

Teck Highland Valley Copper Partnership

2023 Annual Facility Performance Report

7-Day Pond Tailings Storage Facility



ISO 9001 ISO 14001 OHSAS 18001

M02341C62.730

March 2024



March 28, 2024

Teck Highland Valley Copper Partnership PO Box 1500 Logan Lake, British Columbia VOK 1W0

Mr. Carl Diederichs, P.Eng. Superintendent, Geotechnical

Dear Mr. Diederichs:

2023 Annual Facility Performance Report 7-Day Pond Tailings Storage Facility

We are pleased to submit the 7-Day Pond Tailings Storage Facility 2023 Annual Facility Performance Report. The review period for this document is from October 2022 through September 2023.

Yours truly,

KLOHN CRIPPEN BERGER LTD.

Pablo Urrutia, P.Eng. Engineer of Record, Designated Representative Senior Geotechnical Engineer

PU/CT:cd





Teck Highland Valley Copper Partnership

2023 Annual Facility Performance Report

7-Day Pond Tailings Storage Facility



EXECUTIVE SUMMARY

Klohn Crippen Berger Ltd. (KCB) was engaged by Teck Highland Valley Copper Partnership (HVC) to complete the 2023 Annual Facility Performance Report (AFPR) of the 7-Day Pond Tailings Storage Facility (TSF). The review period of this AFPR is from October 2022 through September 2023.

The 7-Day Pond TSF is 180 m north of the Highland Mill and is used to store tailings and water from the Highland Mill during upset conditions.

The 7-Day Pond TSF Structures

The 7-Day Pond TSF is contained by the East Berm and pit waste rock dumps, which also act as access routes around the perimeter of the facility. The East Berm is about 200 m long, has a maximum height of 6 m, and a minimum crest width of 8 m. The existing 7-Day Pond TSF impoundment area is about 70,000 m².

Immediately downstream of the East Berm there are two vegetated areas of approximately 17,000 m² combined (referred to herein as "the treed areas"), which are fully contained by access road fills. The 7-Day Pond TSF and treed areas are the low points of the surrounding catchment; therefore, the 7-Day Pond TSF does not have a failure mode that could endanger permanent population downstream of the facility.

During the review period, Mr. Pablo Urrutia, P.Eng., was the Engineer of Record (EoR) as a representative of KCB. In April 2023, the TSF Qualified Person (QP) role transitioned from Mr. Bryan Bale, P.Eng. to Mr. Carl Diederichs, P.Eng. (Superintendent, Geotechnical). These roles are consistent with the definitions in the Health Safety and Reclamation Code for Mines in B.C. (HSRC¹).

Activity and Operation during the Review Period

During the review period, the 7-Day Pond TSF was maintained within the design basis and conditions assumed for the approved design.

Other than routine maintenance activities, as defined in the Operations, Maintenance and Surveillance (OMS) Manual², there were no major repairs, excavation of tailings, or construction activities completed during the review period. Approximately 4,000 m³ of tailings were discharged into the facility during the review period, resulting in a remaining storage capacity, below El. 1261.0 m (i.e., freeboard limit), of about 115,500 m³. This exceeds the facility's minimum required storage capacity to store the inflow design flood (IDF) (92,100 m³).

¹ EMLCI. 2022. "Health, Safety and Reclamation Code for Mines in British Columbia, Revised." February.

² Teck Highland Valley Copper Partnership (HVC). 2021. 7-Day Pond Tailings Storage Facility – Operation, Maintenance, and Surveillance (OMS) Manual. March.

Governance and Surveillance

The OMS Manual, including the Emergency Preparedness and Response Plan (EPRP), is suitable for the facility. A routine update to the OMS Manual was prepared and issued in March 2024. The 2021 version of the OMS Manual was current during the review period and is used as the reference document for this AFPR.

The 7-Day Pond TSF surveillance program, described in the OMS Manual, is appropriate for this facility. During the review period, surveillance activities were completed as prescribed in the OMS Manual.

HVC commissioned a Dam Safety Review (DSR) of the 7-Day Pond TSF during 2023, which meets the five-year DSR frequency required under the HSRC. The DSR report was being finalized during the preparation of this report and is due for submission to the Ministry of Energy, Mines and Low Carbon Innovation (EMLI) prior to the end of March 2024. An action plan to address any recommendations will be prepared by HVC and the EoR, and reported in the next AFPR. The next DSR is scheduled to be initiated in 2028 (five-year frequency).

7-Day Pond TSF Performance

The facility performance during the review period was consistent with historic performance; no issues of dam safety concern or unacceptable performance were identified. KCB made the following key observations regarding the performance of the 7-Day Pond TSF during the review period:

- Existing design and management controls are in place and are performing as intended based on measured performance.
- Visual inspections by the HVC inspection team, the EoR, and others working in the area identified no signs of unacceptable behaviour at the dam.
- HVC operated the 7-Day Pond TSF with a minimal pond by using the fixed pumping system installed in 2020, and additional support from a diesel pump, when needed.
- The minimum freeboard measured at the 7-Day Pond TSF during the review period was 2.8 m, which is greater than the target minimum freeboard adopted by HVC for the facility (i.e., 0.5 m).

Design Basis and Failure Mode Reviews

The Canadian Dam Association (CDA) Dam Safety Guidelines³ provide a dam classification scheme based on the potential consequences of a hypothetical failure that can be used to provide guidance on the standard of care expected of dam owners and designers The consequence classification is not related to the likelihood of a failure, but rather to the potential impact resulting from a failure if it did occur.

³ CDA. 2013. "Dam Safety Guidelines 2007 (Revised 2013)".

A "Low" consequence category, as defined by CDA (2019), has been assigned to the 7-Day Pond TSF. During the review period there were no material changes to the facility or the downstream conditions that would support a modification to the consequence category.

Potential failure modes and the risk assessment for the 7-Day Pond TSF were also reviewed by HVC and KCB during the review period based on available information and existing controls. The review concluded that potential failure modes are being managed appropriately.

Recommendations

There were no outstanding recommendations related to facility performance from previous AFPRs or the 2018 DSR at the start of the review period. One new recommendation was identified during the 2023 AFPR and is summarized in Table 8.1.

Table 1 2023 Recommendations Related to Facility Performance

ID No.	Performance Area	Recommended Action	Priority ⁽¹⁾	Recommended Deadline
SDP-2023-01	OMS Manual	HVC should include in the OMS Manual a trigger for when to excavate tailings from the TSF to increase the facility's storage capacity.	4	Q1 2025

Note:

1. Recommendation priority guidelines, specified by Teck and assigned by KCB:

Priority 1: A high probability or actual dam safety issue considered immediately dangerous to life, health or the environment, or a significant risk of regulatory enforcement.

Priority 2: If not corrected, could likely result in dam safety issues leading to injury, environmental impact or significant regulatory enforcement; or, a repetitive deficiency that demonstrates a systematic breakdown of procedures.

Priority 3: Single occurrences of deficiencies or non-conformances that alone would not be expected to result in dam safety issues. *Priority 4*: Best Management Practice – Further improvements are necessary to meet industry best practices or reduce potential risks.



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CLARIFICATIONS REGARDING THIS REPORT

This report is an instrument of service of Klohn Crippen Berger (KCB). The report has been prepared for the use of Teck Highland Valley Copper Partnership (Client) for the specific application to the 2023 Dam Safety Support Project, and may be published or disclosed by the Client to the BC Ministry of Energy, Mines, and Low Carbon Innovation.

KCB has prepared this report in a manner consistent with the level of care, skill and diligence ordinarily provided by members of the same profession for projects of a similar nature at the time and place the services were rendered; however, the use of this report will be at the user's sole risk absolutely and in all respects, and KCB makes no warranty, express or implied. This report may not be relied upon by any person other than the Client or BC Ministry of Energy, Mines, and Low Carbon Innovation without KCB's written consent.

Use of or reliance upon this instrument of service by the Client is subject to the following conditions:

- 1. The report is to be read in full, with sections or parts of the report relied upon in the context of the whole report.
- 2. The Executive Summary is a selection of key elements of the report. It does not include details needed for the proper application of the findings and recommendations in the report.
- 3. The observations, findings and conclusions in this report are based on observed factual data and conditions that existed at the time of the work and should not be relied upon to precisely represent conditions at any other time.
- 4. The report is based on information provided to KCB by the Client or by other parties on behalf of the client (Client-supplied information). KCB has not verified the correctness or accuracy of such information and makes no representations regarding its correctness or accuracy. KCB shall not be responsible to the Client for the consequences of any error or omission contained in Client-supplied information.
- 5. KCB should be consulted regarding the interpretation or application of the findings and recommendations in the report.



1 INTRODUCTION

Klohn Crippen Berger Ltd. (KCB) was engaged by Teck Highland Valley Copper Partnership (HVC) to complete the 2023 Annual Facility Performance Report (AFPR) of the 7-Day Pond Tailings Storage Facility (TSF) on the Highland Valley Copper mine site (HVC Mine Site). The review period for the 2023 AFPR is between October 2022 through September 2023.

During the review period, Mr. Pablo Urrutia, P.Eng., was the Engineer of Record (EoR) as a representative of KCB. In April 2023, the TSF Qualified Person (QP) role transitioned from Mr. Bryan Bale, P.Eng. to Mr. Carl Diederichs, P.Eng. (Superintendent, Geotechnical). These roles are consistent with the definitions in the Health, Safety and Reclamation Code for Mines in British Columbia (HSRC) (EMLI 2022).

The AFPR scope of work consisted of:

- site visit to observe the physical conditions of the various containment facilities;
- review of surveillance data for the review period, provided by HVC;
- review of climate and water balance data for the site;
- review of the Operations, Maintenance and Surveillance (OMS) Manual and Emergency Preparedness and Response Plan (EPRP) to confirm they are appropriate for the facility; and
- review of construction activities completed at the site during the review period, if any.

The AFPR site visit to the 7-Day Pond TSF was completed by KCB representatives Mr. Pablo Urrutia, P.Eng., and Ms. Cheryl Torres, P.Eng., on September 28, 2023. During the site visit, the weather was sunny and clear.

The 7-Day Pond TSF is operated under the Permit M-11 (EMLI 2021). The 7-Day Pond TSF, referred to as the Emergency Tailings Pond, is also permitted under the British Columbia Ministry of Environment (MOE) effluent permit PE-376 (MECCS 2023) to receive upset condition discharges from the Highland Mill.



2 FACILITY DESCRIPTION

The HVC Mine Site is approximately 14 km west of Logan Lake in the British Columbia Interior. The 7-Day Pond TSF is approximately 1 km southeast of the Valley Pit, adjacent to the Highland Mill, as shown on Figure 1.

The facility is used to store tailings and water discharged from the Highland Mill during upset conditions, as well as runoff from the Mill catchment and surrounding areas. The Mill Operations Department controls the discharge of tailings, as well as contributing sources of water, which include overflow from the thickeners, Sewage Treatment Plant (STP) effluent, and other pumped flows/surface runoff, as needed.

The 7-Day Pond TSF has been in operations since the 1980s. Perimeter containment is provided by the East Berm and surrounding pit waste dumps. In 2013 and 2014 the majority of the 7-Day Pond TSF impoundment area was capped with mine waste rock. The current configuration of the 7-Day Pond TSF is approximately 40% of the original footprint.

The East Berm was raised in November 2020 to its current configuration. Refer to Figure 2 for a layout of the facility. The low point of perimeter containment is at El. 1261.8 m, along the East Berm. When assessing flood storage, the low point of containment is set at the base of the pervious granular road-surfacing fill along the East Berm (El. 1261.8 m).

The existing 7-Day Pond TSF impoundment area is about 70,000 m². Typical geometry and dimensions of the East Berm are summarized in Table 2.1.

Immediately downstream of the East Berm there are two vegetated areas of approximately 17,000 m² combined that are fully contained by access road fills and are referred to herein as "the treed areas". The 7-Day Pond TSF and treed areas are the low points of the surrounding catchment.

Tailings are discharged at the south end of the 7-Day Pond TSF, forming a beach which slopes to the north. A ponding is present on the north end of the impoundment. In 2020, a fixed pumping system was installed and has been operated, as required, to maintain a low pond volume. Since that time, ponding within the impoundment has been temporary, typically during active deposition or following periods of high runoff (e.g., freshet or floods).

Table 2.1 Summary of Approximate Dam Geometry

Dam	Construction Method	Nominal Crest Elevation (m)	Max. Berm Height (m)	Crest Length (m)	Min. Crest Width (m)	Upstream Slope	Overall Downstream Slope
East Berm	Unknown	1261.8(2)	6	200	8	1.5H:1V	1.5H:1V

Notes:

1. All dimensions are based on the Photosat survey dated September 27th, 2020 and on an aerial survey completed on November 2nd, 2020, provided by HVC.

 Crest elevation reported as top of road surfacing material over the East Berm, which raises the low point of the top of general fill (used to measure flood compliance) from El. 1261.5 m to ~El. 1261.8 m.

3 ACTIVITIES DURING REVIEW PERIOD

During the review period, the 7-Day Pond TSF was maintained within the design basis and the specified operational conditions of the approved design. There were no significant remedial or construction activities required or completed during the review period.

Approximately 4,000 m³ of tailings (net) were deposited between August 19, 2022 and July 12, 2023, based on a comparison of progress surveys provided by HVC (Section 5.3).

HVC maintains sufficient storage capacity in the impoundment for flood storage and tailings by periodically excavating tailings as per the OMS Manual (HVC 2021). No significant tailings excavation took place during the review period. KCB recommends HVC add a threshold to the OMS Manual that, if exceeded, notifies HVC that tailings should be excavated (Table 8.1).



4 WATER MANAGEMENT

4.1 Overview

The schematic of the tailings and water management system for the 7-Day Pond TSF is shown on Figure 3. Inflow and outflow rates/volumes are not monitored. The primary outflows from the facility are:

- Seepage, which reports to the Valley Pit where it becomes part of pit water management.
- Reclaiming water for the mill process using a fixed dewatering pump system that is operated on an as-needed basis to maintain normal operating pond levels in the impoundment and to reduce seepage losses.

4.2 Climate

HVC provided climate data from the Shula Weather Station⁴ for the review period (October 2022 to September 2023) to KCB. The station is in the base of the Witches Brook drainage, approximately 1.6 km northeast of the 7-Day Pond TSF at El. 1208 m.

In recent AFPRs, climate reviews for the 7-Day Pond TSF have been made based on data from the L-L Weather Station near the Highland TSF. However, the Shula Weather Station was upgraded in March 2022 with new equipment (e.g., sensors, modem, power supplies) and is now used as the reference station for the 7-Day Pond TSF climate review. The Historical Average Lornex Synthetic Record data (Golder 2021) was used for comparison to average climate trends at the HVC Mine Site. For a comparison to regional trends, the climate data for the review period from the Kamloops Pratt Road Weather Station (Environment and Climate Change Canada station 116C8PO), approximately 60 km north-east of the Shula Station at El. 729 m, was used.

Table 4.1 summarizes the monthly precipitation during the review period for the referenced climate stations and data sets. The Historical Average Lornex Synthetic Record data, and the Shula Weather Station data have not been adjusted because they are both at similar elevations to the 7-Day Pond TSF. The monthly precipitation record for the reporting period is shown on Figure 4.1. Overall observations regarding precipitation trends at the 7-Day Pond TSF during the review period are:

- Precipitation followed a similar monthly precipitation pattern to the Lornex historical averages and Kamloops Pratt Road weather station but annual precipitation was 9% lower than the Historical Average Lornex Synthetic Record.
- Precipitation at the site was 50% or less of the historical average value during October, January, March, and April. November, February, and June recorded precipitation more than 15% above the historical average. This precipitation trend is consistent with values measured at the Kamloops Pratt Road weather station as well.

⁴ The data provided was raw data, and HVC have advised that the routine quality assurance/quality control review has not been completed at the time of this assessment.

Observations related to high-precipitation events based on the Shula Weather Station data for the review period are:

- No rainfall events were recorded during the review period greater than the 10-year return period annual rainfall event: 40 mm in 24 hours (Golder 2021).
- The three largest recorded precipitation events occurred on June 19, 2023 (20.0 mm), July 12, 2023 (23.4 mm), and August 31, 2023 (21.6 mm):
 - A simultaneous flow increase was observed in the flow data from Guichon Creek above Tunkwa Lake Diversion flow station (ID: 08LG056) following the largest precipitation event on July 12th. The flow station is approximately 15 km north-west of the Shula Weather Station.

	Availabilit	y of Data (%)	Precipitation (mm)			
Month	Shula Weather Station	Kamloops Pratt Road Weather Station	Shula Weather Station Data) ⁽¹⁾	Historical Average Lornex Synthetic Record ⁽¹⁾	Kamloops Pratt Road Weather Station	
Oct 2022	100	100	8	30	7	
Nov 2022	100	100	49	35	71	
Dec 2022	100	100	31	38	41	
Jan 2023	100	100	11	34	18	
Feb 2023	2023 100 93		29	21	37	
Mar 2023	100	100	10	19	1	
Apr 2023	100	100	6	20	10	
May 2023	100	94	44	37	39	
Jun 2023	100	80	58	42	45	
Jul 2023	100	100	37	32	10	
Aug 2023	100	100	28	31	24	
Sep 2023	100	63	24	29	14	
Review Period Total	_	_	335	367	318	

Table 4.1Monthly Precipitation for Review Period (October 2022 to September 2023)

Note:

1. Monthly precipitation recorded at the Shula Weather Station and Historical Average Lornex Synthetic Record were not corrected because their elevation is similar to the 7-Day Pond TSF.





Figure 4.1 Monthly Precipitation Summary: October 2022 to May 2023

Seasonal snowpack depth is not measured at the Shula Weather Station. Instead, HVC monitors snowpack with monthly measurements at the Highland Valley Snow Survey Station (Station No. 1C09A). Table 4.2 summarizes historical snowpack averages and the snowpack measurements during the review period in snow-water equivalent (SWE). Snowpack measurements, in SWE, are also plotted on Figure 4.2 along with temperature data from the Shula Weather Station. Based on this information, KCB notes:

- The daily temperatures recorded at the Shula Weather Station between October 2022 and September 2023 are generally within the historic climate normals from Lornex Climate Station (1981 to 2010); however, there are some colder than average periods (of short-duration) recorded from November to March.
- All snowpack measurements were above historic climate normals, with the maximum measured snowpack over the review period (179 mm) being approximately equivalent to a 10year return period snowpack (169 mm) as reported by Golder (2020).
- Snowmelt began in April and continued into June. This is consistent with the snowmelt trends presented in the Spring Extreme Events and Wind Analysis report (Golder 2020) and coincides with measured temperatures that did not rise consistently above freezing until early April.
- Consistent with previous site observations, temperature, not precipitation, is the primary factor that drove snowmelt during the review period. Snowmelt began in April when precipitation was only 32% of the historic average.

Table 4.2	Historical Snow	back Averages and	2023 Snowpack D	epths (mm SV	VE)
					,

Survey Period	Years of Record ⁽¹⁾	Historic Average Snowpack Depth (mm SWE)	2023 Snowpack Depth ⁽²⁾ (mm SWE)	Percent Change Relative to Historic Average
January 1 st	11	50	Not Surveyed	N/A
February 1 st	33	83	143	+72%
March 1 st	62	94	177	+87%
April 1 st	60	102	179	+75%
May 1 st	60	29	84	+187%
May 15 th	25	2	Not Surveyed	N/A
June 1 st	8	0	Not Surveyed	N/A

Notes:

1. Data prior to 1966 were not included because the station was moved to its current location in 1965.

2. Measured at the Highland Valley Snow Survey Station (1C09A) near the Bethlehem TSF.



Figure 4.2 Measured Temperature and Snowpack: October 2022 to May 2023

Notes:

1. Measured at the Highland Valley Snow Survey Station (1C09A) near the Bethlehem TSF.

2. Daily average temperature data at the Shula Weather Station provided by HVC.

3. The historic Lornex Climate Station minimum and monthly temperature averages from 1981 to 2010 are from ECCC Climate Normals (2023) and are presented as representative of the Shula Weather Station area.

4.3 Water Balance

Figure 3 is a simplified flow schematic for the pond. Inflows and outflows are not measured but the capacity of the fixed pumping system has been demonstrated to have sufficient capacity to manage the pond level and maintain sufficient flood storage (i.e., inflow design flood (IDF) volume) within the impoundment under typical seasonal climate conditions and during tailings discharge from the Highland Mill. Refer to Section 5.3 for further discussion of pond levels during the review period.

4.4 Flood Management

The 7-Day Pond TSF applicable design criteria and flood characteristics are summarized in Table 4.3 and meet HSRC requirements (EMLI 2022).

Table 4.3 Inflow Design Flood for 7-Day Pond TSF

Facility	Outflow/Storage	Inflow Design Flood ⁽¹⁾	IDF Precipitation Depth	IDF Volume
7-Day Pond TSF	Stored	1/3 between the 1,000-year and PMF 72-hour Duration	180.7 mm ⁽²⁾	92,100 m ³

Notes:

1. Per HSRC (EMLI 2022) for tailings and water retaining facilities.

2. Based on Golder (2016).

As described in the OMS Manual (HVC 2021), the storage capacity of the facility is monitored through periodic surveys. Table 4.4 summarizes the changes in available storage capacity in the 7-Day Pond TSF since the East Berm crest was raised in October 2020.

Below the freeboard limit El. 1261.0 m (i.e., 0.5 m below the flood containment level), there was approximately 115,500 m³ of storage capacity based on the July 12, 2023, aerial survey conducted by HVC. This is 23,000 m³ greater than the IDF flood storage requirement (92,100 m³) and provides sufficient storage capacity in excess of the typical annual tailings placement rate since 2020 (i.e., between 3,000 m³ and 13,000 m³ per year). Therefore, the 7-Day Pond TSF was operated with sufficient capacity to store the IDF with adequate flood freeboard (0.5 m).

Table 4.4 Change in Storage Capacity since October 2020 East Berm Crest Raise

Survey Date	Storage Volume Available below El. 1261.0 m ⁽¹⁾ (m ³)	Change in Volume (Tailings and Water) (m ³)
September 27, 2020	136,230	-
October 8, 2021	132,548	-3,682
August 19, 2022	119,505	-13,043
July 12, 2023	115,434	-4.071

Note:

1. El. 1261.0 m is minimum crest elevation minus the flood freeboard requirement (0.5 m).

5 REVIEW OF MONITORING RECORDS AND DOCUMENTS

5.1 Monitoring Plan Compliance

The OMS Manual (HVC 2021) was reviewed by the TSF QP and the EoR during the review period and an updated version was issued in 2024. The 2021 version of the OMS Manual was current during the review period and used as the reference document for this AFPR. The document includes operational procedures for routine tailings excavation, including preparation of a work plan that must be approved by the TSF QP prior to the work. The changes with the 2024 update were typical for a routine OMS Manual update (e.g., updating emergency contact information and minor modifications to the surveillance program agreed upon with the EoR).

The 7-Day Pond TSF surveillance program, described in the OMS Manual, is appropriate for the facility. It includes visual inspections, pond level readings, and a Trigger-Action-Response-Plan (TARP). Surveillance information is reviewed by HVC, including the TSF QP. There were no exceedances of any of the TARP levels during the review period.

Surveillance activities and frequencies, specified in the OMS Manual (HVC 2021), are summarized in Table 5.1. Surveillance records provided to KCB by HVC, and reviewed by the EoR, demonstrate that OMS Manual requirements were met during the review period. The July aerial survey (Section 4.4) is representative of the storage capacity of the facility for the year, as there was no significant tailings discharge into the facility in the second half of 2023.



Table 5.1Monitoring Activities

TSF Monitoring	Minimum Frequency	Responsible Party	Documentation	2023 Frequency Compliance	Notes for the Review Period	
			Inspections			
Routine Visual Inspection ⁽¹⁾	Quarterly	HVC	HVC Inspection	Yes	Completed quarterly.	
Event-Driven Inspection	Event Driven ⁽²⁾	HVC	Reports	N/A	No event-driven inspection during the review period.	
Annual Facility Performance Report (AFPR)	Annually	КСВ	(Reviewed by KCB)	Yes	This report.	
Dam Safety Review	Every 5 years	HVC	Report	Yes	2023 DSR is underway, site visit completed. Regulatory submission deadline is March 31, 2024.	
Instrumentation Monitoring						
Pond level	Monthly ⁽³⁾	HVC	HVC Inspection Reports (Reviewed by KCB)	Yes	No readings were taken in May and August 2023 as the pond level was too low (see Section 5.3).	
			Surveys			
Facility Aerial Surveys	Every 6 Months	HVC	HVC Internal	Yes	Aerial surveys conducted on July 12, 2023 and December 22, 2023.	
Available Storage	Every 6 Months	HVC	Report (Reviewed by KCB as part of	Yes	Stage-storage curve is updated with aerial survey data and the pond level is used to confirm flood storage capacity.	
Facility Record Surveys	After Each Construction Activity	HVC	AFPR)	N/A	No construction activities during the review period.	

Notes:

1. Visual inspections include pond level measurements and observations for any evidence of unusual conditions and/or dam safety concerns (e.g., settlement, sinkholes, slope sloughing, erosion, seepage, piping, etc.).

2. HVC staff are to complete an event-driven inspection in response to one of the following events: earthquake greater than magnitude 5 within 100 km of the site, or any earthquake felt at site; and rainfall event greater than the 10-year, 24-hour duration storm; 39.9 mm (Golder 2020).

3. When accessible, typically outside of winter.



5.2 Routine Visual Inspection

The purpose of routine visual inspections is to identify conditions that might indicate changes to the TSF and the East Berm performance. Based on the available records, routine visual inspections did not identify any unusual conditions at the 7-Day Pond TSF.

5.3 Pond Level and Freeboard

During the review period, HVC operated the fixed pumping system to maintain temporary ponding within the 7-Day Pond TSF. Key facts and observations, based on historical pond levels and pond levels during the review period, are:

- The pond level is only surveyed when access to the pond is safe (e.g., pond level at or above about El. 1258.0 m; pond is not frozen). Visual inspections of the pond to estimate its level and to assess safe accessibility to survey were conducted monthly:
 - The pond level was monitored six times during the review period. The facility's pond was frozen between November 2022 and April 2023, and below El. 1258.0 m in May and August 2023.
- There has been no significant pond at the 7-Day Pond TSF during the reporting period:
 - The pond level varied between El. 1258.7 m (Jun 23, 2023) and El. 1257.8 m (September 1, 2023).
- The 7-Day Pond TSF had an available storage capacity of about 115,434 m³ below the minimum flood freeboard level (El. 1261.0 m) in December 2023 based on the latest aerial survey data provided by HVC (July 12, 2023). This storage capacity is about 23,000 m³ greater than the IDF (92,100 m³; see Table 4.4).

HVC has adopted 0.5 m as the target minimum flood freeboard⁵ for the facility. This exceeds the minimum freeboard required to accommodate wind and wave run-up based on the method proposed by CDA (2019), which is recommended by HSRC (EMLI 2022). The minimum freeboard measured during the review period at the 7-Day Pond TSF was more than 2.5 m.

⁵ Vertical distance between the peak IDF (Table 4.3) flood level and low point of the perimeter crest.



Figure 5.1 7-Day Pond TSF Pond Levels – 2018 to 2023

5.4 Geotechnical Instrumentation

There are no geotechnical instruments at the 7-Day Pond TSF and none are recommended at this time.

5.5 Seepage

Seepage from the 7-Day Pond TSF flows towards the Valley Pit (northwest) and is collected in the Wishing Well Sump (Figure 3). This sump also collects water from other sources, and water from the sump is pumped to the thickeners at the Highland Mill. No seepage was observed from the East Berm downstream slope during the September 28, 2023 AFPR site visit, or reported by HVC visual inspections completed during the review period.

5.6 Water Quality

HVC's Water Quality Monitoring and Reporting Plan, approved under the PE-376 effluent permit (MECCS 2023), specifies minimum water-quality sampling requirements at the HVC Mine Site. There are no sampling requirements downstream of the 7-Day Pond TSF.

Seepage from the 7-Day Pond TSF flows towards the Valley Pit and reports to the Wishing Well Sump, where it is reclaimed.



6 VISUAL OBSERVATIONS AND PHOTOGRAPHS

The AFPR site visit checklists, observations, and photographs are included in Appendix I, with key observations being:

- The facility, including the East Berm, was observed to be in good physical condition with no significant visual change or issues of concern.
- There was a small pond and a visible tailings beach, which is consistent with design intent and the observed state of the facility in previous site visits.



7 ASSESSMENT OF DAM SAFETY

7.1 Review of Potential Downstream Consequences

Conditions and land use downstream of the 7-Day Pond TSF were reviewed by HVC and KCB during the review period as part of the failure mode review (Section 7.2), and no significant changes were identified.

The Canadian Dam Association (CDA) Dam Safety Guidelines (CDA 2019) provide a dam classification scheme based on the potential consequences of a hypothetical failure that can be used to provide guidance on the standard of care expected of dam owners and designers. The consequence classification is not related to the likelihood of a failure, but rather to the potential impact resulting from a failure if it did occur.

Teck provided the following statement regarding the consequence classification of the facility:

Teck is committed to the safe and environmentally responsible management of tailings facilities throughout the mining life cycle to minimize harm to the environment and protect the health and safety of our people and surrounding Communities of Interest. This commitment includes the implementation of the Global Industry Standard on Tailings Management (GISTM) and industry-leading guidelines established by the International Council on Mining and Metals (ICMM), the Mining Association of Canada (MAC) and CDA.

For the purpose of assigning a dam classification, the consequences of potential failure modes are assessed as per the CDA guidelines and the requirements of the jurisdictions in which we operate. The GISTM bases consequence classification on credible failure modes only, which may result in a lower stated classification.

As part of Teck's commitment to the safety of tailings facilities, Teck has adopted using extreme loading criteria for any new facilities with a credible catastrophic flow failure mode, regardless of consequence classification. Risk assessments are performed for all tailings facilities, with the objective of reducing risks to As Low As Reasonably Practicable (ALARP). In some cases, this results in further risk reduction beyond applicable regulatory requirements and is consistent with the GISTM and industry-leading best practice.

A "Low" consequence category, based on the CDA (2019) classification scheme, has been assigned to the 7-Day Pond TSF. There have been no material changes to the facility, or to the upstream or downstream conditions, during the review period that support a modification to the consequence category.

HVC and KCB reviewed the current IDF and earthquake design ground motion (EDGM) for the 7-Day Pond TSF to confirm they meet or exceed the equivalent requirements under the HSRC (EMLI 2022).



7.2 Failure Mode Review

Potential failure modes and risk assessment for the 7-Day Pond TSF were reviewed by HVC and KCB during the review period based on currently available information and existing controls. The review concluded that potential failure modes are being managed appropriately.

Design and operational controls in place to manage potential failure modes are summarized below, along with their status at the end of the review period. As discussed below, the facility meets or exceeds regulatory requirements for all potential failure modes described herein.

Overtopping

The 7-Day Pond TSF is operated to maintain adequate capacity to store the IDF (Table 4.3) with adequate freeboard. Overtopping risks are further managed by:

- the fixed pumping system, which maintains minimal ponding within the impoundment to increase available storage and reduce seepage to the pit (e.g., facility operated with excess flood storage during the review period; Section 5.3); and
- implementing the facility's OMS Manual and TARP, which include procedures for routine tailings excavation (i.e., increasing storage capacity) and outline the actions to be taken by HVC to respond to elevated pond levels, including implementation of additional preventative controls, if required.

Slope Stability – Foundation / Dam Fill / Earthquake

Based on site investigations (KCB 2019b), the East Berm is founded on competent Glacial Till. The dam fill and foundation materials are not susceptible to significant strength loss or liquefaction based on comparison to similar materials under similar conditions around the site. Slope stability met or exceeded the Canadian Dam Association (CDA) Dam Safety Guidelines (CDA 2019) factor of safety criteria for static (\geq 1.5), pseudo-static (\geq 1.0), and post-earthquake stability (\geq 1.2), and comply with requirements of HSRC (EMLI 2022).

Internal Erosion

The primary controls for managing internal erosion through the East Berm are the berm's fill and foundation materials (sandy gravel and glacial till) and the distance between the pond and the berm during normal operating conditions, which reduces the piezometric levels and seepage gradients near the berm.

During a sufficiently large flood event (e.g., IDF), water may temporarily pond against the East Berm, increasing the gradients against the structure.



7.3 Status of Dam Safety Review Recommendations

The most recent dam safety review (DSR) of the 7-Day Pond TSF was completed by SRK Consulting (SRK) in 2018 (SRK 2019). The report concluded that the facility is well-managed, with a high level of technical stewardship and appropriate operating procedures, and the failure modes are understood and effectively controlled. All recommendations from SRK (2019) have been addressed.

HVC commissioned a Dam Safety Review (DSR) of the 7-Day Pond TSF during 2023, which meets the five-year DSR frequency required under the HSRC (EMLI 2022). The DSR report was being finalized during the preparation of this report and is due for submission to EMLI prior to the end of March 2024. An action plan to address any recommendations will be prepared by HVC and the EoR, and reported in the next AFPR. The next DSR is scheduled to be initiated in 2028 (five-year frequency).

7.4 Emergency Preparedness and Response

The 7-Day Pond TSF EPRP forms a part of the OMS Manual (HVC 2021), which was reviewed during the review period. Similar to the OMS Manual, the EPRP the document went through a routine review and an update was issued in 2024. The 7-Day Pond TSF EPRP is appropriate for the existing structure and includes a list of preventative actions that can be taken in response to potential unusual or emergency conditions.

On December 5, 2023, participants from HVC's operation team (including site management), and including the TSF QP, participated in a simulated exercise to test the TSF EPRP. The 7-Day Pond TSF EOR also participated in this exercise.



8 SUMMARY

Based on the review of measured performance and observations summarized herein, KCB concludes that the 7-Day Pond TSF performed as expected, was maintained within design requirements, and operated in accordance with the OMS Manual (HVC 2021) from October 2022 through September 2023.

All the recommendations related to facility performance identified during past AFPRs and the DSR (SRK 2019) have been closed. One new recommendation was identified during the 2023 AFPR and is summarized in Table 8.1. The recommendation pertains adding to the OMS Manual a trigger for when to excavate tailings from the 7-Day Pond TSF to increase storage capacity.

Table 8.1 2023 Recommendations Related to Facility Performance

ID No.	Performance Area	Recommended Action	Priority ⁽¹⁾	Recommended Deadline
SDP-2023-01	OMS Manual	HVC should include in the OMS Manual a trigger for when to excavate tailings from the TSF to increase the facility's storage capacity.	4	Q1 2025

Note:

1. Recommendation priority guidelines, specified by Teck and assigned by KCB:

Priority 1: A high probability or actual dam safety issue considered immediately dangerous to life, health or the environment, or a significant risk of regulatory enforcement.

Priority 2: If not corrected, could likely result in dam safety issues leading to injury, environmental impact or significant regulatory enforcement; or, a repetitive deficiency that demonstrates a systematic breakdown of procedures.

Priority 3: Single occurrences of deficiencies or non-conformances that alone would not be expected to result in dam safety issues. Priority 4: Best Management Practice – Further improvements are necessary to meet industry best practices or reduce potential risks.



9 CLOSING

We thank you for the opportunity to work on this project. Should you have any questions, please contact the undersigned.

KLOHN CRIPPEN BERGER LTD.

B.C Permit to Practice No. 1000171

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Pablo Urrutia, P.Eng. Engineer of Record, Designated Representative Senior Geotechnical Engineer



REFERENCES

CDA. 2013. "Dam Safety Guidelines 2007 (Revised 2013)".

Canadian Dam Association (CDA). 2019. "Technical Bulletin – Application of Dam Safety Guidelines to Mining Dams." 2014 ed. Updated 2019.

Global Industry Standard on Tailings Management (GISTM). 2020. August.

- Golder member of WSP (Golder). 2022. 2021 Highland Valley Copper Groundwater Quality Report In Draft, Reference No. 21505151-002-R-RevA-2. March 2022.
- Golder. 2021. "Surface Water Quantity Existing Conditions". Prepared for Teck Highland Valley Copper Partnership – HVC 2040 Project. September 8.
- Golder Associates (Golder). 2020. "Spring Extreme Events and Wind Analysis". Prepared for Teck Highland Valley Copper Partnership. September 29.
- Golder. 2016. "Site Climate Characterization", December 8.
- Klohn Crippen Berger Ltd. (KCB). 2019a. "7-Day Pond Crest Raise Detailed Design Report", December 16.

Klohn Crippen Berger Ltd. (KCB). 2019b. "2019 Site Investigation 7-Day Pond – East Berm", May 2.

 Mining Association of Canada. (MAC). 2019. "Developing an Operation, Maintenance and Surveillance Manual for Tailings and Water Management Facilities", February. Ministry of Energy and Mines. (MEM). 2016. "Guidance Document – Health, Safety and Reclamation Code for Mines in British Columbia – Version 1.0", July 20.

Ministry of Environment and Climate Change Strategy (MECCS). 2023. "Permit 376." July 27.

- Ministry of Energy, Mines and Low Carbon Innovation (EMLI). 2021. "Permit M11 Approving Mine Plan and Reclamation Program (Issued Pursuant Section of the Mines Act R.S.B.C. 1996, c. 293)", June 1.
- Ministry of Energy, Mines and Low Carbon Innovation (EMLI). 2022. "Health, Safety and Reclamation Code for Mines in British Columbia, Revised" November.

Ministry of Environment and Climate Change Strategy (MECCS). 2023. "Permit 376." July 27.

SRK Consulting (SRK). 2019. "7-Day Pond Tailings Storage Facility 2018 Dam Safety Review", March.

Teck Highland Valley Copper Partnership (HVC). 2021. 7-Day Pond Tailings Storage Facility – Operation, Maintenance, and Surveillance (OMS) Manual. March.



FIGURES

Figure 1Mine Site PlanFigure 27-Day Pond TSF – PlanFigure 3Flow Schematic





Klohn	C
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DATE





Highland Valley Copper



	Description	Status
ine	36" dia. HDPE pipe	Operational
e to	36" HDPE Pipeline	Operational
	HDPE pipe, semi-regular flow from thickener overflow (majority) and surface water around the Mill (minor component).	Operational
5Y)	36" dia. HDPE pipe, irregular flow from:i) overflow from MOP (connects U/S of discharge point);ii) overflow from sump in Mill which collects excess surface water from cleaning activities.	Operational
Water	Irregular open channel overflow from 325 ft Thickeners	Operational
	36" HDPE Pipelines	Operational
' Pit	Seepage reports to Wishing Well Sump in Valley Pit	N/A
rsion	HDPE pipeline and portable pump (deployed when needed)	N/A
ain	6" HDPE pipe with control valve, capped	Operational
age It	Regular, treated effluent in trench running south to north and discharging at the NE corner of the pond	Operational
rusher	1x HDPE pipe, irregular flow	Operational
Wash	Surface runoff from truck wash collected by drainage ditch	Operational

NOT FOR CONSTRUCTION 7-DAY POND TAILINGS STORAGE FACILITY 2023 ANNUAL FACILITY PERFORMANCE REPORT Teck FLOW SCHEMATIC FOR 7-DAY POND TAILINGS STORAGE FACILITY Klohn Crippen Berger SCALE NTS ROJECT No. FIG. No. 3 M02341C62

APPENDIX I

Site Visit Checklist, Observations and Photographs



Appendix I Site Visit Checklist, Observations, and Photographs

SITE VISIT CHECKLIST

Facility: 7-Day Pond TSF		7-Day Pond TSF		September 28, 2023
Weather:	Sunny		KCB Representatives:	Pablo Urrutia, P.Eng. Cheryl Torres, P.Eng.
Freeboard (pond level to dam crest):		2.8 m		

Outlet Condition Survey

Description	Outlet Controls?	Was it flowing?	Flow rate	Visual Review?	Testing / Detailed Site Visit?
Fixed Pumping System	Yes	Pump was on	N/A	N/A	N/A

Are the following components of the facility in <u>SATISFACTORY CONDITION</u>?

(check one if applicable)

WASTE DUMP WALLS	Yes/No
U/S Slope	🛛 Yes 🗌 No
Crest	🛛 Yes 🗌 No

Were any of the following POTENTIAL PROBLEM INDICATORS found?

INDICATOR	WASTE DUMP WALLS
Piping	🗌 Yes 🛛 No
Sinkholes	🗌 Yes 🛛 No
Seepage	🗌 Yes 🛛 No
External Erosion	🗌 Yes 🛛 No
Cracks	🗌 Yes 🛛 No
Settlement	🗌 Yes 🛛 No
Sloughing/Slides	🗌 Yes 🛛 No
Animal Activity	🗌 Yes 🛛 No
Excessive Growth	🗌 Yes 🛛 No
Excessive Debris	🗌 Yes 🛛 No

List and describe any deficiencies (all deficiencies require assessment and/or repair):

• No dam safety deficiencies observed.

Comments / Notes:

• Refer to Site Visit Observations section.

SITE VISIT OBSERVATIONS

- Crest: The haul road that forms the crest of the dam around 7-Day Pond TSF was in good physical condition. No indicators of significant concern were observed (e.g., cracking, slumping) (Photo I-1 and Photo I-2).
- Upstream and Downstream Slopes: Upstream and downstream slopes were in good physical condition. They were not vegetated, and no indicators of significant concern were observed (e.g., animal activity, cracking, slumping, or surface erosion features).
- Tailings Beach and Pond: Impoundment had a visible beach as well as ponded water near the outlet. The v-notch weir near the inlet was buried by tailings, and the east flank trench was filled with tailings and water (Photo I-1).
- **Outflow Pump**: Fixed pumping system operational.
- Seepage: None observed.



SITE VISIT PHOTOGRAPHS

LEGEND:

- SDP = 7-Day Pond.
- SDP-2023-## refers to 2023 AFPR waypoint on Figure 2.
- All photographs taken during the site visit September 28, 2023.
- Photo I-1 7-Day Pond TSF. Two inflow pipes observed: one pipe discharging clear water during site visit (SDP-2023-01)





Photo I-2 East Berm (SDP-2023-02)







Photo I-3 Treed area downstream (D/S) of East Berm (SDP-2023-03)



Photo I-4 7-Day Pond TSF tailings. No visible pond during site visit (SDP-2023-04)



