	E611A/CG	0.050	mg/kg	10.6	----	----	----	----
Hydrocarbons									
EPH (C10-C19)	----	E601A/CG	200	mg/kg	360	----	----	----	----
EPH (C19-C32)	----	E601A/CG	200	mg/kg	350	----	----	----	----
VHs (C6-C10)	----	E581.VH+F1/CG	10	mg/kg	72	----	----	----	----
HEPHs	----	EC600A/CG	200	mg/kg	350	----	----	----	----
LEPHs	----	EC600A/CG	200	mg/kg	350	----	----	----	----

Analytical Results

Sub-Matrix: Soil

(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_PLTSPILL_SO_2023-09-07_NP	----	----	----	----
				Client sampling date / time	07-Sep-2023 11:30	----	----	----	----
					CG2312417-001	--------	--------	--------	--------
					Result	----	----	----	----
Hydrocarbons									
VPHs	----	EC580A/CG	10	mg/kg	55	----	----	----	----
Hydrocarbons Surrogates									
Bromobenzotrifluoride, 2- (EPH surrogate)	392-83-6	E601A/CG	1.0	%	66.9	----	----	----	----
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/CG	1.0	%	82.6	----	----	----	----
Volatile Organic Compounds Surrogates									
Bromofluorobenzene, 4-	460-00-4	E611A/CG	0.10	%	98.2	----	----	----	----
Difluorobenzene, 1,4-	540-36-3	E611A/CG	0.10	%	88.5	----	----	----	----
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	83-32-9	E641A-L/CG	0.0050	mg/kg	0.422	----	----	----	----
Acenaphthylene	208-96-8	E641A-L/CG	0.0050	mg/kg	0.124	----	----	----	----
Acridine	260-94-6	E641A-L/CG	0.010	mg/kg	0.651	----	----	----	----
Anthracene	120-12-7	E641A-L/CG	0.0040	mg/kg	0.0500	----	----	----	----
Benz(a)anthracene	56-55-3	E641A-L/CG	0.010	mg/kg	0.324	----	----	----	----
Benzo(a)pyrene	50-32-8	E641A-L/CG	0.010	mg/kg	0.163	----	----	----	----
Benzo(b+j)fluoranthene	n/a	E641A-L/CG	0.010	mg/kg	0.397	----	----	----	----
Benzo(b+j+k)fluoranthene	n/a	E641A-L/CG	0.015	mg/kg	0.424	----	----	----	----
Benzo(g,h,i)perylene	191-24-2	E641A-L/CG	0.010	mg/kg	0.193	----	----	----	----
Benzo(k)fluoranthene	207-08-9	E641A-L/CG	0.010	mg/kg	0.027	----	----	----	----
Chrysene	218-01-9	E641A-L/CG	0.010	mg/kg	1.07	----	----	----	----
Dibenz(a,h)anthracene	53-70-3	E641A-L/CG	0.0050	mg/kg	0.0844	----	----	----	----
Fluoranthene	206-44-0	E641A-L/CG	0.010	mg/kg	0.201	----	----	----	----
Fluorene	86-73-7	E641A-L/CG	0.010	mg/kg	0.997	----	----	----	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L/CG	0.010	mg/kg	0.068	----	----	----	----
Methylnaphthalene, 1-	90-12-0	E641A-L/CG	0.010	mg/kg	7.76	----	----	----	----
Methylnaphthalene, 2-	91-57-6	E641A-L/CG	0.010	mg/kg	10.6	----	----	----	----
Naphthalene	91-20-3	E641A-L/CG	0.010	mg/kg	2.72	----	----	----	----
Phenanthrene	85-01-8	E641A-L/CG	0.010	mg/kg	5.19	----	----	----	----
Pyrene	129-00-0	E641A-L/CG	0.010	mg/kg	0.350	----	----	----	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid)**

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_PLTSPILL_SO_2023-09-07_NP	----	----	----	----
				Client sampling date / time	07-Sep-2023 11:30	----	----	----	----
					CG2312417-001	--------	--------	--------	--------
					Result	----	----	----	----
Polycyclic Aromatic Hydrocarbons									
Quinoline	91-22-5	E641A-L/CG	0.010	mg/kg	0.017	----	----	----	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L/CG	0.020	mg/kg	0.342	----	----	----	----
IACR (CCME)	----	E641A-L/CG	0.150	-	5.00	----	----	----	----
Polycyclic Aromatic Hydrocarbons Surrogates									
Acridine-d9	34749-75-2	E641A-L/CG	0.1	%	67.3	----	----	----	----
Chrysene-d12	1719-03-5	E641A-L/CG	0.1	%	96.2	----	----	----	----
Naphthalene-d8	1146-65-2	E641A-L/CG	0.1	%	87.9	----	----	----	----
Phenanthrene-d10	1517-22-2	E641A-L/CG	0.1	%	82.3	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

right solutions. right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	:**CG2312417**	Page	: 1 of 8
Client	:**Teck Coal Limited**	Laboratory	: ALS Environmental - Calgary
Contact	:Tom Jeffery	Account Manager	: Justine Buma-a
Address	:PO Box 2003 Sparwood BC Canada V0B 2G0	Address	:2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:250-433-8467	Telephone	:+1 403 407 1800
Project	:LINE CREEK OPERATION	Date Samples Received	: 08-Sep-2023 10:15
PO	: VPO00877747	Issue Date	: 15-Sep-2023 16:07
C-O-C number	:PLTSPILL SO 20230907		
Sampler	:K. Lindenbach		
Site	:----		
Quote number	:Teck Coal Master Quote		
No. of samples received	:1		
No. of samples analysed	:1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_2023-09-07_NP	E569SG.A	07-Sep-2023	13-Sep-2023	28 days	6 days	✓	13-Sep-2023	40 days	0 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_2023-09-07_NP	E601A	07-Sep-2023	11-Sep-2023	14 days	4 days	✓	12-Sep-2023	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_PLTSPILL_SO_2023-09-07_NP	E581.VH+F1	07-Sep-2023	11-Sep-2023	40 days	4 days	✓	11-Sep-2023	40 days	4 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_2023-09-07_NP	E510	07-Sep-2023	14-Sep-2023	28 days	7 days	✓	14-Sep-2023	28 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_2023-09-07_NP	E440	07-Sep-2023	14-Sep-2023	180 days	7 days	✓	14-Sep-2023	180 days	7 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_2023-09-07_NP	E144	07-Sep-2023	----	----	----		11-Sep-2023	----	4 days	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_PLTSPILL_SO_2023-09-07_NP	E108	07-Sep-2023	12-Sep-2023	30 days	5 days	✓	12-Sep-2023	30 days	5 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap										
LC_PLTSPILL_SO_2023-09-07_NP	E641A-L	07-Sep-2023	11-Sep-2023	14 days	4 days	✓	11-Sep-2023	40 days	0 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial										
LC_PLTSPILL_SO_2023-09-07_NP	E611A	07-Sep-2023	11-Sep-2023	40 days	4 days	✓	11-Sep-2023	40 days	4 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BC PHCs - EPH by GC-FID	E601A	1127686	1	2	50.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1127693	1	7	14.2	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1133707	1	16	6.2	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1133708	1	11	9.0	5.0	✓
Moisture Content by Gravimetry	E144	1127690	1	14	7.1	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	1127685	1	11	9.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1130189	1	2	50.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1127694	1	2	50.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	1129958	1	9	11.1	5.0	✓
Laboratory Control Samples (LCS)							
BC PHCs - EPH by GC-FID	E601A	1127686	1	2	50.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1127693	1	7	14.2	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1133707	2	16	12.5	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1133708	2	11	18.1	10.0	✓
Moisture Content by Gravimetry	E144	1127690	1	14	7.1	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	1127685	1	11	9.0	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	1130189	2	2	100.0	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1127694	1	2	50.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	1129958	1	9	11.1	5.0	✓
Method Blanks (MB)							
BC PHCs - EPH by GC-FID	E601A	1127686	1	2	50.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1127693	1	7	14.2	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	1133707	1	16	6.2	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	1133708	1	11	9.0	5.0	✓
Moisture Content by Gravimetry	E144	1127690	1	14	7.1	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	1127685	1	11	9.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	1127694	1	2	50.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	1129958	1	9	11.1	5.0	✓
Matrix Spikes (MS)							
BC PHCs - EPH by GC-FID	E601A	1127686	1	2	50.0	5.0	✓
BTEX by Headspace GC-MS	E611A	1127693	1	7	14.2	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	1127685	1	11	9.0	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by “mod”).

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 ALS Environmental - Calgary	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 ALS Environmental - Calgary	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 ALS Environmental - Calgary	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 ALS Environmental - Calgary	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A ALS Environmental - Vancouver	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A silica gel treated petroleum ether sample extract is evaporated to dryness. The weight of the residue is determined gravimetrically. For classification of samples as waste oil under the HWR, Waste Oil Content is reported by weight on an as-received basis.
VH and F1 by Headspace GC-FID	E581.VH+F1 ALS Environmental - Calgary	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry’s law. Analytical methods for CCME Petroleum Hydrocarbons (PHCs) are validated to comply fully with the Reference Method for the Canada-Wide Standard for PHC. Test results are expressed on a dry weight basis. Unless qualified, all required quality control criteria of the CCME PHC method have been met, including response factor and linearity requirements.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
BC PHCs - EPH by GC-FID	E601A ALS Environmental - Calgary	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
BTEX by Headspace GC-MS	E611A ALS Environmental - Calgary	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L ALS Environmental - Calgary	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are extracted with hexane/acetone and analyzed by GC-MS. If reported, IACR (index of additive cancer risk, unitless) and B(a)P toxic potency equivalent (in soil concentration units) are calculated as per CCME PAH Soil Quality Guidelines fact sheet (2010) or ABT1.
Waste Oil Content (BC HWR 41.1) by Gravimetry	EC569SG ALS Environmental - Vancouver	Soil/Solid	unit conversion	Convert waste oil content from sample wet weight basis to dry weight basis by using moisture. For assessment of compliance of the Total Oil standard under section 41.1 of the HWR (Standards for Management of Hydrocarbon Contaminated Soils), Waste Oil Content is reported on a dry weight basis.
VPH: VH-BTEX-Styrene	EC580A ALS Environmental - Calgary	Soil/Solid	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VH-BTEX = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A ALS Environmental - Calgary	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 ALS Environmental - Calgary	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 ALS Environmental - Calgary	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Waste Oil Content (BC HWR) Extraction for Gravimetry	EP569SG ALS Environmental - Vancouver	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A subsample is dried by magnesium sulfate and extracted with petroleum ether in Soxhlet. The extract is dried with sodium sulfate and treated with silica gel.
VOCs Methanol Extraction for Headspace Analysis	EP581 ALS Environmental - Calgary	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 ALS Environmental - Calgary	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.

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QUALITY CONTROL REPORT

Work Order	: **CG2312417**	Page	: 1 of 14
Client	: Teck Coal Limited	Laboratory	: ALS Environmental - Calgary
Contact	: Tom Jeffery	Account Manager	: Justine Buma-a
Address	: PO Box 2003 Sparwood BC Canada V0B 2G0	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 08-Sep-2023 10:15
PO	: VPO00877747	Date Analysis Commenced	: 11-Sep-2023
C-O-C number	: PLTSPILL SO 20230907	Issue Date	: 15-Sep-2023 16:06
Sampler	: K. Lindenbach 250-433-8467		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Cynthia Bauer	Organic Supervisor	Calgary Organics, Calgary, Alberta
Harpreet Chawla	Team Leader - Inorganics	Calgary Metals, Calgary, Alberta
Marsha Calero	Laboratory Assistant	Calgary Organics, Calgary, Alberta
Mervat Lamose	Lab Assistant	Calgary Inorganics, Calgary, Alberta
Ophelia Chiu	Department Manager - Organics	Vancouver Organics, Burnaby, British Columbia
Sorina Motea	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Zakieh Lalonde		Calgary Metals, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1127690)											
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	Moisture	----	E144	0.25	%	27.0	27.7	2.45%	20%	----
Physical Tests (QC Lot: 1130189)											
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	pH (1:2 soil:water)	----	E108	0.10	pH units	8.68	8.66	0.231%	5%	----
Metals (QC Lot: 1133707)											
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	Mercury	7439-97-6	E510	0.0500	mg/kg	<0.0500	<0.0500	0	Diff <2x LOR	----
Metals (QC Lot: 1133708)											
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	Aluminum	7429-90-5	E440	50	mg/kg	2250	2250	0.0757%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	0.84	0.83	0.841%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	2.14	2.15	0.492%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	227	227	0.305%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.62	0.65	0.03	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	0.45	0.45	0.003	Diff <2x LOR	----
		Boron	7440-42-8	E440	5.0	mg/kg	7.4	7.7	0.4	Diff <2x LOR	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	0.718	0.682	5.08%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	28600	28200	1.39%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	5.13	4.97	3.14%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	2.52	2.50	0.438%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	12.7	12.6	0.551%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	26800	27100	1.08%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	5.43	5.39	0.698%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	2.0	2.1	0.1	Diff <2x LOR	----
		Magnesium	7439-95-4	E440	20	mg/kg	3810	3770	0.970%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	237	235	1.14%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	1.70	1.71	0.795%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	6.74	6.75	0.283%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	691	660	4.51%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	540	540	0.526%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	1.42	1.39	1.89%	30%	----

Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Metals (QC Lot: 1133708) - continued											
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	Silver	7440-22-4	E440	0.10	mg/kg	0.11	0.11	0.001	Diff <2x LOR	----
		Sodium	7440-23-5	E440	50	mg/kg	82	79	2	Diff <2x LOR	----
		Strontium	7440-24-6	E440	0.50	mg/kg	122	120	0.908%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	<1000	<1000	0	Diff <2x LOR	----
		Thallium	7440-28-0	E440	0.050	mg/kg	0.068	0.065	0.002	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	2.3	2.4	0.09	Diff <2x LOR	----
		Titanium	7440-32-6	E440	1.0	mg/kg	21.7	21.7	0.245%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	<0.50	<0.50	0	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	0.662	0.653	1.42%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	23.1	23.2	0.484%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	66.2	64.8	2.15%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	2.1	2.1	0.0002	Diff <2x LOR	----
Aggregate Organics (QC Lot: 1129958)											
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	Waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	<1000	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 1127693)											
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	Benzene	71-43-2	E611A	0.0050	mg/kg	0.794	0.786	1.02%	40%	----
		Ethylbenzene	100-41-4	E611A	0.015	mg/kg	0.721	0.702	2.77%	40%	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		Styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.050	mg/kg	4.86	4.78	1.50%	40%	----
		Xylene, m+p-	179601-23-1	E611A	0.030	mg/kg	8.53	8.33	2.45%	40%	----
		Xylene, o-	95-47-6	E611A	0.030	mg/kg	2.10	2.03	3.33%	40%	----
Hydrocarbons (QC Lot: 1127686)											
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	EPH (C10-C19)	----	E601A	200	mg/kg	360	340	10	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	350	340	10	Diff <2x LOR	----
Hydrocarbons (QC Lot: 1127694)											
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	72	65	11.4%	40%	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 1127685)											
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	Acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	0.422	0.442	4.58%	50%	----
		Acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	0.124	0.120	3.47%	50%	----
		Acridine	260-94-6	E641A-L	0.010	mg/kg	0.651	0.648	0.505%	50%	----

Sub-Matrix: **Soil/Solid**

Laboratory Duplicate (DUP) Report

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Polycyclic Aromatic Hydrocarbons (QC Lot: 1127685) - continued											
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	Anthracene	120-12-7	E641A-L	0.0040	mg/kg	0.0500	0.0353	34.6%	50%	----
		Benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	0.324	0.319	1.57%	50%	----
		Benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.163	0.159	2.44%	50%	----
		Benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	0.397	0.384	3.33%	50%	----
		Benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.193	0.192	0.287%	50%	----
		Benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	0.027	0.025	0.002	Diff <2x LOR	----
		Chrysene	218-01-9	E641A-L	0.010	mg/kg	1.07	0.996	6.88%	50%	----
		Dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.0844	0.0853	0.999%	50%	----
		Fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.201	0.193	4.04%	50%	----
		Fluorene	86-73-7	E641A-L	0.010	mg/kg	0.997	0.977	2.08%	50%	----
		Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.068	0.063	7.16%	50%	----
		Methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	7.76	7.26	6.74%	50%	----
		Methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	10.6	9.86	7.04%	50%	----
		Naphthalene	91-20-3	E641A-L	0.010	mg/kg	2.72	2.48	9.08%	50%	----
		Phenanthrene	85-01-8	E641A-L	0.010	mg/kg	5.19	5.06	2.56%	50%	----
		Pyrene	129-00-0	E641A-L	0.010	mg/kg	0.350	0.337	3.91%	50%	----
		Quinoline	91-22-5	E641A-L	0.010	mg/kg	0.017	0.015	0.002	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1127690)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 1133707)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 1133708)						
Aluminum	7429-90-5	E440	50	mg/kg	<50	----
Antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
Arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
Barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
Beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
Bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
Boron	7440-42-8	E440	5	mg/kg	<5.0	----
Cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
Calcium	7440-70-2	E440	50	mg/kg	<50	----
Chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
Cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
Copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
Iron	7439-89-6	E440	50	mg/kg	<50	----
Lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
Lithium	7439-93-2	E440	2	mg/kg	<2.0	----
Magnesium	7439-95-4	E440	20	mg/kg	<20	----
Manganese	7439-96-5	E440	1	mg/kg	<1.0	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
Nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440	50	mg/kg	<50	----
Potassium	7440-09-7	E440	100	mg/kg	<100	----
Selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
Silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E440	50	mg/kg	<50	----
Strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
Sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
Thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440	2	mg/kg	<2.0	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 1133708) - continued						
Titanium	7440-32-6	E440	1	mg/kg	<1.0	----
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
Uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440	2	mg/kg	<2.0	----
Zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Aggregate Organics (QCLot: 1129958)						
Waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	----
Volatile Organic Compounds (QCLot: 1127693)						
Benzene	71-43-2	E611A	0.005	mg/kg	<0.0050	----
Ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	<0.040	----
Styrene	100-42-5	E611A	0.05	mg/kg	<0.050	----
Toluene	108-88-3	E611A	0.05	mg/kg	<0.050	----
Xylene, m+p-	179601-23-1	E611A	0.03	mg/kg	<0.030	----
Xylene, o-	95-47-6	E611A	0.03	mg/kg	<0.030	----
Hydrocarbons (QCLot: 1127686)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
Hydrocarbons (QCLot: 1127694)						
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	----
Polycyclic Aromatic Hydrocarbons (QCLot: 1127685)						
Acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
Acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
Acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
Anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
Benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
Benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
Benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	<0.010	----
Benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
Benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
Chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
Dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
Fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
Fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 1127685) - continued						
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
Methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
Methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
Naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
Phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
Pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
Quinoline	91-22-5	E641A-L	0.01	mg/kg	<0.010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1127690)									
Moisture	----	E144	0.25	%	50 %	94.8	90.0	110	----
Physical Tests (QCLot: 1130189)									
pH (1:2 soil:water)	----	E108	----	pH units	7 pH units	101	97.0	103	----
Metals (QCLot: 1133707)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	90.9	80.0	120	----
Metals (QCLot: 1133708)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	106	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	107	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	105	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	97.4	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	101	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	99.9	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	100	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	101	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	100	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	96.8	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	105	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	100	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	109	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	104	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	102	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	100	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	100.0	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	114	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	107	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	101	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	96.5	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	106	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	108	80.0	120	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 1133708) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	101	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	101	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	98.5	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	93.2	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	97.1	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	102	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	101	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	104	80.0	120	----
Aggregate Organics (QCLot: 1129958)									
Waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	4250 mg/kg wwt	96.5	70.0	130	----
Volatile Organic Compounds (QCLot: 1127693)									
Benzene	71-43-2	E611A	0.005	mg/kg	2.5 mg/kg	92.7	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.015	mg/kg	2.5 mg/kg	93.1	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	2.5 mg/kg	100	70.0	130	----
Styrene	100-42-5	E611A	0.05	mg/kg	2.5 mg/kg	90.0	70.0	130	----
Toluene	108-88-3	E611A	0.05	mg/kg	2.5 mg/kg	84.4	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.03	mg/kg	5 mg/kg	89.6	70.0	130	----
Xylene, o-	95-47-6	E611A	0.03	mg/kg	2.5 mg/kg	92.5	70.0	130	----
Hydrocarbons (QCLot: 1127686)									
EPH (C10-C19)	----	E601A	200	mg/kg	1002.5 mg/kg	110	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	515.625 mg/kg	107	70.0	130	----
Hydrocarbons (QCLot: 1127694)									
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	75.8045 mg/kg	80.8	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 1127685)									
Acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	91.3	60.0	130	----
Acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	87.5	60.0	130	----
Acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	73.1	60.0	130	----
Anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	78.9	60.0	130	----
Benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	86.7	60.0	130	----
Benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	83.4	60.0	130	----
Benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	0.5 mg/kg	83.4	60.0	130	----
Benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	84.1	60.0	130	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 1127685) - continued									
Benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	88.7	60.0	130	----
Chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	84.5	60.0	130	----
Dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	82.4	60.0	130	----
Fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	88.7	60.0	130	----
Fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	81.7	60.0	130	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	93.4	60.0	130	----
Methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	88.5	60.0	130	----
Methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	91.7	60.0	130	----
Naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	93.0	50.0	130	----
Phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	80.4	60.0	130	----
Pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	87.8	60.0	130	----
Quinoline	91-22-5	E641A-L	0.01	mg/kg	0.5 mg/kg	82.3	60.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 1127693)										
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	Benzene	71-43-2	E611A	3.51 mg/kg	3.4375 mg/kg	84.0	60.0	140	----
		Ethylbenzene	100-41-4	E611A	3.88 mg/kg	3.4375 mg/kg	92.7	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	3.93 mg/kg	3.4375 mg/kg	93.9	60.0	140	----
		Styrene	100-42-5	E611A	3.81 mg/kg	3.4375 mg/kg	91.2	60.0	140	----
		Toluene	108-88-3	E611A	3.72 mg/kg	3.4375 mg/kg	88.8	60.0	140	----
		Xylene, m+p-	179601-23-1	E611A	6.55 mg/kg	6.875 mg/kg	78.4	60.0	140	----
		Xylene, o-	95-47-6	E611A	3.69 mg/kg	3.4375 mg/kg	88.3	60.0	140	----
Hydrocarbons (QCLot: 1127686)										
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	EPH (C10-C19)	----	E601A	850 mg/kg	1002.5 mg/kg	112	60.0	140	----
		EPH (C19-C32)	----	E601A	440 mg/kg	515.625 mg/kg	112	60.0	140	----
Polycyclic Aromatic Hydrocarbons (QCLot: 1127685)										
CG2312417-001	LC_PLTSPILL_SO_2023-09-07_NP	Acenaphthene	83-32-9	E641A-L	0.431 mg/kg	0.5 mg/kg	109	50.0	140	----
		Acenaphthylene	208-96-8	E641A-L	0.357 mg/kg	0.5 mg/kg	90.2	50.0	140	----
		Acridine	260-94-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Anthracene	120-12-7	E641A-L	0.389 mg/kg	0.5 mg/kg	98.3	50.0	140	----
		Benz(a)anthracene	56-55-3	E641A-L	0.388 mg/kg	0.5 mg/kg	98.0	50.0	140	----
		Benzo(a)pyrene	50-32-8	E641A-L	0.307 mg/kg	0.5 mg/kg	77.6	50.0	140	----
		Benzo(b+j)fluoranthene	n/a	E641A-L	0.325 mg/kg	0.5 mg/kg	82.0	50.0	140	----
		Benzo(g,h,i)perylene	191-24-2	E641A-L	0.229 mg/kg	0.5 mg/kg	57.9	50.0	140	----
		Benzo(k)fluoranthene	207-08-9	E641A-L	0.319 mg/kg	0.5 mg/kg	80.6	50.0	140	----
		Chrysene	218-01-9	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Dibenz(a,h)anthracene	53-70-3	E641A-L	0.264 mg/kg	0.5 mg/kg	66.8	50.0	140	----
		Fluoranthene	206-44-0	E641A-L	0.402 mg/kg	0.5 mg/kg	101	50.0	140	----
		Fluorene	86-73-7	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.276 mg/kg	0.5 mg/kg	69.6	50.0	140	----
		Methylnaphthalene, 1-	90-12-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Methylnaphthalene, 2-	91-57-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Naphthalene	91-20-3	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Phenanthrene	85-01-8	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Pyrene	129-00-0	E641A-L	0.374 mg/kg	0.5 mg/kg	94.4	50.0	140	----
		Quinoline	91-22-5	E641A-L	0.309 mg/kg	0.5 mg/kg	78.0	50.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
					RM Target	Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Concentration	RM	Low	High	Qualifier
Physical Tests (QCLot: 1130189)									
	RM	pH (1:2 soil:water)	----	E108	8.06 pH units	97.6	96.0	104	----
Metals (QCLot: 1133707)									
	RM	Mercury	7439-97-6	E510	0.062 mg/kg	87.2	70.0	130	----
Metals (QCLot: 1133708)									
	RM	Aluminum	7429-90-5	E440	9817 mg/kg	107	70.0	130	----
	RM	Antimony	7440-36-0	E440	3.99 mg/kg	99.6	70.0	130	----
	RM	Arsenic	7440-38-2	E440	3.73 mg/kg	104	70.0	130	----
	RM	Barium	7440-39-3	E440	105 mg/kg	112	70.0	130	----
	RM	Beryllium	7440-41-7	E440	0.349 mg/kg	106	70.0	130	----
	RM	Boron	7440-42-8	E440	8.5 mg/kg	122	40.0	160	----
	RM	Cadmium	7440-43-9	E440	0.91 mg/kg	105	70.0	130	----
	RM	Calcium	7440-70-2	E440	31082 mg/kg	94.8	70.0	130	----
	RM	Chromium	7440-47-3	E440	101 mg/kg	103	70.0	130	----
	RM	Cobalt	7440-48-4	E440	6.9 mg/kg	103	70.0	130	----
	RM	Copper	7440-50-8	E440	123 mg/kg	104	70.0	130	----
	RM	Iron	7439-89-6	E440	23558 mg/kg	103	70.0	130	----
	RM	Lead	7439-92-1	E440	267 mg/kg	100.0	70.0	130	----
	RM	Lithium	7439-93-2	E440	9.5 mg/kg	109	70.0	130	----
	RM	Magnesium	7439-95-4	E440	5509 mg/kg	106	70.0	130	----
	RM	Manganese	7439-96-5	E440	269 mg/kg	104	70.0	130	----
	RM	Molybdenum	7439-98-7	E440	1.03 mg/kg	100	70.0	130	----
	RM	Nickel	7440-02-0	E440	26.7 mg/kg	106	70.0	130	----
	RM	Phosphorus	7723-14-0	E440	752 mg/kg	114	70.0	130	----
	RM	Potassium	7440-09-7	E440	1587 mg/kg	106	70.0	130	----
	RM	Silver	7440-22-4	E440	4.06 mg/kg	103	70.0	130	----
	RM	Sodium	7440-23-5	E440	797 mg/kg	104	70.0	130	----
	RM	Strontium	7440-24-6	E440	86.1 mg/kg	105	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report				
					RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	High	Qualifier
Metals (QCLot: 1133708) - continued									
	RM	Thallium	7440-28-0	E440	0.0786 mg/kg	105	40.0	160	----
	RM	Tin	7440-31-5	E440	10.6 mg/kg	102	70.0	130	----
	RM	Titanium	7440-32-6	E440	839 mg/kg	96.6	70.0	130	----
	RM	Uranium	7440-61-1	E440	0.52 mg/kg	97.5	70.0	130	----
	RM	Vanadium	7440-62-2	E440	32.7 mg/kg	102	70.0	130	----
	RM	Zinc	7440-66-6	E440	297 mg/kg	107	70.0	130	----
	RM	Zirconium	7440-67-7	E440	5.73 mg/kg	103	70.0	130	----

Teck

COC ID:	PLTSPILL SO 20230907	TURNAROUND TIME:		RUSH:	

PROJECT/CLIENT INFO

Facility Name / Job#	Line Creek Operation
Project Manager	Tom Jeffery
Email	tom.jeffery@teck.com
Address	Box 2003
	15km North Hwy 43
City	Sparwood
Province	BC
Postal Code	V0B 2G0
Country	Canada
Phone Number	250-425-8478

LABORATORY

Lab Name	ALS Calgary
Lab Contact	Lyudmyla Shvets
Email	Lyudmyla.Shvets@ALSGlobal.com
Address	2559 29 Street NE
City	Calgary
Province	AB
Postal Code	T1Y 7B5
Country	Canada
Phone Number	403 407 1794

OTHER INFO

Report Format / Distribution		Excel	PDF	EDD
Email 1:	tom.jeffery@teck.com	x	x	
Email 2:	teckcoal@equisonline.cor			x
Email 3:	drake.tymstra@teck.com	x	x	
Email 4:	Kyra.lindenbach@teck.co	x	x	
Email 5:	coleen.o'neill@teck.com	x	x	
PO number	VPO00877747			

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Filtered – F: Field, L: Lab, FL: Field & Lab, N: None

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Metals	LEPH_HEPH	Total Oil	BTEX & VPH
FILTERED											N
PRESERVED											Methanol
LC_PLTSPILL_SO_2023-09-07_NP	LC_PLTSPILL	SO	No	9/7/2023	11:30	G	8	2	2	2	2

Environmental Division
Calgary
Work Order Reference
CG2312417
Telephone : + 1 403 407 1800

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Be sure to measure for: total benzene, total ethylbenzene, total toluene, total xylene	D.Tymstra/ K. Lindenbach	7-Sep-23		9/8 1055

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	K. Lindenbach	Mobile #	
Sampler's Signature		Date/Time	September 7, 2023

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ALS Canada Ltd.

right solutions. right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **CG2306508**	Page	: 1 of 6
Client	: **Teck Coal Limited**	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 19-May-2023 09:00
PO	: VPO00877747	Date Analysis Commenced	: 23-May-2023
C-O-C number	: RLPB SO 20230518	Issue Date	: 30-May-2023 12:51
Sampler	: K. Lindenbach		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Cynthia Bauer	Organic Supervisor	Organics, Calgary, Alberta
George Huang	Supervisor - Inorganic	Metals, Calgary, Alberta
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Joshua Stessun	Laboratory Analyst	Organics, Calgary, Alberta
Maqsood UlHassan	Laboratory Analyst	Organics, Calgary, Alberta
Rosalie Van Deelen	Laboratory Assistant	Organics, Calgary, Alberta
Sorina Motea	Laboratory Analyst	Organics, Calgary, Alberta
Vishnu Patel		Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
SLMI	*Surrogate recovery was outside ALS DQO (Low) due to Matrix Interference*

Analytical Results

Sub-Matrix: Soil

(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_RLPB_SO_May-2023_NP1	LC_RLPB_SO_May-2023_NP2	LC_RLPB_SO_May-2023_NP3	LC_RLPB_SO_May-2023_NP4	----
Client sampling date / time					18-May-2023 15:30	18-May-2023 15:30	18-May-2023 15:35	18-May-2023 15:35	----
					CG2306508-001	CG2306508-002	CG2306508-003	CG2306508-004	--------
					Result	Result	Result	Result	----
Physical Tests									
Moisture	----	E144/CG	0.25	%	18.5	42.3	43.3	42.8	----
pH (1:2 soil:water)	----	E108/CG	0.10	pH units	8.10	6.84	7.00	7.32	----
Metals									
Aluminum	7429-90-5	E440/CG	50	mg/kg	2090	2050	2160	2050	----
Antimony	7440-36-0	E440/CG	0.10	mg/kg	0.77	0.85	1.00	0.64	----
Arsenic	7440-38-2	E440/CG	0.10	mg/kg	1.92	2.06	2.64	1.77	----
Barium	7440-39-3	E440/CG	0.50	mg/kg	303	434	464	406	----
Beryllium	7440-41-7	E440/CG	0.10	mg/kg	0.41	0.55	0.46	0.50	----
Bismuth	7440-69-9	E440/CG	0.20	mg/kg	0.33	0.63	0.39	0.57	----
Boron	7440-42-8	E440/CG	5.0	mg/kg	7.3	9.3	11.2	9.1	----
Cadmium	7440-43-9	E440/CG	0.020	mg/kg	0.544	0.796	0.845	0.608	----
Calcium	7440-70-2	E440/CG	50	mg/kg	14500	3650	1860	1930	----
Chromium	7440-47-3	E440/CG	0.50	mg/kg	3.94	4.50	4.91	4.71	----
Cobalt	7440-48-4	E440/CG	0.10	mg/kg	2.27	2.70	2.52	2.90	----
Copper	7440-50-8	E440/CG	0.50	mg/kg	14.9	21.5	18.3	15.7	----
Iron	7439-89-6	E440/CG	50	mg/kg	7730	5030	8080	5560	----
Lead	7439-92-1	E440/CG	0.50	mg/kg	6.16	10.8	8.68	7.48	----
Lithium	7439-93-2	E440/CG	2.0	mg/kg	<2.0	2.0	<2.0	<2.0	----
Magnesium	7439-95-4	E440/CG	20	mg/kg	1900	399	276	301	----
Manganese	7439-96-5	E440/CG	1.0	mg/kg	96.4	58.5	57.1	57.8	----
Mercury	7439-97-6	E510/CG	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	----
Molybdenum	7439-98-7	E440/CG	0.10	mg/kg	2.12	3.41	3.26	2.76	----
Nickel	7440-02-0	E440/CG	0.50	mg/kg	7.54	10.4	10.0	10.9	----
Phosphorus	7723-14-0	E440/CG	50	mg/kg	460	409	538	414	----
Potassium	7440-09-7	E440/CG	100	mg/kg	560	600	660	530	----
Selenium	7782-49-2	E440/CG	0.20	mg/kg	1.84	3.49	3.27	2.10	----
Silver	7440-22-4	E440/CG	0.10	mg/kg	0.12	0.22	0.25	0.17	----
Sodium	7440-23-5	E440/CG	50	mg/kg	53	58	<50	<50	----
Strontium	7440-24-6	E440/CG	0.50	mg/kg	109	135	167	137	----

Analytical Results

Sub-Matrix: Soil
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_RLPB_SO_ May-2023_NP1	LC_RLPB_SO_ May-2023_NP2	LC_RLPB_SO_ May-2023_NP3	LC_RLPB_SO_ May-2023_NP4	----
				Client sampling date / time	18-May-2023 15:30	18-May-2023 15:30	18-May-2023 15:35	18-May-2023 15:35	----
					CG2306508-001	CG2306508-002	CG2306508-003	CG2306508-004	--------
					Result	Result	Result	Result	----
Metals									
Sulfur	7704-34-9	E440/CG	1000	mg/kg	<1000	<1000	1300	<1000	----
Thallium	7440-28-0	E440/CG	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
Tin	7440-31-5	E440/CG	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	----
Titanium	7440-32-6	E440/CG	1.0	mg/kg	20.4	28.0	31.0	26.7	----
Tungsten	7440-33-7	E440/CG	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	----
Uranium	7440-61-1	E440/CG	0.050	mg/kg	0.751	1.24	1.04	0.945	----
Vanadium	7440-62-2	E440/CG	0.20	mg/kg	19.0	23.4	28.8	26.2	----
Zinc	7440-66-6	E440/CG	2.0	mg/kg	36.9	45.1	50.4	42.3	----
Zirconium	7440-67-7	E440/CG	1.0	mg/kg	2.9	4.1	3.0	3.6	----
Aggregate Organics									
Waste oil content (BC HWR 41.1)	----	EC569SG/VA	0.10	%	<0.10	<0.10	<0.10	<0.10	----
Waste oil content (BC HWR)	----	E569SG.A/VA	1000	mg/kg wwt	<1000	<1000	<1000	<1000	----
Volatile Organic Compounds [Fuels]									
Benzene	71-43-2	E611A/CG	0.0050	mg/kg	1.98	0.985	0.211	0.990	----
Ethylbenzene	100-41-4	E611A/CG	0.015	mg/kg	1.10	0.914	0.472	0.998	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A/CG	0.200	mg/kg	<0.200	<0.200	<0.200	<0.200	----
Styrene	100-42-5	E611A/CG	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
Toluene	108-88-3	E611A/CG	0.050	mg/kg	10.0	5.77	1.30	5.71	----
Xylene, m+p-	179601-23-1	E611A/CG	0.030	mg/kg	14.3	9.52	3.90	9.98	----
Xylene, o-	95-47-6	E611A/CG	0.030	mg/kg	3.50	2.54	1.80	3.23	----
Xylenes, total	1330-20-7	E611A/CG	0.050	mg/kg	17.8	12.1	5.70	13.2	----
Hydrocarbons									
EPH (C10-C19)	----	E601A/CG	200	mg/kg	1060	1660	1460	1800	----
EPH (C19-C32)	----	E601A/CG	200	mg/kg	880	1330	1240	1360	----
VHs (C6-C10)	----	E581.VH+F1/ CG	10	mg/kg	95	116	74	122	----
HEPHs	----	EC600A/CG	200	mg/kg	880	1320	1240	1350	----
LEPHs	----	EC600A/CG	200	mg/kg	1030	1630	1440	1770	----
VPHs	----	EC580A/CG	10	mg/kg	64	96	66	101	----
Hydrocarbons Surrogates									

Analytical Results

Sub-Matrix: Soil
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_RLPB_SO_May-2023_NP1	LC_RLPB_SO_May-2023_NP2	LC_RLPB_SO_May-2023_NP3	LC_RLPB_SO_May-2023_NP4	----
Client sampling date / time					18-May-2023 15:30	18-May-2023 15:30	18-May-2023 15:35	18-May-2023 15:35	----
					CG2306508-001	CG2306508-002	CG2306508-003	CG2306508-004	--------
					Result	Result	Result	Result	----
Hydrocarbons Surrogates									
Bromobenzotrifluoride, 2- (EPH surrogate)	392-83-6	E601A/CG	1.0	%	102	106	102	103	----
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/CG	1.0	%	Not Determined SLMI	Not Determined SLMI	Not Determined SLMI	Not Determined SLMI	----
Volatile Organic Compounds Surrogates									
Bromofluorobenzene, 4-	460-00-4	E611A/CG	0.10	%	Not Determined SLMI	Not Determined SLMI	Not Determined SLMI	Not Determined SLMI	----
Difluorobenzene, 1,4-	540-36-3	E611A/CG	0.10	%	72.3	73.2	77.4	75.5	----
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	83-32-9	E641A-L/CG	0.0050	mg/kg	1.20	1.59	1.32	1.65	----
Acenaphthylene	208-96-8	E641A-L/CG	0.0050	mg/kg	0.331	0.437	0.465	0.520	----
Acridine	260-94-6	E641A-L/CG	0.010	mg/kg	2.32	3.12	2.59	3.65	----
Anthracene	120-12-7	E641A-L/CG	0.0040	mg/kg	0.380	0.542	0.579	0.675	----
Benz(a)anthracene	56-55-3	E641A-L/CG	0.010	mg/kg	0.937	1.30	1.25	1.32	----
Benzo(a)pyrene	50-32-8	E641A-L/CG	0.010	mg/kg	0.379	0.491	0.550	0.611	----
Benzo(b+j)fluoranthene	n/a	E641A-L/CG	0.010	mg/kg	1.06	1.44	1.25	1.58	----
Benzo(b+j+k)fluoranthene	n/a	E641A-L/CG	0.015	mg/kg	1.14	1.55	1.36	1.70	----
Benzo(g,h,i)perylene	191-24-2	E641A-L/CG	0.010	mg/kg	0.363	0.406	0.456	0.603	----
Benzo(k)fluoranthene	207-08-9	E641A-L/CG	0.010	mg/kg	0.084	0.113	0.109	0.124	----
Chrysene	218-01-9	E641A-L/CG	0.010	mg/kg	2.87	4.09	3.31	3.94	----
Dibenz(a,h)anthracene	53-70-3	E641A-L/CG	0.0050	mg/kg	0.202	0.264	0.240	0.310	----
Fluoranthene	206-44-0	E641A-L/CG	0.010	mg/kg	0.666	0.970	0.884	0.978	----
Fluorene	86-73-7	E641A-L/CG	0.010	mg/kg	3.16	4.56	3.80	5.50	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L/CG	0.010	mg/kg	0.117	0.162	0.144	0.188	----
Methylnaphthalene, 1-	90-12-0	E641A-L/CG	0.010	mg/kg	20.4	20.9	17.5	23.6	----
Methylnaphthalene, 2-	91-57-6	E641A-L/CG	0.010	mg/kg	32.9	30.1	21.7	35.4	----
Naphthalene	91-20-3	E641A-L/CG	0.010	mg/kg	11.9	10.0	5.52	11.6	----
Phenanthrene	85-01-8	E641A-L/CG	0.010	mg/kg	14.5	21.2	19.0	21.0	----
Pyrene	129-00-0	E641A-L/CG	0.010	mg/kg	1.07	1.58	1.43	1.49	----
Quinoline	91-22-5	E641A-L/CG	0.010	mg/kg	0.051	0.119	0.119	0.175	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L/CG	0.020	mg/kg	0.833	1.10	1.10	1.29	----

Analytical Results

Sub-Matrix: **Soil** (Matrix: **Soil/Solid**)				*Client sample ID*	**LC_RLPB_SO_ May-2023_NP1**	**LC_RLPB_SO_ May-2023_NP2**	**LC_RLPB_SO_ May-2023_NP3**	**LC_RLPB_SO_ May-2023_NP4**	----
				Client sampling date / time	18-May-2023 15:30	18-May-2023 15:30	18-May-2023 15:35	18-May-2023 15:35	----
Analyte	*CAS Number*	*Method/Lab*	*LOR*	*Unit*	**CG2306508-001**	**CG2306508-002**	**CG2306508-003**	**CG2306508-004**	**--------**
					Result	Result	Result	Result	----
Polycyclic Aromatic Hydrocarbons									
IACR (CCME)	----	E641A-L/CG	0.150	-	13.4	18.2	16.5	19.7	----
Polycyclic Aromatic Hydrocarbons Surrogates									
Acridine-d9	34749-75-2	E641A-L/CG	0.1	%	75.2	71.2	79.2	81.7	----
Chrysene-d12	1719-03-5	E641A-L/CG	0.1	%	78.3	73.8	84.3	85.5	----
Naphthalene-d8	1146-65-2	E641A-L/CG	0.1	%	90.7	80.8	96.3	93.5	----
Phenanthrene-d10	1517-22-2	E641A-L/CG	0.1	%	95.5	92.3	101	102	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

ALS Canada Ltd.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **CG2306508**	Page	: 1 of 10
Client	: **Teck Coal Limited**	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 19-May-2023 09:00
PO	: VPO00877747	Issue Date	: 30-May-2023 12:51
C-O-C number	: RLPB SO 20230518		
Sampler	: K. Lindenbach		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.

CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.

DQO: Data Quality Objective.

LOR: Limit of Reporting (detection limit).

RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis: Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E569SG.A	18-May-2023	29-May-2023	28 days	11 days	✓	29-May-2023	40 days	0 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E569SG.A	18-May-2023	29-May-2023	28 days	11 days	✓	29-May-2023	40 days	0 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E569SG.A	18-May-2023	29-May-2023	28 days	11 days	✓	29-May-2023	40 days	0 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E569SG.A	18-May-2023	29-May-2023	28 days	11 days	✓	29-May-2023	40 days	0 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E601A	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E601A	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E601A	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E601A	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP1	E581.VH+F1	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP2	E581.VH+F1	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP3	E581.VH+F1	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP4	E581.VH+F1	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E510	18-May-2023	24-May-2023	----	----		25-May-2023	28 days	7 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E510	18-May-2023	24-May-2023	----	----		25-May-2023	28 days	7 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E510	18-May-2023	24-May-2023	----	----		25-May-2023	28 days	7 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E510	18-May-2023	24-May-2023	----	----		25-May-2023	28 days	7 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E440	18-May-2023	24-May-2023	----	----		25-May-2023	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E440	18-May-2023	24-May-2023	----	----		25-May-2023	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E440	18-May-2023	24-May-2023	----	----		25-May-2023	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E440	18-May-2023	24-May-2023	----	----		25-May-2023	180 days	7 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E144	18-May-2023	----	----	----		23-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E144	18-May-2023	----	----	----		23-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E144	18-May-2023	----	----	----		23-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E144	18-May-2023	----	----	----		23-May-2023	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E108	18-May-2023	25-May-2023	----	----		25-May-2023	30 days	7 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E108	18-May-2023	25-May-2023	----	----		25-May-2023	30 days	7 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E108	18-May-2023	25-May-2023	----	----		25-May-2023	30 days	7 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E108	18-May-2023	25-May-2023	----	----		25-May-2023	30 days	7 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E641A-L	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E641A-L	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E641A-L	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E641A-L	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP1	E611A	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP2	E611A	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP3	E611A	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP4	E611A	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BC PHCs - EPH by GC-FID	E601A	950176	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	950298	1	10	10.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	952532	1	20	5.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	952533	1	20	5.0	5.0	✓
Moisture Content by Gravimetry	E144	950178	1	8	12.5	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	950177	1	6	16.6	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	954542	1	4	25.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	950299	1	4	25.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	959524	1	5	20.0	5.0	✓
Laboratory Control Samples (LCS)							
BC PHCs - EPH by GC-FID	E601A	950176	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	950298	1	10	10.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	952532	2	20	10.0	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	952533	2	20	10.0	10.0	✓
Moisture Content by Gravimetry	E144	950178	1	8	12.5	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	950177	1	6	16.6	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	954542	2	4	50.0	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	950299	1	4	25.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	959524	1	5	20.0	5.0	✓
Method Blanks (MB)							
BC PHCs - EPH by GC-FID	E601A	950176	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	950298	1	10	10.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	952532	1	20	5.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	952533	1	20	5.0	5.0	✓
Moisture Content by Gravimetry	E144	950178	1	8	12.5	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	950177	1	6	16.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	950299	1	4	25.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	959524	1	5	20.0	5.0	✓
Matrix Spikes (MS)							
BC PHCs - EPH by GC-FID	E601A	950176	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	950298	1	10	10.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	950177	1	6	16.6	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Calgary - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Calgary - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Calgary - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Calgary - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A silica gel treated petroleum ether sample extract is evaporated to dryness. The weight of the residue is determined gravimetrically. For classification of samples as waste oil under the HWR, Waste Oil Content is reported by weight on an as-received basis.
VH and F1 by Headspace GC-FID	E581.VH+F1 Calgary - Environmental	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHCs - EPH by GC-FID	E601A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
BTEX by Headspace GC-MS	E611A Calgary - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Calgary - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are extracted with hexane/acetone and analyzed by GC-MS. If reported, IACR (index of additive cancer risk, unitless) and B(a)P toxic potency equivalent (in soil concentration units) are calculated as per CCME PAH Soil Quality Guidelines fact sheet (2010) or ABT1.
Waste Oil Content (BC HWR 41.1) by Gravimetry	EC569SG Vancouver - Environmental	Soil/Solid	unit conversion	Convert waste oil content from sample wet weight basis to dry weight basis by using moisture. For assessment of compliance of the Total Oil standard under section 41.1 of the HWR (Standards for Management of Hydrocarbon Contaminated Soils), Waste Oil Content is reported on a dry weight basis.
VPH: VH-BTEX-Styrene	EC580A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VH-BTEX = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Calgary - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Calgary - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Waste Oil Content (BC HWR) Extraction for Gravimetry	EP569SG Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A subsample is dried by magnesium sulfate and extracted with petroleum ether in Soxhlet. The extract is dried with sodium sulfate and treated with silica gel.
VOCs Methanol Extraction for Headspace Analysis	EP581 Calgary - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Calgary - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **CG2306508**	Page	: 1 of 14
Client	: Teck Coal Limited	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 19-May-2023 09:00
PO	: VPO00877747	Date Analysis Commenced	: 23-May-2023
C-O-C number	: RLPB SO 20230518	Issue Date	: 30-May-2023 12:51
Sampler	: K. Lindenbach 250-433-8467		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Cynthia Bauer	Organic Supervisor	Calgary Organics, Calgary, Alberta
George Huang	Supervisor - Inorganic	Calgary Metals, Calgary, Alberta
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Joshua Stessun	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Maqsood UlHassan	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Rosalie Van Deelen	Laboratory Assistant	Calgary Organics, Calgary, Alberta
Sorina Motea	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Vishnu Patel		Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 950178)											
CG2306581-001	Anonymous	Moisture	----	E144	0.25	%	7.08	7.14	0.935%	20%	----
Physical Tests (QC Lot: 954542)											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	pH (1:2 soil:water)	----	E108	0.10	pH units	8.10	8.12	0.247%	5%	----
Metals (QC Lot: 952532)											
CG2306406-005	Anonymous	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0079	0.0085	0.0006	Diff <2x LOR	----
Metals (QC Lot: 952533)											
CG2306406-005	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	18900	17100	9.94%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	41.1	36.0	13.2%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	2.19	1.95	11.4%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	462	493	6.52%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.21	0.23	0.02	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	31.6	31.7	0.323%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	284	275	3.30%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	3.18	3.72	15.8%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	99900	97900	1.96%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	39.1	38.7	1.05%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	23.3	28.8	21.4%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	1960	1670	16.0%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	6060	5900	2.69%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	94.3	83.5	12.1%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	25.5	22.6	12.0%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	14700	15000	2.28%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	467	484	3.57%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	3.53	3.67	3.84%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	186	182	2.59%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	13600	13000	5.29%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	82300	86700	5.13%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.36	0.04	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	3.18	3.07	3.51%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	18100	17700	2.16%	40%	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Metals (QC Lot: 952533) - continued											
CG2306406-005	Anonymous	Strontium	7440-24-6	E440	0.50	mg/kg	292	306	4.71%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	8400	9000	8.02%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	19.8	20.2	1.96%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	260	272	4.15%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	0.71	0.69	0.01	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	0.841	0.852	1.23%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	13.0	13.2	1.50%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	1750	1880	7.55%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 959524)											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	Waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	<1000	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 950298)											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	Benzene	71-43-2	E611A	0.0050	mg/kg	1.98	2.01	1.23%	40%	----
		Ethylbenzene	100-41-4	E611A	0.015	mg/kg	1.10	1.14	4.09%	40%	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		Styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.050	mg/kg	10.0	8.73	14.2%	40%	----
		Xylene, m+p-	179601-23-1	E611A	0.030	mg/kg	14.3	14.7	2.54%	40%	----
		Xylene, o-	95-47-6	E611A	0.030	mg/kg	3.50	4.09	15.6%	40%	----
Hydrocarbons (QC Lot: 950176)											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	EPH (C10-C19)	----	E601A	200	mg/kg	1060	920	130	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	880	800	80	Diff <2x LOR	----
Hydrocarbons (QC Lot: 950299)											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	95	94	1.32%	40%	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 950177)											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	Acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	1.20	1.05	13.2%	50%	----
		Acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	0.331	0.289	13.3%	50%	----
		Acridine	260-94-6	E641A-L	0.010	mg/kg	2.32	2.06	12.0%	50%	----
		Anthracene	120-12-7	E641A-L	0.0040	mg/kg	0.380	0.336	12.2%	50%	----
		Benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	0.937	0.870	7.33%	50%	----
		Benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.379	0.372	1.80%	50%	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
					Laboratory Duplicate (DUP) Report						
Polycyclic Aromatic Hydrocarbons (QC Lot: 950177) - continued											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	Benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	1.06	1.04	2.76%	50%	----
		Benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.363	0.347	4.46%	50%	----
		Benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	0.084	0.074	12.1%	50%	----
		Chrysene	218-01-9	E641A-L	0.010	mg/kg	2.87	2.67	7.30%	50%	----
		Dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.202	0.189	6.57%	50%	----
		Fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.666	0.606	9.44%	50%	----
		Fluorene	86-73-7	E641A-L	0.010	mg/kg	3.16	2.77	13.2%	50%	----
		Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.117	0.112	3.80%	50%	----
		Methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	20.4	18.3	11.1%	50%	----
		Methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	32.9	29.2	11.7%	50%	----
		Naphthalene	91-20-3	E641A-L	0.010	mg/kg	11.9	10.7	10.9%	50%	----
		Phenanthrene	85-01-8	E641A-L	0.010	mg/kg	14.5	12.9	11.5%	50%	----
		Pyrene	129-00-0	E641A-L	0.010	mg/kg	1.07	0.976	9.39%	50%	----
		Quinoline	91-22-5	E641A-L	0.010	mg/kg	0.051	0.046	10.1%	50%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 950178)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 952532)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 952533)						
Aluminum	7429-90-5	E440	50	mg/kg	<50	----
Antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
Arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
Barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
Beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
Bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
Boron	7440-42-8	E440	5	mg/kg	<5.0	----
Cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
Calcium	7440-70-2	E440	50	mg/kg	<50	----
Chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
Cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
Copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
Iron	7439-89-6	E440	50	mg/kg	<50	----
Lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
Lithium	7439-93-2	E440	2	mg/kg	<2.0	----
Magnesium	7439-95-4	E440	20	mg/kg	<20	----
Manganese	7439-96-5	E440	1	mg/kg	<1.0	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
Nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440	50	mg/kg	<50	----
Potassium	7440-09-7	E440	100	mg/kg	<100	----
Selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
Silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E440	50	mg/kg	<50	----
Strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
Sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
Thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440	2	mg/kg	<2.0	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 952533) - continued						
Titanium	7440-32-6	E440	1	mg/kg	<1.0	----
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
Uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440	2	mg/kg	<2.0	----
Zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Aggregate Organics (QCLot: 959524)						
Waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	----
Volatile Organic Compounds (QCLot: 950298)						
Benzene	71-43-2	E611A	0.005	mg/kg	<0.0050	----
Ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	<0.040	----
Styrene	100-42-5	E611A	0.05	mg/kg	<0.050	----
Toluene	108-88-3	E611A	0.05	mg/kg	<0.050	----
Xylene, m+p-	179601-23-1	E611A	0.03	mg/kg	<0.030	----
Xylene, o-	95-47-6	E611A	0.03	mg/kg	<0.030	----
Hydrocarbons (QCLot: 950176)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
Hydrocarbons (QCLot: 950299)						
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	----
Polycyclic Aromatic Hydrocarbons (QCLot: 950177)						
Acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
Acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
Acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
Anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
Benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
Benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
Benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	<0.010	----
Benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
Benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
Chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
Dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
Fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
Fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 950177) - continued						
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
Methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
Methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
Naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
Phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
Pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
Quinoline	91-22-5	E641A-L	0.01	mg/kg	<0.010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 950178)									
Moisture	----	E144	0.25	%	50 %	96.4	90.0	110	----
Physical Tests (QCLot: 954542)									
pH (1:2 soil:water)	----	E108	----	pH units	7 pH units	100	97.0	103	----
Metals (QCLot: 952532)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	102	80.0	120	----
Metals (QCLot: 952533)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	89.5	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	118	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	83.7	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	96.3	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	81.0	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	96.3	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.0	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	94.4	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	94.7	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	95.1	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	96.9	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	98.4	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	104	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	90.9	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	94.1	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	97.9	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	95.1	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	87.6	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	105	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	95.5	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.3	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	87.0	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	86.9	80.0	120	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 952533) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	95.6	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	98.9	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	90.8	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	98.0	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	95.8	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	97.5	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	92.5	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	101	80.0	120	----
Aggregate Organics (QCLot: 959524)									
Waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	4250 mg/kg wwt	97.6	70.0	130	----
Volatile Organic Compounds (QCLot: 950298)									
Benzene	71-43-2	E611A	0.005	mg/kg	2.5 mg/kg	98.0	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.015	mg/kg	2.5 mg/kg	89.2	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	2.5 mg/kg	104	70.0	130	----
Styrene	100-42-5	E611A	0.05	mg/kg	2.5 mg/kg	85.2	70.0	130	----
Toluene	108-88-3	E611A	0.05	mg/kg	2.5 mg/kg	85.1	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.03	mg/kg	5 mg/kg	100.0	70.0	130	----
Xylene, o-	95-47-6	E611A	0.03	mg/kg	2.5 mg/kg	95.5	70.0	130	----
Hydrocarbons (QCLot: 950176)									
EPH (C10-C19)	----	E601A	200	mg/kg	1002.5 mg/kg	120	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	515.625 mg/kg	119	70.0	130	----
Hydrocarbons (QCLot: 950299)									
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	3.438 mg/kg	94.9	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 950177)									
Acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	107	60.0	130	----
Acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	93.4	60.0	130	----
Acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	91.9	60.0	130	----
Anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	99.6	60.0	130	----
Benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	91.4	60.0	130	----
Benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	80.2	60.0	130	----
Benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	0.5 mg/kg	89.4	60.0	130	----
Benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	90.4	60.0	130	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 950177) - continued									
Benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	90.4	60.0	130	----
Chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	96.4	60.0	130	----
Dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	91.6	60.0	130	----
Fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----
Fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	96.1	60.0	130	----
Methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----
Methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	111	60.0	130	----
Naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	116	50.0	130	----
Phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	110	60.0	130	----
Pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	100	60.0	130	----
Quinoline	91-22-5	E641A-L	0.01	mg/kg	0.5 mg/kg	97.9	60.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 950298)										
CG2306508-001	LC_RLPB_SO_May-2023_NP1	Benzene	71-43-2	E611A	2.86 mg/kg	3.4375 mg/kg	92.8	60.0	140	----
		Ethylbenzene	100-41-4	E611A	3.16 mg/kg	3.4375 mg/kg	103	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	2.82 mg/kg	3.4375 mg/kg	91.6	60.0	140	----
		Styrene	100-42-5	E611A	2.41 mg/kg	3.4375 mg/kg	78.2	60.0	140	----
		Toluene	108-88-3	E611A	ND mg/kg	3.4375 mg/kg	ND	60.0	140	----
		Xylene, m+p-	179601-23-1	E611A	ND mg/kg	6.875 mg/kg	ND	60.0	140	----
		Xylene, o-	95-47-6	E611A	3.76 mg/kg	3.4375 mg/kg	122	60.0	140	----
Hydrocarbons (QCLot: 950176)										
CG2306508-001	LC_RLPB_SO_May-2023_NP1	EPH (C10-C19)	----	E601A	ND mg/kg	1002.5 mg/kg	ND	60.0	140	----
		EPH (C19-C32)	----	E601A	ND mg/kg	515.625 mg/kg	ND	60.0	140	----
Polycyclic Aromatic Hydrocarbons (QCLot: 950177)										
CG2306508-001	LC_RLPB_SO_May-2023_NP1	Acenaphthene	83-32-9	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Acenaphthylene	208-96-8	E641A-L	0.340 mg/kg	0.5 mg/kg	90.6	50.0	140	----
		Acridine	260-94-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Anthracene	120-12-7	E641A-L	0.445 mg/kg	0.5 mg/kg	118	50.0	140	----
		Benz(a)anthracene	56-55-3	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Benzo(a)pyrene	50-32-8	E641A-L	0.267 mg/kg	0.5 mg/kg	71.1	50.0	140	----
		Benzo(b+j)fluoranthene	n/a	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Benzo(g,h,i)perylene	191-24-2	E641A-L	0.460 mg/kg	0.5 mg/kg	122	50.0	140	----
		Benzo(k)fluoranthene	207-08-9	E641A-L	0.280 mg/kg	0.5 mg/kg	74.6	50.0	140	----
		Chrysene	218-01-9	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Dibenz(a,h)anthracene	53-70-3	E641A-L	0.234 mg/kg	0.5 mg/kg	62.2	50.0	140	----
		Fluoranthene	206-44-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Fluorene	86-73-7	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.456 mg/kg	0.5 mg/kg	121	50.0	140	----
		Methylnaphthalene, 1-	90-12-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Methylnaphthalene, 2-	91-57-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Naphthalene	91-20-3	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Phenanthrene	85-01-8	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Pyrene	129-00-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Quinoline	91-22-5	E641A-L	0.312 mg/kg	0.5 mg/kg	83.0	50.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	High	Qualifier
Physical Tests (QCLot: 954542)									
	RM	pH (1:2 soil:water)	----	E108	8.06 pH units	99.4	96.0	104	----
Metals (QCLot: 952532)									
	RM	Mercury	7439-97-6	E510	0.062 mg/kg	98.9	70.0	130	----
Metals (QCLot: 952533)									
	RM	Aluminum	7429-90-5	E440	9817 mg/kg	94.5	70.0	130	----
	RM	Antimony	7440-36-0	E440	3.99 mg/kg	102	70.0	130	----
	RM	Arsenic	7440-38-2	E440	3.73 mg/kg	108	70.0	130	----
	RM	Barium	7440-39-3	E440	105 mg/kg	122	70.0	130	----
	RM	Beryllium	7440-41-7	E440	0.349 mg/kg	90.9	70.0	130	----
	RM	Boron	7440-42-8	E440	8.5 mg/kg	93.7	40.0	160	----
	RM	Cadmium	7440-43-9	E440	0.91 mg/kg	93.6	70.0	130	----
	RM	Calcium	7440-70-2	E440	31082 mg/kg	101	70.0	130	----
	RM	Chromium	7440-47-3	E440	101 mg/kg	99.0	70.0	130	----
	RM	Cobalt	7440-48-4	E440	6.9 mg/kg	96.1	70.0	130	----
	RM	Copper	7440-50-8	E440	123 mg/kg	97.2	70.0	130	----
	RM	Iron	7439-89-6	E440	23558 mg/kg	96.0	70.0	130	----
	RM	Lead	7439-92-1	E440	267 mg/kg	99.6	70.0	130	----
	RM	Lithium	7439-93-2	E440	9.5 mg/kg	99.0	70.0	130	----
	RM	Magnesium	7439-95-4	E440	5509 mg/kg	91.4	70.0	130	----
	RM	Manganese	7439-96-5	E440	269 mg/kg	95.8	70.0	130	----
	RM	Molybdenum	7439-98-7	E440	1.03 mg/kg	117	70.0	130	----
	RM	Nickel	7440-02-0	E440	26.7 mg/kg	99.1	70.0	130	----
	RM	Phosphorus	7723-14-0	E440	752 mg/kg	76.3	70.0	130	----
	RM	Potassium	7440-09-7	E440	1587 mg/kg	106	70.0	130	----
	RM	Silver	7440-22-4	E440	4.06 mg/kg	82.3	70.0	130	----
	RM	Sodium	7440-23-5	E440	797 mg/kg	84.8	70.0	130	----
	RM	Strontium	7440-24-6	E440	86.1 mg/kg	104	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	Reference Material (RM) Report: RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 952533) - continued									
	RM	Thallium	7440-28-0	E440	0.0786 mg/kg	122	40.0	160	----
	RM	Tin	7440-31-5	E440	10.6 mg/kg	92.2	70.0	130	----
	RM	Titanium	7440-32-6	E440	839 mg/kg	99.6	70.0	130	----
	RM	Uranium	7440-61-1	E440	0.52 mg/kg	109	70.0	130	----
	RM	Vanadium	7440-62-2	E440	32.7 mg/kg	97.7	70.0	130	----
	RM	Zinc	7440-66-6	E440	297 mg/kg	90.7	70.0	130	----
	RM	Zirconium	7440-67-7	E440	5.73 mg/kg	105	70.0	130	----

Teck

Page 1 of 1

COC ID:	RLPB SO 20230518	TURNAROUND TIME:		RUSH:

PROJECT/CLIENT INFO

Facility Name / Job#	Line Creek Operation
Project Manager	Tom Jeffery
Email	tom.jeffery@teck.com
Address	Box 2003
	15km North Hwy 43
City	Sparwood
Province	BC
Postal Code	V0B 2G0
Country	Canada
Phone Number	250-425-8478

LABORATORY

Lab Name	ALS Calgary
Lab Contact	Lyudmyla Shvets
Email	Lyudmyla.Shvets@ALSGlobal.com
Address	2559 29 Street NE
City	Calgary
Province	AB
Postal Code	T1Y 7B5
Country	Canada
Phone Number	403 407 1794

OTHER INFO

Report Format / Distribution		Excel	PDF
Email 1:	tom.jeffery@teck.com	x	x
Email 2:	teckcoal@equisonline.cor		
Email 3:	drake.tymstra@teck.com	x	x
Email 4:	Kyra.lindenbach@teck.co	x	x
Email 5:	coleen.o'neill@teck.com	x	x
PO number	VPO00877747		

Environmental Division
Calgary
Work Order Reference
CG2306508

SAMPLE DETAILS / **ANALYSIS REQUESTED**

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Metals	LEPH_HEPH	Total Oil	BTEX & VPH (N, Methanol)
LC_RLPB_SO_May-2023_NP1	LC_RLPB	SO	No	5/18/2023	15:30	G	8	2	2	2	2
LC_RLPB_SO_May-2023_NP2	LC_RLPB	SO	No	5/18/2023	15:30	G	8	2	2	2	2
LC_RLPB_SO_May-2023_NP3	LC_RLPB	SO	No	5/18/2023	15:35	G	8	2	2	2	2
LC_RLPB_SO_May-2023_NP4	LC_RLPB	SO	No	5/18/2023	15:35	G	8	2	2	2	2

Environmental Division
Calgary
Work Order Reference
CG2306508

Telephone : +1 403 407 1800

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS

Be sure to measure for: total benzene, total ethylbenzene, total toluene, total xylene

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
D.Tymstra/ K. Lindenbach	18-May-23		5/19 900

SERVICE REQUEST (rush - subject to availability)

Regular (default)	X
Priority (2-3 business days) - 50% surcharge	
Emergency (1 Business Day) - 100% surcharge	
For Emergency <1 Day, ASAP or Weekend - Contact ALS	

Sampler's Name	K. Lindenbach	Mobile #	
Sampler's Signature		Date/Time	May 18, 2023

12°

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS

Work Order	: **CG2306508**	Page	: 1 of 6
Client	: **Teck Coal Limited**	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary AB Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 19-May-2023 09:00
PO	: VPO00877747	Date Analysis Commenced	: 23-May-2023
C-O-C number	: RLPB SO 20230518	Issue Date	: 30-May-2023 12:51
Sampler	: K. Lindenbach		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Surrogate Control Limits

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Cynthia Bauer	Organic Supervisor	Organics, Calgary, Alberta
George Huang	Supervisor - Inorganic	Metals, Calgary, Alberta
Janice Leung	Supervisor - Organics Instrumentation	Organics, Burnaby, British Columbia
Joshua Stessun	Laboratory Analyst	Organics, Calgary, Alberta
Maqsood UlHassan	Laboratory Analyst	Organics, Calgary, Alberta
Rosalie Van Deelen	Laboratory Assistant	Organics, Calgary, Alberta
Sorina Motea	Laboratory Analyst	Organics, Calgary, Alberta
Vishnu Patel		Inorganics, Calgary, Alberta

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.

Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Please refer to Quality Control Interpretive report (QCI) for information regarding Holding Time compliance.

Key : CAS Number: Chemical Abstracts Services number is a unique identifier assigned to discrete substances
LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
mg/kg	milligrams per kilogram
mg/kg wwt	milligrams per kilogram wet weight
pH units	pH units

<: less than.

>: greater than.

Surrogate: An analyte that is similar in behavior to target analyte(s), but that does not occur naturally in environmental samples. For applicable tests, surrogates are added to samples prior to analysis as a check on recovery.

Test results reported relate only to the samples as received by the laboratory.

UNLESS OTHERWISE STATED on SRN or QCI Report, ALL SAMPLES WERE RECEIVED IN ACCEPTABLE CONDITION.

Qualifiers

Qualifier	*Description*
SLMI	*Surrogate recovery was outside ALS DQO (Low) due to Matrix Interference*

Analytical Results

Sub-Matrix: Soil
(Matrix: Soil/Solid)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_RLPB_SO_May-2023_NP1	LC_RLPB_SO_May-2023_NP2	LC_RLPB_SO_May-2023_NP3	LC_RLPB_SO_May-2023_NP4	----
Client sampling date / time					18-May-2023 15:30	18-May-2023 15:30	18-May-2023 15:35	18-May-2023 15:35	----
					CG2306508-001	CG2306508-002	CG2306508-003	CG2306508-004	--------
					Result	Result	Result	Result	----
Physical Tests									
Moisture	----	E144/CG	0.25	%	18.5	42.3	43.3	42.8	----
pH (1:2 soil:water)	----	E108/CG	0.10	pH units	8.10	6.84	7.00	7.32	----
Metals									
Aluminum	7429-90-5	E440/CG	50	mg/kg	2090	2050	2160	2050	----
Antimony	7440-36-0	E440/CG	0.10	mg/kg	0.77	0.85	1.00	0.64	----
Arsenic	7440-38-2	E440/CG	0.10	mg/kg	1.92	2.06	2.64	1.77	----
Barium	7440-39-3	E440/CG	0.50	mg/kg	303	434	464	406	----
Beryllium	7440-41-7	E440/CG	0.10	mg/kg	0.41	0.55	0.46	0.50	----
Bismuth	7440-69-9	E440/CG	0.20	mg/kg	0.33	0.63	0.39	0.57	----
Boron	7440-42-8	E440/CG	5.0	mg/kg	7.3	9.3	11.2	9.1	----
Cadmium	7440-43-9	E440/CG	0.020	mg/kg	0.544	0.796	0.845	0.608	----
Calcium	7440-70-2	E440/CG	50	mg/kg	14500	3650	1860	1930	----
Chromium	7440-47-3	E440/CG	0.50	mg/kg	3.94	4.50	4.91	4.71	----
Cobalt	7440-48-4	E440/CG	0.10	mg/kg	2.27	2.70	2.52	2.90	----
Copper	7440-50-8	E440/CG	0.50	mg/kg	14.9	21.5	18.3	15.7	----
Iron	7439-89-6	E440/CG	50	mg/kg	7730	5030	8080	5560	----
Lead	7439-92-1	E440/CG	0.50	mg/kg	6.16	10.8	8.68	7.48	----
Lithium	7439-93-2	E440/CG	2.0	mg/kg	<2.0	2.0	<2.0	<2.0	----
Magnesium	7439-95-4	E440/CG	20	mg/kg	1900	399	276	301	----
Manganese	7439-96-5	E440/CG	1.0	mg/kg	96.4	58.5	57.1	57.8	----
Mercury	7439-97-6	E510/CG	0.0500	mg/kg	<0.0500	<0.0500	<0.0500	<0.0500	----
Molybdenum	7439-98-7	E440/CG	0.10	mg/kg	2.12	3.41	3.26	2.76	----
Nickel	7440-02-0	E440/CG	0.50	mg/kg	7.54	10.4	10.0	10.9	----
Phosphorus	7723-14-0	E440/CG	50	mg/kg	460	409	538	414	----
Potassium	7440-09-7	E440/CG	100	mg/kg	560	600	660	530	----
Selenium	7782-49-2	E440/CG	0.20	mg/kg	1.84	3.49	3.27	2.10	----
Silver	7440-22-4	E440/CG	0.10	mg/kg	0.12	0.22	0.25	0.17	----
Sodium	7440-23-5	E440/CG	50	mg/kg	53	58	<50	<50	----
Strontium	7440-24-6	E440/CG	0.50	mg/kg	109	135	167	137	----

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_RLPB_SO_May-2023_NP1	LC_RLPB_SO_May-2023_NP2	LC_RLPB_SO_May-2023_NP3	LC_RLPB_SO_May-2023_NP4	----
				Client sampling date / time	18-May-2023 15:30	18-May-2023 15:30	18-May-2023 15:35	18-May-2023 15:35	----
					CG2306508-001	CG2306508-002	CG2306508-003	CG2306508-004	--------
					Result	Result	Result	Result	----
Metals									
Sulfur	7704-34-9	E440/CG	1000	mg/kg	<1000	<1000	1300	<1000	----
Thallium	7440-28-0	E440/CG	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
Tin	7440-31-5	E440/CG	2.0	mg/kg	<2.0	<2.0	<2.0	<2.0	----
Titanium	7440-32-6	E440/CG	1.0	mg/kg	20.4	28.0	31.0	26.7	----
Tungsten	7440-33-7	E440/CG	0.50	mg/kg	<0.50	<0.50	<0.50	<0.50	----
Uranium	7440-61-1	E440/CG	0.050	mg/kg	0.751	1.24	1.04	0.945	----
Vanadium	7440-62-2	E440/CG	0.20	mg/kg	19.0	23.4	28.8	26.2	----
Zinc	7440-66-6	E440/CG	2.0	mg/kg	36.9	45.1	50.4	42.3	----
Zirconium	7440-67-7	E440/CG	1.0	mg/kg	2.9	4.1	3.0	3.6	----
Aggregate Organics									
Waste oil content (BC HWR 41.1)	----	EC569SG/VA	0.10	%	<0.10	<0.10	<0.10	<0.10	----
Waste oil content (BC HWR)	----	E569SG.A/VA	1000	mg/kg wwt	<1000	<1000	<1000	<1000	----
Volatile Organic Compounds [Fuels]									
Benzene	71-43-2	E611A/CG	0.0050	mg/kg	1.98	0.985	0.211	0.990	----
Ethylbenzene	100-41-4	E611A/CG	0.015	mg/kg	1.10	0.914	0.472	0.998	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A/CG	0.200	mg/kg	<0.200	<0.200	<0.200	<0.200	----
Styrene	100-42-5	E611A/CG	0.050	mg/kg	<0.050	<0.050	<0.050	<0.050	----
Toluene	108-88-3	E611A/CG	0.050	mg/kg	10.0	5.77	1.30	5.71	----
Xylene, m+p-	179601-23-1	E611A/CG	0.030	mg/kg	14.3	9.52	3.90	9.98	----
Xylene, o-	95-47-6	E611A/CG	0.030	mg/kg	3.50	2.54	1.80	3.23	----
Xylenes, total	1330-20-7	E611A/CG	0.050	mg/kg	17.8	12.1	5.70	13.2	----
Hydrocarbons									
EPH (C10-C19)	----	E601A/CG	200	mg/kg	1060	1660	1460	1800	----
EPH (C19-C32)	----	E601A/CG	200	mg/kg	880	1330	1240	1360	----
VHs (C6-C10)	----	E581.VH+F1/CG	10	mg/kg	95	116	74	122	----
HEPHs	----	EC600A/CG	200	mg/kg	880	1320	1240	1350	----
LEPHs	----	EC600A/CG	200	mg/kg	1030	1630	1440	1770	----
VPHs	----	EC580A/CG	10	mg/kg	64	96	66	101	----
Hydrocarbons Surrogates									

Analytical Results

Sub-Matrix: **Soil**
(Matrix: **Soil/Solid**)

Analyte	CAS Number	Method/Lab	LOR	Unit	LC_RLPB_SO_May-2023_NP1	LC_RLPB_SO_May-2023_NP2	LC_RLPB_SO_May-2023_NP3	LC_RLPB_SO_May-2023_NP4	----
Client sampling date / time					18-May-2023 15:30	18-May-2023 15:30	18-May-2023 15:35	18-May-2023 15:35	----
					CG2306508-001	CG2306508-002	CG2306508-003	CG2306508-004	--------
					Result	Result	Result	Result	----
Hydrocarbons Surrogates									
Bromobenzotrifluoride, 2- (EPH surrogate)	392-83-6	E601A/CG	1.0	%	102	106	102	103	----
Dichlorotoluene, 3,4-	95-75-0	E581.VH+F1/CG	1.0	%	Not Determined SLMI	Not Determined SLMI	Not Determined SLMI	Not Determined SLMI	----
Volatile Organic Compounds Surrogates									
Bromofluorobenzene, 4-	460-00-4	E611A/CG	0.10	%	Not Determined SLMI	Not Determined SLMI	Not Determined SLMI	Not Determined SLMI	----
Difluorobenzene, 1,4-	540-36-3	E611A/CG	0.10	%	72.3	73.2	77.4	75.5	----
Polycyclic Aromatic Hydrocarbons									
Acenaphthene	83-32-9	E641A-L/CG	0.0050	mg/kg	1.20	1.59	1.32	1.65	----
Acenaphthylene	208-96-8	E641A-L/CG	0.0050	mg/kg	0.331	0.437	0.465	0.520	----
Acridine	260-94-6	E641A-L/CG	0.010	mg/kg	2.32	3.12	2.59	3.65	----
Anthracene	120-12-7	E641A-L/CG	0.0040	mg/kg	0.380	0.542	0.579	0.675	----
Benz(a)anthracene	56-55-3	E641A-L/CG	0.010	mg/kg	0.937	1.30	1.25	1.32	----
Benzo(a)pyrene	50-32-8	E641A-L/CG	0.010	mg/kg	0.379	0.491	0.550	0.611	----
Benzo(b+j)fluoranthene	n/a	E641A-L/CG	0.010	mg/kg	1.06	1.44	1.25	1.58	----
Benzo(b+j+k)fluoranthene	n/a	E641A-L/CG	0.015	mg/kg	1.14	1.55	1.36	1.70	----
Benzo(g,h,i)perylene	191-24-2	E641A-L/CG	0.010	mg/kg	0.363	0.406	0.456	0.603	----
Benzo(k)fluoranthene	207-08-9	E641A-L/CG	0.010	mg/kg	0.084	0.113	0.109	0.124	----
Chrysene	218-01-9	E641A-L/CG	0.010	mg/kg	2.87	4.09	3.31	3.94	----
Dibenz(a,h)anthracene	53-70-3	E641A-L/CG	0.0050	mg/kg	0.202	0.264	0.240	0.310	----
Fluoranthene	206-44-0	E641A-L/CG	0.010	mg/kg	0.666	0.970	0.884	0.978	----
Fluorene	86-73-7	E641A-L/CG	0.010	mg/kg	3.16	4.56	3.80	5.50	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L/CG	0.010	mg/kg	0.117	0.162	0.144	0.188	----
Methylnaphthalene, 1-	90-12-0	E641A-L/CG	0.010	mg/kg	20.4	20.9	17.5	23.6	----
Methylnaphthalene, 2-	91-57-6	E641A-L/CG	0.010	mg/kg	32.9	30.1	21.7	35.4	----
Naphthalene	91-20-3	E641A-L/CG	0.010	mg/kg	11.9	10.0	5.52	11.6	----
Phenanthrene	85-01-8	E641A-L/CG	0.010	mg/kg	14.5	21.2	19.0	21.0	----
Pyrene	129-00-0	E641A-L/CG	0.010	mg/kg	1.07	1.58	1.43	1.49	----
Quinoline	91-22-5	E641A-L/CG	0.010	mg/kg	0.051	0.119	0.119	0.175	----
B(a)P total potency equivalents [B(a)P TPE]	----	E641A-L/CG	0.020	mg/kg	0.833	1.10	1.10	1.29	----

Analytical Results

Sub-Matrix: **Soil**

(Matrix: **Soil/Solid**)

				Client sample ID	LC_RLPB_SO_ May-2023_NP1	LC_RLPB_SO_ May-2023_NP2	LC_RLPB_SO_ May-2023_NP3	LC_RLPB_SO_ May-2023_NP4	----
				Client sampling date / time	18-May-2023 15:30	18-May-2023 15:30	18-May-2023 15:35	18-May-2023 15:35	----
Analyte	*CAS Number*	*Method/Lab*	*LOR*	*Unit*	CG2306508-001	CG2306508-002	CG2306508-003	CG2306508-004	--------
					Result	Result	Result	Result	----
Polycyclic Aromatic Hydrocarbons									
IACR (CCME)	----	E641A-L/CG	0.150	-	13.4	18.2	16.5	19.7	----
Polycyclic Aromatic Hydrocarbons Surrogates									
Acridine-d9	34749-75-2	E641A-L/CG	0.1	%	75.2	71.2	79.2	81.7	----
Chrysene-d12	1719-03-5	E641A-L/CG	0.1	%	78.3	73.8	84.3	85.5	----
Naphthalene-d8	1146-65-2	E641A-L/CG	0.1	%	90.7	80.8	96.3	93.5	----
Phenanthrene-d10	1517-22-2	E641A-L/CG	0.1	%	95.5	92.3	101	102	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **CG2306508**	Page	: 1 of 10
Client	: **Teck Coal Limited**	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	: 250-433-8467	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 19-May-2023 09:00
PO	: VPO00877747	Issue Date	: 30-May-2023 12:51
C-O-C number	: RLPB SO 20230518		
Sampler	: K. Lindenbach		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Method Blank value outliers occur.
- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- No Analysis Holding Time Outliers exist.

Outliers : Frequency of Quality Control Samples

- No Quality Control Sample Frequency Outliers occur.

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	*Method*	*Sampling Date*	*Extraction / Preparation*				*Analysis*			
			Preparation Date	*Holding Times Rec*	*Holding Times Actual*	*Eval*	*Analysis Date*	*Holding Times Rec*	*Holding Times Actual*	*Eval*
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E569SG.A	18-May-2023	29-May-2023	28 days	11 days	✓	29-May-2023	40 days	0 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E569SG.A	18-May-2023	29-May-2023	28 days	11 days	✓	29-May-2023	40 days	0 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E569SG.A	18-May-2023	29-May-2023	28 days	11 days	✓	29-May-2023	40 days	0 days	✓
Aggregate Organics : Waste Oil Content (BC HWR) by Gravimetry (wet weight)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E569SG.A	18-May-2023	29-May-2023	28 days	11 days	✓	29-May-2023	40 days	0 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E601A	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E601A	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E601A	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Holding Times: Rec	Holding Times: Actual	Eval	Analysis: Analysis Date	Holding Times: Rec	Holding Times: Actual	Eval
Hydrocarbons : BC PHCs - EPH by GC-FID										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E601A	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP1	E581.VH+F1	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP2	E581.VH+F1	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP3	E581.VH+F1	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓
Hydrocarbons : VH and F1 by Headspace GC-FID										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP4	E581.VH+F1	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E510	18-May-2023	24-May-2023	----	----		25-May-2023	28 days	7 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E510	18-May-2023	24-May-2023	----	----		25-May-2023	28 days	7 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E510	18-May-2023	24-May-2023	----	----		25-May-2023	28 days	7 days	✓
Metals : Mercury in Soil/Solid by CVAAS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E510	18-May-2023	24-May-2023	----	----		25-May-2023	28 days	7 days	✓

Work Order : CG2306508
Client : Teck Coal Limited
Project : LINE CREEK OPERATION

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E440	18-May-2023	24-May-2023	----	----		25-May-2023	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E440	18-May-2023	24-May-2023	----	----		25-May-2023	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E440	18-May-2023	24-May-2023	----	----		25-May-2023	180 days	7 days	✓
Metals : Metals in Soil/Solid by CRC ICPMS										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E440	18-May-2023	24-May-2023	----	----		25-May-2023	180 days	7 days	✓
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E144	18-May-2023	----	----	----		23-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E144	18-May-2023	----	----	----		23-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E144	18-May-2023	----	----	----		23-May-2023	----	----	
Physical Tests : Moisture Content by Gravimetry										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E144	18-May-2023	----	----	----		23-May-2023	----	----	
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E108	18-May-2023	25-May-2023	----	----		25-May-2023	30 days	7 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation: Preparation Date	Extraction / Preparation: Holding Times Rec	Extraction / Preparation: Holding Times Actual	Extraction / Preparation: Eval	Analysis: Analysis Date	Analysis: Holding Times Rec	Analysis: Holding Times Actual	Analysis: Eval
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E108	18-May-2023	25-May-2023	----	----		25-May-2023	30 days	7 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E108	18-May-2023	25-May-2023	----	----		25-May-2023	30 days	7 days	✓
Physical Tests : pH by Meter (1:2 Soil:Water Extraction)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E108	18-May-2023	25-May-2023	----	----		25-May-2023	30 days	7 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP1	E641A-L	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP2	E641A-L	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP3	E641A-L	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Polycyclic Aromatic Hydrocarbons : PAHs by Hex:Ace GC-MS (Low Level CCME)										
Glass soil jar/Teflon lined cap LC_RLPB_SO_May-2023_NP4	E641A-L	18-May-2023	23-May-2023	14 days	5 days	✓	24-May-2023	40 days	1 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP1	E611A	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP2	E611A	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓

Matrix: **Soil/Solid**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group	Method	Sampling Date	Extraction / Preparation				Analysis			
Container / Client Sample ID(s)			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP3	E611A	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓
Volatile Organic Compounds [Fuels] : BTEX by Headspace GC-MS										
Glass soil methanol vial LC_RLPB_SO_May-2023_NP4	E611A	18-May-2023	23-May-2023	----	----		24-May-2023	40 days	6 days	✓

Legend & Qualifier Definitions

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Soil/Solid**

Evaluation: × = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
BC PHCs - EPH by GC-FID	E601A	950176	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	950298	1	10	10.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	952532	1	20	5.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	952533	1	20	5.0	5.0	✓
Moisture Content by Gravimetry	E144	950178	1	8	12.5	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	950177	1	6	16.6	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	954542	1	4	25.0	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	950299	1	4	25.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	959524	1	5	20.0	5.0	✓
Laboratory Control Samples (LCS)							
BC PHCs - EPH by GC-FID	E601A	950176	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	950298	1	10	10.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	952532	2	20	10.0	10.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	952533	2	20	10.0	10.0	✓
Moisture Content by Gravimetry	E144	950178	1	8	12.5	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	950177	1	6	16.6	5.0	✓
pH by Meter (1:2 Soil:Water Extraction)	E108	954542	2	4	50.0	10.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	950299	1	4	25.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	959524	1	5	20.0	5.0	✓
Method Blanks (MB)							
BC PHCs - EPH by GC-FID	E601A	950176	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	950298	1	10	10.0	5.0	✓
Mercury in Soil/Solid by CVAAS	E510	952532	1	20	5.0	5.0	✓
Metals in Soil/Solid by CRC ICPMS	E440	952533	1	20	5.0	5.0	✓
Moisture Content by Gravimetry	E144	950178	1	8	12.5	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	950177	1	6	16.6	5.0	✓
VH and F1 by Headspace GC-FID	E581.VH+F1	950299	1	4	25.0	5.0	✓
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A	959524	1	5	20.0	5.0	✓
Matrix Spikes (MS)							
BC PHCs - EPH by GC-FID	E601A	950176	1	4	25.0	5.0	✓
BTEX by Headspace GC-MS	E611A	950298	1	10	10.0	5.0	✓
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L	950177	1	6	16.6	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
pH by Meter (1:2 Soil:Water Extraction)	E108 Calgary - Environmental	Soil/Solid	BC Lab Manual	pH is determined by potentiometric measurement with a pH electrode at ambient laboratory temperature (normally 20 ± 5°C), and is carried out in accordance with procedures described in the BC Lab Manual (prescriptive method). The procedure involves mixing the dried (at <60 ºC) and sieved (10mesh/2mm) sample with ultra pure water at a 1:2 ratio of sediment to water. The pH is then measured by a standard pH probe.
Moisture Content by Gravimetry	E144 Calgary - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1	Moisture is measured gravimetrically by drying the sample at 105°C. Moisture content is calculated as the weight loss (due to water) divided by the wet weight of the sample, expressed as a percentage.
Metals in Soil/Solid by CRC ICPMS	E440 Calgary - Environmental	Soil/Solid	EPA 6020B (mod)	This method is intended to liberate metals that may be environmentally available. Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. Dependent on sample matrix, some metals may be only partially recovered, including Al, Ba, Be, Cr, Sr, Ti, Tl, V, W, and Zr. Silicate minerals are not solubilized. Volatile forms of sulfur (including sulfide) may not be captured, as they may be lost during sampling, storage, or digestion. This method does not adequately recover elemental sulfur, and is unsuitable for assessment of elemental sulfur standards or guidelines. Analysis is by Collision/Reaction Cell ICPMS.
Mercury in Soil/Solid by CVAAS	E510 Calgary - Environmental	Soil/Solid	EPA 200.2/1631 Appendix (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl, followed by CVAAS analysis.
Waste Oil Content (BC HWR) by Gravimetry (wet weight)	E569SG.A Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A silica gel treated petroleum ether sample extract is evaporated to dryness. The weight of the residue is determined gravimetrically. For classification of samples as waste oil under the HWR, Waste Oil Content is reported by weight on an as-received basis.
VH and F1 by Headspace GC-FID	E581.VH+F1 Calgary - Environmental	Soil/Solid	BC MOE Lab Manual / CCME PHC in Soil - Tier 1 (mod)	Volatile Hydrocarbons (VH and F1) is analyzed by static headspace GC-FID. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
BC PHCs - EPH by GC-FID	E601A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (EPH in Solids by GC/FID) (mod)	Sample extracts are analyzed by GC-FID for BC hydrocarbon fractions.
BTEX by Headspace GC-MS	E611A Calgary - Environmental	Soil/Solid	EPA 8260D (mod)	Volatile Organic Compounds (VOCs) are analyzed by static headspace GC-MS. Samples are prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
PAHs by Hex:Ace GC-MS (Low Level CCME)	E641A-L Calgary - Environmental	Soil/Solid	EPA 8270E (mod)	Polycyclic Aromatic Hydrocarbons (PAHs) are extracted with hexane/acetone and analyzed by GC-MS. If reported, IACR (index of additive cancer risk, unitless) and B(a)P toxic potency equivalent (in soil concentration units) are calculated as per CCME PAH Soil Quality Guidelines fact sheet (2010) or ABT1.
Waste Oil Content (BC HWR 41.1) by Gravimetry	EC569SG Vancouver - Environmental	Soil/Solid	unit conversion	Convert waste oil content from sample wet weight basis to dry weight basis by using moisture. For assessment of compliance of the Total Oil standard under section 41.1 of the HWR (Standards for Management of Hydrocarbon Contaminated Soils), Waste Oil Content is reported on a dry weight basis.
VPH: VH-BTEX-Styrene	EC580A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (VPH in Water and Solids) (mod)	Volatile Petroleum Hydrocarbons (VPH) is calculated as follows: VH-BTEX = Volatile Hydrocarbons (VH6-10) minus benzene, toluene, ethylbenzene, xylenes (BTEX) and styrene.
LEPH and HEPH: EPH-PAH	EC600A Calgary - Environmental	Soil/Solid	BC MOE Lab Manual (LEPH and HEPH)	Light Extractable Petroleum Hydrocarbons (LEPH) and Heavy Extractable Petroleum Hydrocarbons (HEPH) are calculated as follows: LEPH = Extractable Petroleum Hydrocarbons (EPH10-19) minus Naphthalene and Phenanthrene; HEPH = Extractable Petroleum Hydrocarbons (EPH19-32) minus Benz(a)anthracene, Benzo(b+j+k)fluoranthene, Benzo(a)pyrene, Dibenz(a,h)anthracene, Indeno(1,2,3-cd)pyrene, and Pyrene.

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Leach 1:2 Soil:Water for pH/EC	EP108 Calgary - Environmental	Soil/Solid	BC WLAP METHOD: PH, ELECTROMETRIC, SOIL	The procedure involves mixing the dried (at <60°C) and sieved (No. 10 / 2mm) sample with deionized/distilled water at a 1:2 ratio of sediment to water.
Digestion for Metals and Mercury	EP440 Calgary - Environmental	Soil/Solid	EPA 200.2 (mod)	Samples are dried, then sieved through a 2 mm sieve, and digested with HNO3 and HCl. This method is intended to liberate metals that may be environmentally available.
Waste Oil Content (BC HWR) Extraction for Gravimetry	EP569SG Vancouver - Environmental	Soil/Solid	BC MOE Lab Manual (Waste Oil Content) (mod)	A subsample is dried by magnesium sulfate and extracted with petroleum ether in Soxhlet. The extract is dried with sodium sulfate and treated with silica gel.
VOCs Methanol Extraction for Headspace Analysis	EP581 Calgary - Environmental	Soil/Solid	EPA 5035A (mod)	VOCs in samples are extracted with methanol. Extracts are then prepared in headspace vials and are heated and agitated on the headspace autosampler, causing VOCs to partition between the aqueous phase and the headspace in accordance with Henry's law.
PHCs and PAHs Hexane-Acetone Tumbler Extraction	EP601 Calgary - Environmental	Soil/Solid	CCME PHC in Soil - Tier 1 (mod)	Samples are subsampled and Petroleum Hydrocarbons (PHC) and PAHs are extracted with 1:1 hexane:acetone using a rotary extractor.

ALS Canada Ltd.

QUALITY CONTROL REPORT

Work Order	: **CG2306508**	Page	: 1 of 14
Client	: Teck Coal Limited	Laboratory	: Calgary - Environmental
Contact	: Tom Jeffery	Account Manager	: Lyudmyla Shvets
Address	: PO BOX 2003 15km North Hwy 43 Sparwood BC Canada	Address	: 2559 29th Street NE Calgary, Alberta Canada T1Y 7B5
Telephone	:	Telephone	: +1 403 407 1800
Project	: LINE CREEK OPERATION	Date Samples Received	: 19-May-2023 09:00
PO	: VPO00877747	Date Analysis Commenced	: 23-May-2023
C-O-C number	: RLPB SO 20230518	Issue Date	: 30-May-2023 12:51
Sampler	: K. Lindenbach 250-433-8467		
Site	: ----		
Quote number	: Teck Coal Master Quote		
No. of samples received	: 4		
No. of samples analysed	: 4		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Reference Material (RM) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Cynthia Bauer	Organic Supervisor	Calgary Organics, Calgary, Alberta
George Huang	Supervisor - Inorganic	Calgary Metals, Calgary, Alberta
Janice Leung	Supervisor - Organics Instrumentation	Vancouver Organics, Burnaby, British Columbia
Joshua Stessun	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Maqsood UlHassan	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Rosalie Van Deelen	Laboratory Assistant	Calgary Organics, Calgary, Alberta
Sorina Motea	Laboratory Analyst	Calgary Organics, Calgary, Alberta
Vishnu Patel		Calgary Inorganics, Calgary, Alberta

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Physical Tests (QC Lot: 950178)											
CG2306581-001	Anonymous	Moisture	----	E144	0.25	%	7.08	7.14	0.935%	20%	----
Physical Tests (QC Lot: 954542)											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	pH (1:2 soil:water)	----	E108	0.10	pH units	8.10	8.12	0.247%	5%	----
Metals (QC Lot: 952532)											
CG2306406-005	Anonymous	Mercury	7439-97-6	E510	0.0050	mg/kg	0.0079	0.0085	0.0006	Diff <2x LOR	----
Metals (QC Lot: 952533)											
CG2306406-005	Anonymous	Aluminum	7429-90-5	E440	50	mg/kg	18900	17100	9.94%	40%	----
		Antimony	7440-36-0	E440	0.10	mg/kg	41.1	36.0	13.2%	30%	----
		Arsenic	7440-38-2	E440	0.10	mg/kg	2.19	1.95	11.4%	30%	----
		Barium	7440-39-3	E440	0.50	mg/kg	462	493	6.52%	40%	----
		Beryllium	7440-41-7	E440	0.10	mg/kg	0.21	0.23	0.02	Diff <2x LOR	----
		Bismuth	7440-69-9	E440	0.20	mg/kg	31.6	31.7	0.323%	30%	----
		Boron	7440-42-8	E440	5.0	mg/kg	284	275	3.30%	30%	----
		Cadmium	7440-43-9	E440	0.020	mg/kg	3.18	3.72	15.8%	30%	----
		Calcium	7440-70-2	E440	50	mg/kg	99900	97900	1.96%	30%	----
		Chromium	7440-47-3	E440	0.50	mg/kg	39.1	38.7	1.05%	30%	----
		Cobalt	7440-48-4	E440	0.10	mg/kg	23.3	28.8	21.4%	30%	----
		Copper	7440-50-8	E440	0.50	mg/kg	1960	1670	16.0%	30%	----
		Iron	7439-89-6	E440	50	mg/kg	6060	5900	2.69%	30%	----
		Lead	7439-92-1	E440	0.50	mg/kg	94.3	83.5	12.1%	40%	----
		Lithium	7439-93-2	E440	2.0	mg/kg	25.5	22.6	12.0%	30%	----
		Magnesium	7439-95-4	E440	20	mg/kg	14700	15000	2.28%	30%	----
		Manganese	7439-96-5	E440	1.0	mg/kg	467	484	3.57%	30%	----
		Molybdenum	7439-98-7	E440	0.10	mg/kg	3.53	3.67	3.84%	40%	----
		Nickel	7440-02-0	E440	0.50	mg/kg	186	182	2.59%	30%	----
		Phosphorus	7723-14-0	E440	50	mg/kg	13600	13000	5.29%	30%	----
		Potassium	7440-09-7	E440	100	mg/kg	82300	86700	5.13%	40%	----
		Selenium	7782-49-2	E440	0.20	mg/kg	0.32	0.36	0.04	Diff <2x LOR	----
		Silver	7440-22-4	E440	0.10	mg/kg	3.18	3.07	3.51%	40%	----
		Sodium	7440-23-5	E440	50	mg/kg	18100	17700	2.16%	40%	----

Sub-Matrix: **Soil/Solid**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Metals (QC Lot: 952533) - continued											
CG2306406-005	Anonymous	Strontium	7440-24-6	E440	0.50	mg/kg	292	306	4.71%	40%	----
		Sulfur	7704-34-9	E440	1000	mg/kg	8400	9000	8.02%	30%	----
		Thallium	7440-28-0	E440	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Tin	7440-31-5	E440	2.0	mg/kg	19.8	20.2	1.96%	40%	----
		Titanium	7440-32-6	E440	1.0	mg/kg	260	272	4.15%	40%	----
		Tungsten	7440-33-7	E440	0.50	mg/kg	0.71	0.69	0.01	Diff <2x LOR	----
		Uranium	7440-61-1	E440	0.050	mg/kg	0.841	0.852	1.23%	30%	----
		Vanadium	7440-62-2	E440	0.20	mg/kg	13.0	13.2	1.50%	30%	----
		Zinc	7440-66-6	E440	2.0	mg/kg	1750	1880	7.55%	30%	----
		Zirconium	7440-67-7	E440	1.0	mg/kg	<1.0	<1.0	0	Diff <2x LOR	----
Aggregate Organics (QC Lot: 959524)											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	Waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	<1000	0	Diff <2x LOR	----
Volatile Organic Compounds (QC Lot: 950298)											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	Benzene	71-43-2	E611A	0.0050	mg/kg	1.98	2.01	1.23%	40%	----
		Ethylbenzene	100-41-4	E611A	0.015	mg/kg	1.10	1.14	4.09%	40%	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.200	mg/kg	<0.200	<0.200	0	Diff <2x LOR	----
		Styrene	100-42-5	E611A	0.050	mg/kg	<0.050	<0.050	0	Diff <2x LOR	----
		Toluene	108-88-3	E611A	0.050	mg/kg	10.0	8.73	14.2%	40%	----
		Xylene, m+p-	179601-23-1	E611A	0.030	mg/kg	14.3	14.7	2.54%	40%	----
		Xylene, o-	95-47-6	E611A	0.030	mg/kg	3.50	4.09	15.6%	40%	----
Hydrocarbons (QC Lot: 950176)											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	EPH (C10-C19)	----	E601A	200	mg/kg	1060	920	130	Diff <2x LOR	----
		EPH (C19-C32)	----	E601A	200	mg/kg	880	800	80	Diff <2x LOR	----
Hydrocarbons (QC Lot: 950299)											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	95	94	1.32%	40%	----
Polycyclic Aromatic Hydrocarbons (QC Lot: 950177)											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	Acenaphthene	83-32-9	E641A-L	0.0050	mg/kg	1.20	1.05	13.2%	50%	----
		Acenaphthylene	208-96-8	E641A-L	0.0050	mg/kg	0.331	0.289	13.3%	50%	----
		Acridine	260-94-6	E641A-L	0.010	mg/kg	2.32	2.06	12.0%	50%	----
		Anthracene	120-12-7	E641A-L	0.0040	mg/kg	0.380	0.336	12.2%	50%	----
		Benz(a)anthracene	56-55-3	E641A-L	0.010	mg/kg	0.937	0.870	7.33%	50%	----
		Benzo(a)pyrene	50-32-8	E641A-L	0.010	mg/kg	0.379	0.372	1.80%	50%	----

Sub-Matrix: **Soil/Solid**

Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Laboratory Duplicate (DUP) Report						
					LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Polycyclic Aromatic Hydrocarbons (QC Lot: 950177) - continued											
CG2306508-001	LC_RLPB_SO_May-2023_NP1	Benzo(b+j)fluoranthene	n/a	E641A-L	0.010	mg/kg	1.06	1.04	2.76%	50%	----
		Benzo(g,h,i)perylene	191-24-2	E641A-L	0.010	mg/kg	0.363	0.347	4.46%	50%	----
		Benzo(k)fluoranthene	207-08-9	E641A-L	0.010	mg/kg	0.084	0.074	12.1%	50%	----
		Chrysene	218-01-9	E641A-L	0.010	mg/kg	2.87	2.67	7.30%	50%	----
		Dibenz(a,h)anthracene	53-70-3	E641A-L	0.0050	mg/kg	0.202	0.189	6.57%	50%	----
		Fluoranthene	206-44-0	E641A-L	0.010	mg/kg	0.666	0.606	9.44%	50%	----
		Fluorene	86-73-7	E641A-L	0.010	mg/kg	3.16	2.77	13.2%	50%	----
		Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.010	mg/kg	0.117	0.112	3.80%	50%	----
		Methylnaphthalene, 1-	90-12-0	E641A-L	0.010	mg/kg	20.4	18.3	11.1%	50%	----
		Methylnaphthalene, 2-	91-57-6	E641A-L	0.010	mg/kg	32.9	29.2	11.7%	50%	----
		Naphthalene	91-20-3	E641A-L	0.010	mg/kg	11.9	10.7	10.9%	50%	----
		Phenanthrene	85-01-8	E641A-L	0.010	mg/kg	14.5	12.9	11.5%	50%	----
		Pyrene	129-00-0	E641A-L	0.010	mg/kg	1.07	0.976	9.39%	50%	----
		Quinoline	91-22-5	E641A-L	0.010	mg/kg	0.051	0.046	10.1%	50%	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 950178)						
Moisture	----	E144	0.25	%	<0.25	----
Metals (QCLot: 952532)						
Mercury	7439-97-6	E510	0.005	mg/kg	<0.0050	----
Metals (QCLot: 952533)						
Aluminum	7429-90-5	E440	50	mg/kg	<50	----
Antimony	7440-36-0	E440	0.1	mg/kg	<0.10	----
Arsenic	7440-38-2	E440	0.1	mg/kg	<0.10	----
Barium	7440-39-3	E440	0.5	mg/kg	<0.50	----
Beryllium	7440-41-7	E440	0.1	mg/kg	<0.10	----
Bismuth	7440-69-9	E440	0.2	mg/kg	<0.20	----
Boron	7440-42-8	E440	5	mg/kg	<5.0	----
Cadmium	7440-43-9	E440	0.02	mg/kg	<0.020	----
Calcium	7440-70-2	E440	50	mg/kg	<50	----
Chromium	7440-47-3	E440	0.5	mg/kg	<0.50	----
Cobalt	7440-48-4	E440	0.1	mg/kg	<0.10	----
Copper	7440-50-8	E440	0.5	mg/kg	<0.50	----
Iron	7439-89-6	E440	50	mg/kg	<50	----
Lead	7439-92-1	E440	0.5	mg/kg	<0.50	----
Lithium	7439-93-2	E440	2	mg/kg	<2.0	----
Magnesium	7439-95-4	E440	20	mg/kg	<20	----
Manganese	7439-96-5	E440	1	mg/kg	<1.0	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	<0.10	----
Nickel	7440-02-0	E440	0.5	mg/kg	<0.50	----
Phosphorus	7723-14-0	E440	50	mg/kg	<50	----
Potassium	7440-09-7	E440	100	mg/kg	<100	----
Selenium	7782-49-2	E440	0.2	mg/kg	<0.20	----
Silver	7440-22-4	E440	0.1	mg/kg	<0.10	----
Sodium	7440-23-5	E440	50	mg/kg	<50	----
Strontium	7440-24-6	E440	0.5	mg/kg	<0.50	----
Sulfur	7704-34-9	E440	1000	mg/kg	<1000	----
Thallium	7440-28-0	E440	0.05	mg/kg	<0.050	----
Tin	7440-31-5	E440	2	mg/kg	<2.0	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Metals (QCLot: 952533) - continued						
Titanium	7440-32-6	E440	1	mg/kg	<1.0	----
Tungsten	7440-33-7	E440	0.5	mg/kg	<0.50	----
Uranium	7440-61-1	E440	0.05	mg/kg	<0.050	----
Vanadium	7440-62-2	E440	0.2	mg/kg	<0.20	----
Zinc	7440-66-6	E440	2	mg/kg	<2.0	----
Zirconium	7440-67-7	E440	1	mg/kg	<1.0	----
Aggregate Organics (QCLot: 959524)						
Waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	<1000	----
Volatile Organic Compounds (QCLot: 950298)						
Benzene	71-43-2	E611A	0.005	mg/kg	<0.0050	----
Ethylbenzene	100-41-4	E611A	0.015	mg/kg	<0.015	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	<0.040	----
Styrene	100-42-5	E611A	0.05	mg/kg	<0.050	----
Toluene	108-88-3	E611A	0.05	mg/kg	<0.050	----
Xylene, m+p-	179601-23-1	E611A	0.03	mg/kg	<0.030	----
Xylene, o-	95-47-6	E611A	0.03	mg/kg	<0.030	----
Hydrocarbons (QCLot: 950176)						
EPH (C10-C19)	----	E601A	200	mg/kg	<200	----
EPH (C19-C32)	----	E601A	200	mg/kg	<200	----
Hydrocarbons (QCLot: 950299)						
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	<10	----
Polycyclic Aromatic Hydrocarbons (QCLot: 950177)						
Acenaphthene	83-32-9	E641A-L	0.005	mg/kg	<0.0050	----
Acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	<0.0050	----
Acridine	260-94-6	E641A-L	0.01	mg/kg	<0.010	----
Anthracene	120-12-7	E641A-L	0.004	mg/kg	<0.0040	----
Benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	<0.010	----
Benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	<0.010	----
Benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	<0.010	----
Benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	<0.010	----
Benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	<0.010	----
Chrysene	218-01-9	E641A-L	0.01	mg/kg	<0.010	----
Dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	<0.0050	----
Fluoranthene	206-44-0	E641A-L	0.01	mg/kg	<0.010	----
Fluorene	86-73-7	E641A-L	0.01	mg/kg	<0.010	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 950177) - continued						
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	<0.010	----
Methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	<0.010	----
Methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	<0.010	----
Naphthalene	91-20-3	E641A-L	0.01	mg/kg	<0.010	----
Phenanthrene	85-01-8	E641A-L	0.01	mg/kg	<0.010	----
Pyrene	129-00-0	E641A-L	0.01	mg/kg	<0.010	----
Quinoline	91-22-5	E641A-L	0.01	mg/kg	<0.010	----

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 950178)									
Moisture	----	E144	0.25	%	50 %	96.4	90.0	110	----
Physical Tests (QCLot: 954542)									
pH (1:2 soil:water)	----	E108	----	pH units	7 pH units	100	97.0	103	----
Metals (QCLot: 952532)									
Mercury	7439-97-6	E510	0.005	mg/kg	0.1 mg/kg	102	80.0	120	----
Metals (QCLot: 952533)									
Aluminum	7429-90-5	E440	50	mg/kg	200 mg/kg	89.5	80.0	120	----
Antimony	7440-36-0	E440	0.1	mg/kg	100 mg/kg	103	80.0	120	----
Arsenic	7440-38-2	E440	0.1	mg/kg	100 mg/kg	105	80.0	120	----
Barium	7440-39-3	E440	0.5	mg/kg	25 mg/kg	118	80.0	120	----
Beryllium	7440-41-7	E440	0.1	mg/kg	10 mg/kg	83.7	80.0	120	----
Bismuth	7440-69-9	E440	0.2	mg/kg	100 mg/kg	96.3	80.0	120	----
Boron	7440-42-8	E440	5	mg/kg	100 mg/kg	81.0	80.0	120	----
Cadmium	7440-43-9	E440	0.02	mg/kg	10 mg/kg	96.3	80.0	120	----
Calcium	7440-70-2	E440	50	mg/kg	5000 mg/kg	97.0	80.0	120	----
Chromium	7440-47-3	E440	0.5	mg/kg	25 mg/kg	94.4	80.0	120	----
Cobalt	7440-48-4	E440	0.1	mg/kg	25 mg/kg	94.7	80.0	120	----
Copper	7440-50-8	E440	0.5	mg/kg	25 mg/kg	95.1	80.0	120	----
Iron	7439-89-6	E440	50	mg/kg	100 mg/kg	96.9	80.0	120	----
Lead	7439-92-1	E440	0.5	mg/kg	50 mg/kg	98.4	80.0	120	----
Lithium	7439-93-2	E440	2	mg/kg	25 mg/kg	104	80.0	120	----
Magnesium	7439-95-4	E440	20	mg/kg	5000 mg/kg	90.9	80.0	120	----
Manganese	7439-96-5	E440	1	mg/kg	25 mg/kg	94.1	80.0	120	----
Molybdenum	7439-98-7	E440	0.1	mg/kg	25 mg/kg	97.9	80.0	120	----
Nickel	7440-02-0	E440	0.5	mg/kg	50 mg/kg	95.1	80.0	120	----
Phosphorus	7723-14-0	E440	50	mg/kg	1000 mg/kg	87.6	80.0	120	----
Potassium	7440-09-7	E440	100	mg/kg	5000 mg/kg	105	80.0	120	----
Selenium	7782-49-2	E440	0.2	mg/kg	100 mg/kg	95.5	80.0	120	----
Silver	7440-22-4	E440	0.1	mg/kg	10 mg/kg	94.3	80.0	120	----
Sodium	7440-23-5	E440	50	mg/kg	5000 mg/kg	87.0	80.0	120	----
Strontium	7440-24-6	E440	0.5	mg/kg	25 mg/kg	107	80.0	120	----
Sulfur	7704-34-9	E440	1000	mg/kg	5000 mg/kg	86.9	80.0	120	----

Sub-Matrix: **Soil/Solid**

Analyte	CAS Number	Method	LOR	Unit	Laboratory Control Sample (LCS) Report: Spike Concentration	Recovery (%) LCS	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 952533) - continued									
Thallium	7440-28-0	E440	0.05	mg/kg	100 mg/kg	95.6	80.0	120	----
Tin	7440-31-5	E440	2	mg/kg	50 mg/kg	98.9	80.0	120	----
Titanium	7440-32-6	E440	1	mg/kg	25 mg/kg	90.8	80.0	120	----
Tungsten	7440-33-7	E440	0.5	mg/kg	10 mg/kg	98.0	80.0	120	----
Uranium	7440-61-1	E440	0.05	mg/kg	0.5 mg/kg	95.8	80.0	120	----
Vanadium	7440-62-2	E440	0.2	mg/kg	50 mg/kg	97.5	80.0	120	----
Zinc	7440-66-6	E440	2	mg/kg	50 mg/kg	92.5	80.0	120	----
Zirconium	7440-67-7	E440	1	mg/kg	10 mg/kg	101	80.0	120	----
Aggregate Organics (QCLot: 959524)									
Waste oil content (BC HWR)	----	E569SG.A	1000	mg/kg wwt	4250 mg/kg wwt	97.6	70.0	130	----
Volatile Organic Compounds (QCLot: 950298)									
Benzene	71-43-2	E611A	0.005	mg/kg	2.5 mg/kg	98.0	70.0	130	----
Ethylbenzene	100-41-4	E611A	0.015	mg/kg	2.5 mg/kg	89.2	70.0	130	----
Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	0.04	mg/kg	2.5 mg/kg	104	70.0	130	----
Styrene	100-42-5	E611A	0.05	mg/kg	2.5 mg/kg	85.2	70.0	130	----
Toluene	108-88-3	E611A	0.05	mg/kg	2.5 mg/kg	85.1	70.0	130	----
Xylene, m+p-	179601-23-1	E611A	0.03	mg/kg	5 mg/kg	100.0	70.0	130	----
Xylene, o-	95-47-6	E611A	0.03	mg/kg	2.5 mg/kg	95.5	70.0	130	----
Hydrocarbons (QCLot: 950176)									
EPH (C10-C19)	----	E601A	200	mg/kg	1002.5 mg/kg	120	70.0	130	----
EPH (C19-C32)	----	E601A	200	mg/kg	515.625 mg/kg	119	70.0	130	----
Hydrocarbons (QCLot: 950299)									
VHs (C6-C10)	----	E581.VH+F1	10	mg/kg	3.438 mg/kg	94.9	70.0	130	----
Polycyclic Aromatic Hydrocarbons (QCLot: 950177)									
Acenaphthene	83-32-9	E641A-L	0.005	mg/kg	0.5 mg/kg	107	60.0	130	----
Acenaphthylene	208-96-8	E641A-L	0.005	mg/kg	0.5 mg/kg	93.4	60.0	130	----
Acridine	260-94-6	E641A-L	0.01	mg/kg	0.5 mg/kg	91.9	60.0	130	----
Anthracene	120-12-7	E641A-L	0.004	mg/kg	0.5 mg/kg	99.6	60.0	130	----
Benz(a)anthracene	56-55-3	E641A-L	0.01	mg/kg	0.5 mg/kg	91.4	60.0	130	----
Benzo(a)pyrene	50-32-8	E641A-L	0.01	mg/kg	0.5 mg/kg	80.2	60.0	130	----
Benzo(b+j)fluoranthene	n/a	E641A-L	0.01	mg/kg	0.5 mg/kg	89.4	60.0	130	----
Benzo(g,h,i)perylene	191-24-2	E641A-L	0.01	mg/kg	0.5 mg/kg	90.4	60.0	130	----

Sub-Matrix: **Soil/Solid**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Concentration	LCS	Low	High	Qualifier
Polycyclic Aromatic Hydrocarbons (QCLot: 950177) - continued									
Benzo(k)fluoranthene	207-08-9	E641A-L	0.01	mg/kg	0.5 mg/kg	90.4	60.0	130	----
Chrysene	218-01-9	E641A-L	0.01	mg/kg	0.5 mg/kg	96.4	60.0	130	----
Dibenz(a,h)anthracene	53-70-3	E641A-L	0.005	mg/kg	0.5 mg/kg	91.6	60.0	130	----
Fluoranthene	206-44-0	E641A-L	0.01	mg/kg	0.5 mg/kg	101	60.0	130	----
Fluorene	86-73-7	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----
Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.01	mg/kg	0.5 mg/kg	96.1	60.0	130	----
Methylnaphthalene, 1-	90-12-0	E641A-L	0.01	mg/kg	0.5 mg/kg	105	60.0	130	----
Methylnaphthalene, 2-	91-57-6	E641A-L	0.01	mg/kg	0.5 mg/kg	111	60.0	130	----
Naphthalene	91-20-3	E641A-L	0.01	mg/kg	0.5 mg/kg	116	50.0	130	----
Phenanthrene	85-01-8	E641A-L	0.01	mg/kg	0.5 mg/kg	110	60.0	130	----
Pyrene	129-00-0	E641A-L	0.01	mg/kg	0.5 mg/kg	100	60.0	130	----
Quinoline	91-22-5	E641A-L	0.01	mg/kg	0.5 mg/kg	97.9	60.0	130	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Soil/Solid**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Volatile Organic Compounds (QCLot: 950298)										
CG2306508-001	LC_RLPB_SO_May-2023_NP1	Benzene	71-43-2	E611A	2.86 mg/kg	3.4375 mg/kg	92.8	60.0	140	----
		Ethylbenzene	100-41-4	E611A	3.16 mg/kg	3.4375 mg/kg	103	60.0	140	----
		Methyl-tert-butyl ether [MTBE]	1634-04-4	E611A	2.82 mg/kg	3.4375 mg/kg	91.6	60.0	140	----
		Styrene	100-42-5	E611A	2.41 mg/kg	3.4375 mg/kg	78.2	60.0	140	----
		Toluene	108-88-3	E611A	ND mg/kg	3.4375 mg/kg	ND	60.0	140	----
		Xylene, m+p-	179601-23-1	E611A	ND mg/kg	6.875 mg/kg	ND	60.0	140	----
		Xylene, o-	95-47-6	E611A	3.76 mg/kg	3.4375 mg/kg	122	60.0	140	----
Hydrocarbons (QCLot: 950176)										
CG2306508-001	LC_RLPB_SO_May-2023_NP1	EPH (C10-C19)	----	E601A	ND mg/kg	1002.5 mg/kg	ND	60.0	140	----
		EPH (C19-C32)	----	E601A	ND mg/kg	515.625 mg/kg	ND	60.0	140	----
Polycyclic Aromatic Hydrocarbons (QCLot: 950177)										
CG2306508-001	LC_RLPB_SO_May-2023_NP1	Acenaphthene	83-32-9	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Acenaphthylene	208-96-8	E641A-L	0.340 mg/kg	0.5 mg/kg	90.6	50.0	140	----
		Acridine	260-94-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Anthracene	120-12-7	E641A-L	0.445 mg/kg	0.5 mg/kg	118	50.0	140	----
		Benz(a)anthracene	56-55-3	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Benzo(a)pyrene	50-32-8	E641A-L	0.267 mg/kg	0.5 mg/kg	71.1	50.0	140	----
		Benzo(b+j)fluoranthene	n/a	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Benzo(g,h,i)perylene	191-24-2	E641A-L	0.460 mg/kg	0.5 mg/kg	122	50.0	140	----
		Benzo(k)fluoranthene	207-08-9	E641A-L	0.280 mg/kg	0.5 mg/kg	74.6	50.0	140	----
		Chrysene	218-01-9	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Dibenz(a,h)anthracene	53-70-3	E641A-L	0.234 mg/kg	0.5 mg/kg	62.2	50.0	140	----
		Fluoranthene	206-44-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Fluorene	86-73-7	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Indeno(1,2,3-c,d)pyrene	193-39-5	E641A-L	0.456 mg/kg	0.5 mg/kg	121	50.0	140	----
		Methylnaphthalene, 1-	90-12-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Methylnaphthalene, 2-	91-57-6	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Naphthalene	91-20-3	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Phenanthrene	85-01-8	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Pyrene	129-00-0	E641A-L	ND mg/kg	0.5 mg/kg	ND	50.0	140	----
		Quinoline	91-22-5	E641A-L	0.312 mg/kg	0.5 mg/kg	83.0	50.0	140	----

Reference Material (RM) Report

A Reference Material (RM) is a homogenous material with known and well-established analyte concentrations. RMs are processed in an identical manner to test samples, and are used to monitor and control the accuracy and precision of a test method for a typical sample matrix. RM results are expressed as percent recovery of the target analyte concentration. RM targets may be certified target concentrations provided by the RM supplier, or may be ALS long-term mean values (for empirical test methods).

Sub-Matrix:

					Reference Material (RM) Report				
Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	High	Qualifier
Physical Tests (QCLot: 954542)									
	RM	pH (1:2 soil:water)	----	E108	8.06 pH units	99.4	96.0	104	----
Metals (QCLot: 952532)									
	RM	Mercury	7439-97-6	E510	0.062 mg/kg	98.9	70.0	130	----
Metals (QCLot: 952533)									
	RM	Aluminum	7429-90-5	E440	9817 mg/kg	94.5	70.0	130	----
	RM	Antimony	7440-36-0	E440	3.99 mg/kg	102	70.0	130	----
	RM	Arsenic	7440-38-2	E440	3.73 mg/kg	108	70.0	130	----
	RM	Barium	7440-39-3	E440	105 mg/kg	122	70.0	130	----
	RM	Beryllium	7440-41-7	E440	0.349 mg/kg	90.9	70.0	130	----
	RM	Boron	7440-42-8	E440	8.5 mg/kg	93.7	40.0	160	----
	RM	Cadmium	7440-43-9	E440	0.91 mg/kg	93.6	70.0	130	----
	RM	Calcium	7440-70-2	E440	31082 mg/kg	101	70.0	130	----
	RM	Chromium	7440-47-3	E440	101 mg/kg	99.0	70.0	130	----
	RM	Cobalt	7440-48-4	E440	6.9 mg/kg	96.1	70.0	130	----
	RM	Copper	7440-50-8	E440	123 mg/kg	97.2	70.0	130	----
	RM	Iron	7439-89-6	E440	23558 mg/kg	96.0	70.0	130	----
	RM	Lead	7439-92-1	E440	267 mg/kg	99.6	70.0	130	----
	RM	Lithium	7439-93-2	E440	9.5 mg/kg	99.0	70.0	130	----
	RM	Magnesium	7439-95-4	E440	5509 mg/kg	91.4	70.0	130	----
	RM	Manganese	7439-96-5	E440	269 mg/kg	95.8	70.0	130	----
	RM	Molybdenum	7439-98-7	E440	1.03 mg/kg	117	70.0	130	----
	RM	Nickel	7440-02-0	E440	26.7 mg/kg	99.1	70.0	130	----
	RM	Phosphorus	7723-14-0	E440	752 mg/kg	76.3	70.0	130	----
	RM	Potassium	7440-09-7	E440	1587 mg/kg	106	70.0	130	----
	RM	Silver	7440-22-4	E440	4.06 mg/kg	82.3	70.0	130	----
	RM	Sodium	7440-23-5	E440	797 mg/kg	84.8	70.0	130	----
	RM	Strontium	7440-24-6	E440	86.1 mg/kg	104	70.0	130	----

Sub-Matrix:

Laboratory sample ID	Reference Material ID	Analyte	CAS Number	Method	RM Target Concentration	Recovery (%) RM	Recovery Limits (%) Low	Recovery Limits (%) High	Qualifier
Metals (QCLot: 952533) - continued									
	RM	Thallium	7440-28-0	E440	0.0786 mg/kg	122	40.0	160	----
	RM	Tin	7440-31-5	E440	10.6 mg/kg	92.2	70.0	130	----
	RM	Titanium	7440-32-6	E440	839 mg/kg	99.6	70.0	130	----
	RM	Uranium	7440-61-1	E440	0.52 mg/kg	109	70.0	130	----
	RM	Vanadium	7440-62-2	E440	32.7 mg/kg	97.7	70.0	130	----
	RM	Zinc	7440-66-6	E440	297 mg/kg	90.7	70.0	130	----
	RM	Zirconium	7440-67-7	E440	5.73 mg/kg	105	70.0	130	----

Page 1 of 1

Teck

COC ID: RLPB SO 20230518 | TURNAROUND TIME: | RUSH:

Environmental Division
Calgary
Work Order Reference
CG2306508

PROJECT/CLIENT INFO				LABORATORY				OTHER INFO			
Facility Name / Job#	Line Creek Operation			Lab Name	ALS Calgary			Report Format / Distribution		Excel	PDF
Project Manager	Tom Jeffery			Lab Contact	Lyudmyla Shvets			Email 1:	tom.jeffery@teck.com	x	x
Email	tom.jeffery@teck.com			Email	Lyudmyla.Shvets@ALSGlobal.com			Email 2:	teckcoal@equisonline.com		
Address	Box 2003			Address	2559 29 Street NE			Email 3:	drake.tymstra@teck.com	x	x
	15km North Hwy 43							Email 4:	Kyra.lindenbach@teck.com	x	x
City	Sparwood	Province	BC	City	Calgary	Province	AB	Email 5:	coleen.o'neill@teck.com	x	x
Postal Code	V0B 2G0	Country	Canada	Postal Code	T1Y 7B5	Country	Canada	PO number	VPO00877747		
Phone Number	250-425-8478			Phone Number	403 407 1794						

SAMPLE DETAILS / ANALYSIS REQUESTED

Sample ID	Sample Location (sys_loc_code)	Field Matrix	Hazardous Material (Yes/No)	Date	Time (24hr)	G=Grab C=Comp	# Of Cont.	Metals	LEPH_HEPH	Total Oil	BTEX & VPH (N, Methanol)
LC_RLPB_SO_May-2023_NP1	LC_RLPB	SO	No	5/18/2023	15:30	G	8	2	2	2	2
LC_RLPB_SO_May-2023_NP2	LC_RLPB	SO	No	5/18/2023	15:30	G	8	2	2	2	2
LC_RLPB_SO_May-2023_NP3	LC_RLPB	SO	No	5/18/2023	15:35	G	8	2	2	2	2
LC_RLPB_SO_May-2023_NP4	LC_RLPB	SO	No	5/18/2023	15:35	G	8	2	2	2	2

Environmental Division
Calgary
Work Order Reference
CG2306508

Telephone : +1 403 407 1800

ADDITIONAL COMMENTS/SPECIAL INSTRUCTIONS	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
Be sure to measure for: total benzene, total ethylbenzene, total toluene, total xylene	D.Tymstra/ K. Lindenbach	18-May-23		5/19 9:00

SERVICE REQUEST (rush - subject to availability)					
Regular (default)	X	Sampler's Name	K. Lindenbach	Mobile #	
Priority (2-3 business days) - 50% surcharge					
Emergency (1 Business Day) - 100% surcharge		Sampler's Signature		Date/Time	May 18, 2023
For Emergency <1 Day, ASAP or Weekend - Contact ALS					

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Appendix C – Summary of Spills and Incidents Reported to Emergency Management BC

Summary of Spill and Incidents Reported to Emergency Management BC Throughout 2023

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
1	7-Jan-23	Spill	Hydraulic Oil	200	MTM	Failure of a hydraulic line. This unit lost approximately 200L of hydraulic oil. Enviro, LPO, and Ops were notified.	Complete	230081
2	12-Jan-23	Spill	Pit Effluent	Unknown	MSX Pit	The sample results for November 17, 2022 showed 70% mortality to rainbow trout through a pH controlled acute toxicity test after 96 hours, as analyzed by Nautilus Environmental, a third-party laboratory. Mortality to rainbow trout through standard acute toxicity test after 96 hours was 100%.	Complete	223310
3	19-Jan-23	Spill	Hydraulic Oil	391	MTM	Failure of a hoist line oring connected to a block under the cab. There was no oil on the ground where the loader was. The leak was over a few hours and spread throughout the BRN pit. No clean up will be required. Leak was repaired. Lost 391L of AST 30 to the ground.	Complete	230258
4	22-Jan-23	Spill	Hydraulic Oil	155	MTM	Failure of an O-Ring on the main hydraulic pump output hose. No notable spill was seen on the ground, the machine was operating in MTM all day and the oil would of been spread around the pit due to the leak being slow. No clean up required	Complete	230284
5	23-Jan-23	Spill	Hydraulic Oil	393	BRN	Failed O-Ring on a pipe coming off of the hydraulic valve on the front of the Loader. Replaced the O-Ring and tested. Service person filled up hydraulic back to operating level. Top up was 393L of hydraulic oil. The leak was a steady stream, but was not leaving more than a small trail of oil where it went. Going over path of loader over the shift no oil puddles were noted, so unable to do any clean up. PEP called.	Complete	230285

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
6	25-Jan-23	Spill	Hydraulic Oil	120	Haul Roads	Failed hydraulic line. On January 25th at 17:48 there was a reported top up for HT214 of AST30 Hydraulic oil this was inspected and noted to be leaking it was leaking at a slow rate over time so it would have leaked over a period of a number of days, Mechanic was dispatched on knowledge of the top up, plan in progress to repair leak.	Complete	230340
7	27-Jan-23	Spill	Hydraulic Oil	120	2176 MTM	Failed hydraulic line. Approximately 120L of hydraulic oil was lost to ground. Ops, Enviro, LPO, and PEP notified.	Complete	230351
8	30-Jan-23	Spill	Hydraulic Oil	327	MTM	Failed hydraulic line. On Jan 30th at around 3:30 am EX815 called in with a hydraulic leak. When the mechanic got to the machine they found a -6 hydraulic line blown. We built a new line in house and installed. The machine lost 327L of Hydraulic oil over the course of the shift. No area had a significant amount of oil that would be able to clean up. Soaker pads were deployed at the location of repair and they were disposed of in the contaminated waste bins.	Complete	230382

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
9	1-Feb-23	Spill	Other	120m3	BRN	Blast in Burnt Ridge North (BRN) on January 24, 2023 caused an avalanche of approximately 120 m3 of snow, mixed with an unknown quantity of cast over material, to slide down the west slope of BRN and created approximately 0.11 ha of new disturbance outside of the C-129 boundary within the Grace Creek catchment. Review of drone imagery data indicates the material came to rest where the topography levelled out on a historical exploration road surface, about 64 m outside of the C-129 permit boundary and at an at angle less than 26^{o}. The disturbance was identified through review of the blast video and confirmed with a drone flight of the area. Blast guards were in place and personnel were clear of the potential run-out zone.	Complete	230423
10	4-Feb-23	Spill	Hydraulic Oil	865	MTM	Failed O-Ring on the RHS hoist pump. HT224 was hauling out of the lower bench on MTM off of SH501 when an adjacent operator noticed a leak coming from HT224. HT224 was notified over the radio of a possible leak on their truck and stopped; they identified a hydraulic leak and called Running Repair. Upon inspection by a mechanic, a failed O-ring off of the RHS of the hoist pump going to the hydraulic filters was found. Approximately 865L of hydraulic oil were lost to ground. Spill contained, operations, environmental, LPO and PEP were notified.	Complete	230462

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
11	4-Feb-23	Spill	Hydraulic Oil	137	BRN	Failed O-Ring on the brake filter pipe flange. On Feb 4th 2023 HT368 went down with a hydraulic leak. When the mechanics went to unit they found 3 out of 4 bolts holding the pipe flange to the brake filter and it blew out the O-Ring. Extracted bolts and installed new O-Ring. Soaker pads were put down, but the leak stopped by the time the operator got to it. 137L of hydraulic oil was lost. Small clean up will be done to spill area, not all oil was lost at site truck went down.	Complete	230479
12	7-Feb-23	Spill	Other		CCR	On February 7, 2023, water pooling on the ERX Coarse Coal Reject (CCR) facility eroded through berm, causing a release of sediment-laden water to the downstream environment outside of the C-129 permit boundary. The release reported to previously impacted vegetated area downstream that is 200 m outside of the permit boundary (at its furthest extent) and approximately 800 m from the Elk River. At the time of discovery, the sediment-laden water was found to be flowing over the surface of previously deposited material and pooling in the valley bottom adjacent to the hillside and the observed deposited material; there was no apparent surface water connection of the water or material from the affected area to any other surface water receiving environment (e.g., Elk River).	Complete	230516
13	8-Feb-23	Spill	Pit Effluent		MSAW Pit Well	The sample collected from the MSAW 6 well on February 8, 2023 and preliminary results show an acute toxicity failure to daphnia magna.	Complete	230603

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
14	9-Feb-23	Spill	Pit Effluent		MSX Pit	The sample results for November 17, 2022 showed 70% mortality to rainbow trout through a pH controlled acute toxicity test after 96 hours, as analyzed by Nautilus Environmental, a third-party laboratory. Mortality to rainbow trout through standard acute toxicity test after 96 hours was 100%.	Complete	223310
15	17-Feb-23	Spill	Hydraulic Oil	248	NLC Stockpiles	Loader hoist cylinder line blew seal and lost its oil.	Complete	230654
16	17-Feb-23	Spill	Coolant	750	BRN	Rock impacted truck resulting a coolant pipe release.	Complete	230661
17	20-Feb-23	Spill	Hydraulic Oil	169.3	NLC Stockpiles	Failed plug on the power train torque housing resulting in a spill over an hour or two.	Complete	230692
18	22-Feb-23	Spill	Hydraulic Oil	113	1.5 km	LDR418 had a O-ring seal fail on a steering line and lost some oil	Complete	230730
19	25-Feb-23	Spill	Clarified Water	500	Wash Plant	plant went down and the wrong floor sump was shut off and the plants bottom floor flooded out and some water went out the man door on the north side of the plant.	Complete	230752
20	28-Feb-23	Spill	Clarified Water	5000	Wash Plant	At approx. 1800, while we were working on 05 clean coal thickener overflow pump, the water overflowing from the thickener overpower the floor sumps, slowly building up to the point it ran out of the man door on the west side of the plant. From there the water ran downhill and into the ditch adjacent to the dryer.	Complete	230785
21	28-Feb-23	Spill	Coolant	686	BRN	HT365 had a coolant leak off a brake cooling pipe when truck was refilled it took 686 liters of which 370 liters was captured the rest was leaking while truck was moving so spread the coolant over a large distance.	Complete	230787
22	5-Mar-23	Spill	Hydraulic Oil	475	1840 Coal Stockpile	Failed hydraulic line.	Complete	230845

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
23	8-Mar-23	Spill	Hydraulic Oil	128	1840 Coal Stockpile	Failed hydraulic line on the front end.	Complete	230878
24	9-Mar-23	Spill	Hydraulic Oil	410.2	MTM	Failed o-O-Ring in the AFT/Air separator filter. Oil lost down drill holes overtime.	Complete	230899
25	9-Mar-23	Spill	Transmission Oil	180	MTM	Failed air compressor. Oil lost to drill holes.	Complete	230902
26	10-Mar-23	Spill	Pit Effluent	unknown	MSX Pit	The sample results for November 17, 2022 showed 70% mortality to rainbow trout through a pH controlled acute toxicity test after 96 hours, as analyzed by Nautilus Environmental, a third-party laboratory. Mortality to rainbow trout through standard acute toxicity test after 96 hours was 100%.	Complete	223310
27	16-Mar-23	Spill	Hydraulic Oil	122	Main Haul Road	Failed hydraulic line. Updated spill volume from 200L to 122 L on April 14 2023, based on reporting post repairs.	Complete	230989
28	17-Mar-23	Spill	Hydraulic Oil	463	MTM	Failed steering line.	Complete	231005
29	18-Mar-23	Spill	clarified water	2000	Breaker Plant	Plugged sump resulted in 2000L flowing out the Breaker plant access door.	Complete	231019
30	25-Mar-23	Spill	Hydraulic Oil	429.9	2176 marshalling area	Cracked fitting on hydraulic brake line.	Complete	231107
31	6-Apr-23	Spill	coolant	529.1	BRN	Damage to coolant line.	Complete	231240
32	10-Apr-23	Spill	coolant	354.7	1 km Haul Road	Failed coolant pipe hose clamp. 200L were contained and recovered in pool.	Complete	231286
33	13-Apr-23	Spill	coolant	525.6	BRN	Failed heater hose clamp due to mud build-up on truck.	Complete	231322
34	18-Apr-23	Spill	Hydraulic Oil	300	7 km Main Haul Road	Failed hydraulic line fitting.	Complete	231385
35	18-Apr-23	Spill	clarified water	600	Plant Dryer	Plugged sump in dryer building resulted in 600L water flowing out the plant access door.	Complete	231400

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
36	19-Apr-23	Spill	Other	500	Plant Septic Tile Field	Raw sewage at surface from Plant Septic Tile System	Complete	231434
37	22-Apr-23	Spill	Hydraulic Oil	1300	MTM 2176	Failed brake cooling line.	Complete	231447
38	30-Apr-23	Spill	engine oil	250	BRN 2200	Failed oil circulation line.	Complete	231543
39	2-May-23	Spill	Other	1 m3	798 sump	Melt water seepage into 798 sump overloaded capacity, causing it to overflow. Flow bypassed other sumps and flowed to Line Creek, leading to a spill of sediment-laden water	Complete	231562
40	7-May-23	Spill	Hydraulic Oil	210	MTM 2176	HT369 had a failed brake filter housing and resulted in 210L of Hydraulic oil spilling along the mine roads near MTM.	Complete	231648
41	7-May-23	Spill	Hydraulic Oil	(210) 69.7	MTM 2176	HT357 had a failed filter housing and resulted in 210L of Hydraulic oil spilling along the mine roads near MTM2176. ** Called EMBC to update volume from 210 L to 69.7L based on top-up after repairs.	Complete	231649
42	11-May-23	Spill	Hydraulic Oil	110	Stn 0	Failed hydraulic coupling.	Complete	231722
43	14-May-23	Spill	Hydraulic Oil	234	NLC Stockpiles	Failed hydraulic line.	Complete	231747
44	14-May-23	Spill	Hydraulic Oil	121	MTM 2260	Failed steering line.	Complete	231754
45	17-May-23	Spill	Hydraulic Oil	202	BRN	Failed brake cooling line fitting.	Complete	231814
46	17-May-23	Spill	Coolant	386	MTM	Failed coolant line.	Complete	231817
47	18-May-23	Spill	Hydraulic Oil	300	BRN 2260	Failed hydraulic control valve.	Complete	231834
48	21-May-23	Spill	Hydraulic Oil	550	MTM	Two failed hydraulic lines.	Complete	231885

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
49	19-May-23	Spill	Fugitive Dust	unknown	Grave Lake	On 3:07pm of Friday May 19, an email was received by from the Teck Manager, Social Responsibility that members of the public at Grave Lake had posted photos to a social media site showing dust on Grave Lake near the public beach/boat launch. In addition, phone calls were received by the Teck Social Responsibility Group from public members stating that there was a "coal dust sheen" on the lake. A request in the email was made of LCO Environmental staff to inspect Grave Lake on Friday May 19 after the email was received to see if there was dust present on the lake. Teck LCO Environment staff visited Grave Lake on Friday May 19 afternoon and found no dust at the Grave Lake boat launch. There were no samples taken as there was no dust floating on the water to be sampled.	Complete	231911
50	24-May-23	Spill	Fugitive Dust	unknown	Dryer Stack	At Approximately 12:33 PM the recirculation pump for the Dryer scrubber went down on a local stop start alarm, most likely due to wash down in which the water stream hit the switch. This caused a hard shut down of the dryer which dropped coal on the deck causing it to burn and discharge black smoke out the exhaust stack.	Complete	231956
51	25-May-23	Spill	Hydraulic Oil	155	MTM	Cracked steel pipe on hydraulic tank.	Complete	231962
52	26-May-23	Spill	Hydraulic Oil	284	Truck dump	Failed brake filter flange O-Ring.	Complete	231985
53	29-May-23	Spill	Hydraulic Oil	327	MTM	Failed O-Ring on pump hydraulic line.	Complete	232007
54	1-Jun-23	Spill	Hydraulic Oil	149	MTM	Failed O-Ring on pump hydraulic line.	Complete	232053

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
55	3-Jun-23	Spill	clarified water	10000	Met Plant	Failed hose on return sump pump.	Complete	232076
56	7-Jun-23	Spill	Hydraulic Oil	131	2176 Spoil	failed O-Ring on hydraulic line.	Complete	232115
57	7-Jun-23	Spill	Hydraulic Oil	124.2	MSB Shop	Failed hydraulic line	Complete	232146
58	8-Jun-23	Spill	Hydraulic Oil	151.7	MTM	Failed Filter Seal	Complete	232147
59	12-Jun-23	Spill	Hydraulic Oil	400	1840 Stockpiles	Loose bolt on flange clamp.	Complete	232187
60	15-Jun-23	Spill	Hydraulic Oil	180	WLC	Contractor work on Reclamation WLC site: hydraulic line failure- contains coolant fluid and disposed of in blue bin.	Complete	232255
61	4-Jul-23	Spill	Hydraulic Oil	447.1	Pits	Failed hydraulic hose.	Complete	232453
62	5-Jul-23	Spill	Gear Oil	168	2176 Dump	Rock hit haul truck differential, causing it to break	Complete	232469
63	7-Jul-23	Spill	Hydraulic Oil	500	Main Coal Haul Rd	Failed hydraulic hose.	Complete	232510
64	7-Jul-23	Spill	clarified water	1000	Wash Plant	equipment failure - overwhelmed sumps	Complete	232512
65	11-Jul-23	Spill	Hydraulic Oil	218	MTM	equipment damage causing steering pump suction pipe hydraulic hose to dislodge.	Complete	232567
66	12-Jul-23	Spill	Fugitive Dust	unknown	GL 5334	Fugitive dust on Grave Lake, reported by Cabin owner.	Complete	232578
67	15-Jul-23	Spill	Hydraulic Oil	219	2170	Failed hydraulic hose fitting. Spill over distance on pit roads, fluid under truck clean up with absorbent pads.	Complete	232607
68	23-Jul-23	Spill	Coolant	300	2176 Spoil	Fan shaft failure caused fan to break loose and hit coolant line.	Complete	232731
69	23-Jul-23	Spill	Hydraulic Oil	400	2170	Hydraulic leak caused by failed hose.	Complete	232732
70	25-Jul-23	Spill	Hydraulic Oil	341	2176	Failed O ring	Complete	232783

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
71	26-Jul-23	Spill	Hydraulic Oil	125.6 (original reported 250L)	BRN 2200	RH steering cylinder ball stud had snapped in half causing damage to the steering lines.	Complete	232787
72	29-Jul-23	Spill	coolant	680	Haul Roads	HT360 had a failed hose that resulted in a release of 680 L of coolant along the coal haul road	Complete	232833
73	30-Jul-23	Spill	clarified water	800	Plant	800 L of clarified water was released out of the process plant.	Complete	232844
74	31-Jul-23	Spill	coolant	300 L (originally reported at 600L)	MTM	Puncture coolant pipe. Reported to EMBC as 600L spill however top-up volume was 500L and 200L was captured in a barrel. Therefore 300L total lost to ground - EMBC updated 9:50 am Aug 1st 2023 by Erin Richan.	Complete	232847
75	2-Aug-23	Spill	Hydraulic Oil	137.9	Pits	RH Steering cylinder line failure.	Complete	232903
76	7-Aug-23	Spill	coolant	531	Truck Dump	Failed water hose.	Complete	232963
77	7-Aug-23	Spill	Hydraulic Oil	120	CCR	Fail O-ring on hydraulic line	Complete	232967
78	13-Aug-23	Spill	Fugitive Dust	TBD	Grave Lake	Fugitive dust reported on GL by cabin owner	Complete	233199
79	18-Aug-23	Spill	Diesel	4500	BRX Pit	main fuel line off the bottom of the fuel tank come loose and fall off. This tank was recently removed and reinstalled and the clamps had come loose.	Complete	233144
80	20-Aug-23	Spill	Hydraulic Oil	139	2176	On August 20th at 11AM HT216 has a fire on the 2176 spoil. After fire suppression went off mechanics were able to find a failed hoist hydraulic line that sprayed oil onto the exhaust pipe causing the fire. Hose was a auxiliary hose and was removed and capped off.	Complete	233161
81	21-Aug-23	Spill	Hydraulic Oil	50.7 L (originally reported at 500L)	2170	Failed hydraulic hose. EMBC updated actual volume Aug 23 2023 7:35 am by Erin Richan.	Complete	233173
82	26-Aug-23	Spill	coolant	392	BRN	Failed coolant line.	Complete	233260

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
83	5-Sep-23	Spill	Hydraulic Oil	198 L (100 estimate)	BRN	Failed RH propel motor. EMBC updated on spill volume Sept 8 2023 by Erin Richan.	Complete	233424
84	10-Sep-23	Spill	Hydraulic Oil	285.8 (Originally report 105.2 L)	BRN	Failed brake line. EMBC Updated Sept 12 2023.	Complete	233476
85	12-Sep-23	Spill	Hydraulic Oil	106.7L	NLC Coal Stockpile	Transmission leak.	Complete	233524
86	14-Sep-23	Spill	Fugitive Dust		Grave Lake	Responding to community feedback regard spill	Complete	233544
87	16-Sep-23	Spill	Hydraulic Oil	484.7	Pits	Failed hydraulic line.	Complete	233564
88	2-Oct-23	Spill	Transmission Oil	118	MTM	Failed hydraulic line.	Complete	233795
89	3-Oct-23	Spill	Hydraulic Oil	500	2170 WT	Failed duo cone seal..	Complete	233812
90	4-Oct-23	Spill	clarified water	500	Plant Breaker	Failed gravity fed sump.	Complete	233825
91	4-Oct-23	Spill	Hydraulic Oil	122	BRN	Failed sand line wind control.	Complete	233831
92	5-Oct-23	Spill	Engine Oil	116	1840 WT	Failed compressor.	Complete	233865
93	10-Oct-23	Spill	clarified water	600	Thermal Plant	tank overfill	Complete	233903
94	17-Oct-23	Spill	Other	120	CCR	12 vacuum truck loads of dredging effluent were removed from the EVO Harmer Dam and dumped on LCO CCR	Complete	234014
95	22-Oct-23	Spill	Hydraulic Oil	114	BRN	Failed hydraulic line.	Complete	234092
96	23-Oct-23	Spill	Hydraulic Oil	307	Pits		Complete	234108

Number	Date	Type	Substance	Spill Volume (L)	Location Name	Description of Incident	Corrective Status	DGIR#
97	25-Oct-23	Spill	Other	20	Mine Shop	Contractor dug up and impacted natural gas line. Approx 20 m3 gas was released to the environment before it was shut off.	Complete	243160
98	26-Oct-23	Spill	Hydraulic Oil	186 (646)	MTM	failed hydraulic fitting. Initially reported at 646 L spill, updated volume of 186 L by LPO 2023-10-26.	Complete	234166
99	28-Oct-23	Spill	Transmission Oil	140	3.5 km	Failed hydraulic line.	Complete	234197
100	14-Nov-23	Spill	Hydraulic Oil	231	MTM	Failed hydraulic hose. Originally reported as 800L, updated to 259.9L after repairs and top up. EMBC called Nov 27 by E Richan.	Complete	234453
101	21-Nov-23	Spill	Hydraulic Oil	800 (259.9)	MTM	Failed O-Ring on high pressure hydraulic hose.	Complete	234543
102	30-Nov-23	Spill	Hydraulic Oil	134	BRN	Equipment damage - tire blew causing damage to rear brakes cooling pipe.	Complete	234674
103	1-Dec-23	Spill	Hydraulic Oil	800	2176	Clean Coal Thickener tank overfill.	Complete	234676
104	11-Dec-23	Spill	Clarified Water	1000	Wash Plant		Complete	234858

Appendix D – Summary of LCO Plant Unauthorized Discharges

Summary of LCO Coal Production Plant Unauthorized Discharges Throughout 2023

Date of Non-compliance	DGIR#	Date Reported	Type of Material Spilled	Volume (L)	Location	Cause	Corrective Actions
25-Feb-23	230752	25-Feb-23	Clarified water	500	Wash Plant	Plant went down and the incorrect floor sump was shut off which resulted in flooding of the plant bottom floor.	Conducted incident investigation and documented corrective action tasks. Automated the flow direction of clarified waster during operating and non-operating events for the sump pumps. Initiated training to ensure operators notify the control room of which floor sump to disengage when the plant goes down. Ensure that Change Management is used for any changes to the design and operation of the process plant to ensure all departments are aware of new procedures.
28-Feb-23	230785	28-Feb-23	Clarified water	5,000	Wash Plant	While working on the 05 clean coal thickener overflow pump, the water overflowing from the thickener overpowered the floor sumps which resulted in a sump overflow.	Created an "upset condition" plant floor management document which standardizes a response to plant equipment failures.
18-Mar-23	231019	18-Mar-23	Clarified water	2,000	Breaker Plant	Plugged sump resulted in water overflow.	Developed a clean up plan for sumps within the process plant that includes procedures and follow up inspections.
18-Apr-23	231400	18-Apr-23	Clarified water	600	Plant Dryer	Plugged sump resulted in water overflow.	Discussed with operator importance of when hosing the dryer floor to use water at the sump to keep liquid in the sump.
3-Jun-23	232076	03-Jun-23	Clarified water	10,000	Met Plant	Failed hose on return sump pump.	Completed investigation and trained control room operators to react quickly when the clarified water tank level goes down.
7-Jul-23	232512	07-Jul-23	Clarified water	1,000	Wash Plant	Equipment failure - overwhelmed sumps.	Ensured effective operation of the new fines area floor sump by developing a guidance procedure for unplanned ad-hoc work.
30-Jul-23	232844	30-Jul-23	Clarified water	800	Plant	PLC equipment failure.	Engaged contractor to clean the plates within the Reflux valve of the plant to gain a better understanding of the PLC error. Noted there is insufficient sump capacity on the plant floor to manage additional water when equipment failures occur, so an additional sump was added to increase sump capacity.
4-Oct-23	233825	04-Oct-23	Clarified water	500	Plant Breaker	Failed gravity fed sump.	Regular checks are completed when the breaker operator is helping on the belt. A high level probe was installed on the sump for alarming of overflow when no person is present.
10-Oct-23	233903	10-Oct-23	Clarified water	600	Thermal Plant	Tank overfill, OEM change.	Notified the manufacturer of the panels that are built for the thermal dilute tank. Manufacturer is required to advise the customer of any changes to the OEM which may affect operations.
11-Dec-23	234858	12-Dec-23	Clarified Water	1,000	Wash Plant	Clean Coal Thickener tank overfill.	Lowered floatation cell levels and put less dryer return to the thickener that allows the clarified tank level to recover, and ensured that when the CC thickener clarified tank level is running high that plant operators are notified and the proper steps can be taken to lower the level.

Appendix E – Field Duplicates

			Location:	LC_LC7	LC_LC7		
			Sample ID:	LC_LC7_MNT_2023-02-07_N	LC_CC1_MNT_2023-02-07_N		
			Date Sampled:	2/6/2023	2/6/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.18	0.16	11.76%	Pass

			Location:	LC_LC7	LC_LC7		
			Sample ID:	LC_LC7_MNT_2023-11-06_N	LC_CC2_MNT_2023-11-06_N		
			Date Sampled:	11/7/2023	11/7/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.5	1.1	30.77%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.54	0.4	29.79%	Pass

			Location:	LC_LC5	LC_LC5		
			Sample ID:	LC_LC5_WS_Q1-2023_N	LC_CC1_WS_Q1-2023_N		
			Date Sampled:	1/5/2023	1/5/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.1	75.00%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.16	0.13	20.69%	Pass-1

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_MNT_2023-02-07_N	LC_CC2_MNT_2023-02-07_N		
			Date Sampled:	2/6/2023	2/6/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.3	88.89%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.16	0.24	40.00%	Pass-1

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_MNT_2023-12-04_N	LC_CC2_MNT_2023-12-04_N		
			Date Sampled:	12/4/2023	12/4/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.18	0.14	25.00%	Pass-1

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2023-01-23_N	LC_CC1_WS_2023-01-23_N		
			Date Sampled:	1/23/2023	1/23/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.2	82.35%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.14	0.46	106.67%	Pass-1

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2023-05-08_N	LC_CC1_WS_2023-05-08_N		
			Date Sampled:	5/8/2023	5/8/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	6.1	5.4	12.17%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	3.21	3.8	16.83%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2023-05-15_N	LC_CC1_WS_2023-05-15_N		
			Date Sampled:	5/15/2023	5/15/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.4	2.4	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	1.17	1.53	26.67%	Pass-2

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2023-07-10_N	LC_CC1_WS_2023-07-10_N		
			Date Sampled:	7/10/2023	7/10/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.8	1.9	5.41%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.26	0.24	8.00%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2023-08-21_N	LC_CC1_WS_2023-08-21_N		
			Date Sampled:	8/21/2023	8/21/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.6	3.6	76.92%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.34	0.24	34.48%	Pass-1

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2023-10-09_N	LC_CC1_WS_2023-10-09_N		
			Date Sampled:	10/10/2023	10/10/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.3	<0.5	128.57%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.15	0.3	66.67%	Pass-1

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2023-10-30_N	LC_CC1_WS_2023-10-30_N		
			Date Sampled:	10/30/2023	10/30/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.8	2.7	3.64%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.13	0.32	84.44%	Pass-1

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_2023-12-27_N	LC_CC1_WS_2023-12-27_N		
			Date Sampled:	12/27/2023	12/27/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.4	1.2	15.38%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.26	0.3	14.29%	Pass

			Location:	LC_LC4	LC_LC4		
			Sample ID:	LC_LC4_WS_Q3-2023_N	LC_CC1_WS_Q3-2023_N		
			Date Sampled:	7/4/2023	7/4/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.5	1.8	18.18%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.21	0.25	17.39%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-01-16_N	LC_CC1_WS_2023-01-16_N		
			Date Sampled:	1/16/2023	1/16/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.1	75.00%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.34	0.31	9.23%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-03-13_N	LC_CC1_WS_2023-03-13_N		
			Date Sampled:	3/13/2023	3/13/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.9	2	5.13%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.37	0.37	0.00%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-03-20_N	LC_CC1_WS_2023-03-20_N		
			Date Sampled:	3/20/2023	3/20/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.6	1.8	36.36%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.63	0.44	35.51%	Pass-1

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-04-10_N	LC_CC1_WS_2023-04-10_N		
			Date Sampled:	4/12/2023	4/12/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.9	2.1	10.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.72	0.54	28.57%	Pass-2

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-05-22_N	LC_CC1_WS_2023-05-22_N		
			Date Sampled:	5/23/2023	5/23/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1	66.67%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.34	0.33	2.99%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-06-05_N	LC_CC2_MNT_2023-06-06_N		
			Date Sampled:	6/6/2023	6/6/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.2	82.35%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.36	0.32	11.76%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-06-19_N	LC_CC1_WS_2023-06-19_N		
			Date Sampled:	6/19/2023	6/19/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.8	113.04%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.19	0.21	10.00%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-06-26_N	LC_CC1_WS_2023-06-26_N		
			Date Sampled:	6/26/2023	6/26/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.2	5.8	**131.43%**	Fail
TURBIDITY, LAB	0.1	0.1	ntu	0.25	0.61	**83.72%**	Fail

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-08-14_N	LC_CC1_WS_2023-08-14_N		
			Date Sampled:	8/15/2023	8/15/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.1	2.2	4.65%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.14	0.2	35.29%	Pass-1

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-08_N_KWL	LC_CC1_WS_2023-08_NP_KWL		
			Date Sampled:	8/2/2023	8/2/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.0	1.3	42.42%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.28	0.23	19.61%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-09-11_N	LC_CC1_WS_2023-09-11_N		
			Date Sampled:	9/12/2023	9/12/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.3	88.89%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.20	0.3	40.00%	Pass-1

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-09-18_N	LC_CC1_WS_2023-09-18_N		
			Date Sampled:	9/18/2023	9/18/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.2	<0.5	82.35%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.14	0.16	13.33%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-09-25_N	LC_CC1_WS_2023-09-25_N		
			Date Sampled:	9/26/2023	9/26/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.1	2.1	62.50%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.28	0.28	0.00%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-11-13_N	LC_CC1_WS_2023-11-13_N		
			Date Sampled:	11/13/2023	11/13/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.2	4.1	109.43%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.81	0.41	**65.57%**	Fail

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_2023-11-27_N	LC_CC1_WS_2023-11-27_N		
			Date Sampled:	11/27/2023	11/27/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	4.2	<0.5	157.45%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.46	0.22	70.59%	Pass-1

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_Q1-2023_N	LC_CC2_WS_Q1-2023_N		
			Date Sampled:	1/3/2023	1/3/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.8	2.4	28.57%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.28	0.2	33.33%	Pass-1

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_Q3-2023_N	LC_CC2_WS_Q3-2023_N		
			Date Sampled:	7/4/2023	7/4/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.21	0.25	17.39%	Pass

			Location:	LC_LC3	LC_LC3		
			Sample ID:	LC_LC3_WS_Q4-2023_N	LC_CC1_WS_Q4-2023_N		
			Date Sampled:	10/4/2023	10/4/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	4.0	5	22.22%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.41	0.41	0.00%	Pass

Location:				LC_LC2	LC_LC2		
Sample ID:				LC_LC2_MNT_2023-03-07_N	LC_CC2_MNT_2023-03-07_N		
Date Sampled:				3/10/2023	3/10/2023		
Sample Type:				**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.2	82.35%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.60	0.5	18.18%	Pass

Location:				LC_LC2	LC_LC2		
Sample ID:				LC_LC2_MNT_2023-08-08_N	LC_CC2_WS_2023-08-09_N		
Date Sampled:				8/9/2023	8/9/2023		
Sample Type:				**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.12	0.13	8.00%	Pass

Location:				LC_LC2	LC_LC2		
Sample ID:				LC_LC2_MNT_2023-09-04_N	LC_CC1_MNT_2023-09-04_N		
Date Sampled:				9/5/2023	9/5/2023		
Sample Type:				**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.3	<0.5	88.89%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.18	0.11	48.28%	Pass-1

Location:				LC_LC2	LC_LC2		
Sample ID:				LC_LC2_WS_Q1-2023_N	LC_CC1_WS_2023-01-09_N		
Date Sampled:				1/9/2023	1/9/2023		
Sample Type:				**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.22	0.25	12.77%	Pass

Location:				LC_LC2	LC_LC2		
Sample ID:				LC_LC2_WS_Q4-2023_N	LC_CC2_WS_Q4-2023_N		
Date Sampled:				10/4/2023	10/4/2023		
Sample Type:				**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.1	<0.5	75.00%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	<0.050	<0.05	0.00%	Pass

Location:				LC_LC1	LC_LC1		
Sample ID:				LC_LC1_MNT_2023-05-02_N	LC_CC2_MNT_2023-05-02_N		
Date Sampled:				5/4/2023	5/4/2023		
Sample Type:				**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	3.5	2.9	18.75%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	1.31	1.64	22.37%	Pass-2

Location:				LC_LC1	LC_LC1		
Sample ID:				LC_LC1_MNT_2023-08-08_N	LC_CC1_WS_2023-08-09_N		
Date Sampled:				8/9/2023	8/9/2023		
Sample Type:				**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.050	0.11	75.00%	Pass-1

Location:				LC_SLC	LC_SLC		
Sample ID:				LC_SLC_MNT_2023-09-04_N	LC_CC2_MNT_2023-09-04_N		
Date Sampled:				9/5/2023	9/5/2023		
Sample Type:				**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.6	104.76%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.15	0.19	23.53%	Pass-1

			Location:	LC_SLC	LC_SLC		
			Sample ID:	LC_SLC_WS_2023-02-20_N	LC_CC1_WS_2023-02-20_N		
			Date Sampled:	2/21/2023	2/21/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.50	<0.05	163.64%	Pass-1

			Location:	LC_SLC	LC_SLC		
			Sample ID:	LC_SLC_WS_2023-10-16_N	LC_CC1_WS_2023-10-16_N		
			Date Sampled:	10/16/2023	10/16/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	2.8	139.39%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.10	0.18	57.14%	Pass-1

			Location:	LC_SLC	LC_SLC		
			Sample ID:	LC_SLC_WS_Q2-2023_N	LC_CC2_WS_Q2-2023_N		
			Date Sampled:	4/5/2023	4/5/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.050	0.43	158.33%	Pass-1

			Location:	LC_LCUSWLC	LC_LCUSWLC		
			Sample ID:	LC_LCUSWLC_WS_2023-03-27_N	LC_CC1_WS_2023-03-27_N		
			Date Sampled:	3/27/2023	3/27/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	2.2	125.93%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.30	0.48	46.15%	Pass-1

			Location:	LC_LCUSWLC	LC_LCUSWLC		
			Sample ID:	LC_LCUSWLC_WS_2023-04-24_N	LC_CC1_WS_2023-04-24_N		
			Date Sampled:	4/24/2023	4/24/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.2	1.3	8.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.10	0.35	111.11%	Pass-1

			Location:	LC_LCUSWLC	LC_LCUSWLC		
			Sample ID:	LC_LCUSWLC_WS_2023-07-31_N	LC_CC1_WS_2023-07-31_N		
			Date Sampled:	7/31/2023	7/31/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.1	4.7	124.14%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.39	1.55	**119.59%**	Fail

			Location:	LC_LCUSWLC	LC_LCUSWLC		
			Sample ID:	LC_LCUSWLC_WS_2023-08-28_N	LC_CC1_WS_2023-08-28_N		
			Date Sampled:	8/28/2023	8/28/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.0	1	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.24	0.3	22.22%	Pass-1

			Location:	LC_LCUSWLC	LC_LCUSWLC		
			Sample ID:	LC_LCUSWLC_WS_2023-09-11_N	LC_CC3_WS_2023-09-11_N		
			Date Sampled:	9/12/2023	9/12/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.22	0.28	24.00%	Pass-1

			Location:	LC_LCUSWLC	LC_LCUSWLC		
			Sample ID:	LC_LCUSWLC_WS_2023-10-23_N	LC_CC1_WS_2023-10-23_N		
			Date Sampled:	10/23/2023	10/23/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	6.1	<0.5	**169.70%**	Fail
TURBIDITY, LAB	0.1	0.1	ntu	2.29	0.32	**150.96%**	Fail

			Location:	LC_LCUSWLC	LC_LCUSWLC		
			Sample ID:	LC_LCUSWLC_WS_2023-12-18_N	LC_CC1_WS_2023-12-18_N		
			Date Sampled:	12/18/2023	12/18/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.20	0.19	5.13%	Pass

			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_MNT_2023-03-07_N	LC_CC1_MNT_2023-03-07_N		
			Date Sampled:	3/6/2023	3/6/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	4.5	4.8	6.45%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.050	0.14	94.74%	Pass-1

			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_MNT_2023-05-02_N	LC_CC1_MNT_2023-05-02_N		
			Date Sampled:	5/1/2023	5/1/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.1	75.00%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	<0.050	<0.05	0.00%	Pass

			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_MNT_2023-11-06_N	LC_CC1_MNT_2023-11-06_N		
			Date Sampled:	11/6/2023	11/6/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.2	2.3	4.44%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.12	0.18	40.00%	Pass-1

			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_WS_2023-02-13_N	LC_CC1_WS_2023-02-13_N		
			Date Sampled:	2/13/2023	2/13/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.050	<0.05	0.00%	Pass

			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_WS_2023-02-27_N	LC_CC1_WS_2023-02-27_N		
			Date Sampled:	2/27/2023	2/27/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.0	1.4	35.29%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	<0.050	<0.05	0.00%	Pass

			Location:	LC_WLC	LC_WLC		
			Sample ID:	LC_WLC_WS_2023-05-29_N	LC_CC1_WS_2023-05-29_N		
			Date Sampled:	5/29/2023	5/29/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	2.8	139.39%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.11	0.33	100.00%	Pass-1

			Location:	LC_LCDSSLCC	LC_LCDSSLCC		
			Sample ID:	LC_LCDSSLCC_MNT_2023-03-07_N	LC_CC1_WS_2023-12-11_N		
			Date Sampled:	3/7/2023	3/7/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.14	0.29	69.77%	Pass-1

			Location:	LC_LCDSSLCC	LC_LCDSSLCC		
			Sample ID:	LC_LCDSSLCC_WS_2023-07-24_N	LC_CC1_WS_2023-07-24_N		
			Date Sampled:	7/24/2023	7/24/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.9	2.5	27.27%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.19	0.26	31.11%	Pass-1

			Location:	LC_LCDSSLCC	LC_LCDSSLCC		
			Sample ID:	LC_LCDSSLCC_WS_2023-11-20_N	LC_CC1_WS_2023-11-20_N		
			Date Sampled:	11/20/2023	11/20/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.5	1.9	27.27%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.22	0.22	0.00%	Pass

			Location:	LC_LCDSSLCC	LC_LCDSSLCC		
			Sample ID:	LC_LCDSSLCC_WS_Q2-2023_N	LC_CC1_WS_Q2-2023_N		
			Date Sampled:	4/3/2023	4/3/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	4.0	<0.5	155.56%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.40	0.52	26.09%	Pass

			Location:	LC_DCEF	LC_DCEF		
			Sample ID:	LC_DCEF_MNT-2023-02-07_N	LC_CC3_MNT-2023-02-07_N		
			Date Sampled:	2/7/2023	2/7/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.050	<0.05	0.00%	Pass

			Location:	LC_DCEF	LC_DCEF		
			Sample ID:	LC_DCEF_MNT_2023-05-02_N	LC_CC3_MNT_2023-05-02_N		
			Date Sampled:	5/2/2023	5/2/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	30.8	37.2	18.82%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	11.6	12.5	7.47%	Pass

			Location:	LC_DCEF	LC_DCEF		
			Sample ID:	LC_DCEF_WS_2023-08_N_KWL	LC_CC2_WS_2023-08_NP_KWL		
			Date Sampled:	8/2/2023	8/2/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.18	0.2	10.53%	Pass

			Location:	LC_DCEF	LC_DCEF		
			Sample ID:	LC_DCEF_WS_2023-09_N_KWL	LC_CC1_WS_2023-09_NP_KWL		
			Date Sampled:	10/12/2023	10/12/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	3.6	<0.5	151.22%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.12	0.16	28.57%	Pass-1

			Location:	LC_DCEF	LC_DCEF		
			Sample ID:	LC_DCEF_WS_Q2-2023_N	LC_CC3_WS_Q2-2023_N		
			Date Sampled:	4/4/2023	4/4/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	<0.050	0.14	94.74%	Pass-1

			Location:	LC_DC3	LC_DC3		
			Sample ID:	LC_DC3_MNT_2023-03-07_NP	LC_CC3_MNT_2023-03-07_N		
			Date Sampled:	3/7/2023	3/7/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.6	1.1	37.04%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.18	0.26	36.36%	Pass-1

			Location:	LC_DC3	LC_DC3		
			Sample ID:	LC_DC3_MNT_2023-06-06_NP	LC_CC3_MNT_2023-06-06_N		
			Date Sampled:	6/7/2023	6/7/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.8	2	10.53%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.81	0.67	18.92%	Pass

			Location:	LC_DC3	LC_DC3		
			Sample ID:	LC_DC3_MNT_2023-09-04_NP	LC_CC3_MNT_2023-09-04_N		
			Date Sampled:	9/6/2023	9/6/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.4	<0.5	94.74%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.14	0.21	40.00%	Pass-1

			Location:	LC_DC3	LC_DC3		
			Sample ID:	LC_DC3_WS_2023-01-16_N	LC_CC3_WS_2023-01-16_N		
			Date Sampled:	1/17/2023	1/17/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.4	<0.5	94.74%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.32	0.25	24.56%	Pass-1

			Location:	LC_DC3	LC_DC3		
			Sample ID:	LC_DC3_WS_2023-04-10_N	LC_CC3_WS_2023-04-10_N		
			Date Sampled:	4/11/2023	4/11/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	29.2	30.9	5.66%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	12.0	10.7	11.45%	Pass

			Location:	LC_DC3	LC_DC3		
			Sample ID:	LC_DC3_WS_2023-04-17_N	LC_CC3_WS_2023-04-17_N		
			Date Sampled:	4/19/2023	4/19/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.2	<0.5	82.35%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	3.44	2.79	20.87%	Pass-2

			Location:	LC_DC3	LC_DC3		
			Sample ID:	LC_DC3_WS_2023-07-17_N	LC_CC3_WS_2023-07-17_N		
			Date Sampled:	7/18/2023	7/18/2023		
			Sample Type:	Primary	Secondary		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.5	100.00%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.31	0.3	3.28%	Pass

			Location:	LC_DC3	LC_DC3		
			Sample ID:	LC_DC3_WS_2023-07-25_N	LC_CC3_WS_2023-07-25_N		
			Date Sampled:	7/25/2023	7/25/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.0	<0.5	120.00%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.42	0.27	43.48%	Pass-1

			Location:	LC_DC3	LC_DC3		
			Sample ID:	LC_DC3_WS_2023-08-01_N	LC_CC3_WS_2023-08-01_N		
			Date Sampled:	8/1/2023	8/1/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.5	2.4	4.08%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.33	0.28	16.39%	Pass

			Location:	LC_DC3	LC_DC3		
			Sample ID:	LC_DC3_WS_2023-09-18_N	LC_CC3_WS_2023-09-18_N		
			Date Sampled:	9/18/2023	9/18/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.8	1.5	60.47%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.16	0.16	0.00%	Pass

			Location:	LC_DCDS	LC_DCDS		
			Sample ID:	LC_DCDS_MNT_2023-08-08_N	LC_CC3_MNT_2023-08-08_N		
			Date Sampled:	8/8/2023	8/8/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.6	<0.5	104.76%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.33	0.2	49.06%	Pass-1

			Location:	LC_DCDS	LC_DCDS		
			Sample ID:	LC_DCDS_WS_2012-12-27_N	LC_CC3_WS_2012-12-27_N		
			Date Sampled:	12/27/2023	12/27/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1	66.67%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.17	0.2	16.22%	Pass

			Location:	LC_DCDS	LC_DCDS		
			Sample ID:	LC_DCDS_WS_2023-01-23_N	LC_CC3_WS_2023-01-23_N		
			Date Sampled:	1/24/2023	1/24/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.6	1.6	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.44	0.21	70.77%	Pass-1

			Location:	LC_DCDS	LC_DCDS		
			Sample ID:	LC_DCDS_WS_2023-02-13_N	LC_CC3_WS_2023-02-13_N		
			Date Sampled:	2/14/2023	2/14/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	4.4	3.2	31.58%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.14	0.15	6.90%	Pass

			Location:	LC_DCDS	LC_DCDS		
			Sample ID:	LC_DCDS_WS_2023-03-20_N	LC_CC3_WS_2023-03-20_N		
			Date Sampled:	3/21/2023	3/21/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	2.4	131.03%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.30	0.39	26.09%	Pass-1

	Location:	LC_DCDS	LC_DCDS
	Sample ID:	LC_DCDS_WS_2023-06-19_N	LC_CC3_WS_2023-06-19_N
	Date Sampled:	6/20/2023	6/20/2023
	Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.7	<0.5	109.09%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.58	0.52	10.91%	Pass

	Location:	LC_DCDS	LC_DCDS
	Sample ID:	LC_DCDS_WS_2023-08-28_N	LC_CC3_WS_2023-08-28_N
	Date Sampled:	8/29/2023	8/29/2023
	Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.75	0.5	40.00%	Pass-2

	Location:	LC_DCDS	LC_DCDS
	Sample ID:	LC_DCDS_WS_2023-12-11_N	LC_CC3_WS_2023-12-11_N
	Date Sampled:	12/12/2023	12/12/2023
	Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1	66.67%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.19	0.14	30.30%	Pass-1

	Location:	LC_DCDS	LC_DCDS
	Sample ID:	LC_DCDS_WS_Q4-2023_N	LC_CC3_WS_Q4-2023_N
	Date Sampled:	10/3/2023	10/3/2023
	Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	2.0	2	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.20	0.17	16.22%	Pass

	Location:	LC_DC1	LC_DC1
	Sample ID:	LC_DC1_MNT_2023-11-06_N	LC_CC3_MNT_2023-11-06_N
	Date Sampled:	11/8/2023	11/8/2023
	Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.6	<0.5	104.76%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.22	0.22	0.00%	Pass

	Location:	LC_DC1	LC_DC1
	Sample ID:	LC_DC1_MNT_2023-12-04_N	LC_CC3_MNT_2023-12-04_N
	Date Sampled:	12/7/2023	12/7/2023
	Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.1	1.4	24.00%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.32	0.34	6.06%	Pass

	Location:	LC_DC1	LC_DC1
	Sample ID:	LC_DC1_WS_2012-12-18_N	LC_CC3_WS_2012-12-18_N
	Date Sampled:	12/19/2023	12/19/2023
	Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.5	1.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.14	0.23	48.65%	Pass-1

	Location:	LC_DC1	LC_DC1
	Sample ID:	LC_DC1_WS_2023-02-20_N	LC_CC3_WS_2023-02-20_N
	Date Sampled:	2/22/2023	2/22/2023
	Sample Type:	Primary	Secondary

Analyte	Detection Limit Pri.	Detection Limit Dup.	Units			Primary vs. Duplicate	Category1
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.27	0.21	25.00%	Pass-1

			Location:	LC_DC1	LC_DC1		
			Sample ID:	LC_DC1_WS_2023-02-27_N	LC_CC3_WS_2023-02-27_N		
			Date Sampled:	2/28/2023	2/28/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.2	<0.5	82.35%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.31	0.22	33.96%	Pass-1

			Location:	LC_DC1	LC_DC1		
			Sample ID:	LC_DC1_WS_2023-05-22_NP	LC_CC3_WS_2023-05-22_N		
			Date Sampled:	5/24/2023	5/24/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.7	2.4	34.15%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.80	0.97	19.21%	Pass

			Location:	LC_DC1	LC_DC1		
			Sample ID:	LC_DC1_WS_2023-06-12_N	LC_CC3_WS_2023-06-12_N		
			Date Sampled:	6/13/2023	6/13/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	3.4	3.2	6.06%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	1.51	1.24	19.64%	Pass

			Location:	LC_DC1	LC_DC1		
			Sample ID:	LC_DC1_WS_2023-08-21_N	LC_CC3_WS_2023-08-21_N		
			Date Sampled:	8/21/2023	8/21/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.8	1.2	40.00%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.34	0.32	6.06%	Pass

			Location:	LC_DC1	LC_DC1		
			Sample ID:	LC_DC1_WS_2023-10-09_N	LC_CC3_WS_2023-10-09_N		
			Date Sampled:	10/11/2023	10/11/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	5.2	3.6	36.36%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.38	0.5	27.27%	Pass

			Location:	LC_DC1	LC_DC1		
			Sample ID:	LC_DC1_WS_2023-10-23_N	LC_CC3_WS_2023-10-23_N		
			Date Sampled:	10/24/2023	10/24/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	3.7	2.7	31.25%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.34	0.25	30.51%	Pass-1

			Location:	LC_DC1	LC_DC1		
			Sample ID:	LC_DC1_WS_2023-11-20_N	LC_CC3_WS_2023-11-20_N		
			Date Sampled:	11/21/2023	11/21/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	3.0	1.4	72.73%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.44	0.4	9.52%	Pass

			Location:	LC_DC1	LC_DC1		
			Sample ID:	LC_DC1_WS_Q1-2023_N	LC_CC3_WS_Q1-2023_N		
			Date Sampled:	1/4/2023	1/4/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.7	2	16.22%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.33	0.12	93.33%	Pass-1

			Location:	LC_DC1	LC_DC1		
			Sample ID:	LC_DC1_WS_Q3-2023_N	LC_CC3_WS_Q3-2023_N		
			Date Sampled:	7/5/2023	7/5/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.2	<0.5	82.35%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.44	0.43	2.30%	Pass

			Location:	LC_FRDSDC	LC_FRDSDC		
			Sample ID:	LC_FRDSDC_MNT_2023-03-07_N	LC_CC3_WS_2023-03-13_N		
			Date Sampled:	3/14/2023	3/14/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	2	120.00%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.74	0.54	31.25%	Pass-2

			Location:	LC_FRDSDC	LC_FRDSDC		
			Sample ID:	LC_FRDSDC_WS_2023-06-26_N	LC_CC3_WS_2023-06-26_N		
			Date Sampled:	6/28/2023	6/28/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.2	<0.5	82.35%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.35	0.3	15.38%	Pass

			Location:	LC_SPDC	LC_SPDC		
			Sample ID:	LC_SPDC_WS_2023-01-30_N	LC_CC3_WS_2023-01-30_N		
			Date Sampled:	1/31/2023	1/31/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.0	<0.5	66.67%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.36	0.43	17.72%	Pass

			Location:	LC_SPDC	LC_SPDC		
			Sample ID:	LC_SPDC_WS_2023-05-08_N	LC_CC3_WS_2023-05-08_N		
			Date Sampled:	5/9/2023	5/9/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	1.2	1	18.18%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	1.08	1.35	22.22%	Pass-2

			Location:	LC_SPDC	LC_SPDC		
			Sample ID:	LC_SPDC_WS_2023-05-15_N	LC_CC3_WS_2023-05-15_N		
			Date Sampled:	5/17/2023	5/17/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.1	75.00%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.79	0.63	22.54%	Pass-2

			Location:	LC_SPDC	LC_SPDC		
			Sample ID:	LC_SPDC_WS_2023-10-16_N	LC_CC3_WS_2023-10-16_N		
			Date Sampled:	10/17/2023	10/17/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	1.4	94.74%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.19	0.22	14.63%	Pass

			Location:	LC_SPDC	LC_SPDC		
			Sample ID:	LC_SPDC_WS_2023-10-30_N	LC_CC3_WS_2023-10-30_N		
			Date Sampled:	10/31/2023	10/31/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	<0.50	<0.5	0.00%	Pass
TURBIDITY, LAB	0.1	0.1	ntu	0.15	0.3	66.67%	Pass-1

			Location:	LC_SPDC	LC_SPDC		
			Sample ID:	LC_SPDC_WS_2023-11-27_N	LC_CC3_WS_2023-11-27_N		
			Date Sampled:	11/28/2023	11/28/2023		
			Sample Type:	**Primary**	**Secondary**		
Analyte	**Detection Limit Pri.**	**Detection Limit Dup.**	**Units**			**Primary vs. Duplicate**	**Category1**
TOTAL SUSPENDED SOLIDS, LAB	1	1	mg/l	3.1	2.4	25.45%	Pass-1
TURBIDITY, LAB	0.1	0.1	ntu	0.44	0.15	98.31%	Pass-1

RPD Control Limits
Pass - RPD ≤ 20%
Pass-1 - RPD > 20%, Analysis results < 5 times Detection Limit
Pass-2 - RPD > 20% and RPD ≤ 50%, Analysis results ≥ 5 times Detection Limit and < 99999 times Detection Limit
Exceeds RPD Control Limits

Appendix F – Field Blanks and Trip Blanks

2023 LCO Trip Blanks		TOTAL SUSPENDED SOLIDS, LAB N mg/l		TURBIDITY, LAB N ntu	
Sample ID	Date	Result	MDL	Result	MDL
LC_RD1_WS_Q1-2023_N	1/4/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_Q1-2023_N	1/5/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-01-09_N	1/9/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-01-09_N	1/10/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-01-16_N	1/16/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-01-16_N	1/17/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-01-23_N	1/23/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-01-23_N	1/24/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-01-30_N	1/30/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-01-30_N	1/31/2023	< 1.0	1	< 0.10	1
LC_RD2_MNT-2023-02-07_N	2/7/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-02-13_N	2/13/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-02-13_N	2/14/2023	< 1.0	1	< 0.10	1
LC_RD1_MNT_2023-02-07_N	2/17/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-02-20_N	2/21/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-02-20_N	2/21/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-02-27_N	2/28/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-02-27_N	2/28/2023	< 1.0	1	< 0.10	1
LC_RD1_MNT_2023-03-07_N	3/6/2023	< 1.0	1	< 0.10	1
LC_RD2_MNT_2023-03-07_N	3/7/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-03-13_N	3/13/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-03-13_N	3/14/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-03-20_N	3/20/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-03-20_N	3/21/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-03-27_N	3/27/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-03-27_N	3/28/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_Q2-2023_N	4/4/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_Q2-2023_N	4/5/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-04-10_N	4/12/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-04-17_N	4/18/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-04-17_N	4/19/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-04-24_N	4/24/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-04-24_N	4/25/2023	< 1.0	1	< 0.10	1
LC_RD1_MNT_2023-05-02_N	5/1/2023	< 1.0	1	< 0.10	1
LC_RD2_MNT_2023-05-02_N	5/2/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-05-08_N	5/8/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-05-08_N	5/9/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-05-15_N	5/15/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-05-15_N	5/17/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-05-29_N	5/23/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-05-22_N	5/23/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-05-22_N	5/24/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-06-02_N	6/2/2023	< 1.0	1	< 0.10	1
LC_RD1_MNT_2023-06-06_N	6/5/2023	< 1.5	1	< 0.10	1
LC_RD2_MNT_2023-06-06_N	6/6/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-06-12_N	6/12/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-06-12_N	6/13/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-06-19_N	6/19/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-06-19_N	6/20/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-06-26_N	6/26/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-06-26_N	6/28/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_Q3-2023_N	7/4/2023	< 1.0	1	< 0.10	1

2023 LCO Trip Blanks		TOTAL SUSPENDED SOLIDS, LAB N mg/l		TURBIDITY, LAB N ntu	
Sample ID	Date	Result	MDL	Result	MDL
LC_RD1_WS_Q3-2023_N	7/5/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-07-10_N	7/10/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-07-10_N	7/12/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-07-17_N	7/18/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-07-24_N	7/24/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-07-25_N	7/25/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-07-31_N	7/31/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-08-01_N	8/1/2023	< 1.0	1	< 0.10	1
LC_RD1_MNT_2023-08-08_N	8/8/2023	< 1.0	1	< 0.10	1
LC_RD2_MNT_2023-08-08_N	8/8/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-08-14_N	8/15/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-08-14_N	8/15/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-08-21_N	8/21/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-08-21_N	8/21/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-08-28_N	8/28/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-08-28_N	8/29/2023	< 1.0	1	< 0.10	1
LC_RD1_MNT_2023-09-04_N	9/5/2023	< 1.0	1	< 0.10	1
LC_RD2_MNT_2023-09-04_N	9/6/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-09-11_N	9/11/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-09-11_N	9/12/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-09-18_N	9/18/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_202A3-09-18_N	9/18/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-09-25_N	9/25/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-09-25_N	9/26/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_Q4-2023_N	10/3/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_Q4-2023_N	10/4/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-10-09_N	10/10/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-10-09_N	10/11/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-10-16_N	10/16/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-10-16_N	10/17/2023	< 1.0	1	< 0.10	1
LC_RD2_WG_Q4_2023_NP2	10/17/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-10-23_N	10/24/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-10-30_N	10/31/2023	< 1.0	1	< 0.10	1
LC_RD1_MNT_2023-11-06_N	11/6/2023	< 1.0	1	< 0.10	1
LC_RD2_MNT_2023-11-06_N	11/8/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-11-13_N	11/13/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-11-13_N	11/14/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_203-11-20_N	11/21/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-11-20_N	11/21/2023	< 3.0	1	< 0.10	1
LC_RD1_WS_2023-11-27_N	11/27/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-11-27_N	11/28/2023	< 1.0	1	< 0.10	1
LC_RD1_MNT_2023-12-04_N	12/4/2023	< 1.0	1	< 0.10	1
LC_RD2_MNT_2023-12-04_N	12/7/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2023-12-11_N	12/12/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-12-11_N	12/12/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-12-18_N	12/18/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2012-12-18_N	12/19/2023	< 1.0	1	< 0.10	1
LC_RD2_WS_2012-12-27_N	12/27/2023	< 1.0	1	< 0.10	1
LC_RD1_WS_2023-12-27_N	12/27/2023	< 1.0	1	< 0.10	1

2023 LCO Field Blanks			TOTAL SUSPENDED SOLIDS, LAB N mg/l		TURBIDITY, LAB N ntu	
SYS_LOC_CODE	EMS ID	SAMPLE_DATE	Result	MDL	Result	MDL
LC_DC1	E288270	10/12/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	3/30/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	11/8/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	12/7/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	12/19/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	2/22/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	2/28/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	3/14/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	3/21/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	5/24/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	6/2/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	6/13/2023	< 1.5	1.0	< 0.10	0.10
LC_DC1	E288270	7/12/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	8/21/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	9/19/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	10/11/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	10/17/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	10/24/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	11/14/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	11/21/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	1/4/2023	< 1.0	1.0	< 0.10	0.10
LC_DC1	E288270	7/5/2023	< 1.0	1.0	< 0.10	0.10
LC_DC3	E288273	7/6/2023	< 1.0	1.0	< 0.10	0.10
LC_DC3	E288273	3/7/2023	< 1.0	1.0	< 0.10	0.10
LC_DC3	E288273	6/7/2023	< 1.0	1.0	< 0.10	0.10
LC_DC3	E288273	9/6/2023	< 1.0	1.0	< 0.10	0.10
LC_DC3	E288273	1/17/2023	< 1.0	1.0	< 0.10	0.10
LC_DC3	E288273	3/28/2023	< 1.0	1.0	< 0.10	0.10
LC_DC3	E288273	7/18/2023	< 1.0	1.0	< 0.10	0.10
LC_DC3	E288273	7/25/2023	< 1.0	1.0	< 0.10	0.10
LC_DC3	E288273	8/1/2023	< 1.0	1.0	< 0.10	0.10
LC_DCDS	E295210	8/8/2023	< 1.0	1.0	< 0.10	0.10
LC_DCDS	E295210	12/27/2023	< 1.0	1.0	< 0.10	0.10
LC_DCDS	E295210	1/24/2023	< 1.0	1.0	< 0.10	0.10
LC_DCDS	E295210	2/14/2023	< 1.0	1.0	< 0.10	0.10
LC_DCDS	E295210	8/29/2023	< 1.0	1.0	< 0.10	0.10
LC_DCDS	E295210	9/25/2023	< 1.0	1.0	< 0.10	0.10
LC_DCDS	E295210	12/12/2023	< 1.0	1.0	< 0.10	0.10
LC_DCDS	E295210	10/3/2023	< 1.0	1.0	< 0.10	0.10
LC_DCEF	E288274	5/2/2023	< 1.0	1.0	< 0.10	0.10
LC_DCEF	E288274	2/7/2023	< 1.0	1.0	< 0.10	0.10
LC_DCEF	E288274	4/4/2023	< 1.0	1.0	< 0.10	0.10
LC_FRDSDC	E288272	5/17/2023	< 1.0	1.0	< 0.10	0.10
LC_FRDSDC	E288272	6/28/2023	< 1.0	1.0	< 0.10	0.10
LC_LC1	E216142	5/4/2023	< 1.0	1.0	< 0.10	0.10
LC_LC2	200335	10/4/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	4/12/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	5/23/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	5/29/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	6/19/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	6/26/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	8/15/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	9/12/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	9/18/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	9/26/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	11/13/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	11/27/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	5/16/2023	< 1.0	1.0	< 0.10	0.10
LC_LC3	200337	7/4/2023	< 1.0	1.0	< 0.10	0.10

2023 LCO Field Blanks			TOTAL SUSPENDED SOLIDS, LAB		TURBIDITY, LAB	
			N		N	
			mg/l		ntu	
SYS_LOC_CODE	EMS ID	SAMPLE_DATE	Result	MDL	Result	MDL
LC_LC4	200044	1/9/2023	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	1/16/2023	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	1/23/2023	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	5/8/2023	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	5/15/2023	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	7/10/2023	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	8/21/2023	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	10/10/2023	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	10/30/2023	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	12/27/2023	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	2/6/2023	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	6/5/2023	< 1.0	1.0	< 0.10	0.10
LC_LC4	200044	12/4/2023	< 1.0	1.0	< 0.10	0.10
LC_LC5	200028	3/27/2023	< 1.0	1.0	< 0.10	0.10
LC_LC5	200028	1/5/2023	< 1.0	1.0	< 0.10	0.10
LC_LC7	E216144	2/6/2023	< 1.0	1.0	< 0.10	0.10
LC_LC7	E216144	3/10/2023	< 1.0	1.0	< 0.10	0.10
LC_LC7	E216144	11/7/2023	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	9/5/2023	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	2/28/2023	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	3/13/2023	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	6/12/2023	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	7/24/2023	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	11/20/2023	< 1.0	1.0	< 0.10	0.10
LC_LCDSSLCC	E297110	12/12/2023	< 1.0	1.0	< 0.10	0.10
LC_LCUSWLC	E293369	8/8/2023	< 1.0	1.0	< 0.10	0.10
LC_LCUSWLC	E293369	2/22/2023	< 1.0	1.0	< 0.10	0.10
LC_LCUSWLC	E293369	3/20/2023	< 1.0	1.0	< 0.10	0.10
LC_LCUSWLC	E293369	4/24/2023	< 1.0	1.0	< 0.10	0.10
LC_LCUSWLC	E293369	7/31/2023	< 1.0	1.0	< 0.10	0.10
LC_LCUSWLC	E293369	8/28/2023	< 1.0	1.0	< 0.10	0.10
LC_LCUSWLC	E293369	10/23/2023	< 1.0	1.0	< 0.10	0.10
LC_LCUSWLC	E293369	12/18/2023	< 1.0	1.0	< 0.10	0.10
LC_SLC	E282149	8/2/2023	< 1.0	1.0	< 0.10	0.10
LC_SLC	E282149	10/16/2023	< 1.0	1.0	< 0.10	0.10
LC_SLC	E282149	9/5/2023	< 1.0	1.0	< 0.10	0.10
LC_SLC	E282149	4/5/2023	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	1/10/2023	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	1/31/2023	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	4/19/2023	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	5/9/2023	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	6/20/2023	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	9/11/2023	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	10/31/2023	< 1.0	1.0	< 0.10	0.10
LC_SPDC	E295211	11/28/2023	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	3/6/2023	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	5/1/2023	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	11/6/2023	< 1.0	1.0	< 0.10	0.10
LC_WLC	E261958	2/13/2023	< 1.0	1.0	< 0.10	0.10

Appendix G – Sample Detection Limits

Parameter	Fraction	Unit	Analytic Method	Detect Limit
48-h Static acute lethality test using Daphnia ma	N	%	EPS1RM14	
96-Hr 100% Conc. Acute lethality test for R. Trout	N	%	EPS1RM13	
ALKALINITY, TOTAL (As CaCO3)	N	mg/l	SM2320B	1
ALUMINUM	D	mg/l	SW6020A	0.003
ALUMINUM	T	mg/l	EPA 200.2/6020A	0.003
ANTIMONY	D	mg/l	SW6020A	0.0001
ANTIMONY	T	mg/l	EPA 200.2/6020A	0.0001
ARSENIC	D	mg/l	SW6020A	0.0001
ARSENIC	T	mg/l	EPA 200.2/6020A	0.0001
BARIUM	D	mg/l	SW6020A	0.0001
BARIUM	T	mg/l	EPA 200.2/6020A	0.0001
BERYLLIUM	D	mg/l	SW6020A	0.00002
BERYLLIUM	T	mg/l	EPA 200.2/6020A	0.00002
BIOCHEMICAL OXYGEN DEMAND, FIVE DAY	N	mg/l	SM5210B	2
BISMUTH	D	mg/l	SW6020A	0.00005
BISMUTH	T	mg/l	EPA 200.2/6020A	0.00005
BORON	D	mg/l	SW6020A	0.01
BORON	T	mg/l	EPA 200.2/6020A	0.01
BROMIDE	D	mg/l	EPA300.1 (mod)	0.05
CADMIUM	D	mg/l	SW6020A	0.000005
CADMIUM	T	mg/l	EPA 200.2/6020A	0.000005
CALCIUM	T	mg/l	EPA 200.2/6020A	0.05
CARBON, DISSOLVED ORGANIC	D	mg/l	APHA 5310B	0.5
CHLORIDE	D	mg/l	EPA300.1 (mod)	0.5
Chlorophyll-a	N	mg/L	EPA 445.0	0.01
CHROMIUM	D	mg/l	SW6020A	0.0001
CHROMIUM	T	mg/l	EPA 200.2/6020A	0.0001
COBALT	D	mg/l	SW6020A	0.0001
COBALT	T	mg/l	EPA 200.2/6020A	0.0001
CONDUCTIVITY, FIELD	N	us/cm	FIELD MEASURE	
CONDUCTIVITY, LAB	N	us/cm	APHA 2510	2
COPPER	D	mg/l	SW6020A	0.0005
COPPER	T	mg/l	EPA 200.2/6020A	0.0005
DISSOLVED OXYGEN, FIELD	N	mg/l	FIELD MEASURE	
Extractable Petroleum Hydrocarbons C10-C19	N	mg/l	EPH by GCFID	0.25
Extractable Petroleum Hydrocarbons C19-C32	N	mg/l	EPH by GCFID	0.25
FLUORIDE	D	mg/l	EPA300.1 (mod)	0.02
Hardness, Total or Dissolved CaCO3	N	mg/l	SM2340B	0.5
IRON	D	mg/l	SW6020A	0.01
IRON	T	mg/l	EPA 200.2/6020A	0.01
LEAD	D	mg/l	SW6020A	0.00005
LEAD	T	mg/l	EPA 200.2/6020A	0.00005
LITHIUM	D	mg/l	SW6020A	0.001
LITHIUM	T	mg/l	EPA 200.2/6020A	0.001
MAGNESIUM	T	mg/l	EPA 200.2/6020A	0.1
MANGANESE	D	mg/l	SW6020A	0.0001
MANGANESE	T	mg/l	EPA 200.2/6020A	0.0001
MERCURY	D	ug/l	A3030B/EPA1631 REV-E	0.0005
MERCURY	T	ug/l	EPA 1631 REV-E	0.0005
MOLYBDENUM	D	mg/l	SW6020A	0.00005
MOLYBDENUM	T	mg/l	EPA 200.2/6020A	0.00005
NICKEL	D	mg/l	SW6020A	0.0005
NICKEL	T	mg/l	EPA 200.2/6020A	0.0005
NITRATE NITROGEN (NO3), AS N	N	mg/l	EPA300.1 (mod)	0.005
NITRITE NITROGEN (NO2), AS N	N	mg/l	EPA300.1 (mod)	0.001
NITROGEN, AMMONIA (AS N)	N	mg/l	JENVMON	0.005
ORTHO-PHOSPHATE	N	mg/l	A4500P	0.001
pH, Field	N	pH units	FIELD MEASURE	
pH, LAB	N	pH units	APHA 4500-H	0.1
PHOSPHORUS	N	mg/l	A4500P	0.002
POTASSIUM	T	mg/l	EPA 200.2/6020A	0.05
SELENIUM	D	ug/l	E1638M	0.053
SELENIUM	D	ug/l	SW6020A	0.05
SELENIUM	T	ug/l	E1638M	0.053
SELENIUM	T	ug/l	EPA 200.2/6020A	0.05
SILVER	D	mg/l	SW6020A	0.00001
SILVER	T	mg/l	EPA 200.2/6020A	0.00001
SODIUM	T	mg/l	EPA 200.2/6020A	0.05
STRONTIUM	D	mg/l	SW6020A	0.0002
STRONTIUM	T	mg/l	EPA 200.2/6020A	0.0002
SULFATE (AS SO4)	D	mg/l	EPA300.1 (mod)	0.3
SULFIDE	T	mg/l	A4500SE	0.0015
SULFIDE	T	mg/L	SM4500S2D	0.002
TEMPERATURE, FIELD	N	°C	FIELD MEASURE	
THALLIUM	D	mg/l	SW6020A	0.00001
THALLIUM	T	mg/l	EPA 200.2/6020A	0.00001
The sum of extractable petroleum hydrocarbons C10-C19 and C19-C32.	N	mg/l	EPH_CALC	0.5
TIN	D	mg/l	SW6020A	0.0001
TIN	T	mg/l	EPA 200.2/6020A	0.0001
TITANIUM	D	mg/l	SW6020A	0.01
TITANIUM	T	mg/l	EPA 200.2/6020A	0.01
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	N	mg/l	SM2540C	20
TOTAL KJELDAHL NITROGEN	N	mg/l	APHA 4500-NORG	0.05
TOTAL KJELDAHL NITROGEN	N	mg/l	FIELD MEASURE	0.05
TOTAL ORGANIC CARBON	T	mg/l	APHA 5310B	0.5
TOTAL SUSPENDED SOLIDS, LAB	N	mg/l	SM2540D	1
TURBIDITY, LAB	N	NTU	E180.1	0.1
URANIUM	D	mg/l	SW6020A	0.00001
URANIUM	T	mg/l	EPA 200.2/6020A	0.00001
VANADIUM	D	mg/l	SW6020A	0.0005
VANADIUM	T	mg/l	EPA 200.2/6020A	0.0005
ZINC	D	mg/l	SW6020A	0.001
ZINC	T	mg/l	EPA 200.2/6020A	0.003

T – Total, D – Dissolved, N – No fraction/not applicable

Appendix H – Monitoring Data

Teck Location Code	Sample Date	Flow Remark	Method	Flow m3/s Result
LC_DC1	1/4/2023	SG Frozen	rating curve	0.0000
LC_DC1	1/10/2023	SG Frozen	rating curve	0.0000
LC_DC1	1/17/2023	SG frozen.	rating curve	0.0000
LC_DC1	1/24/2023	Frozen	rating curve	0.0000
LC_DC1	1/31/2023	Frozen	rating curve	0.0000
LC_DC1	2/7/2023	Frozen	rating curve	0.0000
LC_DC1	2/14/2023	Frozen	rating curve	0.0000
LC_DC1	2/22/2023	Frozen SG	rating curve	0.0000
LC_DC1	2/28/2023	Frozen SG	rating curve	0.0000
LC_DC1	3/7/2023	Frozen SG	rating curve	0.0000
LC_DC1	3/14/2023	SG Frozen	rating curve	0.0000
LC_DC1	3/21/2023	Frozen	rating curve	0.0000
LC_DC1	3/28/2023	Frozen	rating curve	0.0000
LC_DC1	3/30/2023	KWL Data Grade: C, 21 Panels, Max 16.3%	Open Channel	0.0430
LC_DC1	4/4/2023		rating curve	0.1470
LC_DC1	4/6/2023		Rated Discharge Method	0.1037
LC_DC1	4/11/2023		Rated Discharge Method	0.3764
LC_DC1	4/19/2023		Rated Discharge Method	0.2229
LC_DC1	4/25/2023		Rated Discharge Method	0.2006
LC_DC1	5/2/2023		rating curve	0.9719
LC_DC1	5/9/2023		Rated Discharge Method	0.6997
LC_DC1	5/17/2023	KWL Data Grade: B, 25 Panels, Max 9.7	Open Channel	0.6840
LC_DC1	5/17/2023		rating curve	0.6287
LC_DC1	5/24/2023		rating curve	0.4960
LC_DC1	6/2/2023		Rated Discharge Method	0.3216
LC_DC1	6/13/2023		Rated Discharge Method	0.3216
LC_DC1	6/20/2023		Rated Discharge Method	0.4109
LC_DC1	6/24/2023	Manual flow. HachFH950; EDP calculated instant_flow = 0.348 m3/s; EDP calculated velocity = 0.475 m/s	Area-Velocity Method	0.3467
LC_DC1	6/28/2023		Rated Discharge Method	0.4345
LC_DC1	7/5/2023		Rated Discharge Method	0.3216
LC_DC1	7/6/2023	KWL Data Grade: C, 22 Panels, Max 11%, Grade limited by channel width	Open Channel	0.1828
LC_DC1	7/7/2023	EDP calculated instant_flow = 0.145 m3/s; EDP calculated velocity = 0.254 m/s	Area-Velocity Method	0.1447
LC_DC1	7/12/2023		Rated Discharge Method	0.3764
LC_DC1	7/18/2023		Rated Discharge Method	0.4960
LC_DC1	7/25/2023		Rated Discharge Method	0.1792
LC_DC1	8/1/2023		Rated Discharge Method	0.1792
LC_DC1	8/2/2023	KWL Data Grade: B, 21 Panels, Max 7.7%	Open Channel	0.0881
LC_DC1	8/3/2023	Manual flow. HachFH950. 30m DS of SG due to stinging nettle overgrowth and poor bank conditions.; EDP calculated instant_flow = 0.086 m3/s; EDP calculated velocity = 0.249 m/s	Area-Velocity Method	0.0862
LC_DC1	8/8/2023		Rated Discharge Method	0.1792
LC_DC1	8/15/2023		Rated Discharge Method	0.1792
LC_DC1	8/21/2023		Rated Discharge Method	0.1037
LC_DC1	8/29/2023		Rated Discharge Method	0.0724
LC_DC1	9/2/2023	EDP calculated instant_flow = 0.096 m3/s; EDP calculated velocity = 0.139 m/s	Area-Velocity Method	0.0999
LC_DC1	9/6/2023		Rated Discharge Method	0.2229
LC_DC1	9/10/2023	EDP calculated instant_flow = 0.081 m3/s; EDP calculated velocity = 0.14 m/s	Area-Velocity Method	0.0869
LC_DC1	9/11/2023		Rated Discharge Method	0.2006
LC_DC1	9/21/2023	Hach meter. Cloudy, no precip.; EDP calculated instant_flow = 0.076 m3/s; EDP calculated velocity = 0.195 m/s	Area-Velocity Method	0.2229
LC_DC1	9/25/2023		Rated Discharge Method	0.1792

Teck Location Code	Sample Date	Flow Remark	Method	Flow m3/s Result
LC_DC1	9/27/2023	upstream of bridge 10m; EDP calculated instant_flow = 0.069 m3/s; EDP calculated velocity = 0.265 m/s	Area-Velocity Method	0.2229
LC_DC1	10/3/2023		Rated Discharge Method	0.2462
LC_DC1	10/11/2023		Rated Discharge Method	0.2705
LC_DC1	10/12/2023	KWL Data Grade: 22 Panels, Max Panel 9.3%, 0.0633, B	Open Channel	0.0633
LC_DC1	10/17/2023		Rated Discharge Method	0.2606
LC_DC1	10/24/2023 11:45		Rated Discharge Method	0.2415
LC_DC1	10/31/2023 11:30	Frozen	Rated Discharge Method	0.0000
LC_DC1	11/8/2023 12:25	Frozen	Rated Discharge Method	0.0000
LC_DC1	11/14/2023 11:40	Frozen	Rated Discharge Method	0.0000
LC_DC1	11/21/2023 11:30	Frozen	Rated Discharge Method	0.0000
LC_DC1	11/28/2023 11:45	Frozen refer to pictures	Rated Discharge Method	0.0000
LC_DC1	12/7/2023 10:45	frozen	Rated Discharge Method	0.0000
LC_DC1	12/12/2023 11:00		Rated Discharge Method	0.1470
LC_DC1	12/19/2023 12:40	Frozen	Rated Discharge Method	0.0000
LC_DC1	12/27/2023 10:50	frozen	Rated Discharge Method	0.0000
LC_DC3	1/4/2023	New: 0.14	rating curve	0.0570
LC_DC3	1/10/2023	New: 0.13	rating curve	0.0296
LC_DC3	1/17/2023	New: 0.12	rating curve	0.0296
LC_DC3	1/24/2023	Frozen	rating curve	0.0000
LC_DC3	1/31/2023	Frozen	rating curve	0.0000
LC_DC3	2/7/2023	Frozen	rating curve	0.0000
LC_DC3	2/14/2023	Frozen	rating curve	0.0000
LC_DC3	2/21/2023	Frozen SG	rating curve	0.0000
LC_DC3	2/28/2023	Frozen	rating curve	0.0000
LC_DC3	3/7/2023	Frozen SG	rating curve	0.0000
LC_DC3	3/14/2023	SG Frozen	rating curve	0.0000
LC_DC3	3/21/2023	Frozen	rating curve	0.0000
LC_DC3	3/22/2023	Staff Guages are Frozen; EDP calculated instant_flow = 0.035 m3/s; EDP calculated velocity = 0.147 m/s	open channel	0.0354
LC_DC3	3/28/2023	Frozen	rating curve	0.0000
LC_DC3	3/30/2023	KWL Data Grade: E, 18 Panels, Max 22.4%	Open Channel	0.0464
LC_DC3	4/4/2023	New: 0.14	rating curve	0.0498
LC_DC3	4/6/2023	EDP calculated instant_flow = 0.05 m3/s; EDP calculated velocity = 0.141 m/s	open channel	0.0500
LC_DC3	4/13/2023		Rated Discharge Method	0.1543
LC_DC3	4/19/2023		Rated Discharge Method	0.1100
LC_DC3	4/25/2023		Rated Discharge Method	0.1011
LC_DC3	5/2/2023	New: 0.26	rating curve	0.3813
LC_DC3	5/9/2023		Rated Discharge Method	0.2818
LC_DC3	5/17/2023	KWL Data Grade: B, 23 Panels, Max 9.9%	Open Channel	0.1880
LC_DC3	5/17/2023	New: 0.21	rating curve	0.1710
LC_DC3	5/24/2023	Old SG = 0.35	rating curve	0.1710
LC_DC3	5/27/2023	EDP calculated instant_flow = 0.135 m3/s; EDP calculated velocity = 0.24 m/s	open channel	0.1350
LC_DC3	6/1/2023		Rated Discharge Method	0.1726
LC_DC3	6/7/2023		Rated Discharge Method	0.1500
LC_DC3	6/13/2023	SG OLD: 0.162	Rated Discharge Method	0.1372
LC_DC3	6/20/2023	Staff gauge old: 0.169	Rated Discharge Method	0.1331
LC_DC3	6/28/2023	Staff Gauge Old: 0.162	Rated Discharge Method	0.1137
LC_DC3	7/5/2023	Staff Gauge Old: 0.157	Rated Discharge Method	0.0994
LC_DC3	7/6/2023	KWL Data Grade: C, 23 Panels, Max 12%, Grade limited by channel width	Open Channel	0.0691
LC_DC3	7/12/2023		Rated Discharge Method	0.1100
LC_DC3	7/18/2023		Rated Discharge Method	0.0926
LC_DC3	7/19/2023	EDP calculated instant_flow = 0.08 m3/s; EDP calculated velocity = 0.283 m/s	Area-Velocity Method	0.0796
LC_DC3	7/25/2023		Rated Discharge Method	0.0894

Teck Location Code	Sample Date	Flow Remark	Method	Flow m3/s Result
LC_DC3	8/1/2023		Rated Discharge Method	0.0926
LC_DC3	8/2/2023	KWL Data Grade: C, 24 Panels, Max 16%, Grade due to channel limitations	Open Channel	0.0634
LC_DC3	8/8/2023		Rated Discharge Method	0.0926
LC_DC3	8/15/2023		Rated Discharge Method	0.0926
LC_DC3	8/21/2023		Rated Discharge Method	0.0926
LC_DC3	8/29/2023		Rated Discharge Method	0.0740
LC_DC3	8/31/2023	EDP calculated instant_flow = 0.189 m3/s; EDP calculated velocity = 0.166 m/s	Area-Velocity Method	0.1757
LC_DC3	9/6/2023		Rated Discharge Method	0.0960
LC_DC3	9/11/2023		Rated Discharge Method	0.0846
LC_DC3	9/18/2023		Rated Discharge Method	0.0769
LC_DC3	9/25/2023		Rated Discharge Method	0.0926
LC_DC3	10/3/2023		Rated Discharge Method	0.0926
LC_DC3	10/11/2023		Rated Discharge Method	0.0769
LC_DC3	10/12/2023	KWL Data Grade: 22 Panels, Max Panel 10.2%, 0.0419, C	Open Channel	0.0419
LC_DC3	10/17/2023		Rated Discharge Method	0.0960
LC_DC3	10/24/2023		Rated Discharge Method	0.0830
LC_DC3	10/31/2023		Rated Discharge Method	0.0799
LC_DC3	11/8/2023		Rated Discharge Method	0.0799
LC_DC3	11/14/2023		Rated Discharge Method	0.0769
LC_DC3	11/21/2023		Rated Discharge Method	0.0769
LC_DC3	11/28/2023	Frozen refer to pictures	Rated Discharge Method	0.0000
LC_DC3	12/7/2023		Rated Discharge Method	0.0740
LC_DC3	12/12/2023		Rated Discharge Method	0.0629
LC_DC3	12/19/2023		Rated Discharge Method	0.0769
LC_DC3	12/27/2023		Rated Discharge Method	0.0799
LC_DCDS	1/4/2023	New: 0.06	rating curve	0.0462
LC_DCDS	1/10/2023	New: 0.07	rating curve	0.0553
LC_DCDS	1/17/2023	New: 0.08	rating curve	0.0462
LC_DCDS	1/24/2023	New: 0.06	rating curve	0.0462
LC_DCDS	1/31/2023	New SG 0.09	rating curve	0.0767
LC_DCDS	2/7/2023	New: 0.07	rating curve	0.0654
LC_DCDS	2/14/2023	New: 0.056	rating curve	0.0534
LC_DCDS	2/21/2023	New: 0.06	rating curve	0.0553
LC_DCDS	2/28/2023	New: 0.07	rating curve	0.0654
LC_DCDS	3/7/2023	New: 0.05	rating curve	0.0506
LC_DCDS	3/14/2023	Gauge measurement using new staff guage only.	rating curve	0.0396
LC_DCDS	3/21/2023	New: 0.06	rating curve	0.0462
LC_DCDS	3/22/2023	New SG: 0.066; EDP calculated instant_flow = 0.038 m3/s; EDP calculated velocity = 0.168 m/s	open channel	0.0377
LC_DCDS	3/28/2023	New: 0.085	rating curve	0.0709
LC_DCDS	3/30/2023	KWL Data Grade: C, 27 Panels, Max 16.0%	Open Channel	0.0474
LC_DCDS	4/4/2023	New: 0.85	rating curve	0.0654
LC_DCDS	4/6/2023	New SG: 0.081; EDP calculated instant_flow = 0.052 m3/s; EDP calculated velocity = 0.16 m/s	open channel	0.0516
LC_DCDS	4/11/2023		Rated Discharge Method	0.2732
LC_DCDS	4/19/2023		Rated Discharge Method	0.2454
LC_DCDS	4/25/2023		Rated Discharge Method	0.1328
LC_DCDS	5/2/2023	New: 0.335	rating curve	0.9405
LC_DCDS	5/9/2023		Rated Discharge Method	0.6134
LC_DCDS	5/16/2023	New: 0.22	rating curve	0.4417
LC_DCDS	5/23/2023	Old SG = 0.3	rating curve	0.3681
LC_DCDS	5/29/2023		Rated Discharge Method	0.4037
LC_DCDS	6/5/2023		Rated Discharge Method	0.2194
LC_DCDS	6/13/2023	SG OLD: 0.262	Rated Discharge Method	0.2296
LC_DCDS	6/20/2023	Staff gauge old: 0.286	Rated Discharge Method	0.2619
LC_DCDS	6/28/2023	Staff Gauge Old: .262	Rated Discharge Method	0.2095
LC_DCDS	6/29/2023	EDP calculated instant_flow = 0.15 m3/s; EDP calculated velocity = 0.278 m/s	Area-Velocity Method	0.1705

Teck Location Code	Sample Date	Flow Remark	Method	Flow m3/s Result
LC_DCDS	7/5/2023	Staff Gauge Old: 0.246	Rated Discharge Method	0.1560
LC_DCDS	7/12/2023		Rated Discharge Method	0.1952
LC_DCDS	7/18/2023		Rated Discharge Method	0.1328
LC_DCDS	7/19/2023	EDP calculated instant_flow = 0.091 m3/s; EDP calculated velocity = 0.244 m/s	Area-Velocity Method	0.0911
LC_DCDS	7/25/2023		Rated Discharge Method	0.1291
LC_DCDS	8/1/2023		Rated Discharge Method	0.1152
LC_DCDS	8/8/2023		Rated Discharge Method	0.1152
LC_DCDS	8/15/2023		Rated Discharge Method	0.1152
LC_DCDS	8/22/2023		Rated Discharge Method	0.0713
LC_DCDS	8/29/2023		Rated Discharge Method	0.0652
LC_DCDS	9/6/2023		Rated Discharge Method	0.0777
LC_DCDS	9/11/2023		Rated Discharge Method	0.0713
LC_DCDS	9/25/2023		Rated Discharge Method	0.0713
LC_DCDS	9/27/2023	Just DS of old SG; EDP calculated instant_flow = 0.053 m3/s; EDP calculated velocity = 0.156 m/s	Area-Velocity Method	0.0533
LC_DCDS	10/3/2023		Rated Discharge Method	0.0777
LC_DCDS	10/11/2023		Rated Discharge Method	0.0845
LC_DCDS	10/16/2023		Rated Discharge Method	0.0713
LC_DCDS	10/23/2023		Rated Discharge Method	0.0713
LC_DCDS	10/30/2023		Rated Discharge Method	0.0845
LC_DCDS	11/6/2023		Rated Discharge Method	0.0617
LC_DCDS	11/9/2023		Rated Discharge Method	0.0573
LC_DCDS	11/14/2023		Rated Discharge Method	0.0551
LC_DCDS	11/21/2023	Frozen	Rated Discharge Method	0.0000
LC_DCDS	11/28/2023		Rated Discharge Method	0.0664
LC_DCDS	12/7/2023		Rated Discharge Method	0.0595
LC_DCDS	12/12/2023		Rated Discharge Method	0.0509
LC_DCDS	12/19/2023 12:05		Rated Discharge Method	0.0489
LC_DCDS	12/27/2023 11:50		Rated Discharge Method	0.0489
LC_DCEF	1/4/2023		rating curve	0.0063
LC_DCEF	2/7/2023	SG Above Water	rating curve	0.0000
LC_DCEF	3/14/2023	SG Frozen	rating curve	0.0000
LC_DCEF	3/30/2023	KWL Data Grade: C, 16 Panels, Max 14.0%	Open Channel	0.0171
LC_DCEF	4/4/2023		rating curve	0.0189
LC_DCEF	4/6/2023	EDP calculated instant_flow = 0.013 m3/s; EDP calculated velocity = 0.206 m/s	open channel	0.0135
LC_DCEF	5/2/2023		rating curve	0.2849
LC_DCEF	5/17/2023	KWL Data Grade: B, 22 Panels, Max 9.2%	Open Channel	0.2850
LC_DCEF	6/2/2023	EDP calculated instant_flow = 0.069 m3/s; EDP calculated velocity = 0.271 m/s	open channel	0.0693
LC_DCEF	6/7/2023		Rated Discharge Method	0.0704
LC_DCEF	6/24/2023	Sunny day. Manual flow. HachFH950; EDP calculated instant_flow = 0.076 m3/s; EDP calculated velocity = 0.294 m/s	Area-Velocity Method	0.0761
LC_DCEF	7/5/2023 9:30		Rated Discharge Method	0.0146
LC_DCEF	7/6/2023 13:01	KWL Data Grade: C, 18 Panels, Max 9.2%, Grade limited by channel width	Open Channel	0.0514
LC_DCEF	7/7/2023 12:20	EDP calculated instant_flow = 0.063 m3/s; EDP calculated velocity = 0.206 m/s	Area-Velocity Method	0.0631
LC_DCEF	8/2/2023 12:30	KWL Data Grade: C, 20 Panels, Max 12%, Grade due to channel limitations	Open Channel	0.0195
LC_DCEF	8/3/2023 11:05	Manual flow. HachFH950; EDP calculated instant_flow = 0.021 m3/s; EDP calculated velocity = 0.129 m/s	Area-Velocity Method	0.0206
LC_DCEF	8/8/2023 10:40		Rated Discharge Method	0.0146
LC_DCEF	9/6/2023 11:25		Rated Discharge Method	0.0081
LC_DCEF	9/10/2023 13:04	EDP calculated instant_flow = 0.013 m3/s; EDP calculated velocity = 0.069 m/s	Area-Velocity Method	0.0135
LC_DCEF	10/3/2023 13:30		Rated Discharge Method	0.0000

Teck Location Code	Sample Date	Flow Remark	Method	Flow m3/s Result
LC_DCEF	10/12/2023 12:05	KWL Data Grade: 17 Panels, Max Panel 13.8%, 0.01, C	Open Channel	0.0100
LC_DCEF	11/2/2023 12:30	EDP calculated instant_flow = 0.011 m3/s; EDP calculated velocity = 0.076 m/s	Area-Velocity Method	0.0111
LC_DCEF	11/8/2023 10:15		Rated Discharge Method	0.0003
LC_DCEF	12/8/2023 9:45		Rated Discharge Method	0.0000
LC_GRCK	1/24/2023	Frozen	rating curve	0.0000
LC_GRCK	2/9/2023	Frozen	rating curve	0.0000
LC_GRCK	3/15/2023	SG Frozen	rating curve	0.0000
LC_GRCK	5/2/2023		Rated Discharge Method	0.2197
LC_GRCK	6/7/2023		Rated Discharge Method	0.1823
LC_GRCK	6/13/2023	EDP calculated instant_flow = 0.086 m3/s; EDP calculated velocity = 0.503 m/s	Area-Velocity Method	0.0858
LC_GRCK	7/5/2023	EDP calculated instant_flow = 0.071 m3/s; EDP calculated velocity = 0.465 m/s	Area-Velocity Method	0.0706
LC_GRCK	8/9/2023		Rated Discharge Method	0.0325
LC_GRCK	8/31/2023	EDP calculated instant_flow = 0.186 m3/s; EDP calculated velocity = 0.257 m/s	Area-Velocity Method	0.1915
LC_GRCK	9/6/2023	Staff gauge out of water.	Rated Discharge Method	0.0000
LC_GRCK	9/6/2023	EDP calculated instant_flow = 0.039 m3/s; EDP calculated velocity = 0.308 m/s	Area-Velocity Method	0.0387
LC_GRCK	10/11/2023	Water level below staff gauge	Rated Discharge Method	0.0000
LC_GRCK	10/21/2023	EDP calculated instant_flow = 0.032 m3/s; EDP calculated velocity = 0.18 m/s	Area-Velocity Method	0.0324
LC_GRCK	11/7/2023 13:20		Rated Discharge Method	0.2447
LC_GRCK	12/8/2023 12:00	Frozen	Rated Discharge Method	0.0000
LC_GRCK	12/31/2023 10:00	Water level below staff gauge	Rated Discharge Method	0.0000
LC_LC11	1/31/2023	Not discharging pending upgrades. Material taken off site	rating curve	0.0000
LC_LC11	2/28/2023	Not discharging pending upgrades. Material taken off site	rating curve	0.0000
LC_LC11	3/31/2023	Not discharging pending upgrades. Material taken off site	rating curve	0.0000
LC_LC11	4/30/2023	Not discharging pending upgrades. Material taken off site	rating curve	0.0000
LC_LC11	5/31/2023	Not discharging pending upgrades. Material taken off site	rating curve	0.0000
LC_LC11	6/30/2023	Not discharging pending upgrades. Material taken off site	rating curve	0.0000
LC_LC11	7/31/2023	Not discharging pending upgrades. Material taken off site	Rated Discharge Method	0.0000
LC_LC11	8/31/2023	Not discharging pending upgrades. Material taken off site	Rated Discharge Method	0.0000
LC_LC11	9/30/2023	Not discharging pending upgrades. Material taken off site	Rated Discharge Method	0.0000
LC_LC11	10/31/2023	Not discharging pending upgrades. Material taken off site	Rated Discharge Method	0.0000
LC_LC11	11/30/2023	Not discharging pending upgrades. Material taken off site	Rated Discharge Method	0.0000
LC_LC11	12/31/2023	Not discharging pending upgrades. Material taken off site	Rated Discharge Method	0.0000
LC_LC7	1/9/2023	SG too low. Using old 2022 curve.	rating curve	0.1103
LC_LC7	2/6/2023	SG too low. Using old 2022 curve.	rating curve	0.1103
LC_LC7	3/10/2023	Frozen	rating curve	0.0000
LC_LC7	3/13/2023	SG Frozen	rating curve	0.0000
LC_LC7	3/20/2023		rating curve	0.0476
LC_LC7	3/27/2023		rating curve	0.0192
LC_LC7	4/5/2023	SG too low. Using old 2022 curve.	rating curve	0.1103
LC_LC7	4/5/2023	EDP calculated instant_flow = 0.031 m3/s; EDP calculated velocity = 0.234 m/s	open channel	0.0312
LC_LC7	4/10/2023		rating curve	0.0707

Teck Location Code	Sample Date	Flow Remark	Method	Flow m3/s Result
LC_LC7	4/17/2023		rating curve	0.0707
LC_LC7	4/20/2023	Cleaned fish fence	rating curve	0.1905
LC_LC7	4/24/2023		rating curve	0.1103
LC_LC7	5/1/2023	SG too low. Using old 2022 curve.	rating curve	0.1532
LC_LC7	5/10/2023		Rated Discharge Method	0.1344
LC_LC7	5/15/2023	SG too low. Using old 2022 curve.	rating curve	0.1727
LC_LC7	5/22/2023	Taken From 2022 rating curve.	rating curve	0.1532
LC_LC7	5/29/2023	Taken From 2022 rating curve.	Rated Discharge Method	0.1550
LC_LC7	6/1/2023	Fish salvage team end of project	rating curve	0.1155
LC_LC7	6/5/2023	SG too low. Using old 2022 curve.	Rated Discharge Method	0.1550
LC_LC7	6/12/2023		Rated Discharge Method	0.1550
LC_LC7	6/19/2023	Taken From 2022 rating curve.	Rated Discharge Method	0.1590
LC_LC7	6/27/2023	Taken From 2022 rating curve.	Rated Discharge Method	0.1381
LC_LC7	7/4/2023		Rated Discharge Method	0.1550
LC_LC7	7/10/2023		Rated Discharge Method	0.1550
LC_LC7	8/9/2023		Rated Discharge Method	0.0683
LC_LC7	9/5/2023 10:20		Rated Discharge Method	0.1096
LC_LC7	9/28/2023 11:25	DS of creek crossing; where creek flows parallel to road.; EDP calculated instant_flow = 0.068 m3/s; EDP calculated velocity = 0.428 m/s	Area-Velocity Method	0.0675
LC_LC7	10/4/2023 12:30		Rated Discharge Method	0.0683
LC_LC7	11/7/2023 11:00		Rated Discharge Method	0.0625
LC_LC7	11/29/2023 12:15	EDP calculated instant_flow = 0.042 m3/s; EDP calculated velocity = 0.322 m/s	Area-Velocity Method	0.0425
LC_LC7	12/11/2023 9:51		Rated Discharge Method	0.0317
LC_LC8	1/31/2023	Not discharging	rating curve	0.0000
LC_LC8	2/28/2023	Not discharging	rating curve	0.0000
LC_LC8	3/31/2023	Not discharging	rating curve	0.0000
LC_LC8	4/30/2023	Not discharging	rating curve	0.0000
LC_LC8	5/31/2023	Not discharging	rating curve	0.0000
LC_LC8	6/30/2023	Not discharging	rating curve	0.0000
LC_LC8	7/31/2023	Not discharging	Rated Discharge Method	0.0000
LC_LC8	8/31/2023	Not discharging	Rated Discharge Method	0.0000
LC_LC8	9/30/2023	Not discharging	Rated Discharge Method	0.0000
LC_LC8	10/31/2023	Not discharging	Rated Discharge Method	0.0000
LC_LC8	11/30/2023	Not discharging	Rated Discharge Method	0.0000
LC_LC8	12/31/2023	Not discharging	Rated Discharge Method	0.0000
LC_LC9	1/31/2023	Not discharging	rating curve	0.0000
LC_LC9	2/28/2023	Not discharging	rating curve	0.0000
LC_LC9	3/31/2023	Not discharging	rating curve	0.0000
LC_LC9	4/30/2023	Not discharging	rating curve	0.0000
LC_LC9	5/31/2023	Not discharging	rating curve	0.0000
LC_LC9	6/30/2023	Not discharging	rating curve	0.0000
LC_LC9	7/31/2023	Not discharging	Rated Discharge Method	0.0000
LC_LC9	8/31/2023	Not discharging	Rated Discharge Method	0.0000
LC_LC9	9/30/2023	Not discharging	Rated Discharge Method	0.0000
LC_LC9	10/31/2023	Not discharging	Rated Discharge Method	0.0000
LC_LC9	11/30/2023	Not discharging	Rated Discharge Method	0.0000
LC_LC9	12/31/2023	Not discharging	Rated Discharge Method	0.0000
LC_SBPIN	1/19/2023	Max volume capacity of steam bay	volumetric	67.5000
LC_SBPIN	2/23/2023	Max volume capacity of steam bay	volumetric	67.5000
LC_SBPIN	3/31/2023	No discharge for March	volumetric	0.0000
LC_SBPIN	4/30/2023	No discharge for March	volumetric	0.0000
LC_SBPIN	5/31/2023	No discharge for March	volumetric	0.0000
LC_SBPIN	6/30/2023	No discharge for March	volumetric	0.0000
LC_SBPIN	7/31/2023	No discharge for March	Volumetric Method	0.0000
LC_SBPIN	8/31/2023	No discharge for March	Volumetric Method	0.0000
LC_SBPIN	9/30/2023	No discharge for March	Volumetric Method	0.0000
LC_SBPIN	10/31/2023	No discharge for March	Volumetric Method	0.0000
LC_SBPIN	11/30/2023	No discharge for March	Volumetric Method	0.0000
LC_SBPIN	12/31/2023	Max volume capacity of steam bay	Volumetric Method	67.5000

Teck Location Code	Sample Date	Flow Remark	Method	Flow m3/s
				Result
LC_UC	1/26/2023	EDP calculated instant_flow = 0.434 l	volumetric	0.0017
LC_UC	2/9/2023	EDP calculated instant_flow = 0.438 l	volumetric	0.0018
LC_UC	3/15/2023	EDP calculated instant_flow = 0.365 l	volumetric	0.0015
LC_UC	4/13/2023		Rated Discharge Method	0.0000
LC_UC	5/2/2023		Rated Discharge Method	0.0000
LC_UC	6/13/2023	EDP calculated instant_flow = 1.54 l	Volumetric Method	0.0062
LC_UC	7/5/2023		volumetric	0.0003
LC_UC	8/30/2023	EDP calculated instant_flow = 0.631 l	Volumetric Method	0.0025
LC_UC	9/6/2023		Rated Discharge Method	0.0004
LC_UC	10/11/2023		Rated Discharge Method	0.0003
LC_UC	11/8/2023	No photo taken	Rated Discharge Method	0.0003
LC_UC	11/25/2023	Multiple mesurements were taken and averaged in source 1.; EDP calculated instant_flow = 0.307 l	Volumetric Method	0.0003
LC_UC	12/12/2023	EDP calculated instant_flow = 0.324 l	Volumetric Method	0.0003

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LC1	5/4/2023	3.5	1.31
LC_LC1	5/10/2023	< 1.0	0.19
LC_LC1	5/15/2023	< 1.0	0.31
LC_LC1	5/25/2023	2.1	0.60
LC_LC1	5/25/2023	< 1.0	0.10
LC_LC1	6/5/2023	< 1.0	2.94
LC_LC1	6/12/2023	1.0	0.41
LC_LC1	6/19/2023	< 1.0	0.14
LC_LC1	6/26/2023	< 1.0	0.12
LC_LC1	7/4/2023	< 1.0	0.13
LC_LC1	7/10/2023	< 1.0	< 0.10
LC_LC1	8/9/2023	< 1.0	< 0.10
LC_LC1	9/5/2023	< 1.0	0.19
LC_LC1	10/4/2023	4.6	0.96
LC_LC1	11/7/2023	< 1.0	0.12
LC_LC12	5/4/2023	1.1	1.57
LC_LC12	5/10/2023	< 1.0	0.50
LC_LC12	5/15/2023	< 1.0	0.30
LC_LC12	5/25/2023	< 1.0	0.25
LC_LC12	5/29/2023	< 1.0	0.18
LC_LC12	6/5/2023	< 1.0	0.14
LC_LC12	6/12/2023	< 1.0	0.22
LC_LC12	6/19/2023	< 1.0	0.18
LC_LC12	6/26/2023	< 1.0	0.12
LC_LC2	1/9/2023	< 1.0	0.22
LC_LC2	2/6/2023	< 1.0	0.12
LC_LC2	3/10/2023	< 1.0	0.60
LC_LC2	3/13/2023	< 1.0	0.40
LC_LC2	3/20/2023	< 1.0	0.19
LC_LC2	3/27/2023	< 1.0	0.12
LC_LC2	4/5/2023	1.4	0.40
LC_LC2	4/10/2023	< 1.0	0.20
LC_LC2	4/18/2023	< 1.0	0.11
LC_LC2	4/26/2023	< 1.0	< 0.10
LC_LC2	5/1/2023	2.0	0.47
LC_LC2	5/10/2023	< 1.0	0.29
LC_LC2	5/15/2023	< 1.0	0.72
LC_LC2	5/24/2023	< 1.0	0.17
LC_LC2	5/24/2023	< 1.0	0.23
LC_LC2	6/5/2023	1.4	0.35
LC_LC2	6/12/2023	1.1	0.23
LC_LC2	6/19/2023	< 1.0	0.18
LC_LC2	6/26/2023	< 1.0	0.16
LC_LC2	7/4/2023	< 1.0	0.11
LC_LC2	7/10/2023	< 1.0	< 0.10
LC_LC2	8/9/2023	< 1.0	0.12

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LC2	9/5/2023	1.3	0.18
LC_LC2	10/4/2023	1.1	< 0.10
LC_LC2	11/7/2023	< 1.0	0.11
LC_LC2	12/11/2023	< 1.0	0.10
LC_LC3	1/3/2023	1.8	0.28
LC_LC3	1/9/2023	2.3	0.33
LC_LC3	1/16/2023	< 1.0	0.34
LC_LC3	1/23/2023	2.0	0.35
LC_LC3	1/30/2023	< 1.0	0.24
LC_LC3	2/7/2023	2.5	0.26
LC_LC3	2/14/2023	1.6	0.28
LC_LC3	2/21/2023	2.2	0.32
LC_LC3	2/28/2023	< 1.0	0.39
LC_LC3	3/7/2023	< 1.0	0.40
LC_LC3	3/13/2023	1.9	0.37
LC_LC3	3/20/2023	2.6	0.63
LC_LC3	3/27/2023	1.5	0.41
LC_LC3	3/29/2023	2.1	0.41
LC_LC3	4/3/2023	< 1.0	0.47
LC_LC3	4/12/2023	1.9	0.72
LC_LC3	4/17/2023	3.6	0.60
LC_LC3	4/24/2023	< 1.0	0.30
LC_LC3	5/1/2023	2.0	0.65
LC_LC3	5/9/2023	4.8	1.17
LC_LC3	5/16/2023	< 1.0	0.34
LC_LC3	5/16/2023	< 1.0	0.53
LC_LC3	5/19/2023	2.1	0.57
LC_LC3	5/23/2023	< 1.0	0.34
LC_LC3	5/29/2023	< 1.0	0.25
LC_LC3	6/6/2023	< 1.0	0.36
LC_LC3	6/12/2023	< 1.0	0.25
LC_LC3	6/19/2023	< 1.0	0.19
LC_LC3	6/26/2023	1.2	0.25
LC_LC3	7/4/2023	< 1.0	0.21
LC_LC3	7/6/2023	2.2	0.26
LC_LC3	7/10/2023	1.2	0.24
LC_LC3	7/17/2023	1.5	0.45
LC_LC3	7/24/2023	2.0	0.22
LC_LC3	8/1/2023	< 1.0	0.20
LC_LC3	8/2/2023	2.0	0.28
LC_LC3	8/8/2023	1.9	0.14
LC_LC3	8/15/2023	2.1	0.14
LC_LC3	8/22/2023	2.3	0.28
LC_LC3	8/23/2023	< 1.0	0.23
LC_LC3	8/29/2023	< 1.0	0.40
LC_LC3	9/5/2023	7.4	0.25

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LC3	9/12/2023	< 1.0	0.20
LC_LC3	9/18/2023	1.2	0.14
LC_LC3	9/26/2023	1.1	0.28
LC_LC3	10/4/2023	4.0	0.41
LC_LC3	10/10/2023	< 1.0	0.34
LC_LC3	10/12/2023	< 1.0	0.29
LC_LC3	10/16/2023	3.0	0.29
LC_LC3	10/23/2023	2.6	0.39
LC_LC3	10/30/2023	2.6	0.11
LC_LC3	11/6/2023	< 1.0	0.27
LC_LC3	11/9/2023	< 1.0	0.15
LC_LC3	11/13/2023	1.2	0.81
LC_LC3	11/20/2023	1.7	0.28
LC_LC3	11/27/2023	4.2	0.46
LC_LC3	12/4/2023	< 1.0	0.27
LC_LC3	12/13/2023	< 1.0	0.30
LC_LC3	12/18/2023	< 1.0	0.30
LC_LC3	12/27/2023	1.7	0.37
LC_LC4	1/3/2023	< 1.0	< 0.10
LC_LC4	1/9/2023	1.9	0.26
LC_LC4	1/16/2023	< 1.0	0.18
LC_LC4	1/23/2023	< 1.0	0.14
LC_LC4	2/2/2023	< 1.0	0.16
LC_LC4	2/6/2023	< 1.0	0.16
LC_LC4	2/13/2023	< 1.0	0.16
LC_LC4	2/21/2023	< 1.0	0.14
LC_LC4	2/27/2023	1.8	0.41
LC_LC4	3/6/2023	< 1.0	0.18
LC_LC4	3/13/2023	1.4	0.52
LC_LC4	3/20/2023	< 1.0	0.17
LC_LC4	3/27/2023	2.7	2.43
LC_LC4	4/3/2023	1.4	0.29
LC_LC4	4/12/2023	2.9	1.26
LC_LC4	4/17/2023	1.2	0.49
LC_LC4	4/24/2023	1.5	0.41
LC_LC4	5/1/2023	13.9	5.25
LC_LC4	5/8/2023	6.1	3.21
LC_LC4	5/15/2023	2.4	1.17
LC_LC4	5/23/2023	< 1.0	0.42
LC_LC4	5/23/2023	1.9	0.46
LC_LC4	6/5/2023	1.8	0.27
LC_LC4	6/12/2023	1.3	0.36
LC_LC4	6/19/2023	1.8	0.27
LC_LC4	6/26/2023	1.9	0.34
LC_LC4	7/4/2023	1.5	0.21
LC_LC4	7/10/2023	1.8	0.26

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LC4	7/17/2023	1.7	0.31
LC_LC4	7/24/2023	4.8	0.27
LC_LC4	7/31/2023	2.0	0.34
LC_LC4	8/8/2023	2.5	0.21
LC_LC4	8/16/2023	3.7	1.00
LC_LC4	8/21/2023	1.6	0.34
LC_LC4	8/28/2023	1.4	0.25
LC_LC4	9/5/2023	1.0	0.42
LC_LC4	9/12/2023	2.1	0.16
LC_LC4	9/18/2023	< 1.0	0.17
LC_LC4	9/26/2023	< 1.0	0.11
LC_LC4	10/4/2023	1.7	0.23
LC_LC4	10/10/2023	2.3	0.15
LC_LC4	10/17/2023	< 1.0	0.26
LC_LC4	10/24/2023	3.5	0.30
LC_LC4	10/30/2023	2.8	0.13
LC_LC4	11/6/2023	1.1	0.23
LC_LC4	11/13/2023	1.7	0.41
LC_LC4	11/20/2023	1.4	0.12
LC_LC4	11/27/2023	1.9	0.18
LC_LC4	12/4/2023	< 1.0	0.18
LC_LC4	12/12/2023	1.6	0.22
LC_LC4	12/18/2023	< 1.0	0.17
LC_LC4	12/27/2023	1.4	0.26
LC_LC5	1/5/2023	< 1.0	0.16
LC_LC5	2/7/2023	14.9	2.23
LC_LC5	2/14/2023	3.0	2.38
LC_LC5	2/22/2023	< 1.0	0.41
LC_LC5	2/28/2023	4.2	0.25
LC_LC5	3/7/2023	4.1	2.19
LC_LC5	3/13/2023	2.4	0.73
LC_LC5	3/20/2023	3.1	1.00
LC_LC5	3/27/2023	1.0	0.38
LC_LC5	4/3/2023	2.1	0.54
LC_LC5	4/10/2023	3.3	1.81
LC_LC5	4/17/2023	1.8	0.95
LC_LC5	4/24/2023	3.1	1.53
LC_LC5	5/1/2023	34.0	24.6
LC_LC5	5/9/2023	8.5	3.64
LC_LC5	5/16/2023	28.1	8.86
LC_LC5	5/23/2023	7.4	2.27
LC_LC5	5/30/2023	11.0	0.52
LC_LC5	6/6/2023	2.9	0.47
LC_LC5	6/13/2023	27.1	1.10
LC_LC5	6/19/2023	< 1.0	0.42
LC_LC5	6/26/2023	2.3	0.45

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LC5	7/4/2023	1.8	0.33
LC_LC5	7/10/2023	1.6	0.28
LC_LC5	8/8/2023	1.9	0.21
LC_LC5	8/15/2023	2.0	0.21
LC_LC5	8/22/2023	1.2	0.19
LC_LC5	8/29/2023	< 1.0	0.20
LC_LC5	9/5/2023	2.0	0.20
LC_LC5	10/12/2023	1.1	0.20
LC_LC5	10/16/2023	1.7	0.18
LC_LC5	10/23/2023	< 1.0	0.18
LC_LC5	10/30/2023	3.0	0.17
LC_LC5	11/6/2023	1.4	0.12
LC_LC5	12/4/2023	< 1.0	0.15
LC_LCDSSLCC	1/3/2023	1.4	0.22
LC_LCDSSLCC	1/9/2023	1.8	0.22
LC_LCDSSLCC	1/16/2023	< 1.0	0.18
LC_LCDSSLCC	1/23/2023	< 1.0	0.17
LC_LCDSSLCC	1/30/2023	< 1.0	0.12
LC_LCDSSLCC	2/7/2023	< 1.0	0.14
LC_LCDSSLCC	2/14/2023	1.2	0.14
LC_LCDSSLCC	2/21/2023	2.2	1.05
LC_LCDSSLCC	2/28/2023	< 1.0	< 0.10
LC_LCDSSLCC	3/7/2023	< 1.0	0.14
LC_LCDSSLCC	3/13/2023	2.4	0.27
LC_LCDSSLCC	3/20/2023	1.4	0.15
LC_LCDSSLCC	3/27/2023	1.4	0.21
LC_LCDSSLCC	4/3/2023	4.0	0.40
LC_LCDSSLCC	4/12/2023	1.7	0.43
LC_LCDSSLCC	4/17/2023	1.7	0.60
LC_LCDSSLCC	4/24/2023	3.1	1.50
LC_LCDSSLCC	5/1/2023	4.6	1.68
LC_LCDSSLCC	5/9/2023	1.1	0.65
LC_LCDSSLCC	5/16/2023	4.0	1.15
LC_LCDSSLCC	5/19/2023	< 1.0	0.47
LC_LCDSSLCC	5/23/2023	1.2	0.43
LC_LCDSSLCC	5/30/2023	4.6	0.43
LC_LCDSSLCC	6/6/2023	1.4	0.30
LC_LCDSSLCC	6/12/2023	< 1.0	0.28
LC_LCDSSLCC	6/19/2023	< 1.0	0.19
LC_LCDSSLCC	6/26/2023	1.9	0.30
LC_LCDSSLCC	7/4/2023	1.5	0.26
LC_LCDSSLCC	7/10/2023	3.0	0.22
LC_LCDSSLCC	7/17/2023	1.0	0.21
LC_LCDSSLCC	7/24/2023	1.9	0.19
LC_LCDSSLCC	8/1/2023	1.2	0.21
LC_LCDSSLCC	8/8/2023	1.3	0.28

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LCDSSLCC	8/15/2023	2.8	0.24
LC_LCDSSLCC	8/22/2023	4.6	0.29
LC_LCDSSLCC	8/29/2023	< 1.0	0.24
LC_LCDSSLCC	9/5/2023	1.7	0.10
LC_LCDSSLCC	9/12/2023	1.1	0.13
LC_LCDSSLCC	9/18/2023	1.3	0.10
LC_LCDSSLCC	9/26/2023	< 1.0	0.11
LC_LCDSSLCC	10/4/2023	2.0	0.12
LC_LCDSSLCC	10/10/2023	< 1.0	0.15
LC_LCDSSLCC	10/16/2023	3.8	0.34
LC_LCDSSLCC	10/23/2023	< 1.0	0.16
LC_LCDSSLCC	10/30/2023	2.1	< 0.10
LC_LCDSSLCC	11/6/2023	< 1.0	0.22
LC_LCDSSLCC	11/13/2023	2.4	0.45
LC_LCDSSLCC	11/20/2023	2.5	0.22
LC_LCDSSLCC	11/27/2023	< 1.0	0.12
LC_LCDSSLCC	12/4/2023	< 1.0	0.19
LC_LCDSSLCC	12/12/2023	1.0	0.17
LC_LCDSSLCC	12/18/2023	< 1.0	< 0.10
LC_LCDSSLCC	12/27/2023	1.0	0.22
LC_LCUSWLC	1/5/2023	< 1.0	0.26
LC_LCUSWLC	1/11/2023	< 1.0	0.55
LC_LCUSWLC	1/18/2023	< 1.0	0.43
LC_LCUSWLC	1/25/2023	< 1.0	0.59
LC_LCUSWLC	2/1/2023	< 1.0	0.21
LC_LCUSWLC	2/8/2023	< 1.0	0.19
LC_LCUSWLC	2/15/2023	< 1.0	0.22
LC_LCUSWLC	2/22/2023	1.7	0.43
LC_LCUSWLC	3/1/2023	< 1.0	0.26
LC_LCUSWLC	3/8/2023	1.7	0.30
LC_LCUSWLC	3/16/2023	< 1.0	0.48
LC_LCUSWLC	3/20/2023	< 1.0	0.63
LC_LCUSWLC	3/27/2023	< 1.0	0.30
LC_LCUSWLC	3/29/2023	1.3	0.39
LC_LCUSWLC	4/3/2023	1.7	0.26
LC_LCUSWLC	4/12/2023	1.2	0.89
LC_LCUSWLC	4/17/2023	1.2	0.46
LC_LCUSWLC	4/24/2023	1.2	0.10
LC_LCUSWLC	5/1/2023	1.3	1.04
LC_LCUSWLC	5/10/2023	< 1.0	0.27
LC_LCUSWLC	5/15/2023	< 1.0	0.90
LC_LCUSWLC	5/16/2023	< 1.0	0.48
LC_LCUSWLC	5/25/2023	< 1.0	0.28
LC_LCUSWLC	5/25/2023	< 1.0	0.26
LC_LCUSWLC	6/6/2023	< 1.0	0.31
LC_LCUSWLC	6/13/2023	< 1.0	2.59

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_LCUSWLC	6/19/2023	< 1.0	0.21
LC_LCUSWLC	6/26/2023	< 1.0	0.18
LC_LCUSWLC	7/4/2023	< 1.0	0.16
LC_LCUSWLC	7/6/2023	1.3	0.35
LC_LCUSWLC	7/10/2023	< 1.0	0.20
LC_LCUSWLC	7/17/2023	< 1.0	0.29
LC_LCUSWLC	7/24/2023	2.6	0.37
LC_LCUSWLC	7/31/2023	1.1	0.39
LC_LCUSWLC	8/2/2023	1.5	0.41
LC_LCUSWLC	8/8/2023	1.5	0.29
LC_LCUSWLC	8/15/2023	1.4	0.31
LC_LCUSWLC	8/21/2023	< 1.0	0.36
LC_LCUSWLC	8/28/2023	1.0	0.24
LC_LCUSWLC	9/5/2023	2.1	0.30
LC_LCUSWLC	9/12/2023	< 1.0	0.22
LC_LCUSWLC	9/18/2023	< 1.0	0.22
LC_LCUSWLC	9/26/2023	< 1.0	0.29
LC_LCUSWLC	10/4/2023	2.4	0.19
LC_LCUSWLC	10/10/2023	< 1.0	0.18
LC_LCUSWLC	10/12/2023	1.7	0.26
LC_LCUSWLC	10/17/2023	< 1.0	0.33
LC_LCUSWLC	10/23/2023	6.1	2.29
LC_LCUSWLC	11/1/2023	< 1.0	0.20
LC_LCUSWLC	11/6/2023	< 1.0	0.20
LC_LCUSWLC	11/13/2023	< 1.0	0.25
LC_LCUSWLC	11/20/2023	< 1.0	0.33
LC_LCUSWLC	11/27/2023	1.9	0.32
LC_LCUSWLC	12/4/2023	< 1.0	0.20
LC_LCUSWLC	12/13/2023	< 1.0	0.21
LC_LCUSWLC	12/17/2023	< 1.0	0.18
LC_LCUSWLC	12/18/2023	< 1.0	0.20
LC_LCUSWLC	12/19/2023	3.5	0.18
LC_LCUSWLC	12/27/2023	< 1.0	0.24
LC_SLC	1/5/2023	< 1.0	< 0.10
LC_SLC	2/7/2023	1.0	0.10
LC_SLC	2/14/2023	< 1.0	< 0.10
LC_SLC	2/21/2023	< 1.0	0.50
LC_SLC	2/28/2023	< 1.0	< 0.10
LC_SLC	3/7/2023	< 1.0	< 0.10
LC_SLC	3/29/2023	< 1.0	0.20
LC_SLC	4/5/2023	< 1.0	< 0.10
LC_SLC	5/9/2023	< 1.0	1.34
LC_SLC	5/16/2023	5.2	2.33
LC_SLC	5/16/2023	2.6	1.83
LC_SLC	5/23/2023	< 1.0	0.38
LC_SLC	5/30/2023	< 1.0	0.82

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_SLC	6/6/2023	1.5	0.30
LC_SLC	7/4/2023	< 1.0	0.10
LC_SLC	7/6/2023	1.8	0.20
LC_SLC	8/2/2023	< 1.0	0.11
LC_SLC	8/8/2023	< 1.0	0.12
LC_SLC	8/15/2023	< 1.0	0.39
LC_SLC	8/22/2023	< 1.0	0.29
LC_SLC	8/29/2023	< 1.0	0.18
LC_SLC	9/5/2023	< 1.0	0.15
LC_SLC	10/12/2023	1.1	0.10
LC_SLC	10/16/2023	< 1.0	0.10
LC_SLC	10/23/2023	< 1.0	0.16
LC_SLC	10/30/2023	1.4	< 0.10
LC_SLC	11/6/2023	< 1.0	0.15
LC_SLC	11/9/2023	< 1.0	< 0.10
LC_SLC	12/11/2023	< 1.0	< 0.10
LC_SPDC	1/4/2023	1.3	0.17
LC_SPDC	1/10/2023	2.7	0.21
LC_SPDC	1/17/2023	2.5	0.58
LC_SPDC	1/31/2023	1.0	0.36
LC_SPDC	2/7/2023	< 1.0	0.15
LC_SPDC	2/14/2023	1.3	0.18
LC_SPDC	2/21/2023	< 1.0	0.14
LC_SPDC	2/28/2023	1.5	0.26
LC_SPDC	3/7/2023	< 1.0	0.36
LC_SPDC	3/14/2023	< 1.0	0.62
LC_SPDC	3/21/2023	1.0	0.28
LC_SPDC	3/28/2023	1.4	0.35
LC_SPDC	3/30/2023	< 1.0	0.52
LC_SPDC	4/4/2023	< 1.0	0.44
LC_SPDC	4/10/2023	< 1.0	0.25
LC_SPDC	4/11/2023	12.3	8.60
LC_SPDC	4/13/2023	< 1.0	2.20
LC_SPDC	4/16/2023	3.5	0.70
LC_SPDC	4/19/2023	< 1.0	2.35
LC_SPDC	4/25/2023	1.0	0.69
LC_SPDC	5/2/2023	9.4	4.82
LC_SPDC	5/3/2023	3.5	3.08
LC_SPDC	5/9/2023	1.2	1.08
LC_SPDC	5/11/2023	1.2	0.77
LC_SPDC	5/17/2023	4.6	0.75
LC_SPDC	5/17/2023	< 1.0	0.79
LC_SPDC	5/23/2023	1.8	0.33
LC_SPDC	5/30/2023	1.6	0.48
LC_SPDC	6/6/2023	< 1.0	0.46
LC_SPDC	6/13/2023	< 1.0	0.40

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_SPDC	6/20/2023	< 1.0	0.54
LC_SPDC	6/28/2023	< 1.0	0.40
LC_SPDC	7/5/2023	< 1.0	0.48
LC_SPDC	7/6/2023	2.2	0.54
LC_SPDC	7/12/2023	2.6	0.84
LC_SPDC	7/18/2023	< 1.0	0.30
LC_SPDC	7/25/2023	1.9	0.48
LC_SPDC	8/1/2023	2.1	0.40
LC_SPDC	8/2/2023	1.6	0.39
LC_SPDC	8/8/2023	1.7	0.29
LC_SPDC	8/15/2023	4.8	0.24
LC_SPDC	8/22/2023	2.4	0.30
LC_SPDC	8/29/2023	< 1.0	0.40
LC_SPDC	8/29/2023	2.8	0.43
LC_SPDC	9/6/2023	1.1	0.29
LC_SPDC	9/11/2023	< 1.0	0.19
LC_SPDC	9/18/2023	< 1.0	0.16
LC_SPDC	9/25/2023	1.3	0.19
LC_SPDC	10/3/2023	1.0	0.21
LC_SPDC	10/11/2023	1.6	0.20
LC_SPDC	10/12/2023	1.3	0.30
LC_SPDC	10/17/2023	< 1.0	0.19
LC_SPDC	10/24/2023	2.7	0.36
LC_SPDC	10/31/2023	< 1.0	0.15
LC_SPDC	11/8/2023	1.6	0.18
LC_SPDC	11/14/2023	2.0	0.24
LC_SPDC	11/21/2023	1.4	0.17
LC_SPDC	11/28/2023	3.1	0.44
LC_SPDC	12/7/2023	1.1	0.60
LC_SPDC	12/12/2023	< 1.0	0.14
LC_SPDC	12/19/2023	1.2	0.15
LC_SPDC	12/27/2023	< 1.0	0.28
LC_WLC	1/3/2023	3.8	< 0.10
LC_WLC	1/9/2023	< 1.0	< 0.10
LC_WLC	1/16/2023	2.0	< 0.10
LC_WLC	1/23/2023	3.4	< 0.10
LC_WLC	1/30/2023	1.0	< 0.10
LC_WLC	2/6/2023	< 1.0	< 0.10
LC_WLC	2/13/2023	< 1.0	< 0.10
LC_WLC	2/22/2023	1.9	0.15
LC_WLC	2/27/2023	2.0	< 0.10
LC_WLC	3/6/2023	4.5	< 0.10
LC_WLC	3/13/2023	2.2	0.36
LC_WLC	3/20/2023	1.6	0.26
LC_WLC	3/27/2023	< 1.0	< 0.10
LC_WLC	3/29/2023	3.9	0.17

Teck Location Code	Sample Date	TOTAL SUSPENDED SOLIDS, LAB N mg/l	TURBIDITY, FIELD N ntu
		Result	Result
LC_WLC	4/3/2023	6.4	< 0.10
LC_WLC	4/10/2023	2.7	0.14
LC_WLC	4/17/2023	3.1	0.10
LC_WLC	4/24/2023	2.9	0.17
LC_WLC	5/1/2023	< 1.0	< 0.10
LC_WLC	5/8/2023	2.3	1.02
LC_WLC	5/15/2023	< 1.0	0.18
LC_WLC	5/16/2023	< 1.0	0.24
LC_WLC	5/23/2023	< 1.0	0.10
LC_WLC	5/29/2023	< 1.0	0.11
LC_WLC	6/5/2023	< 1.0	< 0.10
LC_WLC	6/12/2023	< 1.0	0.28
LC_WLC	6/19/2023	2.0	< 0.10
LC_WLC	6/26/2023	2.6	0.19
LC_WLC	7/4/2023	1.0	< 0.10
LC_WLC	7/6/2023	3.2	< 0.10
LC_WLC	7/10/2023	3.4	0.21
LC_WLC	7/17/2023	1.5	0.17
LC_WLC	7/24/2023	3.3	< 0.10
LC_WLC	7/31/2023	3.4	0.15
LC_WLC	8/2/2023	4.4	0.16
LC_WLC	8/8/2023	3.5	< 0.10
LC_WLC	8/15/2023	3.6	< 0.10
LC_WLC	8/21/2023	< 1.0	0.16
LC_WLC	8/28/2023	2.4	0.12
LC_WLC	9/5/2023	< 1.0	0.12
LC_WLC	9/12/2023	< 1.0	0.19
LC_WLC	9/18/2023	1.5	< 0.10
LC_WLC	9/26/2023	< 1.0	< 0.10
LC_WLC	10/4/2023	4.3	0.13
LC_WLC	10/10/2023	< 1.0	< 0.10
LC_WLC	10/12/2023	4.8	0.11
LC_WLC	10/17/2023	< 1.0	< 0.10
LC_WLC	10/24/2023	< 1.0	< 0.10
LC_WLC	11/1/2023	3.0	< 0.10
LC_WLC	11/6/2023	2.2	0.12
LC_WLC	11/13/2023	1.3	0.19
LC_WLC	11/20/2023	< 1.0	< 0.10
LC_WLC	11/27/2023	< 1.0	< 0.10
LC_WLC	12/4/2023	< 1.0	< 0.10
LC_WLC	12/13/2023	< 1.0	< 0.10
LC_WLC	12/18/2023	2.0	0.23
LC_WLC	12/27/2023	3.1	0.25

Teck Location Code	Sample Date	The sum of extractable petroleum hydrocarbons C10-C19 and C19-C32. N mg/l
		Result
LC_LC2	1/9/2023	< 0.4
LC_LC2	4/5/2023	< 0.4
LC_LC2	7/4/2023	< 0.4
LC_LC2	10/4/2023	< 0.4
LC_LVWB	1/19/2023	7.96
LC_LVWB	2/23/2023	0.69
LC_LVWB	3/23/2023	3.64
LC_LVWB	5/11/2023	13.9
LC_LVWB	6/22/2023	6.84
LC_LVWB	8/18/2023	1.69
LC_LVWB	10/26/2023	13.7
LC_LVWB	11/30/2023	2.77
LC_LVWB	12/14/2023	4.43
LC_PIZP1101	1/20/2023	< 0.4
LC_PIZP1101	6/15/2023	< 0.4
LC_PIZP1101	6/21/2023	< 0.4
LC_PIZP1101	9/14/2023	< 0.4
LC_PIZP1101	10/23/2023	< 0.4
LC_PIZP1105	1/20/2023	< 0.4
LC_PIZP1105	4/17/2023	< 0.4
LC_PIZP1105	7/17/2023	< 0.4
LC_PIZP1105	10/18/2023	< 0.4
LC_WLC	1/3/2023	< 0.4
LC_WLC	4/3/2023	< 0.4
LC_WLC	7/4/2023	< 0.4
LC_WLC	10/4/2023	< 0.4

Sample Date:				1/19/2023	2/23/2023	3/16/2023	12/7/2023	12/14/2023	12/21/2023
Teck Location Code	Fraction	Result Unit	Parameter	Result	Result	Result	Result	Result	Result
LC_SBPIN	D	mg/l	ALUMINUM	0.0156	0.0400		0.0078	0.915	0.0024
LC_SBPIN	D	mg/l	ANTIMONY	0.00478	0.00332		< 0.00010	0.00448	0.00241
LC_SBPIN	D	mg/l	ARSENIC	0.00031	0.00046		0.00310	0.00221	0.00039
LC_SBPIN	D	mg/l	BARIUM	0.0970	0.102		0.0695	0.0890	0.0902
LC_SBPIN	D	mg/l	BISMUTH	< 0.000050	< 0.000050		< 0.000050	< 0.000500	< 0.000050
LC_SBPIN	D	mg/l	BORON	0.366	0.224		0.643	0.282	0.219
LC_SBPIN	D	mg/l	CARBON, DISSOLVED ORGANIC	54.8	47.7		< 0.50	169	28.8
LC_SBPIN	D	mg/l	CHLORIDE	14.1	14.4		134	21.6	13.7
LC_SBPIN	D	mg/l	CHROMIUM	< 0.00010	0.00020		< 0.00010	0.00154	< 0.00010
LC_SBPIN	D	mg/l	COPPER	0.00094	0.00102		< 0.00020	0.00602	< 0.00020
LC_SBPIN	D	mg/l	Hardness, Total or Dissolved CaCO3	221	231		389	134	191
LC_SBPIN	D	mg/l	IRON	0.192	0.256		0.822	0.896	0.436
LC_SBPIN	D	mg/l	LEAD	0.000281	0.000164		< 0.000050	0.00212	0.000058
LC_SBPIN	D	mg/l	LITHIUM	0.266	0.243		0.157	0.233	0.197
LC_SBPIN	D	mg/l	MANGANESE	0.119	0.104		0.295	0.119	0.113
LC_SBPIN	D	mg/l	MERCURY	< 0.0000050	< 0.0000050		< 0.0000050	0.0000064	< 0.0000050
LC_SBPIN	D	mg/l	MOLYBDENUM	0.0677	0.0248		0.000716	0.116	0.0584
LC_SBPIN	D	mg/l	NICKEL	0.00613	0.00419		0.00396	0.0166	0.00322
LC_SBPIN	D	mg/l	ORTHO-PHOSPHATE	< 0.0010	0.769		33.2	0.0088	< 0.0010
LC_SBPIN	D	mg/l	SILVER	< 0.000010	< 0.000010		< 0.000010	< 0.000100	< 0.000010
LC_SBPIN	D	mg/l	STRONTIUM	0.133	0.133		0.280	0.0688	0.109
LC_SBPIN	D	mg/l	SULFATE (AS SO4)	53.6	65.5		163	74.7	78.7
LC_SBPIN	D	mg/l	THALLIUM	< 0.000010	< 0.000010		< 0.000010	< 0.000100	< 0.000010
LC_SBPIN	D	mg/l	TIN	< 0.00010	< 0.00010		< 0.00010	< 0.00100	< 0.00010
LC_SBPIN	D	mg/l	TITANIUM	0.00057	0.00166		< 0.00030	0.0234	< 0.00030
LC_SBPIN	D	mg/l	URANIUM	0.00176	0.00195		< 0.000010	0.00298	0.00134
LC_SBPIN	D	mg/l	VANADIUM	0.00089	0.00080		< 0.00050	0.00564	< 0.00050
LC_SBPIN	D	mg/l	ZINC	0.0094	0.0044		0.0108	0.0217	0.0156
LC_SBPIN	D	ug/l	BERYLLIUM	< 0.020	< 0.020		< 0.020	< 0.200	< 0.020
LC_SBPIN	D	ug/l	CADMIUM	0.0148	0.0116		< 0.0050	0.168	0.0205
LC_SBPIN	D	ug/l	COBALT	0.61	0.44		2.26	5.17	1.16
LC_SBPIN	D	ug/l	SELENIUM	5.90	2.54		1.20	5.77	5.50
LC_SBPIN	N	deg c	TEMPERATURE, FIELD	16.1	12.10	14.0	14.3	14.5	17.3
LC_SBPIN	N	mg/l	ALKALINITY, TOTAL (As CaCO3)	240	226		84.0	355	107
LC_SBPIN	N	mg/l	BROMIDE	0.104	< 0.050		1.47	0.075	< 0.050
LC_SBPIN	N	mg/l	DISSOLVED OXYGEN, FIELD	3.33	2.67	1.43	1.13	2.09	1.48

Sample Date:				1/19/2023	2/23/2023	3/16/2023	12/7/2023	12/14/2023	12/21/2023
Teck Location Code	Fraction	Result Unit	Parameter	Result	Result	Result	Result	Result	Result
LC_SBPIN	N	mg/l	Extractable Petroleum Hydrocarbons C10-C19	3.92	6.07	2.49	< 0.25	16.4	0.52
LC_SBPIN	N	mg/l	Extractable Petroleum Hydrocarbons C19-C32	6.03	11.0	15.3	< 0.25	47.7	0.86
LC_SBPIN	N	mg/l	FLUORIDE	0.254	0.241		< 0.100	0.246	0.425
LC_SBPIN	N	mg/l	NITRATE NITROGEN (NO3), AS N	0.0231	0.0061		0.160	0.0146	< 0.0050
LC_SBPIN	N	mg/l	NITRITE NITROGEN (NO2), AS N	< 0.0010	< 0.0010		< 0.0050	0.388	0.0011
LC_SBPIN	N	mg/l	The sum of extractable petroleum hydrocarbons C10-C19 and C19-C32.	9.95	17.1	17.8	< 0.40	64.1	1.38
LC_SBPIN	N	mg/l	TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE)	399	401		478	652	559
LC_SBPIN	N	mg/l	TOTAL KJELDAHL NITROGEN	1.98	2.77		3.30	23.3	1.76
LC_SBPIN	N	mg/l	TOTAL SUSPENDED SOLIDS, LAB	34.9	54.4	94.4	1.1	2470	5.3
LC_SBPIN	N	ntu	TURBIDITY, LAB	77.2	114		0.85	< 0.10	13.5
LC_SBPIN	N	ph units	pH, Field	7.17	7.04	7.44	5.72	7.41	7.08
LC_SBPIN	N	ph units	pH, LAB	7.36	7.29		6.08	7.57	7.37
LC_SBPIN	N	us/cm	CONDUCTIVITY, LAB	574	570		944	785	733
LC_SBPIN	T	mg/l	ALUMINUM	0.569	0.396		0.0099	26.1	0.0817
LC_SBPIN	T	mg/l	ANTIMONY	0.00524	0.00381		< 0.00010	0.00814	0.00233
LC_SBPIN	T	mg/l	ARSENIC	0.00070	0.00119		0.00288	0.0176	0.00043
LC_SBPIN	T	mg/l	BARIUM	0.113	0.130		0.0780	1.40	0.0906
LC_SBPIN	T	mg/l	BISMUTH	< 0.000100	< 0.000100		< 0.000050	< 0.00250	< 0.000050
LC_SBPIN	T	mg/l	BORON	0.420	0.230		0.566	< 0.500	0.218
LC_SBPIN	T	mg/l	CALCIUM	56.2	67.5		118	55.3	47.5
LC_SBPIN	T	mg/l	CHROMIUM	0.00141	0.00113		< 0.00010	0.0538	0.00020
LC_SBPIN	T	mg/l	COPPER	0.0826	0.116		0.00101	0.144	0.00171
LC_SBPIN	T	mg/l	IRON	0.779	0.829		0.859	28.7	0.485
LC_SBPIN	T	mg/l	LEAD	0.00607	0.00555		< 0.000050	0.0374	0.000351
LC_SBPIN	T	mg/l	LITHIUM	0.252	0.251		0.180	0.256	0.195
LC_SBPIN	T	mg/l	MAGNESIUM	18.5	19.1		34.5	21.7	17.6

Sample Date:				1/19/2023	2/23/2023	3/16/2023	12/7/2023	12/14/2023	12/21/2023
Teck Location Code	Fraction	Result Unit	Parameter	Result	Result	Result	Result	Result	Result
LC_SBPIN	T	mg/l	MANGANESE	0.122	0.112		0.335	0.488	0.112
LC_SBPIN	T	mg/l	MERCURY	< 0.0000050	< 0.0000050		< 0.0000050	0.000168	< 0.0000050
LC_SBPIN	T	mg/l	MOLYBDENUM	0.0688	0.0407		0.000755	0.222	0.0601
LC_SBPIN	T	mg/l	NICKEL	0.00709	0.00808		0.00443	0.135	0.00355
LC_SBPIN	T	mg/l	NITROGEN, AMMONIA (AS N)	0.134	0.627		2.80	0.323	0.135
LC_SBPIN	T	mg/l	PHOSPHORUS	1.20	2.20		40.8	3.62	0.651
LC_SBPIN	T	mg/l	POTASSIUM	4.62	4.87		12.4	21.1	4.20
LC_SBPIN	T	mg/l	SILVER	0.000039	0.000043		< 0.000010	0.00179	< 0.000010
LC_SBPIN	T	mg/l	SODIUM	43.1	50.3		96.3	139	23.4
LC_SBPIN	T	mg/l	STRONTIUM	0.136	0.133		0.303	0.235	0.108
LC_SBPIN	T	mg/l	THALLIUM	0.000029	0.000027		< 0.000010	0.00147	< 0.000010
LC_SBPIN	T	mg/l	TIN	0.00038	0.00028		< 0.00010	< 0.00500	< 0.00010
LC_SBPIN	T	mg/l	TITANIUM	0.0126	0.00281		< 0.00030	0.400	0.00309
LC_SBPIN	T	mg/l	TOTAL ORGANIC CARBON	73.3	75.4		0.71	1180	36.1
LC_SBPIN	T	mg/l	URANIUM	0.00194	0.00194		< 0.000010	0.00718	0.00136
LC_SBPIN	T	mg/l	VANADIUM	0.00369	0.00378		< 0.00050	0.143	< 0.00050
LC_SBPIN	T	mg/l	ZINC	0.217	0.346		0.0133	0.629	0.0210
LC_SBPIN	T	ug/l	BERYLLIUM	0.054	0.061		< 0.020	2.69	< 0.020
LC_SBPIN	T	ug/l	CADMIUM	0.142	0.173		0.0055	7.58	0.0864
LC_SBPIN	T	ug/l	COBALT	1.17	1.41		2.54	28.1	1.23
LC_SBPIN	T	ug/l	SELENIUM	3.42	4.53		< 0.050	18.5	5.07

Teck Location Code	Sample Date	Remark	The sum of extractable petroleum hydrocarbons C10-C19 and C19-C32. mg/l
			Result
LC_SBPIN	1/19/2023		9.95
LC_SBPIN	2/23/2023		17.1
LC_SBPIN	3/9/2023	No discharge. Internal sample pending upgrades	2.27
LC_SBPIN	3/16/2023		17.8
LC_SBPIN	3/20/2023	No discharge. Internal sample pending upgrades	1.51
LC_SBPIN	3/23/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	3/27/2023	No discharge. Internal sample pending upgrades	2.31
LC_SBPIN	3/30/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	4/6/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	4/9/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	4/13/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	4/16/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	4/20/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	4/27/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	5/4/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	5/11/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	5/25/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	6/15/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	7/27/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	8/17/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	8/31/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	9/28/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	10/19/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	11/30/2023	No discharge. Internal sample pending upgrades	< 0.4
LC_SBPIN	12/7/2023		< 0.4
LC_SBPIN	12/14/2023		64.1
LC_SBPIN	12/21/2023		1.38

Teck Location Code	Sample Date	48-h Daphnia magna 100% screening (single concentration) acute lethality toxicity test - Units of % Mortality N %	96-h rainbow trout 100% screening (single concentration) acute lethality toxicity test - Units of % Mortality N %	COBALT D ug/l	COBALT T ug/l	COPPER D mg/l	COPPER T mg/l	Dimethylselenoxide D ug/l	DISSOLVED OXYGEN, FIELD N mg/l	MERCURY D mg/l	MERCURY T mg/l	Methaneselenonic Acid D ug/l	NICKEL D mg/l	NICKEL T mg/l
		Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result	Result
LC_HSP	1/5/2023	0	0	0.81	1.43	0.00022	0.00061		9.67	< 0.0000050	< 0.0000050		0.0118	0.0132
LC_HSP	1/11/2023			2.76	2.97	< 0.00020	< 0.00050		9.21	< 0.0000050	< 0.0000050		0.0155	0.0159
LC_HSP	1/19/2023			4.85	5.12	< 0.00020	< 0.00050		9.49	< 0.0000050	< 0.0000050		0.0180	0.0181
LC_HSP	1/25/2023			6.76	7.10	0.00028	< 0.00050		8.94	< 0.0000050	< 0.0000050		0.0205	0.0211
LC_HSP	2/1/2023			7.20	7.45	< 0.00020	< 0.00050		9.14	< 0.0000050	< 0.0000050		0.0189	0.0192
LC_HSP	2/8/2023			7.45	7.90	< 0.00020	< 0.00050	0.017	9.44	< 0.0000050	< 0.0000050	0.014	0.0197	0.0208
LC_HSP	2/15/2023	0	0	7.29	7.27	< 0.00020	< 0.00050	0.025	9.3	< 0.0000050	< 0.0000050	0.024	0.0188	0.0186
LC_HSP	2/22/2023			7.29	7.73	< 0.00020	< 0.00050		9.67	< 0.0000050	< 0.0000050		0.0186	0.0196
LC_HSP	3/1/2023			7.75	8.10	0.00022	< 0.00050	0.016	9.17	< 0.0000050	< 0.0000050	0.022	0.0200	0.0202
LC_HSP	3/1/2023	0	0											
LC_HSP	4/27/2023	0	0	5.79	6.01	0.00020	< 0.00050	0.024		< 0.0000050	< 0.0000050	0.026	0.0175	0.0180
LC_HSP	5/9/2023			2.27	2.40	0.00023	< 0.00050		10	< 0.0000050	< 0.0000050		0.0151	0.0151
LC_HSP	10/20/2023			0.60	0.70	0.00022	< 0.00050			< 0.0000050	< 0.0000050		0.0121	0.0129
LC_HSP	10/23/2023							0.015				0.022		
LC_HSP	10/23/2023			0.67	0.75	< 0.00020	< 0.00050		9.22	< 0.0000050	< 0.0000050		0.0124	0.0136
LC_HSP	10/25/2023								9.84					
LC_HSP	11/1/2023	0	0	1.67	1.86	< 0.00020	< 0.00050	0.016	9.75	< 0.0000050	< 0.0000050	0.036	0.0134	0.0144
LC_HSP	11/9/2023			1.96	2.05	< 0.00020	< 0.00050	0.027	10.32	< 0.0000050	< 0.0000050	0.036	0.0145	0.0144
LC_HSP	11/15/2023			2.16	2.37	< 0.00020	< 0.00050	0.024	10.89	< 0.0000050	< 0.0000050	0.050	0.0143	0.0154
LC_HSP	11/20/2023			2.12	2.31	< 0.00020	< 0.00050		11.28	< 0.0000050	< 0.0000050		0.0145	0.0150
LC_HSP	12/4/2023	0	0	2.12	2.35	< 0.00020	< 0.00050	0.038	10.32	< 0.0000050	< 0.0000050	0.034	0.0146	0.0151
LC_HSP	12/11/2023			2.03	2.22	< 0.00020	< 0.00050		10.23	< 0.0000050	< 0.0000050		0.0136	0.0144
LC_MSAWCULV	1/12/2023			< 0.10	0.78	0.00070	0.00091	< 0.010	9.77	< 0.0000050	< 0.0000050	< 0.010	0.0423	0.0446
LC_MSAWCULV	1/18/2023			< 0.10	0.55	0.00081	0.00296	< 0.010	9.8	< 0.0000050	< 0.0000050	< 0.010	0.0400	0.0396

Teck Location Code	Sample Date	NITRITE NITROGEN (NO2), AS N N mg/l Result	NITROGEN, AMMONIA (AS N) T mg/l Result	PHOSPHORUS T mg/l Result	Se(IV) – selenite SeO3(-2) D ug/l Result	Se(VI) – selenate SeO4(-2) D ug/l Result	SeCN – selenocyanate SeCN(-1) D ug/l Result	SELENIUM D ug/l Result	SELENIUM T ug/l Result	Selenosulfate, SeSO3 D ug/l Result	Unknown selenium species – all other selenium species which elute from the applied chromatographic column and are not identified through retention time matching with known standards D ug/l Result
LC_HSP	1/5/2023	0.0148	0.0773	0.0085				13.3	11.4		
LC_HSP	1/11/2023	0.0386	0.227	0.0027				13.0	10.1		
LC_HSP	1/19/2023	0.0444	0.424	0.0034				10.6	9.39		
LC_HSP	1/25/2023	0.0360	0.564	0.0048				9.88	6.85		
LC_HSP	2/1/2023	0.0207	0.641	0.0041				7.99	6.91		
LC_HSP	2/8/2023	0.0190	0.670	< 0.0020	1.45	3.92	< 0.010	7.84	6.06	< 0.010	< 0.010
LC_HSP	2/15/2023	0.0138	0.641	< 0.0020	1.45	3.84	< 0.010	6.77	5.94	< 0.010	< 0.010
LC_HSP	2/22/2023	0.0094	0.688	0.0025				7.07	6.08		
LC_HSP	3/1/2023	0.0087	0.730	0.0034	1.00	3.25	< 0.010	6.68	5.93	< 0.010	< 0.020
LC_HSP	3/1/2023										
LC_HSP	4/27/2023	0.0213	0.670	0.0075	1.07	6.82	< 0.010	9.45	8.64	< 0.010	< 0.020
LC_HSP	5/9/2023	0.0116	0.264	0.0025				16.6	12.8		
LC_HSP	10/20/2023	0.0179	0.0965	0.0025				19.6	17.5		
LC_HSP	10/23/2023				1.03	14.7	< 0.010			< 0.010	< 0.020
LC_HSP	10/23/2023	0.0155	0.0900	< 0.0020				19.1	17.1		
LC_HSP	10/25/2023										
LC_HSP	11/1/2023	0.0118	0.197	< 0.0020	1.66	12.6	< 0.010	16.5	14.6	0.011	< 0.020
LC_HSP	11/9/2023	0.0127	0.218	0.0020	1.51	10.8	< 0.010	15.9	14.5	< 0.010	< 0.020
LC_HSP	11/15/2023	0.0110	0.228	0.0026	1.63	12.0	0.012	16.2	13.6	0.024	0.025
LC_HSP	11/20/2023	0.0109	0.257	0.0085				16.9	13.6		
LC_HSP	12/4/2023	0.0123	0.270	0.0025	1.50	10.1	< 0.010	15.4	12.6	< 0.010	< 0.020
LC_HSP	12/11/2023	0.0115	0.254	0.0294				16.8	12.8		
LC_MSAWCULV	1/12/2023	< 0.0050	< 0.0050	0.0041	0.230	139	< 0.010	187	166	< 0.010	< 0.010
LC_MSAWCULV	1/18/2023	< 0.0050	< 0.0050	0.0048	0.250	165	< 0.010	203	163	< 0.010	0.032

Appendix I – Total Suspended Solids Determination Report

Total Suspended Solids Determination Method: 2023 Data Incorporation and Further Updates

March 31, 2024

Teck

1 Introduction

This report has been prepared on behalf of Teck Coal Line Creek Operations (LCO) to satisfy the requirement to complete the Total Suspended Solids (TSS) Determination Method 2023 update as described in LCO's *Environmental Management Act* Discharge Permit 5353.

The need for updates to the TSS determination method, as described in Section 2.3 of the Permit, is predicated on the use of real-time measurements of turbidity (obtained using field-deployable meters and/or sensors) to manage against increases in TSS concentrations above 50 mg/L. This is the regulatory limit for discharge locations referenced in Section 1 of the Permit. A good understanding of the relationship between TSS and turbidity measurements is further required to manage liquid flocculant use in accordance with the current LCO Flocculant Management Plan (FMP). Decisions regarding the initiation and cessation of liquid flocculant additions and the concentrations of anionic and cationic liquid flocculant introduced to the surface discharge require knowledge about TSS concentrations immediately upstream from compliance points and sites of flocculant addition. The predictive accuracy of the linear regression relationship between TSS and turbidity has a direct bearing on confidence in predictions of TSS trigger levels associated with use of liquid flocculants in a manner that maximizes efficacy while minimizing toxicity risks to aquatic life.

In practice, LCO primarily relies on self-dosing, in-creek flocculant blocks rather than liquid flocculants to reduce TSS in the Dry Creek and Line Creek catchments. The deployment and retrieval of flocculant blocks, as described in the FMP, do not require detailed knowledge of TSS concentrations or turbidity as a TSS proxy above, at, or below the deployment point.

Permit 5353, as amended on July 22, 2021, states the following:

2.3 <u>Total Suspended Solids Sampling</u>

The permittee must develop and validate, at minimum on an annual basis a tool for field analysis of total suspended solids (TSS) value and procedures for additional TSS sampling for discharges referenced in Section 1 of this permit and any effluent discharge to surface water from the mine property. The TSS determination method must be approved by the director. This requirement does not replace TSS analysis by a certified lab that may be required in Section 3 of this permit.

2.3.1 TSS-Turbidity Curves

The permittee shall develop and maintain site-specific TSS-Turbidity regression curves to allow for use of turbidity monitoring as a field monitoring tool. The TSS-Turbidity curve(s), data used to generate the curve, and the turbidity values equivalent to 50 mg/L of TSS, must be submitted with the first Quarterly Monitoring Report required under section 4.2 that is due after the approval of this permit.

Modifications to the regression curves shall be submitted with the monitoring reports as the data set improves. Updates to the regression curves are expected at a minimum, on an annual basis, and should accompany the annual report.

Table 1 of this report summarizes the history of TSS determination reports submitted since 2015. The Permit requirement to "*develop and maintain site-specific TSS-Turbidity regression curves,"* with updates on an annual basis, assumes limited confidence in the predictive accuracy of existing linear regression estimates of TSS from turbidity measures. A further implicit assumption is that the predictive accuracy will be improved with the benefit of greater paired TSS and turbidity data as obtained through annual routine monitoring.

Section 1 of Permit 5353 provides the requirements for compliance monitoring of TSS for seven (7) of the 11 prescribed locations. The requirement for TSS analysis is based on laboratory analysis as opposed to proxy measures such as turbidity. Those discharges and locations referenced in Section 1 of the Permit, for which TSS concentration management and monitoring is required, include:

- Sewage Treatment System, discharge **E102494** (Permit Section 1.2; LCO site ID LC_LC11)[1],
- No Name Creek Diversion and Sediment Pond, discharge to the Line Creek Rock Drain, thence to Line Creek, **E221268** (Permit Section 1.3; LCO site ID LC_LC9),
- MSA North Ponds discharge to Line Creek, **E216144** (Permit Section 1.4; LCO site ID LC_LC7),
- Contingency Treatment System discharge to Line Creek, **E219411** (Permit Section 1.5; LCO site ID LC_LC8),
- Horseshoe and MSAW Pits discharge of stored pit water to Line Creek, **E308146** and **E308147 (**Permit Section 1.8; LCO site ID LC_HSP and LCO site ID LC_MSAWCULV),
- Dry Creek Sedimentation Ponds to Dry Creek, **E295211** (Permit Section 1.10; LCO site ID LC_SPDC), and
- Dry Creek Sedimentation Ponds to Fording River via conveyance pipeline and diffuser, **E295231** (Permit Section 1.11; LCO site ID LC_ SPFR).

The sites referenced in Section 1 of the Permit are a subset of the much larger set of permitted monitoring locations for the Line Creek and Dry Creek catchments, the Fording River, and reference creeks as listed in the Permit's Table 1 and Appendix 2A of the Permit (Table 2 herein). The geographic locations and spatial relationships between this larger suite of monitoring sites are illustrated in Figure 1 through Figure 5.

[1] The treated sewage discharge reflects a different source type than the remainder of the permitted discharges, and appropriate regulatory management under the *EMA* permit may not require real-time turbidity measures.

Table 1 History of TSS determination submissions and regulatory communications.

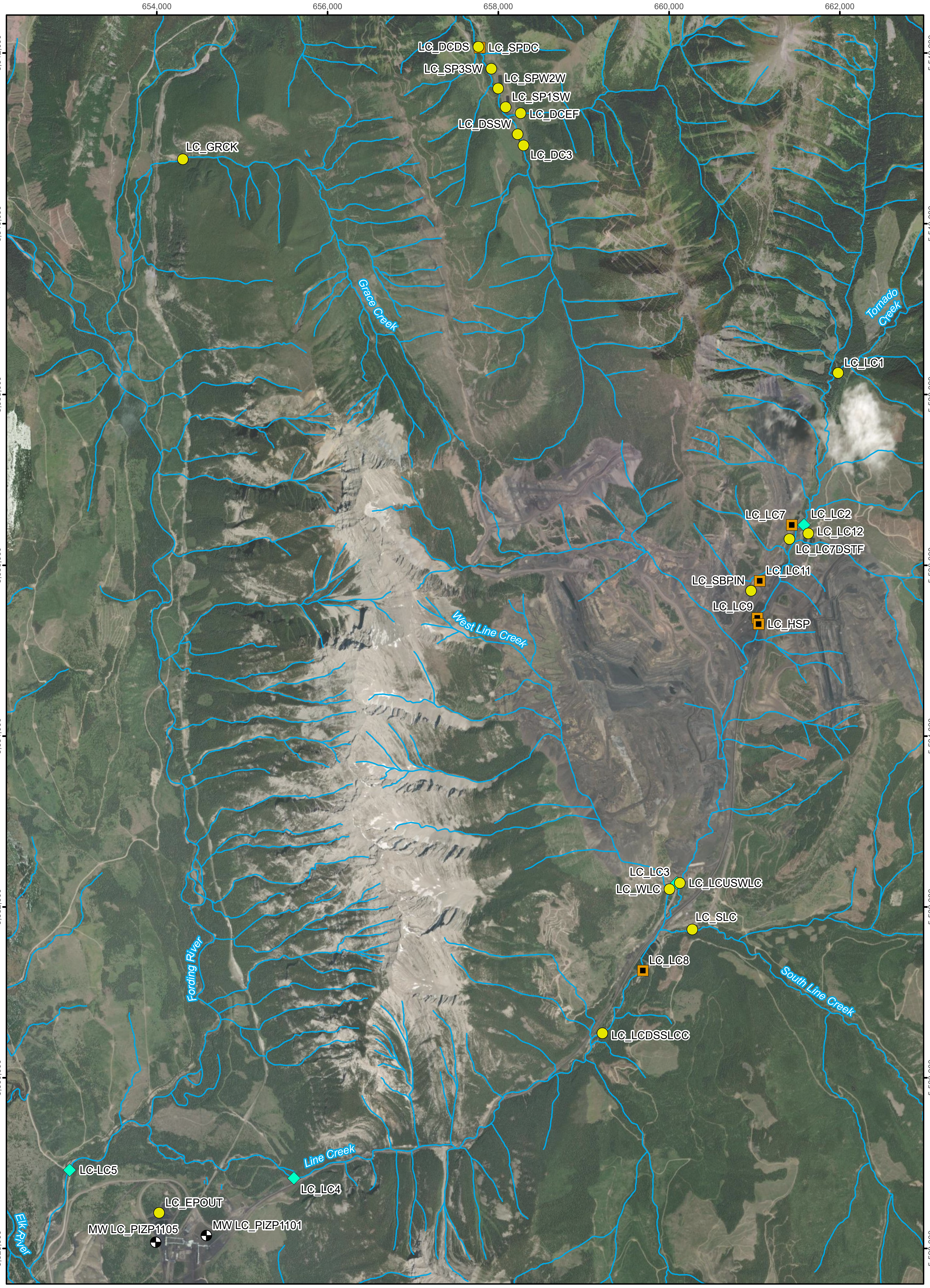
Date of Submission	Submission Title	Due Date	Communications
January 22, 2015	Total Suspended Solids Determination Method		Promulgated into PE 5353 & 106970
November 24, 2015	Summary Update of LCO Actions Taken in 2015 related to the TSS/Turbidity Determination Methodology	December 1, 2015	May 1, 2015 & November 16, 2015, Approval Letters
February 29, 2016	Total Suspended Solids Determination Method – Updated Report	February 29, 2016	November 16, 2015, Approval Letter
March 31, 2017	Total Suspended Solids Determination Method – Updated Report	March 31, 2017 (submitted with annual reports for Permit 5353 and 106970)	No regulatory communications received
April 30, 2018	Total Suspended Solids Determination Method – Updated Report	March 31, 2018 (submitted with Q1 2018 Elk Valley Regional Water Quality Report)	October 29, 2018, Approval Letter
March 30, 2019	Total Suspended Solids Determination Method – Updated Report	March 31, 2019 (submitted with annual reports for Permit 5353 and 106970)	No regulatory communications received
March 31, 2020	Total Suspended Solids Determination Method – Updated Report	March 31, 2020 (submitted with annual reports for Permit 5353 and 106970)	No regulatory communications received
March 31, 2021	Total Suspended Solids Determination Method – Updated Report	March 31, 2021 (submitted with annual report for Permit 5353 and 106970)	No regulatory communications received
March 31, 2022	Total Suspended Solids Determination Method – Updated Report	March 31, 2022 (submitted with annual report for Permit 5353)	No regulatory communications received
March 31, 2023	Total Suspended Solids Determination Method – Updated Report	March 31, 2023 (submitted with annual report for Permit 5353)	No regulatory communications received

Table 2 LCO permitted TSS and turbidity monitoring requirements.

Permitted Monitoring Location	LCO Site ID (Permit 5353 Appendix 2A)	Discharge or Receiving Location	In S. 1 of Permit?	In Table 1 of Permit?	Appendix 2A or 2B of the Permit specifies TSS-turbidity monitoring?	Included in the 2022 TSS Determination Report?	Years included in the 2023 TSS Universal Determination Equation	TSS & Turbidity Specified Monitoring Frequency per Permit Appendix 2A	Site Description
Dry Creek Catchment									
E295211	LC_SPDC	Discharge	**yes**	yes	yes	**yes**	2015-2023	BP-W/M [1]	Dry Creek Sedimentation Ponds to Dry Creek
E295231	LC_SPFR	Discharge	**yes**	yes	yes	no	NA	W/M [2]	Dry Creek Sedimentation Ponds to Fording River via conveyance pipeline and diffuser (when in use)
E295313	LC_DSSW	Discharge	no	yes	yes	no	NA	D/W [3]	Diversion Structure Spillway
E295314	LC_SP1SW	Discharge	no	yes	yes	no	NA	D/W	Dry Creek Sedimentation Ponds Effluent to Dry Creek via Return
E295315	LC_SP2SW	Discharge	no	yes	yes	no	NA	D/W	Dry Creek Sedimentation Ponds Effluent to Fording River via Outfall (when in use)
E295316	LC_SP23W	Discharge	no	yes	yes	no	NA	D/W	Diversion Structure Spillway
Line Creek Mine Service Area (MSA)									
E308146	LC_HSP	Discharge	**yes**	no	no	**yes**	2016, 2018, 2021-2023	NA	Horseshoe and MSAW Pits discharge of stored pit water to Line Creek
E308147	LC_MSAWCULV	Discharge	**yes**	no	no	no	NA	NA	
E216144	LC_LC7	Discharge	**yes**	yes	**no**	**yes**	2014-2017, 2019-2020	**NA**	MSA North Pond discharge to Line Creek
E221268	LC_LC9	Discharge	**yes**	yes	no	**yes**	2014, 2017	NA	No Name Creek Diversion and Sediment Pond to Line Creek Rock Drain then Line Creek
E304613	LC_LC7DSTF	Discharge	no	yes	no	no	2017	NA	MSA North Pond discharge to Line Creek Alternate
E102494	LC_LC11	Discharge	yes	yes	yes	no	NA	quarterly	Mine Sewage Area Effluent to Ground. Not relevant to TSS-turbidity determination efforts.
E223240	LC_LC12	Receiving	no	yes	yes	no	2014, 2016-2017, 2020-2021	W/M	North Horseshoe Creek Near Mouth
E288269	LC_SBPIN	Discharge	no	yes	no	no	2015-2017, 2020-2021	NA	Wash Bay Effluent Discharge to Steam Bay Ponds to Ground.
200335	LC_LC2	Discharge	no	yes	yes	no	2014-2023	W/M	Line Creek upstream from Rock Drain
Line Creek Plant Processing Area									
E302410	LC_PIZP1101	Discharge	no	yes	no	no	2014, 2018, 2023	NA	E302410 Processing Plant Area (MW11(P)-01) [5]
E302411	LC_PIZP1105	Discharge	no	yes	no	no	2016-2019, 2021-2023	NA	E302411 Processing Plant Area (MW11(P)-05) [5]
Line Creek Catchment Other									
E219411	LC_LC8	Discharge	**yes**	yes	no	**yes**	2014	**not specified**	Contingency Treatment System discharge to Line Creek
E293369	LC_LCUSWLC	Receiving	no	yes	no	no	NA	NA	Line Creek upstream from West Line Creek, below rock drain (~140 m upstream from Westline Creek WPT outfall)
200044	LC_LC4	Receiving	no	yes	yes	no	2014-2023	W/M	Line Creek upstream from Process Plant
200337	LC_LC3	Receiving	no	yes	yes	no	NA	W/M	Line Creek downstream from West Line Creek
E216142	LC_LC1	Receiving	no	yes	yes	no	2015-2022	W/M	Line Creek upstream from MSA North Pit
E282149	LC_SLC	Receiving	no	yes	yes	no	2016-2018, 2020-2023	M[4]	South Line Creek
E297110	LC_LDSS	Receiving	no	yes	yes	no	NA	M	Line Creek immediately D/S from South Line Creek Confluence
E261958	LC_WLC	Receiving	no	yes	yes	no	2016-2017	M	West Line Creek
Fording River									
E295232	LC_FRUS	Receiving	no	yes	no	no	2014-2015	NA	Fording River 100m upstream from conveyance outfall
E288271	LC_FRUSDC	Receiving	no	yes	no	no	2014-2015	NA	Fording River upstream from Dry Creek
E288272	LC_FRDSDC	Receiving	no	yes	np	no	2014-2023	NA	Fording River downstream from Dry Creek
200028	LC_LC5	Receiving	no	yes	yes	no	2014-2023	W/M	Fording River downstream from Line Creek

Notes:
[1] Weekly frequency (W) March 15 to at least August 31 during bypass of DCWMS, monthly frequency (M) during the rest of the year depending on unexpected monitoring results that indicate potential ortho-P uptake or the generation of organic selenium species; [2] Weekly frequency (W) March 15 to July 15, monthly (M) during the rest of the year; [3] One sample within the first 24 hours when actively discharging at spillway, then weekly; [4] Monthly (M); [5] Groundwater, not surface water samples; NA = not applicable

Figure 1 Water quality monitoring locations, Line Creek and Dry Creek catchments.



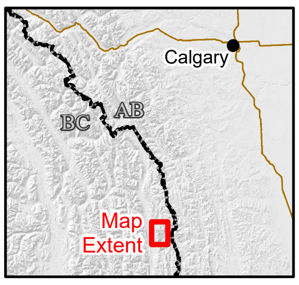
Legend

Watercourse

Site Locations

- TSS compliance sites (permit 5353 Section 1)
- Permitted monitoring locations, surface waters
- Receiving environment monitoring locations
- Groundwater monitoring locations

Data Sources:
a) Watercourses, BC Freshwater Atlas Atlas, 2011.
b) Site locations, Hatfield, 2024.
c) Background, 50 - 60 cm imagery, 2008 - 2020, Esri Online Service.



0 250 500 1000 m

Scale: 1:45,000

Projection: NAD 1983 UTM Zone 11N

Hatfield CELEBRATING 50 YEARS

Completion of 2023 Update to TSS Determination Method

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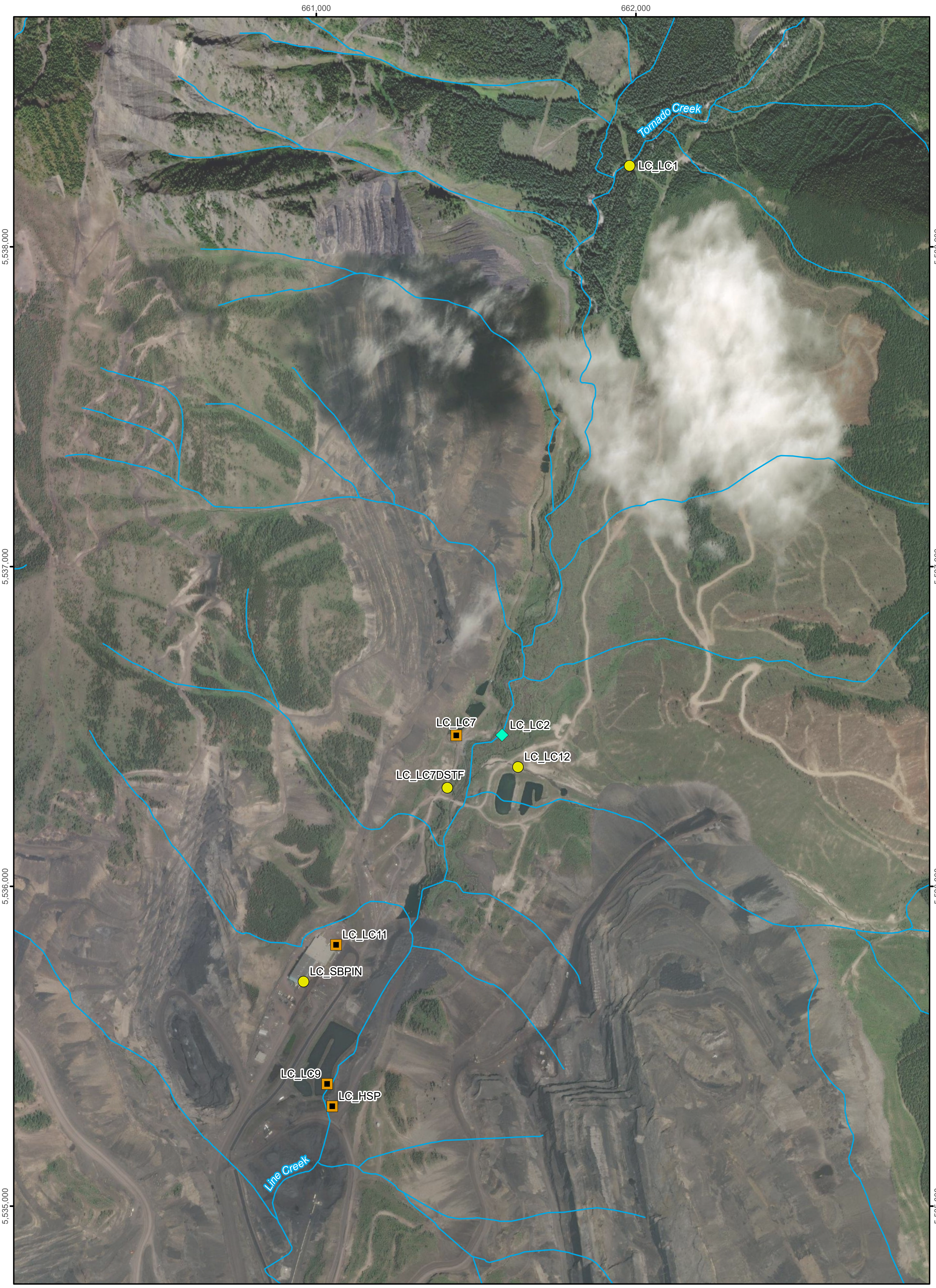
TECK12503_LineCreekOverview_20240318_v0_2_LC

Figure 2 Water quality monitoring locations, Mine Service Area within upper Line Creek catchment.



Legend

Watercourse

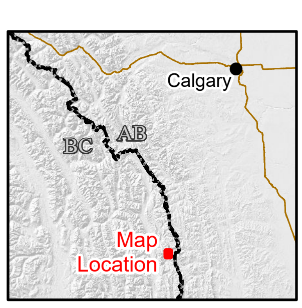
Site Locations

TSS compliance sites (permit 5353 Section 1)

Permitted monitoring locations, surface waters

Receiving environment monitoring locations

Data Sources:
a) Watercourses, BC Freshwater Atlas Atlas, 2011.
b) Site locations, Hatfield, 2024.
c) Background, QuickBird-2 60 cm, 30 June 2008, Esri Online Service.



0 50 100 200 300 m

N

Scale: 1:12,000

Projection: NAD 1983 UTM Zone 11N

Hatfield CELEBRATING 50 YEARS

Completion of 2023 Update to TSS Determination Method

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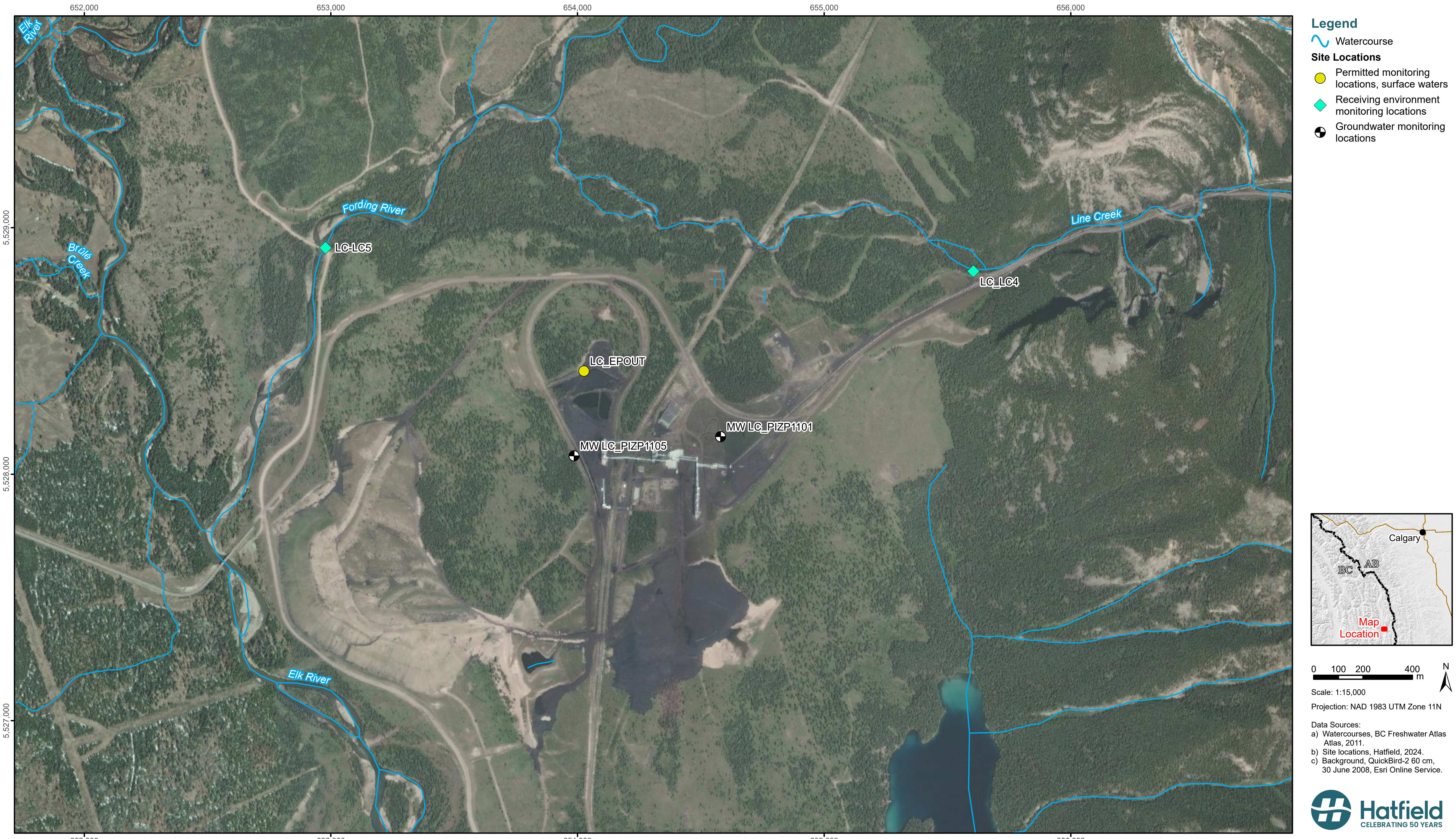
TECK12503_LineCreekMineServiceArea_20240318_v0_2_LC

Figure 3 Water quality monitoring locations, Plant Processing Area within Line Creek catchment.



Completion of 2023 Update to TSS Determination Method

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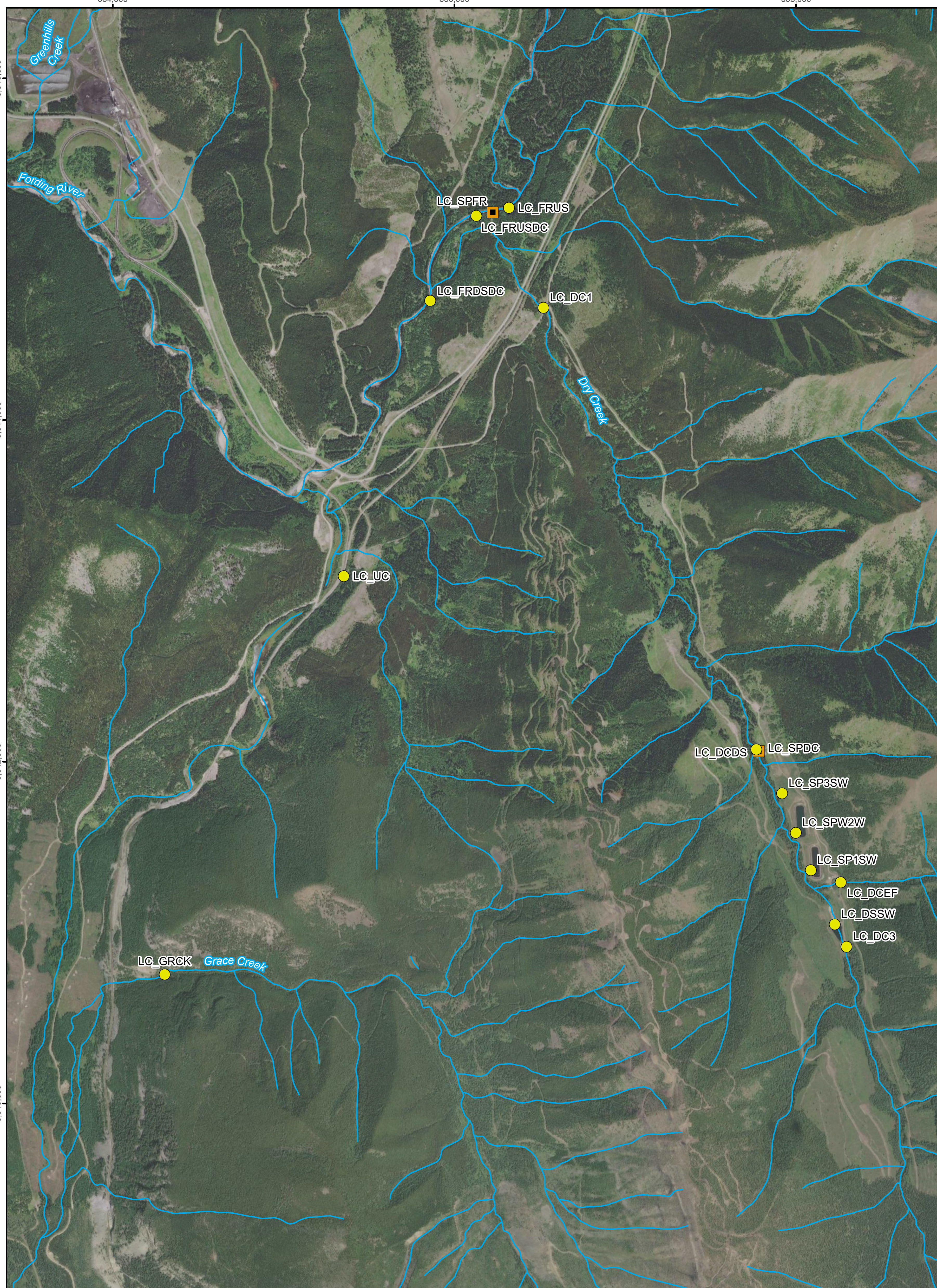
TECK12503_LineCreekLowerCatchment_20240318_v0_2_LC

Figure 4 Water quality monitoring locations, Dry Creek catchment.



Legend

Watercourse

Site Locations

TSS compliance sites (permit 5353 Section 1)

Permitted monitoring locations, surface waters

Data Sources:
a) Watercourses, BC Freshwater Atlas Atlas, 2011.
b) Site locations, Hatfield, 2024.
c) Background, 50 - 60 cm imagery, 2008 - 2020, Esri Online Service.

0 200 400 600 m

Scale: 1:23,000

Projection: NAD 1983 UTM Zone 11N

Hatfield
CELEBRATING 50 YEARS

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TECK12503_DryCreekOverview_20240313_v0_1_LC

Figure 5 Water quality monitoring locations, Sedimentation Ponds within Dry Creek catchment.

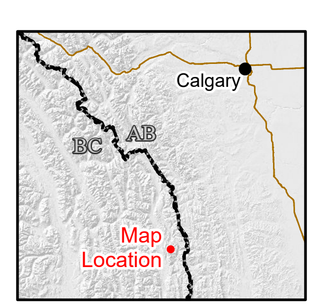
Legend

Watercourse

Site Locations

- TSS compliance sites (permit 5353 Section 1)
- Permitted monitoring locations, surface waters

Data Sources:
a) Watercourse digitized based on a map image layer (Hydrography 2.0 MIL2), Teck, 2023.
b) Site locations, Hatfield, 2024.
c) Background, GeoEye-1 50 cm, 17 August 2020, Esri Online Service.



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Scale: 1:4,200

Projection: NAD 1983 UTM Zone 11N

Hatfield CELEBRATING 50 YEARS

Completion of 2023 Update to TSS Determination Method

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TECK12503_DryCreekSedimentPondsArea_20240313_v0_2_LC

2 Methodology for Refining Predictive Estimates of TSS from Turbidity Data

Matched LCO routine monitoring data for TSS (in mg/L), field-measured turbidity and laboratory-analyzed turbidity (both in Nephelometric Turbidity Units: NTU) were obtained for all monitoring locations within the Dry Creek and Line Creek catchments and Fording River for the period January 2014 through December 2023 (ten-year time span). The monitoring sites with routinely collected TSS and turbidity are listed in Table 2, along with the prescribed monitoring frequency.

Based on a critical review of the existing LCO surface water monitoring data for TSS and turbidity (for both field turbidity observations and laboratory turbidity measurements) over a decadal time span, this update incorporates the further evaluation of potentially viable and statistically defensible options for data manipulations and the particulars of linear regression analysis.

Per previous LCO TSS Determination reports, the association between turbidity as a predictor variable for TSS (dependent variable) is reasonably approximated based on a linear relationship between the two, with or without data transformation to render the data set bivariate normal:

$$[\text{TSS (mg/L)}] = a \times [\text{turbidity (NTU)}] + b \qquad [1]$$

Where:

a is the slope of the least-squares linear regression line.

b is the y-intercept.

<u>**Data normality**</u>:

For this update, an evaluation of the effects of departures of the TSS and turbidity data from bivariate normality was completed. There are some important consequences of using untransformed TSS and turbidity data for developing linear regression estimates, especially given the marked departures of these water quality parameters from bivariate normality in the LCO monitoring data. The heteroscedasticity of the data before log-transformation (i.e., highly uneven distribution of the data points over the larger observed concentration range) results in excessive leverage on the slope of the regression line of both the large cluster of data in the lower range of TSS (including values near or below the instrument or analytical detection limits) and the scarce upper range values.

Log-log transformed[2] TSS and turbidity data for the LCO water quality data will likely exhibit bivariate normality and greater homoscedasticity. A log-log transformation would also rectify the need to assume that a linear regression best-fit line passes through the origin even though the y-intercept value may be statistically significant and reduce the need to constrict the use of the available TSS-turbidity data to the upper end of the observed concentration range.

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[2] The logarithmic transformations discussed in this report were consistently based on a natural log transformation (Ln or Log_e) rather than a Log_{10} transformation. Use of a Log_e or Log_{10} TSS and turbidity data transformation would have the same effect on making the data more bivariate normal and reducing heteroscedasticity.

A series of quantile-quantile (Q-Q) plots were developed to visually assess the bivariate normality of the TSS and turbidity data before and after a log transformation of both variables.

Influence of TSS and turbidity data obtained during clear flow conditions:

It was proposed by Kerr Wood Leidal (KWL, May 2023) that the exclusion of TSS and turbidity data with the lowest reported concentrations (e.g., at or near their respective detection limits) could increase the strength of the association between the two variables; KWL describes this approach as aligning with the assumption that minimal or no suspended sediments in the water column should result in no light diffraction from particles. A very large portion of the routinely collected water quality monitoring data for LCO consists of low TSS and turbidity results that are generally reflective of clear flow conditions in Dry Creek or Line Creek. We evaluate herein the implications of removing site data for TSS results that are near or below the analytical detection limit (e.g. TSS results ≤ 1 mg/L) from the regression estimates.

Strength of association of TSS with field measures versus laboratory-measured turbidity:

The LCO TSS Determination Method for each year from 2016 through 2022 was based on regression analysis of laboratory TSS values paired with the corresponding field turbidity results. This was apparently based on discussions with the BC Ministry of Environment (ENV) following the submission of the original LCO Determination Method in January of 2015.

Our experience with water quality monitoring data at other Teck Coal operations is that there is generally a stronger association between TSS and the associated laboratory turbidity measurements than paired field turbidity observations. This likely results from the settling and coagulation/coalescence of suspended particles in the water sample following collection and during transport and storage before analysis. Turbidity is a measurement of the degree of light scattered by suspended particles, and the magnitude of scatter depends on several factors, such as the wavelength of the light used and the angle of the detectors in the turbidity meter, as well as the size and chemical characteristics of the suspended particulates. There invariably is a lag time between the time of acquisition of a field turbidity measurement and the laboratory analysis of TSS for the same sampling event, and this lag is likely sufficient to alter suspended sediment particle sizes and the particulars of light scatter. For the LCO-permitted monitoring data, laboratory turbidity data are generally (but not consistently) biased low compared to matching field turbidity data.

The strength of association between TSS and either field-measured or laboratory-measured turbidity was compared, and the results were incorporated into the data selection process for the updated TSS Determination method.

Pooling of monitoring data across years - critical evaluation of the influence of inter-annual variability on turbidity-TSS covariations:

Log-log, least-squares linear regression estimates were produced for each year over the ten-year time span for each permitted monitoring site. The slope of the regression line was compared across years, and data for anomalous years were removed prior to updating the log-log TSS-turbidity regression estimates. Removing site data for those years with few sample results and linear regression slopes that approached zero or were negative improved the model fit for the remaining years.

As has been noted in previous TSS determination method updates, there are several permitted monitoring sites for which it has not been possible to obtain water quality data over the last several years, including the following:

- LC_LC8 (E219411: Contingency Treatment System discharge to Line Creek): No data since May 2015.
- LC_LC9 (E221286: No Name Creek Diversion and Sediment Pond to Line Creek Rock Drain then Line Creek): no data from October 2014 to March 2017, and no data since March 2018.

While temporally limited, the data from LC_LC8 and LC_LC9 were pooled into a larger dataset as the TSS-turbidity linear trend for these sites is similar to the trend observed at other Line Creek sites (see Section 3, Data Manipulation and Statistical Analysis) supporting a generalized as opposed to site-specific TSS determination estimate for the larger set of Line Creek sites referenced in Section 1 of Permit 5353.

Pooling of monitoring data across monitoring sites:

The statistical power to detect a significant relationship between a predictor and dependent variable will generally increase with the size of the data set for the analysis, assuming that the data comprise an unbiased sample set from a single statistical population. A simple way to increase the amount of available data is to pool the TSS-turbidity data from monitoring sites in the Line Creek and Dry Creek catchments that reflect the same data population. The routine water quality monitoring data from the 30 sites listed in Table2 were used to evaluate whether the log-TSS / log-turbidity linear regression equations significantly differed from those of other sites. The data for spatially related sites with no statistically significant differences in the slopes of the log-log TSS turbidity regression estimates were pooled to develop a generalized log-log linear regression estimate for the larger catchment. The pooling of TSS-turbidity data across monitoring sites was further critically analyzed based on anticipated site similarities or differences, based in turn on position within the larger watershed and potential influence of local conditions.

3 Data Manipulation and Statistical Analysis

Field turbidity, laboratory turbidity, and laboratory TSS data were utilized for TSS determinations across sites at LCO between 2014 and 2023. Flocculant block deployment records were additionally obtained so that the TSS-turbidity relationships at monitoring sites downstream from points of flocculant application could be compared with locations of any recent or historical flocculant use.

All field and lab turbidity results were paired with the corresponding TSS value taken on the same date and time. Field duplicate results were not included in the regression analyses.

Logarithmic Data Transformation

The utility of log-transforming (log henceforth refers to the natural logarithm) to achieve bivariate normality was explored. To assess whether the data exhibited a normal distribution, quantile-quantile plots were constructed from untransformed TSS data and log-transformed TSS data. In quantile-quantile plots, the x-axis displays sample quantiles (i.e., specific quantiles from the sample data), and the y-axis displays theoretical quantiles (i.e., the quantiles expected from a normal distribution); data points aligning with a 1:1 line on the plot better approximate bivariate normality. As shown in Figure A1 and Figure A2, untransformed TSS data consistently deviated from a normal distribution. In contrast, log-transformed TSS data above a threshold value at very low concentrations better approximated bivariate normality to meet the underlying assumption of linear regression. Log-transformed lab-based and field-measured turbidity yielded similar findings, and therefore log-transformed data were used in further analysis. Given the limited data collected at site LC_EPOUT, it was excluded from further analysis.

Exclusion of Non-Detected Values and Marginal Data

The log-transformed quantile-quantile plots indicated that low-concentration values did not adhere to a normal distribution, and generally reflected random variation. Those samples with low TSS concentrations (reflective of clear flow conditions at the monitoring site) tended to exhibit a random variation of turbidity on TSS. Therefore, values at or below laboratory detection limits were omitted from further analysis (for example, a TSS result of ≤1 mg/L or a turbidity result of ≤0.10 NTU). Quantile-quantile data plots from all locations are displayed with and without values below the detection limit in Figure A2; data from LC_LC7 are displayed below (Figure 6).

All locations better approximate bivariate normality with the exclusion of below-detection values. The site LC_DSSW was subsequently omitted from further analysis due to a low number of observations above the detection limits.

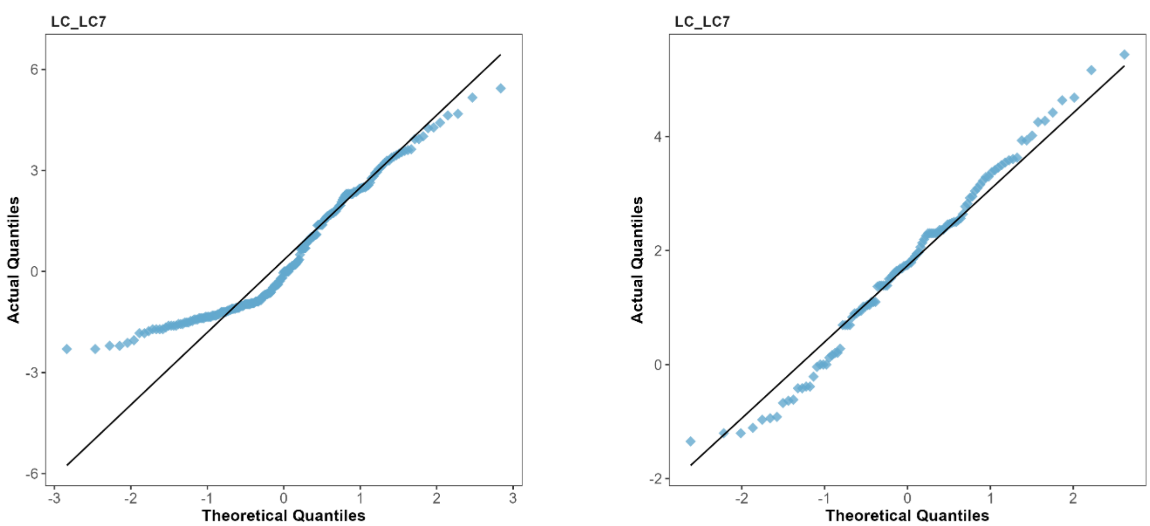

Figure 6 Quantile-quantile plots of log-transformed TSS data at LC_LC7, including data below the detection limit of 1 mg/L (left) and excluding data below the detection limit (right).

Applicability of Field-measured versus Laboratory-measured Turbidity

The strength of the association between log-transformed TSS and field-acquired or lab-based turbidity measurements was compared by comparing their coefficients of determination, R^2. Across sites, lab-based turbidity results explained a greater proportion of the variability of the lab-based TSS results relative to field-measured turbidity, as indicated by the R^2 values (Figure A4 and Figure A5). Figure 7 compares TSS against field-measured turbidity versus TSS against lab-based turbidity at LC_LC7, where lab-based turbidity explains 67% of the variability of TSS and field-measured turbidity explains 58% of the variability in TSS.

Lab-based turbidity likely has a stronger relationship with lab-based TSS due to the additional variability associated with comparing measurements from two different samples (i.e. between-sample variability is introduced as an additional source of data variance). In addition, as previously discussed, the laboratory TSS determinations may reflect some degree of sediment loss to the side and bottom of the collection container unless the lab analyst rigorously removes all such material from the container to the filter for further gravimetric analysis. There is a potential, therefore, for lab TSS measurements to be biased low in comparison with the true in situ TSS, while this bias would not occur for field turbidity measurements. Therefore, lab-based turbidity values were used as the basis for linear regression estimates of the numerical association with TSS.

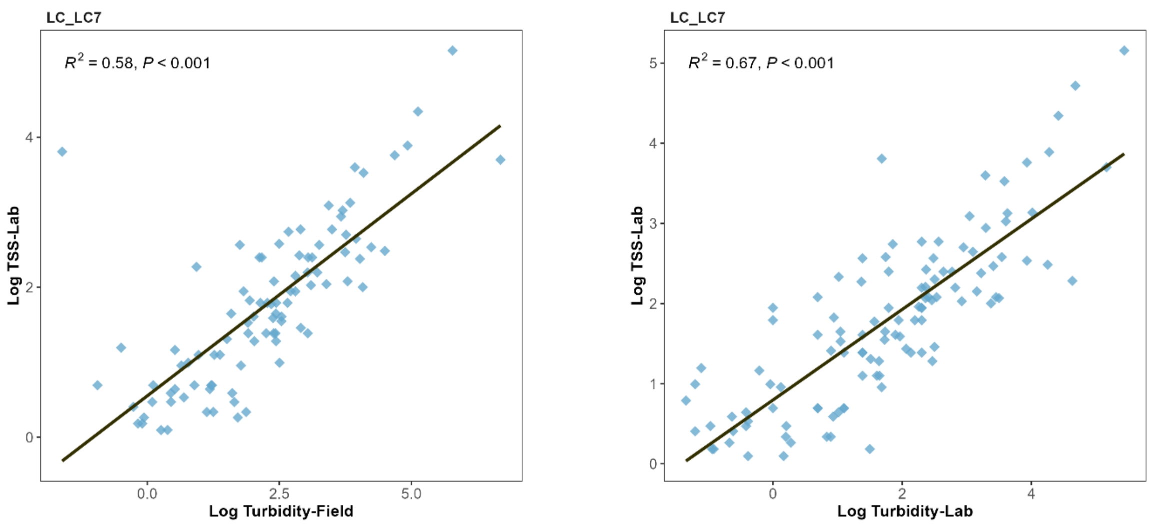

Figure 7 Regression of log-transformed lab-based TSS against field-measured turbidity (left) and against lab-based turbidity (right).

<u>Combining Data Across Years and Monitoring Sites</u>

Data were examined to determine their suitability for pooling across monitoring years at each sampling location. The regression slope, derived from the regression of log-transformed lab-based TSS against lab-based turbidity, was used to evaluate the similarity of the association between TSS and turbidity across monitoring years. Data from specific years were excluded if less than three data points were collected that year or annual regression slope values approached or were less than zero (which indicates no apparent trend in TSS across the measured turbidity values). Annual slopes are displayed in Figure A6. Annual y-intercepts were additionally examined at each location, and years with anomalous y-intercept values (i.e., $b < 0$) were removed. Overall, visual and numerical comparison of the slope of the least-squares linear regression of TSS on turbidity for individual years between 2016 and the end of 2023 made it relatively easy to identify anomalous years in the data set for each monitoring site.

ANOVA was used to determine whether data could be appropriately pooled across monitoring locations based on their regression slopes; the annual regression slopes from Figure A6 were analyzed. The monitoring locations were indicated to have statistically significantly different regression slopes ($p < 0.001$) and y-intercept values ($p < 0.001$). Differences in TSS-turbidity relationships among creeks are likely driven by variability in water flow velocity, bed materials, coal deposition, and particle-size tendencies at their sampling locations.

The mean regression slopes and y-intercept values of the monitoring locations and their post hoc groupings based on Tukey's method are shown in Table A1. Data exclusion was based on regression slope groupings; LC_UC (highest regression slope) LC_LC3, and LC_LCUSWLC (lowest regression slopes) were significantly different from each other, while all other monitoring locations were not significantly different from each other or LC_UC, LC_LCUSWLC and LC_LC3. As LC_UC, LC_ LCUSWLC, and LC_LC3 are not authorized discharges, they were excluded from further analysis. The monitoring locations and years used in the resulting pooled regression are indicated in Table 1.

4 Updated Regressions and Trigger Values

As for all previous years since 2016, the predictive model for TSS and turbidity was developed using a least-squares linear regression of TSS (response variable) on turbidity (predictor variable). The regression of log-transformed and lab-based TSS and turbidity using the pooled dataset, with data from anomalous years and sites, is displayed in Figure 8.

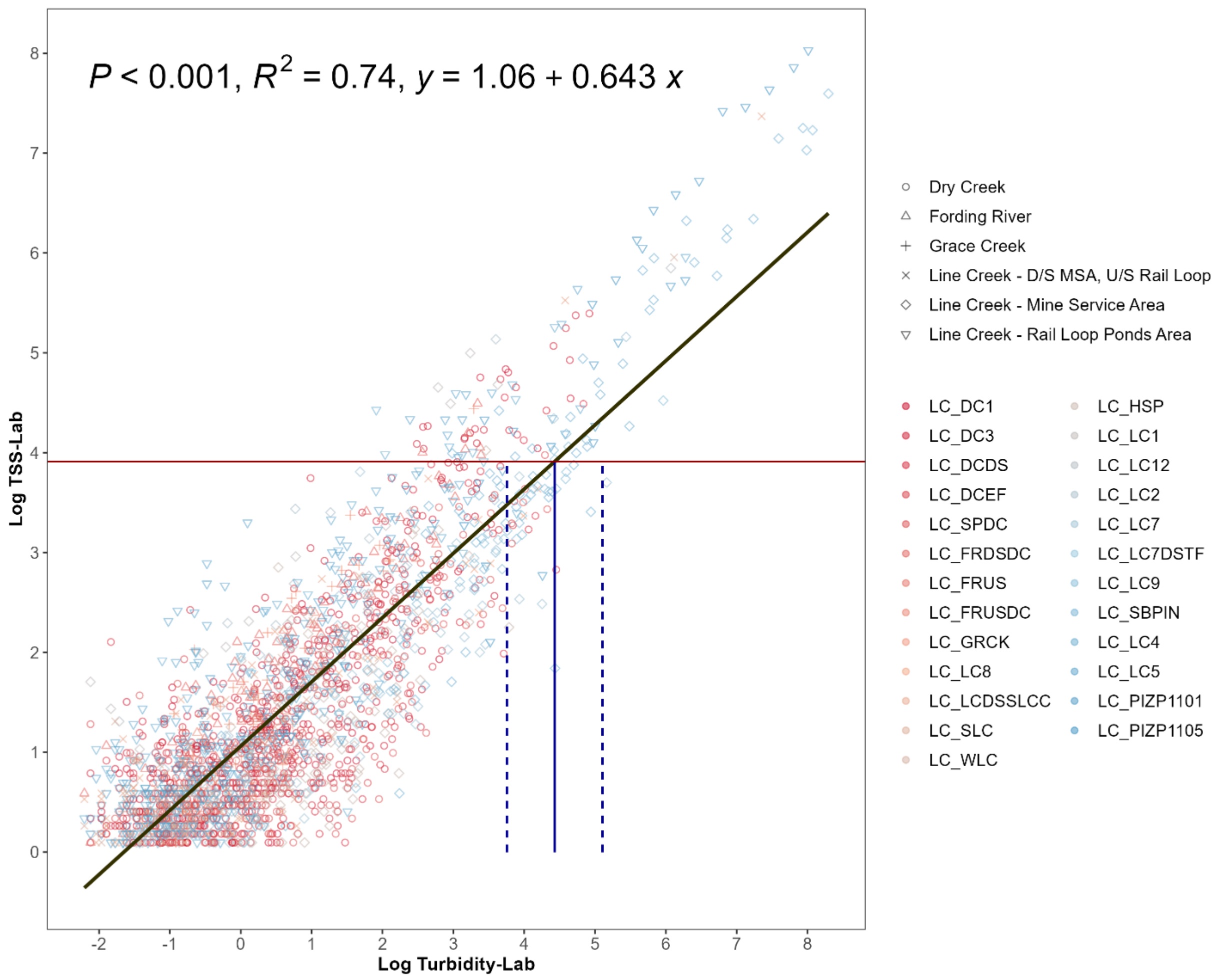

Figure 8 **Regression of log-transformed lab-based TSS against lab-based turbidity using pooled data across monitoring locations (n = 2245). The black diagonal line is the best-fit line, the horizontal red line is equivalent to log(50) (i.e., representing 50 mg/L TSS), and the vertical blue lines are the inversely calculated turbidity trigger values for potential non-compliance; the dashed blue lines represent the 95% confidence limits.**

The TSS concentration (mg/L) from authorized discharges at LCO can be predicted from turbidity (NTU) as follows:

$$\mathbf{Log[TSS\ (mg/L)] = 1.06 + 0.643*log[Turbidity\ (NTU)];} \qquad [2]$$

$$\mathbf{TSS\ (mg/L) = exp(1.06 + 0.643*log[Turbidity\ (NTU])} \qquad [3]$$

The trigger value for potential non-compliances at the authorized discharges (TSS > 50 mg/L) was inversely calculated from the updated regression to correspond to a turbidity value of 84 NTU, with a lower and upper 95% confidence limit of 42 NTU and 165 NTU respectively (Figure 8).

The LCO universal regression estimate (equation [2]) derived using an ordinary least-squares linear regression explains 74% of the overall variability in the degree of association between TSS and turbidity (Figure 8: R^2 = 0.74). However, it is evident that the accuracy of this predictive estimate is inconsistent across the range of documented turbidity. In particular, the predictive estimate for TSS based on equation [2] is biased low at the higher end of the TSS range (Log_e turbidity ≥ 3, or turbidity ≥ ~ 20 NTU). The higher turbidity (and TSS) values are particularly important since these reflect surface water discharge conditions that may require incremental management actions. Therefore, the systematic bias in the ordinary least-squares regression model is potentially problematic.

The predictive bias across the observed range of TSS values is further illustrated in Figure A7, which provides biplot of the predicted and observed values of TSS for the available data from each LCO monitoring location (equation [2]). The predictive estimate for TSS based on equation [2] is biased slightly low at the higher end of the TSS range (Log_e turbidity ≥ ~ 4 or turbidity ≥ ~ 55 NTU), while predicted TSS more closely aligns with observed values at lower ranges of TSS.

The systematic bias in residuals (i.e., the difference between the actual measured TSS value and that predicted by the least-squares log-log linear regression line) across the larger turbidity range is also evident in the TSS Determination Method 2022 data update (e.g., for site LC_LC7; see Figure 14 in that report).

When applying linear regression as part of the General Linear Model (GLM) set of statistical tools, it should be noted that the regression of the dependent variable (y) on the predictor variable (x) results in a predicted best-fit line through the bivariate data with a slope and y-intercept that is different than if x were regressed on y. This is because least-squares linear regression produces a best-fit approximation to the bivariate data by minimizing the difference between observed values and predicted values along the y-axis. The difference between and observed values in the direction of the x-axis is not accounted for.

In cases where either of two variables could be reasonably assumed to be the predictor versus the response variable, it becomes unclear whether it is more appropriate to assume that either of the variables is the independent predictor variable or response variable. Such is the case with the TSS determination method: TSS has been modelled as a dependent variable on turbidity in previous years so that the predictive models support the prediction of TSS from near real-time turbidity measurements. However, we view turbidity as a proxy measure of the true TSS concentration, with the implicit assumption that stream turbidity varies as a function of TSS.

The issues that arise from using an ordinary least-squares linear regression approach are well recognized in the published literature and can be resolved by a few approaches. In particular, linear or non-linear predictive models for bivariate data that minimize the cumulative orthogonal distance between the observed and predicted data values (Orthogonal Distance Regression: ODR) were first developed in the late 1980s (Boggs and Rogers, 1990; Boggs et al., 1988).

An Orthogonal Distance Regression was used to improve the TSS-turbidity predictive model based on the same screened and transformed data presented in Figure 8. This model was selected due to the lack of clear distinction between the predictor (lab-based turbidity) and response (TSS) variables, given the inter-reliance of these variables when fitting the regression of TSS versus turbidity, and given that both TSS and turbidity are prone to minor measurement error (this makes it important to consider the magnitude of variation between the observed and predicted data values in both the x- and y-direction.

The ODR regression of log-transformed and lab-based TSS and turbidity using the pooled dataset is displayed in Figure 9:

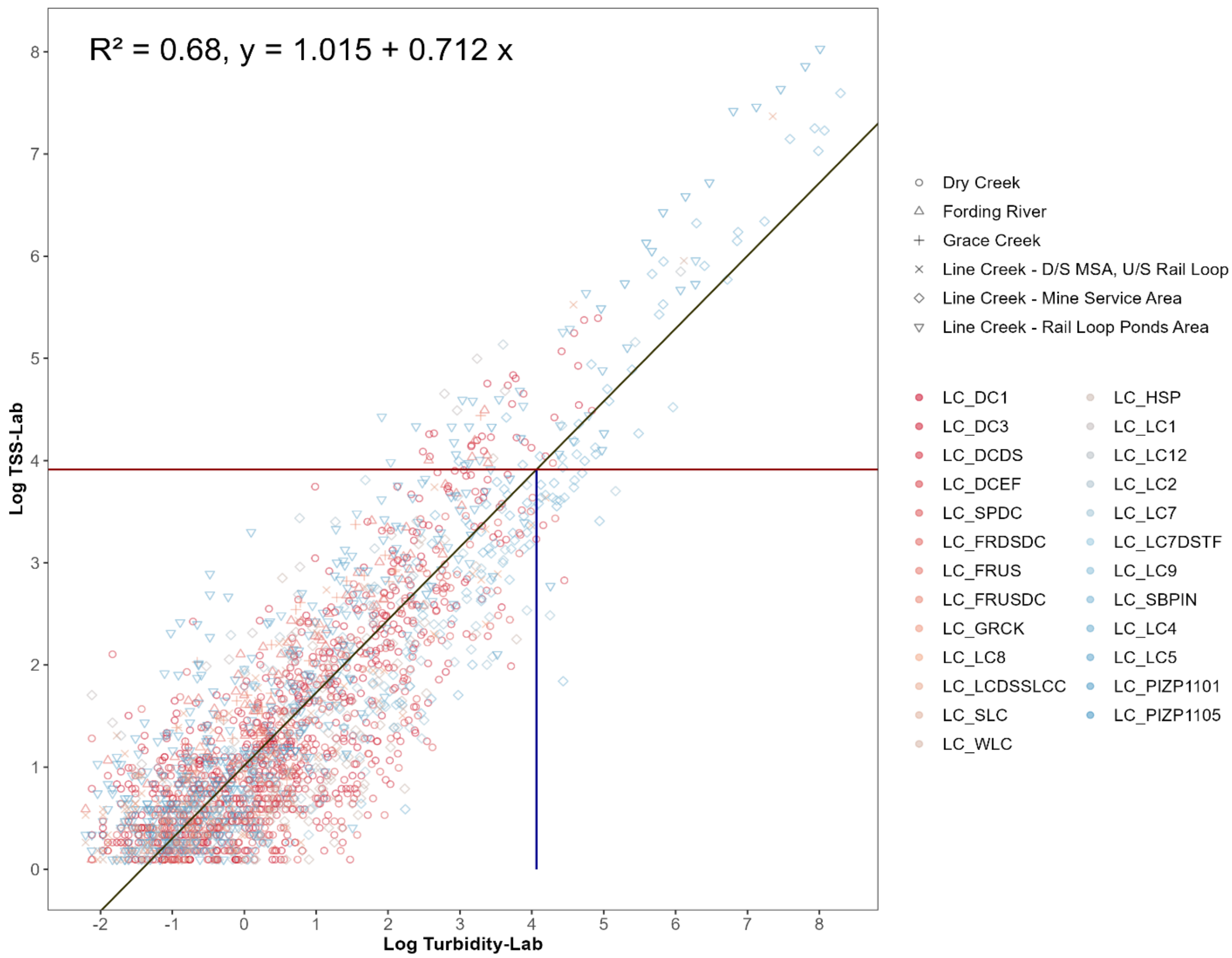

Figure 9 Orthogonal Distance Regression of log-transformed lab-based TSS against lab-based turbidity using pooled data across monitoring locations (n = 2245). The black diagonal line is the best-fit line, the horizontal red line is equivalent to log(50) (i.e., representing 50 mg/L TSS concentration) and the vertical line is the inversely calculated turbidity trigger value.

TSS (mg/L) from authorized discharges at LCO can be calculated from turbidity (NTU) as follows:

$$\textbf{Log[TSS (mg/L)] = 1.015 + 0.712*log[Turbidity (NTU)];} \quad [4]$$

$$\textbf{TSS (mg/L) = exp(1.015 + 0.712*log[Turbidity (NTU)])} \quad [5]$$

The LCO universal regression estimate (equation [4]) explains 68% of the overall variability in the degree of association between TSS and turbidity. The turbidity trigger value corresponding to a TSS concentration of 50 mg/L was inversely calculated from the updated regression (equation [4]): A TSS value of 50 mg/L corresponds to a turbidity value of 58 NTU (Figure 9

Table 3 provides a summary of the TSS-turbidity predictive models discussed above, in comparison with models and turbidity trigger values provided in the LCO TSS Determination Method based on monitoring data available through 2022. The cautionary values for turbidity provided in Table 3 comprise estimates of catchment/discharge TSS concentrations that may be approaching 50 mg/L (when the instantaneous suspended sediment load is increasing) to further assist with the anticipation of and mitigation against high TSS conditions.

It should be noted that a regression-based predictive estimate of TSS from turbidity is not necessarily better based on having only a high coefficient of determination (e.g., $R^2 > 0.70$). There are several examples in Table 4 of site-specific predictive estimates for which an improved linear fit was achieved through use of matched TSS and turbidity data for only one or a few years. Constraining the data set, however, can have the unintended consequence of removing sources of variability in the bivariate relationship that are both real and potentially important. There is a risk of focusing on a narrow time frame and neglecting inter-annual variability in the relationship between TSS and turbidity, which could be driven by substantial differences in the timing and particulars of the hydrological cycle and an associated variation in the particle size distributions of suspended sediment over the larger annual dataset. This may be one form of overfitting a regression model to the data, which can lower the predictive accuracy of the model for some years.

Given the wide variation in turbidity trigger values that have been proposed in this and previous updates to the TSS determination method, a sensitivity analysis was completed. In particular, the turbidity trigger value of 58 NTU developed using all data to the end of 2023 using ODR for model-fitting was used to assess the potential for false negative predictions or false positive predictions of TSS concentrations higher than 50 mg/L. This sensitivity analysis was completed on all LCO paired turbidity-TSS monitoring data available from 2014 through 2023 for the authorized discharge sites listed in Table 4.

The sensitivity analysis (Table 4) supports using a 58 NTU trigger value. A turbidity value > 58 NTU consistently captured previously collected TSS data >50 mg/L at the authorized discharge sites. For sites with seven or more data points with laboratory turbidity values ≥58 NTU (LC_SPDC, LC_LC7, LC_LC9), the observed TSS was higher than 50 mg/L in 34% or more of the samples. The average TSS was also higher than 50 mg/L for LC_LC7 and LC_LC9 samples when turbidity was ≥58 NTU. Turbidity values < 58 NTU were accompanied by an observed TSS value >50 mg/L in only 2 samples out of 1,043, or approximately 0.2% of all sample observations with turbidity <58 NTU (Table 4).

As per the 2022 TSS Determination Report, a “cautionary” or “sample trigger value” associated with a slightly lower TSS value than the compliance limit was developed to provide an early warning that suspended sediment concentrations may be increasing and could approach a TSS concentration of

50 mg/L in the absence of further management actions. Based on equation [4], a cautionary value of 43 NTU is suggested, which is equivalent to a TSS value of 40 mg/L.

Table 3 Summary of updated and previous TSS-Turbidity predictive models for LCO Catchments

Location EMS Code	Teck Station Code	Coeff. of Determ. (R^2)	Regression Equation	Trigger Value (NTU)	Cautionary Value (NTU)	Years of Data, or *Equation Referenced*	Report
All LCO Discharges (paired data for detected TSS)	N/A	***Ordinary Least Squares Regression***				**2014-2023[1]**	**Current (2023)**
		0.74	**TSS-L = *exp*(1.06+ 0.643*log[Turb-L])**	**84**	**42 (lower 95% CL)**		
		Orthogonal Distance Regression					
		0.68	**TSS-L = *exp*(1.015 + 0.712*log[Turb-L])**	**58**	**43 (≈ 40 mg/L TSS)**		
E216144	LC7	0.689	TSS-F = 0.289*(Turb-F) + 3.30	162	NA	2012-2022	2022
		0.953	TSS-F = 0.399*(Turb-F) + 1.01	124	87	*2016*	2022
E219411	LC8	0.656	TSF-F = 0.290*(Turb-F) + 1.98	161	NA	2012-2022	2022
		0.845	TSS-F = 1.58*(Turb-F) - 8.40	40	30	*2017, with spike testing*	2022
E221268	LC9	0.730	TSS-F = 0.294*(Turb-F) + 3.23	167	115	*2016*	2022
E295211	SPDC	0.750	TSS-F = 0.288*(Turb-F) + 1.46	52	36	*2022*	2022
E308146	HSP	0.374	TSS-F = 0.420*(Turb-F) + 0.19	111	NA	2012-2022	2022
		0.187	NA[2]	40[2]	20[2]	NA[2]	2022

[1] See Table 1; [2] Based on the Horseshoe Pit Pumping Plan Trigger Action Response Plan; Turb-L = lab-based turbidity; TSS-L = lab-based TSS; Turb-F = field-based turbidity; TSS-F = field-based turbidity.

Table 4 Summary of previously measured TSS values corresponding to paired lab-based turbidity data greater than or less than trigger value of 58 NTU at authorized discharge sites.

Location	Turbidity Lab (NTU)	TSS (mg/L)				
		Mean	Min	Max	Count (total)	Count (>50 mg/L)
LC_SPDC	≥58	41.1	20.3	58.0	32	11
LC_LC8		38.0	38.0	38.0	1	0
LC_HSP		30.7	30.7	30.7	1	0
LC_LC7		67.7	9.8	174.0	7	3
LC_LC9		50.6	11.5	92.0	22	11
LC_SPDC	<58	4.2	1.0	41.0	478	0
LC_LC8		5.8	1.0	29.0	38	0
LC_HSP		4.8	1.0	92.0	261	2
LC_LC7		4.4	1.0	45.1	216	0
LC_LC9		12.2	1.0	39.0	50	0

Note: Highlighted values are >50 mg/L TSS.

5 Summary

This TSS Determination Method update incorporates the relevant LCO water quality monitoring data for the 2023 calendar year and further demonstrates the robustness of TSS-turbidity regression-based predictive relationships based on pooled data available from the multiple monitoring locations in the Dry Creek and Line Creek catchments over a ten-year period, from 2014 through 2023. Understanding the relationship between TSS and turbidity measurements is required to manage liquid flocculant use in accordance with the current LCO FMP.

Table 4 describes the updated predictive models generated from pooling data across LCO discharges. A turbidity value of 58 NTU is generally equivalent to the TSS discharge compliance limit of 50 mg/L for LCO catchments, although the specific quantitative relationship between turbidity and TSS varies for each sample, arising from variations in how suspended particulates intercept and scatter light. Variations in light back-scatter (the basis of turbidity measurements), in turn, are attributable especially to variations in the particle size distributions of suspended sediments and their physical/chemical properties associated with mineralogical and organic content. While there will always be greater or lesser degrees of variation in quantitative relationships between TSS and turbidity, LCO authorized discharge site samples with observed lab-measured turbidity ≥58 NTU had a probability of greater than 30% of having a TSS >50 mg/L. Conversely, less than 0.2% of site samples with lab-based turbidity <58 NTU had a TSS >50 mg/L.

Similarly, an LCO turbidity value of 43 NTU is calculated herein as a cautionary value, generally equivalent to a TSS concentration of 40 mg/L, allowing for the inherent variation in the relationship between TSS and turbidity. Line Creek Operations will continue to perform field turbidity measurements and collect samples for laboratory analysis for both TSS and turbidity, when and where possible, to refine the above correlations further. Triggers have been identified for ENV reporting purposes for potential non-compliances; lab analyses will confirm actual non-compliance. Additionally, triggers for sample collection are also developed to assist in continually improving each correlation.

6 Closure

This TSS Determination Report has been prepared by the undersigned.

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7 References

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Boggs, P.T., J.R. Donaldson, R.B. Schnabel and C.H. Spiegelman, 1988. A computational examination of orthoganol distance regression. *J. Econometrics,* **35:** 19-201.

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Appendix A

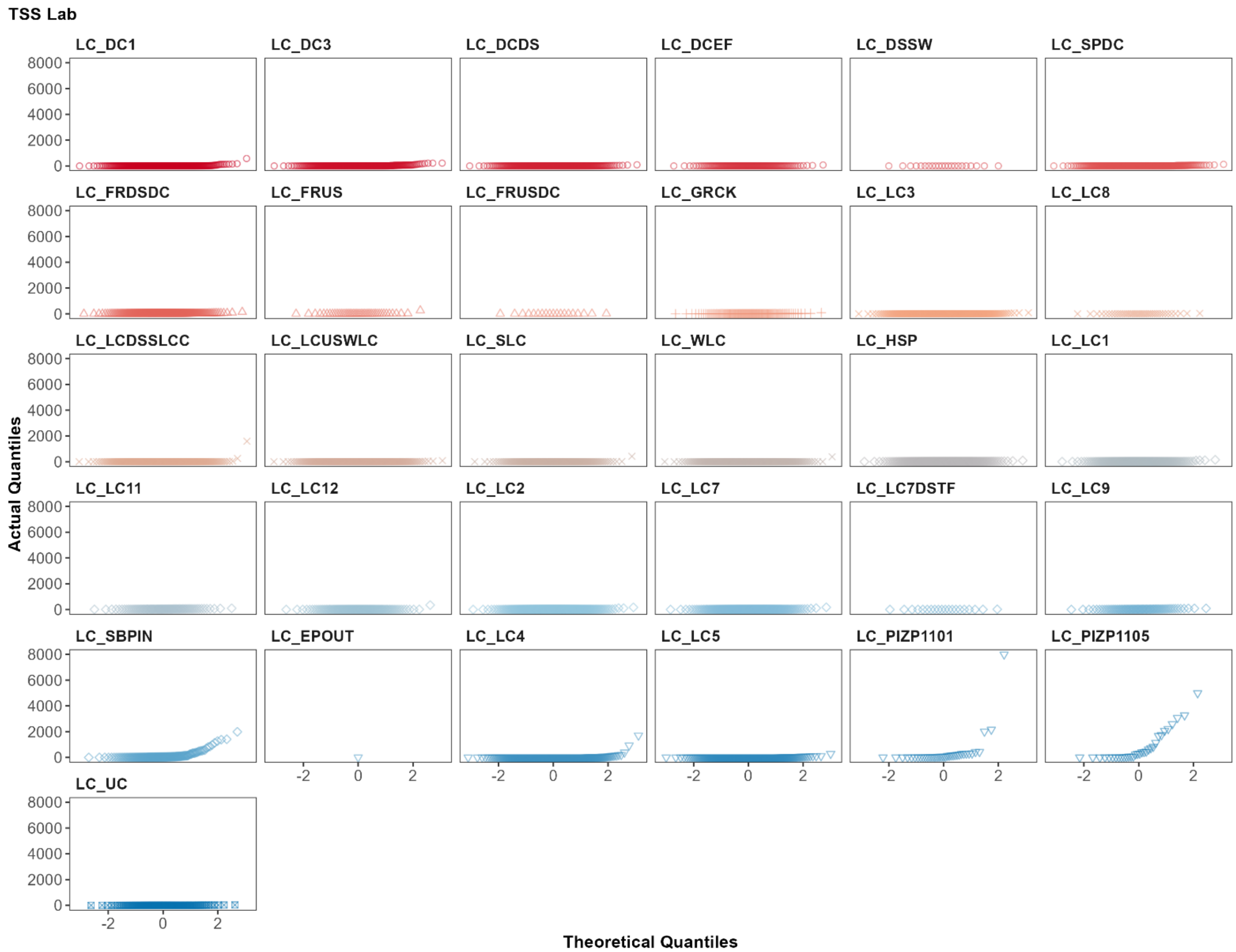

Figure A1 Quantile-quantile plots of untransformed TSS data.

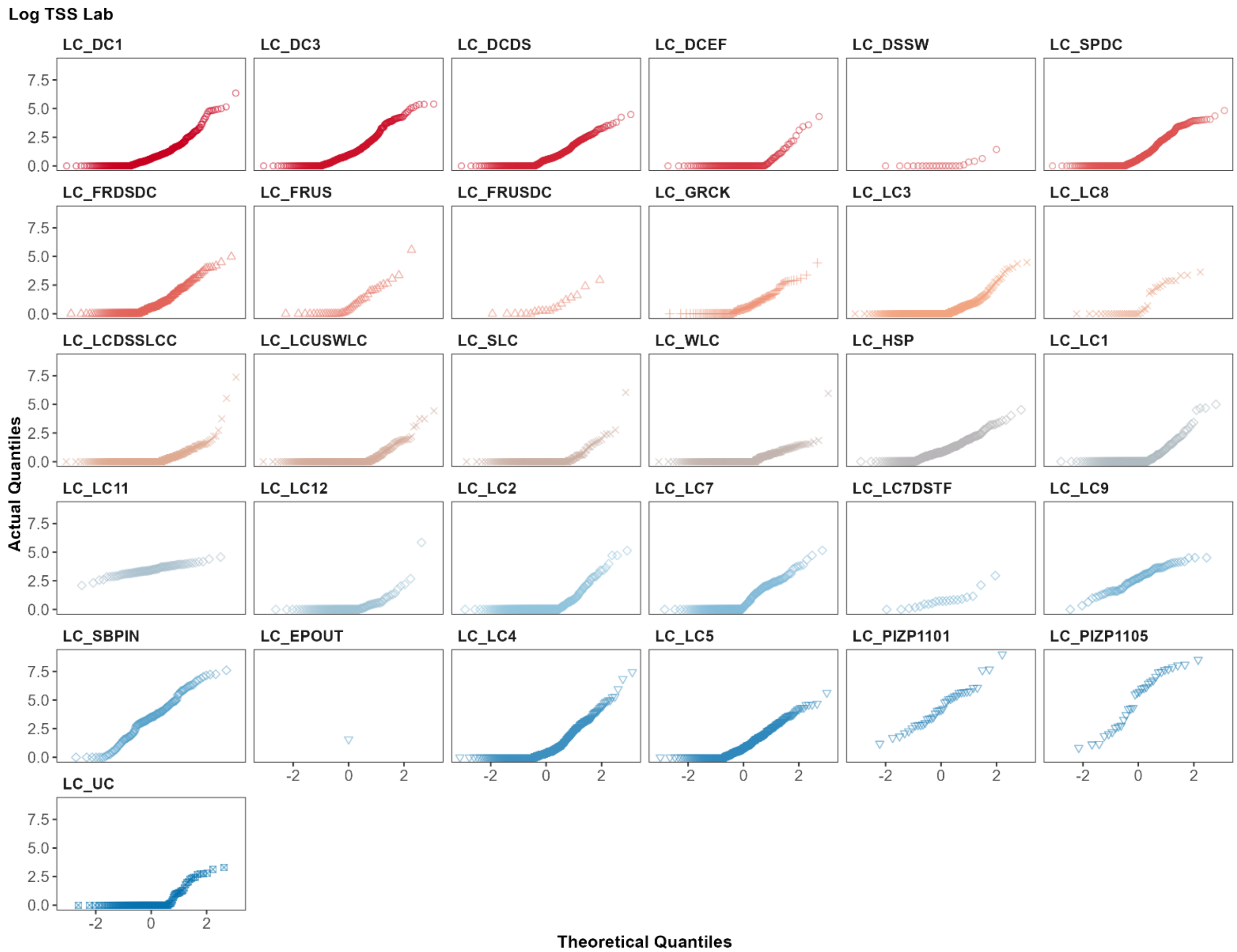

Figure A2 Quantile-quantile plots of log-transformed TSS data.

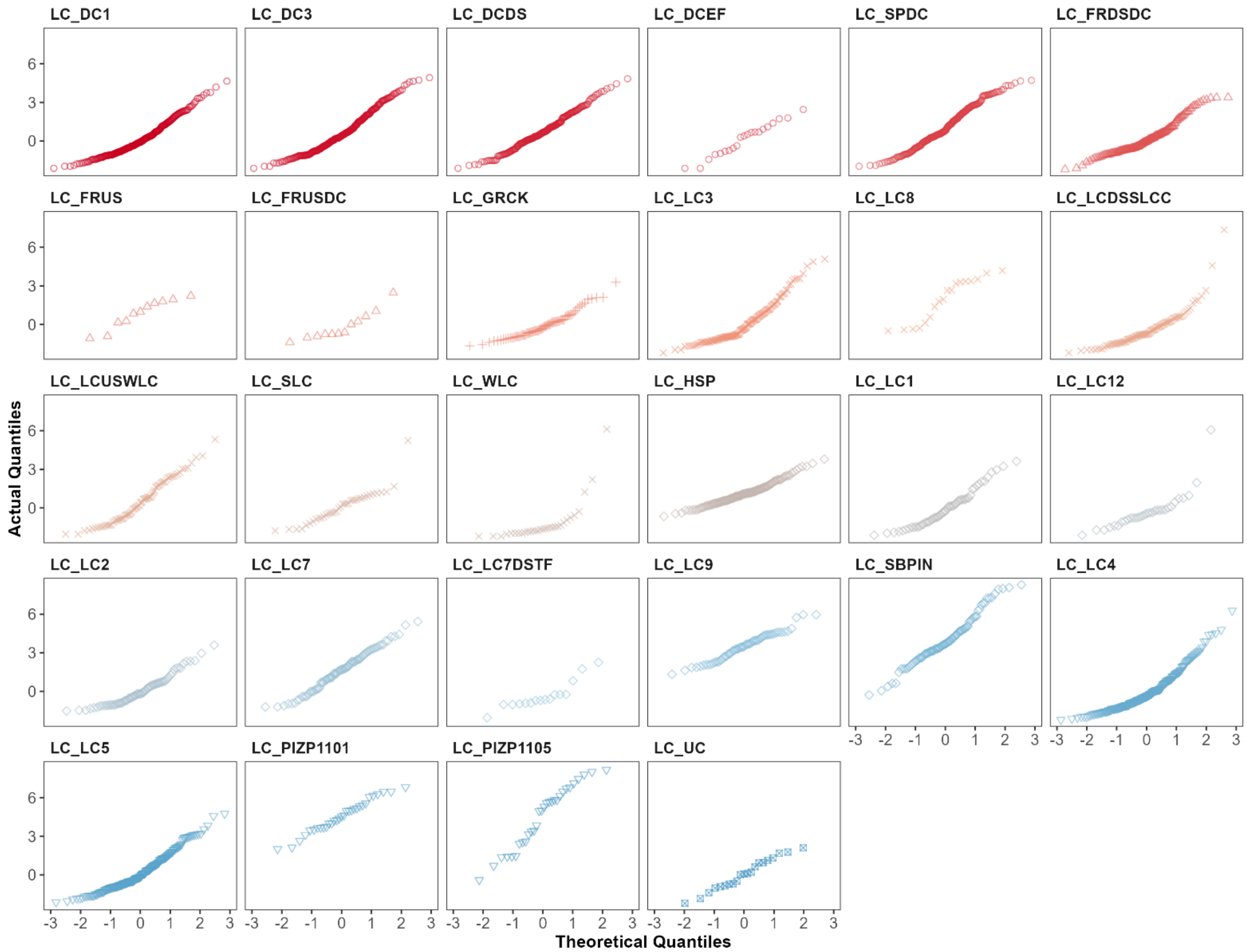

Figure A3 **Quantile-quantile plots of log-transformed TSS data, excluding data below detection limit of 1 mg/L.**

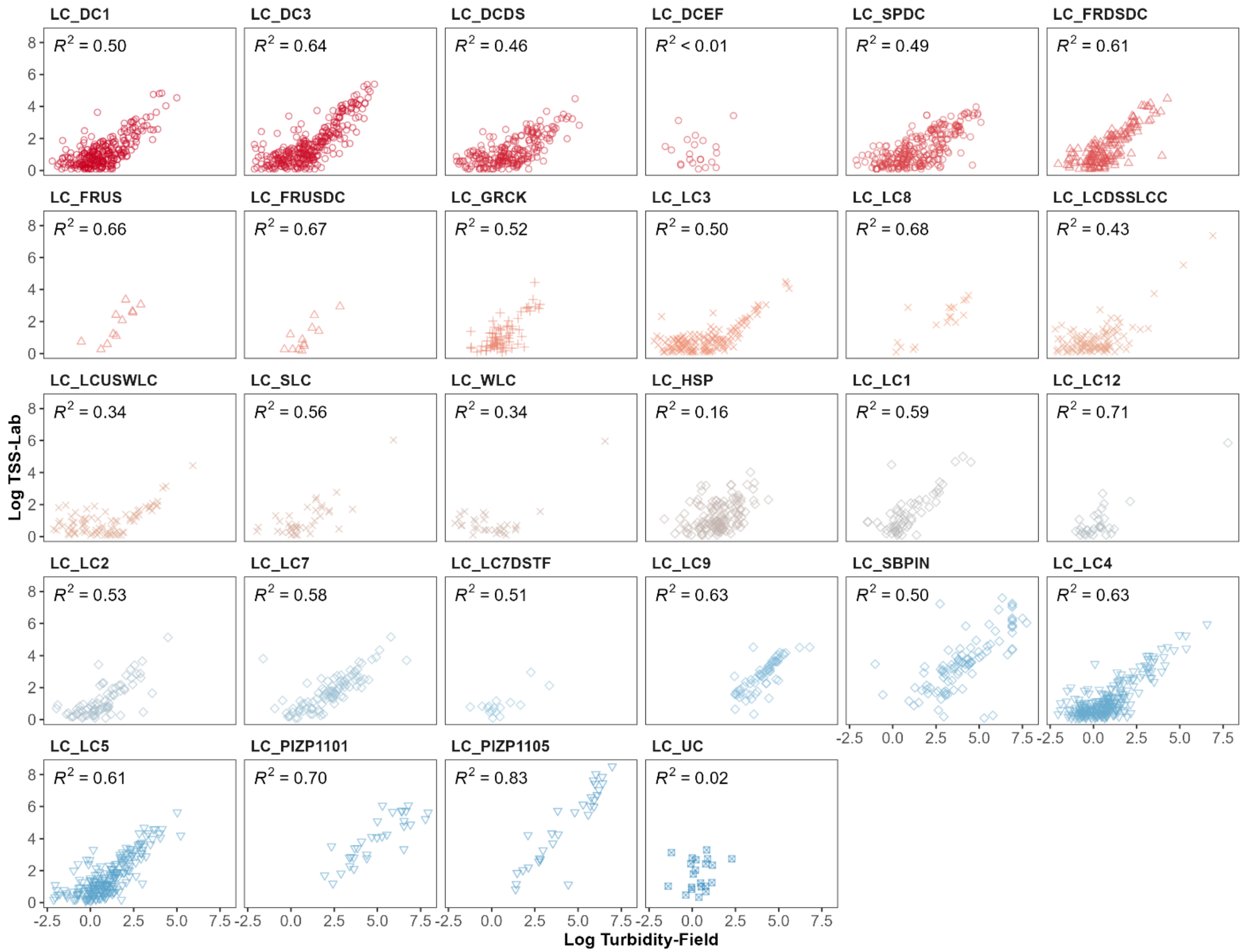

Figure A4 **Regression of log-transformed lab-based TSS against field-measured turbidity.**

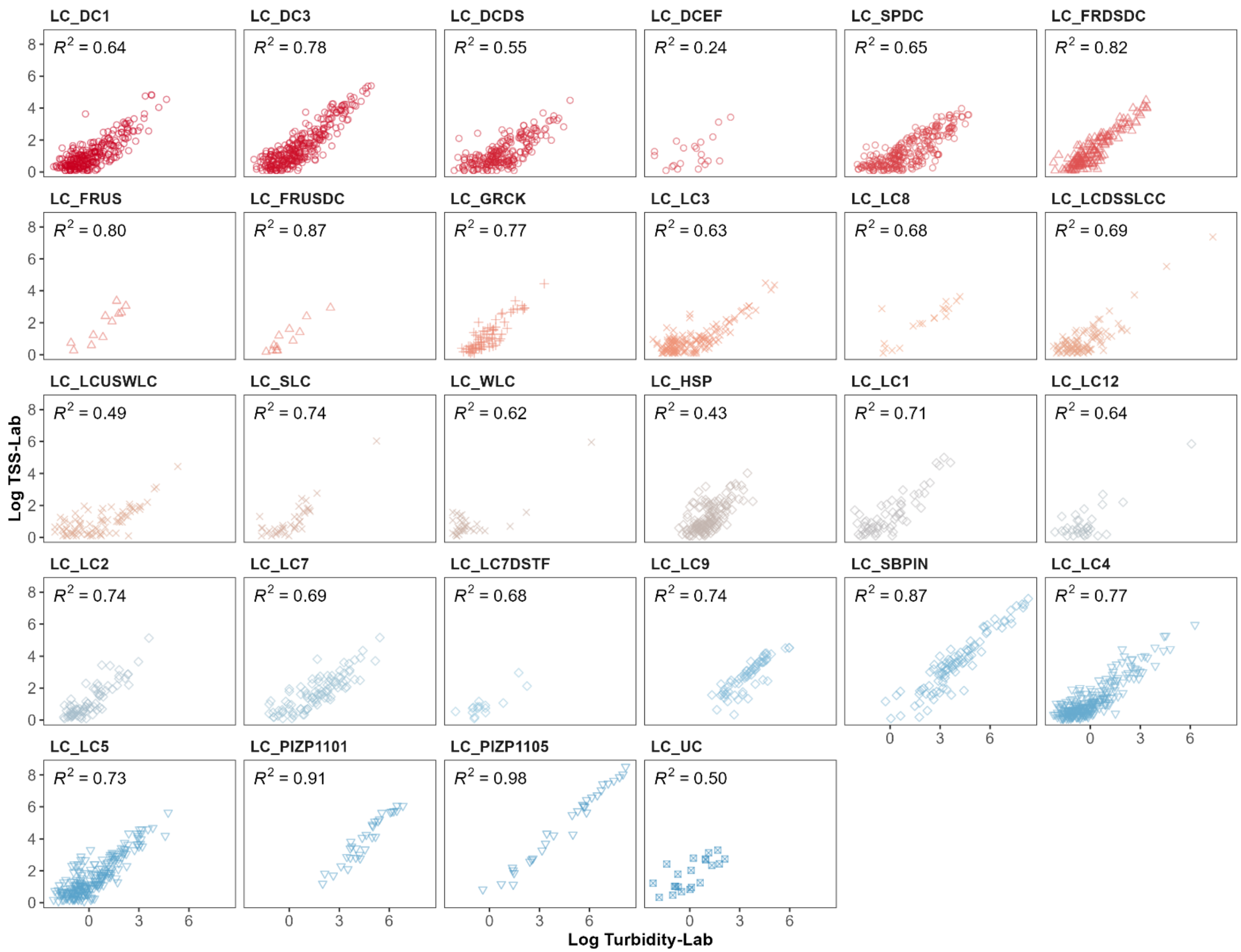

Figure A5 Regression of log-transformed lab-based TSS against lab-based turbidity.

Figure A6 Annual slope from regression of log-transformed TSS against lab-based turbidity; data from specific years were excluded if <3 data points were collected in a year, or if the slope of the regression estimate was lower than or approaching zero. Data from years with y-intercept values less than zero were additionally excluded.

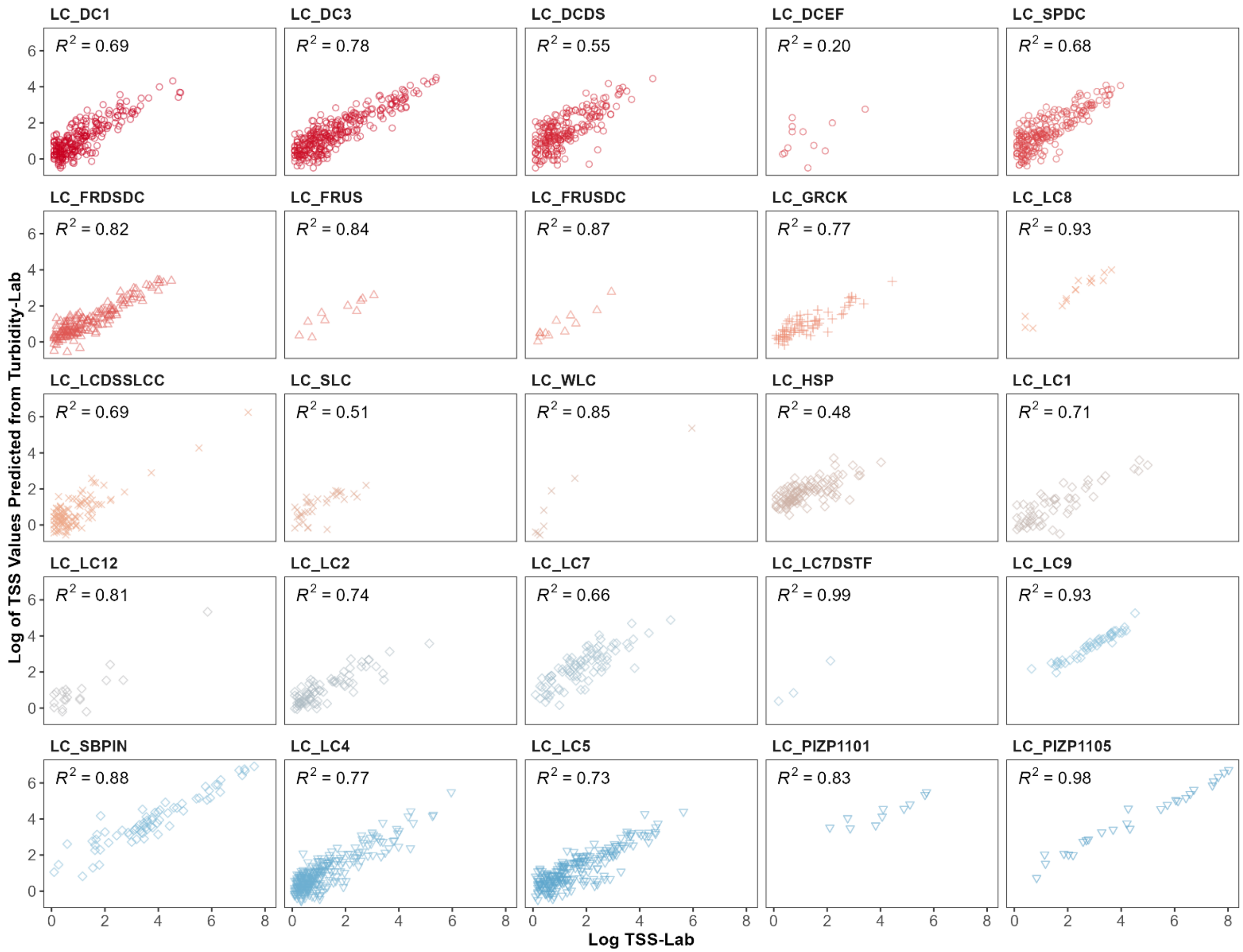

Figure A7 **Regression of log-transformed predicted TSS against measured TSS.**

Table A1 Mean slopes and y-intercepts for ordinary least-squares linear regression of log-transformed lab-based TSS against lab-based turbidity and monitoring location groupings from ANOVA as indicated by Tukey's method.

Location	Slope		Intercept	
	Mean value	Grouping – Tukey's Method	Mean value	Grouping – Tukey's Method
LC_UC	1.04	a	1.4	a
LC_FRUS	0.91	ab	1.1	ab
LC_LC12	0.87	ab	1.2	ab
LC_PIZP1105	0.86	ab	0.8	ab
LC_LC9	0.84	ab	0.1	b
LC_LC1	0.84	ab	1.3	a
LC_GRCK	0.84	ab	1.3	a
LC_FRUSDC	0.82	ab	1.2	ab
LC_FRDSDC	0.81	ab	1.2	a
LC_SBPIN	0.80	ab	0.5	b
LC_DC3	0.77	ab	1.0	ab
LC_LC2	0.76	ab	1.1	ab
LC_LC5	0.76	ab	1.4	a
LC_LC8	0.68	ab	0.6	ab
LC_HSP	0.67	ab	0.5	ab
LC_PIZP1101	0.65	ab	0.8	ab
LC_LC4	0.64	ab	1.1	ab
LC_LC7	0.63	ab	0.8	ab
LC_SLC	0.63	ab	0.8	ab
LC_DC1	0.62	ab	1.0	ab
LC_SPDC	0.60	ab	0.7	ab
LC_LC7DSTF	0.60	ab	0.8	ab
LC_DCDS	0.54	ab	0.8	ab
LC_WLC	0.50	ab	0.7	ab
LC_LCDSSLCC	0.50	ab	1.0	ab
LC_DCEF	0.44	ab	1.2	ab
LC_LC3	0.44	b	0.8	ab
LC_LCUSWLC	0.33	b	0.8	ab

Appendix J – Memo MSAN Statistical Evaluation and Temporary Paired Sampling at MSAN

Memorandum

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Teck

To: Mark Hall, MOE **SENT VIA EMAIL** Date: 30th October 2015

From: Kevin Podrasky, Line Creek Operations Cc: -

Subject: Statistical evaluation (T-Test) regarding the MSAN MSX Short Dump LC7 (E216142) and 'LC7 alternate' sampling location.

The Mine Services Area North Pond (MSAN) System (identified in Section 1.4 of PE5353 (June 2015) is a series of three separate cells which are used to settle suspended sediment in mine impacted water from the MSAN Pit. Line Creek Operations plans to implement a mine optimization opportunity that involves backfilling of the MSAN Pit with a short dump (MSX Short Dump) which comprises approximately 7.1 Million BCM of waste rock. The runout zone of the Short Dump has the potential to limit access to the Pond System and therefore may limit Line Creek Operations ability to meet compliance monitoring obligations as specified within the permit, unless the sample can be obtained from within the safe zone.

Line Creek Operations propose that for the duration of the spoil development, that compliance samples will be obtained where possible at the current discharge location E216142 and when access is restricted, that sampling is obtained from the '*LC_7 alternate location'* (LC_LC7DSTF).

In support of the request to sample an alternate location, the water quality and physical characteristics at the MSAN Pond discharge (E216142 (LC_7)) and the '*LC_7 alternate location'* (LC_LC7DSTF) were compared. An evaluation of standard deviation and coefficient of variation were applied to the dataset and submitted to MOE on 5th October 2015, concluding that there was a low degree of variation between the datasets. Following review of this submission, the MOE requested (14th October, 2015) that additional statistical evaluation was conducted, to determine the significance of any difference between the datasets from the two locations.

A t-test statistical analysis was undertaken on the original MSAN Pond discharge (E216142 (LC_7)) and the *LC7_alternate* dataset, to verify the hypothesis that no significant difference exists between them. For the purpose of hypothesis testing, the following assumptions applied to the analysis:

- Both datasets exhibit a normal distribution with equal variance
- The direction of difference is unable to be determined (two-tailed test)
- Significance level (α) of 0.05, 95% confidence

1 - Navidi, William. *Statistics for Engineers and Scientists*. New York: McGraw-Hill, 2006.

Values below detection were not utilized to conduct the t-test analysis as their value is undeterminable and would misconstrue the normal distribution.

The t-test assesses whether the means of two groups are statistically different from each other. In order to conduct the t-test analysis, a P value (or t-value in some references) was calculated for the distributions of parameter values from the two locations, within the assessed dataset (Table 1). To determine the critical P-value (or critical t-value in some references), the degree of freedom was determined for each parameter, by summing the number of samples (N) from LC7 (n_1) and *LC7_alternate* (n_2) as follows:

$$N = n_1 + n_2$$
$$degree\ of\ freedom = N - 2$$

Once the degree of freedom and the significance level were identified, the critical P-value was determined from t-test tables[1]. The T-test identifies that, where the calculated P-value exceeds the critical P-value, the two datasets are deemed to be significantly different.

In this case, the t-test was applied to a dataset of 86 water quality analytes, sampled from both the MSAN Pond discharge (E216142 (LC_7)) and the *'LC_7 alternate'* location. The parameters tested are listed in Table 1 and included mining constituents of concern, anions and nutrients (eg. nitrate, nitrite, ammonia and sulphate), total and dissolved metals (eg. selenium and cadmium) and Total Suspended Solids, etc. Data was obtained on 46 sampling events at the MSAN Pond discharge (E216142 (LC_7)) and 16 sampling events at the *'LC_7 alternate location'* (LC_LC7DSTF), throughout 2013.

Although the degrees of freedom varied for each parameter, the calculated P-values of all analytes collectively ranged from 0.0175 to 0.998 and critical P-values collectively ranged from 2.021 to 4.303. In all cases the P-value was less than the corresponding critical P-value, which verifies acceptance of the hypothesis that no significant difference exists between the two datasets.

The findings of this statistical comparison of water quality at the MSAN pond discharge and the *'LC_7 alternate'* location support the initial hypothesis that the water quality ~400 m downstream of the current sampling location (in the safe sampling zone), is not markedly different than the MSAN Pond Outlet (LC_LC7). The t-test results align with the initial statistical evaluations (submitted to MOE on 5th October) which concluded that there was a low degree of variation between the datasets at each location. Both analyses support the LCO proposal to obtain representative compliance samples where safe to do so at the discharge location (E216142 (LC_7)) and when access is restricted due to safety concerns, that sampling is obtained from the *'LC_7 alternate'* location.

Should you have any questions or comments regarding this report, please feel free to contact Kevin Podrasky, Superintendent Environment, at 250-425-3169, or via email at Kevin.Podrasky@teck.com.

Kevin Podrasky
Superintendent Environment - Line Creek Operations

Table 1. T-Test results for *LC7_alternate* as compared to LC7 (E216142) for all analytes

Analyte	P-value	Sample Count (N)	Degree of Freedom (N-2)	Alpha	Critical P-Value	ACCEPT or REJECT Null Hypothesis
ALUMINUM (D)	0.574	16	14	0.05	2.145	ACCEPT
ALUMINUM (T)	0.831	37	35	0.05	2.042	ACCEPT
ANTIMONY (D)	0.315	37	35	0.05	2.042	ACCEPT
ANTIMONY (T)	0.345	37	35	0.05	2.042	ACCEPT
ARSENIC (D)	0.967	34	32	0.05	2.042	ACCEPT
ARSENIC (T)	0.902	37	35	0.05	2.042	ACCEPT
BARIUM (D)	0.958	37	35	0.05	2.042	ACCEPT
BARIUM (T)	0.818	37	35	0.05	2.042	ACCEPT
BERYLLIUM (D)		0	*	0.05		N/A
BERYLLIUM (T)	0.404	4	2	0.05	4.303	ACCEPT
BISMUTH (D)		0	*	0.05		N/A
BISMUTH (T)		0	*	0.05		N/A
BORON (D)	0.211	32	30	0.05	2.042	ACCEPT
BORON (T)	0.337	37	35	0.05	2.042	ACCEPT
BROMIDE (D)		0	*	0.05		N/A
CADMIUM (D)	0.548	37	35	0.05	2.042	ACCEPT
CADMIUM (T)	0.814	37	35	0.05	2.042	ACCEPT
CALCIUM (T)	0.486	38	36	0.05	2.042	ACCEPT
CARBON, DISSOLVED ORGANIC (D)	0.347	35	33	0.05	2.042	ACCEPT
CHLORIDE (D)	0.304	24	22	0.05	2.074	ACCEPT
CHLORIDE (N)		2	0	0.05		N/A
CHROMIUM (D)	0.782	20	18	0.05	2.101	ACCEPT
CHROMIUM (T)	0.796	37	35	0.05	2.042	ACCEPT
COBALT (D)	0.362	35	33	0.05	2.042	ACCEPT
COBALT (T)	0.697	37	35	0.05	2.042	ACCEPT
CONDUCTIVITY, FIELD (N)	0.216	38	36	0.05	2.042	ACCEPT
CONDUCTIVITY, LAB (N)	0.812	37	35	0.05	2.042	ACCEPT
COPPER (D)	0.220	15	13	0.05	2.16	ACCEPT
COPPER (T)	0.702	22	20	0.05	2.086	ACCEPT
DISSOLVED OXYGEN, FIELD (N)	0.134	38	36	0.05	2.042	ACCEPT
FLUORIDE (D)	0.933	32	30	0.05	2.042	ACCEPT
Hardness, Total or Dissolved CaCO3 (N)	0.998	38	36	0.05	2.042	ACCEPT
IRON (D)		0	*	0.05		N/A
IRON (T)	0.546	26	24	0.05	2.064	ACCEPT
LEAD (D)		0	*	0.05		N/A
LEAD (T)	0.676	24	22	0.05	2.074	ACCEPT
LITHIUM (D)	0.319	37	35	0.05	2.042	ACCEPT
LITHIUM (T)	0.506	37	35	0.05	2.042	ACCEPT
MAGNESIUM (T)	0.694	38	36	0.05	2.042	ACCEPT
MANGANESE (D)	0.223	37	35	0.05	2.042	ACCEPT

Analyte	P-value	Sample Count (N)	Degree of Freedom (N-2)	Alpha	Critical P-Value	ACCEPT or REJECT Null Hypothesis
MANGANESE (T)	0.967	37	35	0.05	2.042	ACCEPT
MERCURY (D)		0	*	0.05		N/A
MERCURY (T)		0	*	0.05		N/A
MOLYBDENUM (D)	0.226	37	35	0.05	2.042	ACCEPT
MOLYBDENUM (T)	0.346	37	35	0.05	2.042	ACCEPT
NICKEL (D)	0.436	37	35	0.05	2.042	ACCEPT
NICKEL (T)	0.593	37	35	0.05	2.042	ACCEPT
NITRATE NITROGEN (NO3), AS N (N)	0.659	38	36	0.05	2.042	ACCEPT
NITRITE NITROGEN (NO2), AS N (N)	0.278	35	33	0.05	2.042	ACCEPT
NITROGEN, AMMONIA (AS N) (N)	0.051	32	30	0.05	2.042	ACCEPT
NITROGEN, AMMONIA (AS N) (T)	0.757	5	3	0.05	3.182	ACCEPT
ORTHO-PHOSPHATE (D)		2	*	0.05		N/A
ORTHO-PHOSPHATE (N)	0.691	22	20	0.05	2.086	ACCEPT
pH, Field (N)	0.845	38	36	0.05	2.042	ACCEPT
pH, LAB (N)	0.035	38	36	0.05	2.042	ACCEPT
PHOSPHORUS (N)	0.409	7	5	0.05	2.571	ACCEPT
PHOSPHORUS (T)	0.933	18	16	0.05	2.12	ACCEPT
POTASSIUM (T)	0.319	15	13	0.05	2.16	ACCEPT
SELENIUM (D)	0.556	37	35	0.05	2.042	ACCEPT
SELENIUM (T)	0.574	37	35	0.05	2.042	ACCEPT
SILVER (D)		0	*	0.05		N/A
SILVER (T)	0.804	10	8	0.05	2.306	ACCEPT
SODIUM (T)	0.525	33	31	0.05	2.042	ACCEPT
STRONTIUM (D)	0.399	37	35	0.05	2.042	ACCEPT
STRONTIUM (T)	0.244	37	35	0.05	2.042	ACCEPT
SULFATE (AS SO4) (D)	0.571	38	36	0.05	2.042	ACCEPT
TEMPERATURE, FIELD (N)	0.288	38	36	0.05	2.042	ACCEPT
THALLIUM (D)	0.671	13	11	0.05	2.201	ACCEPT
THALLIUM (T)	0.929	18	16	0.05	2.12	ACCEPT
TIN (D)		0	*	0.05		ACCEPT
TIN (T)		0	*	0.05		ACCEPT
TITANIUM (D)		2	0	0.05		N/A
TITANIUM (T)	0.679	14	12	0.05	2.179	ACCEPT
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABLE) (N)	0.834	31	29	0.05	2.043	ACCEPT
TOTAL KJELDAHL NITROGEN (N)	0.322	34	32	0.05	2.042	ACCEPT

Analyte	P-value	Sample Count (N)	Degree of Freedom (N-2)	Alpha	Critical P-Value	ACCEPT or REJECT Null Hypothesis
TOTAL ORGANIC CARBON (T)	0.934	36	34	0.05	2.042	ACCEPT
TOTAL SUSPENDED SOLIDS, LAB (T)		1	*	0.05		ACCEPT
TURBIDITY, LAB (N)	0.548	57	55	0.05	2.021	ACCEPT
URANIUM (D)	0.542	37	35	0.05	2.042	ACCEPT
URANIUM (T)	0.664	37	35	0.05	2.042	ACCEPT
VANADIUM (D)		0	*	0.05		N/A
VANADIUM (T)	0.470	9	7	0.05	2.635	ACCEPT
ZINC (D)	0.017	25	23	0.05	2.069	ACCEPT
ZINC (T)	0.530	33	31	0.05	2.042	ACCEPT

* All sample results remained below detection limits for both sample locations

Analyte	P-value	Sample Count	Degree of Freedom	Alpha	Critical P-Value	ACCEPT/REJECT Null Hypothesis
ALUMINUM (D)	0.375	38	36	0.05	2.042	ACCEPT
ALUMINUM (T)	0.795	60	58	0.05	2.021	ACCEPT
ANTIMONY (D)	0.972	60	58	0.05	2.021	ACCEPT
ANTIMONY (T)	0.994	60	58	0.05	2.021	ACCEPT
ARSENIC (D)	0.813	57	55	0.05	2.021	ACCEPT
ARSENIC (T)	0.770	60	58	0.05	2.021	ACCEPT
BARIUM (D)	0.459	60	58	0.05	2.021	ACCEPT
BARIUM (T)	0.560	60	58	0.05	2.021	ACCEPT
BERYLLIUM (D)	0.886	28	26	0.05	2.056	ACCEPT
BERYLLIUM (T)	0.895	32	30	0.05	2.042	ACCEPT
BISMUTH (D)	*					
BISMUTH (T)	*					
BORON (D)	1.000	56	54	0.05	2.021	ACCEPT
BORON (T)	0.977	60	58	0.05	2.021	ACCEPT
CADMIUM (D)	0.992	60	58	0.05	2.021	ACCEPT
CADMIUM (T)	0.949	60	58	0.05	2.021	ACCEPT
CALCIUM	0.839	24	22	0.05	2.074	ACCEPT
CALCIUM (T)	0.834	60	58	0.05	2.021	ACCEPT
CARBON, DISSOLVED ORGANIC (D)	0.505	58	56	0.05	2.021	ACCEPT
CHROMIUM (D)	0.741	48	46	0.05	2.021	ACCEPT
CHROMIUM (T)	0.823	49	47	0.05	2.021	ACCEPT
COBALT (D)	0.939	58	56	0.05	2.021	ACCEPT
COBALT (T)	0.928	60	58	0.05	2.021	ACCEPT
CONDUCTIVITY, LAB (N)	0.988	60	58	0.05	2.021	ACCEPT
COPPER (D)	0.680	39	37	0.05	2.042	ACCEPT
COPPER (T)	0.681	45	43	0.05	2.021	ACCEPT
DISSOLVED OXYGEN, FIELD (N)	0.223	57	55	0.05	2.021	ACCEPT
FLUORIDE (D)	0.438	54	52	0.05	2.021	ACCEPT
Hardness, Total or Dissolved CaCO3 (N)	0.995	60	58	0.05	2.021	ACCEPT
IRON (T)	0.939	49	47	0.05	2.021	ACCEPT
LEAD (D)	0.345	27	25	0.05	2.06	ACCEPT
LEAD (T)	0.803	45	43	0.05	2.021	ACCEPT
LITHIUM (D)	0.823	60	58	0.05	2.021	ACCEPT
LITHIUM (T)	0.967	60	58	0.05	2.021	ACCEPT
MAGNESIUM (D)	0.992	60	58	0.05	2.021	ACCEPT
MAGNESIUM (T)	0.967	60	58	0.05	2.021	ACCEPT
MANGANESE (D)	0.934	60	58	0.05	2.021	ACCEPT
MANGANESE (T)	0.377	60	58	0.05	2.021	ACCEPT
MERCURY (D)	*					
MERCURY (T)	0.409	16	14	0.05	2.145	ACCEPT
MOLYBDENUM (T)	0.759	58	56	0.05	2.021	ACCEPT
NICKEL (T)	0.944	60	58	0.05	2.021	ACCEPT
NITRATE NITROGEN (NO3), AS N (N)	0.979	60	58	0.05	2.021	ACCEPT
NITRITE NITROGEN (NO2), AS N (N)	0.837	58	56	0.05	2.021	ACCEPT
NITROGEN, AMMONIA (AS N) (N)	0.581	53	51	0.05	2.021	ACCEPT
ORTHO-PHOSPHATE (N)	0.689	47	45	0.05	2.021	ACCEPT
pH, Field (N)	0.810	57	55	0.05	2.021	ACCEPT
pH, LAB (N)	0.043	60	58	0.05	2.021	ACCEPT
Potassium	0.456	24	22	0.05	2.074	ACCEPT
POTASSIUM (T)	0.801	41	39	0.05	2.042	ACCEPT
SELENIUM (D)	0.969	60	58	0.05	2.021	ACCEPT
SELENIUM (T)	0.994	60	58	0.05	2.021	ACCEPT
SILICON	0.430	24	22	0.05	2.074	ACCEPT
SILICON	0.968	24	22	0.05	2.074	ACCEPT
SILVER (D)	*					
SILVER (T)	0.942	33	31	0.05	2.042	ACCEPT
SODIUM	0.710	26	24	0.05	2.064	ACCEPT
STRONTIUM (D)	0.973	60	58	0.05	2.021	ACCEPT
STRONTIUM (T)	0.787	60	58	0.05	2.021	ACCEPT
SULFATE (AS SO4) (D)	0.891	60	58	0.05	2.021	ACCEPT
TEMPERATURE, FIELD (N)	0.672	55	53	0.05	2.021	ACCEPT
THALLIUM (D)	0.343	35	33	0.05	2.042	ACCEPT
THALLIUM (T)	0.922	39	37	0.05	2.042	ACCEPT
The sum of extractable petroleum hydrocarbons C	1.000	24	22	0.05	2.074	ACCEPT
TIN (D)	0.327	26	24	0.05	2.064	ACCEPT
TIN (T)	1.000	28	26	0.05	2.056	ACCEPT
TITANIUM (D)	0.849	30	28	0.05	2.048	ACCEPT
TITANIUM (T)	0.873	38	36	0.05	2.042	ACCEPT
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABL	0.828	54	52	0.05	2.021	ACCEPT
TOTAL KJELDAHL NITROGEN (N)	0.215	55	53	0.05	2.021	ACCEPT
TOTAL ORGANIC CARBON (T)	0.886	58	56	0.05	2.021	ACCEPT
TOTAL SUSPENDED SOLIDS, LAB (T)	0.459	29	27	0.05	2.052	ACCEPT
TURBIDITY, LAB (N)	0.960	60	58	0.05	2.021	ACCEPT
URANIUM (D)	0.979	60	58	0.05	2.021	ACCEPT
URANIUM (T)	0.883	60	58	0.05	2.021	ACCEPT
VANADIUM (D)	0.421	28	26	0.05	2.056	ACCEPT
VANADIUM (T)	0.950	36	34	0.05	2.042	ACCEPT
ZINC (D)	0.319	51	49	0.05	2.021	ACCEPT
ZINC (T)	0.951	57	55	0.05	2.021	ACCEPT

*All sample results remained below detection limits for both sample locations.

2023 T-Test: LC_LC7 and LC_LC7DSTF

Analyte	P-value	Sample Count	Degree of Freedom	Alpha	Critical P-Value	ACCEPT/REJECT Null Hypothesis
ALUMINUM (D)	0.745	44	42	0.05	2.021	ACCEPT
ALUMINUM (T)	0.788	66	64	0.05	2.000	ACCEPT
ANTIMONY (D)	0.966	66	64	0.05	2.000	ACCEPT
ANTIMONY (T)	0.988	66	64	0.05	2.000	ACCEPT
ARSENIC (D)	0.983	63	61	0.05	2.000	ACCEPT
ARSENIC (T)	0.776	66	64	0.05	2.000	ACCEPT
BARIUM (D)	0.447	66	64	0.05	2.000	ACCEPT
BARIUM (T)	0.541	66	64	0.05	2.000	ACCEPT
BERYLLIUM (D)	0.8330	34	32	0.05	2.042	ACCEPT
BERYLLIUM (T)	0.850	38	36	0.05	2.042	ACCEPT
BISMUTH (D)	*					
BISMUTH (T)	*					
BORON (D)	1.000	62	60	0.05	2.000	ACCEPT
BORON (T)	0.966	66	64	0.05	2.000	ACCEPT
CADMIUM (D)	0.891	66	64	0.05	2.000	ACCEPT
CADMIUM (T)	0.993	66	64	0.05	2.000	ACCEPT
CALCIUM	0.970	30	28	0.05	2.048	ACCEPT
CALCIUM (T)	0.819	66	64	0.05	2.000	ACCEPT
CARBON, DISSOLVED ORGANIC (D)	0.559	64	62	0.05	2.000	ACCEPT
CHROMIUM (D)	0.397	54	52	0.05	2.021	ACCEPT
CHROMIUM (T)	0.823	49	47	0.05	2.021	ACCEPT
COBALT (D)	0.762	64	62	0.05	2.000	ACCEPT
COBALT (T)	0.999	66	64	0.05	2.000	ACCEPT
CONDUCTIVITY, LAB (N)	0.980	66	64	0.05	2.000	ACCEPT
COPPER (D)	0.703	45	43	0.05	2.021	ACCEPT
COPPER (T)	0.696	51	49	0.05	2.021	ACCEPT
DISSOLVED OXYGEN, FIELD (N)	0.193	63	61	0.05	2.000	ACCEPT
FLUORIDE (D)	0.453	60	58	0.05	2.021	ACCEPT
Hardness, Total or Dissolved CaCO3 (N)	0.998	66	64	0.05	2.000	ACCEPT
IRON (T)	0.993	55	53	0.05	2.021	ACCEPT
LEAD (D)	0.340	33	31	0.05	2.042	ACCEPT
LEAD (T)	0.840	51	49	0.05	2.021	ACCEPT
LITHIUM (D)	0.833	66	64	0.05	2.000	ACCEPT
LITHIUM (T)	0.976	66	64	0.05	2.000	ACCEPT
MAGNESIUM (D)	0.995	66	64	0.05	2.000	ACCEPT
MAGNESIUM (T)	0.946	66	64	0.05	2.000	ACCEPT
MANGANESE (D)	0.928	66	64	0.05	2.000	ACCEPT
MANGANESE (T)	0.363	66	64	0.05	2.000	ACCEPT
MERCURY (D)	*					
MERCURY (T)	0.559	22	20	0.05	2.086	ACCEPT
MOLYBDENUM (T)	0.758	64	62	0.05	2.000	ACCEPT
NICKEL (T)	0.942	66	64	0.05	2.000	ACCEPT
NITRATE NITROGEN (NO3), AS N (N)	0.989	66	64	0.05	2.000	ACCEPT
NITRITE NITROGEN (NO2), AS N (N)	0.772	64	62	0.05	2.000	ACCEPT
NITROGEN, AMMONIA (AS N) (N)	0.583	59	57	0.05	2.021	ACCEPT
ORTHO-PHOSPHATE (N)	0.641	53	51	0.05	2.021	ACCEPT
pH, Field (N)	0.758	63	61	0.05	2.000	ACCEPT
pH, LAB (N)	0.039	66	64	0.05	2.000	ACCEPT
Potassium	0.563	30	28	0.05	2.048	ACCEPT
POTASSIUM (T)	0.815	47	45	0.05	2.021	ACCEPT
SELENIUM (D)	0.932	66	64	0.05	2.000	ACCEPT
SELENIUM (T)	0.987	66	64	0.05	2.000	ACCEPT
SILICON	0.635	30	28	0.05	2.048	ACCEPT
SILICON	0.953	30	28	0.05	2.048	ACCEPT
SILVER (D)	*					
SILVER (T)	0.950	39	37	0.05	2.042	ACCEPT
SODIUM	0.801	32	30	0.05	2.042	ACCEPT
STRONTIUM (D)	0.979	66	64	0.05	2.000	ACCEPT
STRONTIUM (T)	0.796	66	64	0.05	2.000	ACCEPT
SULFATE (AS SO4) (D)	0.924	66	64	0.05	2.000	ACCEPT
TEMPERATURE, FIELD (N)	0.706	60	58	0.05	2.021	ACCEPT
THALLIUM (D)	0.342	41	39	0.05	2.042	ACCEPT
THALLIUM (T)	0.942	45	43	0.05	2.021	ACCEPT
The sum of extractable petroleum hydrocarbons C	*					
TIN (D)	0.32531	32	30	0.05	2.042	ACCEPT
TIN (T)	*					
TITANIUM (D)	0.812	36	34	0.05	2.042	ACCEPT
TITANIUM (T)	0.902	44	42	0.05	2.021	ACCEPT
TOTAL DISSOLVED SOLIDS (RESIDUE, FILTERABI	0.889	60	58	0.05	2.021	ACCEPT
TOTAL KJELDAHL NITROGEN (N)	0.200	61	59	0.05	2.021	ACCEPT
TOTAL ORGANIC CARBON (T)	0.903	64	62	0.05	2.000	ACCEPT
TOTAL SUSPENDED SOLIDS, LAB (T)	0.340	35	33	0.05	2.042	ACCEPT
TURBIDITY, LAB (N)	0.956	66	64	0.05	2.000	ACCEPT
URANIUM (D)	1.000	66	64	0.05	2.000	ACCEPT
URANIUM (T)	0.887	66	64	0.05	2.000	ACCEPT
VANADIUM (D)	0.429	34	32	0.05	2.042	ACCEPT
VANADIUM (T)	0.950	42	40	0.05	2.021	ACCEPT
ZINC (D)	0.280	57	55	0.05	2.021	ACCEPT
ZINC (T)	0.953	63	61	0.05	2.000	ACCEPT

*All sample results remained below detection limits for both sample locations.

Appendix K – ERX Data Compared Against B.C. Water Quality Guidelines for Wildlife

Sample Site	Sample Date	Chemical Name	Reporting Detection Limit	Result Units	BCWQG for Protection of Wildlife*	DISSOLVED Results	N/A Results	TOTAL Results
LC_ERX	6/29/2023	ALUMINUM	0.0020	mg/l		< 0.0020		
LC_ERX	6/29/2023	ALUMINUM	0.0060	mg/l	**5**			< 0.0060
LC_ERX	6/29/2023	ARSENIC	0.00020	mg/l	**0.025**	< 0.00020		0.00028
LC_ERX	6/29/2023	BORON	0.020	mg/l	**5**	0.075		0.082
LC_ERX	6/29/2023	CHLORIDE	0.50	mg/l	**600**	390		
LC_ERX	6/29/2023	COPPER	0.00040	mg/l		< 0.00040		
LC_ERX	6/29/2023	COPPER	0.00100	mg/l	**300**			< 0.00100
LC_ERX	6/29/2023	FLUORIDE	0.100	mg/l	**1.0**		0.203	
LC_ERX	6/29/2023	LEAD	0.000100	mg/l	**0.00005**	< 0.000100		< 0.000100
LC_ERX	6/29/2023	MOLYBDENUM	0.000100	mg/l	**0.00005**	0.00525		0.00542
LC_ERX	6/29/2023	NITRATE NITROGEN (NO3), AS N	0.0250	mg/l	**100**		0.313	
LC_ERX	6/29/2023	NITRITE NITROGEN (NO2), AS N	0.0050	mg/l	**100**		0.0123	
LC_ERX	6/29/2023	NITROGEN, AMMONIA (AS N)	0.0050	mg/l	**100**			0.508
LC_ERX	6/29/2023	SELENIUM	0.100	ug/l	**2**	0.990		0.752
LC_ERX	10/17/2023	ALUMINUM	0.0020	mg/l		< 0.0020		
LC_ERX	10/17/2023	ALUMINUM	0.0060	mg/l	**5**			< 0.0060
LC_ERX	10/17/2023	ARSENIC	0.00020	mg/l	**0.025**	< 0.00020		< 0.00020
LC_ERX	10/17/2023	BORON	0.020	mg/l	**5**	0.074		0.084
LC_ERX	10/17/2023	CHLORIDE	0.50	mg/l	**600**	451		
LC_ERX	10/17/2023	COPPER	0.00040	mg/l		< 0.00040		
LC_ERX	10/17/2023	COPPER	0.00100	mg/l	**300**			< 0.00100
LC_ERX	10/17/2023	FLUORIDE	0.100	mg/l	**1.0**		0.182	
LC_ERX	10/17/2023	LEAD	0.000100	mg/l	**0.00005**	< 0.000100		< 0.000100
LC_ERX	10/17/2023	MOLYBDENUM	0.000100	mg/l	**0.00005**	0.00475		0.00512
LC_ERX	10/17/2023	NITRATE NITROGEN (NO3), AS N	0.0250	mg/l	**100**		0.480	
LC_ERX	10/17/2023	NITRITE NITROGEN (NO2), AS N	0.0050	mg/l	**100**		0.0232	
LC_ERX	10/17/2023	NITROGEN, AMMONIA (AS N)	0.0250	mg/l	**100**			0.484
LC_ERX	10/17/2023	SELENIUM	0.100	ug/l	**2**	0.565		0.519
LC_ERX	10/26/2023	ALUMINUM	0.0020	mg/l		0.0024		
LC_ERX	10/26/2023	ALUMINUM	0.0060	mg/l	**5**			< 0.0060
LC_ERX	10/26/2023	ARSENIC	0.00020	mg/l	**0.025**	< 0.00020		< 0.00020
LC_ERX	10/26/2023	BORON	0.020	mg/l	**5**	0.079		0.082
LC_ERX	10/26/2023	CHLORIDE	0.50	mg/l	**600**		436	
LC_ERX	10/26/2023	COPPER	0.00040	mg/l		< 0.00040		
LC_ERX	10/26/2023	COPPER	0.00100	mg/l	**300**			< 0.00100
LC_ERX	10/26/2023	FLUORIDE	0.100	mg/l	**1.0**		0.184	
LC_ERX	10/26/2023	LEAD	0.000100	mg/l	**0.00005**	< 0.000100		< 0.000100
LC_ERX	10/26/2023	MOLYBDENUM	0.000100	mg/l	**0.00005**	0.00455		0.00461
LC_ERX	10/26/2023	NITRATE NITROGEN (NO3), AS N	0.0250	mg/l	**100**		0.398	
LC_ERX	10/26/2023	NITRITE NITROGEN (NO2), AS N	0.0050	mg/l	**100**		0.0251	
LC_ERX	10/26/2023	NITROGEN, AMMONIA (AS N)	0.0050	mg/l	**100**			0.529
LC_ERX	10/26/2023	SELENIUM	0.100	ug/l	**2**	0.746		0.634

Appendix L – LCO Hydrometric Program Report

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2023 LCO Hydrometric Program

Final Report
March 27, 2024
KWL Project No. 2544.078

Prepared for:

TECK COAL LIMITED – LINE CREEK OPERATIONS

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Tables

Figures

Appendices

1. Introduction

To satisfy permitting requirements, Teck Coal's Line Creek Operations (LCO) collects water quantity data at multiple locations on its operation. The data is collected by LCO resources throughout the field season. Kerr Wood Leidal Associates (KWL) is retained by LCO to provide hydrometric network oversite to the data collection and to provide yearly data assurance and reporting along with the data collected.

This report details LCO's 2023 Hydrometric Monitoring Program and data is presented for the period between January and December 2023 (the monitoring period).

1.1 Flow Monitoring Protocol

Teck Coal Limited (Teck) operates four active coal mines in southeastern British Columbia with a fifth mine, Coal Mountain Mine (CMm), in a care and maintenance status. Teck has been developing protocols to provide consistent monitoring and reporting protocols to satisfy permitting requirements. Teck's Flow Monitoring Protocol[1] outlines standard procedures for flow monitoring and provides information on equipment, measurement approaches, calculations, documentation, and quality control.

The collection of hydrometric data by LCO should be consistent with the 2017 Flow Monitoring Protocol Document as well as the most recent version of the Manual of British Columbia Hydrometric Standards[2].

1.2 Hydrometric Stations

The Line Creek hydrometric network includes twelve (12) active hydrometric stations (collecting continuous water level and/or discharge data). These sites are listed in Table 1 and locations are shown on Figure 1.

1.3 Staff Gauge Sites

In addition to hydrometric stations, LCO operates five sites where staff gauges have been installed and flows are measured periodically (no continuous water level data is collected). These sites and locations are also shown on Figure 1.

1.4 Roles and Responsibilities

LCO is responsible for collecting stage and discharge measurements throughout the year at each of its hydrometric stations and conducting regular maintenance of the sites (i.e. changing batteries). LCO field technicians also collect manual discharge measurements as part of the mine water quality sampling program.

KWL conducts one site visit per year to maintain the hydrometric stations (e.g., survey benchmarks, check equipment, etc.) and make any necessary adjustments or station equipment repair. In addition, KWL performs monthly quality assurance/quality control checks on the continuous water level data. KWL completes an annual review of the manual stage-discharge data collected by local LCO

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[1] KWL, 2017. *Flow Monitoring Protocol*. Report prepared for Teck Coal Limited. (KWL Project 2628.033).

[2] Ministry of Environment and Climate Change Strategy Knowledge Management Branch. December 2018. *Manual of British Columbia Hydrometric Standards*, Version 2.0 (Resources Information Standards Committee), 2018.

resources (LCO staff and other consultants). KWL develops or refines stage-discharge curves for each of the stations based on manual stage-discharge measurements.

Table 1: LCO Hydrometric, Climate, and Staff Gauge Site Summary

Monitoring Station ID	Station	Water Level Sensor	Stream Section	Status	Period of Record
LC_LC1	Hydrometric	Pressure Transducer	Open Channel	Active	June 2010 to present
LC_LC2	Hydrometric	Pressure Transducer	Open Channel	Active	Nov 2009 to present
LC_LC7	Staff Gauge	N/A	Weir	Active	N/A
LC_LCDS-LC2	Hydrometric (Water Level Only)	Pressure Transducer	Open Channel	Active	June 2010 to present (water level only)
LC_LC9	Staff Gauge	N/A	Weir	Active	N/A
LC_WLC	Hydrometric	Pressure Transducer	Weir	Active	Nov 2009 to present
LC_LC3	Hydrometric	Pressure Transducer	Open Channel	Active	Nov 2009 to present
LC_SLC	Staff Gauge	N/A	Open Channel	Active	N/A
LC_LCDSSLCC	Hydrometric	Bubbler	Open Channel	Active	July 2016 to present
LC_DC3	Hydrometric	Pressure Transducer	Open Channel	Active	August 2019 to present
LC_DCEF	Hydrometric	Bubbler and Pressure Transducer	Open Channel	Active	May 2012 to present
LC_SPDC	Hydrometric	Flowmeter	Pipe	Active	March 2015 to present
LC_DCDS	Hydrometric	Pressure Transducer	Open Channel	Active	Jan 2016 to present
LC_DC4	Hydrometric	Pressure Transducer	Open Channel	Active	August 2019 to present
LC_DC1	Hydrometric	Bubbler and Pressure Transducer	Open Channel	Active	July 2011 to present
LC_GRCK	Staff Gauge	N/A	Open Channel	Active	N/A
LC_UC	Staff Gauge	N/A	Open Channel	Active	N/A

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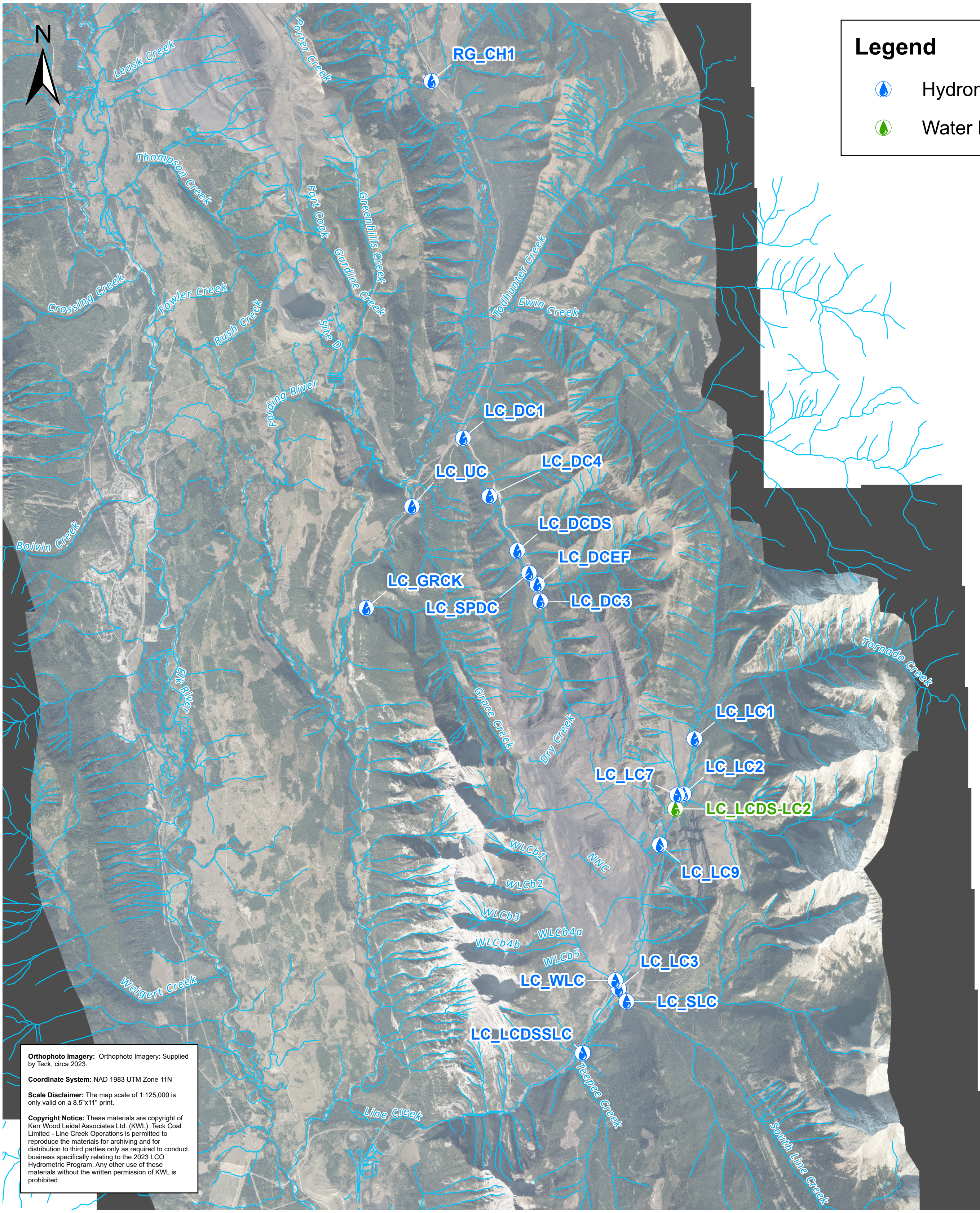
Teck Resources Limited - Line Creek Operations

2023 LCO Hydrometric Program

KERR WOOD LEIDAL
consulting engineers



Project No.	2544.078
Date	March 2024
Scale	1:125,000

0 1 2 4 Kilometers

LCO Hydrometric Station Locations

Figure 1

2. Stage-Discharge Relationships

2.1 Background

Each of LCO's hydrometric stations includes a continuous water level sensor and a staff gauge. Discharge is not measured directly by the sensors. Discharge is related to water level at the staff gauge through manual discharge measurements and the development of a stage-discharge relationship (SDR). At the remaining LCO stations there is no continuous water level sensor, but a staff gauge has been installed to allow for the development of a SDR at each station.

Stage-discharge relationships are created by measuring instantaneous discharge at different water levels and relating the measured discharge to water level on a fixed staff gauge. Measured flows are plotted against the associated stages, and a curve relating the two is fit through the plotted points (the SDR).

KWL uses a maximum-likelihood analysis method for creating SDRs. Discharge points are assigned an uncertainty value based on criteria outlined in the *Manual of British Columbia Hydrometric Standards*. The discharge measurements performed by LCO generally meet 'Class B' and 'Class C' hydrometric data standards (refer to Table 2 for a list of data quality indicators) and are typically assigned an uncertainty value of +/-15% to +/- 25%, respectively. A best-fit power law curve is generated to describe the relationship between measured discharge and stage.

Once a SDR has been developed for a given site, stage-discharge measurements are performed annually to confirm that the existing curve is representative of current channel conditions. Channel changes such as sediment deposition or erosion (typically caused by major flow events) can result in the need for a new SDR to be developed.

2.2 Offsets

SDRs reference the water level on the staff gauge (the stage) that is recorded by field crews at the time of each discharge measurement. Due to many factors (sensor drift, logger movement, environmental factors etc.) the logger values typically vary slightly from the staff gauge readings (less than 1 cm is typical). LCO staff record the staff gauge and sensor water level readings during each site visit. This data is used to calculate the visit offset values which are then applied during the post processing procedure to correct the water level time series data.

2.3 Station Datums

Each station uses a local datum to which stage values are referenced. Typically, the bottom of the station staff gauge is assigned the assumed value of 0.000 m to which all station benchmarks are referenced (station datum). The station benchmarks (three stable benchmarks) are surveyed each year to document any movement to them or the staff gauge; this was performed in 2023 by KWL for all the LCO stations discussed in this report.

2.4 Field Data Collection

Discharge Measurements

As mentioned previously, the collection of hydrometric data by LCO should be consistent with the *Flow Monitoring Protocol*. Table 2 summarizes discharge data quality indicators corresponding to different grades of hydrometric data according to the British Columbia Hydrometric Standards (also referred to as RISC). In general, LCO attempts to collect hydrometric data consistent with RISC Grade B standard, as follows:

- minimum three benchmarks per station;
- discharge measurements consist of 20 or more vertical panels (for open-channel-style measurements);
- vertical panels are spaced so that no one panel contains more than 10% of the total flow (note that even spacing may not achieve this criterion);
- three or more manual flow measurements are collected per year over an adequate range of streamflows; and
- two or more level checks are completed per year or at least once per year when the reference gauge and benchmarks have been documented to be stable.

Vertical Panels

As mentioned above, spacing should be adjusted such that the discharge measured in any one vertical panel does not exceed 10%. Practically speaking, this means tighter panel spacing in areas of the stream where the flow is concentrated; collecting evenly spaced verticals may not achieve this criterion.

Relatively narrow wetted stream widths will require fine spacing to achieve 20 verticals. Tight spacing of verticals can be achieved using an electromagnetic-type velocity meter (such as the Marsh McBirney brand) or Acoustic Doppler Velocimeters (ADV). Propeller type meters have a minimum spacing limit; this should be considered when making tightly spaced velocity measurements.

Improving the Measurement Section

Personnel making discharge measurements are encouraged to make improvements to the measurement cross-section to improve the hydraulic conditions. Improvements may include the following actions:

- removing large rocks and debris from the section, and immediately upstream;
- removing weeds; and
- concentrating into a single channel the flow when low water levels cause a braided channel.

The intent of improving the measurement section is to improve the accuracy of the discharge measurement; these changes should not affect the local hydraulic control and the station stage measured by the staff gauge (note the stage before and after any improvements to confirm there is no effect).

After improvements are made, allow sufficient time for conditions to stabilize before proceeding with the discharge measurement. Importantly, all improvements to the metering section should be completed before starting the measurement: do not make changes to the metering section (such as moving rocks) during the discharge measurement.

Stage Measurements

Except at very low flows, the water level surface in a creek or river is rarely flat (streams naturally surge with time). As such, there is uncertainty associated with the stage measurement that needs to be incorporated into the SDR.

KWL suggests that the following field procedures be adopted when reading staff gauges:

- Observe the water level at the staff gauge for a sufficient period to observe any pattern in stage fluctuations at the time of measurement (e.g., 30 seconds);
- Make a ‘best estimate’ of the average stage (i.e., the stage around which the fluctuations are centered, or what the water level would be if the surface were flat);
- Record an estimate of the range of stage fluctuation (e.g., best estimate is 0.3 m, water level fluctuated between 0.295 m and 0.305 m); and
- If possible, record a short (e.g., 10-15 second) video rather than a photo to document the observed stage: a video provides far more accurate confirmation of the field conditions than photos, which rarely capture the ‘real’ stage value.

Channel Condition

Stream channel condition is also a factor in the grade that is assigned to the data. This factor can only be controlled through careful station siting to avoid locations with unstable beds or other hydraulic challenges.

Table 2: Summary of Discharge Data Quality Indicators for Field Procedures

Data Quality Indicator	Standard Grade for Discharge Data					
	Grade A/RS	Grade A	Grade B	Grade C	Grade E (Estimated)	Grade U (Unknown Data Quality)
Field Procedure						
Minimum Number of Benchmarks	3	3	3	3	See notes below	Undefined
Number of Verticals in Manual Flow Measurements When Current Meter is Used	N/A	20 or more (if sufficient channel width to meet minimum flow meter panel widths) and not more than 10% of total flow in each panel	20 or more (if sufficient channel width to meet minimum flow meter panel widths) and not more than 10% of total flow in each panel	10 or more (if sufficient channel width to meet minimum flow meter panel widths) and not more than 20% of total flow in each panel		
Number of Manual Flow Measurements Per Year	Minimum of one field measurement for rating verification	5 or more over adequate range of streamflows	3 or more over adequate range of streamflows	2 or more over adequate range of streamflows		
Number of benchmark elevation and ref. gauge elevation level checks per year	2 or more, or at least once when ref. gauge and the benchmarks have been documented to be stable	2 or more, or at least once when ref. gauge and the benchmarks have been documented to be stable	2 or more, or at least once when ref. gauge and the benchmarks have been documented to be stable	1 or more		
Data Calculation & Assessment						
Discharge rating accuracy /Rating curve shift deviation threshold	<5%	<7%	<15%	<25%	See notes below	Undefined
Data and calculation reviewed for anomalies	Yes	Yes	Yes	Yes		
Results are compared with other stations and/or other years for consistency	Yes	Yes	No	No		

Notes:
Hydrometric data should be graded as "E" (i.e., Estimated) when stations were operated using RISC Standards (i.e., water level or discharge data could be either Grade A/RS, A, B or C but data were estimated because of instrument anomalies, shift correction, missing data or rating curve extrapolation beyond measured discharge level). Hydrometric data should be graded as "U" (i.e., Unknown data quality), when RISC Hydrometric Standards are not followed for data collection and/or data quality is unknown.

Source: Table 1: Standards Requirement Criteria (MoE, 2018).

3. 2023 Station Work

A summary of 2023 hydrometric work is provided below for each station. Appendices at the end of this report contain the following information for each station:

- a list of replaced/repaired equipment (if applicable);
- a list of missing data (for stations with water level sensors);
- a list of manual discharge measurements for 2023 (if applicable);
- average monthly discharge data (for stations with water level sensors);
- an annual hydrograph (for stations with water level sensors);
- the station SDR; and
- summary of average daily discharge (if applicable).

3.1 LC_LC1

LC1 is located on Line Creek upstream of mine influence; this monitoring location is also used to sample water quality parameters representative of background (non-mine-influenced) conditions. In June 2020, the station was upgraded with a Sutron XLink Logger, OTT PLS Pressure transducer, and solar panels.

The station performed well in 2023.

LC1 SDR

During the 2023 monitoring period, LCO performed three discharge measurements (two Grade B, one Grade C) and KWL performed one Grade B measurement.

2023 measurements indicate a channel scour occurred during the winter 2022/2023 period, both the pre-freshet measurement and post-freshet measurement plot similarly off the previous SDR. With only four measurements in 2023 there were insufficient points to develop a new SDR and the 2022 SDR was shifted to the 2023 measurements. All 2023 station data is graded E for this reason. Caution should be used with higher flows as there are no 2023 measurements to confirm this portion of the SDR.

As the channel at this location has become unstable, it is recommended that LCO perform six to ten manual measurements in 2024 that cover the full range of the station’s water levels to allow for construction of a new SDR equation.

Appendix A presents summary hydrometric data for LC1.

3.2 LC_LC2

LC2 is located on Line Creek downstream of LC1 and upstream of the Line Creek rock drain. At this location, the creek is influenced by mining activities. In June 2020, the station was upgraded with a Sutron Xlink Logger, OTT PLS Pressure transducer, and solar panels.

The station performed well in 2023.

LC2 SDR

During the 2023 monitoring period, LCO performed six discharge measurements (five Grade B, one Grade C) and KWL performed one discharge measurement (Grade B). The 2023 measurements suggest a deviation at the low end of the 2022 SDR, as the staff gauge is approximately 2 m upstream of the start of the concrete control sill, this deviation suggests that rocks may have been moved in the section of natural channel upstream of the concrete sill. For this reason, the SDR was refined to reflect these changes.

Appendix B presents summary hydrometric data for LC2.

3.3 LC_LC7

The LC7 site is the authorized discharge point located downstream of the MSA North Ponds which decant to a collector ditch located immediately upstream of the Line Creek Rock Drain. A concrete weir structure controls the flow, and a staff gauge is affixed to the face of the structure. LC7 is a staff gauge site, no continuous water level data are collected at this site.

LC7 SDR

LC_LC7 discharge values are calculated using a weir equation. During 2023, three manual discharge measurements were performed by LCO (one Grade B and two Grade C).

There is significant scatter in the 2023 and historic discharge measurements at this station. We suggest that additional notes/pictures be taken at the time of site visits to document channel conditions to provide an explanation of the measurement scatter. Additionally, the crest of the weir should be cleaned if aquatic growth is noted by the field crews.

Because the measurements over the past few years have consistently plotted off the theoretical weir equation (i.e., theoretical weir equation is over-estimating flows), the equation was shifted in 2022 to provide more accurate calculated measurement values. The 2023 measurements generally confirm this 2022 shift and the 2022 SDR was retained for 2023. The data grade of the SDR remains C for 2023 due to the uncertainty with the SDR.

Affixing a sharp-crested weir plate to the face of the existing broad-crested concrete weir structure could be considered to improve the station accuracy.

Appendix C presents summary hydrometric data for LC7.

3.4 LC_LCDS-LC2

LCDS-LC2 is located on Line Creek downstream of station LC2 and the MSAN ponds and upstream of LC3. This is the last monitoring station before water flows into the Line Creek rock drain. Given proximity to the rock drain, this station is regularly backwatered throughout the spring months. The purpose of this station is to indicate water elevation of the pool that forms when Line Creek is backwatered during freshet by the capacity of the rock drain inlet.

LCDS-LC2 SDR

No discharge measurements are collected at this station and no SDR is created.

Stage data when the station was backwatered in 2023 are presented in Appendix D.

3.5 LC_LC9

LC9 is the authorized discharge point located at the spillway from the No Name Creek diversion and sediment pond to the Line Creek rock drain, upstream of the rock drain. A broad concrete weir structure regulates flow from the pond system. The staff gauge is located approximately 5 m downstream of the structure in a decant channel. LC9 is a staff gauge site, no continuous water level data are collected at this site.

LC9 SDR

Site visits throughout 2023 confirmed that no flow occurred in 2023.

3.6 LC_WLC

The West Line Creek (WLC) hydrometric station is located at a concrete structure downstream of the West Line Creek rock drain, and immediately upstream of the active wastewater treatment facility (AWTF) intake. Flow at WLC passes through a 120^{o} sharp crested V-notch weir. The station consists of a Sutron Xlink 500 logger connected to an OTT PLS pressure transducer, and solar panel.

The water level sensor failed from February 21 – April 2, 2023 and erroneous data was removed from the record. KWL replaced the sensor and the station performed well for the remainder of 2023.

WLC SDR

During 2023, KWL performed five manual discharge measurements (three Grade C, two Grade E). The flow measurement section is not conducive to accurate measurements however the SDR has remained stable over the years (as expected with an engineered structure); for this reason, the SDR is graded B.

Appendix E presents summary hydrometric data for WLC.

3.7 LC_LC3

LC3 is located downstream of the Line Creek rock drain and the West Line Creek Confluence. The hydrometric station is located above a trapezoidal section of engineered concrete channel. The station consists of a Sutron Xlink Logger, OTT PLS pressure transducer, and solar panels.

The station performed well during the 2023 monitoring period with no significant data removed.

LC3 SDR

During the 2023 monitoring period, LCO performed five discharge measurements (all Grade B) and KWL performed six discharge measurements (all Grade B).

A new vertical staff gauge was installed in 2022, and the 2023 SDR is a continuation of the new SDR development. Good agreement with manual measurements confirms the SDR equation and it is graded B.

Appendix F presents summary hydrometric data for LC3.

3.8 LC_SLC

The South Line Creek site is located about 500 m upstream of the confluence with Line Creek. The site is accessed off the South Line Creek Forest Service Road. A new, staff gauge was installed by KWL in April 2022.

LC_SLC SDR

During the 2023 monitoring period, LCO performed nine manual discharge measurements (eight Grade B and one Grade C) and KWL performed six discharge measurements (four Grade B and two Grade C). Due to extensive channel reconfigurations, the staff gauge was out of water for large portions of the year. A new SDR was developed in 2023 by measuring down from the lowest part of the staff gauge to determine a negative stage value for low-flow measurements (at some visits the staff gauge photos were used to determine this negative stage with calibrated software). Due to uncertainties with this technique and measurement scatter, the SDR has been graded E.

Appendix G presents summary hydrometric data for SLC.

3.9 LC_LCDSSLC

Line Creek downstream of South Line Creek Confluence (LCDSSLCC) is located on Line Creek about 1,200 m downstream of the South Line Creek Confluence and is the permit compliance location for LCO. This station consists of an FTS Axiom Logger and a Waterlog H-3553 Bubbler sensor.

The station performed well in 2023.

LCDSSLC SDR

During the 2023 monitoring period, LCO performed six manual discharge measurements (all Grade B), and KWL performed six discharge measurements (all Grade B).

The 2023 measurements were used to refine the 2022 SDR as a clear channel re-configuration is noted. The SDR is graded B below a stage value of 0.350 m and graded C above due to the low number of higher flow measurements performed. Additional measurements at higher flows in 2024 will allow for further refinement of the high end of the curve.

LCDSSLC data is presented in Appendix H.

3.10 LC_DC3

DC3 is located on Dry Creek immediately upstream of the head pond/intake for the Dry Creek Settling Ponds. The station consists of a staff gauge, a Sutron Xlink Logger and Ott PLS-C pressure sensor that was installed in August 2019. A new staff gauge was installed at this site in 2022.

The station performed well in 2023.

DC3 SDR

During the 2023 monitoring period, LCO performed five manual discharge measurements (three Grade B, one Grade C, and one Grade E), and KWL performed six manual discharge measurements (one Grade B, four Grade C, and one Grade E).

The 2022 SDR was retained prior to freshet. The grade pre-freshet is E due to a lack of measurements used to confirm the old curve. Manual measurements post-freshet indicates a clear channel re-configuration occurred, and a new SDR has been developed. This new post-freshet SDR is Grade C due to a minimum number of measurements to develop the SDR. There is a transition period between rating curves (May 3rd to May 17th) where data is graded E due to uncertainty of new SDR timing and the lack of measurements over freshet.

Appendix I presents summary hydrometric data for DC3.

3.11 LC_DCEF

The Dry Creek East Fork (DCEF) hydrometric station is located on a tributary to Dry Creek known as East Fork. The hydrometric station is located immediately downstream of the Dry Creek Forest Service Road (FSR) bridge about 110 m upstream of the confluence with Dry Creek. This station consists of an FTS Axiom Logger and a Waterlog H-3553 Bubbler sensor. An OTT PLS-C pressure transducer (conductivity included on this sensor) was added in 2019. In 2023 the staff gauge plate was replaced to improve readability at low water levels.

Upon year-end data review, it was discovered that the pressure transducer data was suspect in 2023, and the decision was made to switch to the bubbler data as the preliminary water level sensor.

DCEF SDR

During the 2023 monitoring period, LCO performed seven manual discharge measurements (five Grade B, and two Grade C), and KWL performed six manual discharge measurements (two Grade B and four Grade C).

The replacement of the staff gauge plate meant a datum change occurred and all 2023 measurements prior to the replacement date (July 25th, 2023) now reference the new staff gauge. There was reasonable agreement with the previous 2022 SDR; however, a new SDR was developed in 2023 to refine the lower end. Although the new SDR is graded C, issues with the bubbler at site (excessive painting trace) lead to a downgrade to E for the station data.

Appendix J presents summary hydrometric data for DCEF.

3.12 LC_SPDC

The Setting Ponds at Dry Creek (SPDC) hydrometric station (a electromagnetic flowmeter) is located on the discharge pipe of the Dry Creek Settling Ponds, immediately before it discharges to an open channel to Dry Creek.

The station performed well in 2023.

SPDC SDR

The flowmeter measures flow directly, therefore there is no station SDR to be generated. During the 2023 monitoring period, KWL performed four MantaRay measurements (Grade B). These manual measurements agree well with the Flowmeter data.

Data from the SPDC Flowmeter is presented in Appendix K.

3.13 LC_DCDS

The Dry Creek Downstream of Settling Ponds (DCDS) site is located on Dry Creek immediately downstream of the Dry Creek Settling Pond outflow confluence with Dry Creek. This location captures flow from DCEF, the Dry Creek Settling Ponds and any flow bypassing the settling ponds via the head pond spillway. This station consists of an FTS Axiom Logger and an OTT PLS-C pressure transducer (conductivity included on this sensor).

The station performed well in 2023.

DCDS SDR

During the 2023 monitoring period, LCO performed five manual discharge measurements (four Grade B, and one Grade C), and KWL performed six manual discharge measurements (four Grade B, two Grade C).

The previous SDR was refined with 2023 points and a new SDR developed. The 2023 manual measurements show good agreement with the new SDR and is graded B.

Appendix L presents summary hydrometric data for DCDS.

3.14 LC_DC4

DC4 is located on Dry Creek midway between DCDS and DC1. The station consists of a staff gauge, a Sutron Xlink Logger and Ott PLS-C pressure sensor, which was installed in August 2019.

The station performed well in 2023.

DC4 SDR

During the 2023 monitoring period, LCO performed two manual discharge measurements (Grade B), and KWL performed six manual discharge measurements (five Grade B, one Grade C).

The previous SDR was refined with 2023 points and a new SDR developed. The 2023 manual measurements show good agreement with the new SDR and is graded B.

Appendix M presents summary hydrometric data for DC4.

3.15 LC_DC1

The Dry Creek (DC1) hydrometric station is located upstream of the confluence of Dry Creek and the Fording River. This station was installed to monitor the flow regime of Dry Creek prior to development of mine operations in the headwaters of the watershed. This station consists of an FTS Axiom Logger, a Waterlog H-3553 Bubbler sensor, and an OTT PLS-C pressure transducer (conductivity included on this sensor).

The OTT PLS-C pressure transducer failed on September 6, 2023, and was replaced by KWL on December 6, 2023. During this timeframe, the bubbler sensor was also reporting erroneous values and thus no data is presented during this period. The station performed well until the pressure transducer sensor failed.

DC1 SDR

During the 2023 monitoring period, LCO performed seven manual discharge measurements (five Grade B, and two Grade C), and KWL performed six manual discharge measurements (four Grade B, two Grade C).

The 2022 SDR was retained prior to the 2023 freshet. The grade pre-freshet is E due to a lack of pre freshet measurements that would confirm the old SDR. Manual measurements indicate a clear channel re-configuration occurred during the 2023 freshet and a new SDR has been developed. Measurements below a stage reading of 0.450 m are scattered relative to the new SDR warranting an SDR grade of E below this level. Above 0.450 m, there is better agreement of measurements, thus the SDR is graded C.

Appendix N presents summary hydrometric data for DC1.

3.16 LC_GRCK

The Grace Creek site is located approximately 1.5 km up the Grace Creek FSR (accessed via Fording Mine Road FSR) upstream of the CP rail tracks. Grace Creek is not mine influenced and is a tributary to the Fording River. The staff gauge is on the low side of the road, immediately downstream of the culvert. LC_GRCK is a staff gauge site, no continuous water level data are collected at this site.

GRCK SDR

During the 2023 monitoring period, LCO performed five manual discharge measurements (four Grade B and one Grade E). The previous SDR has been retained but is graded E due to the amount of scatter.

Appendix O presents summary hydrometric data for GRCK.

3.17 LC_UC

The Unnamed Creek (UC) site is located approximately 670 m south from the Fording River Road along the Fording FSR. Unnamed Creek is not mine-influenced and is a tributary to the Fording River. The staff gauge is located on the downstream side of the CP Rail tracks just below the culvert which conveys water under the tracks. No continuous water level data are collected at this site.

UC SDR

During the 2023 monitoring period, LCO performed eight volumetric flow measurements (two Grade C and six Grade E). The existing data points for UC plot over a relatively small vertical range (stage) and large horizontal range (discharge) meaning an SDR cannot be created for this site.

Manual flow measurements (encompassing a wider range of water levels) should continue to be collected at this site until an SDR can be developed. Care should be taken to read the staff gauge to the millimeter and perform volumetric measurements over a period of at least 10 seconds in the hope that an SDR can be generated.

Appendix P presents summary hydrometric data for LC_UC.

4. Summary of SDRs

4.1 Rating Curve Equations

Table 3 provides a summary of the SDR equations for the active LCO sites.

Table 3: Stage-Discharge Relationship Summary for LCO Sites

Monitoring Station ID	SDR Revised Since 2022	Stage-Discharge Relationship
LC_LC1	Yes	Discharge = 37.750*(Stage - 0.184)$^{2.960}$
LC_LC2	Yes	Discharge = 18.514*(Stage - 0.450)$^{2.212}$
LC_LC7	No	Discharge = 1.838*(2.0066 - ((Stage+(-0.02))*0.2))*(Stage+(-0.02))$^{1.5}$
LC_LC9	No	Discharge = 2.45*(Stage + 0.38)$^{5.98}$

Monitoring Station ID	SDR Revised Since 2022	Stage-Discharge Relationship
LC_WLC	No	Discharge = 2.390*(Stage - 0.408)$^{2.500}$
LC_LC3	Yes	Discharge = 34.656*(Stage - 0.186)$^{1.913}$
LC_SLC	Yes	Discharge = 15.911*(Stage + 0.231)$^{2.803}$
LC_LCDSSLCC	Yes	Discharge = 65.017*(Stage - 0.191)$^{2.121}$
LC_DC3	Yes	<u>Pre-Freshet Discharge (January 1 – May 3, 2023):</u> Discharge = 10.525*(Stage - 0.030)$^{2.325}$ <u>Post-Freshet Discharge (May 3 – December 31, 2023):</u> Discharge = 52.432*(Stage - 0.044)$^{3.190}$
LC_DCEF	Yes	Discharge = 5.476*(Stage + 0.003)$^{2.393}$
LC_SPDC[a]	N/A	N/A
LC_DCDS	Yes	Discharge = 7.570*(Stage + 0.019)$^{2.184}$
LC_DC4	Yes	Discharge = 8.372*(Stage + 0.016)$^{2.018}$
LC_DC1	Yes	<u>Pre-Freshet Discharge (January 1 – April 29 [17:00] 2023):</u> Discharge = 14.891*(Stage – 0.348)$^{1.689}$ <u>Post-Freshet Discharge (April 29 [17:45] – December 31, 2023):</u> Discharge = 376.446*(Stage - 0.322)$^{3.736}$
LC_GRCK	No	Discharge = 2.195*(Stage + 0.008)$^{1.139}$
LC_UC[b]	N/A	N/A

Notes:
a. Flowmeter site, no SDR.
b. No SDR created due to excessive scatter in available data.

SDRs are based on 'free discharge' conditions: curves are not valid during ice cover. If freezing of the water surface occurs, these conditions should be documented and the SDR should not be applied.

4.2 Recommended Upper Limit of Applicability

The recommended upper limit of applicability for each SDR is an indication of how far the curve should be extrapolated beyond the highest discharge measurement. An industry standard is to extrapolate to the lowest of:

- two times the highest discharge measurement; or
- the next major change in channel geometry <u>not</u> captured by discharge measurements (e.g., top of bank).

Table 4 summarizes the recommended upper limit of applicability for each of the LCO SDRs.

4.3 Data Gaps

Stage-discharge relationships should be refined annually as more discharge measurements are collected. The equations in Table 3 represent the estimated channel conditions for 2023 but some SDRs have gaps in discharge measurement information at various stages (i.e., a manual discharge measurement is required at one or more creek levels).

Table 4 lists major gaps in the manually measured flows. Manual flow measurements at each site should be continued over the next monitoring year to confirm that the SDR relationships remain valid and should target the observed gaps. Future discharge measurements should target these gaps (subject to 2024 flow values and field crew availability) to refine the SDRs and to be able to confidently extend them to capture the entire range of flow at each site.

Table 4: Recommended Upper Limit of Applicability Summary

Monitoring Station ID	Recommended Upper Limit of Applicability	Recommended Upper Limit of Applicability (m^3/s)	SDR Gaps
LC_LC1	2x highest discharge measurement	1.33	Entire range of flows to address channel instability
LC_LC2	2x highest discharge measurement	3.62	Flows above 0.2 m^3/s (approximate corresponding staff gauge reading 0.585 m)
LC_LC7	Top of weir	N/A	Entire range of flows to continue to confirm weir equation and explain measurement scatter
LC_LC9	2x highest discharge measurement	N/A	Entire range of flows. Station was dry in 2023
LC_WLC	Top of weir plate [a]	1.1	Entire range of flows to confirm weir is functioning as expected
LC_LC3	2x highest discharge measurement	6.8	Flows above 1.5 m^3/s (approximately corresponding staff gauge reading 0.375 m)
LC_SLC	2x highest discharge measurement	7.4	Entire range of flows to refine SDR.
LC_LCDSSLCC	2x highest discharge measurement	12.3	Flows above 1.3 m^3/s (approximately corresponding staff gauge reading 0.345 m)
LC_DC3	2x highest discharge measurement	0.4	Entire range of flows to refine SDR
LC_DCEF	2x highest discharge measurement	0.6	Entire range of flows to address channel instability
LC_SPDC	Maximum rating of flowmeter	Unknown	N/A
LC_DCDS	2x highest discharge measurement	0.86	Flows above 0.170 m^3/s (approximately corresponding staff gauge reading above 0.150 m)
LC_DC4	2x highest discharge measurement	1.2	Entire range of flows to refine SDR

Monitoring Station ID	Recommended Upper Limit of Applicability	Recommended Upper Limit of Applicability (m^3/s)	SDR Gaps
LC_DC1	2x highest discharge measurement	1.4	Entire range of flows to address channel instability
LC_GRCK	Point at which flow measurements no longer correlate [b]	0.441	All range of flows

Notes:
a. The SDR is invalid above the top of the weir plate. Manual measurements must be obtained to accurately estimate discharge values for water levels that overtop the weir plate.
b. Recommended limit of applicability has been lowered due to uncertainty at higher stages.

5. Average Monthly Discharge

A list of average daily discharge values for each site is included in the corresponding appendices. Average monthly discharges are summarized in Table 5.

Table 5: Monthly Average Discharge Summary

Monthly Average Discharge (m^3/s)											
Month	LC1	LC2	LC3	WLC	LCDSSLCC	DC1	DC3	DC4	DCEF	DCDS	SPDC Flowmeter
Jan	-	0.054	0.411	0.036	0.471	0.069	0.033	0.046	-	0.034	0.049
Feb	-	0.049	0.305	0.033	0.380	0.035	-	0.052	-	-	0.045
Mar	-	0.047	0.260	-	0.339	0.024	0.043	0.068	-	-	0.050
Apr	-	0.093	0.378	0.035	0.669	0.159	0.116	0.204	0.036	0.118	0.133
May	0.902	1.085	2.947	0.113	4.831	0.838	0.239	0.581	0.324	0.483	0.267
Jun	0.561	0.662	1.318	0.079	2.471	0.223	0.100	0.239	0.076	0.190	0.148
Jul	0.165	0.259	0.687	0.054	1.025	0.141	0.060	0.138	-	0.107	0.111
Aug	0.084	0.091	0.373	0.046	0.694	0.036	0.045	0.079	-	0.052	0.074
Sep	0.132	0.143	0.494	0.039	0.805	-	0.052	0.066	-	0.050	0.070
Oct	0.094	0.095	0.386	0.035	0.666	-	0.049	0.051	-	0.052	0.061
Nov	0.046	0.075	0.405	0.034	0.564	-	0.039	0.046	-	0.043	0.054
Dec	0.007	0.054	0.294	0.032	0.521	0.037	0.034	0.046	-	0.031	0.051

6. Recommendations

Recommendations, to be performed by Teck, KWL or other consultants, for the continuation of the hydrometric monitoring program include:

1. Continue to obtain manual discharge measurements at all sites including sites with rated structures (a minimum of <u>three</u> per year). Specific recommendations for sites include:
   a. Obtain ten manual discharge measurements as possible at LC_SLC, LC_LC1, LC_DC1, LC_DC3 and LC_DCEF and LC_SLC throughout the range of the station water levels.
   b. Obtain five or more manual discharge measurements at LC_LC2 and LC_LC3 to confirm the SDR and/or refine the SDR with staff gauge readings from the vertical staff.
   c. Obtain five or more manual discharge measurements at LC_LCDSSLC to confirm the SDR and/or refine the SDR. Attempt to target high-end measurements.
   d. Obtain six to ten manual discharge measurements at LC_UC over the entire range of flows. The staff gauge should be read to the nearest millimetre to try and reduce the possible scatter in the data.
2. Lower the LC_SLC staff gauge or relocate to a location that is wetted year-round. (KWL to support).
3. Assess site conditions at LC_UC and confirm they are or are not suitable for developing an SDR at that location. Modify the measurement technique and site as required to improve measurement conditions and staff gauge readings as required.
4. Replace the pressure transducer at LC_DCEF.
5. In general, when possible, target gaps in SDR shown in Table 4 when scheduling manual discharge measurements. This will assist in refining the SDR and in validating extrapolated discharge measurements.
6. Refine field procedures to be consistent with Teck's *Flow Monitoring Protocol* (2017) and to improve the accuracy of stage measurements (see Section 2.3).
7. Continue documenting and submitting monthly updates to KWL of site activities to update offsets etc. as quickly as possible. This will improve the QA/QC process and provide improved preliminary data.
8. Compare manual measurements against the existing SDRs while in the field and inform KWL of any changes that may be starting to appear.
9. Complete an annual level tie-in survey that ties the staff gauges to local benchmarks at all stations to confirm the staff gauge is stable (KWL will complete during the annual site visit).
   a. Survey staff gauges and benchmarks at least twice per year at stations with staff gauge instability (LC_SLC, LC_LCDSSLC).
10. Continue to have monthly data reviews completed by KWL (or a qualified professional). This will assist with diagnosing problems and improve the availability of data by reducing station downtime.
11. Purchase and maintain a small inventory of equipment for future repair of stations. This will minimize the time stations are inactive due to equipment malfunction.

Report Submission

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Statement of Limitations

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Revision History

Revision #	Date	Status	Revision	Author
A	March 27, 2024	Final		MAC

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Appendix A

LC_LC1

Station Details			
Station Name:	**Line Creek upstream MSA North Pit**	**Reporting Year:**	**2023**
Site ID:	**LC_LC1**	**Station Type:**	Year-Round Continuous Data
EMS:	**E216142**	**Teck Mine:**	Line Creek Operation

Station Description:	LC1 is located on Line Creek in a location upstream of mine influence. The station consists of a real-time water level sensor, logger, and staff gauge.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	C
Rationale for Data Grade Recommendation (RSFMP)	Consistent with Compliance Monitoring (Q10 flow) data use.

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - April 30, 2023	M	Ice affected data removed from the record
April 30 - May 4, 2023	E	Station operated as expected. Discharge above the limit of maximum applicability.
May 5 - November 1, 2023	E	Station operated as expected
November 2- November 16, 2023	E	Station operated as expected, potential ice in channel
November 17- November 19, 2023	M	Ice affected data removed from the record
November 20- November 23, 2023	E	Station operated as expected, potential ice in channel
November 24- December 5, 2023	M	Ice affected data removed from the record
December 6- December 13, 2023	E	Station operated as expected, potential ice in channel
December 14- December 31, 2023	M	Ice affected data removed from the record

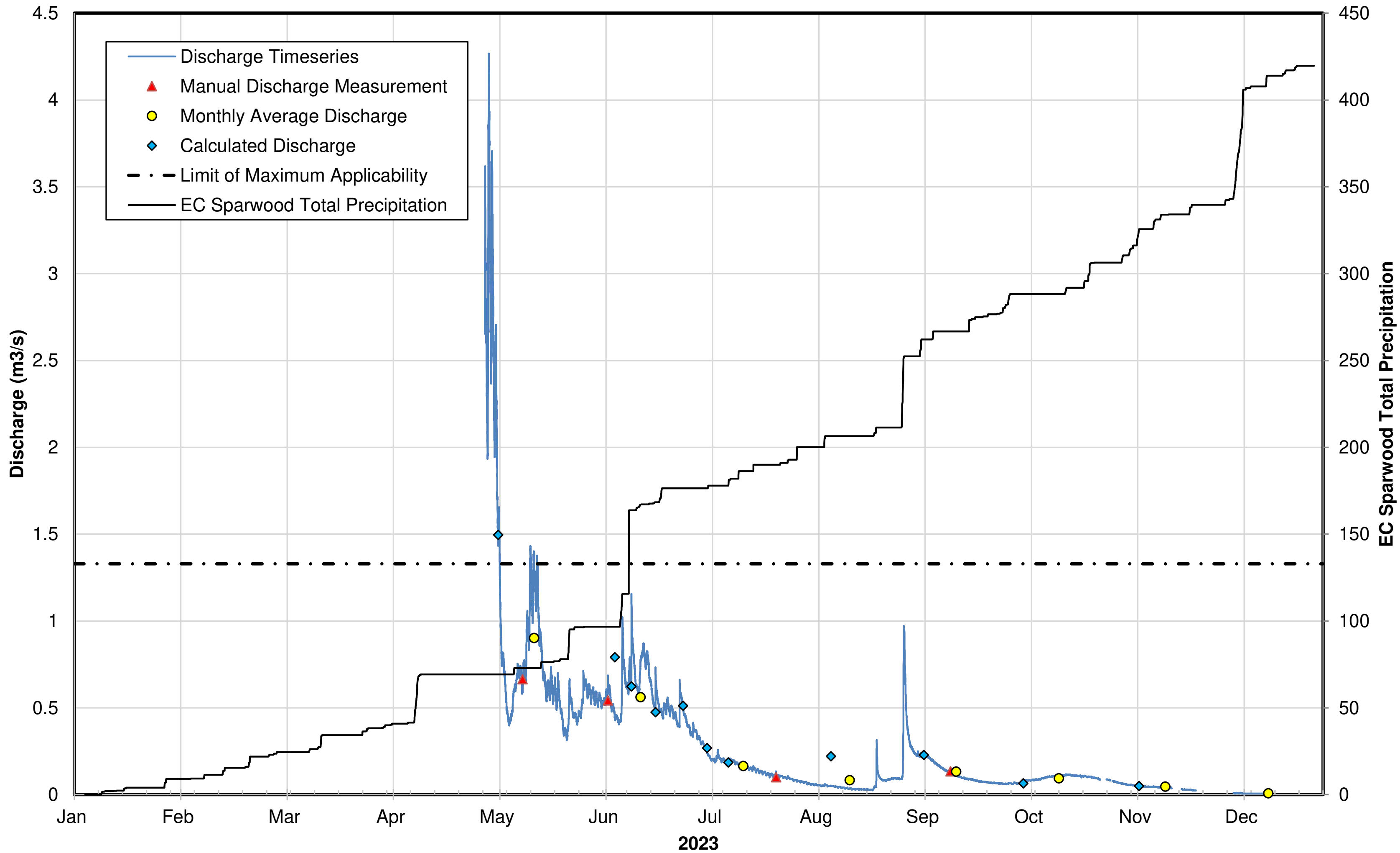
* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 31, 2023	-	-	-	-	-	-	Site confirmed frozen.
February 28, 2023	-	-	-	-	-	-	Site confirmed frozen.
March 31, 2023	-	-	-	-	-	-	Site confirmed frozen.
May 4, 2023	0.520	-	E	1.496	-	-	Calculated Discharge
May 11, 2023	0.430	0.664	B	0.594	0.070	11.8%	LCO Measurement, 24 Panels, Max 10%
June 5, 2023	0.430	0.543	B	0.594	-0.051	-8.7%	LCO Measurement, 25 Panels, Max 6%
June 7, 2023	0.455	-	E	0.792	-	-	Calculated Discharge. Suspect staff gauge.
June 12, 2023	0.434	-	E	0.623	-	-	Calculated Discharge
June 19, 2023	0.412	-	E	0.475	-	-	Calculated Discharge
June 27, 2023	0.418	-	E	0.513	-	-	Calculated Discharge
July 4, 2023	0.372	-	E	0.268	-	-	Calculated Discharge
July 10, 2023	0.350	-	E	0.186	-	-	Calculated Discharge
July 24, 2023	0.322	0.101	B	0.107	-0.007	-6.2%	KWL Measurement 25 Panels, Max 9%
August 9, 2023	0.360	-	E	0.221	-	-	Calculated Discharge. Suspect staff gauge.
September 5, 2023	0.362	-	E	0.228	-	-	Calculated Discharge
September 13, 2023	0.332	0.134	C	0.132	0.002	1.5%	LCO Measurement, 20 Panels, Max 11.3%
October 4, 2023	0.300	-	E	0.064	-	-	Calculated Discharge
November 7, 2023	0.290	-	E	0.049	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

* Grades A, B, C, E and U based on the BC RISC Standards Document.

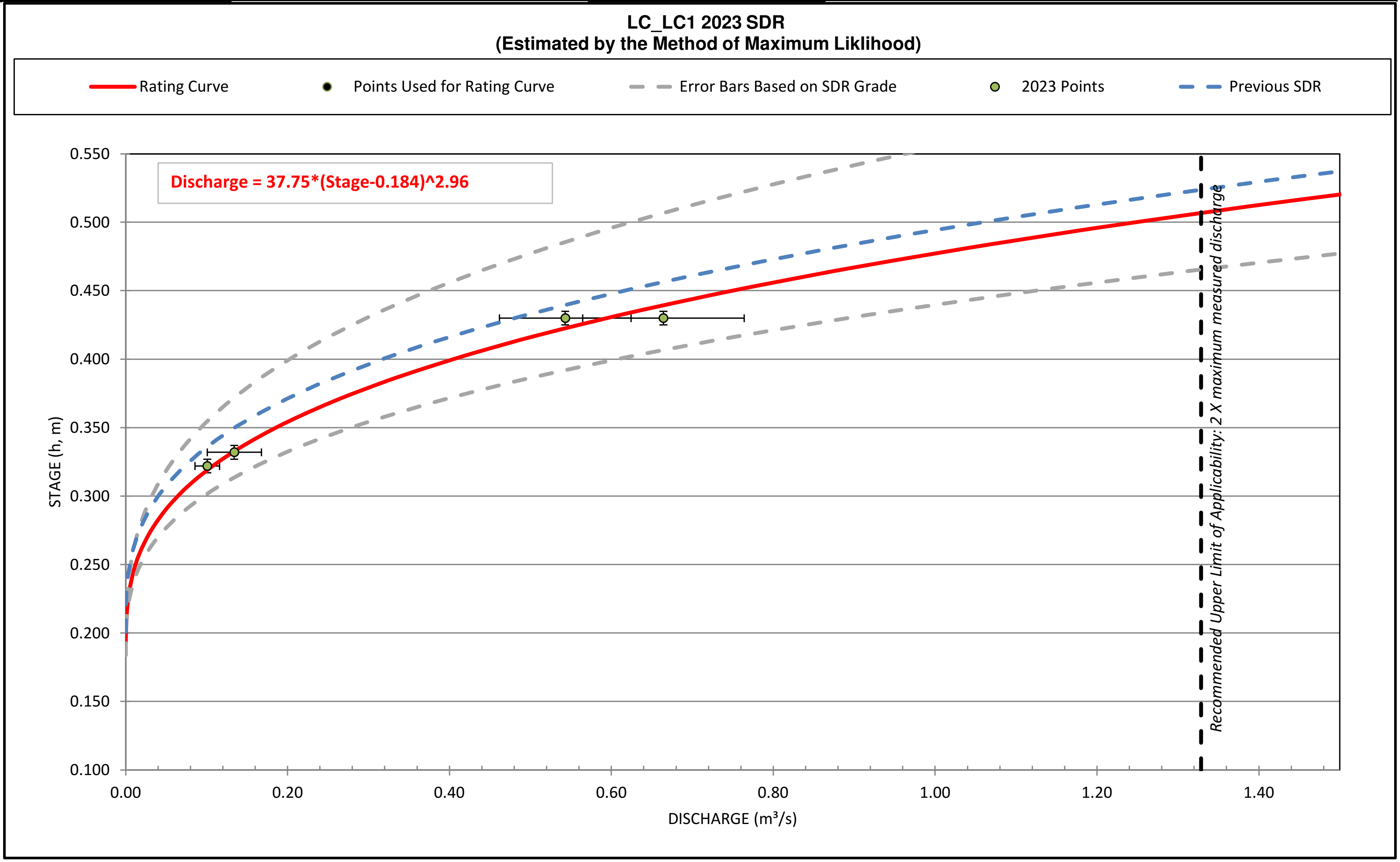
Monthly Average Discharge m³/sec											
January	February	March	April	May	June	July	August	September	October	November	December
#N/A	#N/A	#N/A	#N/A	0.902	0.561	0.165	0.084	0.132	0.094	0.046	0.007

LC_LC1 2023 - Yearly Hydrograph



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2023	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	E
Reason For Change	Clear change in trend	**Data Grade Rational:**	Clear channel change and the 2022 SDR was shifted to limited number of 2023 measurement points warranting a lower grade.		



LC_LC1

Summary Report
Year: 2023
Measurement: Final Discharge (m3/s)

2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	*	*	*	*	2.916 PK	0.571	0.346 PK	0.072	0.307 PK	0.064	0.068 PK	*
2	*	*	*	*	3.042	0.548	0.312	0.067	0.253	0.066	0.064	*
3	*	*	*	*	2.397	0.539	0.286	0.061	0.231	0.065	0.059	*
4	*	*	*	*	1.686	0.541	0.249	0.057	0.229	0.072	0.056	0.009
5	*	*	*	*	0.903	0.607	0.208	0.056	0.230	0.082	0.054	0.009
6	*	*	*	*	0.656	0.535	0.196	0.053	0.222	0.082	0.052	0.009
7	*	*	*	*	0.441	0.467	0.221	0.054	0.207	0.084	0.050	0.007
8	*	*	*	*	0.479	0.431	0.201	0.051	0.190	0.086	0.047	0.006
9	*	*	*	*	0.621	0.622	0.199	0.050	0.174	0.090	0.046	0.006
10	*	*	*	*	0.714	0.689	0.196	0.047	0.159	0.096	0.045	0.006
11	*	*	*	*	0.670	0.653	0.200	0.044	0.146	0.101	0.045	0.006
12	*	*	*	*	0.777	0.818 PK	0.187	0.041	0.134	0.103	0.043	0.006
13	*	*	*	*	1.050	0.687	0.176	0.039	0.123	0.106	0.043	0.006
14	*	*	*	*	1.209	0.616	0.168	0.036	0.114	0.110	0.041	0.011 PK
15	*	*	*	*	1.224	0.811	0.161	0.034	0.107	0.111	0.038	0.008
16	*	*	*	*	0.993	0.789	0.152	0.032	0.100	0.111	0.037	*
17	*	*	*	*	0.748	0.722	0.151	0.031	0.094	0.114 PK	*	*
18	*	*	*	*	0.618	0.576	0.144	0.030	0.091	0.112	*	*
19	*	*	*	*	0.629	0.569	0.137	0.030	0.087	0.109	0.031	*
20	*	*	*	*	0.599	0.504	0.129	0.028	0.083	0.108	0.029	*
21	*	*	*	*	0.584	0.478	0.122	0.029	0.078	0.107	0.028	*
22	*	*	*	*	0.543	0.509	0.115	0.091	0.075	0.106	0.027	*
23	*	*	*	*	0.398	0.494	0.113	0.118	0.073	0.103	0.025	*
24	*	*	*	*	0.356	0.475	0.111	0.085	0.070	0.100	*	*
25	*	*	*	*	0.543	0.434	0.108	0.082	0.068	0.097	*	*
26	*	*	*	*	0.468	0.507	0.103	0.088	0.067	0.089	*	*
27	*	*	*	*	0.437	0.497	0.097	0.092	0.066	0.088	*	*
28	*	*	*	*	0.474	0.419	0.094	0.094	0.064	0.088	*	*
29	*		*	*	0.605	0.367	0.086	0.092	0.062	0.084	*	*
30	*		*	3.094 PK	0.616	0.367	0.082	0.374 PK	0.065	0.077	*	*
31	*		*		0.585		0.077	0.531		0.074		*
Mean	**---**	**---**	**---**	**3.094**	**0.903**	**0.561**	**0.165**	**0.084**	**0.132**	**0.093**	**0.044**	**0.007**
Maximum	**---**	**---**	**---**	**3.094**	**3.042**	**0.818**	**0.346**	**0.531**	**0.307**	**0.114**	**0.068**	**0.011**
Minimum	**---**	**---**	**---**	**3.094**	**0.356**	**0.367**	**0.077**	**0.028**	**0.062**	**0.064**	**0.025**	**0.006+**
Peak 5-Minute	**---**	**---**	**---**	**3.619**	**4.268**	**1.156**	**0.372+**	**0.972**	**0.363**	**0.117**	**0.072**	**0.026**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix B

LC_LC2

Station Details			
Station Name:	**Line Cr. U/S of Rock Drain**	**Reporting Year:**	**2023**
Site ID:	**LC_LC2**	**Station Type:**	Year-Round Continuous Data
EMS:	**200335**	**Teck Mine:**	Line Creek Operation

Station Description:	The station is located upstream of the Line Creek rock drain.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by MAD data use.

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1- January 9, 2023	M	Ice affected data removed from the record
January 9 - March 15, 2023	E	Station operated as expected, potential ice in channel
March 16- November 31, 2023	C	Station operated as expected
December 1- December 31, 2023	E	Station operated as expected, potential ice in channel

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
March 17, 2023	0.510	0.041	B	0.037	0.004	11.7%	LCO Measurement, 20 Panels, Max 9.4%
April 14, 2023	0.534	0.056	B	0.077	-0.022	-28.1%	LCO Measurement, 22 Panels, Max 9.7%. Measurement reviewed - no explanation for deviation from SDR.
June 5, 2023	0.670	-	C	0.650	-	-	Calculated Discharge
June 12, 2023	0.674	-	C	0.676	-	-	Calculated Discharge
June 19, 2023	0.678	-	C	0.703	-	-	Calculated Discharge
June 27, 2023	0.650	-	C	0.526	-	-	Calculated Discharge
July 4, 2023	0.620	-	C	0.367	-	-	Calculated Discharge
July 10, 2023	0.600	-	C	0.279	-	-	Calculated Discharge
July 24, 2023	0.575	0.181	B	0.186	-0.005	-2.8%	KWL Measurement 23 Panels, Max 8%
September 5, 2023	0.586	-	C	0.224	-	-	Calculated Discharge
September 7, 2023	0.586	0.216	B	0.224	-0.008	-3.7%	LCO Measurement, 20 Panels, Max 9.9%
September 13, 2023	0.570	0.167	C	0.170	-0.003	-1.6%	LCO Measurement, 20 Panels, Max 12.2%
September 13, 2023	0.570	-	C	0.170	-	-	Calculated Discharge
October 4, 2023	0.550	-	C	0.114	-	-	Calculated Discharge
November 1, 2023	0.542	0.093	B	0.094	-0.001	-1.1%	LCO Measurement 20 Panels, Max 10%
November 7, 2023	0.552	-	C	0.119	-	-	Calculated Discharge
November 10, 2023	0.532	0.080	B	0.073	0.007	9.8%	LCO Measurement 20 Panels, Max 9%
November 10, 2023	0.532	-	C	0.073	-	-	Calculated Discharge
December 11, 2023	0.520	-	E	0.052	-	-	Calculated Discharge
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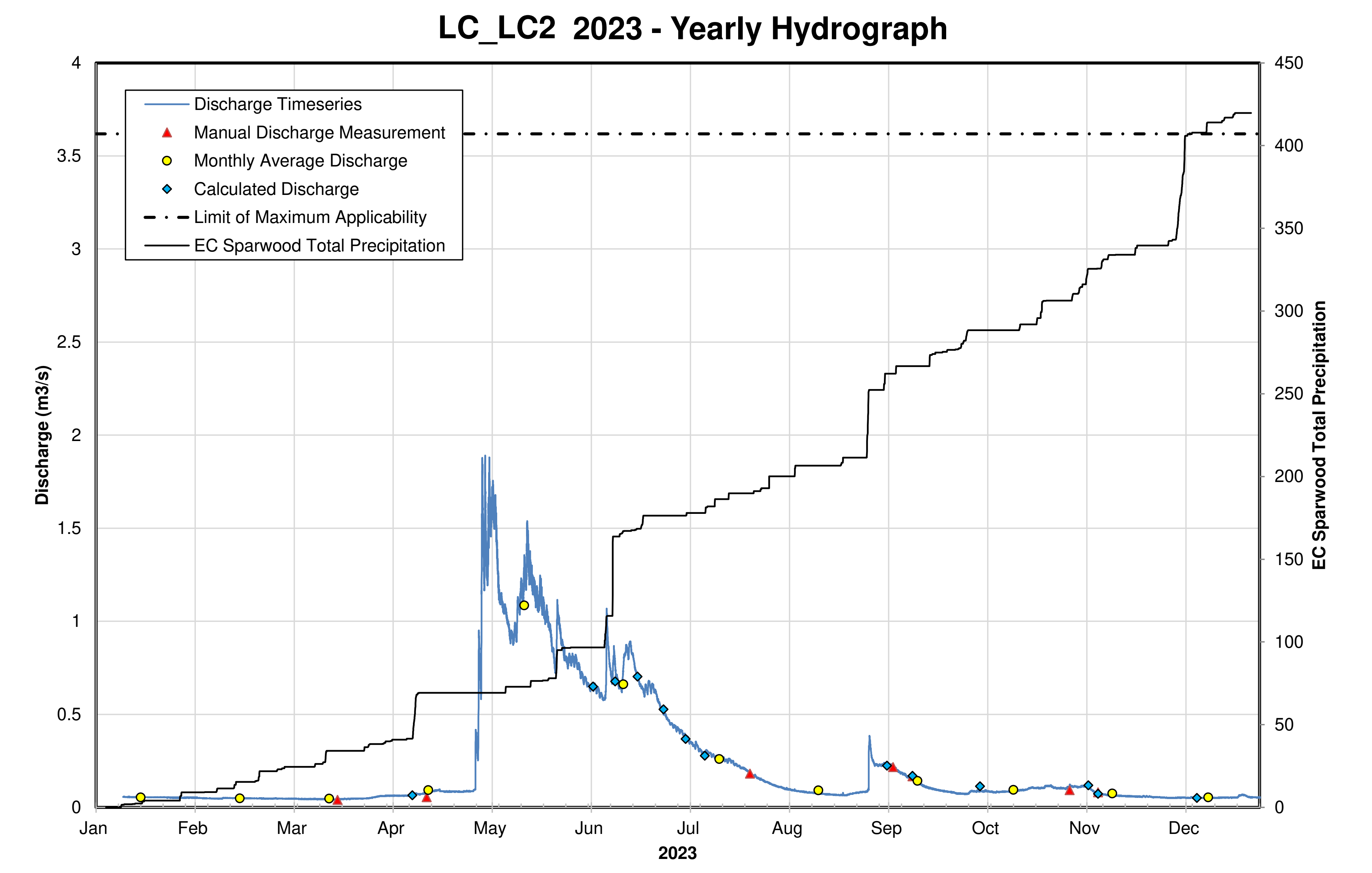
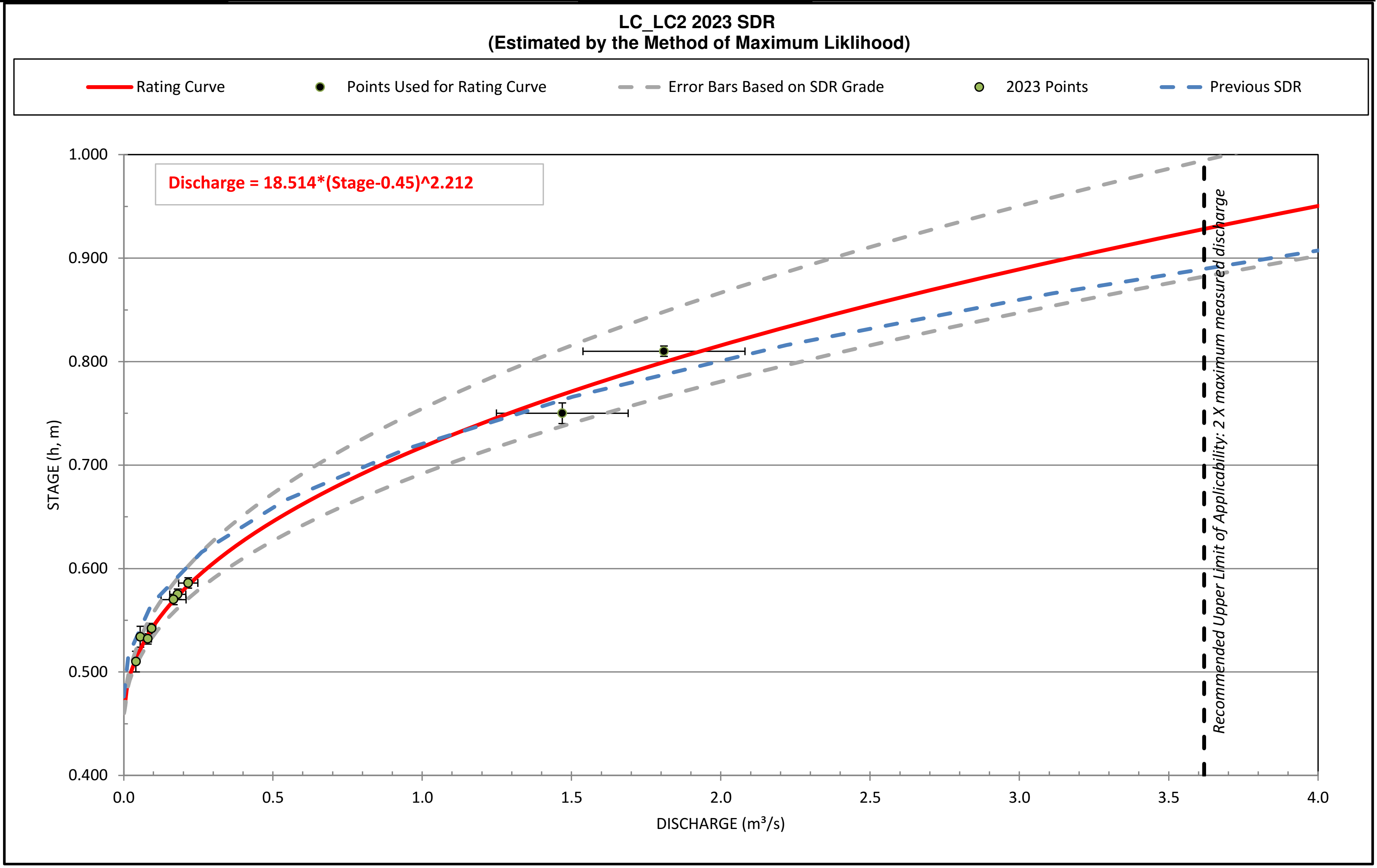
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m^3/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.054	0.049	0.047	0.093	1.085	0.662	0.259	0.091	0.143	0.095	0.075	0.054



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2023	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	C
Reason For Change	Refinement of Existing SDR (lower end)	**Data Grade Rational:**	Limited measurements to build the new SDR, limited medium and high-water measurements warrant a lower grade.		



LC_LC2

Summary Report
Year: 2023
Measurement: Final Discharge (m3/s)

2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	*	0.052 PK	0.047	0.062	1.053	0.730	0.425 PK	0.117	0.237 PK	0.083	0.113 PK	0.052
2	*	0.050	0.047	0.062	1.441 PK	0.694	0.414	0.111	0.228	0.087	0.112	0.052
3	*	0.050	0.046	0.062	1.380	0.674	0.401	0.108	0.227	0.088	0.112	0.051
4	*	0.049	0.046	0.063	1.616	0.647	0.385	0.101	0.232	0.087	0.109	0.051
5	*	0.048	0.045	0.063	1.600	0.647	0.363	0.098	0.232	0.086	0.114	0.052
6	*	0.048	0.045	0.063	1.378	0.638	0.342	0.095	0.228	0.089	0.113	0.052
7	*	0.048	0.045	0.063	1.126	0.618	0.334	0.092	0.216	0.086	0.109	0.053
8	*	0.047	0.045	0.064	1.072	0.592	0.317	0.087	0.202	0.083	0.094	0.051
9	0.057 PK	0.049	0.045	0.064	1.026	0.734 PK	0.299	0.086	0.189	0.082	0.083	0.053
10	0.057	0.051	0.045	0.068	0.936	0.823	0.291	0.084	0.181	0.083	0.073	0.052
11	0.056	0.050	0.045	0.073	0.917	0.724	0.297	0.081	0.170	0.085	0.071	0.051
12	0.056	0.050	0.044	0.071	0.977	0.761	0.284	0.080	0.159	0.085	0.069	0.051
13	0.056	0.050	0.045	0.074	1.104	0.663	0.275	0.078	0.154	0.085	0.066	0.051
14	0.056	0.050	0.044	0.076	1.168	0.662	0.267	0.076	0.142	0.086	0.065	0.052
15	0.055	0.050	0.044	0.081	1.301	0.824	0.265	0.074	0.130	0.088	0.064	0.052
16	0.055	0.050	0.044	0.087	1.328	0.842	0.260	0.073	0.119	0.090	0.063	0.052
17	0.055	0.049	0.044	0.091	1.218	0.851	0.252	0.071	0.111	0.093	0.062	0.052
18	0.055	0.049	0.044	0.091	1.145	0.767	0.253	0.070	0.106	0.094	0.062	0.052
19	0.055	0.048	0.045	0.086	1.116	0.701	0.239	0.069	0.101	0.100	0.061	0.053
20	0.055	0.048	0.046	0.085	1.120	0.651	0.227	0.067	0.097	0.105	0.060	0.053
21	0.054	0.048	0.046	0.085	1.043	0.626	0.217	0.067	0.093	0.105	0.059	0.053
22	0.054	0.048	0.047	0.085	0.999	0.644	0.211	0.067	0.090	0.105	0.059	0.053
23	0.054	0.048	0.047	0.085	0.899	0.647	0.201	0.066	0.087	0.104	0.058	0.053
24	0.053	0.048	0.047	0.085	0.785	0.639	0.185	0.069	0.085	0.106	0.059	0.060
25	0.053	0.048	0.048	0.084	0.988	0.596	0.173	0.074	0.082	0.115	0.059	0.067 PK
26	0.052	0.048	0.049	0.087	0.917	0.548	0.165	0.078	0.080	0.116 PK	0.058	0.065
27	0.052	0.047	0.050	0.087	0.823	0.512	0.154	0.080	0.075	0.108	0.056	0.057
28	0.052	0.047	0.053	0.087	0.785	0.485	0.147	0.082	0.074	0.104	0.055	0.054
29	0.053		0.056	0.168	0.795	0.457	0.138	0.084	0.073	0.104	0.054	0.054
30	0.053		0.059 PK	0.488 PK	0.791	0.440	0.132	0.148 PK	0.074	0.103	0.053	0.054
31	0.053		0.061		0.777		0.124	0.302		0.103		0.054
Mean	**0.054**	**0.049**	**0.047**	**0.093**	**1.085**	**0.661**	**0.259**	**0.091**	**0.143**	**0.095**	**0.075**	**0.054**
Maximum	**0.057**	**0.052**	**0.061**	**0.488**	**1.616**	**0.851**	**0.425**	**0.302**	**0.237**	**0.116**	**0.114**	**0.067**
Minimum	**0.052**	**0.047**	**0.044**	**0.062**	**0.777**	**0.440**	**0.124**	**0.066**	**0.073**	**0.082**	**0.053**	**0.051**
Peak 5-Minute	**0.058+**	**0.053+**	**0.062+**	**0.951**	**1.891**	**1.068**	**0.438+**	**0.385**	**0.257**	**0.120**	**0.124**	**0.069**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix C

LC_LC7

Station Details			
Station Name:	**MSA North Ponds Effluent to Line Creek**	**Reporting Year:**	**2023**
Site ID:	**LC_LC7**	**Station Type:**	Manual Measurements
EMS:	**E216144**	**Teck Mine:**	Line Creek Operation
Station Description:	The LC7 site is the authorized discharge point located downstream of the MSA North Ponds which decant to a collector ditch located immediately upstream of the Line Creek Rock Drain. A concrete weir structure controls the flow and a staff gauge is affixed to the face of the structure. LC7 is a staff gauge site: no continuous water level data are collected at this site.		
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol		
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B		
Rationale for Data Grade Recommendation (RSFMP)	Governed by MAD data use.		

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
February 6, 2023	0.096	-	C	0.077	-	-	Calculated Discharge. Suspect staff gauge.
March 20, 2023	0.075	-	C	0.048	-	-	Calculated Discharge
March 27, 2023	0.050	-	C	0.019	-	-	Calculated Discharge
April 5, 2023	0.068	0.031	C	0.039	-0.008	-19.5%	LCO Measurement, 20 Panels, Max 12.9%
April 10, 2023	0.072	-	C	0.044	-	-	Calculated Discharge
April 17, 2023	0.070	-	C	0.041	-	-	Calculated Discharge
April 20, 2023	0.140	-	C	0.153	-	-	Calculated Discharge
April 24, 2023	0.090	-	C	0.068	-	-	Calculated Discharge
May 1, 2023	0.140	-	C	0.153	-	-	Calculated Discharge
May 10, 2023	0.130	-	C	0.134	-	-	Calculated Discharge
May 15, 2023	0.150	-	C	0.173	-	-	Calculated Discharge
May 22, 2023	0.140	-	C	0.153	-	-	Calculated Discharge
May 29, 2023	0.120	-	C	0.117	-	-	Calculated Discharge
June 1, 2023	0.100	-	C	0.083	-	-	Calculated Discharge
June 5, 2023	0.122	-	C	0.120	-	-	Calculated Discharge
June 12, 2023	0.122	-	C	0.120	-	-	Calculated Discharge
June 19, 2023	0.124	-	C	0.124	-	-	Calculated Discharge
June 27, 2023	0.132	-	C	0.138	-	-	Calculated Discharge
July 4, 2023	0.122	-	C	0.120	-	-	Calculated Discharge
July 10, 2023	0.120	-	C	0.117	-	-	Calculated Discharge
September 5, 2023	0.116	-	C	0.110	-	-	Calculated Discharge
September 28, 2023	0.090	0.068	B	0.068	-0.001	-1.1%	LCO Measurement, 21 Panels, Max 6.8%
October 4, 2023	0.090	-	C	0.068	-	-	Calculated Discharge
November 29, 2023	0.061	0.042	C	0.031	0.012	38.7%	LCO Measurement, 21 Panels, Max 10.1%. Measurement reviewed - no explanation for deviation from SDR.
December 11, 2023	0.062	-	C	0.032	-	-	Calculated Discharge
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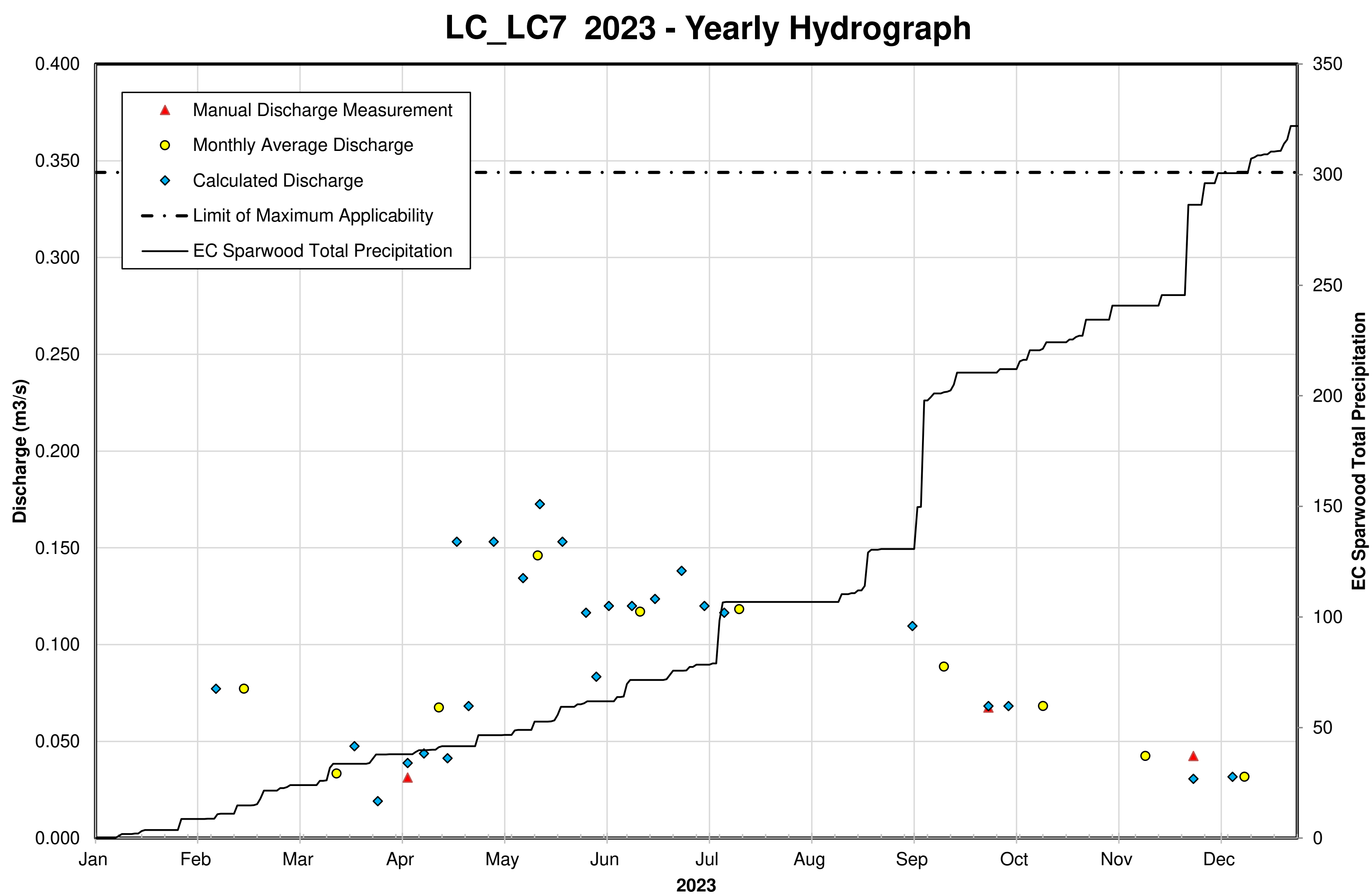
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

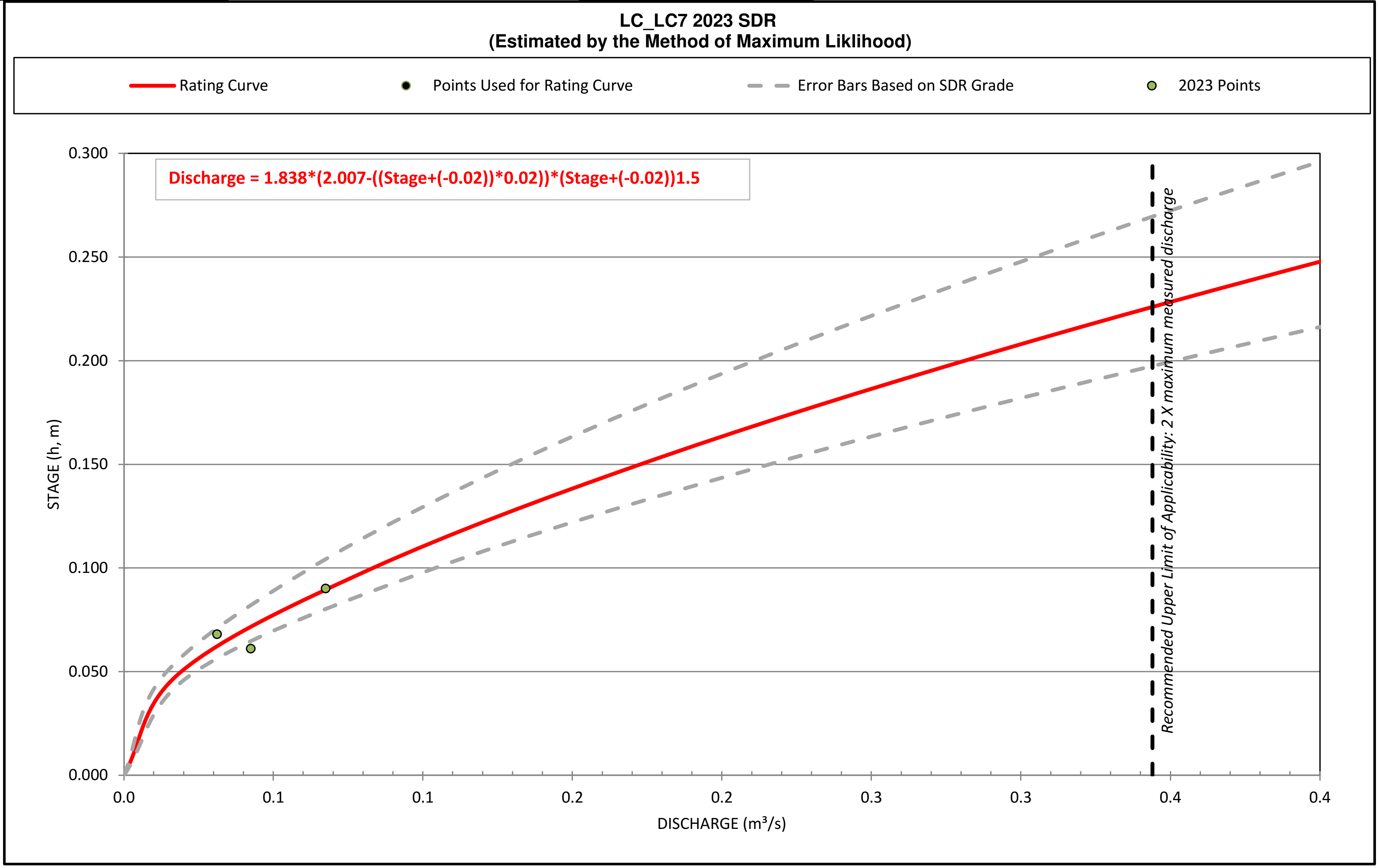
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m^3/sec											
January	February	March	April	May	June	July	August	September	October	November	December
#N/A	0.08	0.03	0.07	0.15	0.12	0.12	#N/A	0.09	0.07	0.04	0.03



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2022	**Updated from Previous Year:**	No	**SDR Data Grade:**	C
Reason For Change		**Data Grade Rational:**	Lack of measurements to confirm weir equation in 2023		



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Appendix D

LC_LCDS-LC2

Station Details			
Station Name:	**Line Creek Downstream LC2**	**Reporting Year:**	**2023**
Site ID:	**LC_LCDSLC2**	**Station Type:**	Year-Round Continuous Data
EMS:	**N/A**	**Teck Mine:**	Line Creek Operation

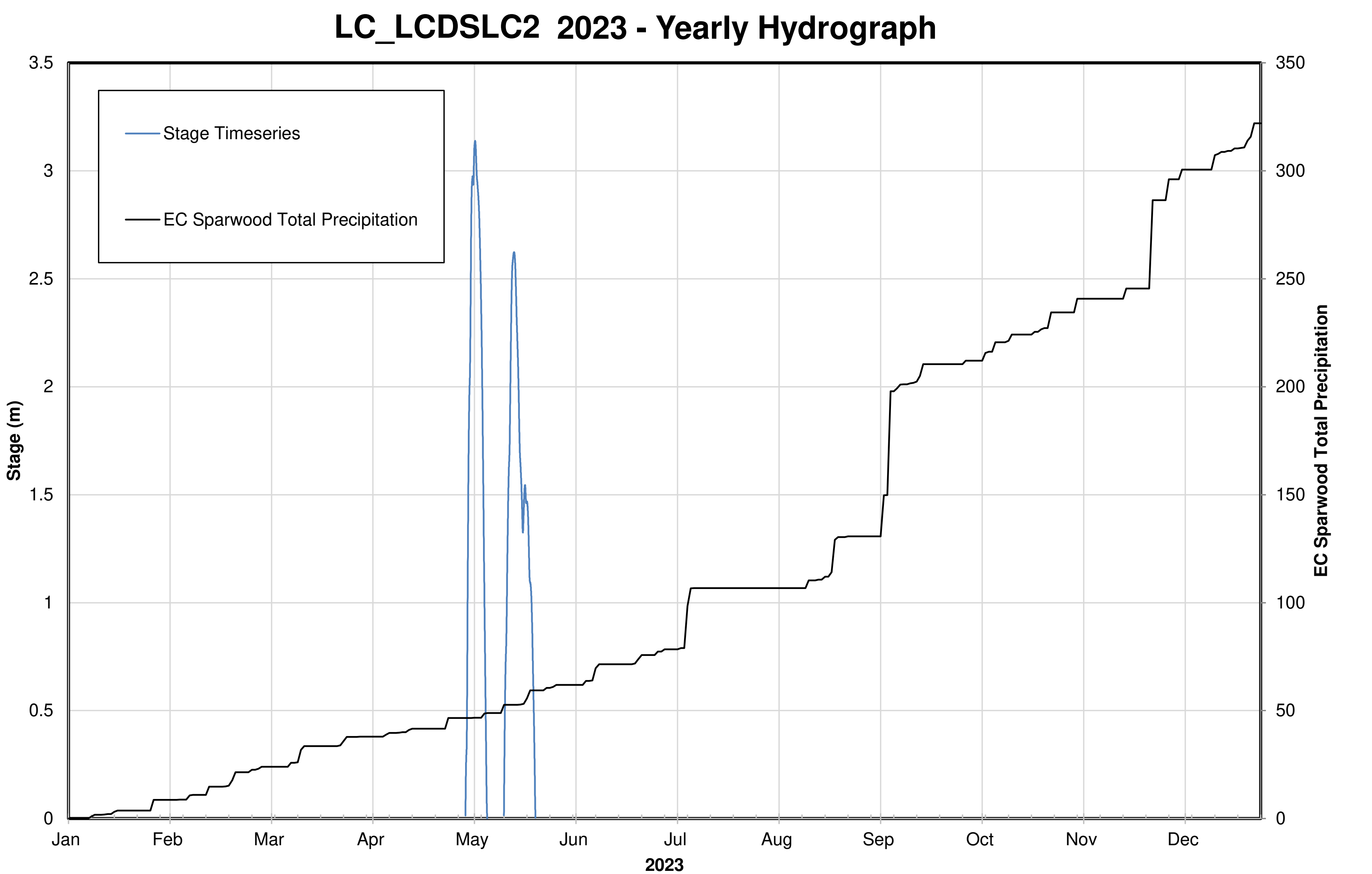
Station Description:	LCDS-LC2 is located on Line Creek downstream of station LC2 and the MSAN ponds and upstream of LC3
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	N/A
Rationale for Data Grade Recommendation (RSFMP)	No data grade provided since this site is only suitable to record water level and not discharge.

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - May 2, 2023	M	No water at sensor
May 2 - 8, 2023	B	Station backwatered
May 8 - 13, 2023	M	No water at sensor
May 13 - 23, 2023	B	Station backwatered
May 23 - December 31, 2023	M	No water at sensor

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Monthly Average Discharge m³/sec											
January	February	March	April	May	June	July	August	September	October	November	December
#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A



* Calculated and/or manual measurements used to calculate monthly average

Appendix E

LC_WLC

Station Details			
Station Name:	**West Line Creek**	**Reporting Year:**	**2023**
Site ID:	**LC_WLC**	**Station Type:**	Year-Round Continuous Data
EMS:	**E261958**	**Teck Mine:**	Line Creek Operation

Station Description:	The West Line Creek (WLC) hydrometric station is located at a concrete structure downstream of the West Line Creek rock drain, and immediately upstream of the active wastewater treatment (AWTF) intake. Flow at WLC passes through a rated 120° V-notch weir.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	The site should achieve Grade B data to be consistent with the MAD data use (don't require Grade A data for AWTF operations because this is to understand how much flow may be bypassing treatment, not for the operation of the AWTF)

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - February 21, 2023	B	Station operating as expected
February 21 - April 2, 2023	M	Sensor failure
April 2 - December 31, 2023	B	Station operating as expected

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 16, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
January 23, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
January 30, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
February 6, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
February 13, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
February 22, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
February 27, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
March 6, 2023	0.580	-	B	0.029	-	-	Calculated Discharge
March 13, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
March 20, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
March 27, 2023	0.600	-	B	0.039	-	-	Calculated Discharge
March 29, 2023	0.590	0.033	E	0.034	-0.0004	-1.1%	KWL Measurement, 18 Panels, Max 24.3%.Channel not conducive to manual measurements.
April 3, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
May 1, 2023	0.600	-	B	0.039	-	-	Calculated Discharge
May 15, 2023	0.720	-	B	0.130	-	-	Calculated Discharge
May 16, 2023	0.744	0.091	C	0.156	-0.065	-41.8%	KWL Measurement, 32 Panels, Max 12.2%. Channel not conducive to manual measurements
May 23, 2023	0.725	-	B	0.135	-	-	Calculated Discharge
June 5, 2023	0.680	-	B	0.092	-	-	Calculated Discharge
June 12, 2023	0.666	-	B	0.081	-	-	Calculated Discharge
June 19, 2023	0.658	-	B	0.075	-	-	Calculated Discharge
June 27, 2023	0.650	-	B	0.069	-	-	Calculated Discharge
July 4, 2023	0.638	-	B	0.061	-	-	Calculated Discharge
July 6, 2023	0.639	0.062	E	0.061	0.001	1.1%	KWL Measurment 18 panels, Max 27.6%. Channel not conducive to manual measurements.
July 10, 2023	0.630	-	B	0.055	-	-	Calculated Discharge
July 17, 2023	0.620	-	B	0.049	-	-	Calculated Discharge
July 24, 2023	0.634	0.048	C	0.058	-0.010	-17.3%	KWL Measurement 24 Panels , Max 15%. Channel not conducive to manual measurements.
August 2, 2023	0.619	0.034	C	0.049	-0.014	-29.6%	KWL Measurement 21 panels, Max 16%. Channel not conducive to manual measurements
August 8, 2023	0.610	-	B	0.044	-	-	Calculated Discharge
August 21, 2023	0.615	-	B	0.047	-	-	Calculated Discharge
August 28, 2023	0.605	-	B	0.041	-	-	Calculated Discharge
September 5, 2023	0.605	-	B	0.041	-	-	Calculated Discharge

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Summary Table of Yearly Discharge Measurements

Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
September 12, 2023	0.600	-	B	0.039	-	-	Calculated Discharge
September 18, 2023	0.600	-	B	0.039	-	-	Calculated Discharge
September 26, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
October 13, 2023	0.598	-	B	0.038	-	-	Calculated Discharge
October 17, 2023	0.600	-	B	0.039	-	-	Calculated Discharge
October 24, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
November 1, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
November 13, 2023	0.598	-	B	0.038	-	-	Calculated Discharge
November 20, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
November 27, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
December 4, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
December 13, 2023	0.590	-	B	0.034	-	-	Calculated Discharge
December 18, 2023	0.580	-	B	0.029	-	-	Calculated Discharge
December 27, 2023	0.580	-	B	0.029	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
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	-	-	-	-	-	-	
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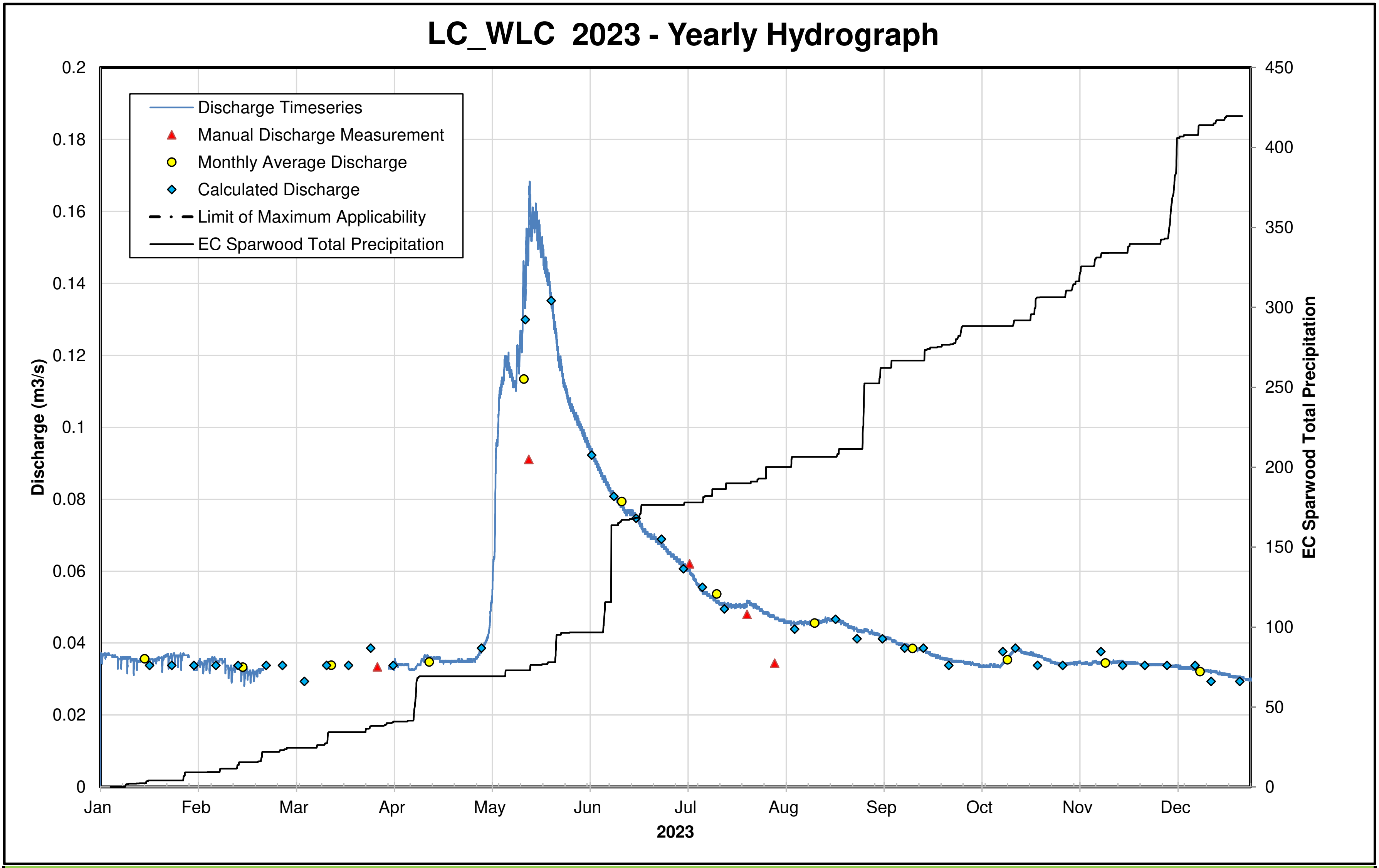
	-	-	-	-	-	-	

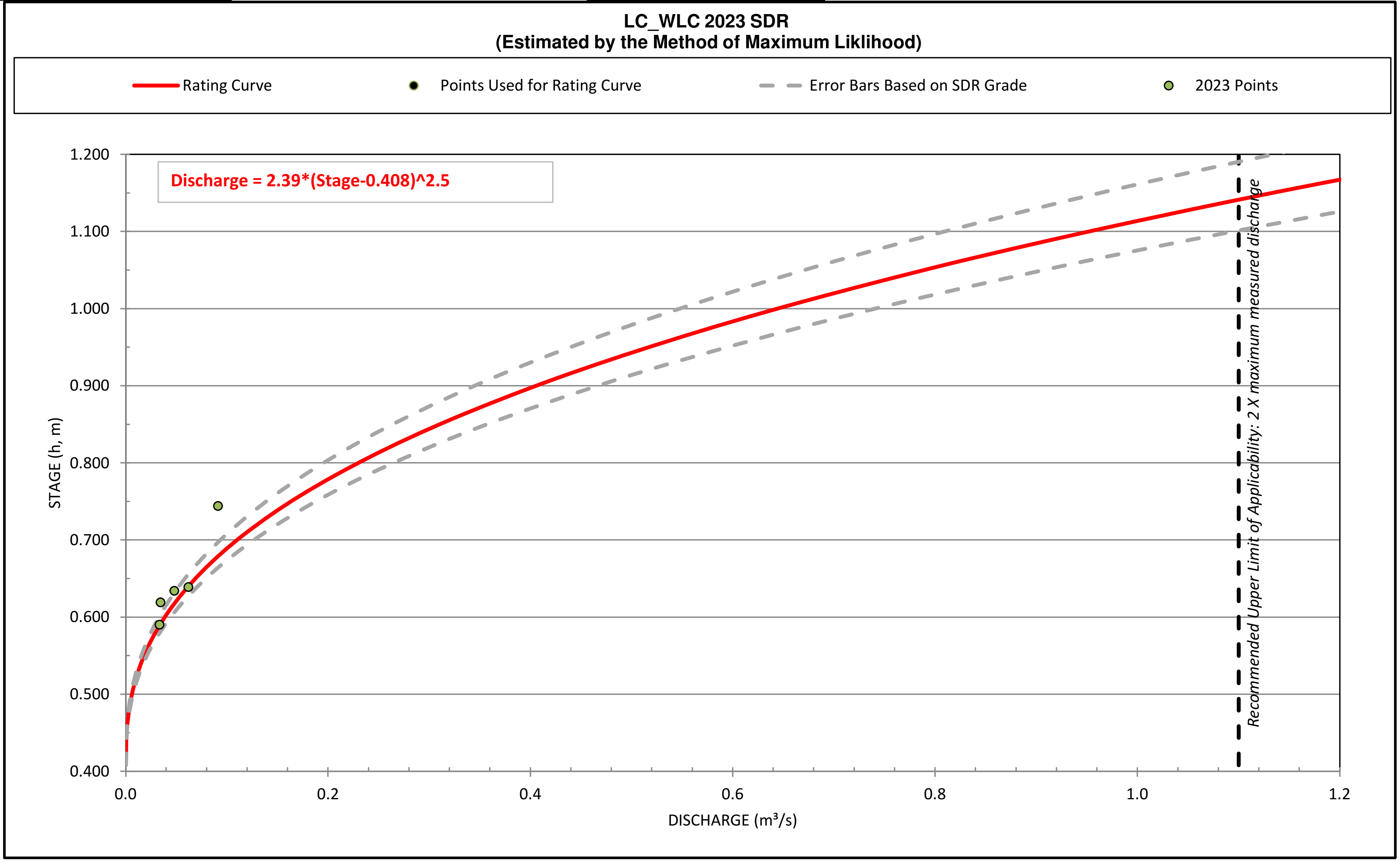
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m^3/sec											
January	February	March*	April	May	June	July	August	September	October	November	December
0.036	0.033	0.034	0.035	0.113	0.079	0.054	0.046	0.039	0.035	0.034	0.032



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2014	**Updated from Previous Year:**	No	**SDR Data Grade:**	B
Reason For Change		**Data Grade Rational:**	Engineerd Strcuture (90° V-Notch Weir)		



LC_WLC
Summary Report
Year: 2023
Measurement: Final Discharge (m3/s)

2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.036 PK	0.035	*	*	0.038	0.101 PK	0.064 PK	0.047 PK	0.043	0.035	0.034	0.034 PK
2	0.037	0.034	*	0.033	0.040	0.099	0.063	0.047	0.043 PK	0.034	0.034	0.034
3	0.037	0.034	*	0.033	0.042	0.097	0.062	0.047	0.042	0.034	0.034	0.034
4	0.037	0.035	*	0.036 PK	0.049	0.095	0.062	0.046	0.042	0.034	0.034	0.034
5	0.036	0.035 PK	*	0.034	0.065	0.093	0.061	0.046	0.042	0.034	0.034	0.033
6	0.036	0.035	*	0.034	0.096	0.091	0.060	0.046	0.041	0.034	0.034	0.033
7	0.035	0.035	*	0.034	0.109	0.089	0.059	0.045	0.041	0.034	0.035	0.033
8	0.036	0.035	*	0.033	0.114	0.087	0.057	0.045	0.041	0.034	0.034	0.033
9	0.036	0.034	*	0.033	0.118	0.085	0.056	0.046	0.040	0.034	0.034	0.033
10	0.036	0.033	*	0.033	0.116	0.084	0.055	0.046	0.040	0.034	0.034	0.033
11	0.035	0.032	*	0.034	0.113	0.082	0.054	0.046	0.040	0.034	0.035	0.033
12	0.035	0.033	*	0.035	0.115	0.081	0.053	0.046	0.039	0.034	0.035	0.033
13	0.035	0.034	*	0.036	0.120	0.080	0.053	0.046	0.039	0.034	0.035	0.033
14	0.036	0.032	*	0.036	0.131	0.079	0.052	0.046	0.039	0.035	0.035	0.033
15	0.036	0.031	*	0.036	0.143	0.077	0.051	0.046	0.038	0.036	0.035	0.032
16	0.035	0.032	*	0.036	0.156 PK	0.076	0.051	0.046	0.038	0.037	0.035	0.032
17	0.035	0.031	*	0.036	0.157	0.077	0.051	0.046	0.038	0.038 PK	0.035 PK	0.032
18	0.035	0.031	*	0.035	0.158	0.076	0.051	0.046	0.038	0.038	0.035	0.032
19	0.036	0.032	*	0.035	0.155	0.075	0.050	0.046	0.038	0.038	0.035	0.032
20	0.035	0.033	*	0.035	0.150	0.073	0.050	0.046	0.037	0.037	0.035	0.032
21	0.036	0.033	*	0.035	0.146	0.072	0.050	0.047	0.037	0.037	0.035	0.032
22	0.036	*	*	0.035	0.142	0.071	0.050	0.046	0.036	0.037	0.035	0.031
23	0.036	*	*	0.035	0.137	0.070	0.050	0.046	0.036	0.037	0.035	0.031
24	0.036	*	*	0.035	0.130	0.069	0.051	0.045	0.036	0.037	0.034	0.031
25	0.036	*	*	0.035	0.123	0.069	0.051	0.045	0.036	0.036	0.034	0.031
26	0.036	*	*	0.035	0.118	0.068	0.051	0.044	0.035	0.036	0.034	0.031
27	0.037	*	*	0.035	0.113	0.067	0.050	0.044	0.035	0.035	0.034	0.030
28	0.037	*	*	0.035	0.110	0.066	0.049	0.044	0.035	0.035	0.034	0.030
29	0.036		*	0.035	0.107	0.065	0.049	0.043	0.035	0.035	0.034	0.030
30	0.033		*	0.036	0.105	0.065	0.048	0.044	0.035	0.034	0.034	0.030
31	0.033		*		0.103		0.048	0.043		0.034		0.030
Mean	**0.036**	**0.033**	**---**	**0.035**	**0.113**	**0.079**	**0.054**	**0.046**	**0.039**	**0.035**	**0.034**	**0.032**
Maximum	**0.037**	**0.035**	**---**	**0.036**	**0.158**	**0.101**	**0.064**	**0.047**	**0.043**	**0.038**	**0.035**	**0.034**
Minimum	**0.033**	**0.031**	**---**	**0.033**	**0.038**	**0.065**	**0.048**	**0.043**	**0.035**	**0.034**	**0.034**	**0.030**
Peak 5-Minute	**0.037+**	**0.036+**	**---**	**0.051+**	**0.168+**	**0.102**	**0.065+**	**0.048**	**0.044**	**0.039**	**0.035**	**0.034+**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix F

LC_LC3

Station Details			
Station Name:	**Line Cr. D/S of West Line Creek**	**Reporting Year:**	**2023**
Site ID:	**LC_LC3**	**Station Type:**	Year-Round Continuous Data
EMS:	**200337**	**Teck Mine:**	Line Creek Operation

Station Description:	LC3 is located downstream of the Line Creek rock drain and the West Line Creek Confluence. The hydrometric station is located above a trapezoidal section of engineered concrete channel.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by MAD and AWTF design data uses.

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 to March 15, 2023	E	Station operating as expected, potential for ice in channel
March 16 - October 31, 2023	B	Station operating as expected
November 1 - December 31, 2023	E	Station operating as expected, potential for ice in channel

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 16, 2023	0.290	-	E	0.456	-	-	Calculated Discharge
January 23, 2023	0.290	-	E	0.456	-	-	Calculated Discharge
January 30, 2023	0.270	-	E	0.303	-	-	Calculated Discharge
February 2, 2023	0.275	0.231	B	-	-	-	LCO Measurement, 21 Panels, Max 9.7%. Ice affected measurement and staff gauge reading.
February 7, 2023	0.280	-	E	0.376	-	-	Calculated Discharge
February 14, 2023	0.270	-	E	0.303	-	-	Calculated Discharge
February 21, 2023	0.260	-	E	0.238	-	-	Calculated Discharge
March 7, 2023	0.260	-	E	0.238	-	-	Calculated Discharge
March 13, 2023	0.250	-	E	0.180	-	-	Calculated Discharge
March 17, 2023	0.260	0.249	B	0.238	0.011	4.5%	LCO Measurement, 29 Panels, Max 8.5%
March 20, 2023	0.260	-	B	0.238	-	-	Calculated Discharge
March 27, 2023	0.265	-	B	0.270	-	-	Calculated Discharge
March 29, 2023	0.269	0.310	B	0.296	0.014	4.7%	KWL Measurement, 21 Panels, Max 9.3%
April 3, 2023	0.280	-	B	0.376	-	-	Calculated Discharge
April 12, 2023	0.283	-	B	0.399	-	-	Calculated Discharge
April 14, 2023	0.298	0.370	B	0.526	-0.156	-29.7%	LCO Measurement, 21 Panels, Max 8.9%. Measurement reviewed, no explanation for deviation from SDR.
May 1, 2023	0.380	-	B	1.504	-	-	Calculated Discharge
May 16, 2023	0.490	3.409	B	3.552	-0.144	-4.0%	KWL Measurement, 22 Panels, Max 7.8%
May 23, 2023	0.450	-	B	2.712	-	-	Calculated Discharge
May 30, 2023	0.410	-	B	1.981	-	-	Calculated Discharge
June 6, 2023	0.360	-	B	1.222	-	-	Calculated Discharge
June 12, 2023	0.386	-	B	1.595	-	-	Calculated Discharge
June 19, 2023	0.386	-	B	1.595	-	-	Calculated Discharge
June 27, 2023	0.365	-	B	1.290	-	-	Calculated Discharge
July 4, 2023	0.332	-	B	0.873	-	-	Calculated Discharge
July 6, 2023	0.329	0.915	B	0.839	0.076	9.0%	KWL Measurement 23 Panels, Max 8%
July 10, 2023	0.320	-	B	0.741	-	-	Calculated Discharge
July 17, 2023	0.310	-	B	0.639	-	-	Calculated Discharge
July 24, 2023	0.300	0.568	B	0.544	0.024	4.4%	KWL Measurement 22 Panels, Max 9%
August 2, 2023	0.290	0.433	B	0.456	-0.023	-5.1%	KWL Measurement 22 Panels, Max 9%
August 22, 2023	0.270	-	B	0.303	-	-	Calculated Discharge
August 22, 2023	0.274	-	B	0.332	-	-	Calculated Discharge
August 29, 2023	0.306	-	B	0.600	-	-	Calculated Discharge
September 5, 2023	0.297	-	B	0.517	-	-	Calculated Discharge

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
September 12, 2023	0.297	-	B	0.517	-	-	Calculated Discharge
September 13, 2023	0.296	0.710	B	0.508	0.202	39.7%	LCO Measurement, 21 Panels, Max 7%. Measurement reviewed, no obvious reason for deviation from curve
September 18, 2023	0.290	-	B	0.456	-	-	Calculated Discharge
September 26, 2023	0.280	-	B	0.376	-	-	Calculated Discharge
October 4, 2023	0.280	-	B	0.376	-	-	Calculated Discharge
October 10, 2023	0.284	-	B	0.407	-	-	Calculated Discharge
October 12, 2023	0.275	0.321	B	0.339	-0.018	-5.3%	KWL Measurement, 21 Panels, Max 9.2%
October 13, 2023	0.287	-	B	0.432	-	-	Calculated Discharge
October 16, 2023	0.275	-	B	0.339	-	-	Calculated Discharge
October 23, 2023	0.288	-	B	0.440	-	-	Calculated Discharge
October 30, 2023	0.290	-	B	0.456	-	-	Calculated Discharge
November 6, 2023	0.290	-	E	0.456	-	-	Calculated Discharge
November 9, 2023	0.289	-	E	0.448	-	-	Calculated Discharge
November 10, 2023	0.299	0.366	B	-	-	-	LCO Measurement 22 Panels, Max 9%. Ice affected measurement and staff gauge reading
November 13, 2023	0.287	-	E	0.432	-	-	Calculated Discharge
November 20, 2023	0.282	-	E	0.392	-	-	Calculated Discharge
November 27, 2023	0.278	-	E	0.361	-	-	Calculated Discharge
December 4, 2023	0.272	-	E	0.317	-	-	Calculated Discharge
December 13, 2023	0.274	-	E	0.332	-	-	Calculated Discharge
December 18, 2023	0.262	-	E	0.250	-	-	Calculated Discharge
December 27, 2023	0.255	-	E	0.208	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
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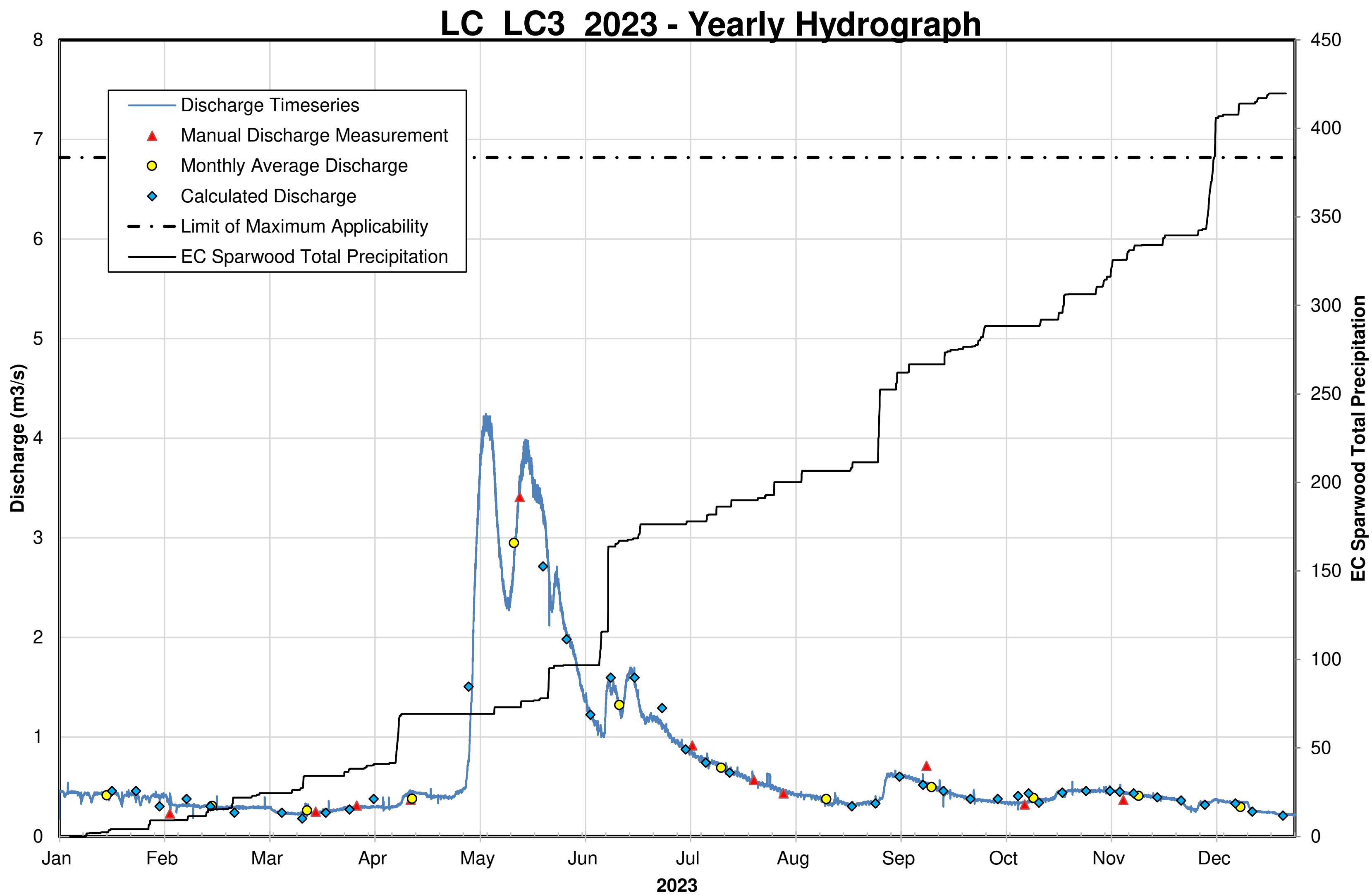
	-	-	-	-	-	-	
	-	-	-	-	-	-	

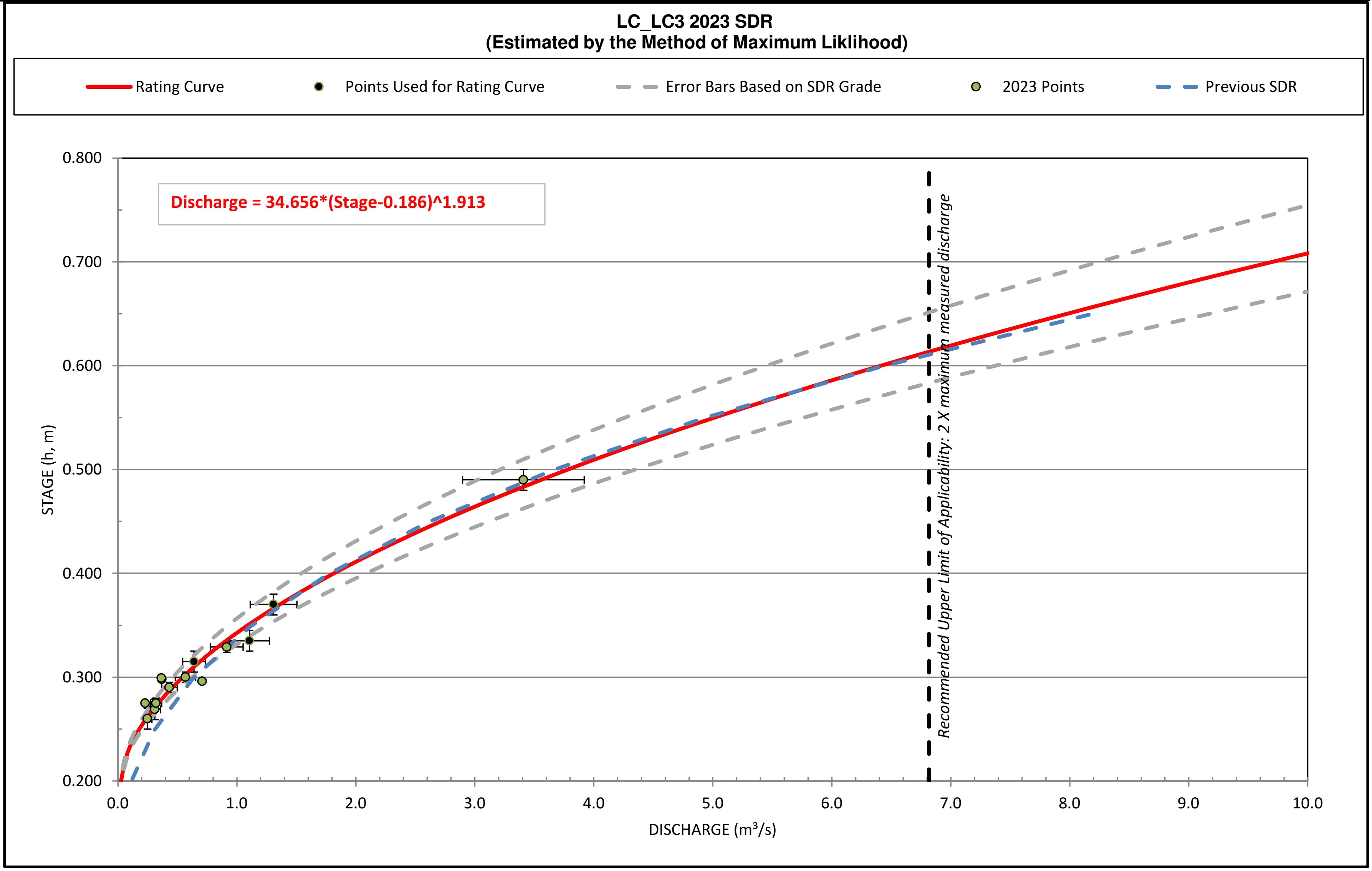
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m^3/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.411	0.305	0.260	0.378	2.947	1.318	0.687	0.373	0.494	0.386	0.405	0.294



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2023	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	B
Reason For Change	Clear change in trend	**Data Grade Rational:**	New vertical staff gauge installed in 2022, and the 2023 SDR is a continuation of the new SDR development. Good agreement with manual measurements.		



LC_LC3

Summary Report
Year: 2023
Measurement: Final Discharge (m3/s)

2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.447	0.393	0.292	0.295	0.776	1.860 PK	0.958 PK	0.462 PK	0.570	0.357	0.455	0.270
2	0.420	0.352 PK	0.295 PK	0.292	1.495	1.707	0.933	0.454	0.620	0.355	0.457	0.297
3	0.444 PK	0.321	0.292	0.296	2.626	1.547	0.913	0.445	0.617	0.351	0.456	0.342
4	0.443	0.301	0.277	0.297	3.391	1.414	0.891	0.434	0.617 PK	0.347	0.458	0.344
5	0.443	0.308	0.252	0.297	3.947	1.317	0.857	0.424	0.611	0.346	0.457	0.343
6	0.435	0.313	0.244	0.294	4.146 PK	1.231	0.836	0.416	0.609	0.341	0.459	0.352
7	0.383	0.314	0.238	0.291	4.117	1.160	0.809	0.417	0.601	0.338	0.454	0.371 PK
8	0.428	0.311	0.234	0.298	3.961	1.098	0.786	0.408	0.593	0.336	0.450	0.362
9	0.420	0.307	0.232	0.299	3.447	1.058	0.778	0.411	0.580	0.336	0.450 PK	0.357
10	0.373	0.305	0.230	0.308	2.950	1.076	0.773	0.405	0.567	0.339	0.438	0.349
11	0.424	0.297	0.226	0.332	2.610	1.498	0.733	0.397	0.556	0.341	0.433	0.349
12	0.430	0.305	0.226	0.397	2.383	1.486	0.743	0.391	0.545	0.345	0.425	0.348
13	0.432	0.309	0.233	0.426	2.351	1.488	0.730	0.381	0.531	0.349	0.419	0.347
14	0.435	0.306	0.246	0.447	2.586	1.377	0.718	0.356	0.515	0.355	0.416	0.348
15	0.396	0.301	0.238	0.444	3.022	1.237	0.694	0.328	0.500	0.358	0.412	0.344
16	0.426	0.297	0.238	0.436	3.469	1.408	0.671	0.322	0.484	0.361	0.408	0.345
17	0.430	0.292	0.237	0.431	3.755	1.601	0.659	0.358	0.493	0.369	0.405	0.304
18	0.398	0.287	0.239	0.429	3.880	1.661	0.641	0.353	0.450	0.370	0.401	0.266
19	0.359	0.292	0.248	0.411	3.772	1.560	0.634	0.345	0.441	0.370	0.397	0.257
20	0.415	0.295	0.257	0.406	3.566	1.389	0.620	0.329	0.431	0.377	0.391	0.251
21	0.422	0.296	0.261	0.400	3.464	1.239	0.605	0.324	0.419	0.405	0.386	0.247
22	0.422	0.294	0.258	0.400	3.413	1.177	0.584	0.318	0.412	0.445	0.384	0.245
23	0.384	0.290	0.263	0.398	3.261	1.181	0.564	0.317	0.405	0.423	0.381	0.244
24	0.363	0.289	0.271	0.397	2.970	1.200	0.566	0.326	0.397	0.426	0.378	0.242
25	0.375	0.289	0.276	0.393	2.492	1.187	0.538	0.331	0.390	0.461	0.374	0.231
26	0.392	0.292	0.285	0.392	2.386	1.163	0.530	0.338	0.386	0.465 PK	0.371	0.224
27	0.376	0.293	0.290	0.417	2.580	1.120	0.520	0.338	0.389	0.463	0.363	0.223
28	0.411	0.293	0.292	0.445	2.392	1.079	0.543	0.337	0.367	0.460	0.320	0.224
29	0.409		0.298	0.460	2.169	1.031	0.524	0.350	0.366	0.460	0.287	0.220
30	0.396		0.299	0.501 PK	2.028	0.982	0.490	0.357	0.363	0.456	0.275	0.216
31	0.408		0.297		1.951		0.476	0.405		0.453		0.214
Mean	**0.411**	**0.305**	**0.260**	**0.378**	**2.947**	**1.318**	**0.688**	**0.373**	**0.494**	**0.386**	**0.405**	**0.293**
Maximum	**0.447**	**0.393**	**0.299**	**0.501**	**4.146**	**1.860**	**0.958**	**0.462**	**0.620**	**0.465**	**0.459**	**0.371**
Minimum	**0.359**	**0.287**	**0.226**	**0.291**	**0.776**	**0.982**	**0.476**	**0.317**	**0.363**	**0.336**	**0.275**	**0.214**
Peak 5-Minute	**0.539+**	**0.435+**	**0.394+**	**0.584**	**4.243**	**1.922+**	**0.989**	**0.485+**	**0.662**	**0.548+**	**0.520**	**0.379+**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix G

LC_SLC

Station Details			
Station Name:	South Line Creek West Side of Main Rock Drain	Reporting Year:	2023
Site ID:	LC_SLC	Station Type:	Manual Measurements
EMS:	E282149	Teck Mine:	Line Creek Operation

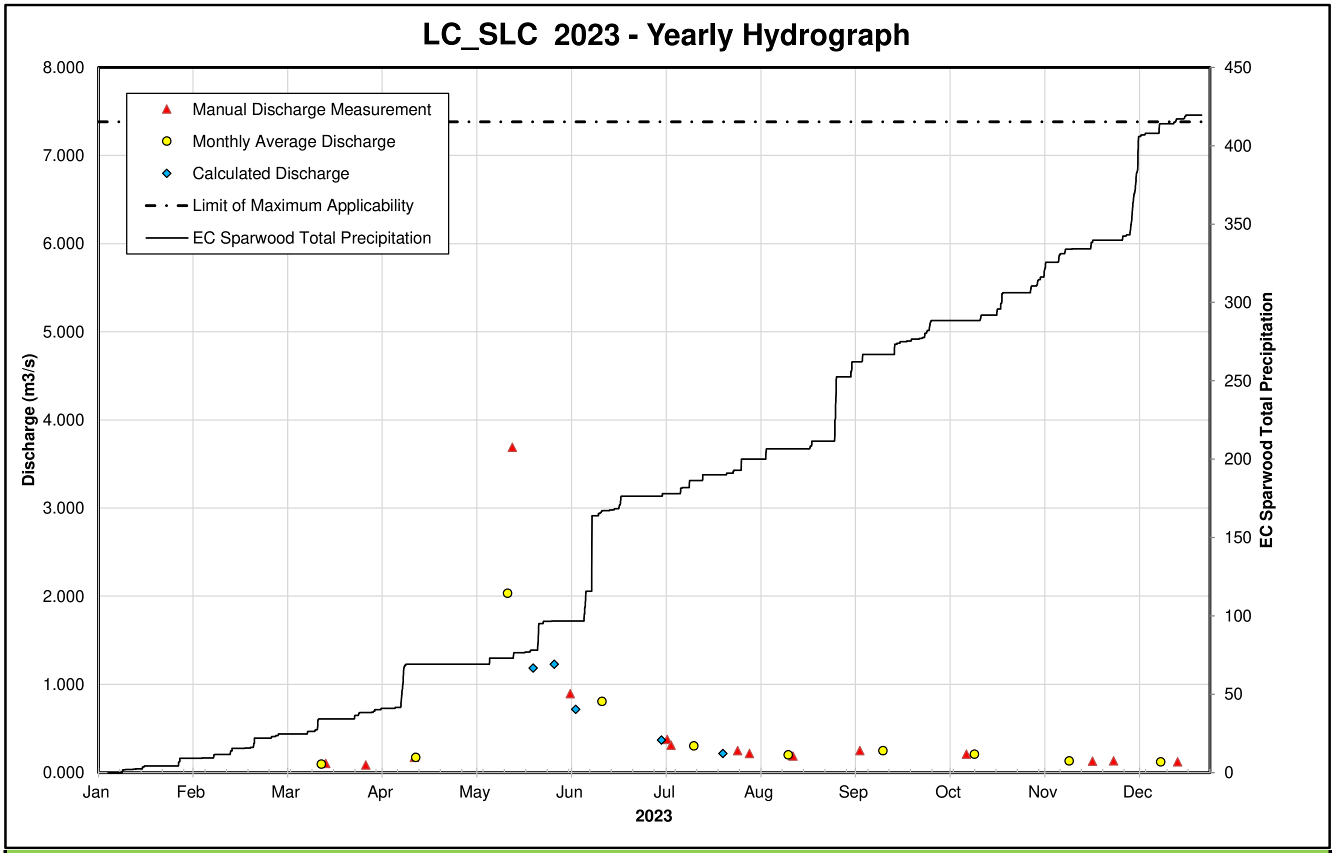
Station Description:	The South Line Creek site is located about 500 m upstream of the confluence with Line Creek. The station consits of a staff gauge.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by MAD and AWTF Design data uses.

Summary Table of Yearly Discharge Measurements

Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
March 16, 2023	-	0.103	B	-	-	-	LCO Measurement, 22 Panels, Max 9.1%. Staff gauge out of water. Photos unusable.
March 29, 2023	-0.080	0.085	C	0.080	0.005	6.3%	KWL Measurement, 18 Panels, Max 14%. Staff gauge out of water. Photos used to calculate staff gauge.
April 14, 2023	-0.050	0.172	B	0.132	0.040	30.2%	LCO Measurement, 22 Panels, Max 9%. Staff gauge out of water. Photos used to calculate staff gauge.
May 16, 2023	0.335	3.691	B	3.227	0.464	14.4%	KWL Measurement, 23 Panels, Max 7.9%
May 23, 2023	0.165	-	E	1.186	-	-	Calculated Discharge
May 30, 2023	0.170	-	E	1.228	-	-	Calculated Discharge
June 4, 2023	0.100	0.895	B	0.717	0.177	24.7%	LCO Measurement, 23 Panels, Max 9.7%
June 6, 2023	0.100	-	E	0.717	-	-	Calculated Discharge
July 4, 2023	0.030	-	E	0.369	-	-	Calculated Discharge
July 6, 2023	0.031	0.373	B	0.373	0.000	0.1%	KWL Measurement, 21 Panels, Max 9.3%
July 7, 2023	0.040	0.311	B	0.410	-0.099	-24.1%	LCO Measurement, 26 Panels, Max 8%
July 24, 2023	-0.016	-	-	-	-	-	KWL Visit: Survey only. Staff gauge out of water. Photos used to calculate staff gauge.
July 29, 2023	-0.030	0.247	B	0.177	0.070	39.3%	LCO Measurement, 20 Panels, Max 8.9%. Staff gauge out of water. Photos used to calculate staff gauge.
August 2, 2023	-0.034	0.214	B	0.168	0.047	27.9%	KWL Measurement, 22 Panels, Max 9.8%. Staff gauge out of water. Photos used to calculate staff gauge.
August 16, 2023	-	0.184	B	-	-	-	LCO Measurement, 27 Panels, Max 8.4%. Staff gauge out of water. Photos unusable.
September 7, 2023	-0.040	0.248	B	0.154	0.095	61.7%	LCO Measurement, 20 Panels, Max 9.9%. Staff gauge out of water. Photos used to calculate staff gauge.
October 12, 2023	-0.024	0.208	C	0.192	0.016	8.1%	KWL Measurement, 21 Panels, Max 10.8%. Staff gauge out of water. Photos used to calculate staff gauge.
November 22, 2023	-	0.127	C	-	-	-	LCO Measurement, 25 Panels, Max 12.3%. Staff gauge out of water. No photos
November 29, 2023	-	0.133	C	-	-	-	LCO Measurement, 24 Panels, Max 10.4%. Staff gauge out of water. No photos
December 20, 2023	-	0.120	B	-	-	-	LCO Measurement, 20 Panels, Max 8.4%. Staff gauge out of water. No photos
	-	-	-	-	-	-	

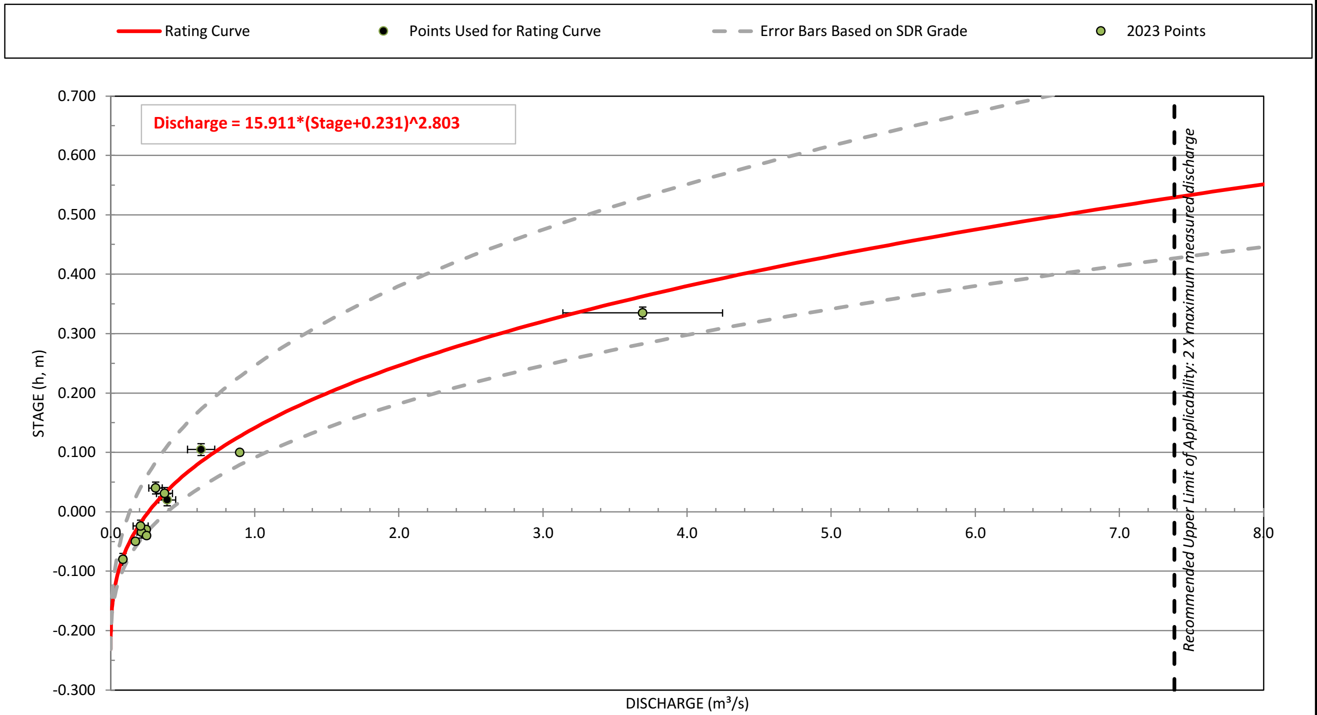
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m^3/sec											
January	February	March	April	May	June	July	August	September	October	November	December
#N/A	#N/A	0.094	0.172	2.035	0.806	0.303	0.199	0.248	0.208	0.130	0.120



Stage Discharge Relationship					
Year SDR Created:	2023	**Updated from Previous Year:**	N/A	**SDR Data Grade:**	E
Reason For Change		**Data Grade Rational:**	SDR creation was not possible in 2022 as the staff gauge was not wetted for the majority of the year. In 2023 an SDR was created by measuring the negative stage from photos. Due to uncertainty with this method, the SDR has been graded E.		

LC_SLC 2023 SDR
(Estimated by the Method of Maximum Liklihood)



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Appendix H

LC_LCDSSLC

Station Details			
Station Name:	**Line Creek Immediately Downstream of South Line Creek confluence**	**Reporting Year:**	**2023**
Site ID:	**LC_LCDSSLC**	**Station Type:**	Year-Round Continuous Data
EMS:	**E297110**	**Teck Mine:**	Line Creek Operation

Station Description:	This station is located on Line Creek located immediately downstream of the South Line Creek Confluence. A permanent bubbler water level sensor and datalogger are present at the site.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by MAD and RWQM data uses.

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - March 20, 2023	E	Station operating as expected, potential ice in channel
March 21 - April 30, 2023	B	Station operating as expected
May 1 - July 4, 2023	C	Stage above 0.350 m, lack of rating points above this stage warrants a lower data grade
July 5 - November 1, 2023	B	Station operating as expected
November 2 - December 31, 2023	E	Station operating as expected, potential ice in channel

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

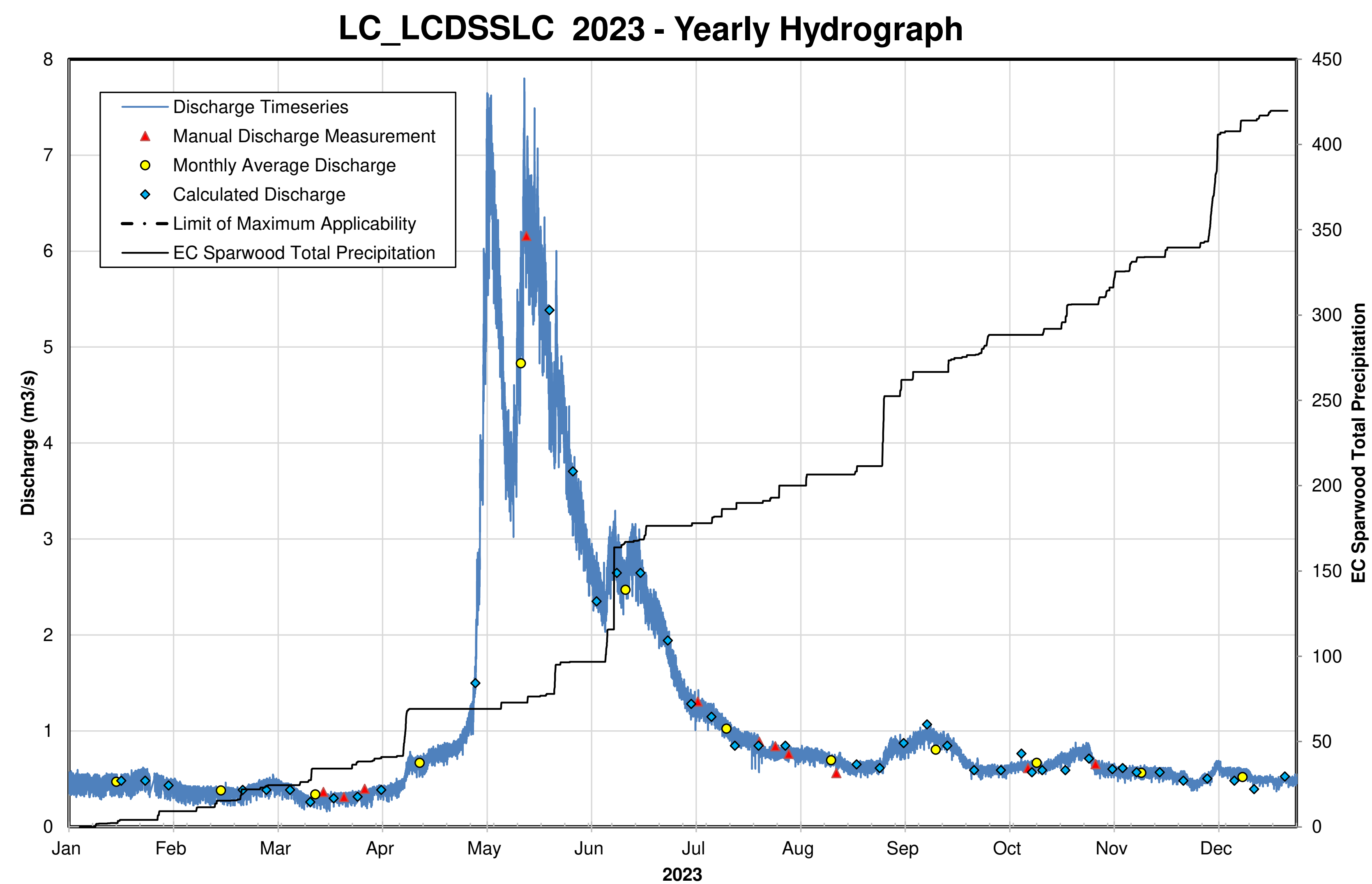
Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 16, 2023	0.290	-	E	0.482	-	-	Calculated Discharge
January 23, 2023	0.290	-	E	0.482	-	-	Calculated Discharge
January 30, 2023	0.285	-	E	0.432	-	-	Calculated Discharge
February 21, 2023	0.280	-	E	0.384	-	-	Calculated Discharge
February 28, 2023	0.280	-	E	0.384	-	-	Calculated Discharge
March 7, 2023	0.280	-	E	0.384	-	-	Calculated Discharge
March 13, 2023	0.265	-	E	0.260	-	-	Calculated Discharge
March 17, 2023	0.270	0.364	B	-	-	-	LCO Measurement, 27 Panels, Max 6.9% Ice-affected measurement.
March 20, 2023	0.270	-	E	0.298	-	-	Calculated Discharge
March 23, 2023	0.274	0.312	B	0.331	-0.019	-5.8%	LCO Measurement, 21 Panels, Max 9.1%
March 27, 2023	0.272	-	B	0.315	-	-	Calculated Discharge
March 29, 2023	0.278	0.396	B	0.366	0.029	8.0%	KWL Measurement, 21 Panels, Max 8.3%
April 3, 2023	0.280	-	B	0.384	-	-	Calculated Discharge
May 1, 2023	0.360	-	C	1.498	-	-	Calculated Discharge
May 16, 2023	0.522	6.157	B	6.231	-0.074	-1.2%	KWL Measurement, 21 Panels, Max 9.1%
May 23, 2023	0.500	-	C	5.386	-	-	Calculated Discharge
May 30, 2023	0.450	-	C	3.704	-	-	Calculated Discharge
June 6, 2023	0.400	-	C	2.350	-	-	Calculated Discharge
June 12, 2023	0.412	-	C	2.645	-	-	Calculated Discharge
June 19, 2023	0.412	-	C	2.645	-	-	Calculated Discharge
June 27, 2023	0.382	-	C	1.941	-	-	Calculated Discharge
July 4, 2023	0.348	-	B	1.281	-	-	Calculated Discharge
July 6, 2023	0.345	1.306	B	1.230	0.076	6.2%	KWL Measurement 25 Panels, Max 9.3%
July 10, 2023	0.340	-	B	1.146	-	-	Calculated Discharge
July 17, 2023	0.320	-	B	0.844	-	-	Calculated Discharge
July 24, 2023	0.320	-	B	0.844	-	-	Calculated Discharge
July 24, 2023	0.322	0.886	B	0.872	0.014	1.5%	KWL Measurement 26 Panels, Max 9%
July 29, 2023	0.320	0.841	B	0.844	-0.003	-0.4%	LCO Measurement, 23 Panels, Max 9.8%
August 1, 2023	0.320	-	B	0.844	-	-	Calculated Discharge
August 2, 2023	0.316	0.760	B	0.790	-0.030	-3.8%	KWL Measurement 23 Panels, Max 8%
August 16, 2023	0.303	0.561	B	0.626	-0.065	-10.3%	LCO Measurement, 20 Panels, Max 9.5%
August 22, 2023	0.305	-	B	0.650	-	-	Calculated Discharge
August 29, 2023	0.302	-	B	0.614	-	-	Calculated Discharge

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
September 5, 2023	0.322	-	B	0.872	-	-	Calculated Discharge
September 12, 2023	0.335	-	B	1.066	-	-	Calculated Discharge
September 18, 2023	0.320	-	B	0.844	-	-	Calculated Discharge
September 26, 2023	0.300	-	B	0.591	-	-	Calculated Discharge
October 4, 2023	0.300	-	B	0.591	-	-	Calculated Discharge
October 10, 2023	0.314	-	B	0.763	-	-	Calculated Discharge
October 12, 2023	0.304	0.612	B	0.638	-0.025	-4.0%	KWL Measurement, 21 Panels, Max 8.6%
October 13, 2023	0.298	-	B	0.568	-	-	Calculated Discharge
October 16, 2023	0.300	-	B	0.591	-	-	Calculated Discharge
October 23, 2023	0.300	-	B	0.591	-	-	Calculated Discharge
October 30, 2023	0.310	-	B	0.712	-	-	Calculated Discharge
November 1, 2023	0.304	0.654	B	0.638	0.017	2.6%	LCO Measurement 21 Panels, Max 10%
November 6, 2023	0.301	-	E	0.602	-	-	Calculated Discharge
November 9, 2023	0.302	-	E	0.614	-	-	Calculated Discharge
November 13, 2023	0.298	-	E	0.568	-	-	Calculated Discharge
November 20, 2023	0.298	-	E	0.568	-	-	Calculated Discharge
November 27, 2023	0.290	-	E	0.482	-	-	Calculated Discharge
December 4, 2023	0.292	-	E	0.503	-	-	Calculated Discharge
December 12, 2023	0.290	-	E	0.482	-	-	Calculated Discharge
December 18, 2023	0.281	-	E	0.394	-	-	Calculated Discharge
December 27, 2023	0.294	-	E	0.524	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

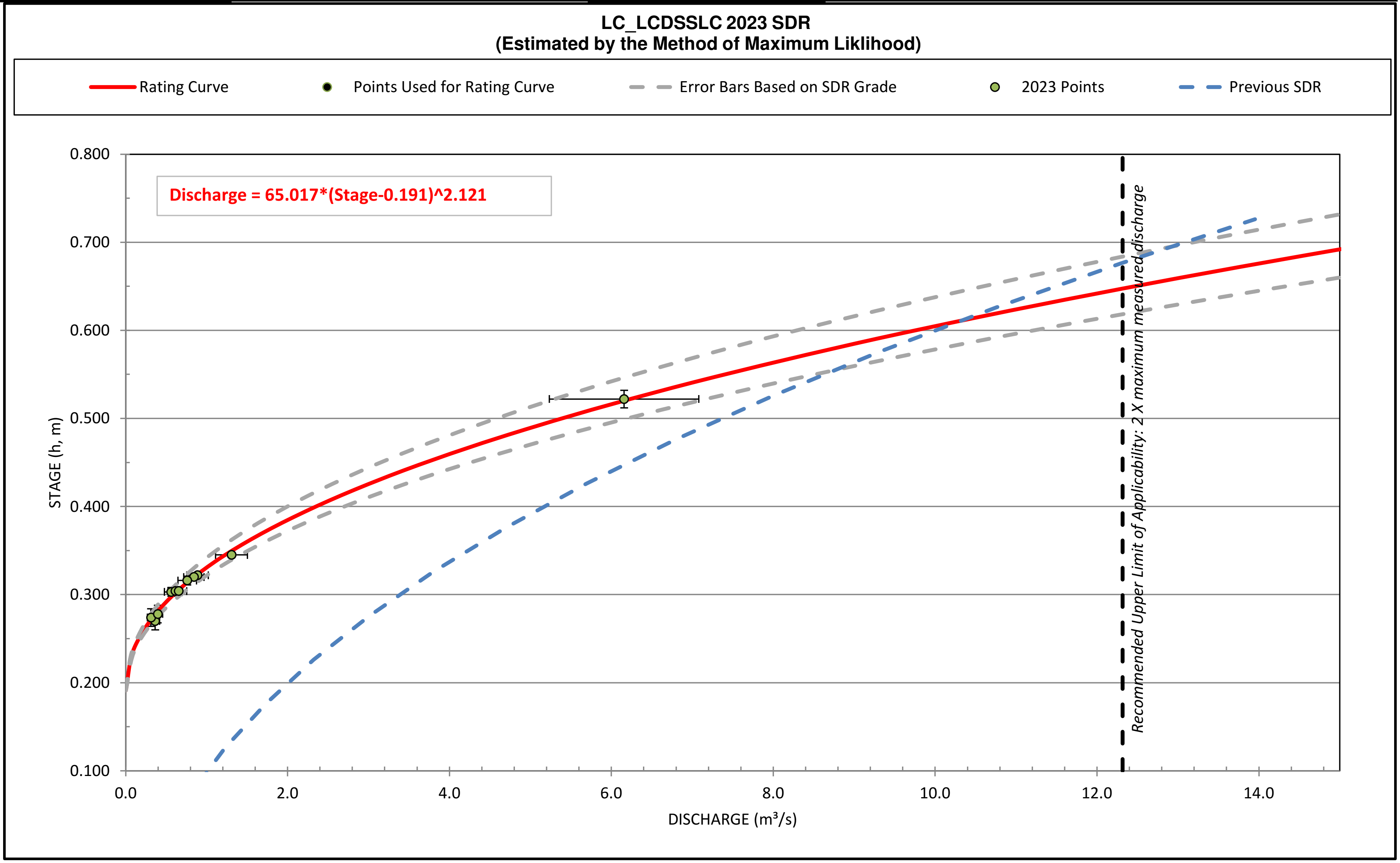
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m3/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.471	0.380	0.339	0.669	4.831	2.471	1.025	0.694	0.805	0.666	0.564	0.521



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2023	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	B
Reason For Change	Clear change in trend	**Data Grade Rational:**	Good agreement with 2023 manual measurements and new SDR.		



LC_LCDSSLC
Summary Report
Year: 2023
Measurement: Final Discharge (m3/s)

2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.477	0.427 PK	0.448	0.376	1.595	3.233 PK	1.453 PK	0.772	0.819	0.585	0.624 PK	0.451
2	0.481	0.404	0.454 PK	0.387	2.679	3.074	1.387	0.778	0.827	0.594	0.618	0.472
3	0.476	0.380	0.444	0.385	3.963	2.884	1.318	0.777	0.832	0.591	0.615	0.501
4	0.465	0.365	0.431	0.377	5.717	2.721	1.281	0.756	0.826	0.590	0.601	0.512
5	0.462	0.371	0.409	0.374	6.837	2.642	1.250	0.759	0.821	0.587	0.604	0.534
6	0.469	0.362	0.400	0.398	6.667	2.551	1.229	0.757 PK	0.840	0.600	0.611	0.586
7	0.448	0.373	0.395	0.403	5.979	2.439	1.231	0.766	0.850	0.623	0.589	0.636 PK
8	0.468	0.369	0.376	0.419	5.510	2.320	1.208	0.755	0.892	0.620	0.576	0.602
9	0.469	0.367	0.354	0.435	4.729	2.426	1.194	0.748	0.916	0.630	0.573	0.574
10	0.440	0.373	0.329	0.502	4.053	2.781	1.189	0.758	0.922	0.636	0.567	0.578
11	0.455	0.362	0.305	0.632	3.767	2.924	1.147	0.740	0.948	0.643	0.575	0.578
12	0.478	0.357	0.290	0.677	3.764	2.772	1.124	0.735	0.957	0.642	0.582	0.568
13	0.464	0.370	0.284	0.650	4.173	2.692	1.083	0.721	0.953 PK	0.639	0.580	0.567
14	0.472	0.375	0.293	0.659	4.911	2.615	1.047	0.705	0.943	0.641	0.573	0.569
15	0.445	0.355	0.288	0.654	5.896	2.637	1.011	0.692	0.920	0.641	0.575	0.568
16	0.459	0.362	0.278	0.682	6.504 PK	2.825	0.967	0.686	0.906	0.622	0.572	0.561
17	0.489	0.355	0.282	0.712	6.140	2.879	0.935	0.694	0.908	0.624	0.570	0.522
18	0.474	0.361	0.288	0.743	6.002	2.766	0.921	0.664	0.875	0.644	0.569	0.490
19	0.452	0.355	0.300	0.745	6.118	2.654	0.909	0.637	0.860	0.655	0.571	0.491
20	0.506	0.353	0.313	0.761	5.843	2.456	0.903	0.619	0.834	0.674	0.565	0.492
21	0.517	0.346	0.316	0.778	5.511	2.314	0.906	0.599	0.794	0.696	0.566	0.489
22	0.543 PK	0.369	0.307	0.777	5.323	2.253	0.887	0.606	0.751	0.713	0.570	0.494
23	0.519	0.390	0.316	0.794	4.765	2.212	0.868	0.629	0.692	0.714	0.561	0.499
24	0.500	0.399	0.315	0.805	4.317	2.192	0.834	0.630	0.661	0.721	0.535	0.464
25	*	0.407	0.320	0.832	4.780	2.123	0.780	0.624	0.632	0.762	0.516	0.463
26	0.482	0.430	0.321	0.834	4.368	2.034	0.777	0.628	0.610	0.769 PK	0.525	0.480
27	0.463	0.442	0.326	0.891	4.334	1.899	0.766	0.625	0.608	0.784	0.538	0.503
28	0.474	0.450	0.332	0.959	3.960	1.749	0.781	0.626	0.581	0.774	0.500	0.491
29	0.434		0.325	1.077	3.718	1.634	0.773	0.636	0.589	0.789	0.470	0.481
30	0.420		0.328	1.182 PK	3.489	1.530	0.768	0.670	0.595	0.781	0.450	0.481
31	0.436		0.347		3.354		0.767	0.743		0.696		0.484
Mean	**0.471**	**0.380**	**0.339**	**0.663**	**4.799**	**2.474**	**1.022**	**0.695**	**0.805**	**0.667**	**0.565**	**0.522**
Maximum	**0.543**	**0.450**	**0.454**	**1.182**	**6.837**	**3.233**	**1.453**	**0.778**	**0.957**	**0.789**	**0.624**	**0.636**
Minimum	**0.420**	**0.346**	**0.278**	**0.374**	**1.595**	**1.530**	**0.766**	**0.599**	**0.581**	**0.585**	**0.450**	**0.451**
Peak 5-Minute	**0.618**	**0.504+**	**0.547**	**1.454**	**7.800**	**3.625**	**1.623**	**0.846**	**1.053**	**0.877**	**0.694**	**0.690**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix I

LC_DC3

Station Details			
Station Name:	**Dry Creek upstream of East Tributary Creek**	**Reporting Year:**	**2023**
Site ID:	**LC_DC3**	**Station Type:**	Year-Round Continuous Data
EMS:	**E288273**	**Teck Mine:**	Line Creek Operation

Station Description:	DC3 is located on Dry Creek immediately upstream of the head pond/intake for the Dry Creek Settling Ponds.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by AWTF design data use.

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1- January 23, 2023	E	Station operated as expected, potential ice in channel.
January 24- February 4, 2023	M	Ice affected data removed.
February 5- February 21, 2023	E	Station operated as expected, potential ice in channel.
February 22- February 27, 2023	M	Ice affected data removed.
February 28- March 9, 2023	E	Station operated as expected, potential ice in channel.
March 9- March 11, 2023	M	Ice affected data removed.
March 12- 31, 2023	E	Station operated as expected, potential ice in channel.
April 1 - May 3, 2023	E	Station operated as expected. Lack of ice-free, open-channel measurements prior to freshet warrants a downgrade in data.
May 3 - May 17, 2023	E	New SDR in effect. Uncertainty with new SDR timing and lack of measurements over freshet warrants a downgrade in data.
May 17 - November 1, 2023	C	New SDR in effect. Station operated as expected.
November 2- November 23, 2023	E	Station operated as expected, potential ice in channel
November 24- November 28, 2023	M	Ice affected data removed
November 29- December 31, 2023	E	Station operated as expected, potential ice in channel

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 17, 2023	0.110	-	E	0.030	-	-	Calculated Discharge
March 22, 2023	-	0.035	B	-	-	-	LCO Measurement, 20 Panels, Max 9.5%. Staff gauge frozen. Ice affected measurement.
March 30, 2023	0.137	0.046	E	-	-	-	KWL Measurement, 16 Panels, Max 22.4%. Ice affected measurement.
April 4, 2023	0.130	-	E	0.050	-	-	Calculated Discharge
April 6, 2023	0.130	0.050	B	0.050	0.000	0.4%	LCO Measurement, 24 Panels, Max 8.8%
April 13, 2023	0.192	-	E	0.153	-	-	Calculated Discharge
May 2, 2023	0.270	-	E	0.381	-	-	Calculated Discharge
May 17, 2023	0.215	0.188	B	0.187	0.000	0.2%	KWL Measurement, 21 Panels, Max 10%
May 24, 2023	0.200	-	C	0.140	-	-	Calculated Discharge
May 27, 2023	0.192	0.135	B	0.118	0.017	14.2%	LCO Measurement, 22 Panels, Max 9.6%
June 1, 2023	0.200	-	C	0.140	-	-	Calculated Discharge
June 7, 2023	0.190	-	C	0.113	-	-	Calculated Discharge
June 13, 2023	0.184	-	C	0.099	-	-	Calculated Discharge
June 20, 2023	0.182	-	C	0.095	-	-	Calculated Discharge
June 28, 2023	0.172	-	C	0.074	-	-	Calculated Discharge
July 5, 2023	0.164	-	C	0.061	-	-	Calculated Discharge
July 6, 2023	0.178	0.069	C	0.086	-0.017	-19.8%	KWL Measurement, 21 Panels, Max 12.3%
July 12, 2023	0.170	-	C	0.071	-	-	Calculated Discharge
July 18, 2023	0.160	-	C	0.054	-	-	Calculated Discharge
July 19, 2023	-	0.080	C	-	-	-	LCO Measurement, 22 Panels, Max 11.7%. No staff gauge reading.
July 25, 2023	0.159	0.054	C	0.053	0.001	2.1%	KWL Measurement 24 Panels, Max 12%
July 25, 2023	0.158	-	C	0.051	-	-	Calculated Discharge
August 1, 2023	0.160	-	C	0.054	-	-	Calculated Discharge
August 2, 2023	0.162	0.063	C	0.057	0.006	9.8%	KWL Measurement 24 Panels, Max 16%
August 8, 2023	0.155	-	C	0.047	-	-	Calculated Discharge
August 15, 2023	0.150	-	C	0.041	-	-	Calculated Discharge
August 21, 2023	0.160	-	E	0.054	-	-	Calculated Discharge. Suspect staff gauge.
August 29, 2023	0.148	-	C	0.038	-	-	Calculated Discharge
August 31, 2023	0.165	0.061	E	0.062	-0.001	-1.3%	LCO Measurement, 25 Panels, Max 28.5%.
September 6, 2023	0.162	-	C	0.057	-	-	Calculated Discharge
September 11, 2023	0.155	-	C	0.047	-	-	Calculated Discharge
September 25, 2023	0.160	-	C	0.054	-	-	Calculated Discharge
October 3, 2023	0.160	-	C	0.054	-	-	Calculated Discharge

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
October 11, 2023	0.150	-	C	0.041	-	-	Calculated Discharge
October 12, 2023	0.151	0.042	C	0.042	0.000	-0.3%	KWL Measurement, 20 Panels, Max 10.8%
October 17, 2023	0.162	-	C	0.057	-	-	Calculated Discharge
October 24, 2023	0.154	-	C	0.046	-	-	Calculated Discharge
October 31, 2023	0.152	-	C	0.043	-	-	Calculated Discharge
November 8, 2023	0.152	-	E	0.043	-	-	Calculated Discharge
November 14, 2023	0.150	-	E	0.041	-	-	Calculated Discharge
November 21, 2023	0.150	-	E	0.041	-	-	Calculated Discharge
December 7, 2023	0.148	-	E	0.038	-	-	Calculated Discharge
December 12, 2023	0.148	-	E	0.038	-	-	Calculated Discharge
December 19, 2023	0.139	-	E	0.029	-	-	Calculated Discharge
December 27, 2023	0.152	-	E	0.043	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
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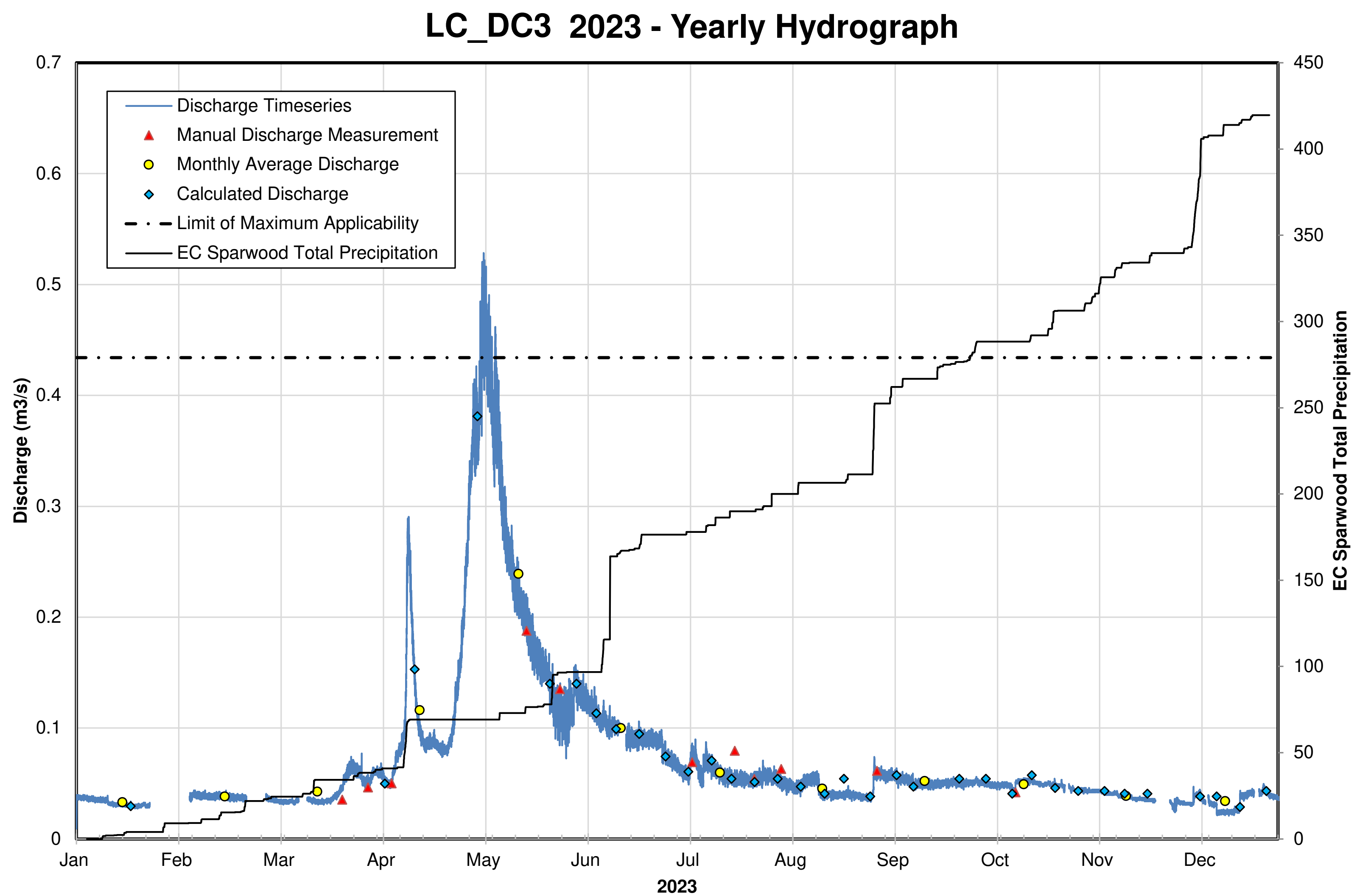
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

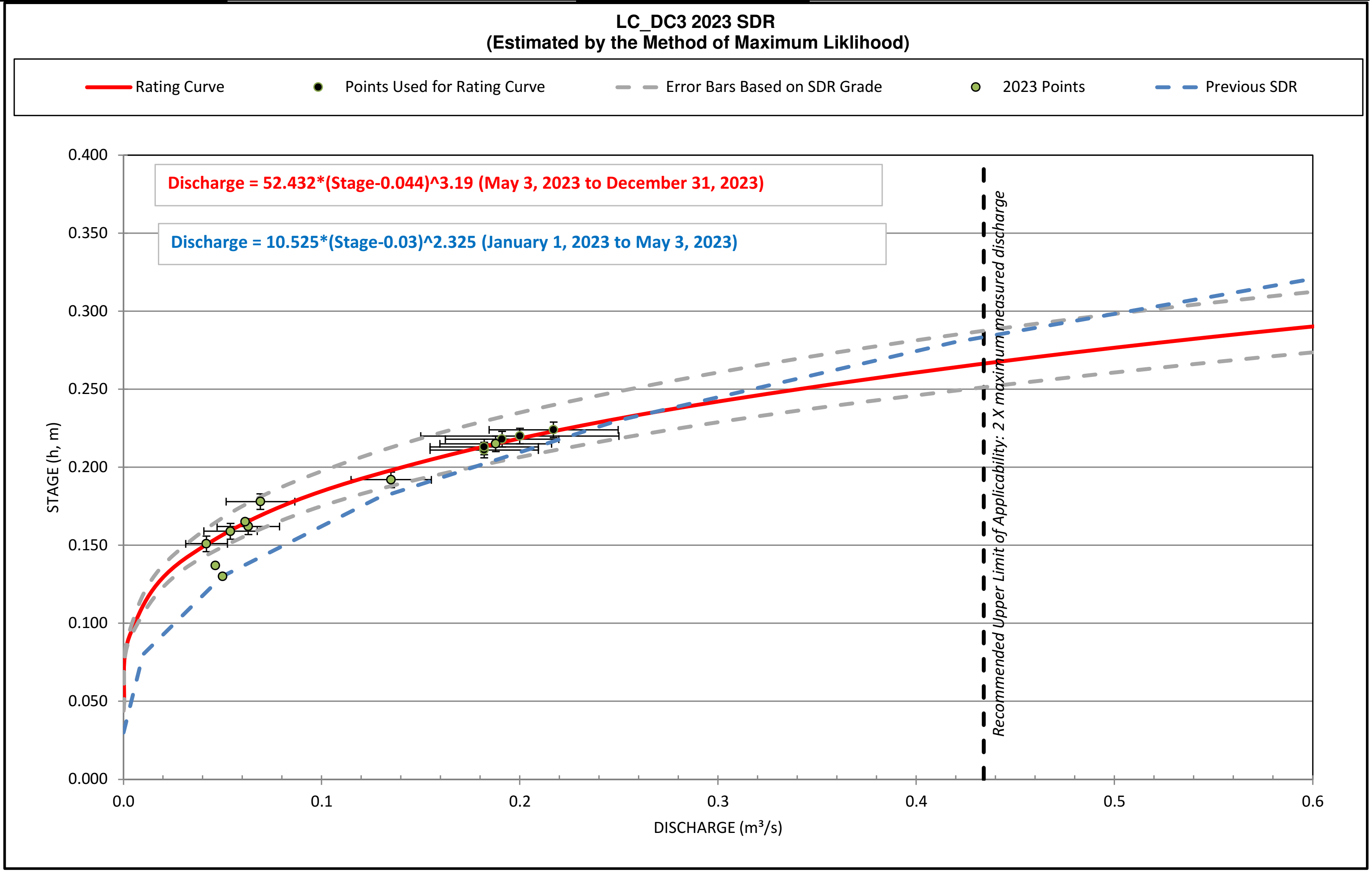
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m^3/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.033	0.038	0.043	0.116	0.239	0.100	0.060	0.045	0.052	0.049	0.039	0.034



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2023	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	C
Reason For Change	Clear change in trend	**Data Grade Rational:**	Lack of ice-free, open-channel measurements prior to freshet warrants Grade E for this period. Minimum number of measurements post-freshet warrants Grade C SDR.		



LC_DC3

Summary Report
Year: 2023
Measurement: Final Discharge (m3/s)

2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.037	*	0.035	0.060	0.363	0.138 PK	0.068	0.054	0.059 PK	0.051	0.044 PK	0.033
2	0.037	*	0.035	0.060	0.376	0.131	0.065	0.052	0.058	0.051	0.044	0.032
3	0.037 PK	*	0.034	0.058	0.425	0.128	0.062	0.050	0.056	0.050	0.043	0.032
4	0.037	0.037	0.033	0.053	0.463 PK	0.125	0.059	0.049	0.058	0.049	0.043	0.031
5	0.036	0.040 PK	0.033	0.050	0.441	0.120	0.059	0.049	0.058	0.049	0.044	0.035
6	0.036	0.040	0.034	0.053	0.415	0.119	0.076	0.046	0.056	0.048	0.043	0.040
7	0.035	0.039	0.034	0.066	0.382	0.114	0.074 PK	0.047	0.054	0.049	0.043	0.039
8	0.035	0.039	0.034	0.077	0.388	0.106	0.063	0.048	0.054	0.049	0.042	0.034
9	0.035	0.039	0.035	0.084	0.333	0.108	0.058	0.050	0.054	0.048	0.041	0.037
10	0.033	0.038	*	0.112	0.288	0.104	0.071	0.049	0.053	0.048	0.041	0.032
11	0.032	0.038	0.036	0.254	0.264	0.100	0.070	0.048	0.050	0.046	0.041	0.030
12	0.031	0.039	0.036	0.209	0.255	0.102	0.067	0.047	0.049	0.048	0.040	0.028
13	0.031	0.039	0.035	0.144	0.234	0.099	0.064	0.046	0.050	0.052	0.039	0.027
14	0.031	0.038	0.034	0.108	0.223	0.102	0.061	0.043	0.050	0.052	0.038	0.027
15	0.031	0.038	0.034	0.093	0.214	*	0.058	0.054	0.049	0.052	0.037	0.026
16	0.030	0.037	0.033	0.085	0.207	0.090	0.056	0.065	0.049	0.052	0.037	0.026
17	0.030	0.037	0.034	0.087	0.196	0.093	0.056	0.065	0.049	0.052 PK	0.036	0.026
18	0.030	0.037	0.034	0.088	0.183	0.091	0.055	0.066	0.049	0.051	0.036	0.027
19	0.029	0.037	0.036	0.088	0.172	0.090	0.054	0.066	0.049	0.050	0.036	0.034
20	0.030	0.037	0.039	0.084	0.164	0.091	0.054	0.066	0.050	0.049	0.036	0.039
21	0.031	0.036	0.042	0.081	0.156	0.091	0.054	0.066	0.050	0.049	0.035	0.040
22	0.030	*	0.047	0.080	0.153	0.089	0.053	0.069	0.050	0.050	0.035	0.042
23	0.030	*	0.056	0.082	0.151	0.090	0.054	0.068	0.051	0.049	0.035	0.042
24	*	*	0.062	0.091	0.136	0.090	0.052	0.067	0.051	0.049	*	*
25	*	*	0.064	0.113	0.127	0.089	0.054	0.066	0.050	0.048	*	0.042
26	*	*	0.063	0.139	0.117	0.089	0.054	0.066	0.049	0.049	*	0.045 PK
27	*	0.037	0.061	0.169	0.116	0.082	0.055	0.066	0.051	0.045	*	0.043
28	*	0.036	0.056 PK	0.212	0.113	0.076	0.058	0.065	0.051	0.047	0.032	0.040
29	*		0.051	0.269	0.114	0.073	0.057	0.064	0.051	0.045	0.029	0.039
30	*		0.050	0.332 PK	0.119	0.071	0.056	0.075 PK	0.052	0.044	0.034	0.037
31	*		0.057		0.124		0.056	0.061		0.044		0.036
Mean	**0.033**	**0.038**	**0.042**	**0.116**	**0.239**	**0.100**	**0.060**	**0.058**	**0.052**	**0.049**	**0.039**	**0.035**
Maximum	**0.037**	**0.040**	**0.064**	**0.332**	**0.463**	**0.138**	**0.076**	**0.075**	**0.059**	**0.052**	**0.044**	**0.045**
Minimum	**0.029**	**0.036**	**0.033**	**0.050**	**0.113**	**0.071**	**0.052**	**0.043**	**0.049**	**0.044**	**0.029**	**0.026**
Peak 5-Minute	**0.040**	**0.044+**	**0.077**	**0.362**	**0.528**	**0.157**	**0.090**	**0.100**	**0.066**	**0.055**	**0.046+**	**0.050**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix J

LC_DCEF

Station Details			
Station Name:	**East Tributary of Dry Creek**	**Reporting Year:**	**2023**
Site ID:	**LC_DCEF**	**Station Type:**	Year-Round Continuous Data
EMS:	**E288274**	**Teck Mine:**	Line Creek Operation

Station Description:	The Dry Creek East Fork (DCEF) hydrometric station is located on a tributary to Dry Creek known as East Fork. The hydrometric station is located immediately downstream of the Dry Creek Forest Service Road (FSR) bridge about 110 m upstream of the confluence with Dry Creek.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by WQ sampling data use.

Data Quality Assessment - Continuous Data

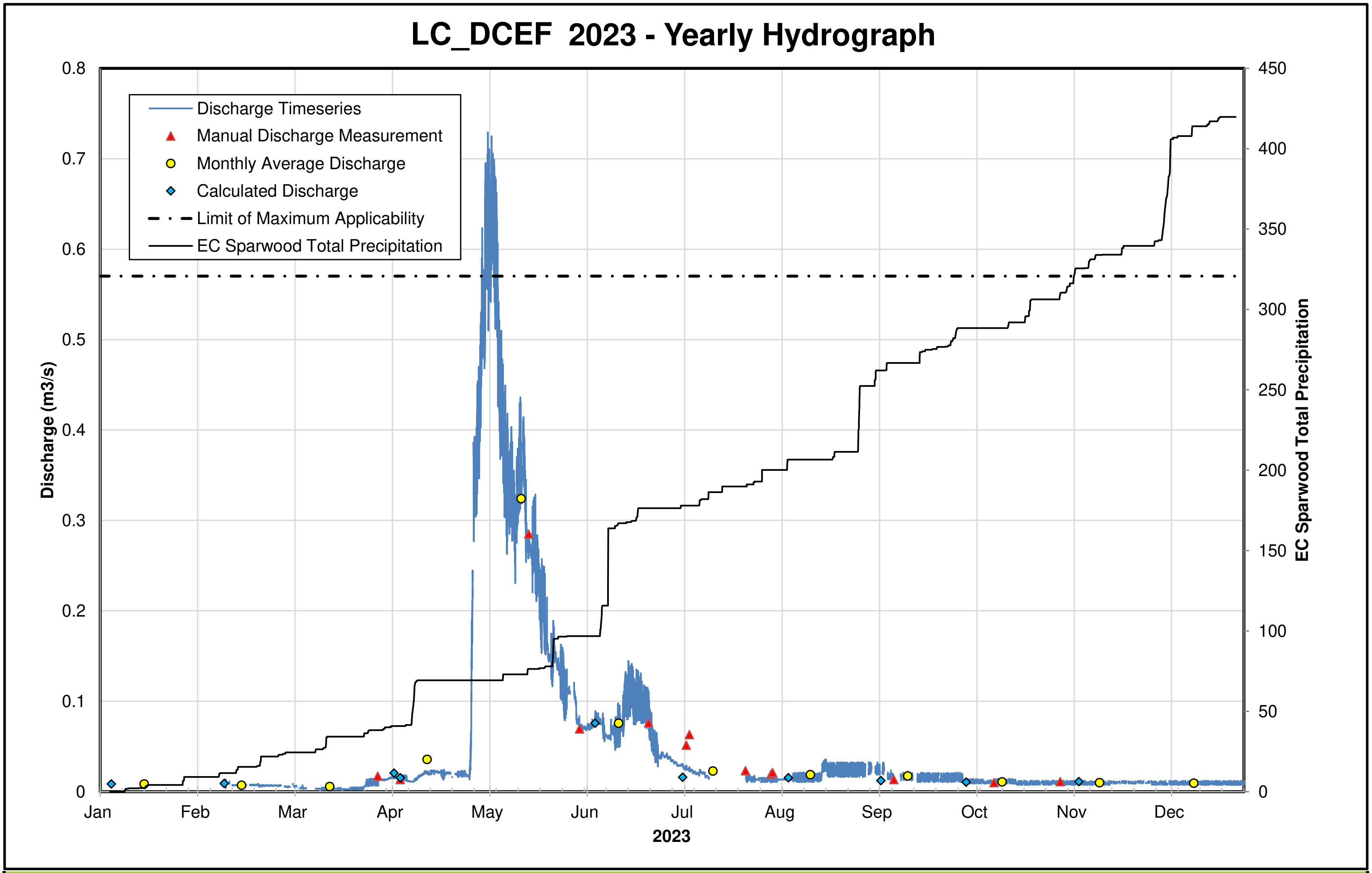
Data Range	Data Quality Assessment Grade*	Description
January 1 - February 9, 2023	M	Logger failure, data not recovered.
February 9 - March 15, 2023	E	Potential for ice in channel.
March 16 - May 1, 2023	E	Data has been downgraded due to excessive bubbler painting.
May 2 - 7, 2023	E	Data has been downgraded due to excessive bubbler painting. Discharge above the limit of maximum applicability.
May 8 - July 13, 2023	E	Data has been downgraded due to excessive bubbler painting.
July 13 - July 25, 2023	M	Logger failure, data not recovered.
July 25 - November 15, 2023	E	Data has been downgraded due to excessive bubbler painting.
November 16 - December 31, 2023	E	Potential for ice in channel.

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 4, 2023	0.064	-	E	0.008	-	-	Calculated Discharge
February 9, 2023	0.066	-	E	0.009	-	-	Calculated Discharge
March 30, 2023	0.082	0.017	C	0.015	0.002	13.9%	KWL Measurement, 14 Panels, Max 14%
April 4, 2023	0.094	-	C	0.021	-	-	Calculated Discharge
April 6, 2023	0.083	0.013	B	0.015	-0.002	-12.7%	LCO Measurement, 20 Panels, Max 9.8%
April 6, 2023	0.083	-	C	0.015	-	-	Calculated Discharge
May 17, 2023	0.284	0.285	B	0.276	0.009	3.2%	KWL Measurement, 20 Panels, Max 9.2%
June 2, 2023	0.164	0.069	B	0.076	-0.006	-8.3%	LCO Measurement 23 Panels, Max 10%
June 7, 2023	0.164	-	C	0.076	-	-	Calculated Discharge
June 24, 2023	0.164	0.076	B	0.076	0.001	0.7%	LCO Measurement 27 Panels, Max 8%
July 5, 2023	0.084	-	E	0.016	-	-	Calculated Discharge. Old staff gauge faded and unreadable at low end - value suspicious.
July 6, 2023	0.104	0.051	C	0.026	0.025	97.3%	KWL Measurement, 16 Panels, Max 9.2%. Old staff gauge faded and unreadable at low end, staff reading is questionable.
July 7, 2023	0.104	0.063	B	0.026	0.037	142.3%	LCO Measurement, 24 Panels, Max 9.1%. Old staff gauge faded and unreadable at low end, staff reading is questionable.
July 25, 2023	0.099	0.023	B	0.023	-0.00003	-0.1%	KWL Measurement 21 Panels, Max 10.5%
August 2, 2023	0.093	0.020	C	0.020	-0.001	-2.9%	KWL Measurement 20 Panels, Max 12%
August 3, 2023	0.090	0.021	B	0.019	0.002	12.8%	LCO Measurement 21 Panels, Max 10%
August 8, 2023	0.083	-	C	0.015	-	-	Calculated Discharge
September 6, 2023	0.075	-	C	0.012	-	-	Calculated Discharge
September 10, 2023	0.070	0.013	C	0.010	0.003	29.3%	LCO Measurement, 18 Panels, Max 18.7%
October 3, 2023	0.070	-	C	0.010	-	-	Calculated Discharge
October 12, 2023	0.072	0.010	C	0.011	-0.0011	-10.2%	KWL Measurement, 15 Panels, Max 13.8%
November 2, 2023	0.072	0.011	C	0.011	-0.00004	-0.4%	LCO Measurement, 20 Panels, Max 13%
November 8, 2023	0.072	-	C	0.011	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

* Grades A, B, C, E and U based on the BC RISC Standards Document.

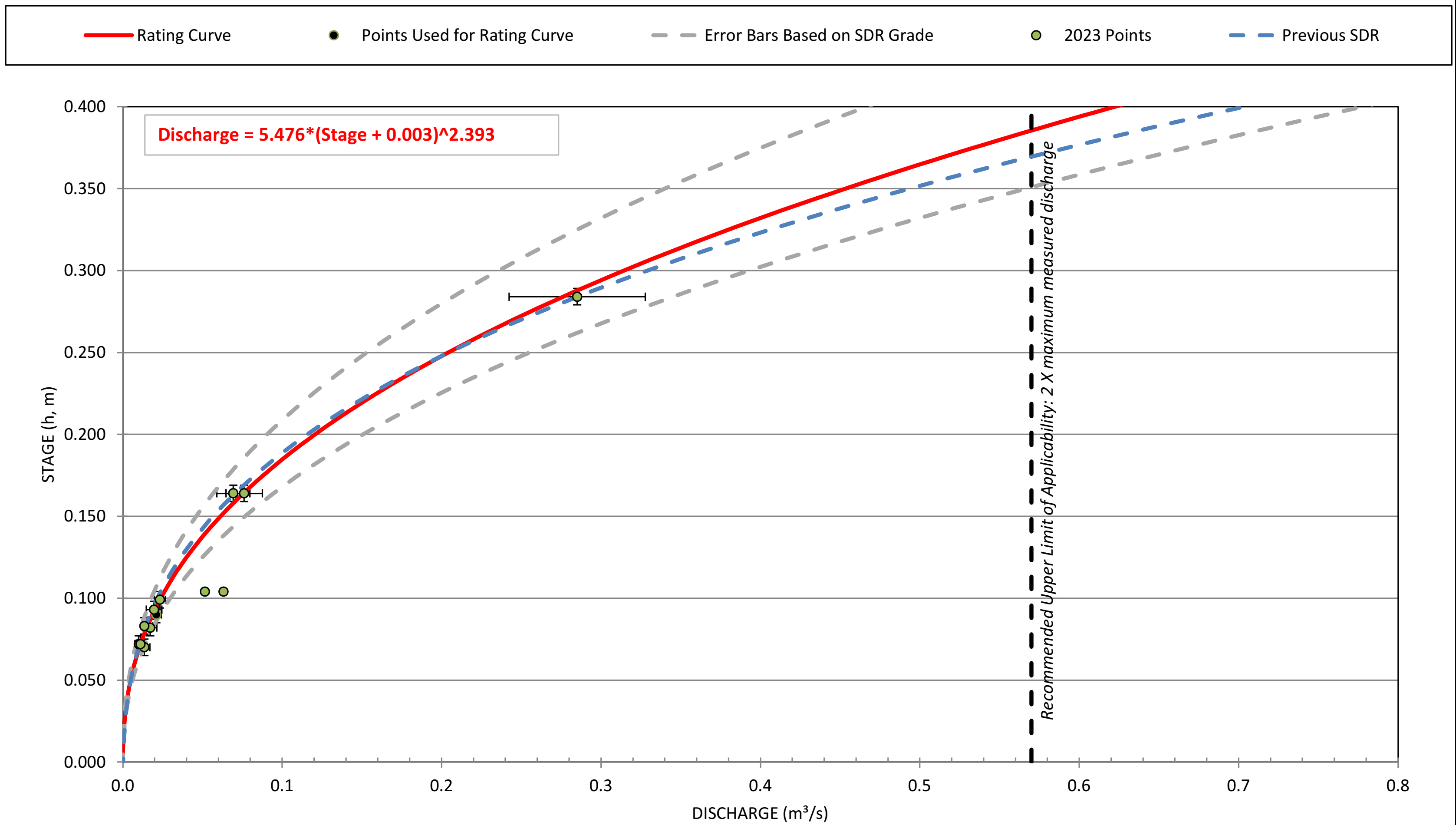
Monthly Average Discharge m³/sec											
January*	February	March	April	May	June	July	August	September	October	November	December
0.008	0.007	0.006	0.036	0.324	0.076	0.023	0.019	0.017	0.011	0.010	0.010



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2023	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	C
Reason For Change	New Staff Gauge	**Data Grade Rational:**	Staff gauge was replaced on July 25th resulting in a datum change. 2023 measurements showed reasonable agreement with the previous 2022 SDR; however a new SDR was developed in 2023 to refine the lower end.		

LC_DCEF 2023 SDR
(Estimated by the Method of Maximum Liklihood)



LC_DCEF
Summary Report
Year: 2023
Measurement: Final Discharge (m3/s)

2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	*	*	0.005	0.013	0.413	0.092	0.036 PK	0.013	0.023	0.016 PK	0.010	0.010 PK
2	*	*	0.006	0.014	0.514	0.075	0.033	0.012	0.027 PK	0.013	0.010	0.010
3	*	*	0.007	0.015	0.570	0.071	0.031	0.013	0.026	0.011	0.010	0.009
4	*	*	0.006	0.015	0.632 PK	0.070	0.029	0.013	0.024	0.011	0.010	0.010
5	*	*	0.004	0.016	0.632	0.071	0.028	0.013	0.025	0.012	0.010	0.009
6	*	*	0.004	0.016	0.620	0.073	0.026	0.013	0.022	0.011	0.010	0.008
7	*	*	0.004	0.015	0.530	0.080	0.025	0.013	0.026	0.011	0.009	0.010
8	*	*	0.007	0.013	0.436	0.081	0.022	0.013	0.017	0.011	0.011	0.009
9	*	0.009 PK	*	0.011	0.390	0.077	0.021	0.014	0.016	0.010	0.010	0.010
10	*	0.009	0.003	0.011	0.343	0.066	0.021	0.015	0.016	0.011	0.009 PK	0.010
11	*	0.010	0.003	0.014	0.327	0.061	0.021	0.015	*	0.011	0.009	0.010
12	*	0.007	0.003	0.017	0.306	0.065	0.018	0.015	0.017	0.012	0.009	0.010
13	*	0.007	0.004	0.019	0.315	0.065	0.016	0.015	0.016	0.012	0.009	0.010
14	*	0.007	0.004	0.021	0.365	0.070	*	0.015	0.017	0.012	0.009	0.010
15	*	0.007	0.003	0.020	0.366	0.070	*	0.016	0.017	0.011	0.010	0.009
16	*	0.007	0.003	0.021	0.306	0.084	*	0.015	0.015	0.011	0.010	0.010
17	*	0.007	0.003	0.022	0.270	0.107	*	0.015	*	0.012	0.009	0.009
18	*	0.007	0.003	0.022	0.270	0.110 PK	*	0.020	0.015	0.011	0.010	0.009
19	*	0.007	0.003	0.021	0.267	0.112	*	0.028 PK	0.016	0.011	0.010	0.010
20	*	0.007	0.003	0.020	0.240	0.098	*	0.025	0.015	0.010	0.010	0.010
21	*	0.007	0.003	0.021	0.210	0.102	*	0.024	0.015	0.009	0.010	0.010
22	*	0.007	0.003	0.020	0.181	0.095	*	0.024	0.017	0.010	0.011	0.009
23	*	0.007	0.004	0.016	0.156	0.094	*	0.024	0.015	0.010	0.010	0.009
24	*	0.007	0.004	0.019	0.148	0.087	*	0.024	0.015	0.009	0.011	0.010
25	*	0.007	0.004	0.020	0.156	0.064	0.014	0.024	0.014	0.009	0.010	0.009
26	*	0.007	0.007	0.020	0.142	0.049	0.015	0.025	0.016	0.010	0.010	0.009
27	*	0.007	0.010	0.018	0.132	0.042	0.014	0.024	0.015	0.010	0.011	0.009
28	*	0.006	0.010	0.025	0.120	0.039	0.014	0.024	0.016	0.009	0.011	0.010
29	*		0.011	0.206	0.109	0.039	0.013	0.024	0.017	0.010	0.010	0.009
30	*		0.013 PK	0.358 PK	0.110	0.039	0.013	0.023	0.017	0.010	0.010	0.009
31	*		0.013		0.109		0.013	0.024		0.010		0.010
Mean	**---**	**0.007**	**0.005**	**0.035**	**0.312**	**0.075**	**0.021**	**0.019**	**0.018**	**0.011**	**0.010**	**0.010**
Maximum	**---**	**0.010**	**0.013**	**0.358**	**0.632**	**0.112**	**0.036**	**0.028**	**0.027**	**0.016**	**0.011**	**0.010**
Minimum	**---**	**0.006**	**0.003**	**0.011**	**0.109**	**0.039**	**0.013**	**0.012**	**0.014**	**0.009**	**0.009**	**0.008**
Peak 5-Minute	**---**	**0.013**	**0.015+**	**0.423**	**0.729**	**0.145**	**0.039+**	**0.036+**	**0.033**	**0.021**	**0.012**	**0.012+**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix K

LC_SPDC

Station Details

Station Name:	**Dry Creek Sed. Ponds effluent to Dry Creek via the return channel**	**Reporting Year:**	**2023**
Site ID:	**LC_SPDC**	**Station Type:**	Year-Round Continuous Data
EMS:	**E295211**	**Teck Mine:**	Line Creek Operation

Station Description:	Area-Velocity meter installed at the outlet of the the Dry Creek Sediment Ponds outflow pipeline. The station is immediately upstream of the confluence with Dry Creek.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by WQ sampling data use.

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - July 11, 2023	B	Station operated as expected
July 11 - 14, 2023	B	Dry Creek Sediment Pond dewatering causes temporary jump in flow rates - valid.
July 14 - December 31, 2023	B	Station operated as expected

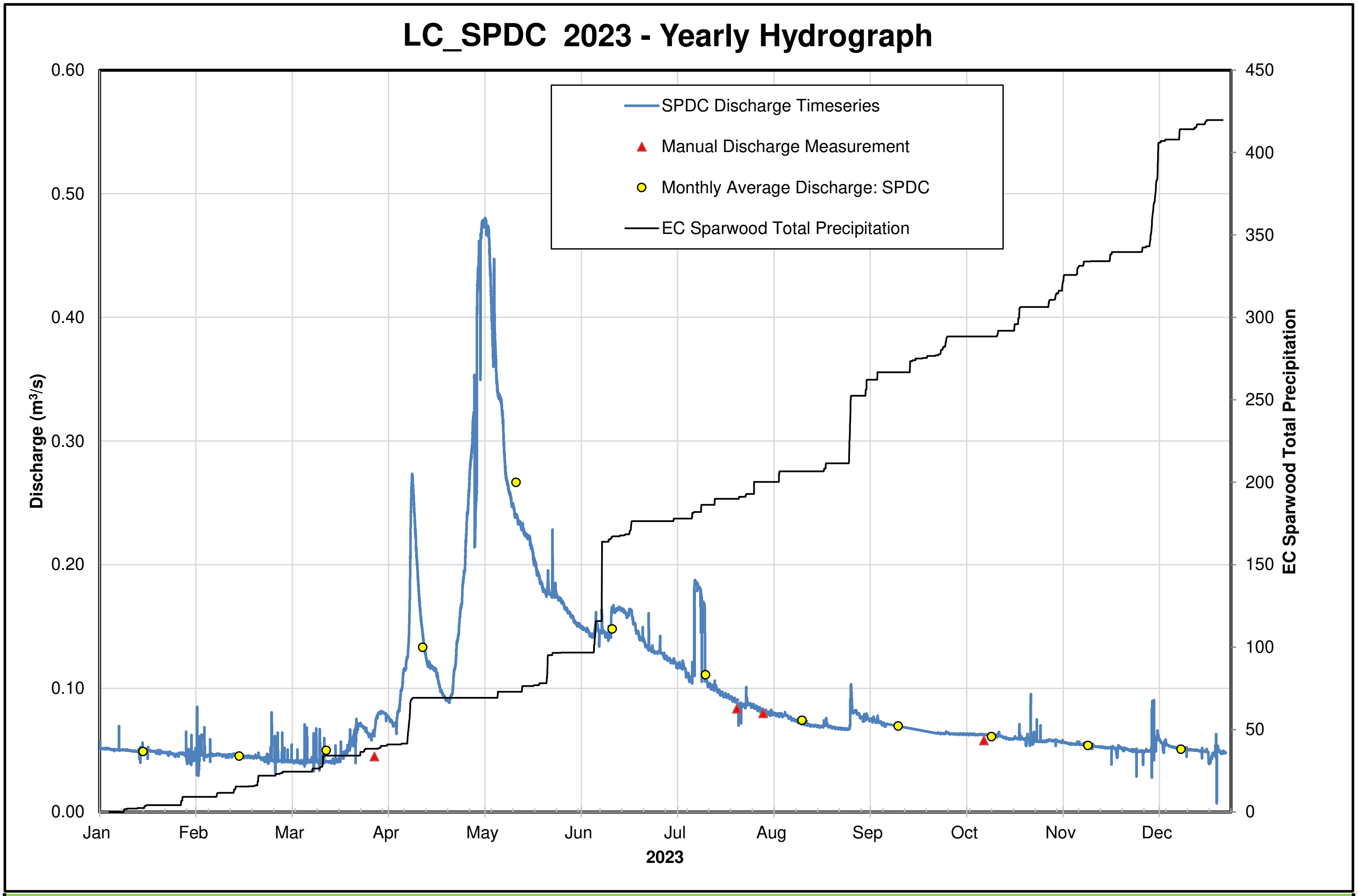
* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements

Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
March 30, 2023	-	0.05	B	-	-	-	KWL Measurement, MantaRay. Suspected algae build up on sensor mount and cable is aerating flow at pipe outlet. We suspect this is the reason for the manual measurement disagreement to sensor reading.
July 25, 2023	-	0.08	B	-	-	-	KWL Measurement, MantaRay. Sensor cleaned, large amount of algae removed from sensor cable and sensor mount. Flow much more laminar after algae removal.
August 2, 2023	-	0.08	B	-	-	-	KWL Measurement, MantaRay.
October 12, 2023	-	0.06	B	-	-	-	KWL Measurement, MantaRay.
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m³/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.049	0.045	0.050	0.133	0.267	0.148	0.111	0.074	0.070	0.061	0.054	0.051



* Calculated and/or manual measurements used to calculate monthly average

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Appendix L

LC_DCDS

Station Details			
Station Name:	**Dry Creek downstream of sedimentation ponds**	**Reporting Year:**	**2023**
Site ID:	**LC_DCDS**	**Station Type:**	Year-Round Continuous Data
EMS:	**E295210**	**Teck Mine:**	Line Creek Operation
Station Description:	The Dry Creek Downstream of Settling Ponds (DCDS) site is located immediately downstream of the Dry Creek Settling Ponds. This location captures flow from DCEF, the Dry Creek Settling Ponds and any flow bypassing the settling ponds via the head pond spillway.		
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol		
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B		
Rationale for Data Grade Recommendation (RSFMP)	Governed by WQ sampling data use.		

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1- January 29, 2023	E	Station operated as expected, potential ice in channel
January 30- Febuary 3, 2023	M	Ice affected data removed
February 4- February 22, 2023	E	Station operated as expected, potential ice in channel
February 23- February 25, 2023	M	Ice affected data removed
February 26- March 31, 2023	E	Station operated as expected, potential ice in channel
April 1- May 4, 2023	B	Station operated as expected
May 5- May 8, 2023	E	Flow above upper limit of SDR
May 9- October 31, 2023	B	Station operated as expected
November 1- December 31, 2023	E	Station operated as expected, potential ice in channel

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

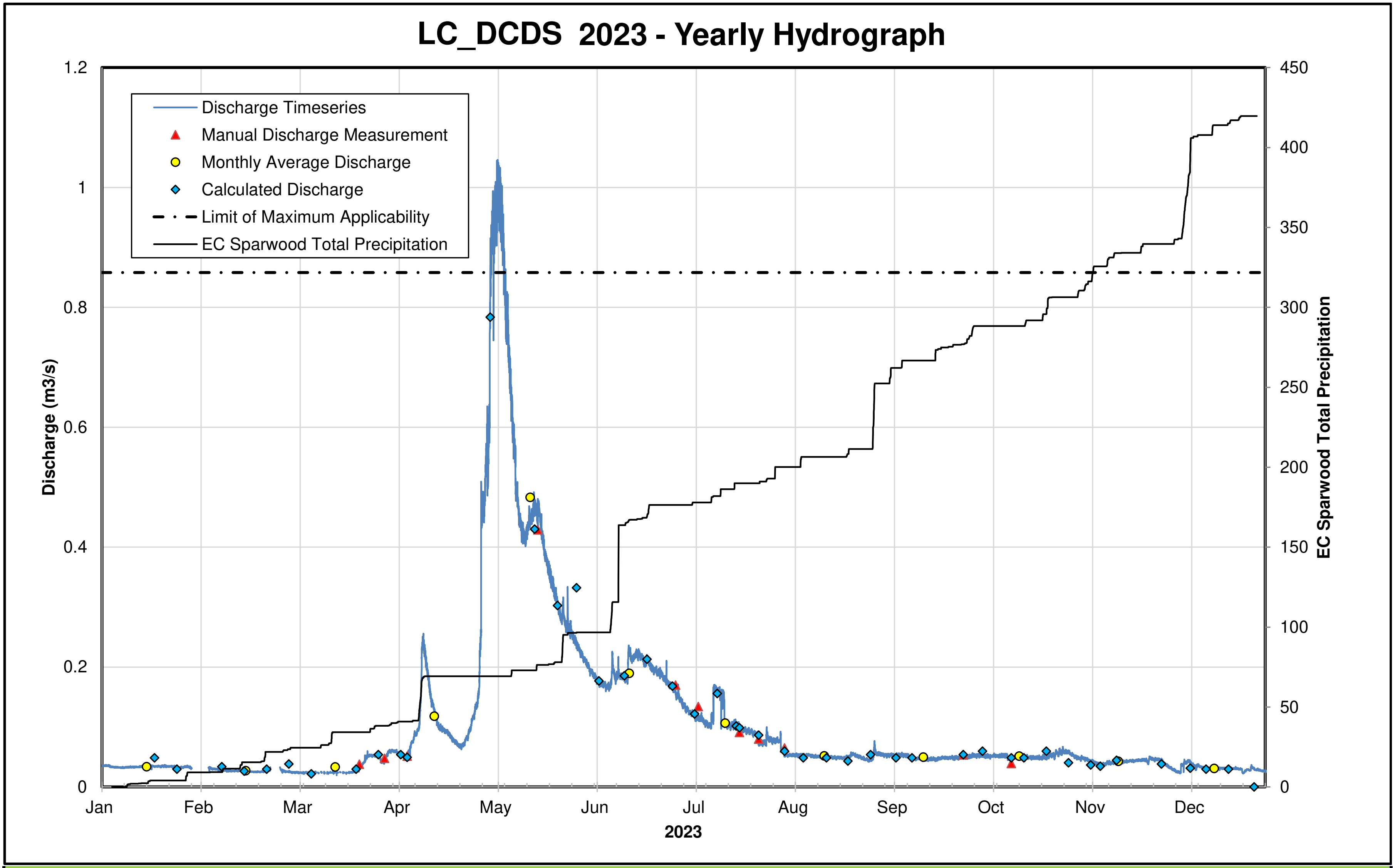
Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 17, 2023	0.080	-	E	0.048	-	-	Calculated Discharge
January 24, 2023	0.060	-	E	0.030	-	-	Calculated Discharge
February 7, 2023	0.065	-	E	0.034	-	-	Calculated Discharge.
February 14, 2023	0.056	-	E	0.026	-	-	Calculated Discharge
February 21, 2023	0.060	-	E	0.030	-	-	Calculated Discharge
February 28, 2023	0.070	-	E	0.038	-	-	Calculated Discharge
March 7, 2023	0.050	-	E	0.022	-	-	Calculated Discharge
March 21, 2023	0.060	-	E	0.030	-	-	Calculated Discharge
March 22, 2023	0.066	0.038	B	-	-	-	LCO Measurement, 24 Panels, Max 9.8%. Ice affected measurement.
March 28, 2023	0.085	-	E	0.054	-	-	Calculated Discharge
March 30, 2023	0.071	0.048	C	-	-	-	KWL Measurement, 25 Panels, Max 16%. Ice affected measurement.
April 4, 2023	0.085	-	B	0.054	-	-	Calculated Discharge
April 6, 2023	0.081	0.052	B	0.050	0.002	4.1%	LCO Measurement, 23 Panels, Max 9.8%
April 6, 2023	0.081	-	B	0.050	-	-	Calculated Discharge
May 2, 2023	0.335	-	B	0.784	-	-	Calculated Discharge
May 16, 2023	0.250	-	B	0.430	-	-	Calculated Discharge
May 17, 2023	0.250	0.429	B	0.430	-0.001	-0.3%	KWL Measurement, 23 Panels, Max 8.6%
May 23, 2023	0.210	-	B	0.303	-	-	Calculated Discharge
May 29, 2023	0.220	-	E	0.332	-	-	Calculated Discharge. Suspect staff gauge.
June 5, 2023	0.160	-	B	0.177	-	-	Calculated Discharge
June 13, 2023	0.164	-	B	0.185	-	-	Calculated Discharge
June 20, 2023	0.176	-	B	0.213	-	-	Calculated Discharge
June 28, 2023	0.156	-	B	0.168	-	-	Calculated Discharge
June 29, 2023	0.150	0.170	B	0.156	0.014	9.1%	LCO Measurement, 23 Panels, Max Panel 9%
July 5, 2023	0.132	-	B	0.122	-	-	Calculated Discharge
July 6, 2023	0.141	0.134	B	0.138	-0.004	-3.1%	KWL Measurement, 23 Panels, Max Panel 10%
July 12, 2023	0.150	-	B	0.156	-	-	Calculated Discharge
July 18, 2023	0.120	-	B	0.102	-	-	Calculated Discharge
July 19, 2023	-	0.091	B	-	-	-	LCO Measurement, 27 Panels, Max Panel 9.2%. No staff gauge reading.
July 25, 2023	0.118	-	B	0.099	-	-	Calculated Discharge
July 25, 2023	0.106	0.080	B	0.081	-0.001	-0.8%	KWL Measurement, 23 Panels, Max Panel 10%
August 1, 2023	0.110	-	B	0.086	-	-	Calculated Discharge
August 2, 2023	0.095	0.065	B	0.066	-0.001	-1.5%	KWL Measurement, 24 Panels, Max Panel 10%

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
August 8, 2023	0.090	-	B	0.060	-	-	Calculated Discharge
August 15, 2023	0.080	-	B	0.048	-	-	Calculated Discharge
August 22, 2023	0.080	-	B	0.048	-	-	Calculated Discharge
August 29, 2023	0.075	-	B	0.043	-	-	Calculated Discharge
September 6, 2023	0.085	-	B	0.054	-	-	Calculated Discharge
September 11, 2023	0.080	-	B	0.048	-	-	Calculated Discharge
September 25, 2023	0.080	-	B	0.048	-	-	Calculated Discharge
September 27, 2023	0.082	0.053	C	0.051	0.003	5.3%	LCO Measurement, 19 Panels, Max Panel 8.1%
October 3, 2023	0.085	-	B	0.054	-	-	Calculated Discharge
October 11, 2023	0.090	-	B	0.060	-	-	Calculated Discharge
October 12, 2023	0.081	0.039	C	0.050	-0.011	-21.3%	KWL Measurement, 21 Panels, Max Panel 11.4%.
October 16, 2023	0.080	-	B	0.048	-	-	Calculated Discharge
October 23, 2023	0.080	-	B	0.048	-	-	Calculated Discharge
October 30, 2023	0.090	-	B	0.060	-	-	Calculated Discharge
November 6, 2023	0.072	-	E	0.040	-	-	Calculated Discharge
November 9, 2023	0.068	-	E	0.037	-	-	Calculated Discharge
November 14, 2023	0.066	-	E	0.035	-	-	Calculated Discharge
November 28, 2023	0.076	-	E	0.044	-	-	Calculated Discharge
December 7, 2023	0.070	-	E	0.038	-	-	Calculated Discharge
December 12, 2023	0.062	-	E	0.031	-	-	Calculated Discharge
December 19, 2023	0.060	-	E	0.030	-	-	Calculated Discharge
December 27, 2023	0.060	-	E	0.030	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

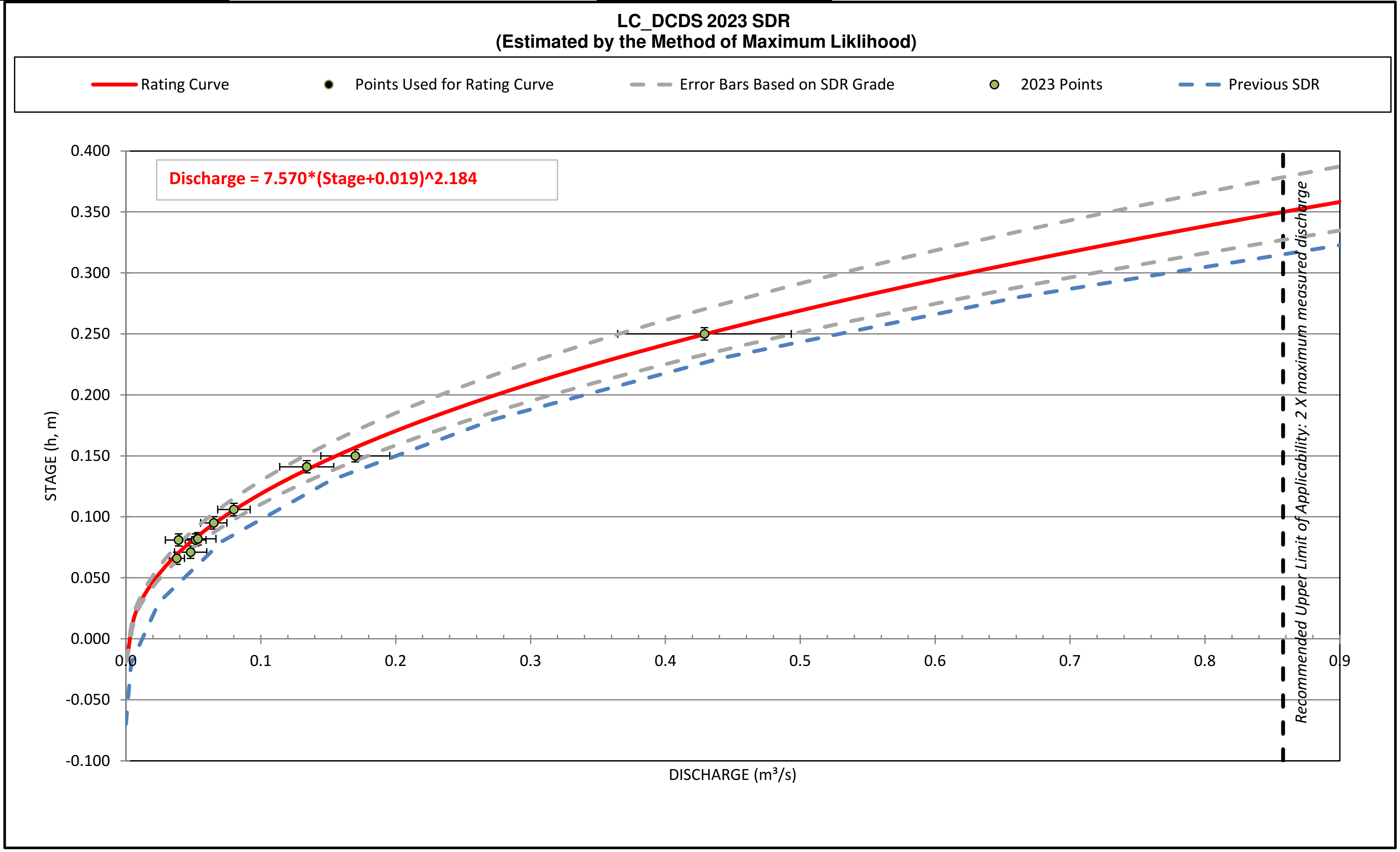
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m^3/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.034	0.027	0.033	0.118	0.483	0.190	0.107	0.052	0.050	0.052	0.043	0.031



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2023	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	B
Reason For Change	Clear change in trend	**Data Grade Rational:**	2023 manual measurements show good agreement with new SDR		



LC_DCDS
Summary Report
Year: 2023
Measurement: Final Discharge (m3/s)

2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.035	*	0.024	0.060	0.544	0.208	0.140	0.070 PK	0.055 PK	0.052	0.050 PK	0.031
2	0.035	*	0.024	0.059	0.757	0.197	0.133	0.058	0.054	0.052	0.048	0.028
3	0.034	0.032 PK	0.024	0.057	0.921	0.190	0.127	0.053	0.053	0.052	0.048	0.025
4	0.033	0.030	0.024	0.053	0.976 PK	0.182	0.123	0.053	0.053	0.051	0.047	0.028
5	0.033	0.030	0.023	0.051	0.977	0.175	0.116	0.053	0.053	0.051	0.045	0.038 PK
6	0.033	0.029	0.023	0.053	0.916	0.172	0.115	0.053	0.053	0.051	0.043	0.042
7	0.032	0.028	0.023	0.067	0.790	0.170	0.114	0.053	0.054	0.052	0.041	0.041
8	0.033	0.027	0.024	0.081	0.707	0.167	0.108	0.053	0.053	0.052	0.039	0.037
9	0.033	0.026	0.024	0.091	0.605	0.191	0.104	0.053	0.052	0.051	0.037	0.033
10	0.033	0.027	0.024	0.121	0.514	0.185	0.108	0.053	0.051	0.052	0.038	0.035
11	0.033	0.027	0.023	0.236	0.457	0.188	0.148 PK	0.051	0.048	0.049	0.040	0.033
12	0.033	0.027	0.023	0.206	0.427	0.184	0.161	0.051	0.047	0.048	0.040	0.032
13	0.034	0.027	0.024	0.168	0.418	0.183	0.155	0.050	0.048	0.049	0.041	0.032
14	0.035 PK	0.027	0.024	0.138	0.440	0.198 PK	0.141	0.050	0.047	0.049	0.041	0.031
15	0.035	0.026	0.024	0.117	0.452	0.217	0.103	0.050	0.046	0.049	0.041	0.031
16	0.035	0.025	0.024	0.101	0.465	0.216	0.102	0.050	0.046	0.049	0.042	0.031
17	0.034	0.025	0.024	0.097	0.462	0.222	0.104	0.049	0.046	0.050	0.043	0.031
18	0.035	0.025	0.024	0.093	0.429	0.219	0.106	0.049	0.046	0.049	0.043	0.031
19	0.035	0.025	0.024	0.089	0.394	0.210	0.100	0.049	0.047	0.049	0.043	0.031
20	0.035	0.025	0.025	0.081	0.370	0.211	0.096	0.049	0.048	0.048	0.044	0.031
21	0.034	0.028	0.027	0.076	0.350	0.204	0.094	0.049	0.048	0.048	0.044	0.031
22	0.034	0.029	0.031	0.070	0.329	0.196	0.093	0.050	0.048	0.049	0.045	0.030
23	0.034	*	0.037	0.068	0.308	0.193	0.091	0.054	0.048	0.049	0.045	0.029
24	0.033	*	0.046	0.074	0.286	0.190	0.089	0.053	0.049	0.052	0.044	0.025
25	0.033	0.031	0.052	0.086	0.288	0.184	0.081	0.051	0.049	0.053	0.047	0.029
26	0.033	0.027	0.052	0.103	0.270	0.179	0.073	0.049	0.049	0.055	0.046	0.031
27	0.034	0.026	0.052	0.123	0.262	0.172	0.075	0.047	0.049	0.057	0.046	0.030
28	0.033	0.025	0.051	0.143	0.249	0.165	0.082	0.045	0.049	0.058 PK	0.044	0.029
29	0.031		0.043	0.319	0.240	0.157	0.078	0.045	0.050	0.059	0.039	0.028
30	*		0.044	0.472 PK	0.228	0.152	0.077	0.057	0.052	0.058	0.035	0.027
31	*		0.056 PK		0.216		0.077	0.056		0.054		0.026
Mean	**0.034**	**0.027**	**0.031**	**0.118**	**0.485**	**0.189**	**0.107**	**0.052**	**0.050**	**0.052**	**0.043**	**0.031**
Maximum	**0.035**	**0.032**	**0.056**	**0.472**	**0.977**	**0.222**	**0.161**	**0.070**	**0.055**	**0.059**	**0.050**	**0.042**
Minimum	**0.031**	**0.025**	**0.023**	**0.051**	**0.216**	**0.152**	**0.073**	**0.045**	**0.046**	**0.048**	**0.035**	**0.025**
Peak 5-Minute	**0.039**	**0.033**	**0.061+**	**0.518**	**1.046**	**0.236**	**0.170+**	**0.092**	**0.059**	**0.067**	**0.054**	**0.046**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix M

LC_DC4

Station Details			
Station Name:	**Dry Creek LC_DC4**	**Reporting Year:**	**2023**
Site ID:	**LC_DC4**	**Station Type:**	Year-Round Continuous Data
EMS:	**#N/A**	**Teck Mine:**	Line Creek Operation

Station Description:	DC4 is located on Dry Creek between DCDS and DC1.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	#N/A
Rationale for Data Grade Recommendation (RSFMP)	#N/A

Data Quality Assessment - Continuous Data

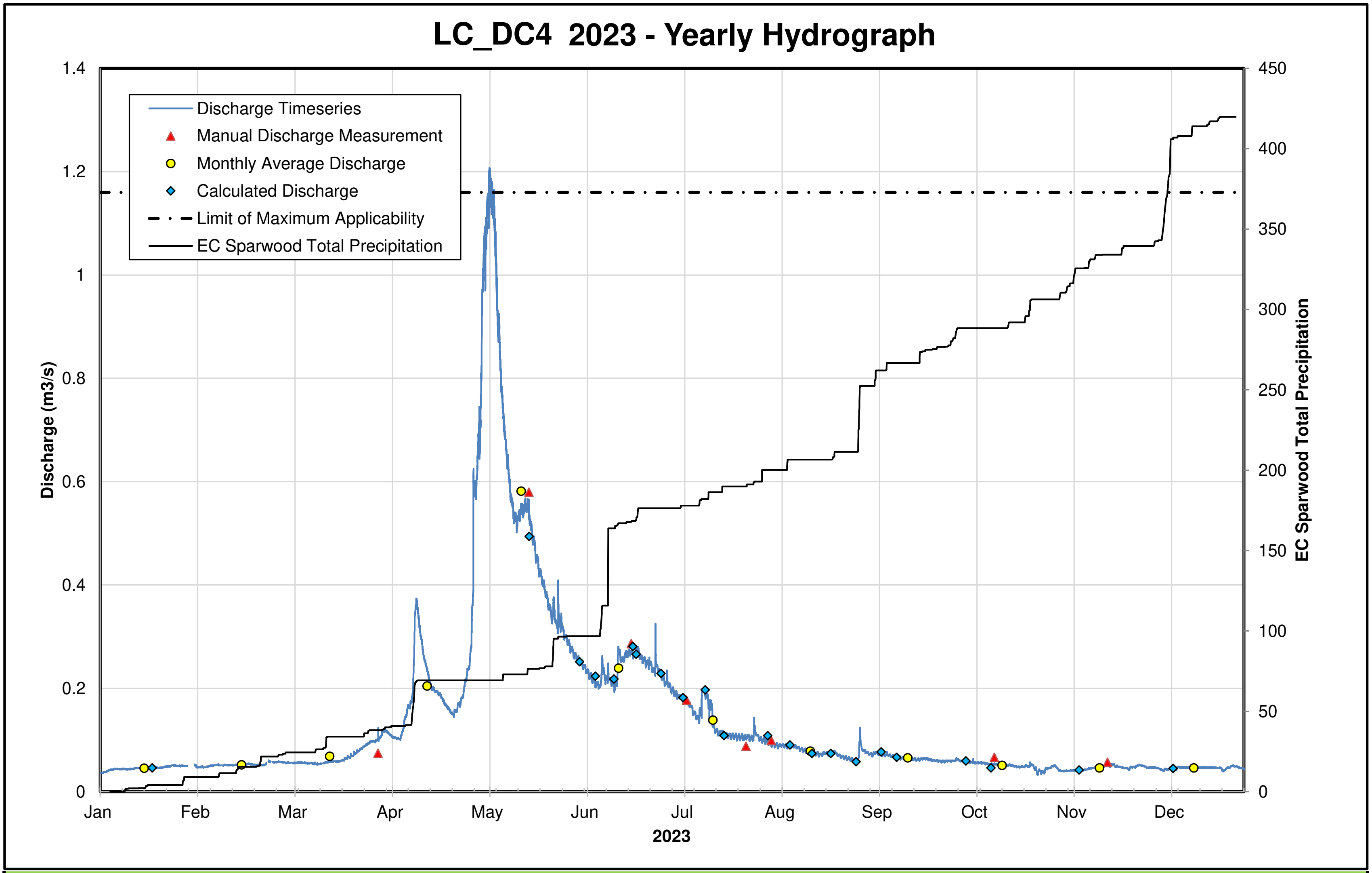
Data Range	Data Quality Assessment Grade*	Description
January 1 - January 28, 2023	E	Station operated as expected, potential ice in channel
January 28- January 31, 2023	M	Ice affected data removed
January 31 - March 31, 2023	E	Station operated as expected, potential ice in channel
April 1- May 3, 2023	B	Station operated as expected
May 4 - 6, 2023	E	Station operated as expected. Discharge above the limit of maximum applicability.
May 7 - July 11, 2023	B	Station operated as expected
July 11- July 14, 2023	B	Station operated as expected. Dry Creek sediment pond dewatered at this time
July 15 - December 1, 2023	B	Station operated as expected
December 2- December 31, 2023	E	Station operated as expected, potential ice in channel

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 17, 2023	0.060	-	E	0.046	-	-	Calculated Discharge
March 30, 2023	0.096	0.074	C	-	-	-	KWL Measurement, 27 Panels, Max 10.4%. Ice affected measurement.
May 17, 2023	0.240	0.580	B	0.535	0.044	8.3%	KWL Measurement, 20 Panels, Max 9.4%
May 17, 2023	0.230	-	B	0.494	-	-	Calculated Discharge
June 2, 2023	0.160	-	B	0.251	-	-	Calculated Discharge
June 7, 2023	0.150	-	B	0.223	-	-	Calculated Discharge
June 13, 2023	0.148	-	B	0.218	-	-	Calculated Discharge
June 19, 2023	0.170	0.286	B	0.281	0.005	1.9%	LCO Measurement 20 Panels, Max 10%
June 19, 2023	0.170	-	B	0.281	-	-	Calculated Discharge
June 20, 2023	0.165	-	B	0.266	-	-	Calculated Discharge
June 28, 2023	0.152	-	B	0.229	-	-	Calculated Discharge
July 5, 2023	0.134	-	B	0.182	-	-	Calculated Discharge
July 6, 2023	0.134	0.177	B	0.182	-0.005	-2.8%	KWL Measurement 22 Panels, Max 10%
July 12, 2023	0.140	-	B	0.197	-	-	Calculated Discharge
July 18, 2023	0.100	-	B	0.108	-	-	Calculated Discharge
July 25, 2023	0.098	0.088	B	0.105	-0.017	-15.9%	KWL Measurement 24 Panels, Max 8%
August 1, 2023	0.100	-	B	0.108	-	-	Calculated Discharge
August 2, 2023	0.090	0.099	B	0.090	0.009	9.6%	KWL Measurement 21 Panels, Max 9%
August 8, 2023	0.090	-	B	0.090	-	-	Calculated Discharge
August 15, 2023	0.080	-	B	0.074	-	-	Calculated Discharge
August 21, 2023	0.080	-	B	0.074	-	-	Calculated Discharge
August 29, 2023	0.069	-	B	0.058	-	-	Calculated Discharge
September 6, 2023	0.082	-	B	0.077	-	-	Calculated Discharge
September 11, 2023	0.075	-	B	0.066	-	-	Calculated Discharge
October 3, 2023	0.070	-	B	0.059	-	-	Calculated Discharge
October 11, 2023	0.060	-	B	0.046	-	-	Calculated Discharge
October 12, 2023	0.073	0.066	B	0.063	0.003	4.4%	KWL Measurement 20 Panels, Max 9.7%
November 8, 2023	0.056	-	B	0.042	-	-	Calculated Discharge
November 17, 2023	0.065	0.057	B	0.052	0.004	8.4%	LCO Measurement 20 Panels, Max 8%
December 8, 2023	0.059	-	E	0.045	-	-	Calculated Discharge
	-	-	-	-	-	-	
	-	-	-	-	-	-	
	-	-	-	-	-	-	

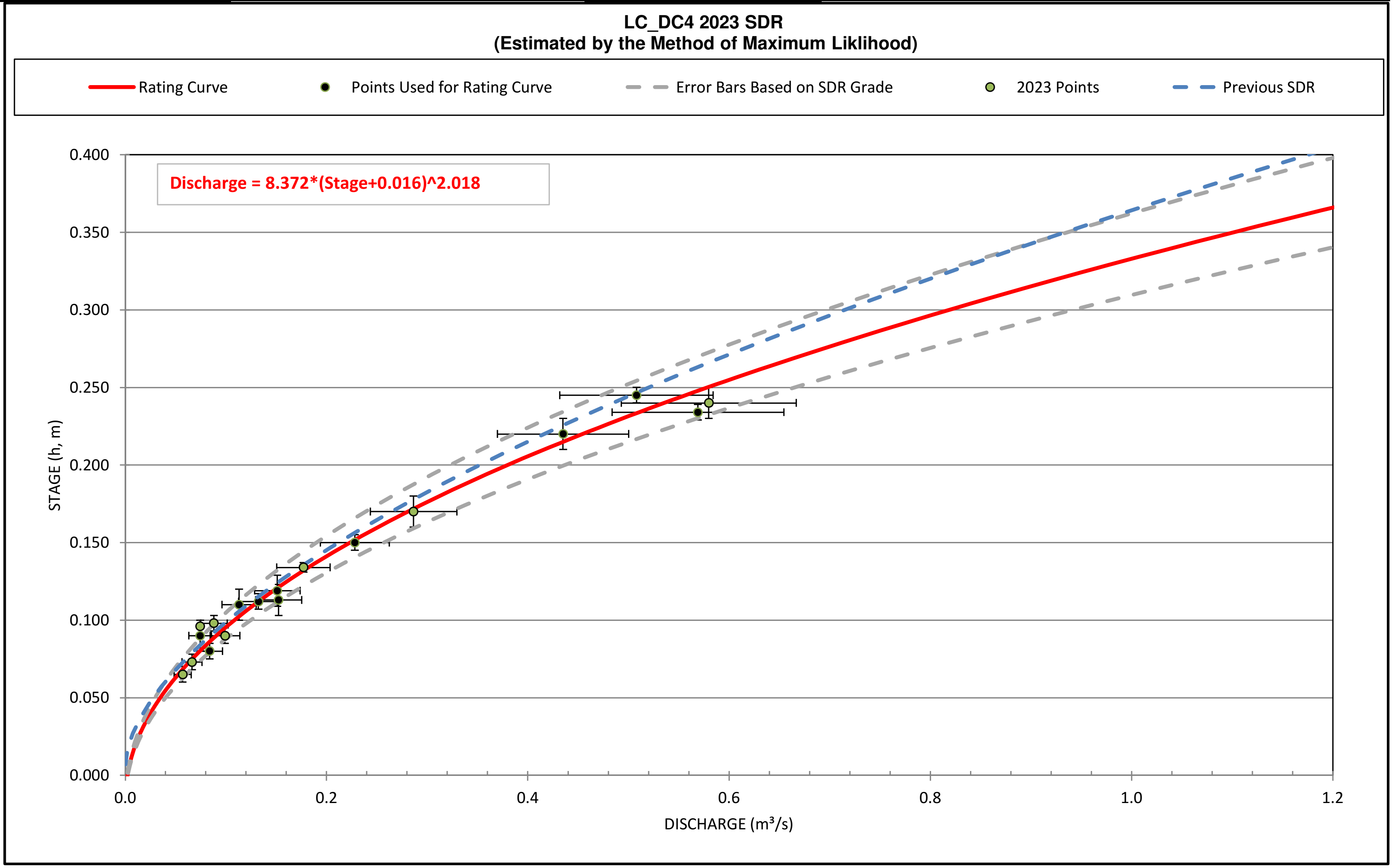
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m³/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.046	0.052	0.068	0.204	0.581	0.239	0.138	0.079	0.066	0.051	0.046	0.046



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2023	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	B
Reason For Change	Refinement of Existing SDR (upper end)	**Data Grade Rational:**	Good agreement with 2023 manual measurements and new SDR.		



LC_DC4

Summary Report
Year: 2023
Measurement: Final Discharge (m3/s)

2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.037	0.048	0.056	0.117	0.675	0.262	0.201 PK	0.097	0.077 PK	0.060 PK	0.046	0.047
2	0.038	0.047	0.056	0.114	0.888	0.254	0.194	0.094	0.074	0.059	0.041	0.047
3	0.040	0.048	0.056	0.109	1.060	0.246	0.188	0.091	0.072	0.058	0.040	0.045
4	0.042	0.049	0.056	0.105	1.143 PK	0.237	0.184	0.089	0.075	0.057	0.040	0.043
5	0.044	0.050	0.056	0.103	1.155	0.228	0.179	0.090	0.073	0.057	0.041	0.042
6	0.044	0.051	0.056	0.105	1.094	0.220	0.176	0.089	0.072	0.056	0.041	0.043
7	0.044	0.051	0.056	0.126	0.930	0.212	0.169	0.088	0.071	0.056	0.041	0.045
8	0.044	0.051	0.055	0.152	0.813	0.206	0.158	0.088	0.072	0.056	0.041	0.044
9	0.043	0.051	0.054	0.167	0.715	0.227	0.148	0.088	0.070	0.055	0.042	0.044
10	0.043	0.051	0.054	0.211	0.645	0.225	0.147	0.086	0.068	0.054	0.043	0.048
11	0.044	0.051	0.053	0.355	0.584	0.221	0.177	0.083	0.066	0.054	0.044	0.047
12	0.045	0.051	0.054	0.328	0.544	0.213	0.190	0.081	0.065	0.053	0.045	0.047
13	0.046	0.052	0.056	0.283	0.525	0.206	0.179	0.079	0.065	0.053	0.047	0.047
14	0.046	0.050	0.057	0.249	0.535	0.230	0.164	0.077	0.065	0.053	0.048	0.048
15	0.045	0.050	0.058	0.224	0.546	0.262	0.121	0.075	0.064	0.052	0.047	0.047
16	0.046	0.052	0.059	0.202	0.554	0.257	0.115	0.074	0.063	0.051	0.050	0.047
17	0.046	0.053	0.059	0.196	0.536	0.265	0.113	0.073	0.062	0.051	0.052	0.047
18	0.046	0.053	0.060	0.191	0.499	0.269	0.112	0.072	0.062	0.050	0.051 PK	0.047
19	0.046	0.051	0.062	0.184	0.466	0.266	0.109	0.075	0.063	0.049	0.052	0.047
20	0.047	0.051	0.065	0.172	0.437	0.272	0.107	0.073	0.064	0.048	0.049	0.046
21	0.048	0.051	0.068	0.163	0.414	0.268	0.108	0.072	0.063	0.048	0.048	0.046
22	0.049	0.053	0.071	0.155	0.392	0.256	0.106	0.076	0.062	0.050	0.047	0.046
23	0.050	0.058 PK	0.076	0.152	0.368	0.252	0.106	0.073	0.061	0.050	0.046	0.046
24	0.051	0.058	0.080	0.160	0.344	0.249	0.105	0.069	0.060	0.052	0.045	0.041
25	0.050	0.057	0.085	0.172	0.347	0.242	0.106	0.067	0.059	0.045	0.048	0.045
26	0.050	0.057	0.090	0.189	0.334	0.245 PK	0.105	0.065	0.059	0.038	0.048	0.047
27	0.050	0.057	0.094	0.221	0.328	0.237	0.104	0.063	0.060	0.038	0.051	0.050 PK
28	0.050	0.057	0.097	0.250	0.308	0.225	0.119	0.062	0.059	0.039	0.051	0.049
29	*		0.098	0.400 PK	0.294	0.215	0.105	0.060	0.060	0.045	0.049	0.047
30	*		0.102 PK	0.592	0.281	0.213	0.101	0.083 PK	0.062	0.047	0.046	0.045
31	0.049 PK		0.110		0.270		0.099	0.084		0.050		0.043
Mean	**0.046**	**0.052**	**0.068**	**0.205**	**0.581**	**0.239**	**0.138**	**0.079**	**0.066**	**0.051**	**0.046**	**0.046**
Maximum	**0.051**	**0.058**	**0.110**	**0.592**	**1.155**	**0.272**	**0.201**	**0.097**	**0.077**	**0.060**	**0.052**	**0.050**
Minimum	**0.037**	**0.047**	**0.053**	**0.103**	**0.270**	**0.206**	**0.099**	**0.060**	**0.059**	**0.038**	**0.040**	**0.041**
Peak 5-Minute	**0.053**	**0.061**	**0.124**	**0.625**	**1.207**	**0.325**	**0.210**	**0.124+**	**0.080+**	**0.063+**	**0.054+**	**0.051+**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix N

LC_DC1

Station Details			
Station Name:	Dry Creek near mouth	Reporting Year:	2023
Site ID:	LC_DC1	Station Type:	Year-Round Continuous Data
EMS:	E288270	Teck Mine:	Line Creek Operation
Station Description:	The Dry Creek (DC1) hydrometric station is located upstream of the confluence of Dry Creek and the Fording River. This station was installed to monitor the flow regime of Dry Creek prior to development of mine operations in the headwaters of the watershed.		
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol		
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B		
Rationale for Data Grade Recommendation (RSFMP)	Governed by RWQM data use.		

Data Quality Assessment - Continuous Data

Data Range	Data Quality Assessment Grade*	Description
January 1 - April 20, 2023	E	Previous SDR in effect. Station operated as expected, potential ice effects.
April 21 - 29, 2023	E	Previous SDR in effect. Station operated as expected. Lack of ice-free open-channel measurements prior to freshet warrants a downgrade in data.
April 29 - May 2, 2023	E	New SDR in effect. Uncertainty with new SDR timing and lack of measurements prior to freshet warrants a downgrade in data.
May 2 - May 9, 2023	E	Flow above upper limit of new SDR.
May 10 - May 30, 2023	C	New SDR in effect. Station operated as expected. Graded C above 0.450m stage (0.174 m^3/s).
May 31 - June 14, 2023	E	New SDR in effect. Station operated as expected. Graded E below 0.450m stage (0.174 m3/s).
June 15 - July 14, 2023	C	New SDR in effect. Station operated as expected. Graded C above 0.450m stage (0.174 m^3/s).
July 15 - September 6, 2023	E	New SDR in effect. Station operated as expected. Graded E below 0.450m stage (0.174 m3/s).
September 6 - December 6, 2023	M	Sensor failure.
December 6 - 23, 2023	E	Station operated as expected, potential ice effects
December 24 - 27, 2023	M	Erroneous ice-affected data removed from the record
December 28 - 31, 2023	E	Station operated as expected, potential ice effects

* Grades A, B, C, E and U based on the BC RISC Standards Document. Data gaps greater than 12 hours categorized as **Missing (M)**, data where ice was present in the stream is categorized as **Estimated (E)**

Summary Table of Yearly Discharge Measurements							
Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
March 30, 2023	0.399	0.043	C	-	-	-	KWL Measurement, 19 Panels, Max 16.3% Measurement heavily ice affected
April 4, 2023	0.412	-	E	0.143	-	-	Calculated Discharge. Ice affected staff gauge reading.
May 17, 2023	0.499	0.684	B	0.584	0.100	17.2%	KWL Measurement, 23 Panels, Max 9.7%
May 24, 2023	0.480	-	C	0.382	-	-	Calculated Discharge
June 2, 2023	0.450	-	C	0.174	-	-	Calculated Discharge
June 13, 2023	0.450	-	C	0.174	-	-	Calculated Discharge
June 20, 2023	0.466	-	C	0.270	-	-	Calculated Discharge
June 24, 2023	0.470	0.347	B	0.299	0.048	15.9%	LCO Measurement, 31 Panels, Max 10%
June 28, 2023	0.470	-	C	0.299	-	-	Calculated Discharge
July 5, 2023	0.450	-	C	0.174	-	-	Calculated Discharge
July 6, 2023	0.455	0.183	C	0.201	-0.018	-8.9%	KWL Measurement, 20 Panels, Max 10.7%
July 7, 2023	0.454	0.145	B	0.195	-0.050	-25.8%	LCO Measurement 37 Panels, Max 9%
July 12, 2023	0.460	-	C	0.230	-	-	Calculated Discharge
July 18, 2023	0.436	-	E	0.113	-	-	Calculated Discharge
July 25, 2023	0.420	0.090	B	0.064	0.026	39.9%	KWL Measurement, 20 Panels, Max 9.3%
August 1, 2023	0.420	-	E	0.064	-	-	Calculated Discharge
August 2, 2023	0.418	0.088	B	0.059	0.029	48.4%	KWL Measurement, 20 Panels, Max 7.7%
August 3, 2023	0.415	0.086	B	0.053	0.033	63.4%	LCO Measurement 27 Panels, Max 7% Measurement reviewed, no obvious reason for deviation from curve
August 8, 2023	0.410	-	E	0.043	-	-	Calculated Discharge
August 15, 2023	0.410	-	E	0.043	-	-	Calculated Discharge
August 21, 2023	0.400	-	E	0.027	-	-	Calculated Discharge
August 29, 2023	0.390	-	E	0.016	-	-	Calculated Discharge
September 2, 2023	0.400	0.100	C	0.027	0.073	265.7%	LCO Measurement, 25 Panels, Max 10.2% Measurement reviewed, no obvious reason for deviation from the curve
September 6, 2023	0.430	-	E	0.092	-	-	Calculated Discharge
September 10, 2023	0.420	0.087	B	0.064	0.023	35.6%	LCO Measurement, 22 Panels, Max 9.7%
September 11, 2023	0.425	-	E	0.077	-	-	Calculated Discharge
September 21, 2023	0.425	0.076	B	0.077	-0.001	-1.8%	LCO Measurement, 24 Panels, Max 7.9%
September 21, 2023	0.430	-	E	0.092	-	-	Calculated Discharge
September 25, 2023	0.420	-	E	0.064	-	-	Calculated Discharge
September 27, 2023	0.425	0.069	C	0.077	-0.008	-10.3%	LCO Measurement, 20 Panels, Max 10.4%
October 3, 2023	0.435	-	E	0.109	-	-	Calculated Discharge
October 11, 2023	0.440	-	E	0.128	-	-	Calculated Discharge
October 12, 2023	0.437	0.063	B	0.117	-0.053	-45.7%	KWL Measurement, 20 Panels, Max 9.3%

* Grades A, B, C, E and U based on the BC RISC Standards Document.

Summary Table of Yearly Discharge Measurements

Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
October 17, 2023	0.438	-	E	0.120	-	-	Calculated Discharge
October 24, 2023	0.434	-	E	0.106	-	-	Calculated Discharge
December 12, 2023	0.412	-	E	0.047	-	-	Calculated Discharge
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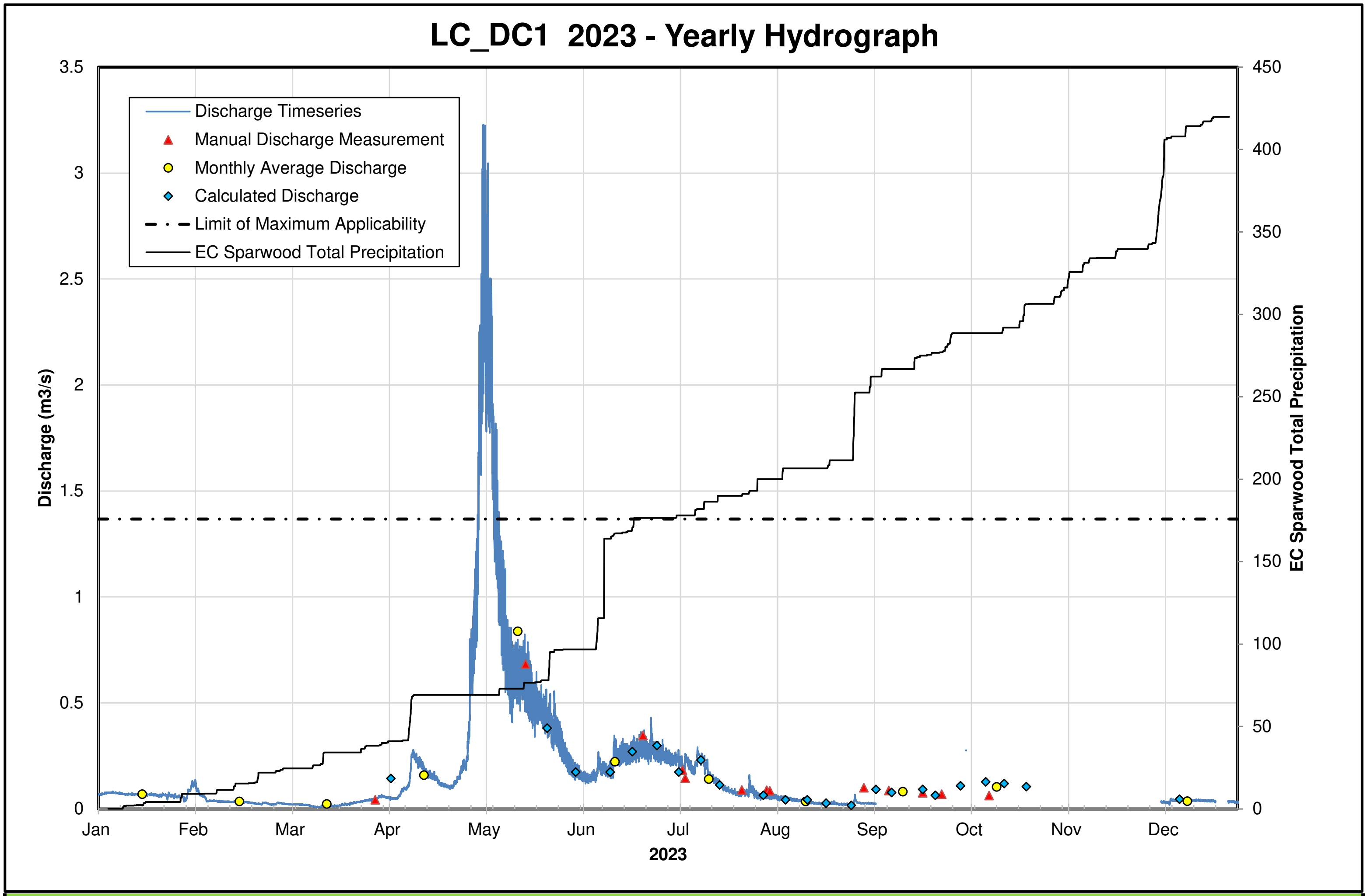
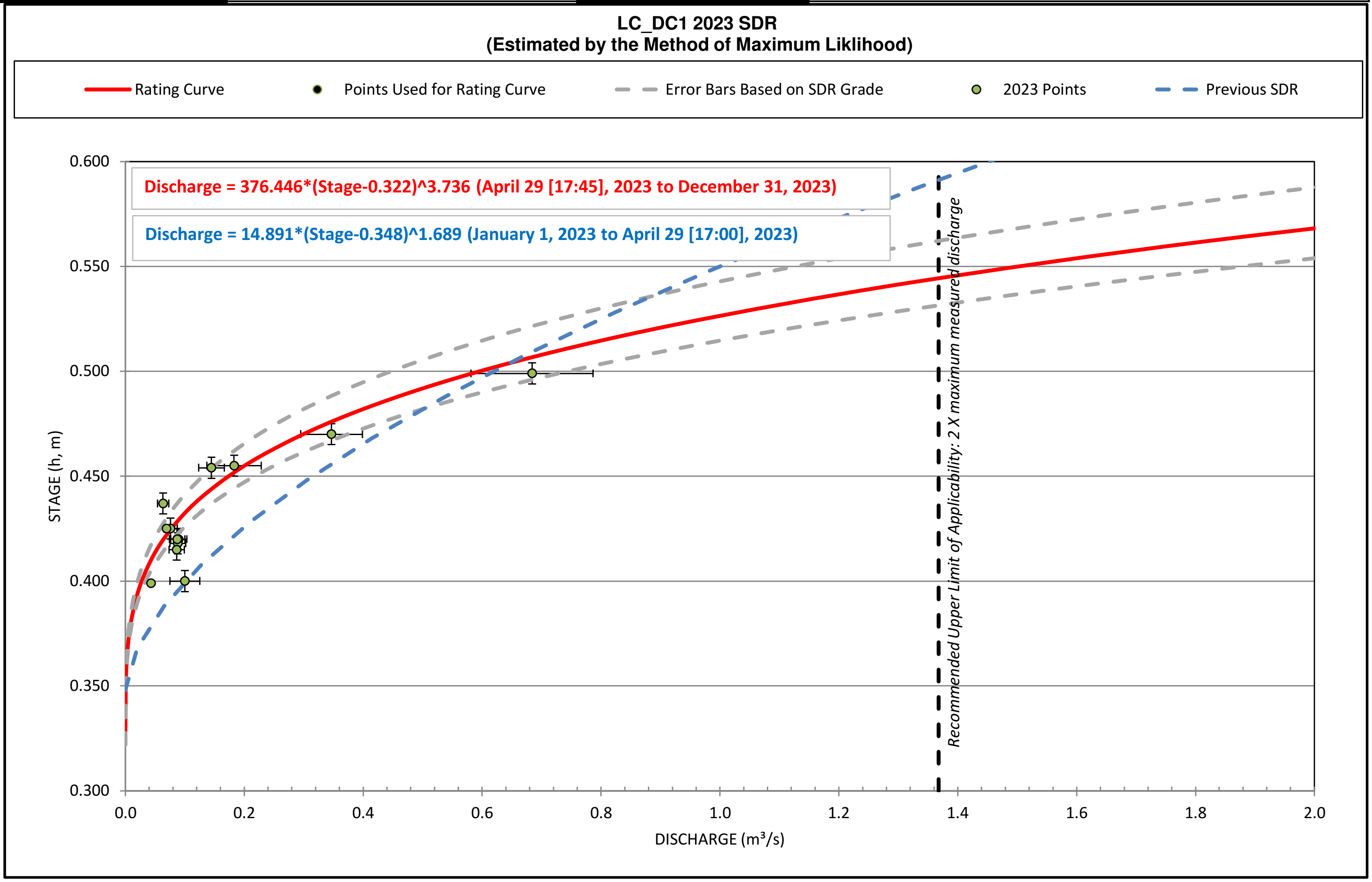
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m³/sec											
January	February	March	April	May	June	July	August	September	October*	November	December
0.069	0.035	0.024	0.159	0.838	0.223	0.141	0.036	0.082	0.104	#N/A	0.037



* Calculated and/or manual measurements used to calculate monthly average

Stage Discharge Relationship					
Year SDR Created:	2023	**Updated from Previous Year:**	Yes	**SDR Data Grade:**	C
Reason For Change	Clear change in trend	**Data Grade Rational:**	SDR Graded C above 0.450m stage (0.174 m^3/s), Grade E below due to measurement scatter		



LC_DC1

Summary Report
Year: 2023
Measurement: Final Discharge (m3/s)

2023	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	0.068	0.097 PK	0.023	0.059	0.931	0.182	0.239	0.061 PK	0.028 PK	*	*	*
2	0.070	0.069	0.022	0.057	1.480	0.172	0.235	0.058	0.026	*	*	*
3	0.074	0.058	0.021	0.053	2.120	0.171	0.233	0.058	0.026	*	*	*
4	0.075	0.043	0.021	0.049	2.479 PK	0.154	0.234	0.057	0.026	*	*	*
5	0.077	0.038	0.021	0.048	2.120	0.148	0.225	0.056	0.025	0.276 PK	*	*
6	0.074	0.038	0.020	0.051	2.086	0.143	0.216	0.049	0.025	*	*	0.032
7	0.073	0.037	0.020	0.070	1.543	0.149	0.221	0.048	*	*	*	0.032
8	0.072	0.035	0.018	0.091	1.243	0.152	0.213	0.047	*	*	*	0.030
9	0.069	0.034	0.016	0.098	1.030	0.192	0.192	0.045	*	*	*	0.034 PK
10	0.068	0.034	0.012	0.143	0.888	0.193	0.186	0.043	*	*	*	0.040
11	0.069	0.033	0.009	0.257	0.725	0.193	0.259 PK	0.041	*	*	*	0.040
12	0.069	0.033	0.009	0.235	0.638	0.183	0.232	0.039	*	*	*	0.043
13	0.068	0.033	0.014	0.219	0.605	0.175	0.223	0.037	*	*	*	0.042
14	0.068	0.030	0.014	0.205	0.625	0.218	0.197	0.035	*	*	*	0.042
15	0.067	0.027	0.012	0.178	0.618	0.260	0.149	0.034	*	*	*	0.041
16	0.066	0.030	0.013	0.162	0.636	0.246	0.135	0.031	*	*	*	0.040
17	0.067	0.032	0.014	0.154	0.596	0.262	0.128	0.028	*	*	*	0.041
18	0.066	0.029	0.015	0.149	0.570	0.262	0.113	0.026	*	*	*	0.041
19	0.065	0.026	0.018	0.132	0.532	0.254	0.101	0.025	*	*	*	0.040
20	0.064	0.025	0.020	0.116	0.491	0.267	0.093	0.022	*	*	*	0.039
21	0.065	0.023	0.021	0.112	0.475	0.278	0.086	0.023	*	*	*	0.038
22	0.064	0.025	0.024	0.107	0.462	0.271	0.079	0.027	*	*	*	0.038
23	0.065	0.027	0.028	0.104	0.440	0.282	0.073	0.026	*	*	*	0.037
24	0.061	0.023	0.031	0.112	0.410	0.283	0.068	0.026	*	*	*	0.036
25	0.057	0.021	0.033	0.132	0.418	0.274	0.070	0.022	*	*	*	*
26	0.057	0.022	0.036	0.158	0.385	0.284 PK	0.075	0.022	*	*	*	*
27	0.056	0.028	0.039	0.199	0.360	0.275	0.077	0.022	*	*	*	*
28	0.046	0.026	0.042	0.214	0.317	0.261	0.104	0.022	*	*	*	0.034
29	0.068		0.042	0.438	0.276	0.254	0.078	0.020	*	*	*	0.034
30	0.097		0.046	0.728 PK	0.248	0.255	0.064	0.035	*	*	*	0.032
31	0.120 PK		0.053 PK		0.210		0.059	0.032		*		0.030
Mean	**0.069**	**0.035**	**0.023**	**0.161**	**0.837**	**0.223**	**0.150**	**0.036**	**0.026**	**0.276**	**---**	**0.037**
Maximum	**0.120**	**0.097**	**0.053**	**0.728**	**2.479**	**0.284**	**0.259**	**0.061**	**0.028**	**0.276**	**---**	**0.043**
Minimum	**0.046**	**0.021**	**0.009**	**0.048**	**0.210**	**0.143**	**0.059**	**0.020**	**0.025**	**0.276**	**---**	**0.030**
Peak 5-Minute	**0.135**	**0.127**	**0.061**	**0.945**	**3.227**	**0.429**	**0.290**	**0.080**	**0.031+**	**0.276**	**---**	**0.048**

Notes:
' . ' denotes a 0 value for the period.
' * ' denotes there was no data for that period.
' + ' denotes the min/max/peak occurred more than once.
' P ' denotes only partial data exists for the day.
' PK ' denotes that the peak instantaneous value for the month occurred on this day.

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Appendix O

LC_GRCK

Station Details			
Station Name:	Grace Creek upstream of the CP rail tracks	**Reporting Year:**	2023
Site ID:	LC_GRCK	**Station Type:**	Manual Measurements
EMS:	E288275	**Teck Mine:**	Line Creek Operation

Station Description:	The Grace Creek staff gauge is located approximately 1.5km up the Grace Creek FSR (accessed via Fording Mine Road FSR) upstream of the CP rail tracks.
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B
Rationale for Data Grade Recommendation (RSFMP)	Governed by WQ sampling data use.

Summary Table of Yearly Discharge Measurements

Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship			Comments
				Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	
January 24, 2023	-	-	-	0.000	-	-	Staff gauge frozen - no flow.
February 9, 2023	-	-	-	0.000	-	-	Staff gauge frozen - no flow.
March 15, 2023	-	-	-	0.000	-	-	Staff gauge frozen - no flow.
May 2, 2023	0.080	-	E	0.138	-	-	Calculated Discharge
June 7, 2023	0.065	-	E	0.111	-	-	Calculated Discharge
June 13, 2023	0.052	0.086	B	0.089	-0.003	-3.7%	LCO Measurement 21 Panels, Max 7%
July 5, 2023	0.030	0.071	B	0.053	0.018	33.4%	LCO Measurement 20 Panels, Max 9%
August 31, 2023	0.010	0.191	E	0.023	0.169	747.0%	LCO Measurement, 19 Panels, Max 28.2%. Measurement reviewed - panel spacing is suspect.
September 6, 2023	0.010	0.039	B	0.023	0.016	71.3%	LCO Measurement, 21 Panels, Max 10.1%. Measurement reviewed - no explanation for deviation from SDR.
October 11, 2023	-	-	-	-	-	-	Calculated Discharge. Water level below staff gauge.
October 21, 2023	-	0.032	B	-	-	-	LCO Measurement, 22 Panels, Max 9.9%. Water level below staff gauge.
November 7, 2023	0.090	-	E	0.156	-	-	Calculated Discharge. Suspect staff gauge.
December 8, 2023	-	-	-	-	-	-	Staff gauge frozen - no flow.
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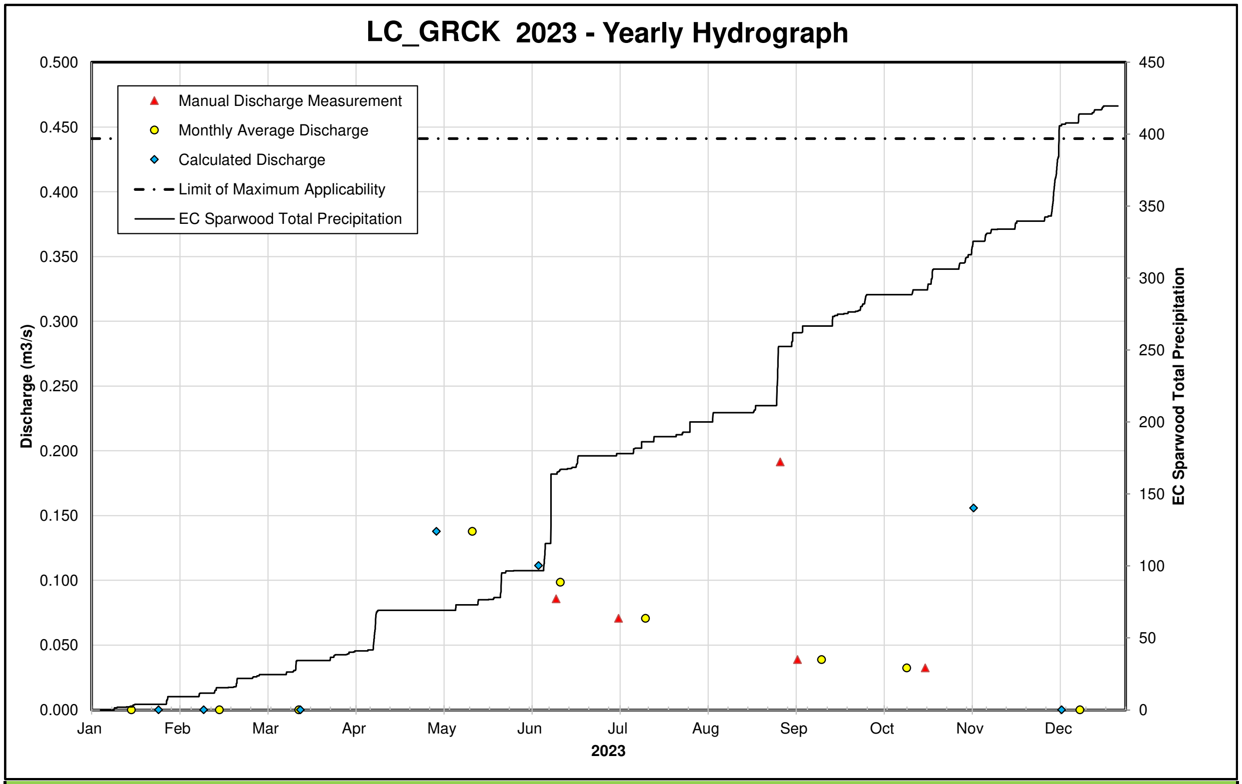
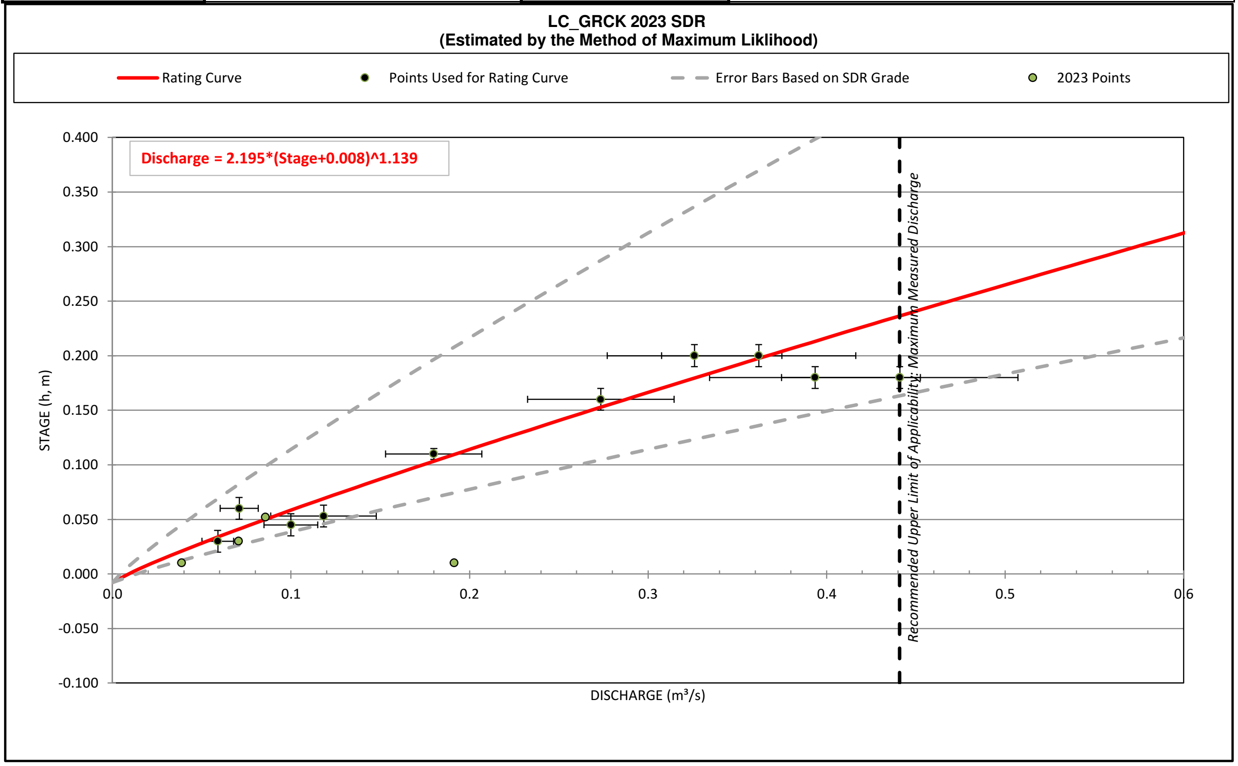
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m^3/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.000	0.000	0.000	#N/A	0.138	0.099	0.071	#N/A	0.039	0.032	#N/A	0.000



Stage Discharge Relationship					
Year SDR Created:	2019	**Updated from Previous Year:**	No	**SDR Data Grade:**	E
Reason For Change		**Data Grade Rational:**	Scatter of manual measurements warrants a lower data grade		



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Appendix P

LC_UC

Station Details			
Station Name:	Unnamed Creek	**Reporting Year:**	**2023**
Site ID:	**LC_UC**	**Station Type:**	Year-Round Continuous Data
EMS:	**E295213**	**Teck Mine:**	Line Creek Operation
Station Description:	The Unnamed Creek (UC) staff gauge is located approximately 670m south from the Fording River Road along the Fording Mine Road FSR.		
Description of measurement methods, field procedures or data calculation that deviate from the information provided in the Metadata Summary:	All data was collected and managed as per the detail provided in the 2021 Metadata Summary and the 2017 Flow Monitoring Protocol		
Target Data Quality from Regional Surface Flow Monitoring Plan (RSFMP):	B		
Rationale for Data Grade Recommendation (RSFMP)	Governed by WQ sampling data use.		

Summary Table of Yearly Discharge Measurements

Date	Manual Staff Gauge Reading	Manual Discharge Measurement (m^3/s)	Data Grade of Manual or Calculated Discharge Measurement*	From Stage Discharge Relationship: Calculated Discharge Measurement (m^3/s)	Difference (Manual-Calculated)	% Difference (Difference/ Calculated)	Comments
January 26, 2023	0.092	0.002	C	-	-	-	LCO Volumetric Flow, 4 Trials, 8s average
February 9, 2023	0.090	0.002	E	-	-	-	LCO Volumetric Flow, 4 Trials, 4.5s average
March 15, 2023	0.090	0.001	C	-	-	-	LCO Volumetric Flow, 4 Trials, 9.4s average
June 13, 2023	0.098	0.006	E	-	-	-	LCO Volumetric Flow, 4 Trials, 1.6s average
July 5, 2023	0.092	0.0003	E	-	-	-	LCO Volumetric Flow, 1 Trial, 2.33s
August 30, 2023	-	0.003	E	-	-	-	LCO Volumetric Flow, 4 Trials, 4.8s average. No staff gauge reading.
September 6, 2023	0.082	-	-	-	-	-	Staff gauge reading only, no measurement.
October 11, 2023	0.090	-	-	-	-	-	Staff gauge reading only, no measurement.
November 25, 2023	0.090	0.0003	E	-	-	-	LCO Volumetric Flow, 1 Trial, 3.26s
December 12, 2023	-	0.0003	E	-	-	-	LCO Volumetric Flow, 4 Trials, 4.2s average, 1.35L. No staff gauge reading.
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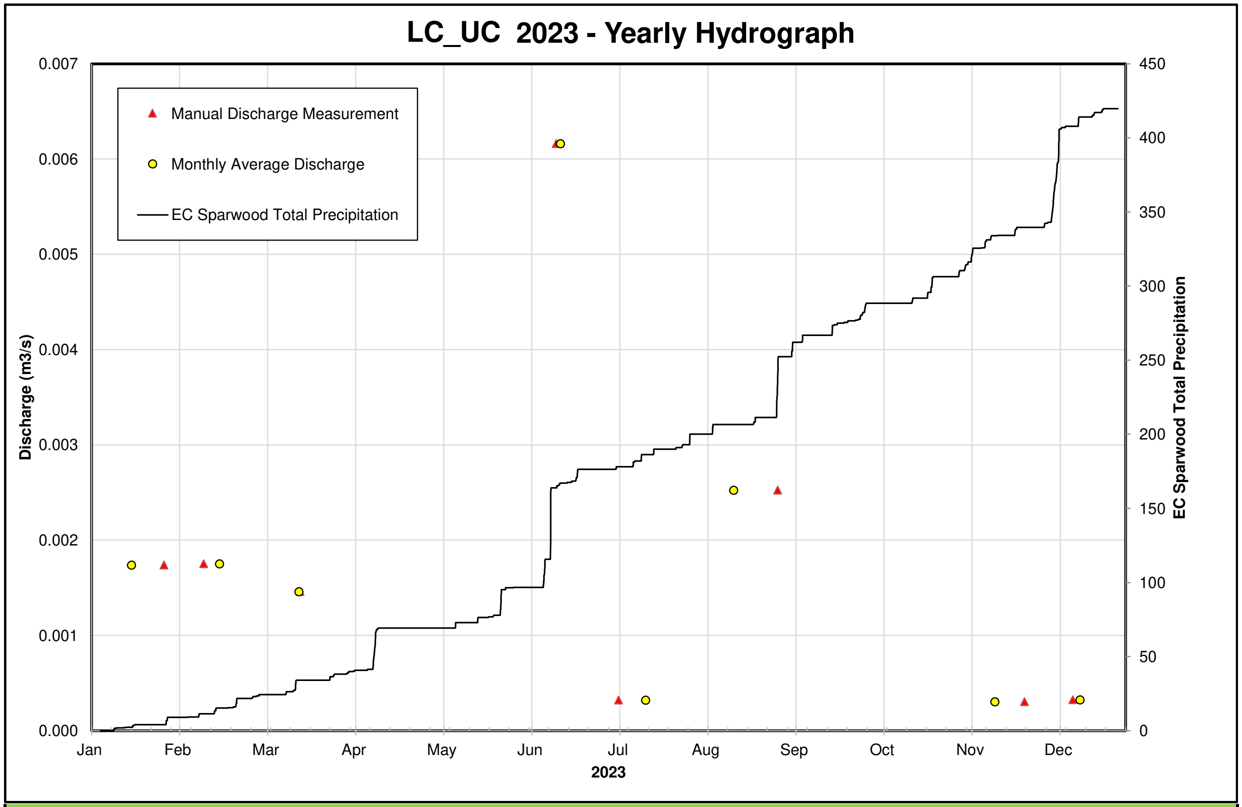
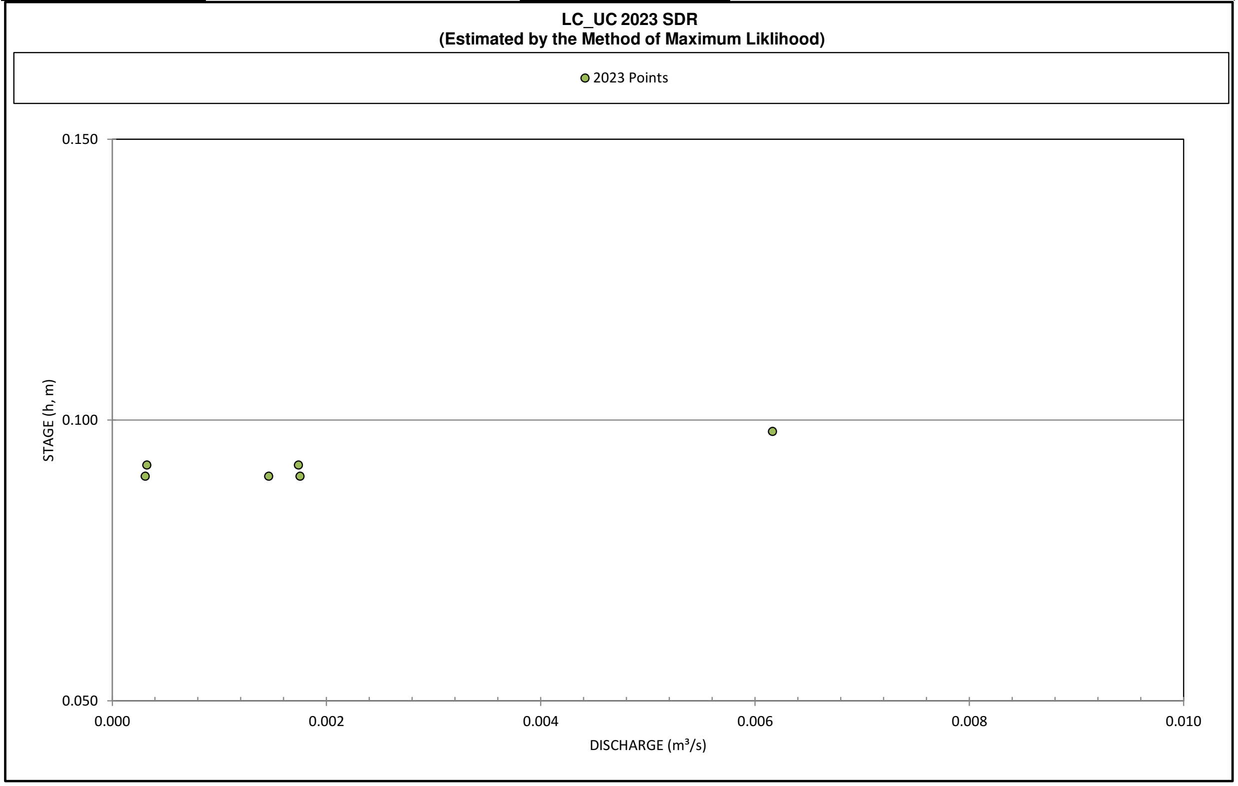
* Grades A, B, C, E and U based on the BC RISC Standards Document.

Monthly Average Discharge m³/sec											
January	February	March	April	May	June	July	August	September	October	November	December
0.002	0.002	0.001	#N/A	#N/A	0.006	0.0003	0.003	#N/A	#N/A	0.0003	0.0003



Stage Discharge Relationship					
Year SDR Created:	N/A	Updated from Previous Year:	N/A	SDR Data Grade:	N/A
Reason For Change		Data Grade Rational:			



Appendix M – HSP and MSX Dewatering Tool Evaluations

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Memo

To	Chris Blurton, Ben Gesner	**Client**	Teck Coal Ltd.
From	Noah Levin, Christina James	**Project**	CAPR003040
Cc	Terri Laliberte (SRK)	**Date**	March 27, 2024

Subject Horseshoe Ridge Pit and MSX Pit Dewatering Tool Assessment

File name: LineCreek_DewateringToolEvaluation_Memo_CAPR003040_20240327_FNL.docx

1 Introduction

SRK Consulting (Canada) Inc. has developed a deterministic Excel™ based mass balance tool for the Horseshoe Ridge Pit (HSP) and the Mine Service Area Extension (MSX) Pit at the Line Creek Operations (LCO) to calculate dewatering rates that ensure downstream water quality does not exceed relevant permit limits or benchmarks (SRK 2023a and SRK 2023b). As per Section 4.3 (vii) of the Environmental Management Act Permit PE 5353, water quality predictions from the tool were compared to actual monitoring results at downstream locations to identify potential areas for improvement in water quality predictions for pit pumping in the upcoming year.

For dewatering that occurred prior to October 20, 2023, the recommended pump rates were calculated using conservatively high water quality inputs for the pits and conservatively low flow conditions for Line Creek. Assuming these criteria are met, water quality in Line Creek is expected to remain below water quality thresholds with the recommended pump rate provided by SRK (2023a and 2023b).

The recommended pump rates for HSP calculated after October 20, 2023, were calculated using the most recent measured water quality and flow data as inputs. The inputs were updated approximately weekly by LCO personnel. The adequacy of the tool can be assessed based on the water quality in Line Creek.

This memo provides a summary of HSP, MSX Pit and Line Creek water quality conditions for the Contaminants of Potential Concern (COPCs) identified by SRK, pit dewatering rates applied in 2023, Line Creek flow conditions, as well as a comparison of water quality from the tool to actual monitoring results. Water quality data for Line Creek is from monitoring stations LC_LCDSSLCC, LC_LC3, and LC_LCUSWLC.

1.1 Evaluation Criteria

When using pump rates determined by the tool calculated using conservative inputs, the following conditions must be met:

1. Water quality in HSP or MSX Pit is equal or lower than the input values pre-set in the tool, which are based on conservative assumption for pit water quality.
2. Flow conditions in Line Creek are equal or higher than the values used in the tool.

The dewatering tool can be considered adequately conservative if the water quality in Line Creek is below the water quality thresholds during dewatering.

Observed 2023 monitoring data are compared to calculation inputs to determine if these two criteria were met. However, both the MSX Pit and HSP dewatering tools are editable and allow for use of recent monitoring data to modify pump rates if the conditions are not met or recommended pit dewatering rates were insufficient to address pumping requirements.

The evaluation of the tool includes evaluation of monitoring data compared to each criterion, comparison of applied dewatering rates compared to recommended dewatering rates and comparison of resulting Line Creek water quality compared to water quality thresholds.

2 2023 Flow Analysis

Data availability for flow data in 2023 are presented in Table 2-1.

Table 2-1: Flow Data Availability for 2023

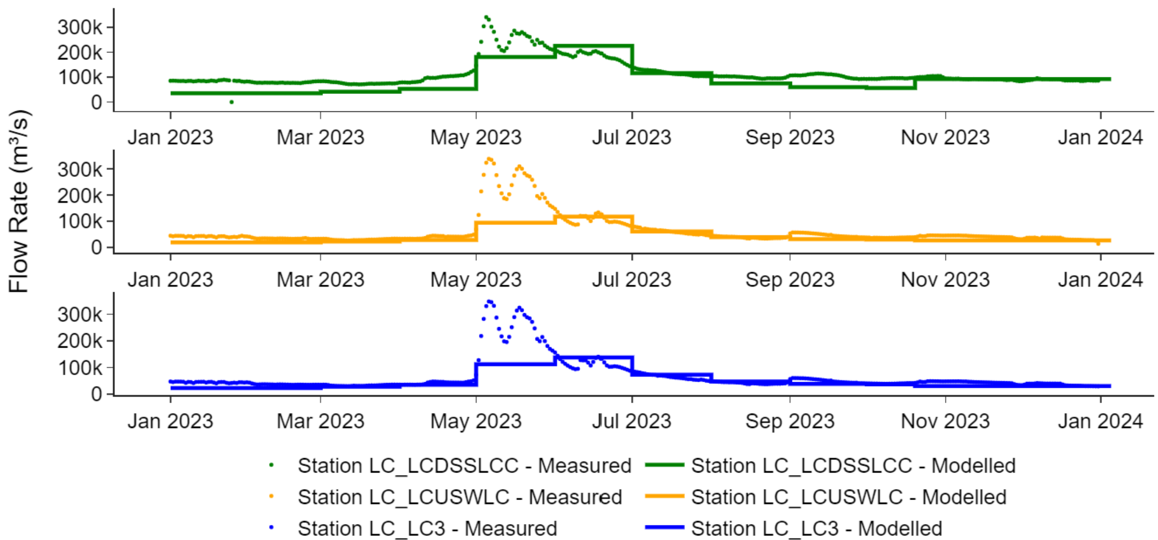
Name	Station ID	Time Series	Total Samples from 2023
MSX Pit	LC_MSXS	January 1 – March 21	90
HSP Pit	LC_HSP	January 1 – March 3, October 20 – December 16	120
Line Creek – Compliance Point	LC_LCDSSLCC	January 1 – December 31	365
Line Creek	LC_LC3	January 1 – December 31	365
Line Creek	LC_LCUSWLC	January 1 – December 31	365

Source: compiled in text.

2.1 Line Creek Flow Comparison

Daily flowrates for three monitoring locations in Line Creek are provided in Figure 2-1.

The measured flow at Line Creek is lower than the 1 in 10 dry-year in June. The 1 in 10 dry year monthly flow rates are based on statistics over multiple years of data, and the resulting hydrograph is the 'average' shape of the data. However, each year is slightly different and, in 2023, freshet occurred before the modelled freshet. This did not impact the dewatering rates calculations because dewatering from MSX Pit and HSP Pit was not required (and did not occur) in June.



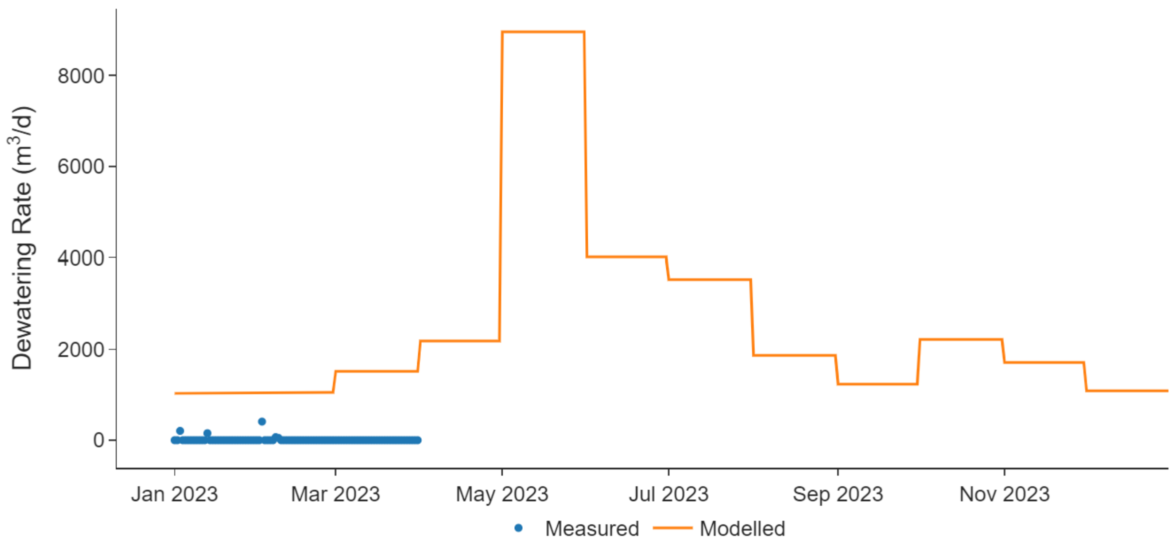
Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 2-1: Measured vs. Modelled Flow Rates at Line Creek

2.2 MSX Pit Dewatering Rate Comparison

Dewatering of MSX Pit occurred on five days prior to the end of MSX mining in March 2023. Operations reported that pumping and sampling were severely challenged with geotechnical risks as pit bottom mining occurred in January and February. On the days where pumping occurred, the dewatering rate was less than the maximum recommended pumping rate.

In 2023, some COPC concentrations in MSX Pit were observed to be higher than what was previously input into the dewatering tool. Although the real-time option was not available at the time, updated concentrations of these parameters were hardcoded into the dewatering tool. The flows in Line Creek were not updated, and the 1-in-10 dry flows that were already included in the tool were used. Due to the higher than historically observed concentrations, the maximum allowed pumping rates were decreased, and these reduced rates were communicated to operations.



Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

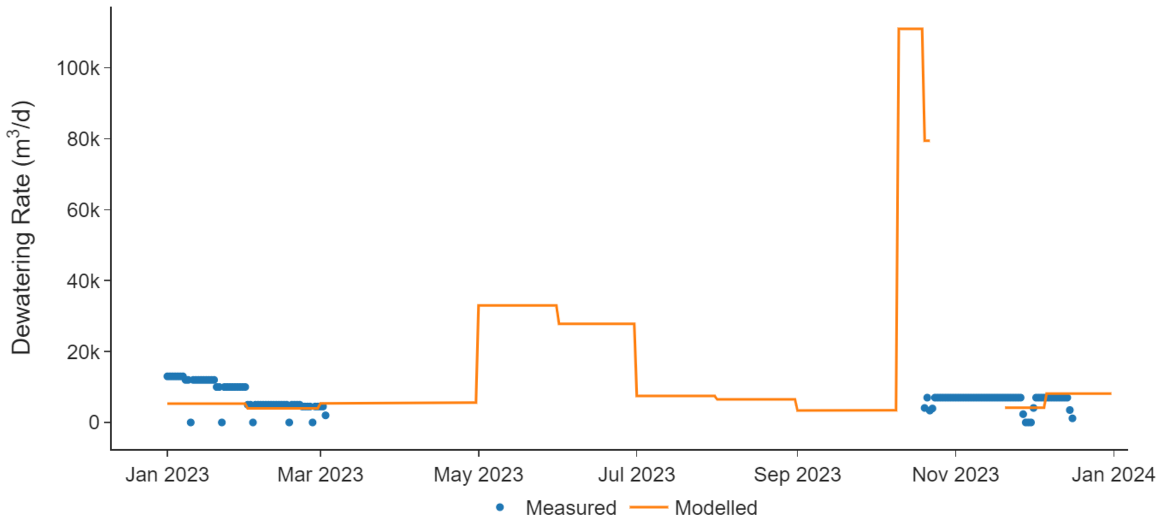
Figure 2-2: Modelled vs. Measured Dewatering Rates at MSX

2.3 HSP Pit Dewatering Rate Comparison

Dewatering rates for HSP are provided from January 1 to March 3, and October 20 to December 16, 2023 (Figure 2-3). From January 1 to March 3, LCO updated the historical tool with real time data from the most recent water quality sampled from HSP to calculate the pump rate. This led to different pump rates than the rates originally recommended by SRK based on conservative assumptions. LCO did not pump the full recommended pump rate re-calculated in the tool as a precautionary measure. Since the tool was not initially designed to track pump rates calculated using real time data, the tool recommended dewatering rates are not available between January and March 2023.

In May 2023, the tool was updated to enable the use of real-time water quality data to calculate dewatering rates. The set dewatering rate was slightly above SRK's recommended dewatering rate for a short period of time, from November 20 to November 26, and December 2 to December 5. This difference was a result of Teck's dewatering rates being set to mitigate the risk of increasing total nickel concentrations at LC_LCDSSLCC above the Level 2 Benchmark as a result of HSP dewatering (as specified in the 2023 HSP Dewatering Plan), while SRK's recommended rate was set to mitigate the risk of increasing total nickel concentrations at LC_LCUSWLC above the Level 3 Benchmark. Downstream nickel concentrations did not surpass the Level 2 Benchmark at LC_LCDSSLCC or the Level 3 Benchmark at LC_LCUSWLC and LC_LC3 during this time period.

From October 20 to November 20, the concentrations for all COPCs at HSP were below water quality thresholds. Therefore, dewatering was not limited represented by a break in the orange line in Figure 2-3.



Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 2-3: Modelled vs. Measured Dewatering Rates at HSP

3 2023 Water Quality Analysis

Available water quality monitoring data for 2023 are presented in Table 3-1, and include a full suite of parameters as analyzed by ALS labs.

Table 3-1: Water Quality Data Availability

Name	Station ID	Duration of 2023 Time Series	Number of Samples in 2023
MSX Pit	LC_MSXS	January 3, January 19, February 2, May 11	4
HSP Pit	LC_HSP	January 5 – May 9, and October 20 – December 11	19
Line Creek – Compliance Point	LC_LCDSSLCC	January 3 – December 27	52
Line Creek	LC_LC3	January 3 – December 27	60
Line Creek	LC_LCUSWLC	January 6 – December 27	59

Source: Compiled in text.

3.1 MSX Pit Water Quality

COPCs were identified by SRK in the initial development of each pit dewatering tool. Although some previously identified COPC concentrations were higher in 2023 than previously observed, no new COPCs were identified in the 2023 water quality dataset. Table 3-2 shows the maximum concentration of the COPCs observed in MSX Pit in 2023, compared to the concentrations of the COPCs used to represent MSX water quality in the dewatering tool. The 'Exceedance' column reports if the measured concentration in 2023 exceeds the assumed concentration pre-set in the tool.

In 2023, MSX Pit concentrations of dissolved aluminum, dissolved barium, dissolved beryllium, nitrite, phosphorus, and total dissolved solids exceed the assumed concentration used in the dewatering tool. Therefore, assumption 1 (Section 1.1) was not met for these constituents.

The elevated concentrations recorded in 2023 represent maximum values, not the 95th percentile usually applied when there are more than ten samples. Since there were under 10 samples from MSX Pit in 2023, outliers that would otherwise be excluded if the 95th percentile concentration are included in the dataset.

Table 3-2: Modelled and Measured Water Quality at MSX Pit

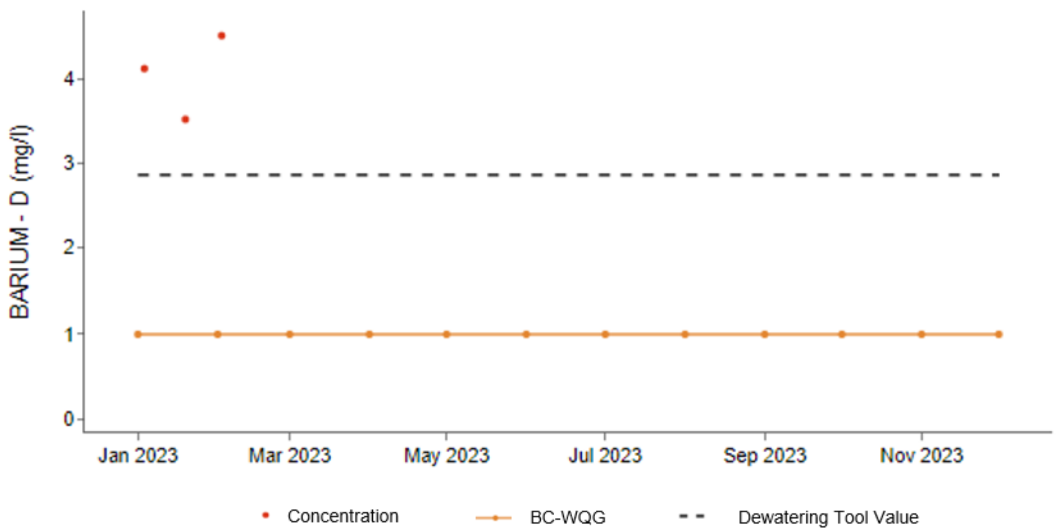
Parameter	Dewatering Tool Input Concentration	Maximum Concentration (2023)	Exceedance
Dissolved Aluminum (mg/L)	0.030	0.040	Yes
Dissolved Antimony (mg/L)	0.016	0.0022	No
Dissolved Arsenic (mg/L)	0.003	0.002	No
Dissolved Barium (mg/L)	2.86	4.51	Yes
Dissolved Beryllium (mg/L)	0.02	0.4	Yes
Dissolved Chromium (mg/L)	0.0004	0.0020	Yes
Dissolved Cobalt (mg/L)	0.019	0.0084	No
Dissolved Iron (mg/L)	0.21	0.20	No
Dissolved Nickel (mg/L)	0.085	0.044	No
Nitrate (mg N/L)	15.97	4.37	No
Nitrite (mg N/L)	0.61	0.63	Yes
Ammonia (mg N/L)	7.028	5.63	No
Phosphorus (mg/L)	0.096	0.11	Yes
Total Selenium (mg/L)	67.98	4.02	No
Dissolved Sulphate (mg/L)	304.2	101	No
Total Dissolved Solids (mg/L)	1009	1150	Yes
Dissolved Uranium (mg/L)	0.0339	0.00212	No
Total Organoselenium (µg/L)	0.052	0.034	No

Source: compiled in text

Note: If there are ten or less samples in the water quality dataset, the maximum concentration is used. Otherwise, the 95th percentile of data is used.

3.1.1 Dissolved Barium

Dissolved barium exceeds the tool's pre-set concentration of 2.86 mg/L in three samples in 2023. Two exceedances of the modelled concentration occurred during pumping. (Figure 3-1).

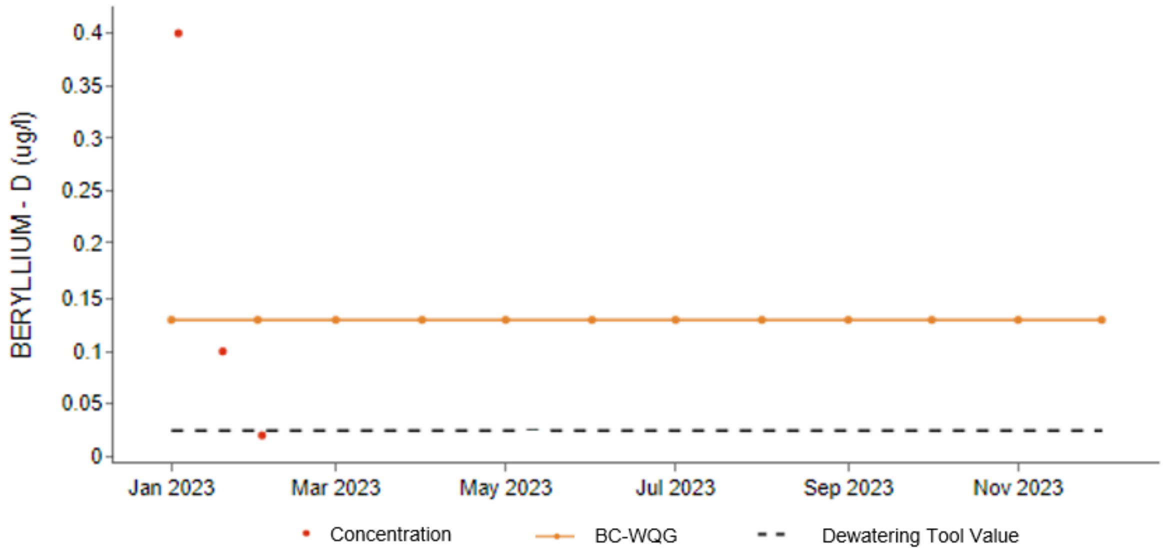


Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-1: Dissolved Barium Concentration in MSX Pit

3.1.2 Dissolved Beryllium

Dissolved beryllium exceeds the tool's pre-set concentration of 0.025 μg/L once during pumping in 2023 (Figure 3-2).

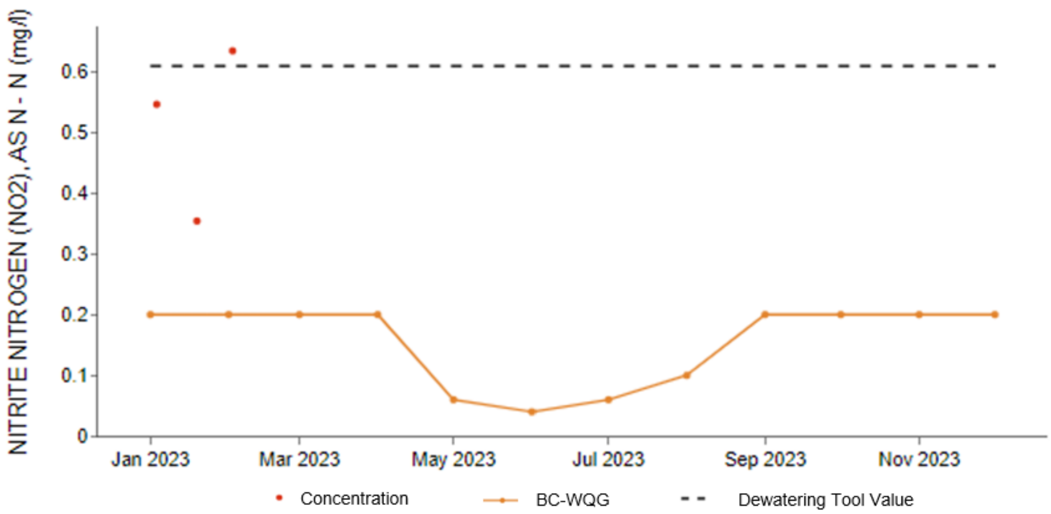


Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-2: Beryllium Concentration in MSX Pit

3.1.3 Nitrite

Nitrite exceeds the tool's pre-set concentration of 0.61 mg/L in one recorded (Figure 3-3). Two exceedances occurred during pumping.

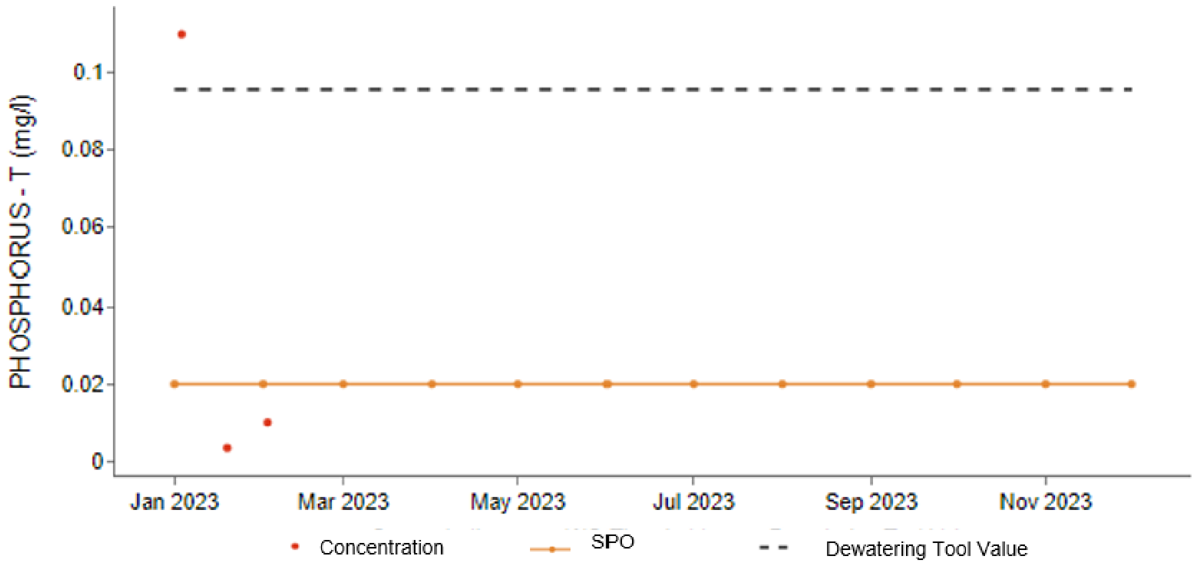


Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-3: Nitrite Concentration in MSX Pit

3.1.4 Phosphorus

Total phosphorus exceeded the tool's pre-set concentration of 0.096 mg/l in one sample on January 3. Pumping occurred during this period.

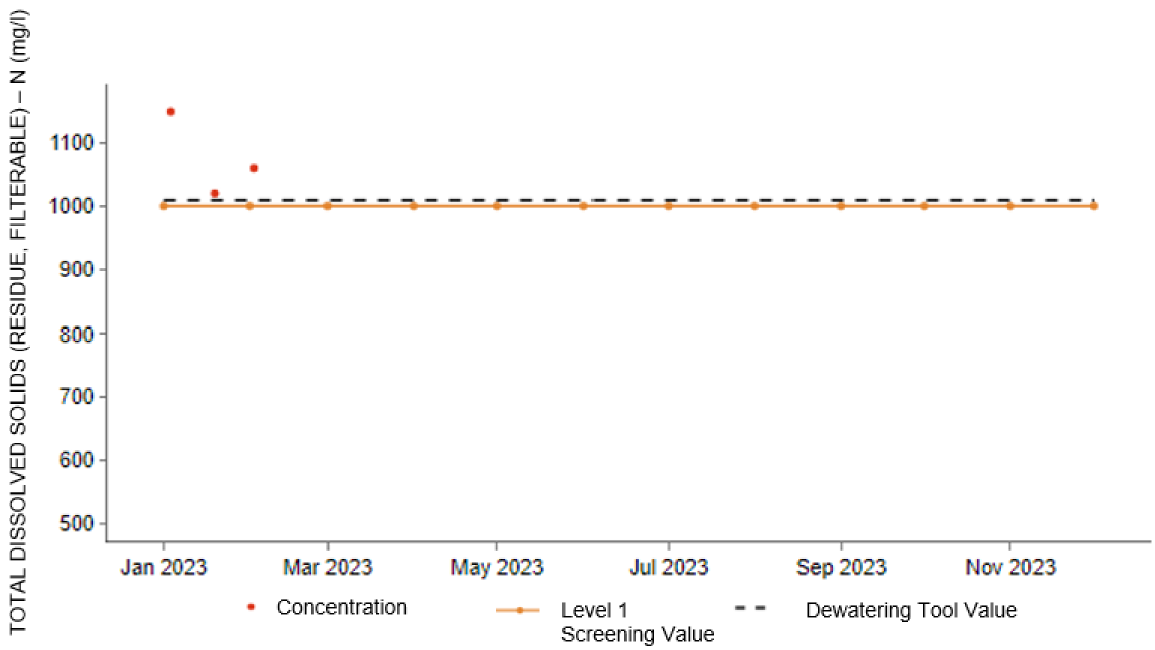


Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-4: Total Phosphorus Concentration in MSX Pit

3.1.5 Total Dissolved Solids

Total dissolved solids (TDS) exceeded the tool's pre-set concentration of 1,009 mg/L in three samples (Figure 3-5).



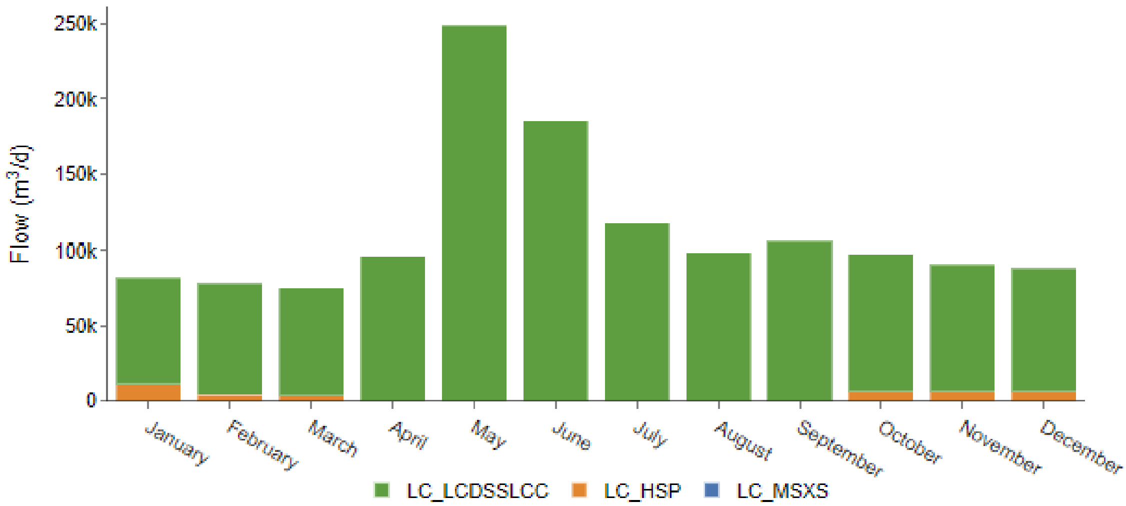
Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-5: Total Dissolved Solids in MSX Pit

The contribution of MSX Pit water is negligible compared to flows from Line Creek upstream of MSX and HSP dewatering flows. In January and February, MSX Pit dewatering contributed 0.014% and 0.024% of the average monthly flow at Line Creek, respectively. Conversely, HSP dewatering accounted for 4.87% to 13% of the total Line Creek flow in months where dewatering occurred (Table 3-3 and Figure 3-6).

Table 3-3: Monthly Proportional Contribution to Flow at Line Creek (Percent of Total Flow)

Station	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
LC_MSXS	0.01	0.02	0	0	0	0	0	0	0	0	0	0
LC_HSP	13.10	5.56	5	0	0	0	0	0	0	6	7	7
LC_LCDSSLCC	86.89	94.41	95	100	100	100	100	100	100	94	93	93



Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-6: Monthly Total Flow Contributions at Line Creek

3.2 HSP Water Quality

COPCs were identified by SRK in the initial development of the HSP dewatering tool. No new COPCs were identified in the 2023 water quality dataset.

Table 3-4 shows the 95th percentile concentration of the COPCs observed in 2023, and the concentrations of the COPCs used in the tool at HSP. The 'Exceedance' column reports if the measured concentration in 2023 exceeds the tool's pre-set concentration.

Table 3-4: Modelled and Measured Water Quality at HSP Pit

Parameter	Dewatering Tool Input Concentration	95th Percentile Measured Concentration (2023)	Exceedance
Total Cobalt (mg/L)	0.00799	0.00792	No
Dissolved Copper (mg/L)	0.0005	0.000235	No
Dissolved Oxygen (mg/L)	4.1	9.1	No*
Total Nickel (mg/L)	0.030	0.021	No
Nitrite (mg N/L)	0.069	0.0392	No
Phosphorus (mg/L)	0.018	0.011	No
Total Selenium (µg/L)	13.1	17.1	Yes
Dissolved Sulphate (mg/L)	263.4	233.6	No
Nitrate (mg N/L)	1.78	1.59	No
Dissolved Cadmium (µg/L)	0.146	0.0924	No
Dimethylseleneoxide (µg/L)	0.023	0.034	Yes
Methylseleninic acid (µg/L)	0.027	0.044	Yes

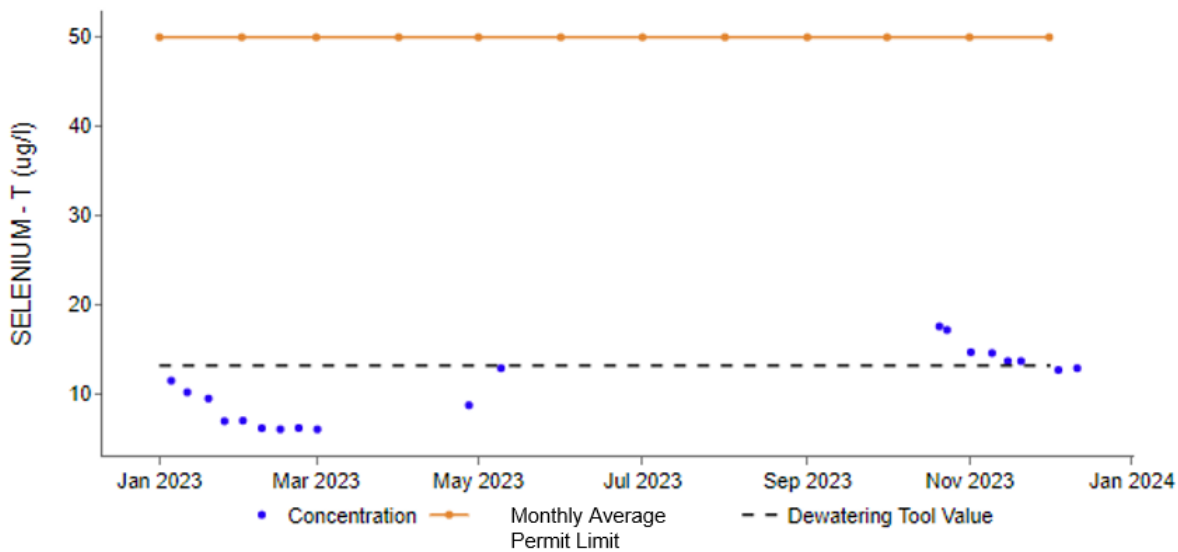
Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Note : Since Dissolved Oxygen is a minimum threshold, the 5th percentile of water quality was used in the assessment

The 95th percentile concentration of ammonia, total selenium, and organoselenium species measured in 2023 exceeded the concentration pre-set in the tool. HSP water quality in 2023 had higher dissolved oxygen concentration than the minimum threshold, indicating it is not a concern for discharge. The BC Water Quality guideline for dissolved oxygen is 3.1 mg/l, and the 5th percentile HSP concentration was 9.1 mg/L in 2023. Selenium species are not used to determine dewatering rates and are included in the tool for tracking purposes.

3.2.1 Total Selenium

The concentration of selenium exceeded the tool's pre-set concentration of 13.1 µg/L from October 20 to November 20. All instances occurred during dewatering. The concentration of total selenium at HSP was always below the water quality threshold of 50 µg/l (Figure 3-7).



Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

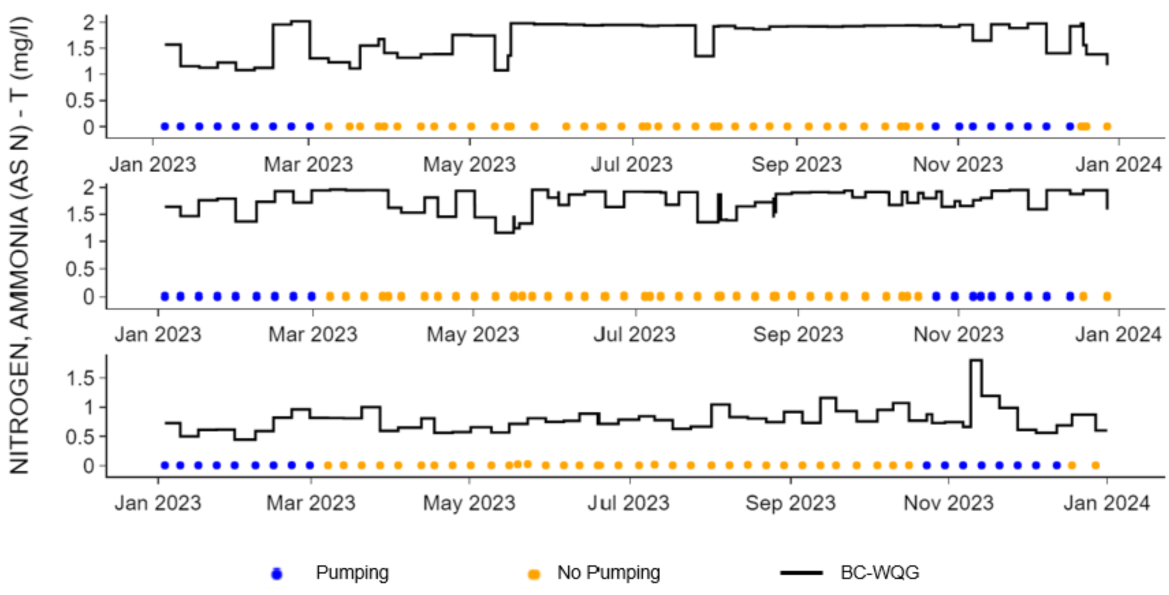
Figure 3-7: Total Selenium Concentration at HSP

3.3 Line Creek Water Quality

The water quality of LC_LCDSSLCC, LC_LC3 and LC_LCUSWLC were compared against the thresholds used in the tool. Water quality thresholds are a combination of permit limits, site performance objectives and BC Water Quality Guidelines. While several constituents were found to have a measured concentration that exceeded the concentration used by the tool to represent pit water quality, the concentration of those same constituents in Line Creek are below the relevant water quality threshold.

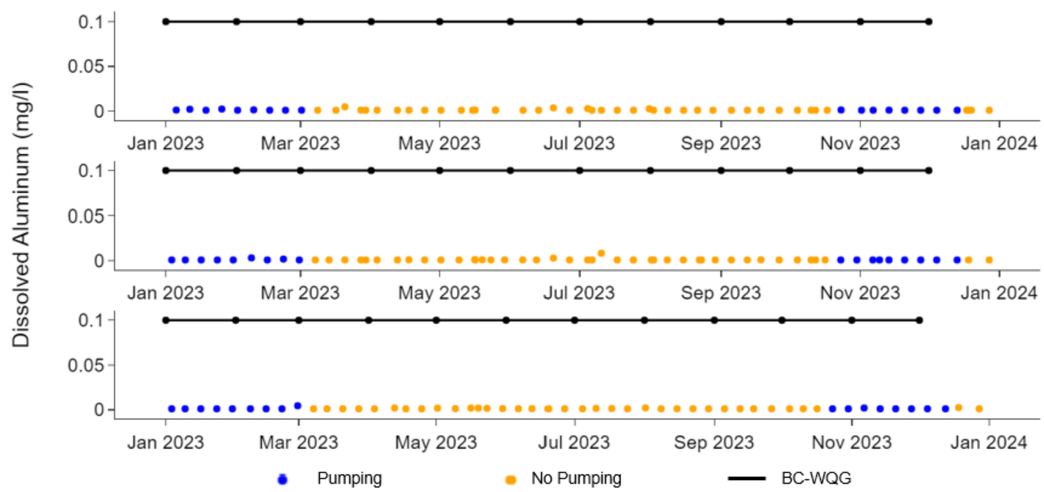
Dewatering from HSP occurred from January to April and October to December 2023. Dewatering from MSX Pit occurred in January and February 2023. As a result, the water quality in Line Creek during dates outside of these dewatering periods is not influenced by MSX or HSP dewatering. However, Line Creek monitoring data for the entire year for each COPC has been provided.

Trends for COPCs that exceeded the modelled concentration at MSX Pit are provided in Figure 3-8 to Figure 3-15. For all figures, the top subplot is LC_LCUSWLC, the middle subplot is LC_LC_LC3, and the bottom subplot is LC_LC_LCDSSLCC. The water quality thresholds for ammonia and nitrite are calculated based on the water quality data from Line Creek. Figures showing the concentration of all COPCs at Line Creek are shown in Appendix A.



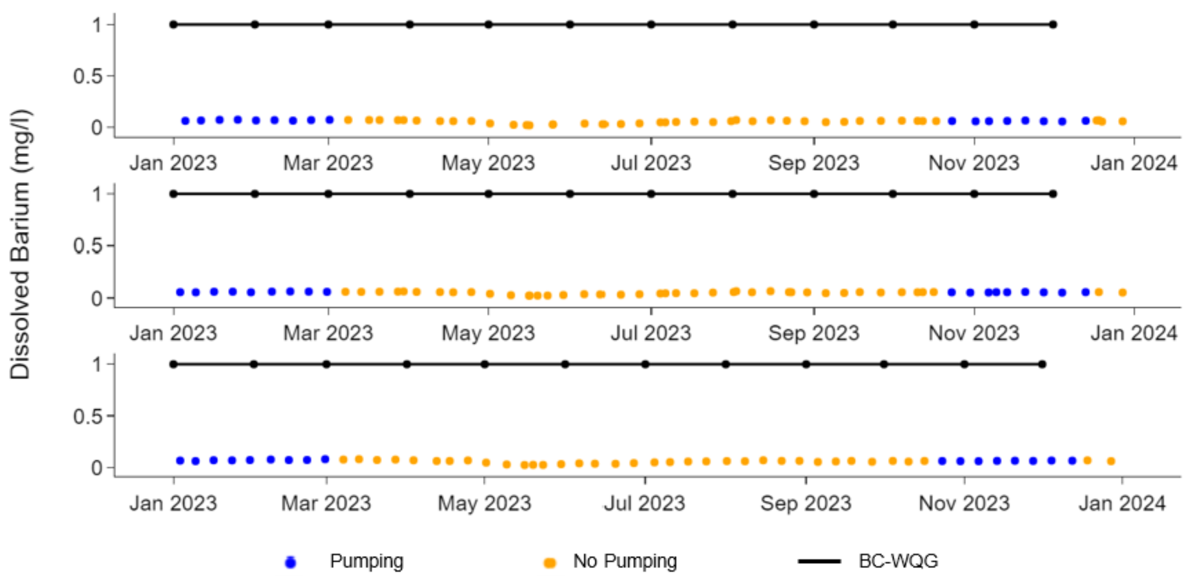
Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-8: Concentration of Ammonia at LC_LCUSWLC (top), LC_LC3 (middle), and LC_LCDSSLCC (bottom)



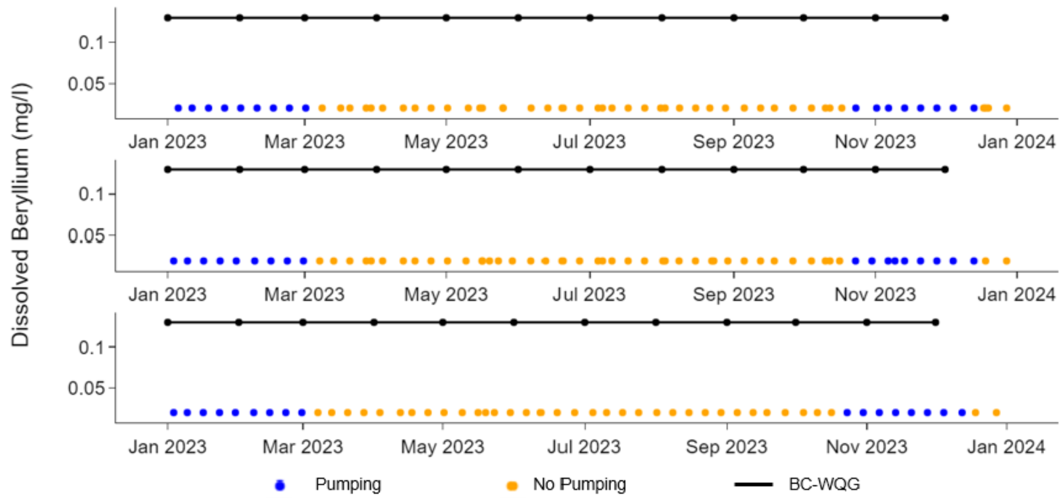
Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-9: Concentration of Dissolved Aluminum at LC_LCUSWLC (top), LC_LC3 (middle), and LC_LCDSSLCC (bottom)



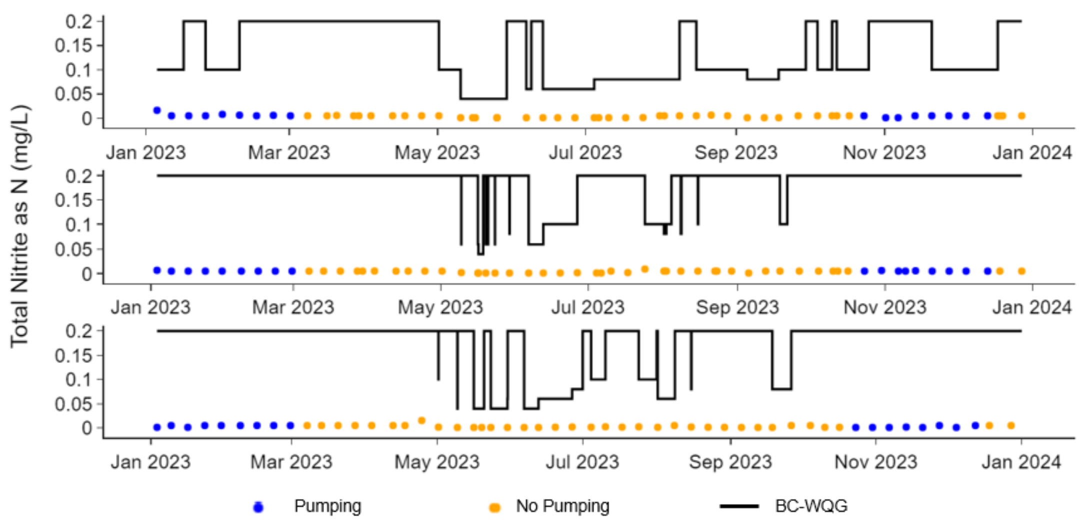
Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-10: Concentration of Dissolved Barium at LC_LCUSWLC (top), LC_LC3 (middle), and LC_LCDSSLCC (bottom)



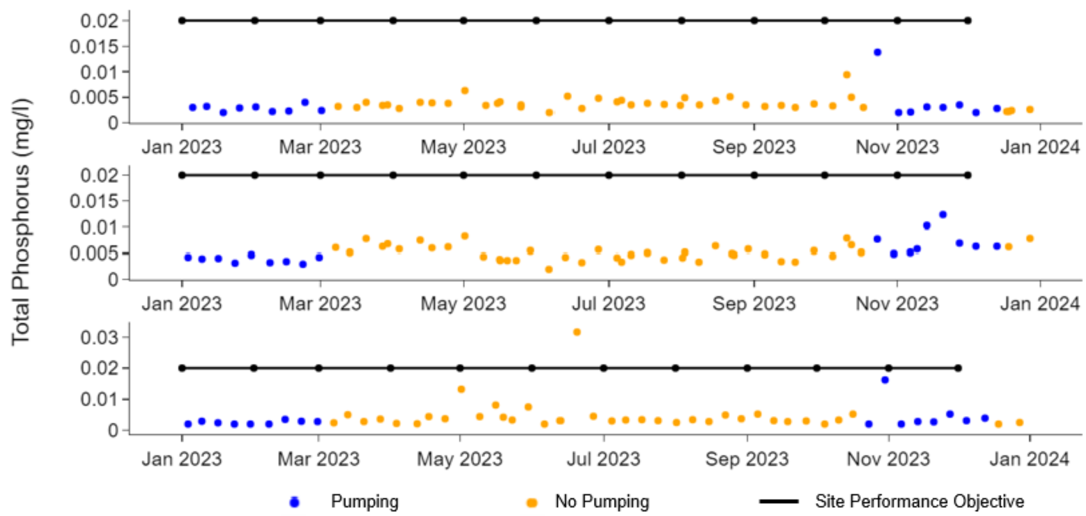
Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-11: Concentration of Dissolved Beryllium at LC_LCUSWLC (top), LC_LC3 (middle), and LC_LCDSSLCC (bottom)



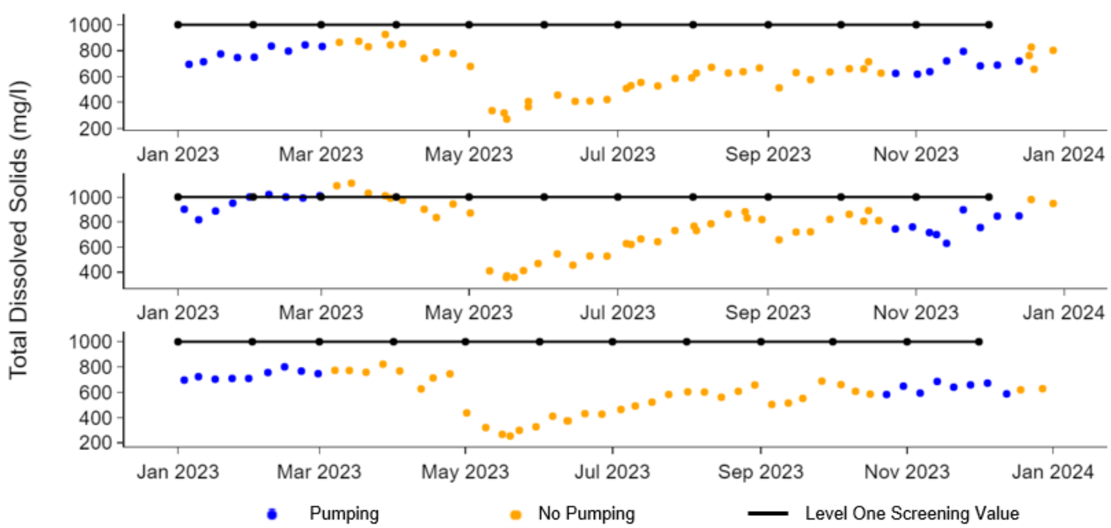
Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-12: Concentration of Nitrite at LC_LCUSWLC (top), LC_LC3 (middle), and LC_LCDSSLCC (bottom)



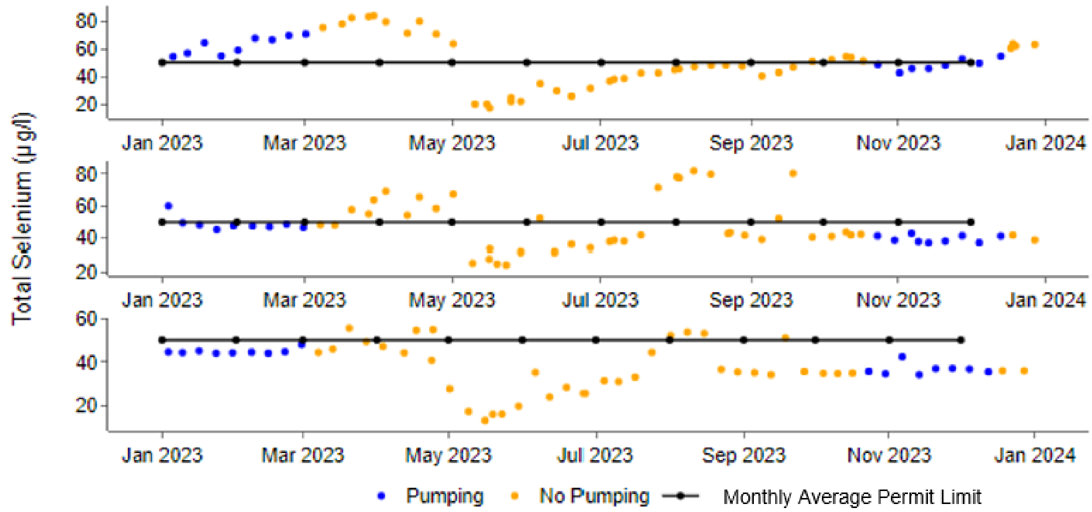
Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-13: Concentration of Phosphorus at LC_LCUSWLC (top), LC_LC3 (middle), and LC_LCDSSLCC (bottom)



Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-14: Concentration of Total Dissolved Solids at LC_LCUSWLC (top), LC_LC3 (middle), and LC_LCDSSLCC (bottom)



Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

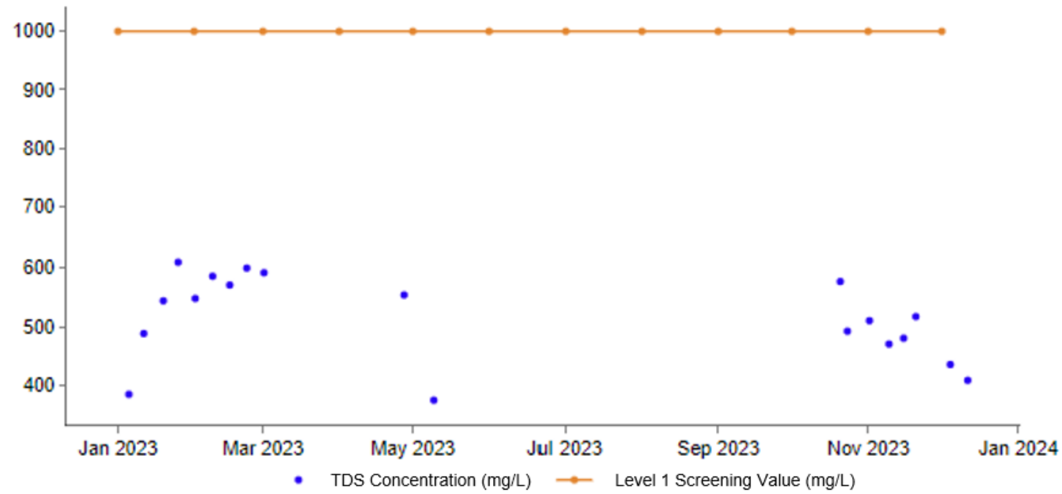
Figure 3-15: Concentration of Total Selenium at LC_LCUSWLC (top), LC_LC3 (middle), and LC_LCDSSLCC (bottom)

The Line Creek water quality was below the WQ thresholds set in the HSP and MSX dewatering plans for all constituents where pit water concentrations were above water quality thresholds for all COPCs except total dissolved solids, and total selenium.

Total selenium concentration was above the water quality threshold once at LC_LC3 during dewatering, and consistently from January to May at LC_LCUSWLC (although pit dewatering only occurred from January to March). The water quality measured at MSX Pit and HSP were consistently under the water quality threshold and would have offered dilution to Line Creek which periodically has selenium concentrations above the permit limit of 50 µg/L (Figure 3-7).

Total selenium concentrations were above the water quality threshold once at LC_LC3 during dewatering, and consistently from January to May at LC_LCUSWLC (although pit dewatering only occurred from January to March). The water quality measured at MSX Pit and HSP were consistently under the water quality threshold and would have offered dilution to Line Creek which periodically has selenium concentrations above the WQ threshold of 50 µg/L (Figure 3-7). The 50 µg/L threshold for total selenium set in the plans is based on the LC_LCDSSLCC monthly average permit limit. This limit is conservatively applied as an instantaneous limit at all three downstream locations in the plans.

On days where dewatering occurs from MSX, MSX contributes between 0.16% and 1.16% of the TDS load to LC_LC3. Given that MSX contributes minimal flow to Line Creek, it is improbable that it caused the heightened TDS levels. Furthermore, TDS concentrations at HSP were consistently below Level 1 screening values, significantly reducing the likelihood HSP as a source of the increase. (Figure 3-16). Notably, the concentration of TDS at LC_LCUSWLC, the first monitoring point past HSP and MSX, did not go above the water quality threshold, further supporting the hypothesis that pit dewatering at LC_LC3 is unlikely to be the cause of the elevated TDS readings at LC_LC3.

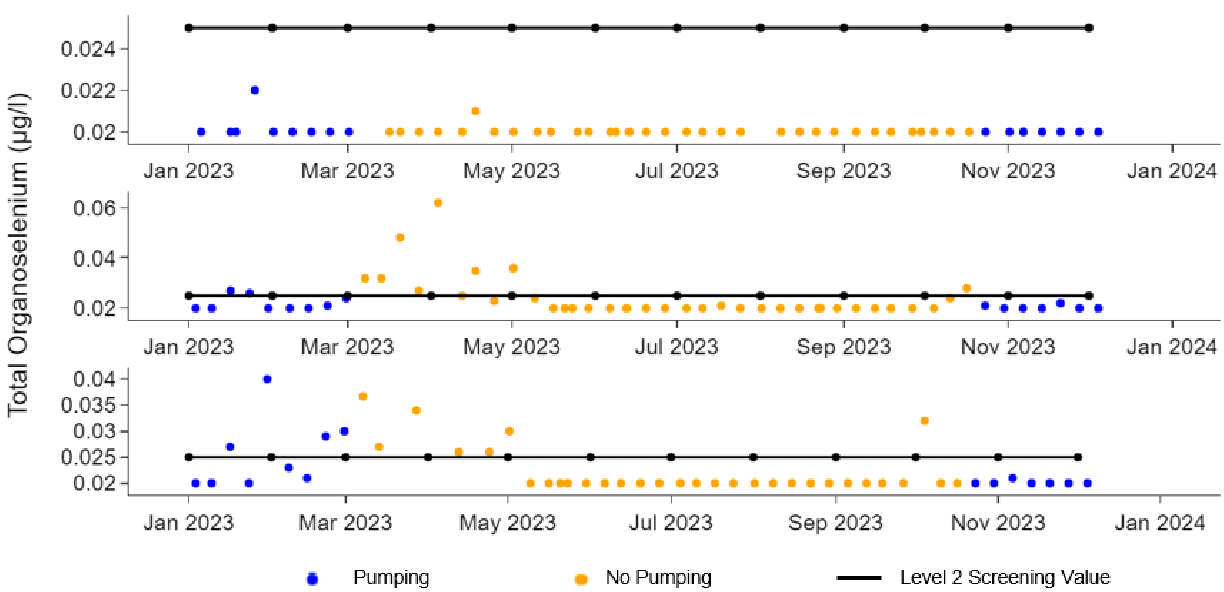


Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-16: Concentration of TDS at HSP

3.3.1 Organoselenium

Organoselenium was above the level 2 screening value on 10 and 11 occasions at LC_LC3 and LC_LCDSSLCC, respectively in 2023. All occurrences except two occur during freshet. At LC_LCUSWLC, organoselenium concentrations were at or below the detection limits for all samples.

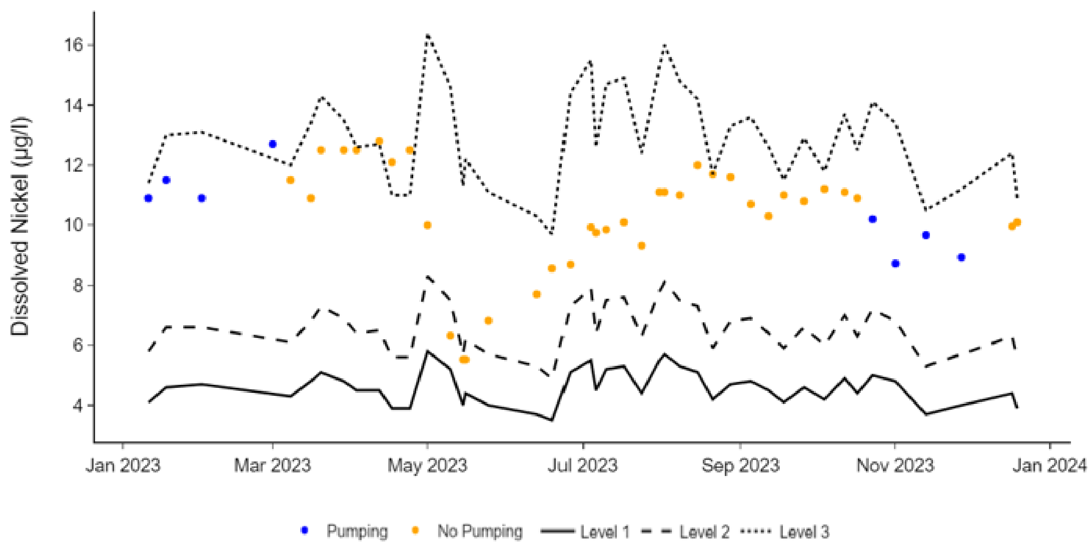


Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 3-17: Concentration of Total Organoselenium at LC_LCUSWLC (top), LC_LC3 (middle), and LC_LCDSSLCC (bottom)

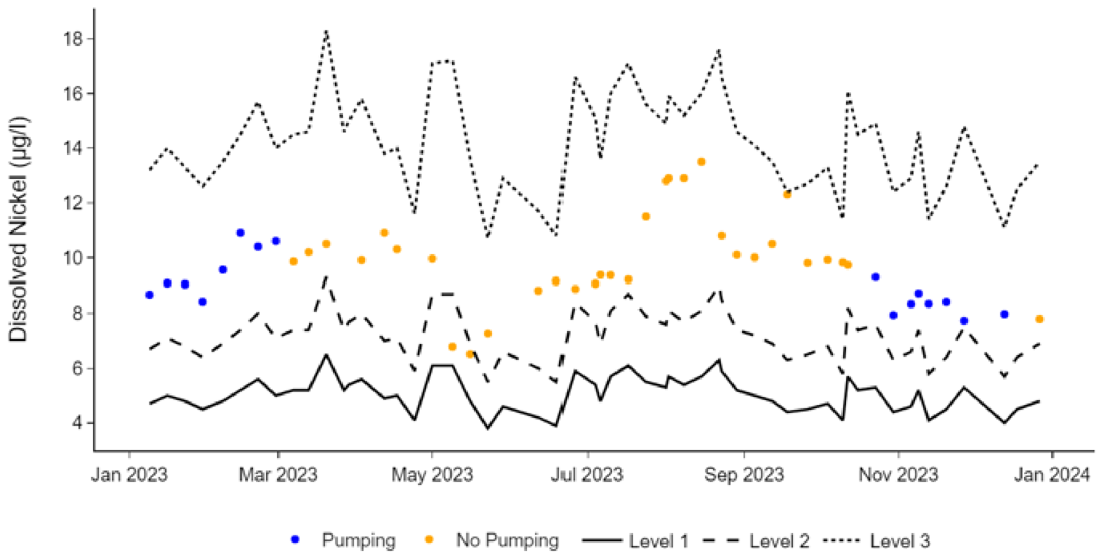
4 Nickel Assessment

Nickel concentrations have been closely monitored due to being identified as the most limiting COPC in the 2023 HSP Water Quality Evaluation. Nickel is a COPC in HSP and MSX based on calculated nickel benchmarks. To assess these concerns, an assessment was conducted to evaluate the potential impact of dewatering HSP on nickel concentrations in Line Creek. The level 2 benchmark was used at LC_LCDSSLCC, while the level 3 benchmark was used at LC_LC3 and LC_LCUSWLC. The concentration of nickel remains below the real-time calculated nickel benchmark in Line Creek, other than from April 12 to April 24, where it is slightly above the benchmark in LC_LCDSSLCC (Figure 4-1). Pit dewatering did not occur during this time.



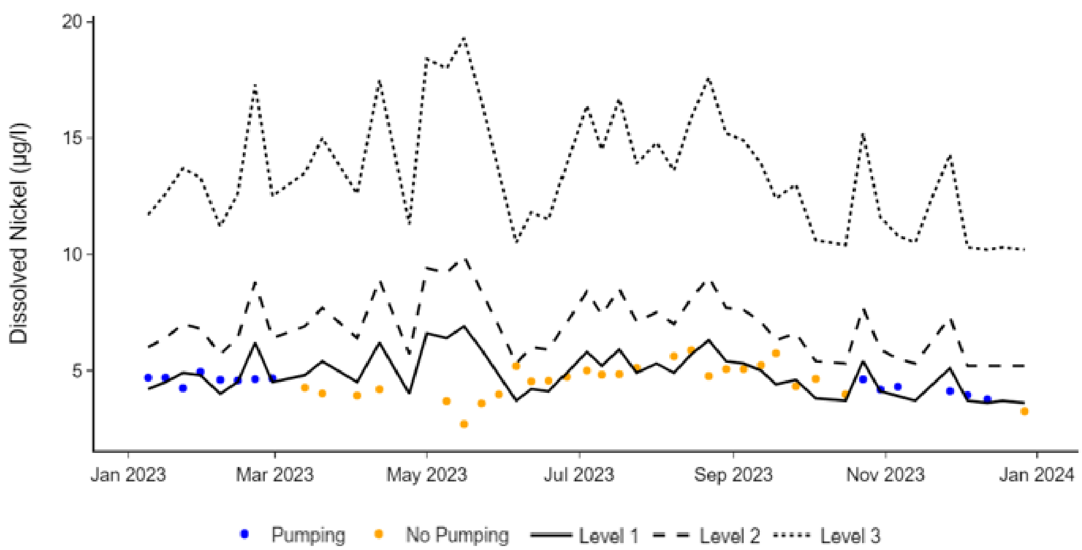
Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 4-1: Nickel Concentrations in LC_LCUSWLC



Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 4-2: Nickel Concentrations in LC_LC3



Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

Figure 4-3: Nickel Concentrations in LC_LCDSSLCC

Hypothesis testing was used to determine if the nickel concentrations in Line Creek vary during periods of dewatering. The normality and equal variance for each station were calculated for dissolved and total nickel at each station to ensure that the assumptions for hypothesis testing was met. Then, a test statistic and associated p-value were calculated. If the p-value is greater than 0.05, there is a statistically significant difference in nickel concentration between periods of dewatering and no dewatering. Otherwise, there is no statistical difference. The results of the hypothesis test are seen in Table 4-1.

Table 4-1: Nickel Dewatering Hypothesis Test Result

Station	Constituent	Mean (No Pumping)	Mean (Pumping)	P-Value	Result
LC_LC3	Dissolved Nickel (µg/L)	9.8	8.9	0.016	Significant Difference
LC_LC3	Total Nickel (µg/L)	10.2	9.4	0.042	Significant Difference
LC_LCDSSLCC	Dissolved Nickel (µg/L)	4.5	4.4	0.61	No Significant Difference
LC_LCDSSLCC	Total Nickel (µg/L)	4.8	4.8	0.73	No Significant Difference
LC_LCUSWLC	Dissolved Nickel (µg/L)	10.2	10.5	0.93	No Significant Difference
LC_LCUSWLC	Total Nickel (µg/L)	10.5	10.7	0.85	No Significant Difference

Source: https://srk.sharepoint.com/sites/NACAPR003040/Internal/COPC_Review/MSX_HSP_Tool_Assessment_2023_r1_NL.ipynb

The results indicate that at stations LC_LCDSSLCC and LC_LCUSWLC, there is no significant difference in nickel concentrations during dewatering activities. Conversely, at station LC_LC3, the concentration of nickel during periods without pumping is significantly higher than during periods with pumping.

Given the inherent variability of nickel concentrations due to seasonal changes and other environmental factors, the current dataset does not provide conclusive evidence to determine the material impact of HSP dewatering on nickel concentrations in Line Creek. To fully assess the impact of dewatering, data over at least one year during times where pumping did occur, and data over at least one year during times where pumping did not occur is required. This assessment will occur in the 2024 water quality evaluation update. Nevertheless, the statistical analysis supports the hypothesis that HSP dewatering does not significantly influence nickel concentrations. To enhance the robustness of these findings, it is recommended that future assessments include data spanning multiple years. This would help mitigate the influence of seasonal variability and provide a more comprehensive understanding of the trends.

5 Conclusions and Recommendations

Although the concentration of some constituents exceeded the dewatering tool input concentrations in the MSX dewatering tool, the tools were both successful in recommending dewatering rates that ensured the concentration of COPCs at LC_LCDSSLCC, LC_LC3, and LC_LCUSWLC did not go above the water quality thresholds for all COPCs except total dissolved solids.

Annual review of water quality data should include updating the conservative assumptions on which the recommended pit dewatering rates are made. In 2023, HSP and MSX pit water quality exceeded the tool input concentrations for several parameters. However, as noted above, mining in MSX pit ended in Q1 2023, and updating the dewatering tool may be unnecessary. For HSP, the representative water quality of some COPCs recorded in 2023 is higher than 2022. However, LCO will rely on the real time option for determining dewatering rates. Therefore, no updates to the HSP dewatering tool inputs are necessary. Records of water quality and flow inputs should be maintained for use in future annual tool evaluations.

Regards,
SRK Consulting (Canada) Inc.

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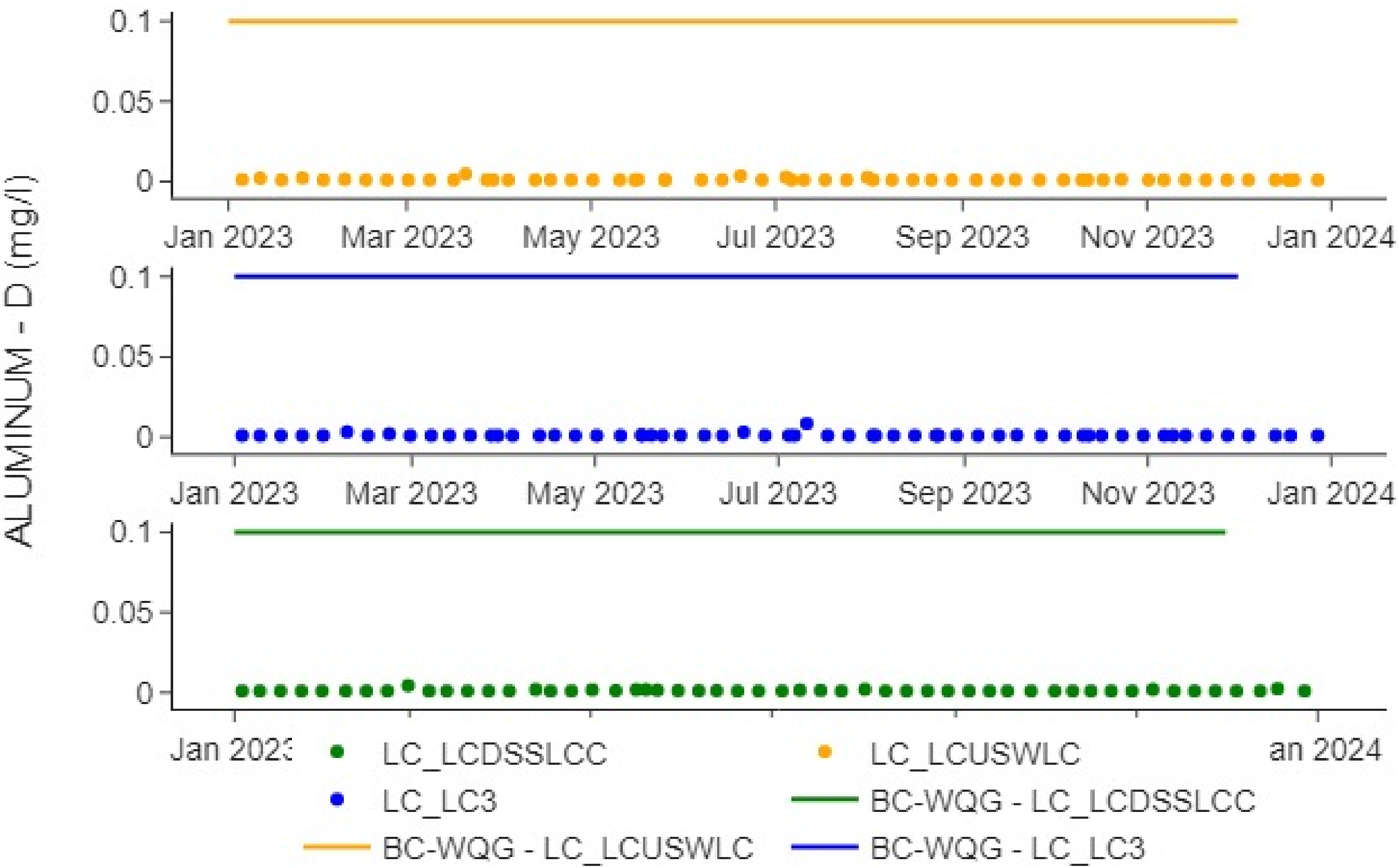
References

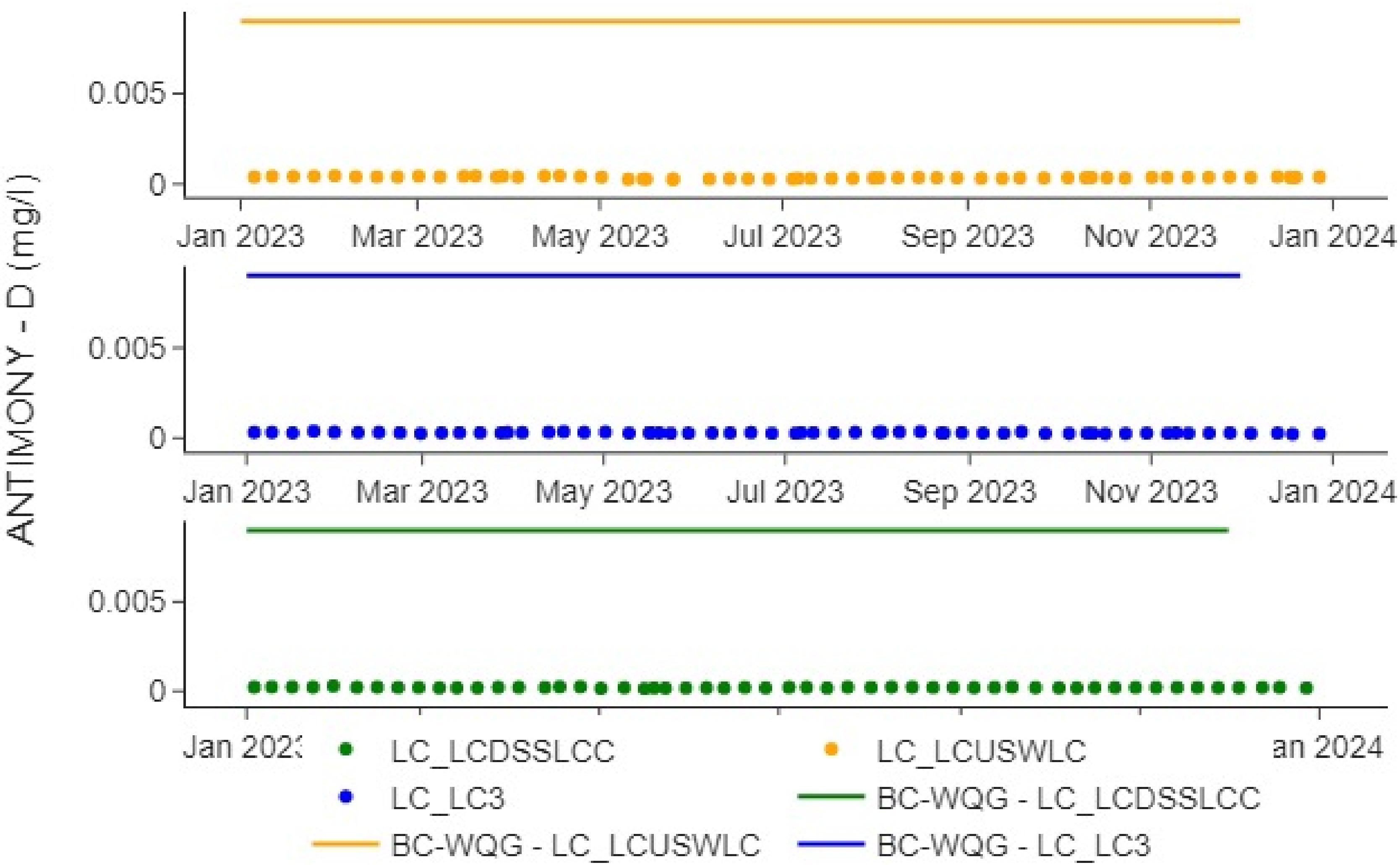
SRK Consulting (Canada) Inc., 2023a. Horseshoe Ridge Pit Dewatering Plan Water Quality Evaluation – 2021 Water Quality Update. September 2023.

SRK Consulting (Canada) Inc., 2023b. MSX Pit Dewatering Plan Water Quality Evaluation – 2022 Water Quality Update. March 2023.

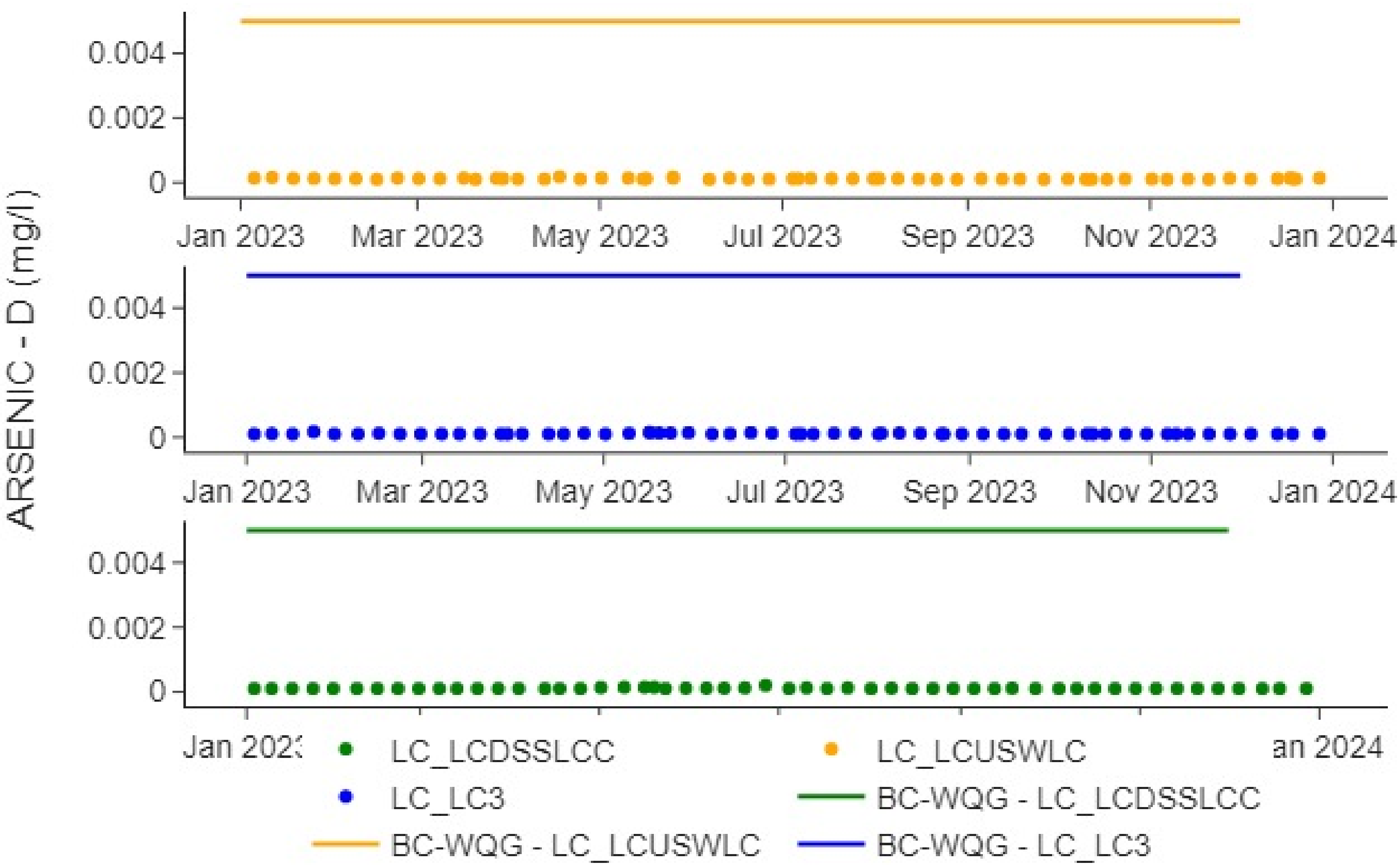
Appendix A Figures



ALUMINUM - D (mg/l)
0.1
0.05
0
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3



ANTIMONY - D (mg/l)
0.005
0
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3


ARSENIC - D (mg/l)
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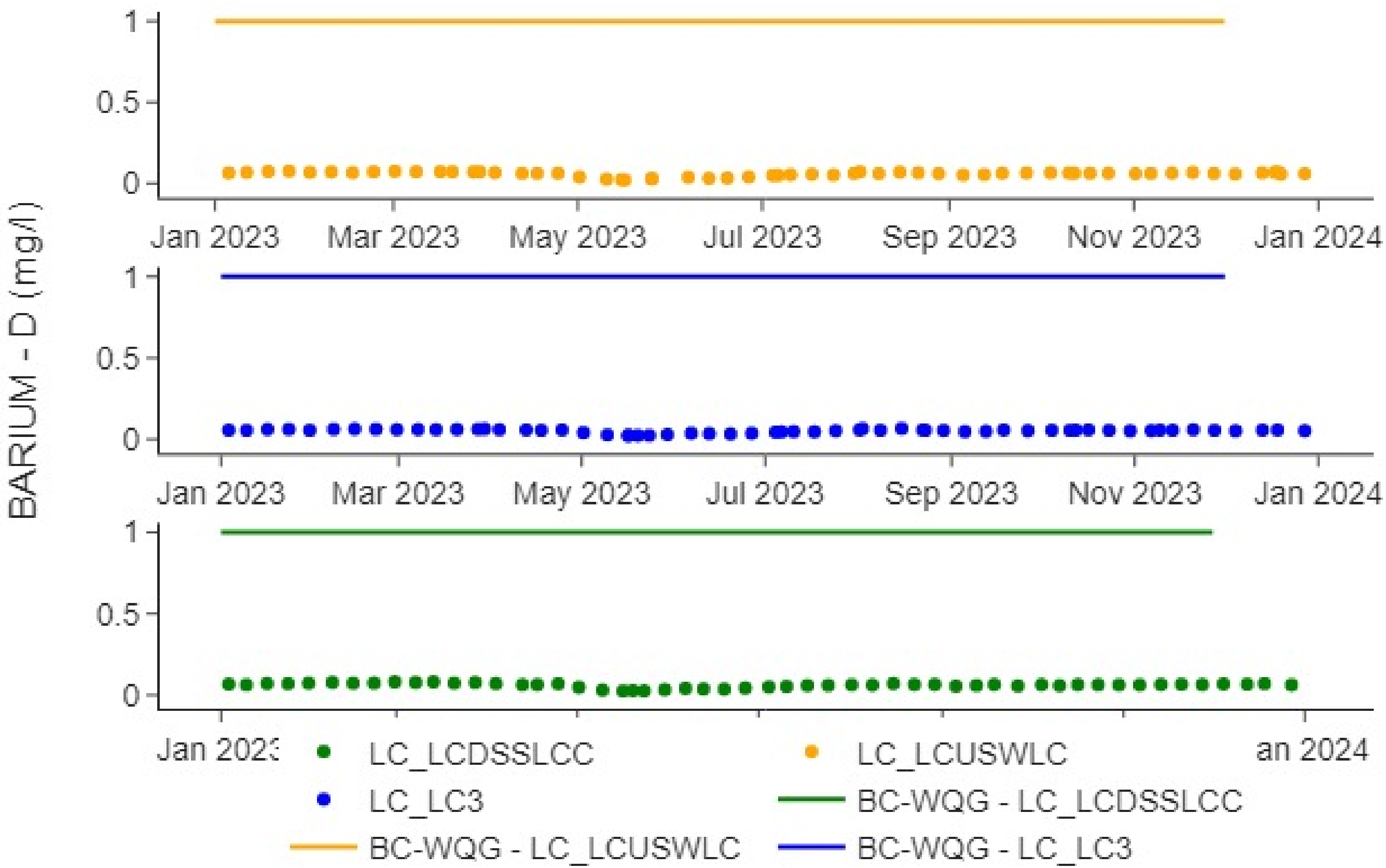
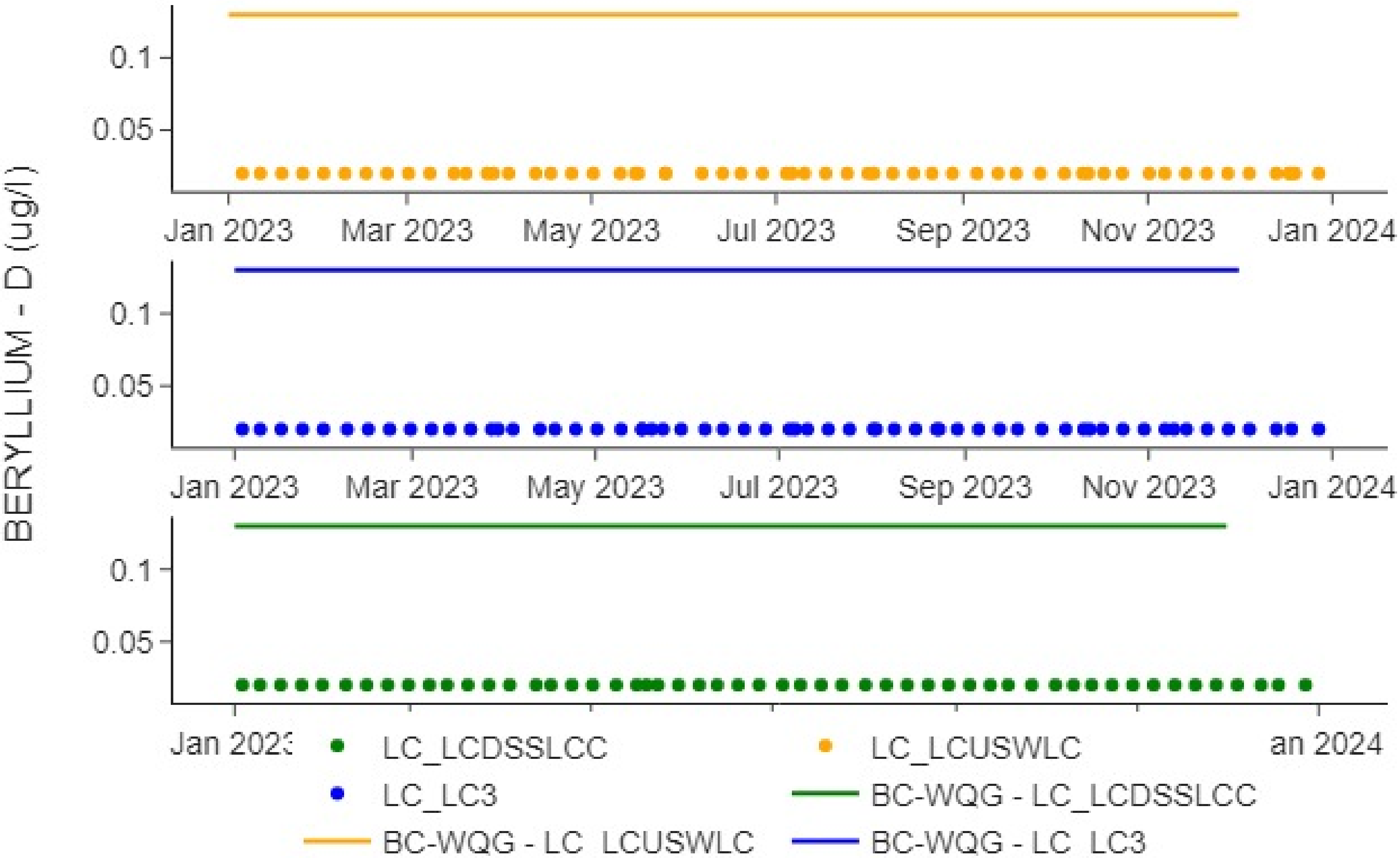
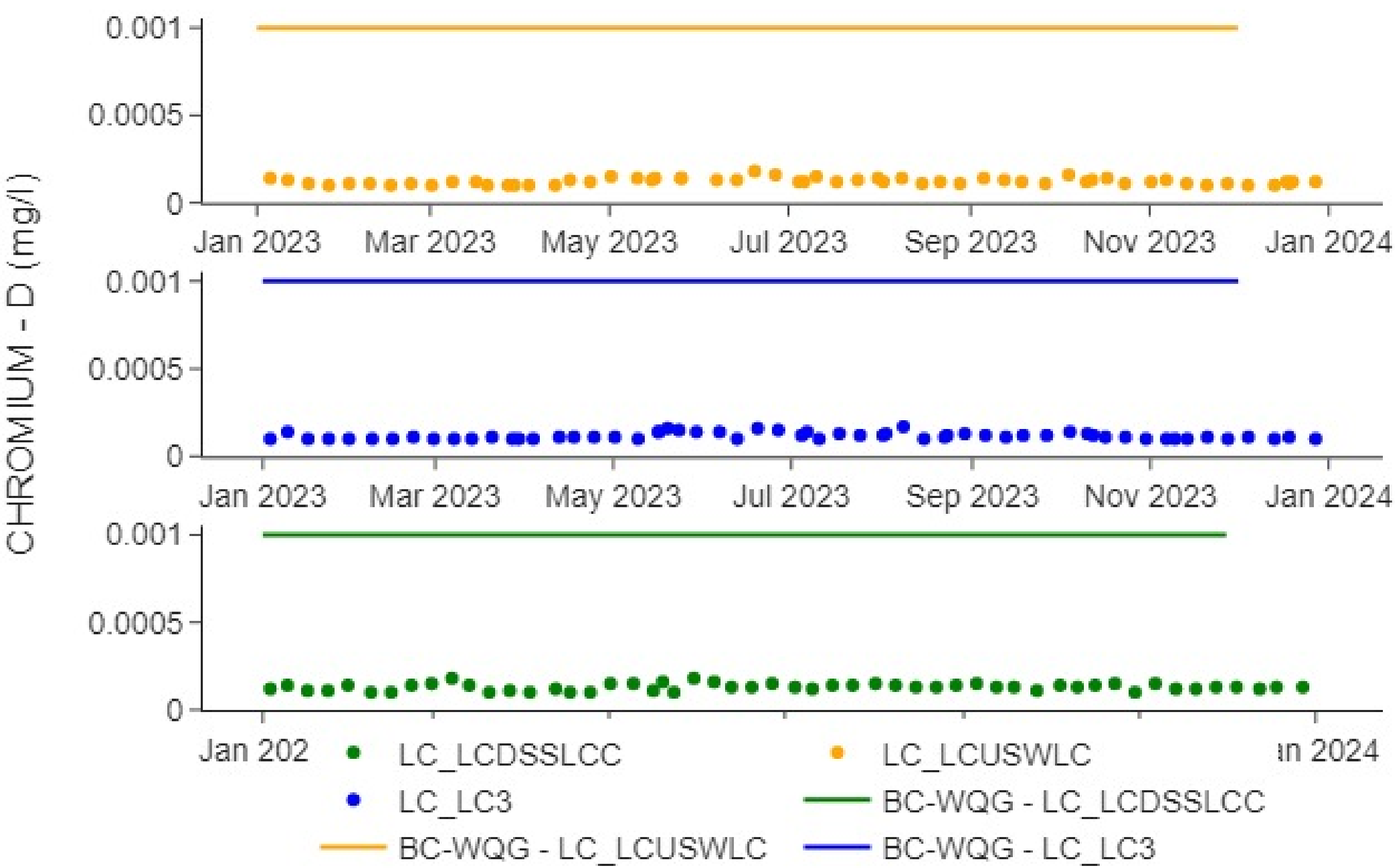
0.002
0
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3



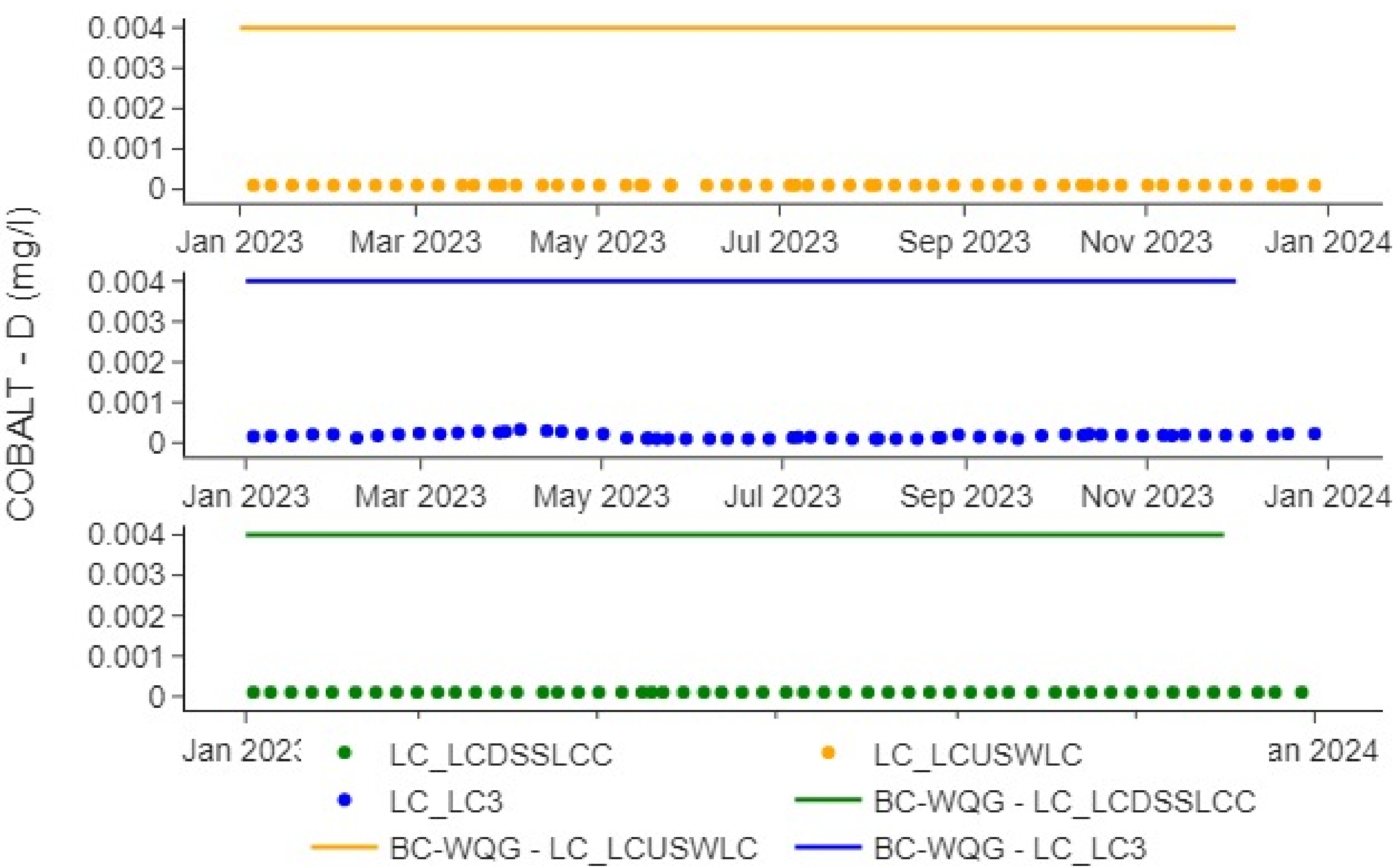
BARIUM - D (mg/l)
1
0.5
0
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3

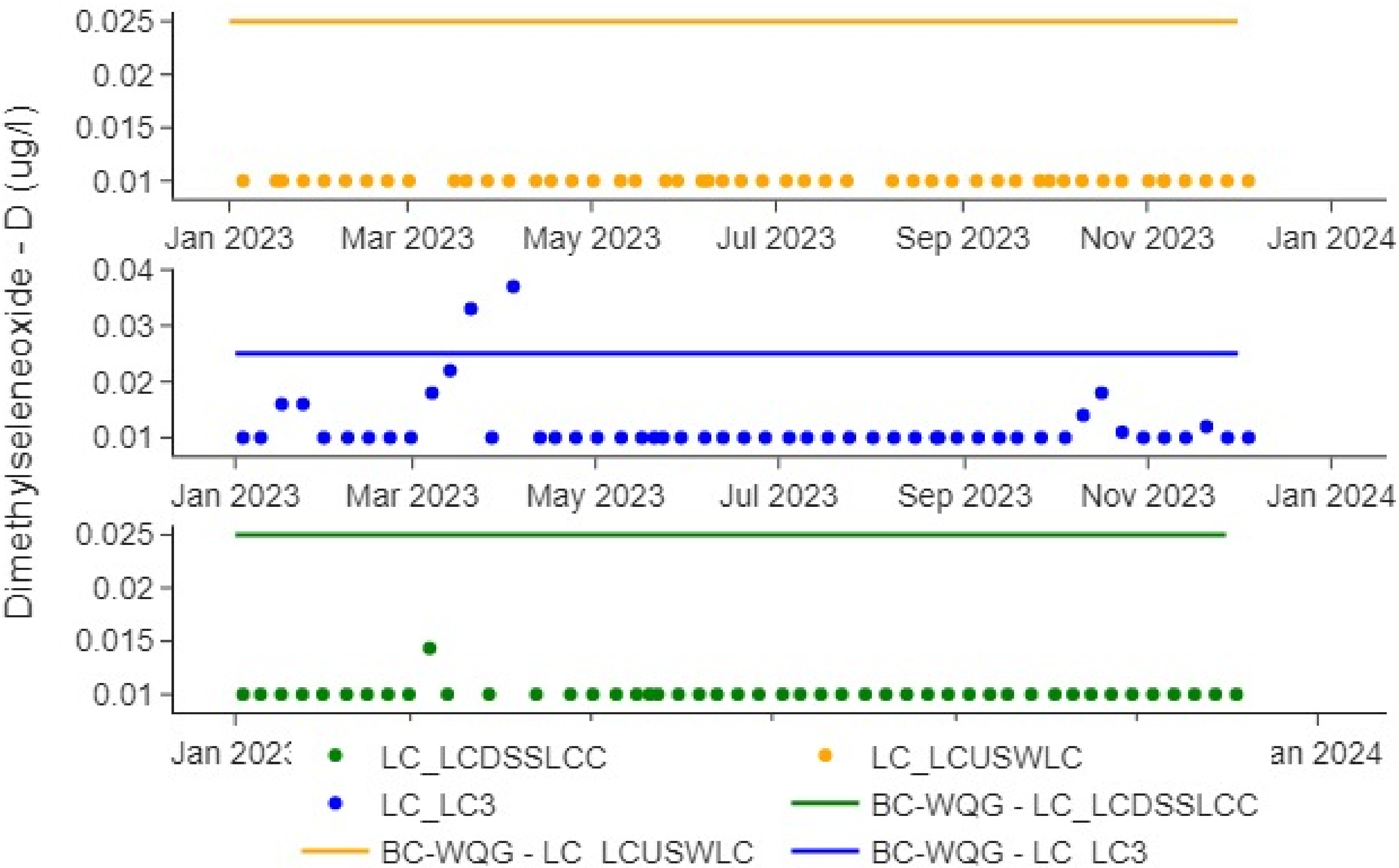


BERYLLIUM - D (ug/l)
0.1
0.05
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3

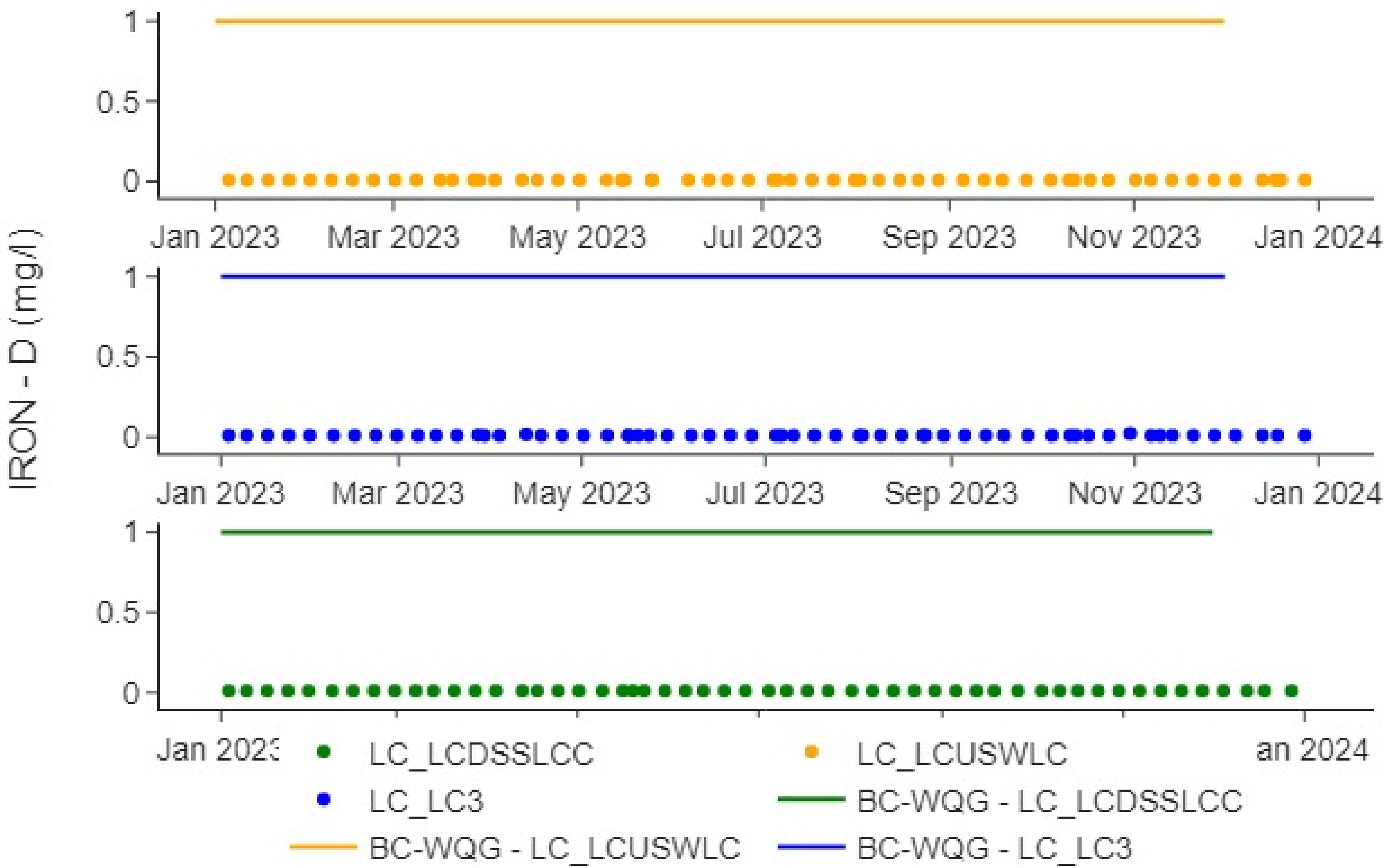


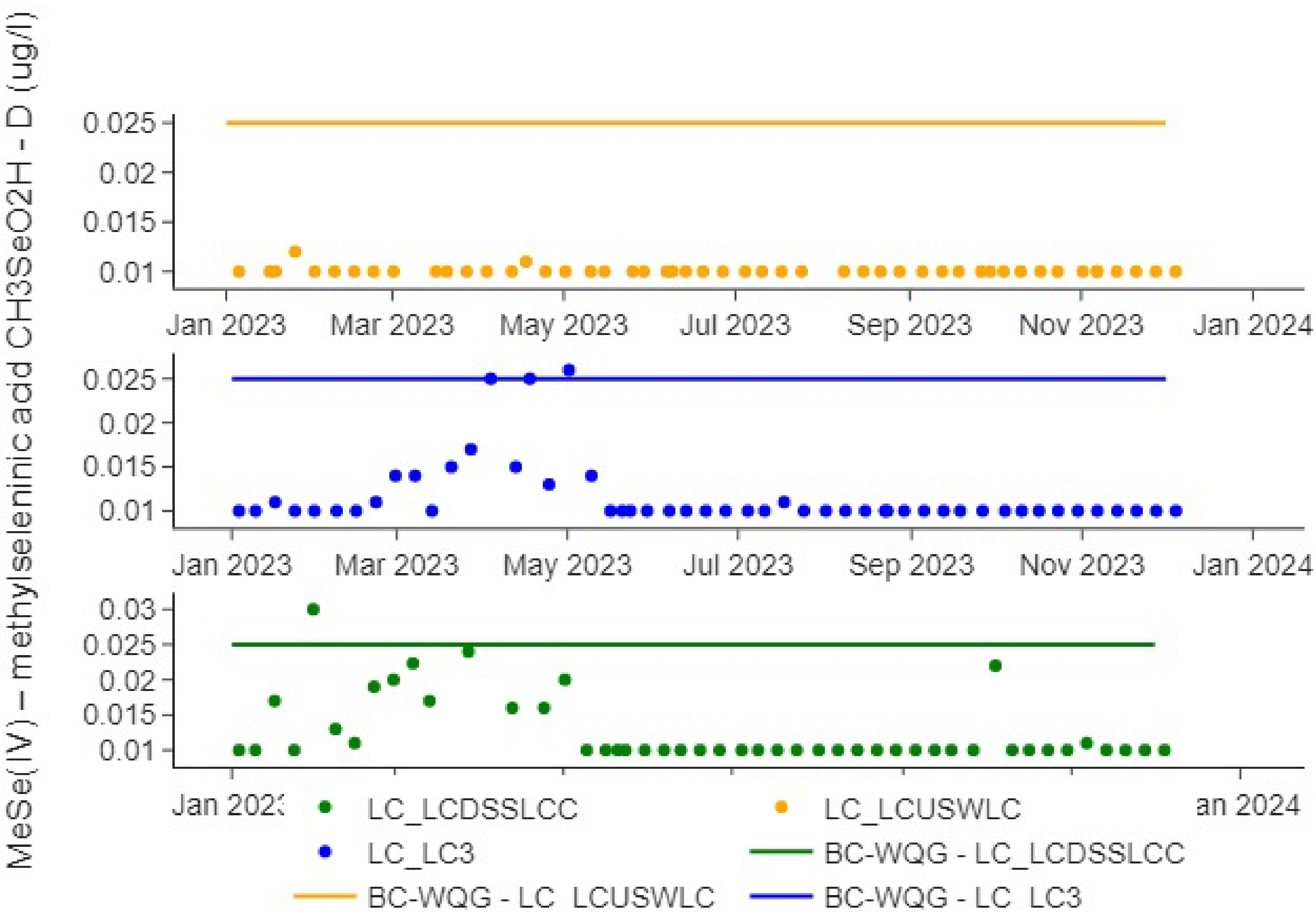
CHROMIUM - D (mg/l)
0.001
0.0005
0
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3

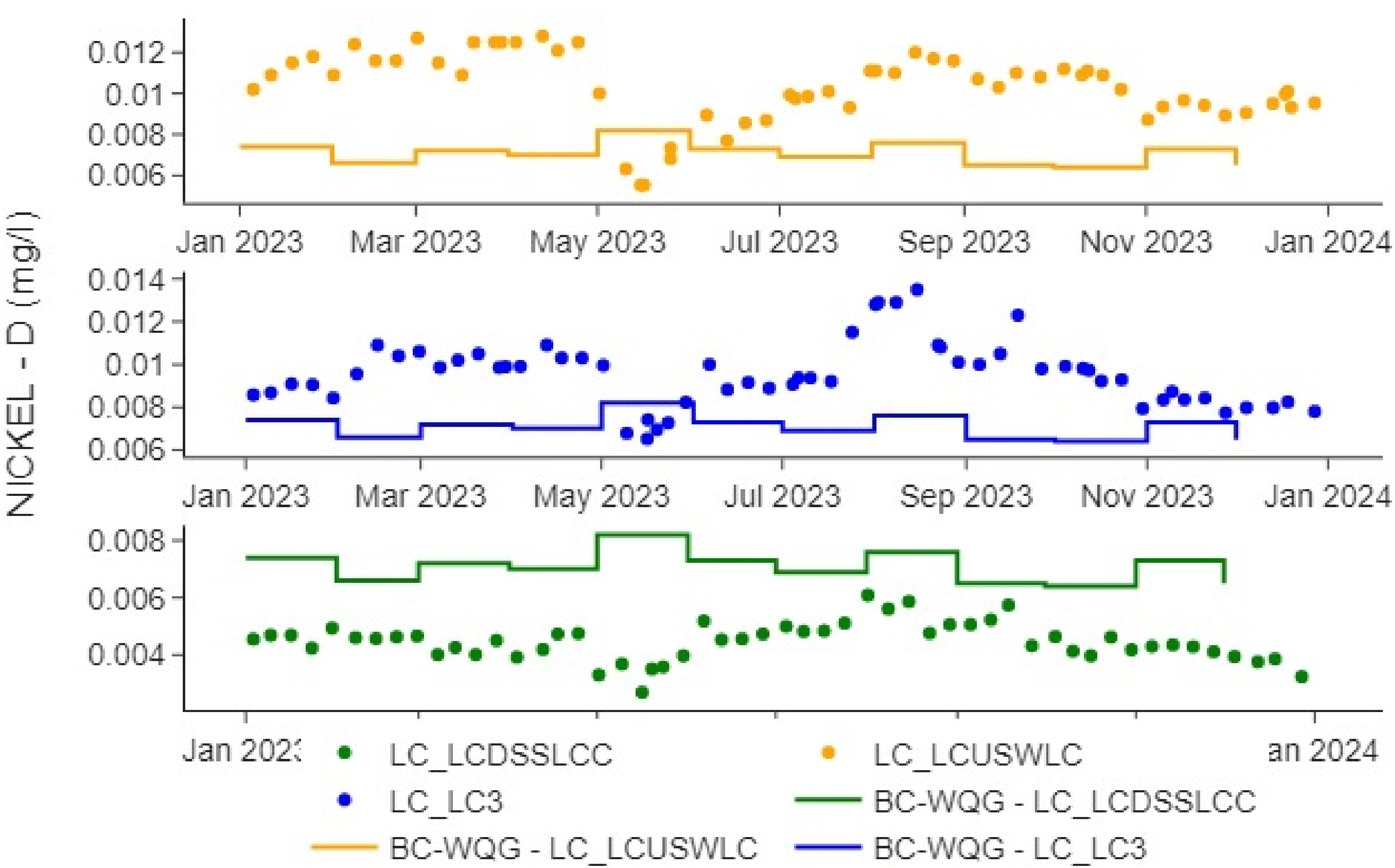

COBALT - D (mg/l)
0.004
0.003
0.002
0.001
0
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3



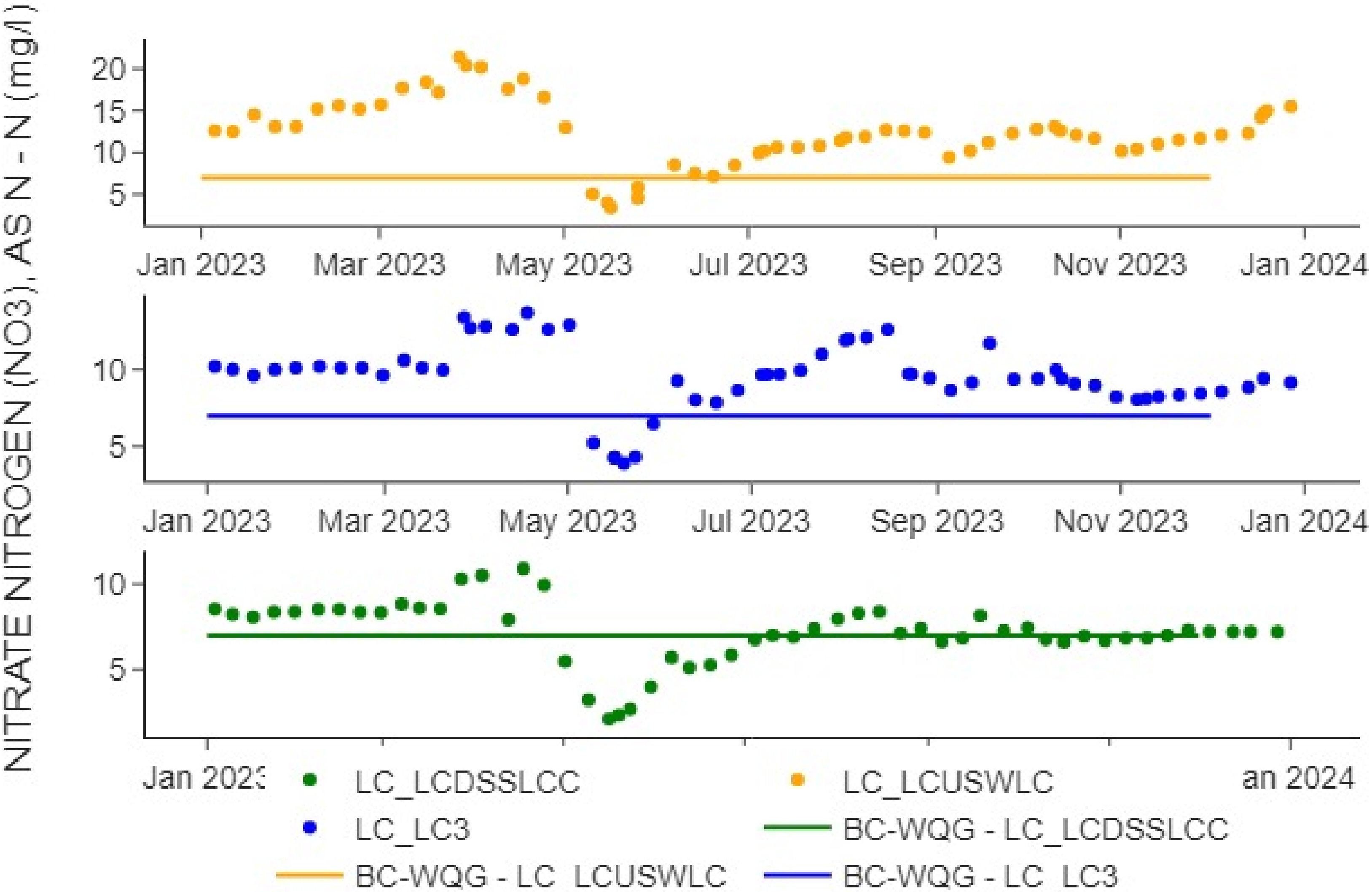
Dimethylseleneoxide - D (ug/l)
0.025
0.02
0.015
0.01
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
0.04
0.03
0.02
0.01
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3

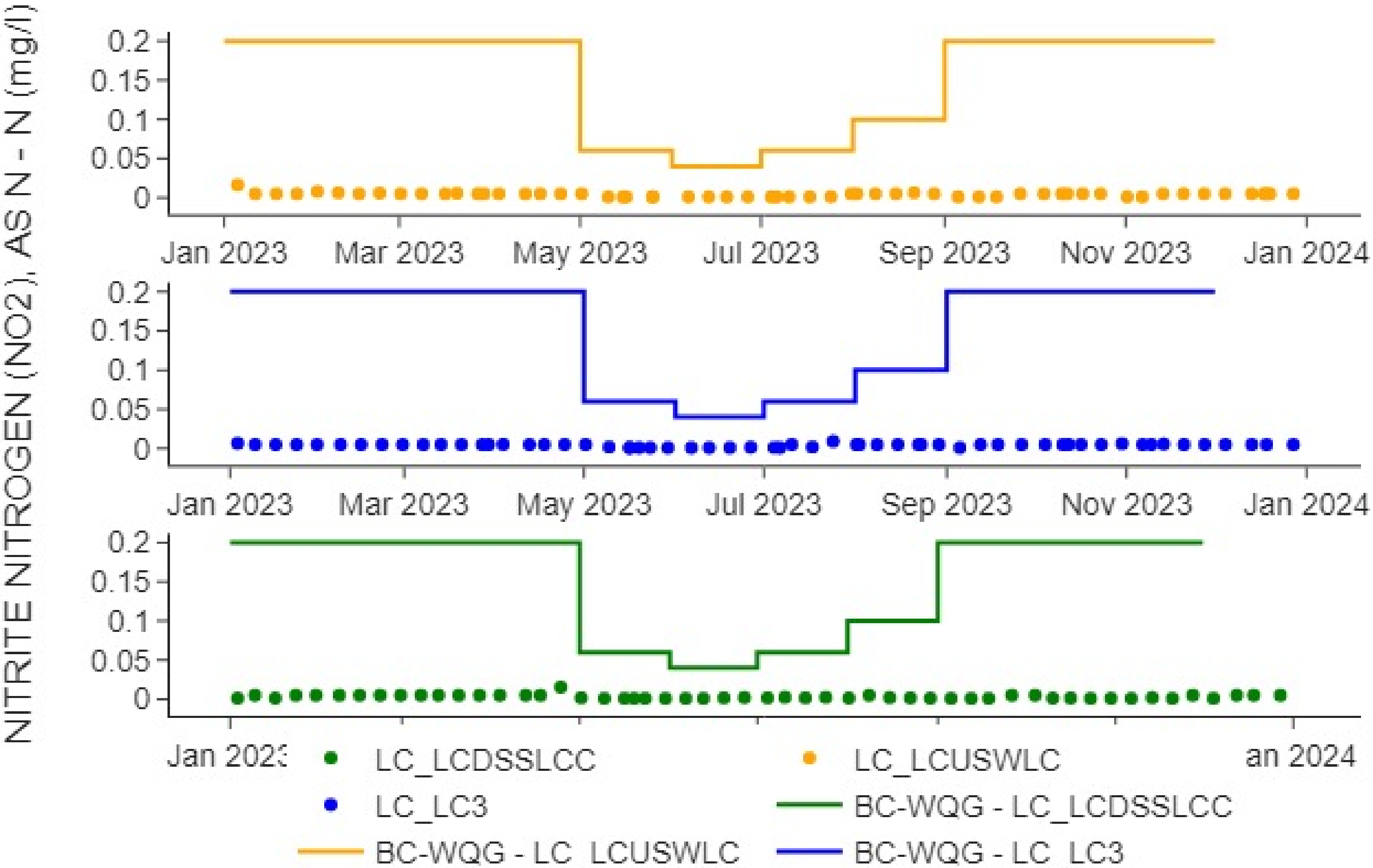

IRON - D (mg/l)
1
0.5
0
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3

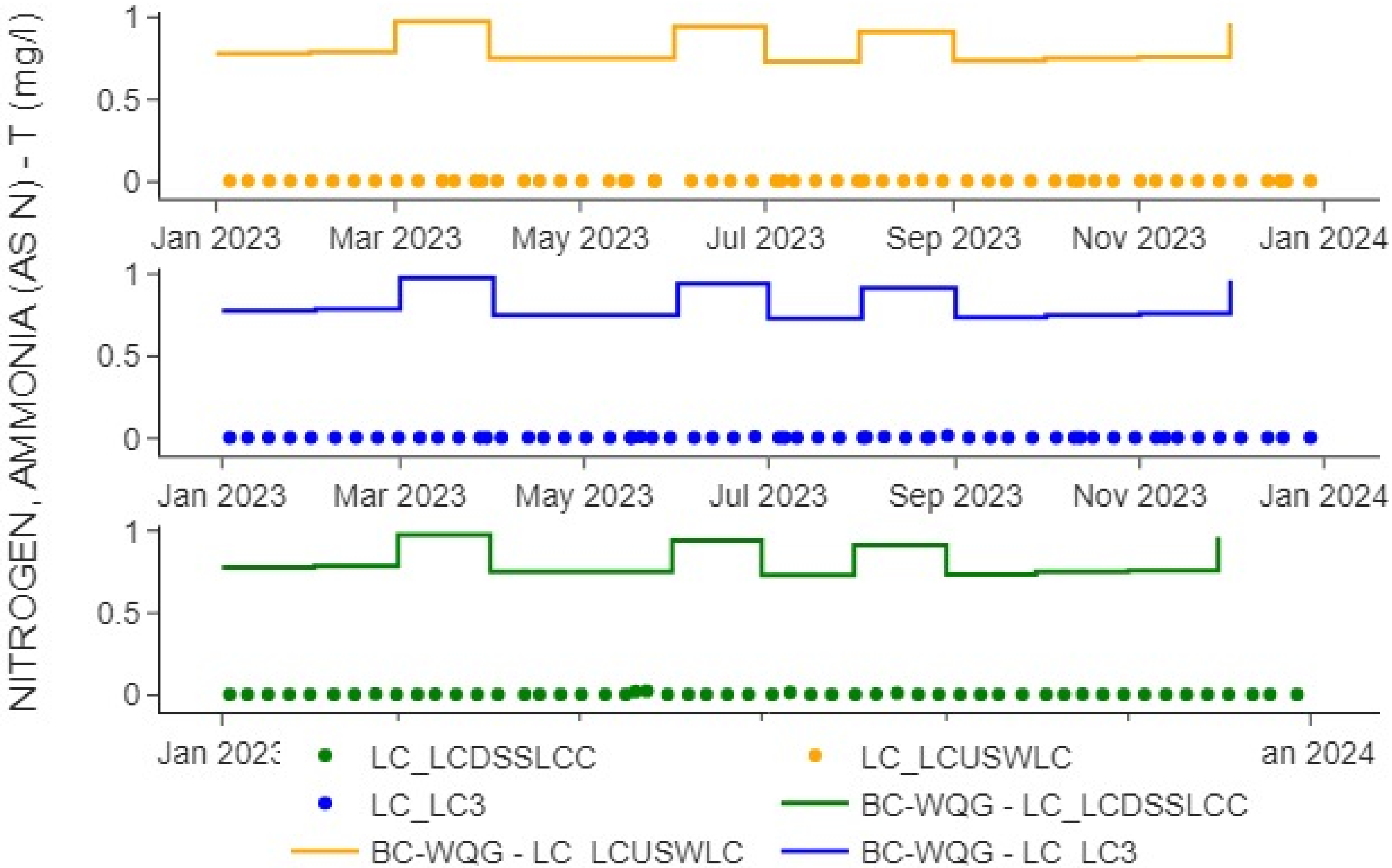

MeSe(IV) – methylseleninic acid CH3SeO2H - D (ug/l)
0.025
0.02
0.015
0.01
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
0.03
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3



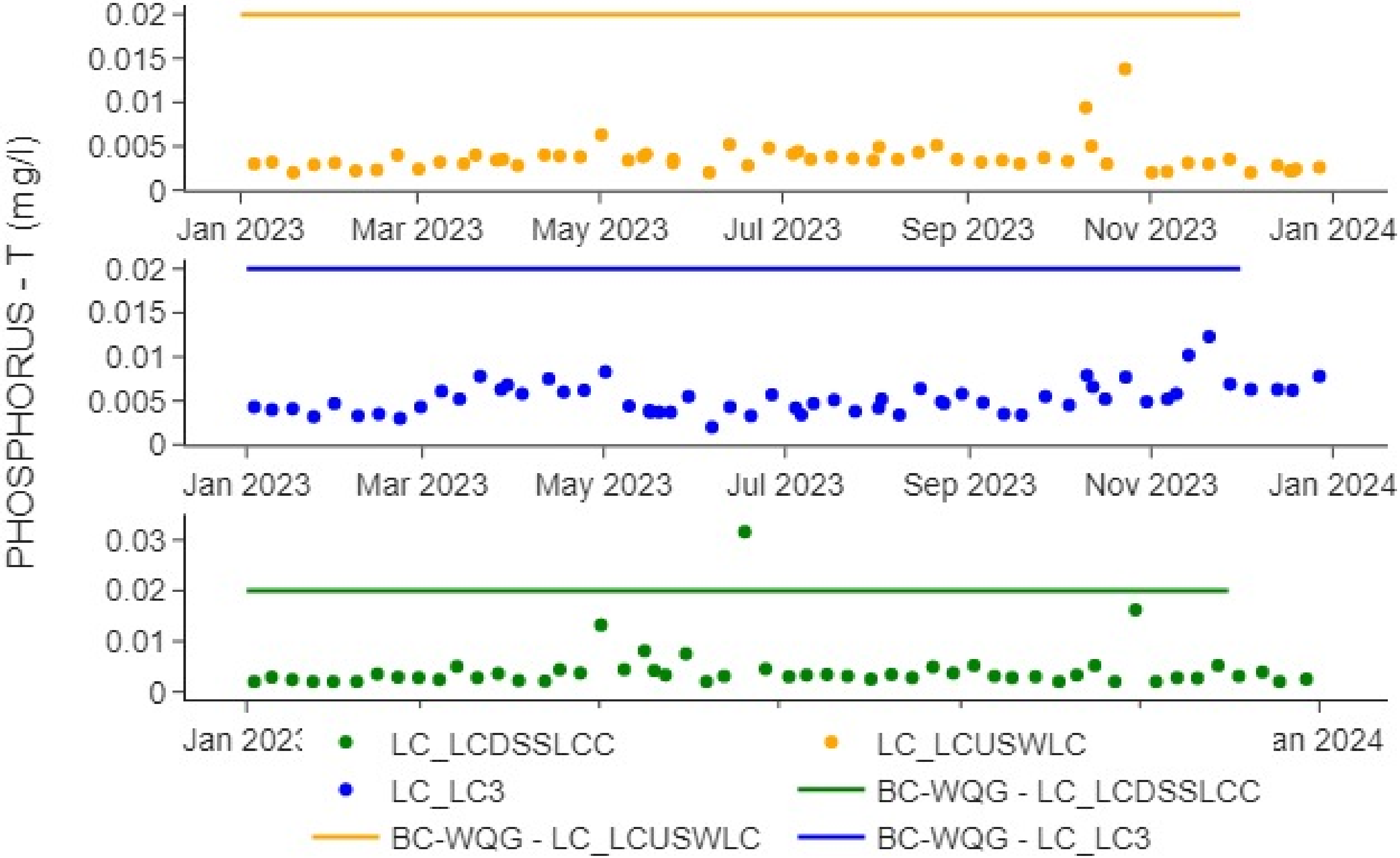
NICKEL - D (mg/l)
0.012
0.01
0.008
0.006
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
0.014
0.012
0.01
0.008
0.006
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
0.008
0.006
0.004
Jan 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3

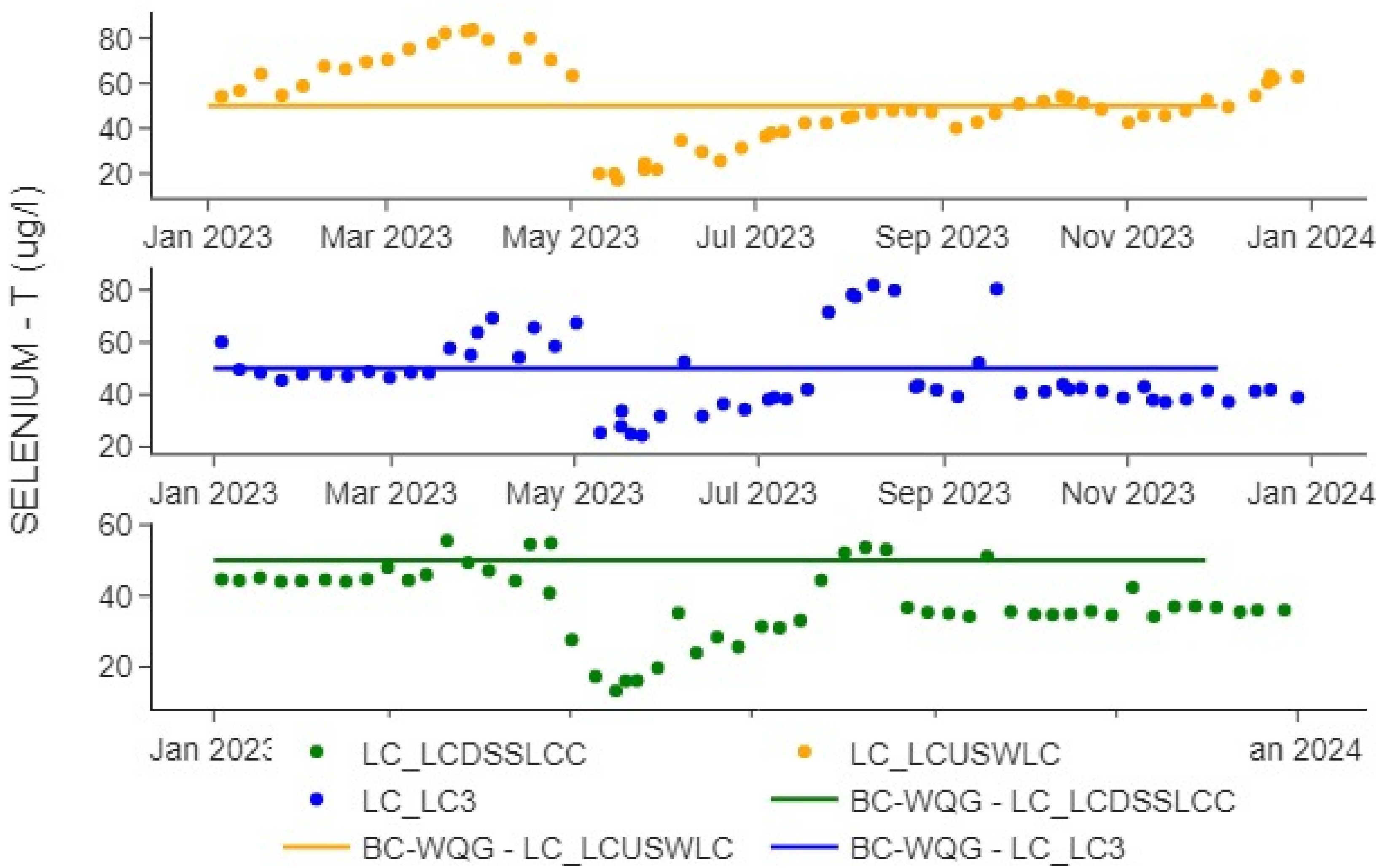

NITRATE NITROGEN (NO3), AS N - N (mg/l)
20
15
10
5
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
10
5
10
5
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3

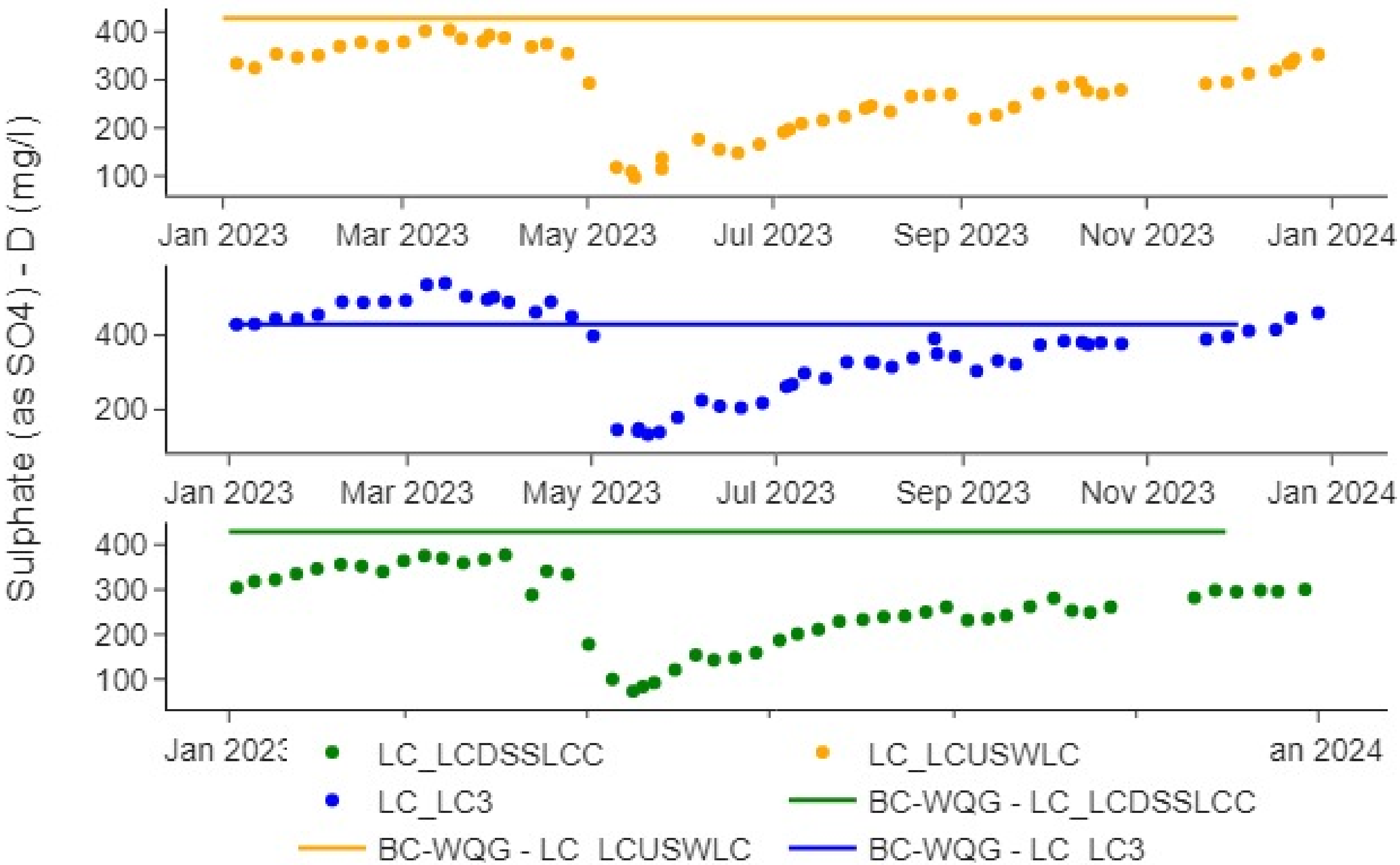

NITRITE NITROGEN (NO2), AS N - N (mg/l)
0.2
0.15
0.1
0.05
0
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3

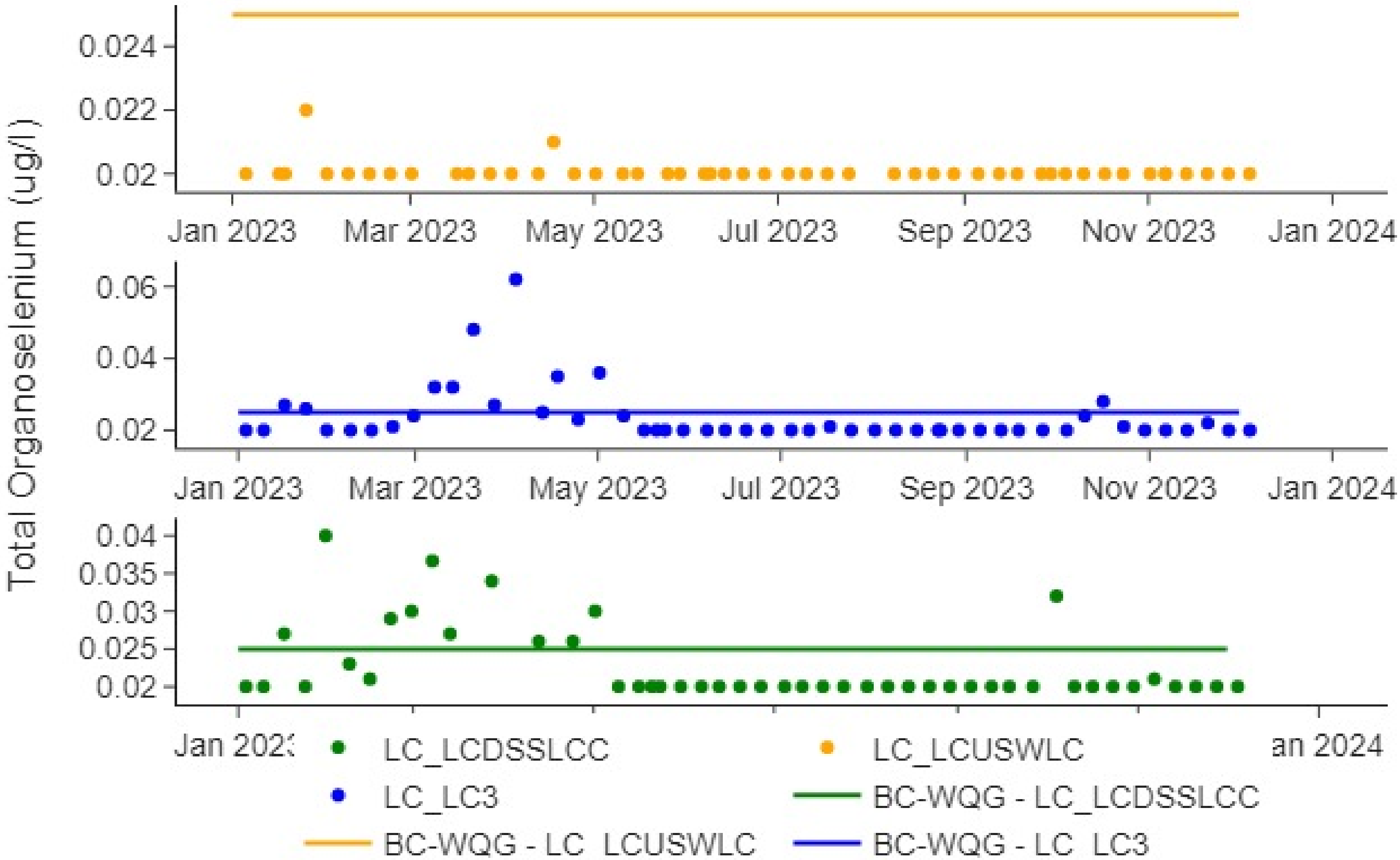


NITROGEN, AMMONIA (AS N) - T (mg/l)
1
0.5
0
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3


PHOSPHORUS - T (mg/l)
0.02
0.015
0.01
0.005
0
0.03
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3


SELENIUM - T (ug/l)
80
60
40
20
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
80
60
40
20
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
60
40
20
Jan 2023
an 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3


Sulphate (as SO4) - D (mg/l)
400
300
200
100
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3


Total Organoselenium (ug/l)
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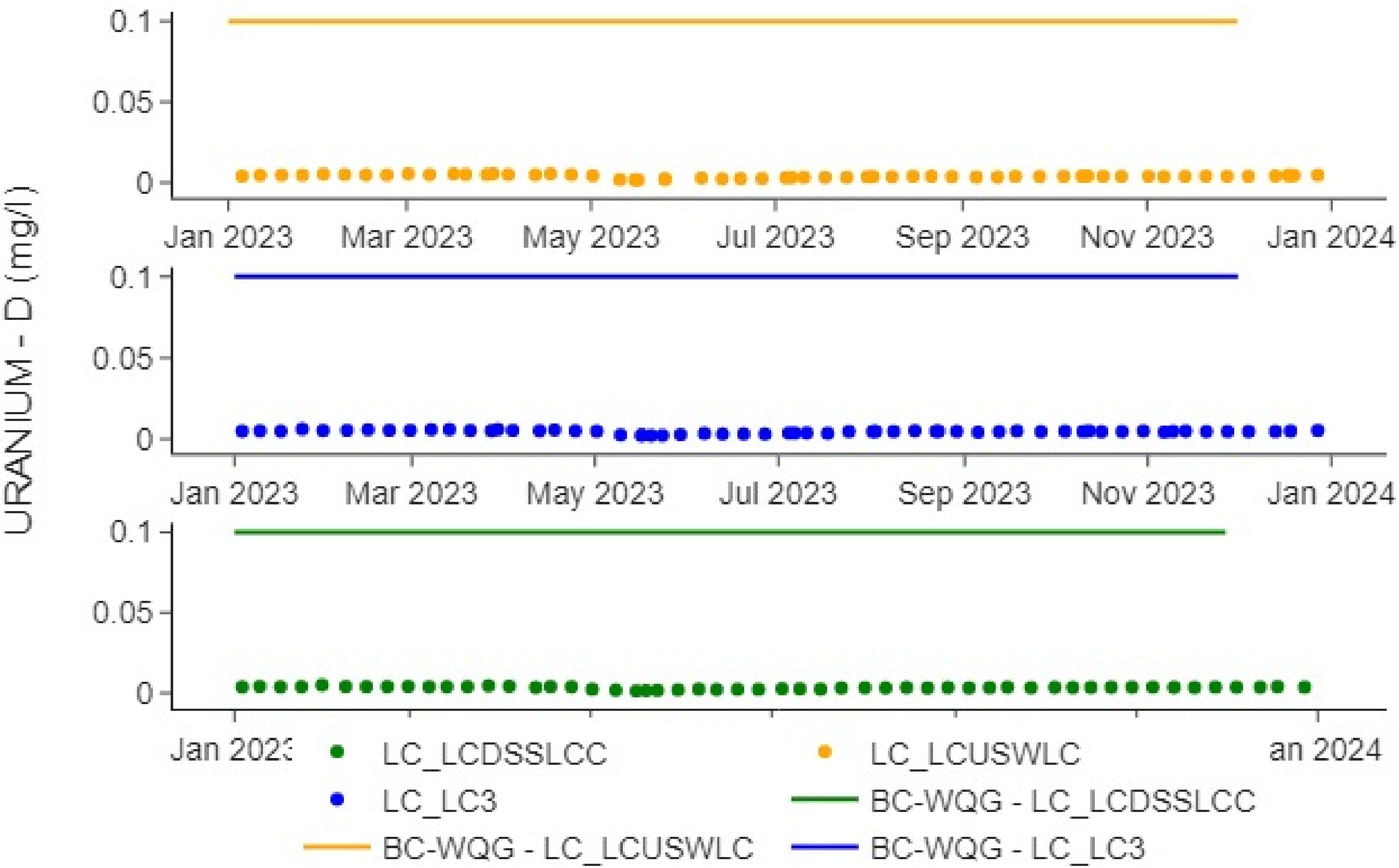
0.022
0.02
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
0.06
0.04
0.02
0.04
0.035
0.03
0.025
0.02
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3



URANIUM - D (mg/l)
0.1
0.05
0
Jan 2023
Mar 2023
May 2023
Jul 2023
Sep 2023
Nov 2023
Jan 2024
LC_LCDSSLCC
LC_LCUSWLC
LC_LC3
BC-WQG - LC_LCDSSLCC
BC-WQG - LC_LCUSWLC
BC-WQG - LC_LC3