Teck

**Teck Resources Limited**
Canadian Legacy Properties
Bag 2000
Kimberley, B.C. V1A 3E1

**Cindy Robinson**
Senior Supervisor,
Environment
and Permitting

587-215-6937 Direct
cindy.robinson@teck.com

March 28, 2024

Andrew Wheeler
Andrea Cleland
Regulatory Specialist
Mackenzie Valley Land and Water Board
PO Box 2130
7th Floor-4922 48th Street
Yellowknife, NT X1A 2P6

Dear Andrew and Andrea

**Reference: 2023 Annual Water Licence Report – MV2017L2-0007**

Please find enclosed the 2023 Annual Water Licence Report fur the Pine Point Tailings Impoundment Area as required according to Water Licence MV2017L2-0007.

Please contact me with any questions or concerns regarding this report.

Sincerely,

Cindy Robinson
Senior Supervisor, Environment and Permitting
Teck

ec: Chief Louis Balsillie, Deninu K'ue First Nation
President Arthur Beck, Fort Resolution Métis Government
Wendy Bidwell, Senior Water Resource Officer, Department of Environment and Natural Resources

# Annual Water Licence Report for 2023

Property Name: Pine Point Tailings Impoundment Area
Company: Teck Metals Ltd.
Water Use Licence: MV2017L2-0007
Land Use Permit: MV2019X0006

Issued Date: March 26, 2024

Legacy Properties / Teck

# Pine Point Tailings Impoundment Area Annual Water Licence Report for 2023

Prepared By:
Neil MacDonald
Supervisor, Water Treament & Monitoring
(250) 427-8415

Neil MacDonald

Cindy Robinson, B.Sc., P. Biol.
Senior Supervisor, Environment and Permitting
(587) 215-6937

# EXECUTIVE SUMMARY

The Pine Point mine was operated by Cominco (a predecessor of Teck Metals Ltd.) as an open-pit lead (Pb) and zinc (Zn) mine from 1964 to 1988. When the Pine Point Mine closed in 1988, the original Closure and Reclamation Plan (titled "Restoration and Abandonment Plan," approved June 1987) was implemented. Updates to the plan were issued in 1990 and again in 1991 as reclamation work neared completion. In accordance with the plan, surface leases and mining claims were surrendered back to the Crown during the mid to late 1990s, with the exception of one surface land lease (#85B/16-9-11). The lease included the Main Pond, polishing pond, a portion of the dykes and tailings, and an area east of the Tailings Impoundment Area (TIA). A second surface lease (L-2000009T) was also obtained in 2020 for the south portion of the TIA. Restoration work at the TIA has focused on surface stability, effluent quality, and long-term stability of the dykes and decant structures. The TIA is considered to be in the Closure-Active Care phase of mine life and operates under a Type B Water Licence (MV2017L2-0007). The site also has a Land Use Permit (MX2019X0006) to allow for maintenance activities of the TIA.

In 2018, a 3-year Reclamation Research Plan was submitted, which outlined research activities, and addressed data gaps to inform the updated Closure and Reclamation Plan (CRP). The CRP was submitted on June 1, 2021. The 2021 CRP (Version 3) included summaries of previous reclamation research and community engagement, and defined closure objectives. Upon review, the MVLWB provided comments and requested that the CRP be revised. The revised CRP (V3.1; Teck 2023) was submitted. The MVLWB subsequently approved the objectives as defined in CRP V3.1. The next CRP will be provided with the water licence renewal application. Reclamation research is currently underway to support the next CRP update and as required by the licence, and as committed by Teck, updates on the reclamation research are provided herein.

This annual report includes a summary of the results of reclamation research activities that were conducted in 2023. All 2023 activities, identified as planned activities in the 2022 annual report, were initiated. Wildfire activity shortened the planned spring field program and as such not all tasks were completed as planned during the spring event. However, a fall field event was completed in its entirety. The water quality model was advanced, and a dust model was initiated. Geochemical laboratory tests were completed. Hydraulic modelling of the East Drainage Ditch was initiated as was the future land use planning.

Routine water treatment, which is conducted annually, occurred from 23 July to 13 August 2023. The total volume discharged was 106,214 $m^3$. The effluent discharge water quality was analyzed as per the Water Licence and met the effluent quality criteria (EQC).

Monitoring according to the Surveillance Network Program was completed. Only zinc concentrations were greater than the EQC in the Main Pond, which confirmed the need for water treatment. Treated water samples at 35-1B met the EQC for all licence parameters prior to discharge. Sampling of the monitoring locations between the TIA and Great Slave Lake occurred later in the year than typical, as such samples were collected under ice conditions.

Concentrations at 35-5 were higher than have been measured in recent years but may be due to the sampling conditions.

Other activities in 2023 included the routine dyke inspections. The results of these inspections were documented in the 2023 Annual Facility Performance Review, which was submitted to the MVLWB on December 20, 2023.

Work in 2024 will include a continuation of the reclamation research activities, water treatment, routine dyke inspections and maintenance, as required. No major modification or construction activities are anticipated.

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## 1.0 Introduction

The Pine Point mine was operated by Cominco (a predecessor of Teck Metals Ltd.) as an open-pit lead (Pb) and zinc (Zn) mine from 1964 to 1988. The Tailings Impoundment Area (TIA) is located approximately 50 km west of Fort Resolution (Denínu Kų́ę́) and 75 km east of Hay River (Xát'ł'odehchee), and 7 km south of the southern shoreline of Great Slave Lake. The site location is shown on Figure 1-1.

Following mine decommissioning, Teck maintained one lease, 85B/16-9-11, associated with the TIA which encompassed the Main Pond, Polishing Pond, a portion of the dykes and tailings, and an area east of the tailings. In 2017, Teck received a Type B Water Licence renewal MV2017L2-0007 (herein referred to as the Water Licence) from the Mackenzie Valley Land and Water Board (MVLWB), which authorized Teck to treat and discharge water from the TIA at the former Pine Point Mine location (60°53'41.3"N and 114°25'30.7"W). The Water Licence can be found on the MVLWB registry at the following link: MV2017L2-0007.pdf. In 2020, Teck obtained a second lease (L-2000009T) to include the remainder of the dykes and tailings to conduct inspections, research and future reclamation activities as needed. Figure 1-2 presents the two land leases held by Teck. The mine is in a Closure-Active Care phase of mine life.

When the Pine Point Mine closed in 1988, the original Closure and Reclamation Plan (titled "Restoration and Abandonment Plan," approved June 1987) was implemented. Updates to the plan were issued in 1990 and again in 1991 as reclamation work neared completion. In accordance with the plan, surface leases and mining claims were surrendered back to the Crown during the mid to late 1990s, with the exception of one surface land lease (#85B/16-9-11), which encompasses the TIA. In 2006 the reclamation plan (titled "Update to Restoration and Abandonment Plan, Tailings Impoundment Area") was updated and focused on effluent quality, and long-term stability of the dykes and decant structures. When the Water Licence was renewed in 2017, conditions in the licence included development and implementation of a reclamation research plan, and an updated Closure and Reclamation Plan (CRP) was required in accordance with the MVLWB and Aboriginal Affairs and Northern Development Canada's (AANDC) November 2013 *Guidelines for the Closure and Reclamation of Advanced Mineral Exploration and Mine Sites in the Northwest Territories* (herein referred to as the Guidelines) (MVWLB/AANDC 2013).

On June 1, 2021, a Closure and Reclamation Plan (2021 CRP; Teck 2021) was submitted to the MVLWB. The 2021 CRP included summaries of previous reclamation research and community engagement, and defined closure objectives. The 2021 version of the CRP was updated on January 30, 2023 (2023 CRP; Teck 2023) to address comments from the MVLWB on the document, including revised closure objectives. The next CRP update is scheduled to coincide with the Water Licence renewal in 2027. Reclamation research is currently underway to support the next CRP update and as required by the licence and as committed by Teck. Updates on the reclamation research are provided herein.

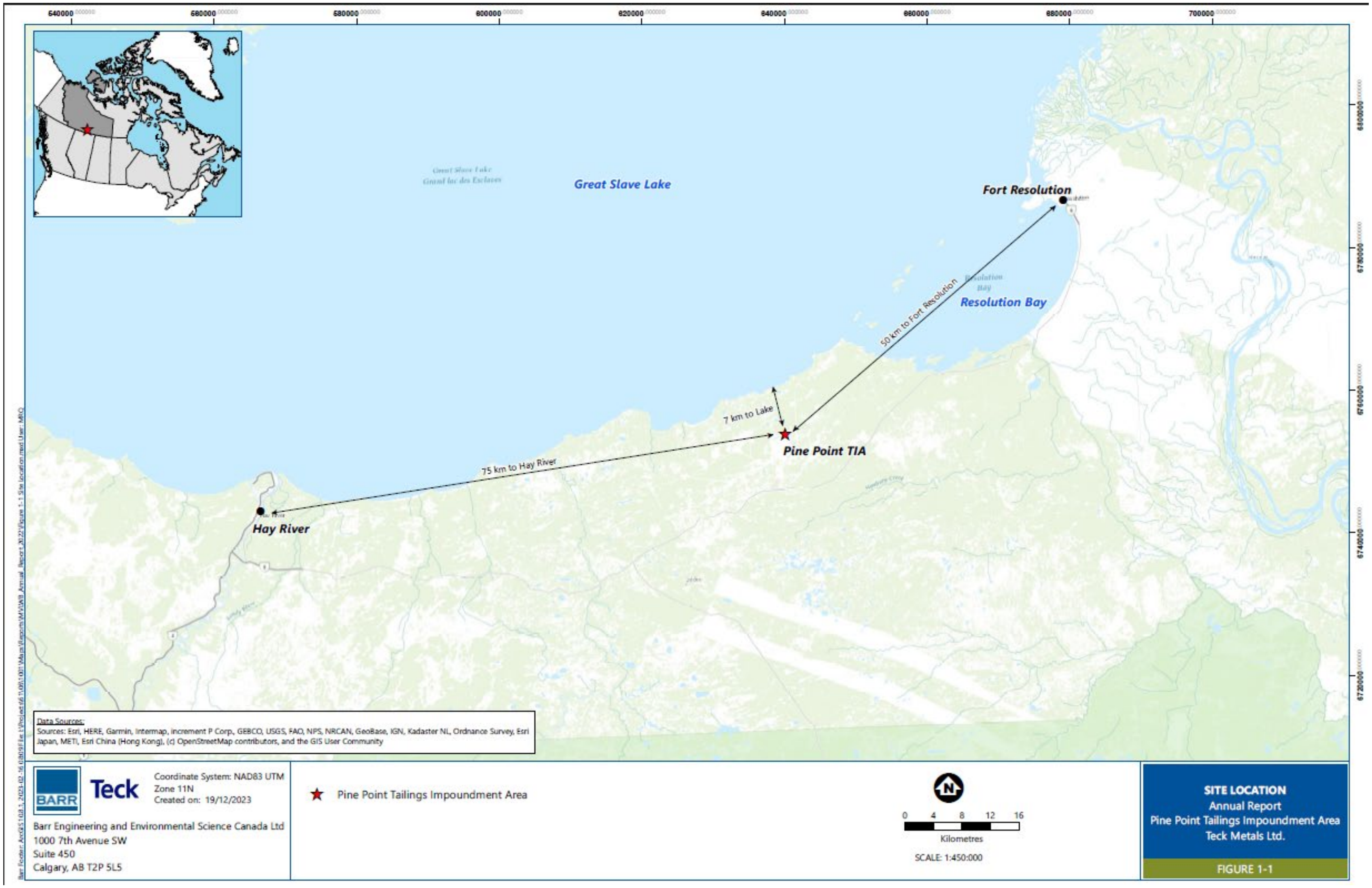


**Figure 1-1 Site Location**

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**Figure 1-2 Surface Leases**

The TIA stores approximately 60 million tonnes of tailings that were produced from milling the ore mined from the pits. The tailings contain residual metals and are held in place by dykes constructed from local earthfill materials. By 1992, the surface of the tailings was covered with 15 cm of gravel to prevent the tailings from spreading dust to surrounding areas. Water from snow melt and rain that contacts the tailings (contact water) collects at the north end of the TIA in the Main Pond. Zinc concentrations in the Main Pond are greater than the effluent quality criterion (EQC) defined in the Water Licence; therefore, water treatment is necessary before water can be released to the surrounding environment. Water is treated by mixing the water with lime in the treatment pond. Treated water is released to a channel and a series of borrow areas that were used during mine operations before entering the surrounding muskeg. Water treatment has been ongoing since closure and continues today.

This 2023 Annual Report includes the requirements defined in Schedule 1, Part B, Item 12 of Water Licence MV2017L2-0007 issued October 25, 2017. A conformance table is provided in Appendix A. The remaining sections of this report include the following:

- Section 2: Reclamation Research – summary of 2023 activities and planned activities for 2024
- Section 3: Engagement Summary – summary of 2023 community engagement activities and planned activities for 2024
- Section 4: Major Modification or Construction Activities – summary of 2023 activities
- Section 5: Water Management Plan activities – summaries of water treatment processes, and 2023 treatment volumes
- Section 6: Operations and Maintenance Plan – descriptions of processes and response actions
- Section 7: Spill Contingency Plan – description of training and communications exercises in 2023 and unauthorized discharges as applicable
- Section 8: Surveillance Network Program – summaries of water quality monitoring results, including Hach system monitoring and calibration and maintenance records
- Section 9: Regulator Inspections – summaries of inspections conducted by Lands and/or Water Resource inspectors

## 2.0 2023 Reclamation Research Activities

The CRP concluded that the timing for decline in zinc concentrations to levels consistently less than the Effluent Quality Criteria (EQC) in the Main Pond remains uncertain and further study is needed to better understand future trends to inform any additional closure activities that may be warranted. In 2023, reclamation research focused on collecting data necessary for inputs into the water quality model and to inform water quality monitoring targets (i.e., criteria for post-closure monitoring) for the site. The goal of the research is to resolve uncertainties regarding zinc movement (and other metals as necessary) within environmental media in the TIA.

A summary of the planned 2023 reclamation research activities is presented in Table 2-1 with the status of each activity at the end of 2023.

**Table 2-1 Status Update for 2023 Planned Activities**

| Category | Activity | Status Update |
|---|---|---|
| Ongoing Monitoring | • Porewater/groundwater water levels and quality<br>• Surface water quality of the Main Pond and downstream drainage network<br>• Field study of infiltration during spring melt for water balance and geochemical evaluation | • All tasks completed with the exception of the spring field program for porewater/groundwater and surface water quality, which was shortened due to significant wildfire activity and evacuations in the area |
| Desktop Assessments | • Validation of GoldSim model for use in current pond operations and to forecast future conditions<br>• Sensitivity analysis on water quality predictions within the Main Pond, incorporating geochemical bench testing results<br>• Dust modelling of exposed tailings for risk evaluation and to inform longer-term closure options<br>• Scoping of a dust monitoring program for the site | • All tasks in progress (initiated in 2023) |
| Geochemical Evaluation | • Complete column testing replicating the column study completed by Cominco in 1989-1992 on raw tailings, but on the weathered tailings<br>• Complete oxidation/drying test to quantify the rate of accumulation of soluble metal mass following different drying times to provide an estimate of the maximum soluble mass of zinc and other metals<br>• Further investigation of the 'interflow' depth in which flow moves through the tailings toward the main pond | • All geochemical testing tasks completed.<br>• Geochemical data analysis initiated in 2023.<br>• Further investigation of the 'interflow' depth was completed.<br>• Initiated peat attenuation study. |
| East Drainage Area and East Diversion Ditch (EDD) | • Hydraulic modelling of the EDD to effectively convey flow during large snowmelt and storm events, up to the Inflow Design Flood (IDF) | • In progress (initiated in 2023) |
| Future Land Use Planning | • Ecosystem mapping and habitat capability modelling of the pre-mining conditions for the TIA footprint to allow for estimates of residual ecological effects in the next version of the CRP and to inform future land use planning<br>• Next phase of community engagement to collaborate on future land uses envisioned for the site | • In progress (initiated in 2023) |

A summary of the 2023 field activities is presented in Table 2-2 and are described below. Field programs were completed by Maskwa Engineering Ltd. (Maskwa) and Barr Engineering and Environmental Science Canada Ltd. (Barr). The field programs were completed during the following months:

- Winter (completed by Maskwa): January, February, March
- Spring (completed by Barr and Maskwa): May (Barr), April (Maskwa)
- Fall (completed by Barr): October

The May field campaign was shortened due to wildfire activity in the area that resulted in an emergency evacuation. This resulted in limited task completion and data collection during the spring campaign conducted by Barr.

Community assistants from the Fort Resolution Métis Government (FRMG) and Deninu K'ue First Nation (DKFN) supported the spring and fall field programs conducted by Barr, respectively. A summary of desktop studies follows the discussion of field activities.

**Table 2-2 Summary of 2023 Reclamation Research Field Activities**

| Assessment | Winter | Spring | Summer | Fall |
|---|---|---|---|---|
| **Surface Water Quality** | | | | |
| Main Pond sampling | ✓ | ✓ | See footnote 1 | ✓ |
| Reference location sampling | | | | ✓ |
| Downstream Drainage Network | | | | ✓ |
| In-Situ water quality profilers data download | | ✓ | | ✓ |
| **Groundwater Quality** | | | | |
| Groundwater sampling | | | | ✓ |
| **Geochemistry** | | | | |
| Column testing and drying study bench testing | ✓ | ✓ | ✓ | ✓ |
| Treatment pond sludge monitoring and sampling | | | | ✓ |
| SoilVue probes downloads | | ✓ | | ✓ |
| **Other** | | | | |
| Meteorological station maintenance | ✓ | ✓ | | ✓ |
| Snow depth and ice thickness measurements | ✓ | | | |
| East Drainage Ditch (EDD) Capacity Analysis | | ✓ | ✓ | |

[1] Main Pond sampling is conducted by Teck and Maskwa during summer water treatment operations.

## 2.1 Surface Water Quality

In 2023, surface water quality samples and field measurements were collected during the winter, spring and fall field programs from the Main Pond, and in the fall for the Downstream Drainage Network. Surface water quality samples were collected to address the following objectives:

- Understand seasonal and year-to-year variability in metals concentrations, specifically zinc, in the Main Pond
- Understand year-to-year variability in the Downstream Drainage Network (i.e., downstream of the treated water discharge point)

Surface water quality field programs also included data collection, deployment, and maintenance of in-situ water quality profilers (i.e., sonde) during the spring and fall field programs conducted by Barr. Sample locations are shown in Figure 2-1; however, not all sample locations were sampled during each program.

The winter (January, February, and March) and spring (April) field programs were completed by Maskwa. Each winter field program consisted of sampling at one surface water location (SW-1) in the Main Pond. The spring program consisted of sampling at one surface water location (35-1A) from the shore of the Main Pond. Maskwa used a YSI probe to measure temperature, dissolved oxygen (DO), specific conductivity, pH, and oxidation reduction potential (ORP) in the field. Water quality samples were collected for submission to ALS Laboratories for chemical analyses including total and dissolved metals, total and dissolved mercury, pH, total suspended solids (TSS), ammonia, chloride, alkalinity, and sulphate.

The spring (May) and fall (October) field programs were completed by Barr. During the spring program, significant wildfire activity in the area resulted in limited task completion and data collection. Surface water tasks planned for the spring and fall programs included monitoring and sampling within the Main Pond, reference location (Paulette Creek) and Downstream Drainage Network; however, only the in-situ quality profiler tasks were able to be completed in the spring. The fall program was completed in its entirety by collecting surface water samples at two locations within the Main Pond (SW-1 and 35-1A), 10 locations within the Downstream Drainage Network, and one reference location (Paulette Creek) after the release of treated water from the Main Pond. Field monitoring conducted by Barr during the fall field program at surface water sample locations included Secchi depth, total depth, turbidity and YSI field readings for temperature, DO, specific conductivity, pH, and ORP. Samples were analyzed by Bureau Veritas for total and dissolved metals, total and dissolved mercury, dissolved nutrients (dissolved organic carbon [DOC]), cyanide, and routine analysis (alkalinity, pH, conductivity, TSS, anions, and cations).

### 2.1.1 In-Situ Water Quality Profilers

One deep in-situ water quality profiler was stationed in the Main Pond during 2023. The deep sonde was stationed at SW-1 at approximately 2.5 m depth and continually recorded pH, specific conductivity, ORP, and temperature measurements throughout the year. Routine maintenance and data collection was completed during both the spring and fall field programs conducted by Barr.

Two additional sondes were deployed in May during the spring event at approximately 1.5 m depth at 35-1A and SW-1. Before deployment, each sonde was inspected and programmed to record pH, specific conductivity, ORP, and temperature measurements. The sonde at 35-1A was removed in October during the fall program, prior to the development of ice in the Main Pond. The sonde that was deployed at SW-1 at the 1.5-m depth could not be retrieved as it was no longer attached to the buoy or rescue lines. The lines were inspected, and it is suspected that a muskrat or other wildlife damaged these lines resulting in loss of the sonde.

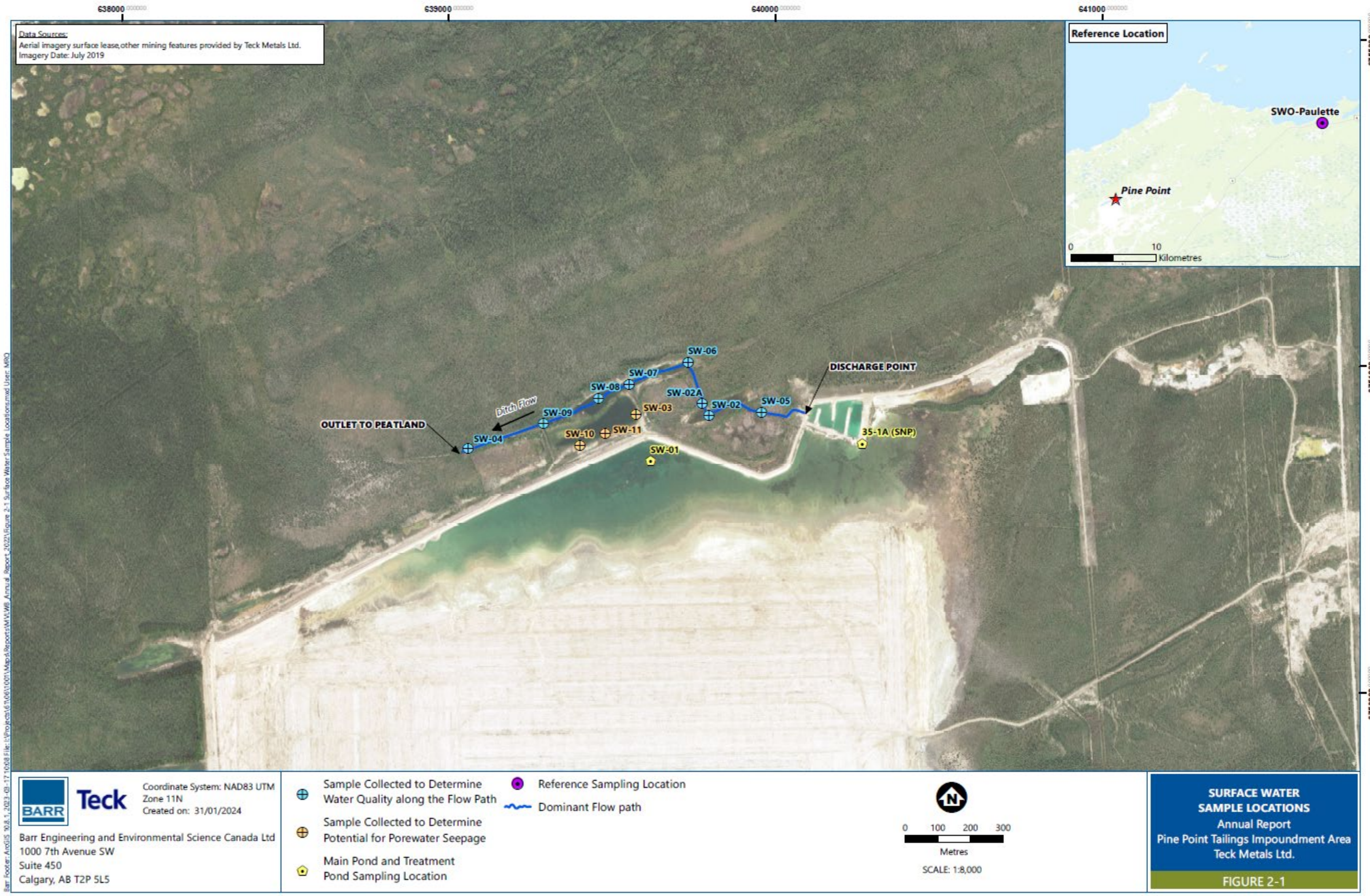


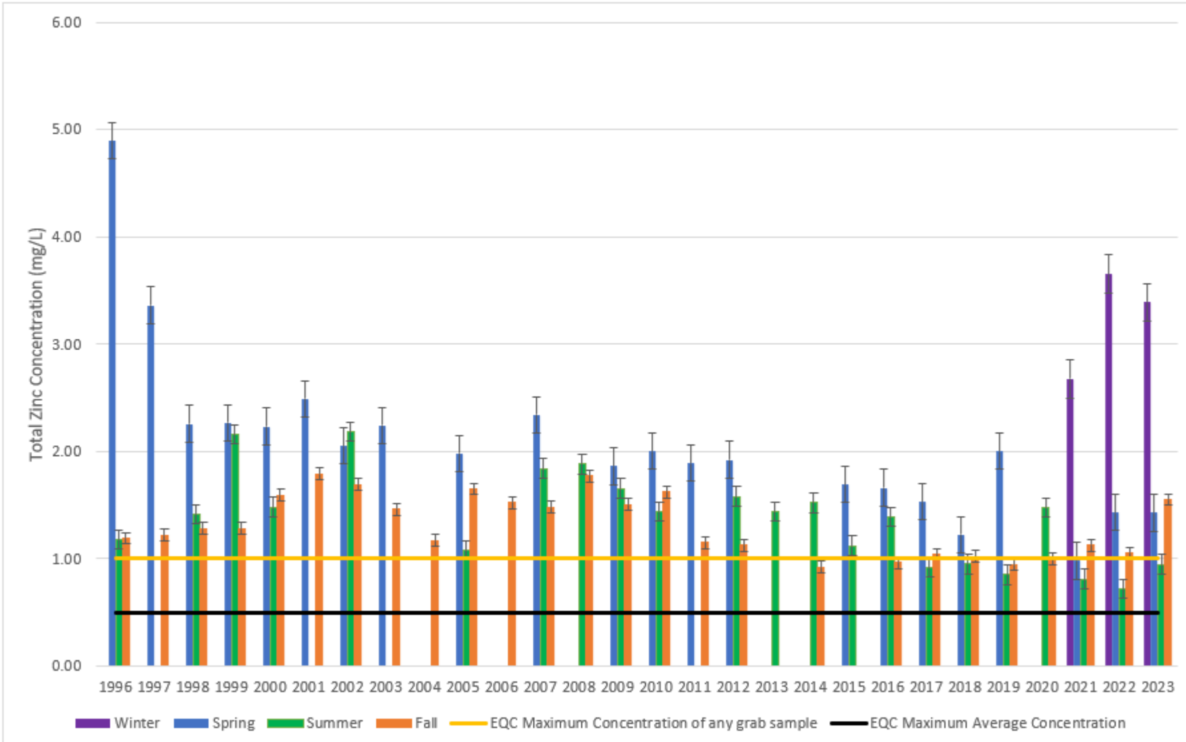

**Figure 2-1 Reclamation Research Surface Water Sample Locations**

### 2.1.2 Main Pond Water Quality Results

Water that is directly or indirectly released from the Main Pond and contained within the TIA is compared to the EQC, as defined in the Water Licence. Surface water sample results from the Main Pond collected for the purposes of reclamation research (i.e., do not include Teck operations data) between 2018 and 2023 are compared to the EQC in Table 2-3.

Zinc is the only parameter in the Main Pond that is consistently reported to be greater than the EQC maximum average concentration (0.50 mg/L) and the maximum concentration of any grab sample (1.00 mg/L). 2023 total zinc values in the Main Pond were consistent with previous sampling programs, with the exception of the fall sample which was slightly elevated compared to previous years.

Seasonal average total zinc concentrations measured in the Main Pond from 1996 to 2023 are presented in Figure 2-2 and include data collected for operational monitoring and reclamation research. Total zinc concentrations have been consistently greater than the EQC maximum average concentration since 1996. Total zinc concentrations are greatest in the winter and spring, and typically lowest in the summer and fall months The seasonal variation in zinc concentrations may be related to seasonal variations in pH within the Main Pond. Changes in pH reflect seasonal changes within the water column due to ice formation, spring thaw, freshet runoff, and biochemical activity (e.g., within sediments). Total zinc concentrations measured in samples collected by Barr, and Teck water treatment operators, between 2018 and 2023 are presented with average lab pH data in Figure 2-3. Zinc concentrations are the highest when pH is the lowest (pH 7.5 to 7.75), and conversely, zinc concentrations decrease when the pH is greater than 7.75. Based on these results, it appears zinc remains primarily in solution during the winter months and is generally excluded from the ice at the surface. As the ice melts, pH increases and zinc concentrations in solution decrease.




Notes: Seasons are defined as Winter (December through March), Spring (April through June), Summer (July and August), Fall (September through November).2022 winter zinc values were updated for this report to exclude the ice concentrations that were included in previous versions of this figure in past (2022) reporting years.

**Figure 2-2 Total Zinc Concentrations in the Main Pond from 1996 to 2023**

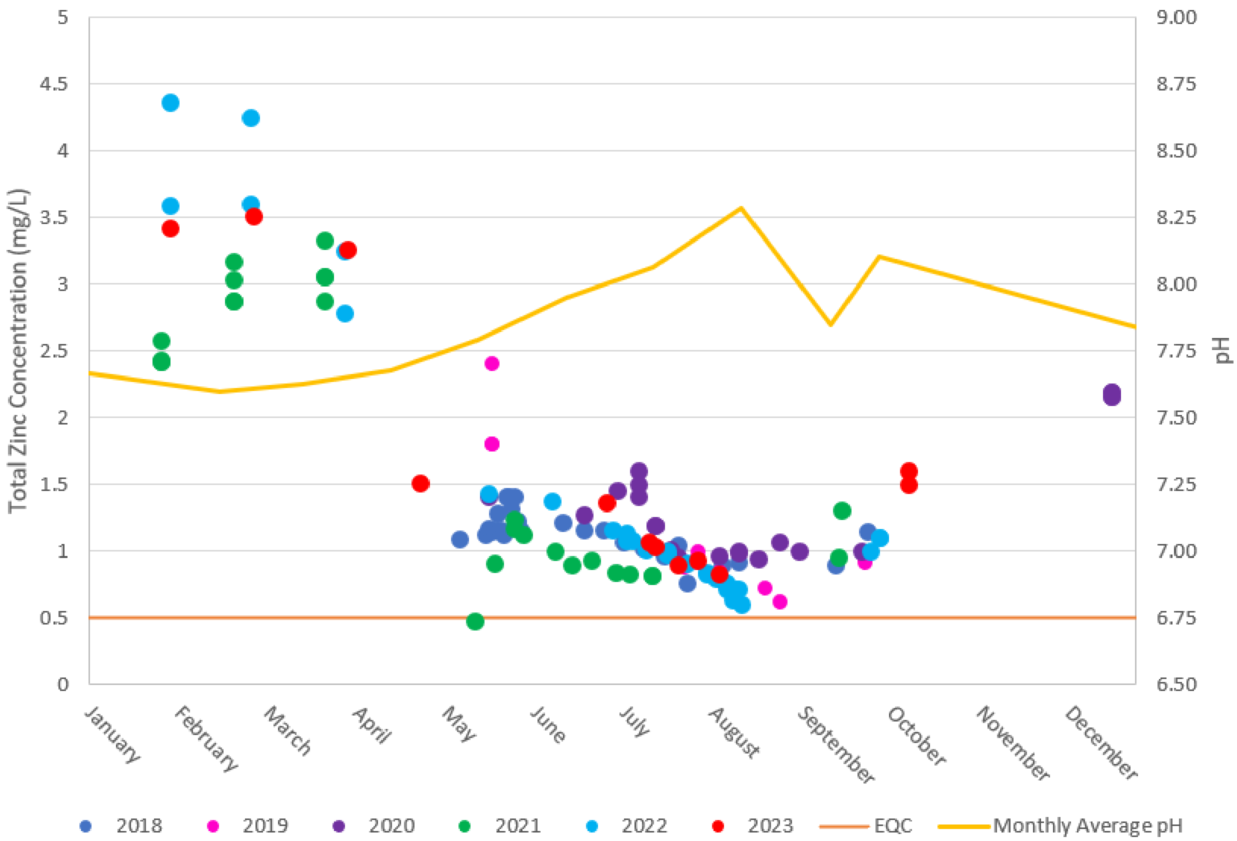



**Figure 2-3 Main Pond Total Zinc Concentration and Average Monthly pH**

**Table 2-3 Effluent Quality Criteria Parameters Measured in the Main Pond from 2018 to 2023**

| Parameter | EQC Maximum Average Concentration (mg/L) | EQC Maximum Concentration of any Grab Sample (mg/L) | Concentration (mg/L) | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 17 Sep 2018 | 20 May 2019 | 20 May 2019 | 20 May 2019 | 31 Jul 2019 | 31 Jul 2019 | 31 Jul 2019 | 27 Sep 2019 | 27 Sep 2019 | 27 Sep 2019 | 10 Jul 2020 | 10 Jul 2020 | 10 Jul 2020 | 10 Jul 2020 | 26 Sep 2020 | 22 Dec 2020 | 26 Jan 2021 | 20 Feb 2021 |
| | | | SW-1 | SW-19SP-01B | SW-19SP-01M | SW-19SP-01T | SW-19SUM-01B | SW-19SUM-01M | SW-19SUM-01T | SW-19FL-01-B | SW-19FL-01-M | SW-19FL-01-T | SW-20SUM-1-B | SW-20SUM-1-M | SW-20SUM-1-T | SW-20SUM-35-1A-T | SW-1 | 35-1A_DEEP | SW-1 | SW-1 |
| Arsenic (Total) | 0.50 | 1.00 | 0.00023 | 0.00030 | < 0.00020 | < 0.00020 | 0.00025 | 0.00024 | < 0.00020 | < 0.00020 | < 0.00020 | < 0.00020 | < 0.00020 | < 0.00020 | < 0.00020 | < 0.00020 | 0.00028 | 0.00029 | 0.00025 | 0.00034 |
| Copper (Total) | 0.15 | 0.30 | 0.00919 | 0.022 | 0.0063 | 0.0061 | 0.011 | 0.0092 | 0.0091 | 0.0082 | 0.0081 | 0.0081 | 0.0074 | 0.0079 | 0.0081 | 0.0077 | 0.0069 | 0.00991 | 0.00979 | 0.0117 |
| Cyanide (Total/SAD) | 0.10 | 0.20 | NM | < 0.0020 | < 0.0020 | < 0.0020 | < 0.0020 | < 0.0020 | < 0.0020 | < 0.0020 | < 0.0020 | < 0.0020 | < 0.0020 | < 0.0020 | < 0.0020 | NM | < 0.0020 | NM | NM | NM |
| Lead (Total) | 0.20 | 0.40 | 0.0227 | 0.18 | 0.041 | 0.042 | 0.038 | 0.032 | 0.034 | 0.020 | 0.020 | 0.020 | 0.046 | 0.050 | 0.053 | 0.044 | 0.028 | 0.0336 | 0.0303 | 0.0342 |
| Zinc (Total) | 0.50 | 1.00 | 0.895 | **2.4** | **1.8** | **1.8** | **1.0** | 0.92 | 0.94 | 0.92 | 0.95 | 0.95 | **1.4** | **1.5** | **1.6** | **1.4** | **1.0** | **2.16** | **2.42** | **2.87** |
| Solids, total suspended | 25.00 | 50.00 | 1.0 | 4.0 | 2.0 | 2.0 | 19 | 2.0 | 2.7 | 1.3 | 2.0 | 2.7 | < 4.6 | < 1.6 | < 2.2 | < 1.7 | 1.3 | < 3.0 | 4.1 | < 3.0 |
| Nitrogen, ammonia, as N | 2.00 | 4.00 | 0.0149 | < 0.015 | < 0.015 | 0.023 | < 0.015 | < 0.015 | < 0.015 | 0.038 | 0.029 | 0.044 | < 0.015 | < 0.015 | < 0.015 | < 0.015 | 0.024 | < 0.050 | < 0.050 | 0.071 |

(a) SAD = strong acid dissociable
(b) NM = Not measured
(c) Bolded cells indicate concentrations that are greater than the EQC maximum concentration of any grab sample.
(d) Shaded cells indicate concentrations that are greater than the EQC maximum average concentration.

**Table 2-3 (continued)**

| Parameter | EQC Maximum Average Concentration (mg/L) | EQC Maximum Concentration of any Grab Sample (mg/L) | Concentration (mg/L) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 23 Mar 2021 | 28 May 2021 | 15 Jul 2021 | 15 Jul 2021 | 18 Sep 2021 | 19 Sep 2021 | 29 Jan 2022 | 26 Feb 2022 | 30 Mar 2022 | 29 Sep 2022 | 02 Oct 2022 | 29 Jan 2023 | 27 Feb 2023 | 31 Mar 2023 | 25 Apr 2023 | 12 Oct 2023 | 12 Oct 2023 |
| | | | SW-1 | SW-1 | SW-1 | SW-35-1A | SW-1 | SW-35-1A | SW-1 | SW-1 | SW-1 | SW-1 | SW-35-1A | SW-1 | SW-1 | SW-1 | SW-35-1A | SW-1 | SW-35-1A |
| Arsenic (Total) | 0.50 | 1.00 | 0.00030 | 0.00016 | < 0.00020 | < 0.00020 | 0.00032 | 0.00048 | 0.00040 | 0.00041 | 0.00041 | 0.00021 | 0.00023 | 0.00036 | 0.00039 | 0.00038 | 0.00013 | < 0.00020 | < 0.00020 |
| Copper (Total) | 0.15 | 0.30 | 0.00981 | 0.00587 | 0.0058 | 0.0059 | 0.0080 | 0.022 | 0.0186 | 0.0186 | 0.0168 | 0.0075 | 0.016 | 0.0119 | 0.0135 | 0.00942 | 0.00489 | 0.0083 | 0.0099 |
| Cyanide (Total/SAD) | 0.10 | 0.20 | NM | NM | < 0.0020 | < 0.0020 | < 0.0020 | < 0.0020 | NM | NM | NM | 0.00079 | 0.00205 | NM | NM | NM | NM | < 0.00050 | < 0.00050 |
| Lead (Total) | 0.20 | 0.40 | 0.0295 | 0.0428 | 0.026 | 0.025 | 0.054 | 0.27 | 0.0491 | 0.0593 | 0.0474 | 0.045 | 0.059 | 0.065 | 0.0577 | 0.0362 | 0.0537 | 0.048 | 0.045 |
| Zinc (Total) | 0.50 | 1.00 | **3.05** | **1.23** | 0.81 | 0.81 | 0.95 | **1.3** | **3.59** | **3.60** | **3.25** | **1.0** | **1.1** | **3.42** | **3.51** | **3.26** | **1.51** | **1.6** | **1.5** |
| Solids, total suspended (TSS) | 25.00 | 50.00 | < 3.0 | < 3.0 | < 1.0 | < 1.0 | 1.7 | 28 | < 3.0 | < 3.0 | < 3.0 | < 1.0 | 29 | 8.2 | 8.2 | 14.2 | 7.4 | 1.9 | < 1.0 |
| Nitrogen, ammonia, as N | 2.00 | 4.00 | 0.095 | < 0.050 | NM | NM | NM | NM | 0.0446 | 0.0516 | 0.0686 | NM | NM | 0.0452 | 0.0893 | 0.0997 | 0.0467 | NM | NM |

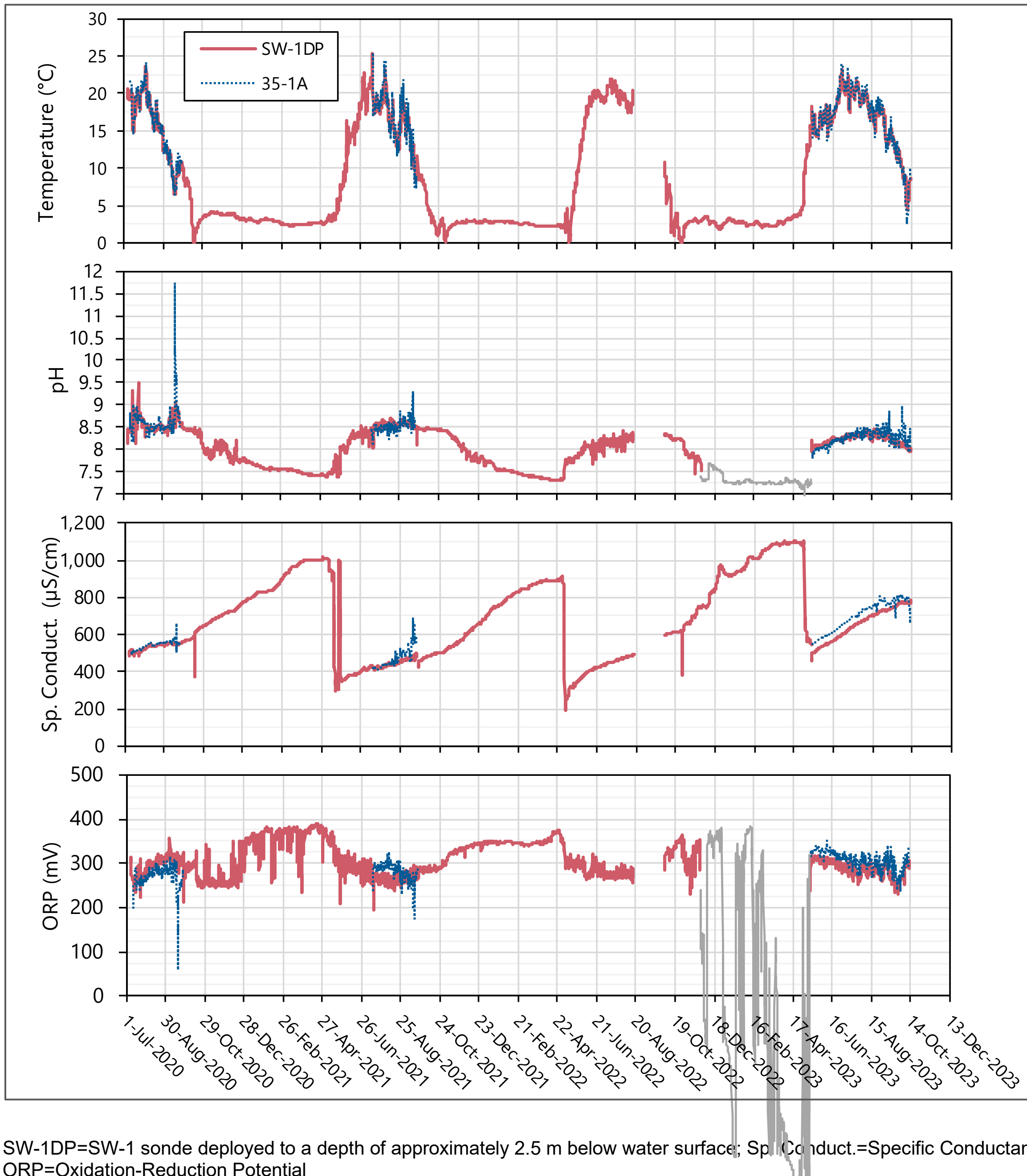
(a) SAD = strong acid dissociable
(b) NM = Not measured
(c) Bolded cells indicate concentrations that are greater than the EQC maximum concentration of any grab sample.
(d) Shaded cells indicate concentrations that are greater than the EQC maximum average concentration.

### 2.1.3 In-Situ Water Quality Profilers Data

Key observations from the updated dataset including data recorded since August 2022 are summarized below.

- The sonde at SW-1 has captured approximately 3.5 years of data from the Main Pond. These data show cyclic behaviour within the Main Pond with impacts from ice formation, ice thawing, freshet input, and evaporative water loss. The sonde at 35-1A has captured three open water seasons of data from the Main Pond and shows a similar pattern as observed at SW-1, suggesting the Main Pond is a well-mixed system.
- Similar patterns in temperature, pH, specific conductance, and oxidation-reduction potential (ORP) were observed in 2023 as the prior two years of monitoring.
    - The surface water temperature of the Main Pond ranges from 0°C in late October and November up to 25°C in late June and July. During the open water period between late-May and September, the temperature changes substantially from 3 to 4°C in mid-May, up to 20 to 25°C in June and July and cooling back down to 3 to 4°C by mid-October. The typical temperature during the ice-cover period from mid-October to mid-May is 3 to 4°C.
    - During the open water period from June through September, the pH typically reaches up to pH 8.25 to 8.5. Periods when the pH rose above pH 9 and greater are typically correlated with water treatment activities, such as treatment pond recirculation or addition of surplus lime to the Main Pond. The pH typically drops rapidly to below pH 8 in October and November over two to four weeks. This pH drop occurs concurrently with the formation of the ice cover and is likely caused by a build-up of carbon dioxide ($CO_2$) from microbial respiration occurring in the pond sediments. During the ice-cover period, the pH has progressively dropped, reaching a minimum of approximately pH 7.3-7.4 in late April or early May. Between May and June, the pH rises above pH 8 concurrently with the melting of the ice cover as the pond surface water comes to equilibrium with atmospheric $CO_2$.
    - The specific conductance of the surface water of the Main Pond rises continuously through the open water months, likely due to evaporative water loss. During the ice-cover months, the specific conductance continues to rise up to 900 to 1,100 µS/cm, likely due to dissolved solid exclusion from the ice crystals. During spring freshet, the specific conductance rapidly decreases over approximately one to two weeks due to run-in of snowmelt, lowering the specific conductance down to 200 to 500 µS/cm.
    - The ORP of the surface water of the Main Pond has remained consistently between +200 to +400 mV for the duration that the sondes have been deployed, indicating the Main Pond maintains oxic conditions.
- During the 2023 monitoring period, it is suspected that the pH/ORP probe malfunctioned starting in late-November 2022 based on high fluctuations in ORP observed between

November 26, 2022 and May 13, 2023 and the gap observed in the pH data before and after sensor maintenance and calibration on May 13, 2023. The pH and ORP data recorded over this period are shown in gray on Figure 2-4 to separate it from the other data due to the uncertainty in its reliability.




SW-1DP=SW-1 sonde deployed to a depth of approximately 2.5 m below water surface; Sp. Conduct.=Specific Conductance; ORP=Oxidation-Reduction Potential
The data gap in the SW-1DP dataset between August 15, 2022 and October 2, 2022 is due to loss of battery power.
Data recorded by the SW-1DP pH/ORP sensor between November 26, 2022 and May 13, 2023 is shown in gray to separate it from the other data due to uncertainty in its reliability. It is suspected that the sensor malfunctioned based on the high fluctuations in the ORP values and the gap observed between the pH values before and after calibration and maintenance on May 13, 2023.

**Figure 2-4 In-situ Water Quality Profiler Data from July 7, 2020 through October 11, 2023**

### 2.1.4 Downstream Drainage Network Water Quality Results

Treated water from the Main Pond is released at the discharge point and enters the Downstream Drainage Network via spillway siphons, which is then released to the surrounding muskeg. Water quality monitoring of the Downstream Drainage Network has been completed over the past six years (2018 to 2023) to determine spatial and seasonal variability, to provide a current baseline of environmental conditions, and to inform water quality monitoring targets (i.e., criteria) for post-reclamation monitoring. The objective is to collect samples in the spring during the peak of run-off and in the fall following water treatment and prior to freeze-up; however, 2023 sampling was limited to the fall program due to wildfire activity in the spring necessitating evacuation from the site. Sample results from the Downstream Drainage Network were assessed to address:

a) Concentration gradients for cadmium, copper, lead, and zinc concentrations along the flow path from the discharge point to the outlet to the surrounding peatland,

b) Indicators of tailings porewater seepage in the water chemistry at three locations (SW- 03, SW-10, and SW-11) in the Downstream Drainage Network; and

c) Comparisons between cadmium, copper, lead, and zinc concentrations in the Main Pond, immediately downstream from the discharge point and at the outlet of the Downstream Drainage Network to the surrounding peatland.

Surface water in the Downstream Drainage Network is compared to the Canadian Council of Ministers of the Environment Environmental Quality Guidelines (CCME) for the protection of aquatic life, which are conservative and intended to protect all forms of aquatic life and all aspects of aquatic life cycles (CCME, 2023).

#### 2.1.4.1 Total Metal Concentrations along the Downstream Drainage Network Flow Path

Figure 2-5 through Figure 2-8 present metal concentrations (total cadmium, total copper, total lead, dissolved zinc) based on the time of year the samples were collected, and the distance along the flow path from the discharge point, compared to CCME guidelines.

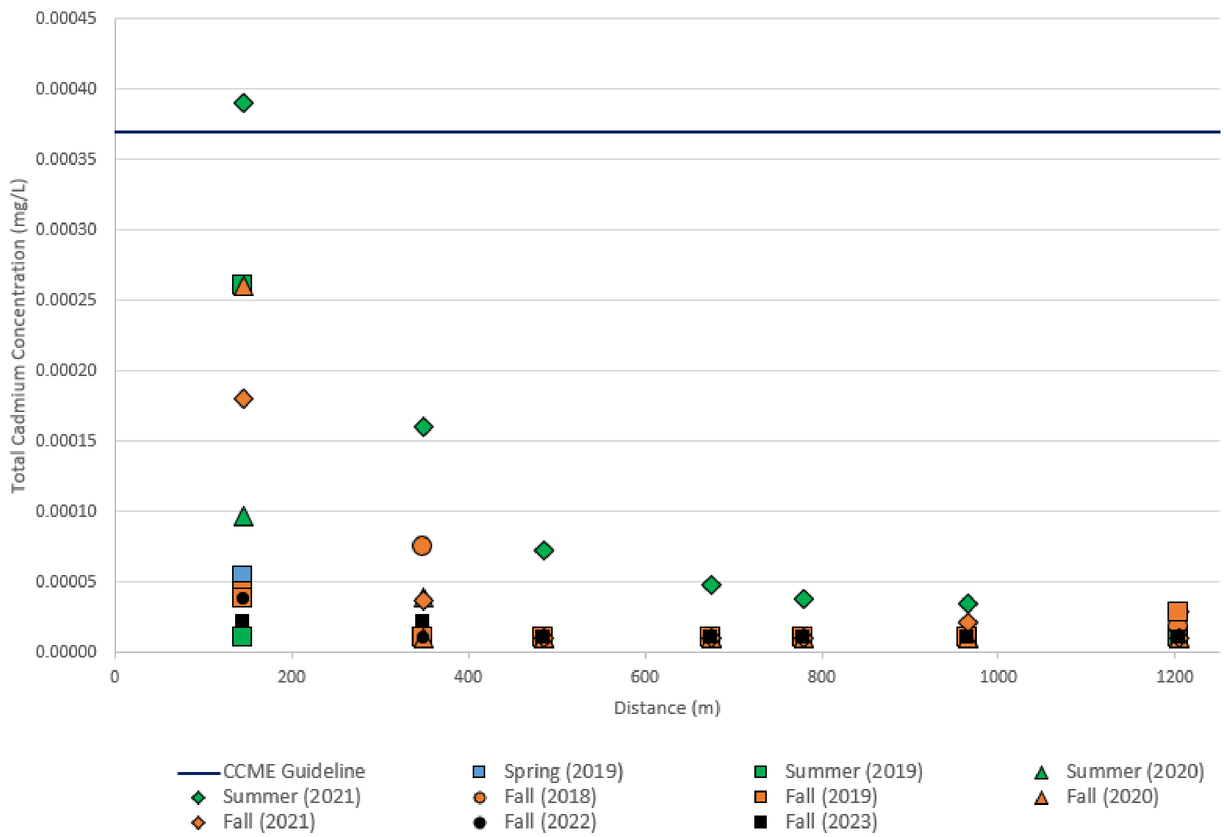



**Figure 2-5 Total Cadmium Concentration with Downstream Drainage Distance Compared to CCME Guidelines**

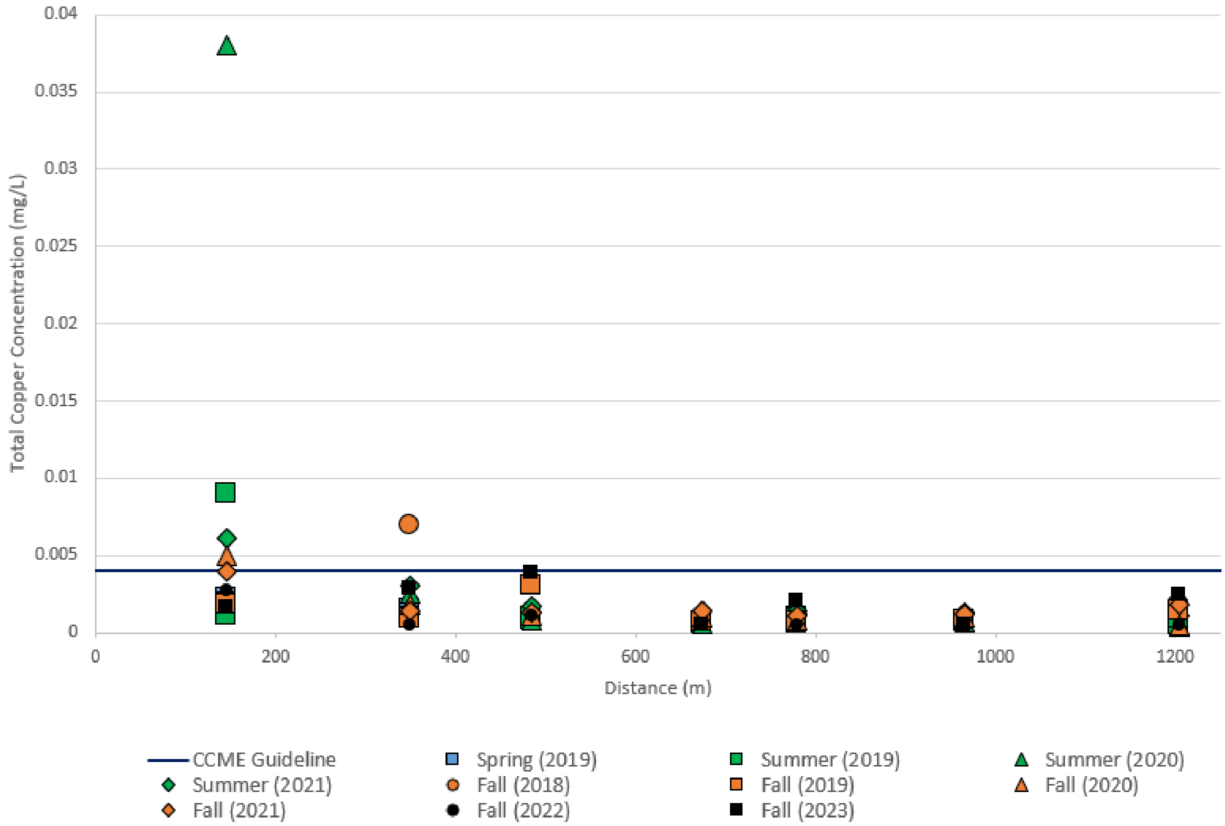



**Figure 2-6 Total Copper Concentration with Downstream Drainage Distance Compared to CCME Guidelines**

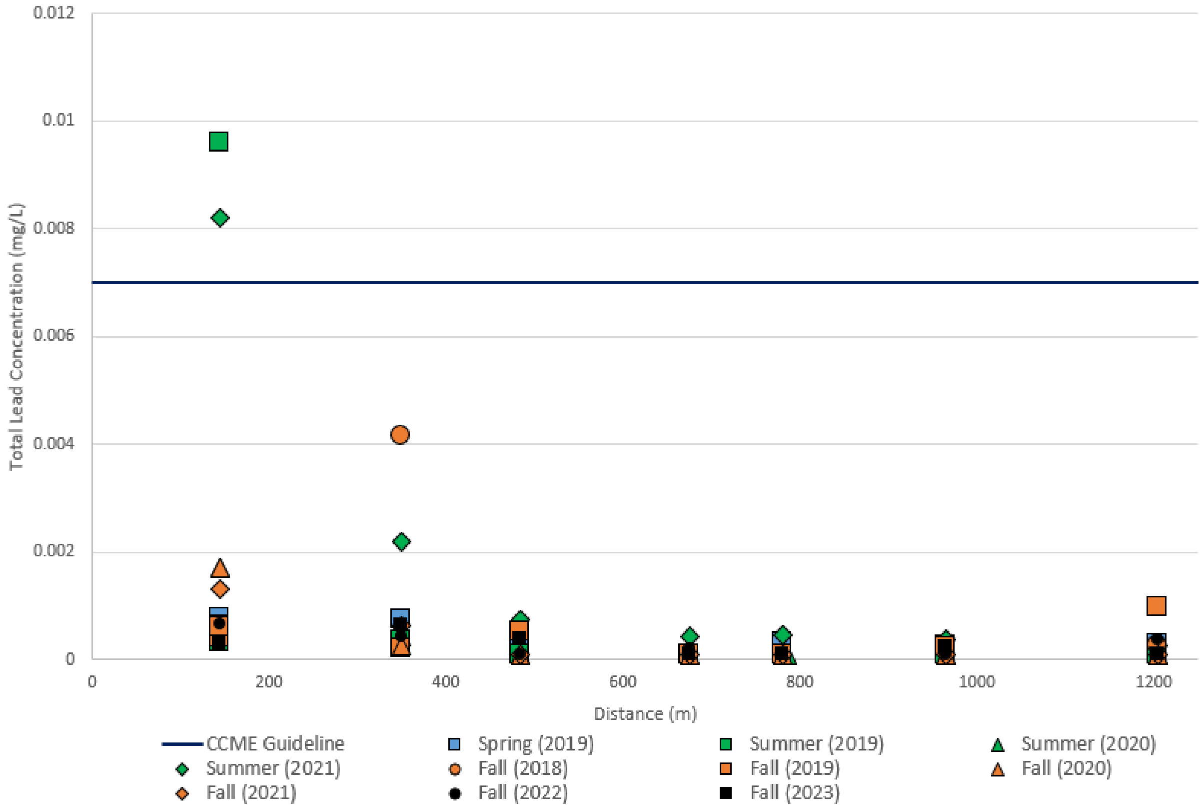



**Figure 2-7 Total Lead Concentration with Downstream Drainage Distance Compared to CCME Guidelines**

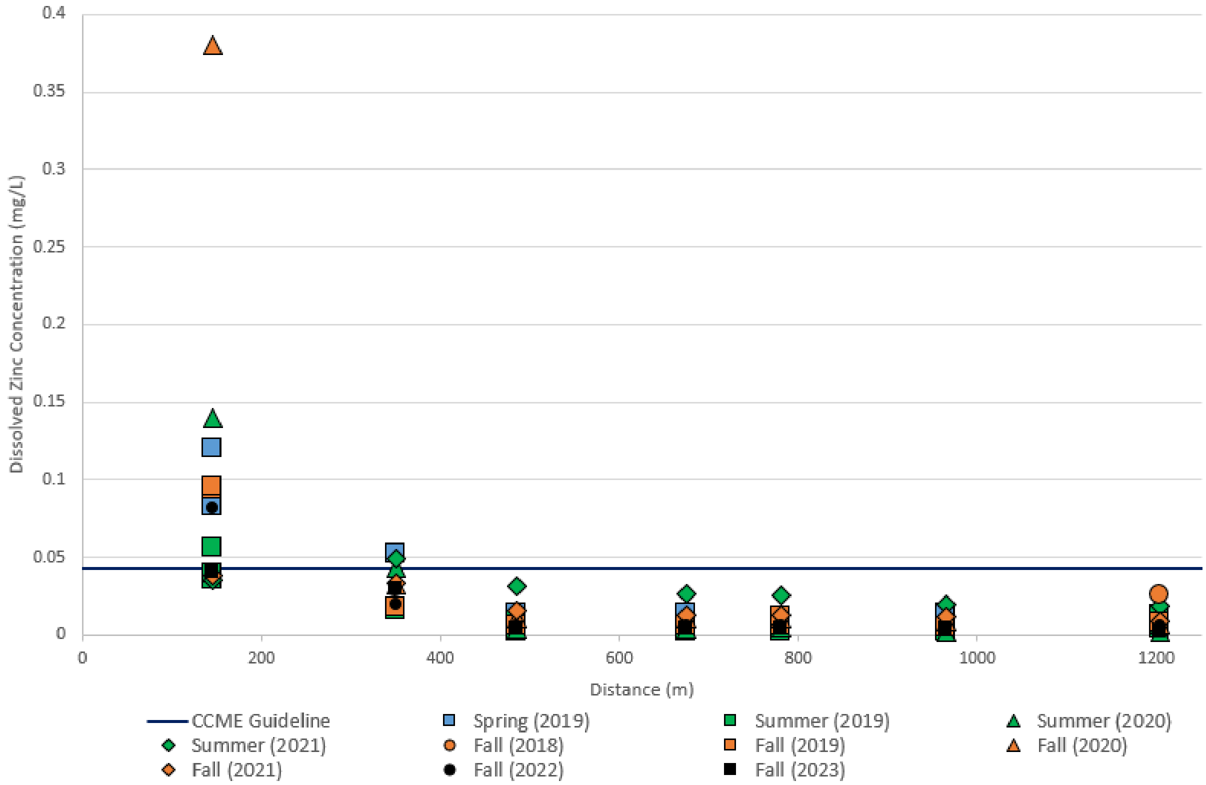



**Figure 2-8 Dissolved Zinc Concentration with Downstream Drainage Distance Compared to CCME Guidelines**

Overall, metal concentrations decrease as distance from the discharge point increases. Dissolved zinc was observed to consistently require the longest distance from the discharge point before becoming less than the CCME guideline at approximately 400 m.

Total copper concentrations were similar to, or slightly greater than, concentrations from previous years. Total cadmium, lead and zinc concentrations were similar to, or less than, concentrations from previous years.

#### 2.1.4.2 Potential for Tailings Porewater Seepage Impacts to Downstream Water Quality

Between 2018 and 2020, one sample location (SW-03) proximate to the north dyke, outside of the Downstream Drainage Network flow path, was sampled to determine the likelihood for tailings porewater seepage impacts. In 2021, two additional locations, SW-10 and SW-11, were added to the sample program (Figure 2-1). Concentrations of cadmium, copper, lead, and zinc measured in samples from SW-03 in 2018 to 2023, and SW-10 and SW-11 in 2021 to 2023 are presented in Table 2-4.

Concentrations of total and dissolved cadmium, copper, lead, and zinc at SW-03, SW-10, and SW-11 are comparable or less than concentrations measured in samples collected at distances further than 400 m along the drainage flow path; therefore, porewater seepage does not appear to degrade water quality in the Downstream Drainage Network, under current site conditions.

Seepage rates and contribution to the downstream drainage would be expected to be greatest during spring freshet when Main Pond levels are highest; therefore, future sampling in the late stages of freshet are needed to confirm that seepage is not detectable in the water quality of the pond adjacent to the dyke. Total copper, lead, and zinc concentrations from September 2020 continue to appear to be outliers, since data before and after this sample event were similar, and below CCME guidelines. It remains likely that the sample had higher than average particulate matter since the total concentrations are elevated, but the dissolved concentrations are similar to other sample events.

**Table 2-4 Concentrations of Cadmium, Copper, Lead, and Zinc in SW-03, SW-10, and SW-11 in Proximity to the North Dyke**

| Parameter | CCME Aquatic Life Guidelines | Concentration (mg/L) | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 17 Sept 2018 | 20 May 2019 | | | 01 Aug 2019 | | | 27 Sep 2019 | | | 06 Jul 2020 | | 25 Sep 2020 |
| | | SW-03 Top | SW-03 Top | SW-03 Middle | SW-03 Bottom | SW-03 Top | SW-03 Middle | SW-03 Bottom | SW-03 Top | SW-03 Middle | SW-03 Bottom | SW-03 Top | SW-03 Dup | SW-03 Top |
| ***Dissolved*** | | | | | | | | | | | | | | |
| Cadmium | 0.00037 | 0.000014 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| Copper | 0.0040 | 0.0018 | 0.00050 | 0.00051 | 0.00048 | 0.00064 | 0.00064 | 0.00067 | 0.00044 | 0.00044 | 0.00070 | 0.00051 | 0.00033 | 0.00083 |
| Lead | 0.0070 | 0.00016 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 |
| Zinc | 0.043 | 0.029 | 0.012 | 0.012 | 0.011 | < 0.003 | < 0.003 | < 0.003 | 0.011 | 0.0052 | 0.0057 | 0.0032 | < 0.003 | 0.0087 |
| ***Total*** | | | | | | | | | | | | | | |
| Cadmium | 0.00037 | 0.000020 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | 0.000052 |
| Copper | 0.0040 | 0.0020 | 0.0006 | 0.0006 | 0.0006 | 0.00089 | 0.00078 | 0.0012 | 0.00052 | 0.00054 | 0.00071 | 0.00059 | 0.00069 | **0.13** |
| Lead | 0.0070 | 0.00031 | 0.00025 | 0.00025 | < 0.0002 | < 0.0002 | < 0.0002 | 0.00042 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | **0.15** |
| Zinc | NG [(a)] | 0.028 | 0.016 | 0.017 | 0.018 | 0.005 | 0.0052 | 0.016 | 0.006 | 0.006 | 0.010 | < 0.003 | < 0.003 | 1.20 |

(a) NG = No guideline

The CCME Guidelines apply to total metals, with the exception of zinc which apply to dissolved metals only. The dissolved data results have conservatively been compared to the total metals guidelines. However, the comparison of guidelines for dissolved concentrations were not compared to total concentrations.

Bolded and shaded cells indicate concentrations that are greater than the CCME Aquatic Life Guidelines.

Copper, lead and nickel: based on site-wide hardness greater than 180 mg/L.

Zinc long-term guideline (dissolved): based on site-wide hardness median of 300 mg/L, pH 8, DOC median of 6.3 mg/L.

Note that hardness is higher than range deemed applicable in guideline, but hardness decreases toxicity

**Table 2-4 (continued)**

| Parameter | CCME Aquatic Life Guidelines | Concentration (mg/L) | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 14 Jul 2021 | | | 18 Sep 2021 | | | 30 Sep 2022 | | | 12 Oct 2023 | | |
| | | SW-03 | SW-10 | SW-11 | SW-03 | SW-10 | SW-11 | SW-03 | SW-10 | SW-11 | SW-03 | SW-10 | SW-11 |
| ***Dissolved*** | | | | | | | | | | | | | |
| Cadmium | 0.00037 | 0.000027 | 0.000023 | 0.000026 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| Copper | 0.0040 | 0.0011 | 0.0011 | 0.0010 | 0.00089 | 0.00077 | 0.00076 | 0.0017 | < 0.0005 | < 0.0005 | 0.0016 | 0.0015 | 0.0013 |
| Lead | 0.0070 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 |
| Zinc | 0.043 | 0.025 | 0.019 | 0.020 | 0.011 | 0.011 | 0.011 | 0.0054 | 0.0065 | 0.0058 | 0.0039 | 0.0036 | 0.0041 |
| ***Total*** | | | | | | | | | | | | | |
| Cadmium | 0.00037 | 0.000038 | 0.000031 | 0.000036 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 | < 0.00002 |
| Copper | 0.0040 | 0.0013 | 0.0014 | 0.0012 | 0.00098 | 0.001 | 0.001 | < 0.0005 | < 0.0005 | < 0.0005 | 0.0039 | < 0.001 | < 0.001 |
| Lead | 0.0070 | 0.00034 | 0.00026 | 0.00030 | < 0.0002 | < 0.0002 | < 0.0002 | < 0.0002 | 0.00021 | 0.0016 | < 0.00002 | < 0.00002 | < 0.00002 |
| Zinc | NG [(a)] | 0.022 | 0.019 | 0.019 | 0.017 | 0.019 | 0.019 | 0.0080 | 0.0096 | 0.035 | 0.0063 | 0.007 | 0.0068 |

(a) NG = No guideline

The CCME Guidelines apply to total metals, with the exception of zinc which apply to dissolved metals only. The dissolved data results have conservatively been compared to the total metals guidelines. However, the comparison of guidelines for dissolved concentrations were not compared to total concentrations.

Bolded and shaded cells indicate concentrations that are greater than the CCME Aquatic Life Guidelines.

Copper, lead and nickel: based on site-wide hardness greater than 180 mg/L.

Zinc long-term guideline (dissolved): based on site-wide hardness median of 300 mg/L, pH 8, DOC median of 6.3 mg/L.

Note that hardness is higher than range deemed applicable in guideline, but hardness decreases toxicity

#### 2.1.4.3 Comparison to Concentrations in the Main Pond, Immediately Following Discharge and at the Downstream Drainage Network Outlet

Figure 2-9 is an updated version of a figure that was included in the 2021 CRP. The graph shows average concentrations measured in the Main Pond compared to fall concentrations (i.e., post water treatment) measured in the first sample point downstream of the discharge (approximately 145 m from the discharge point) and at the point where the downstream drainage is released to the surrounding peatland. The 2023 data is similar to previous year's data, with the exception of total copper, which had a higher concentration at the outlet to peatland sample location relative to the immediately downstream sample location. Though the total copper concentration at the outlet to peatland sample location was higher in 2023 than in 2022, it was similar to that observed in 2021 and 2019. Total cadmium, copper, lead and zinc concentrations immediately downstream of the treated water discharge location were lower in 2023 than in previous years. Overall, the five years of data indicate that attenuation in the Downstream Drainage Network is occurring such that concentrations are less than CCME guidelines at the outlet.

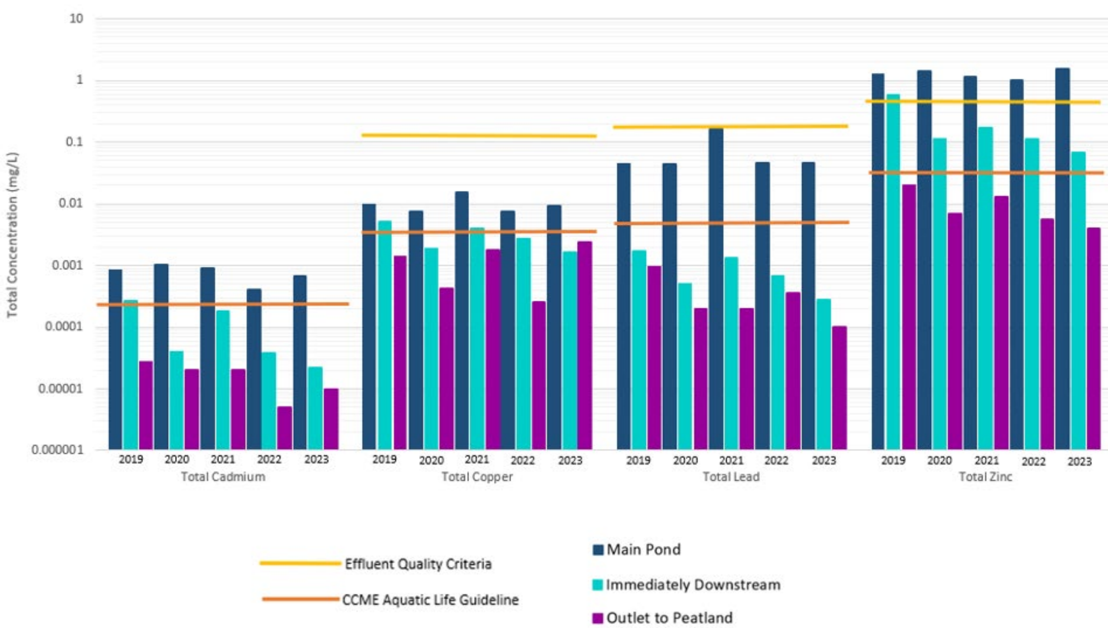



**Figure 2-9 Total Cadmium, Copper, Lead, and Zinc Concentrations in the Samples from the Main Pond Compared with Samples Collected Immediately Downstream of the Water Treatment Discharge Point and at the Outlet to the Peatland**

## 2.2 Groundwater Quality Evaluation

### 2.2.1 Groundwater Assessments and Monitoring

In fall 2018, three nested monitoring wells were installed (BH18-B/G-10A/B/C, BH18-B/G-13A/B/C, and BH18-B/G-16A/B/C). For these nested wells, the most shallow wells (designated with an 'A' in the well name) were screened between 1 and 6 metres below ground surface (mbgs) and within the tailings with the goal of intersecting the water table, the intermediate wells (designated with a 'B' in the well name) were screened between 3 and 8 m within the tailings with the goal of collecting porewater at the base of saturated tailings, and the deepest wells (designated with a 'C' in the well name) were screened within unconsolidated deposits at 5 to 12.7 m with the goal of collecting local groundwater below the tailings. Three individual wells were also drilled in areas surrounding the tailings (BH18-B/G-11, BH18-B/G-14, and BH18-B/G-18) and six perimeter monitoring wells were added in September 2019. Perimeter wells were screened in unconsolidated deposits at shallow depths ranging from 0.8 to 5.8 m where saturated soils were encountered with the goal of monitoring local groundwater surrounding the tailings, including upgradient, side-gradient, and downgradient orientations. Figure 2-10 shows the locations of the monitoring wells.

#### 2.2.1.1 Groundwater Elevation Monitoring

Local hydrogeology and groundwater flow patterns were assessed through the monitoring of vibrating wire piezometers (VWPs) and a monitoring well network within, and adjacent to, the TIA. In 2023, groundwater elevations in monitoring wells were measured continuously by the VWPs and manually measured during the May and October groundwater assessment.

The May and October groundwater assessments included collection of static water levels from the 18 monitoring wells within, and adjacent to, the TIA. Two of the wells within the TIA were identified to be dry in 2023.

#### 2.2.1.2 Groundwater Sampling

Sampling of the groundwater monitoring well network occurs annually during seasonal (spring/summer and fall) campaigns to monitor porewater (water within saturated tailings) concentrations and groundwater concentrations (where groundwater is defined as water within the silt, clay, sand, and gravel seams that lie beneath the tailings).

The groundwater assessment was unable to be completed during the May field campaign due to wildfire activity in the area. Of the 18 wells in and around the TIA, 16 were able to be sampled during the October 2023 groundwater assessment. The other two wells were identified to be dry and were not sampled. The October groundwater assessment included low flow sampling using a peristaltic pump at 14 of the 16 well locations. The two remaining wells (BH18-B/G-10B and C) were sampled using a Geosub submersible pump.

Prior to sampling, groundwater was measured in the field for temperature, specific conductance, dissolved oxygen, turbidity, pH and ORP. Temperature, specific conductance, and dissolved oxygen were measured using a handheld YSI Pro DSS multi-parameter probe, turbidity was measured using a Lovibond Turbidity Meter, and pH and ORP were measured using an in-situ water quality profiler. The sonde was used to measure pH and ORP due to malfunction of the probe that measures those parameters on the YSI. When parameters stabilized, samples were collected and submitted to Bureau Veritas for analysis of total and dissolved metals, total and dissolved mercury, dissolved organic carbon (DOC), cyanide, and routine analysis (alkalinity, pH, conductivity, TSS, anions, and cations).

### 2.2.2 Results of Groundwater Assessments and Monitoring

#### 2.2.2.1 Groundwater Elevations

Groundwater elevations have generally increased slightly or remained constant on a year over year basis from 2018 to 2023. Groundwater levels fluctuate seasonally, typically lowest during early summer and highest in early fall. In October 2023, sitewide groundwater elevations in monitoring wells were below the geometric mean or the lowest since 2018 at all locations except for BH18-B/G-10B and BH18-B/G-10C (Figure 2-10). Within the TIA, groundwater typically moves vertically downward at BH18-B/G-16 (i.e., vertical gradients are negative), and vertically upward between BH18-B/G-13B and BH18-B/G-13A (i.e., positive gradient between the two wells). The vertical hydraulic gradient between BH18-B/G-10B and BH18-B/G-10C has fluctuated between positive and negative since 2018.


**Figure 2-10 Groundwater Well Locations**

Legacy Properties / Teck

**Table 2-5 Groundwater Elevations and Vertical Hydraulic Gradients from Monitoring Wells between 2018 and 2023**

| Well Name | Geologic Unit | Ground Surface (m) | Top of Screen (mbgs) | Bottom of Screen (mbgs) | Top of Screen (m) | Bottom of Screen (m) | Oct 2018 | | May 2019 | | Oct 2019 | | Jul 2020 | | Sep 2020 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Groundwater Elevation (m) | Vertical Gradient (positive upward) | Groundwater Elevation (m) | Vertical Gradient (positive upward) | Groundwater Elevation (m) | Vertical Gradient (positive upward) | Groundwater Elevation (m) | Vertical Gradient (positive upward) | Groundwater Elevation (m) | Vertical Gradient (positive upward) |
| **TIA** | | | | | | | | | | | | | | | | |
| BH18-B/G-10A | Tailings | 215.20 | 6.00 | 9.00 | 209.20 | 206.20 | 205.67 | 0.33 | Dry | NA | Dry | NA | Dry | NA | Dry | NA |
| BH18-B/G-10B | Tailings | 215.21 | 9.22 | 12.22 | 205.99 | 202.99 | 206.74 | 0.053 | 206.25 | 0.0035 | 206.04 | -0.30 | 205.88 | 0.0018 | 205.85 | -0.0041 |
| BH18-B/G-10C | Silty sand / Silty clay | 215.28 | 12.70 | 15.70 | 202.58 | 199.58 | 206.92 | NA | 206.26 | NA | 205.03 | NA | 205.89 | NA | 205.84 | NA |
| BH18-B/G-13A | Tailings | 202.39 | 1.00 | 2.50 | 201.39 | 199.89 | 201.77 | 0.27 | 200.88 | -0.0056 | 202.24 | -0.028 | 201.26 | 0.038 | 201.94 | 0.088 |
| BH18-B/G-13B | Tailings | 202.42 | 2.80 | 4.30 | 199.62 | 198.12 | 202.24 | 0.024 | 200.87 | -0.0023 | 202.19 | < 0.001 | 201.33 | 0.0064 | 202.10 | -0.0052 |
| BH18-B/G-13C | Silty clay / Clay | 202.42 | 5.50 | 8.50 | 196.92 | 193.92 | 202.33 | NA | 200.87 | NA | 202.20 | NA | 201.35 | NA | 202.08 | NA |
| BH18-B/G-16A | Tailings | 201.82 | 0.90 | 2.40 | 200.92 | 199.42 | 200.84 | -0.11 | Dry | NA | Dry | NA | NA | NA | 200.58 | -0.11 |
| BH18-B/G-16B | Tailings | 201.76 | 5.00 | 6.50 | 196.76 | 195.26 | 200.37 | -0.094 | 198.82 | -0.24 | 199.17 | -0.21 | 198.96 | -0.20 | 200.11 | -0.18 |
| BH18-B/G-16C | Clay | 201.83 | 7.80 | 10.80 | 194.03 | 191.03 | 200.04 | NA | 197.97 | NA | 198.44 | NA | 198.28 | NA | 199.48 | NA |
| **Surrounding TIA** | | | | | | | | | | | | | | | | |
| BH18-B-11 | Sand | 210.16 | 0.80 | 2.80 | 209.36 | 207.36 | 209.93 | NA | 210.06 | NA | 209.82 | NA | 210.00 | NA | 210.14 | NA |
| BH18-B/G-14 | Silty clay / Gravel | 197.57 | 5.80 | 8.80 | 191.77 | 188.77 | NA | NA | 197.97 | NA | 197.91 | NA | 198.10 | NA | 198.06 | NA |
| BH18-B/G-18 | Sand / Clay | 202.18 | 0.80 | 3.80 | 201.38 | 198.38 | 202.07 | NA | 201.77 | NA | 201.34 | NA | 201.74 | NA | 202.04 | NA |
| BH19-B/G-12 | Sand / Clay | 197.84 | 1.30 | 2.80 | 196.54 | 195.04 | NM | NA | NM | NA | 197.15 | NA | 197.27 | NA | 197.39 | NA |
| BH19-B/G-15 | Sand / Clay | 206.64 | 1.90 | 3.40 | 204.74 | 203.24 | NM | NA | NM | NA | 204.39 | NA | 204.33 | NA | 204.57 | NA |
| BH19-B/G-17 | Sand / Gravel / Clay | 195.11 | 1.40 | 2.90 | 193.71 | 192.21 | NM | NA | NM | NA | 194.04 | NA | 193.96 | NA | 194.11 | NA |
| BH19-B/G-36 | Sand / Clayey Sand | 198.53 | 1.90 | 3.40 | 196.63 | 195.13 | NM | NA | NM | NA | 197.18 | NA | 197.06 | NA | 197.21 | NA |
| BH19-B/G-41 | Sandy clay / Sand | 207.75 | 1.40 | 2.90 | 206.35 | 204.85 | NM | NA | NM | NA | 206.91 | NA | 207.20 | NA | 207.46 | NA |
| BH19-B/G-42 | Clay | 211.93 | 2.00 | 3.60 | 209.93 | 208.33 | NM | NA | NM | NA | 209.24 | NA | 211.64 | NA | 211.81 | NA |

Notes:

- NM – Not Measured
- NA – Not Applicable

**Table 2-5 (continued)**

| Well Name | Geologic Unit | Ground Surface (m) | Top of Screen (mbgs) | Bottom of Screen (mbgs) | Top of Screen (m) | Bottom of Screen (m) | Jul 2021 | | Sep 2021 | | May 2022 | | May 2023 | | October 2023 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Groundwater Elevation (m) | Vertical Gradient (positive upward) | Groundwater Elevation (m) | Vertical Gradient (positive upward) | Groundwater Elevation (m) | Vertical Gradient (positive upward) | Groundwater Elevation (m) | Vertical Gradient (positive upward) | Groundwater Elevation (m) | Vertical Gradient (positive upward) |
| **TIA** | | | | | | | | | | | | | | | | |
| BH18-B/G-10A | Tailings | 215.20 | 6.00 | 9.00 | 209.20 | 206.20 | Dry | NA | Dry | NA | Dry | NA | Dry | NA | Dry | NA |
| BH18-B/G-10B | Tailings | 215.21 | 9.22 | 12.22 | 205.99 | 202.99 | 206.33 | < -0.001 | 206.35 | < 0.001 | 206.76 | < 0.001 | 206.54 | < 0.001 | 206.37 | 0.0021 |
| BH18-B/G-10C | Silty sand / Silty clay | 215.28 | 12.70 | 15.70 | 202.58 | 199.58 | 206.33 | NA | 206.35 | NA | 206.76 | NA | 206.54 | NA | 206.38 | NA |
| BH18-B/G-13A | Tailings | 202.39 | 1.00 | 2.50 | 201.39 | 199.89 | 201.41 | 0.071 | 202.00 | 0.070 | No access | NA | 200.55 | 0.060 | 200.89 | 0.16 |
| BH18-B/G-13B | Tailings | 202.42 | 2.80 | 4.30 | 199.62 | 198.12 | 201.53 | -0.0075 | 202.12 | -0.0075 | No access | NA | 200.66 | -0.017 | 201.18 | -0.014 |
| BH18-B/G-13C | Silty clay / Clay | 202.42 | 5.50 | 8.50 | 196.92 | 193.92 | 201.51 | NA | 202.10 | NA | No access | NA | 200.60 | NA | 201.13 | NA |
| BH18-B/G-16A | Tailings | 201.82 | 0.90 | 2.40 | 200.92 | 199.42 | 200.67 | -0.087 | 200.84 | -0.081 | Dry | NA | Dry | NA | Dry | NA |
| BH18-B/G-16B | Tailings | 201.76 | 5.00 | 6.50 | 196.76 | 195.26 | 200.31 | -0.11 | 200.50 | -0.11 | 198.50 | -0.048 | 198.29 | -0.028 | 198.55 | -0.015 |
| BH18-B/G-16C | Clay | 201.83 | 7.80 | 10.80 | 194.03 | 191.03 | 199.94 | NA | 200.11 | NA | 198.33 | NA | 198.19 | NA | 198.50 | NA |
| **Surrounding TIA** | | | | | | | | | | | | | | | | |
| BH18-B-11 | Sand | 210.16 | 0.80 | 2.80 | 209.36 | 207.36 | 210.15 | NA | 210.19 | NA | 210.00 | NA | 210.10 | NA | 209.16 | NA |
| BH18-B/G-14 | Silty clay / Gravel | 197.57 | 5.80 | 8.80 | 191.77 | 188.77 | 198.20 | NA | 198.03 | NA | 198.07 | NA | 197.95 | NA | 197.77 | NA |
| BH18-B/G-18 | Sand / Clay | 202.18 | 0.80 | 3.80 | 201.38 | 198.38 | 201.98 | NA | 202.02 | NA | 201.96 | NA | 201.80 | NA | 200.71 | NA |
| BH19-B/G-12 | Sand / Clay | 197.84 | 1.30 | 2.80 | 196.54 | 195.04 | 197.40 | NA | 197.38 | NA | 197.46 | NA | 197.18 | NA | 197.14 | NA |
| BH19-B/G-15 | Sand / Clay | 206.64 | 1.90 | 3.40 | 204.74 | 203.24 | 204.52 | NA | 204.57 | NA | 204.63 | NA | 204.50 | NA | 204.08 | NA |
| BH19-B/G-17 | Sand / Gravel / Clay | 195.11 | 1.40 | 2.90 | 193.71 | 192.21 | 194.06 | NA | 194.07 | NA | 194.39 | NA | 194.05 | NA | 193.72 | NA |
| BH19-B/G-36 | Sand / Clayey Sand | 198.53 | 1.90 | 3.40 | 196.63 | 195.13 | 197.18 | NA | 197.17 | NA | NM | NA | 197.19 | NA | 197.03 | NA |
| BH19-B/G-41 | Sandy clay / Sand | 207.75 | 1.40 | 2.90 | 206.35 | 204.85 | 207.47 | NA | 207.41 | NA | 207.66 | NA | 207.23 | NA | 206.59 | NA |
| BH19-B/G-42 | Clay | 211.93 | 2.00 | 3.60 | 209.93 | 208.33 | 212.17 | NA | 212.10 | NA | 211.75 | NA | 211.98 | NA | 210.44 | NA |

Notes:

- NM – Not Measured
- NA – Not Applicable

#### 2.2.2.2 Groundwater Zinc Concentrations

Groundwater quality data has been collected in various seasons over the past six years. The 18 sitewide monitoring wells were installed during two drilling campaigns in 2018 and 2019. As of 2023 there have been two spring, two summer, and five fall sampling events completed on the groundwater monitoring network (Table 2-6).

**Table 2-6 Summary of Groundwater Sampling Campaigns**

| Year | Spring | Summer | Fall |
|---|---|---|---|
| **2018** | N/A | N/A | Sampled 11 wells (one well was dry) |
| **2019** | Sampled 10 wells (2 wells were dry) | No Sampling Planned | Installed 6 wells. Sampled 16 wells (2 wells were dry) |
| **2020** | No Sampling due to COVID-19 travel restrictions | Sampled 16 wells[a] (2 wells were dry) | Sampled 17 wells (1 well was dry) |
| **2021** | No Sampling due to COVID-19 travel restrictions | Sampled 17 wells[a] (1 well was dry) | Sampled 17 wells (1 well was dry) |
| **2022** | Sampled 12 wells (2 wells were dry and 3 wells were inaccessible) | No Sampling Planned | No Sampling Planned |
| **2023** | No sampling due to wildfire evacuations | No Sampling Planned | Sampled 16 wells (2 wells were dry) |

(a) Sampling completed during the summer in lieu of the planned spring event due to COVID-19 travel restrictions

Groundwater sampling is being completed to provide a current baseline of environmental conditions and to inform groundwater quality monitoring targets (i.e., criteria) should they be needed for post-reclamation monitoring once the long-term closure approach is determined. In the absence of CCME groundwater guidelines (currently under development), the Federal Interim Groundwater Quality Guidelines have been conservatively applied as comparative criteria for groundwater analytical data collected at the site.

Groundwater samples were collected from wells screened in upper tailings, saturated tailings (tailings base), and beneath the tailings. Dissolved zinc concentrations in the nested wells are presented in Table 2-7, and compared to the Federal Interim Groundwater Quality Guidelines. Dissolved zinc concentrations are higher in pore water in saturated tailings and decreased with depth into native soils. Zinc concentrations were similar in 2023 to concentrations measured in previous sample events. The trend and magnitude of concentration change with depth was also similar in 2023 when compared with previous years, indicating that tailings pore water concentrations are continuing to decrease with depth beneath the tailings, and the impacts associated with the tailings are primarily limited to the tailings porewater. Few, infrequent exceedances have been identified beneath the tailings (groundwater within the native soil); however, results from the last three sampling events have been below applicable guidelines, and during the latest sampling event in October 2023, two of the three groundwater samples collected within the native soil (beneath the tailings) (BH18-B/G-13C and BH18-B/G-16C) were below detection limits.

Groundwater wells BH18-B/G-11 and BH19-B/G-41 are located upgradient of the tailings and outside of the apparent contact water run-off extent and therefore can be considered representative of water quality flowing into the site. Dissolved zinc concentrations for these wells ranged from approximately <0.003 to 0.0275mg/L (Table 2-8) and met applicable guidelines for all samples collected from 2018 and 2023. Concentrations from samples collected from groundwater wells located downgradient and adjacent to the tailings are also presented in Table 2-8.

Concentrations exceeding applicable guidelines were observed in two wells located along the western dyke of the TIA (BH19-B/G-15, BH19-B/G-17), and one local upgradient well (BH19-B/G-42). The highest concentrations were observed in the well located in the southwest corner of the TIA along the western dyke (BH19-B/G-15 concentrations range between 0.079 and 0.3 mg/L). Dissolved zinc concentrations in the remaining wells ranged from <0.003 to 0.079 mg/L. The data collected to date suggest that the impact from tailings to groundwater is localized to the tailings area and that concentrations decline rapidly immediately laterally and vertically from the tailings source.

**Table 2-7 Dissolved Zinc Concentrations within Nested Wells in the TIA**

| Borehole ID | Dissolved Zinc (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Sampling Period | | | | | | | | | |
| | Federal Interim Groundwater Quality Guideline | Oct 2018 | May 2019 | Oct 2019 | Jul 2020 | Sep 2020 | Jul 2021 | Sep 2021 | May 2022 | October 2023 |
| **Upper Tailings** | | | | | | | | | | |
| BH18 – B/G – 10A | 0.03 | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry | Dry |
| BH18 – B/G – 13A | 0.03 | **1.64** | **1.10** | **13.0** | **1.50** | **14.0** | **1.80** | **5.80** | NM | **1.20** |
| BH18 – B/G – 16A | 0.03 | **5.05** | Dry | Dry | Dry | **17.0** | **13.0** | **14.0** | Dry | Dry |
| **Tailings Base** | | | | | | | | | | |
| BH18 – B/G – 10B | 0.03 | **6.55** | **9.10** | **9.30** | **9.70** | **9.30** | **9.20** | **8.60** | **8.25** | **8.40** |
| BH18 – B/G – 13B | 0.03 | **0.619** | **0.42** | **0.069** | **0.27** | **0.17** | **0.28** | **0.26** | NM | **0.28** |
| BH18 – B/G – 16B | 0.03 | **2.26** | **3.60** | **0.73** | **1.70** | **1.40** | **1.40** | **0.42** | **1.40** | **1.50** |
| **Native Material** | | | | | | | | | | |
| BH18 – B/G – 10C | 0.03 | **0.179** | 0.028 | **0.062** | 0.0091 | 0.0076 | 0.013 | 0.0085 | < 0.0015 | 0.012 |
| BH18 – B/G – 13C | 0.03 | **0.0409** | 0.0096 | **0.15** | 0.0092 | 0.0054 | < 0.0015 | 0.0033 | NM | < 0.0030 |
| BH18 – B/G – 16C | 0.03 | **0.0581** | 0.012 | 0.0084 | 0.014 | 0.0092 | **0.064** | 0.024 | 0.027 | < 0.0030 |

Notes:

- NM – Not Measured due to weather conditions that made wells inaccessible.
- Federal Interim Groundwater Quality Guideline for all land uses with fine-or coarse-grained soil, Protection of Freshwater Aquatic Life.

Legacy Properties / Teck

**Table 2-8 Dissolved Zinc Concentrations Upgradient and Downgradient of Tailings**

| Borehole ID | Dissolved Zinc Concentration (mg/L) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Federal Interim Groundwater Quality Guideline | Oct-18 | May-19 | Oct-19 | Jul-20 | Sep-20 | Jul-21 | Sep-21 | May-22 | Oct 23 |
| **Downgradient** | | | | | | | | | | |
| BH19-B/G-12 | 0.03 | NA | NA | 0.026 | 0.026 | 0.028 | 0.025 | 0.029 | 0.027 | 0.014 |
| BH18-B/G-14 | 0.03 | 0.0037 | < 0.0030 | < 0.0030 | < 0.0030 | < 0.0030 | < 0.0030 | <0.0030 | < 0.0030 | < 0.0030 |
| BH19-B/G-15 | 0.03 | NA | NA | **0.079** | **0.3** | **0.18** | **0.18** | **0.11** | **0.16** | **0.11** |
| BH19-B/G-17 | 0.03 | NA | NA | **0.041** | **0.049** | **0.052** | **0.049** | **0.057** | **0.044** | **0.038** |
| BH18-B/G-18 | 0.03 | 0.022 | 0.0031 | < 0.0030 | < 0.0030 | < 0.0030 | 0.0035 | 0.0034 | < 0.0030 | < 0.0030 |
| BH19-B/G-36 | 0.03 | NA | NA | 0.011 | 0.017 | 0.011 | 0.0088 | 0.017 | NA | 0.019 |
| BH19-B/G-42 | 0.03 | NA | NA | **0.04** | **0.048** | **0.042** | 0.021 | **0.045** | NA | **0.079** |
| **Upgradient** | | | | | | | | | | |
| BH18-B/G-11 | 0.03 | 0.0275 | 0.01 | 0.0094 | 0.0068 | 0.0095 | 0.0036 | 0.008 | 0.0033 | 0.0038 |
| BH19-B/G-41 | 0.03 | NA | NA | 0.0092 | 0.0037 | 0.0094 | <0.0030 | <0.0030 | < 0.0030 | < 0.0030 |

Notes:

- NA = Not analyzed
- Federal Interim Groundwater Quality Guideline for all land uses with fine-or coarse-grained soil, Protection of Freshwater Aquatic Life.

## 2.3 Hydrology and Water Balance Evaluation

A water balance evaluation using the software GoldSim continued in 2023, building off the previous work described in the 2022 annual report. No significant modifications were made to the water balance model. Ice coring was completed monthly at the Main Pond between January and March 2023 by Maskwa to further calibrate and validate the ice formation component of the model that was added in 2021. Snowpack observations were made in late January, late February, and late March, with the average snowpack over the TIA reaching over 13 cm of snow-water equivalent (SWE) in early April.

The model was used to forecast Main Pond peak water levels during freshet based on observed snowpack development. Model forecasts were provided in mid-February, mid-March, early and mid-April. The evolution of the peak pond level forecast is provided in Figure 2-11.

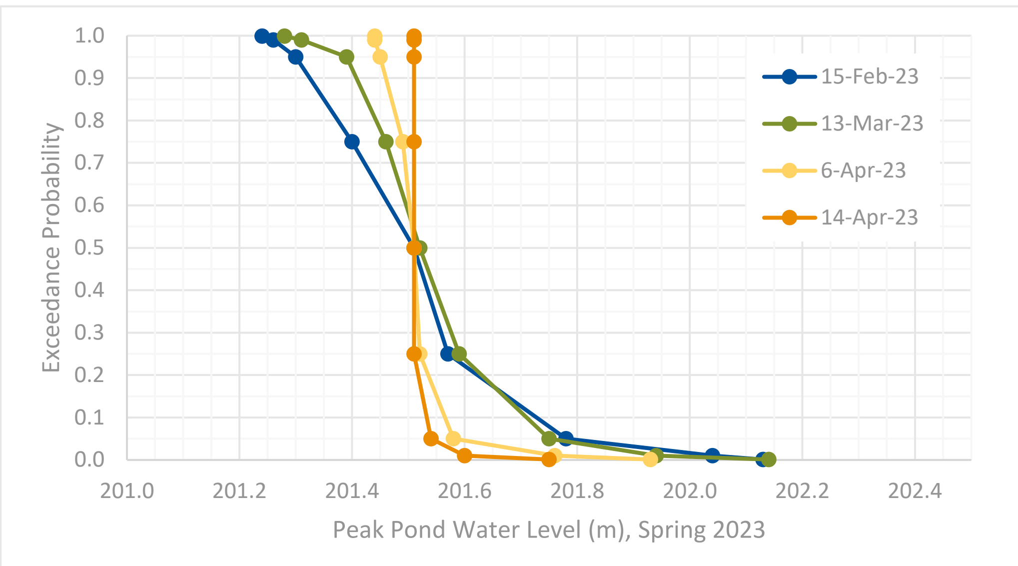
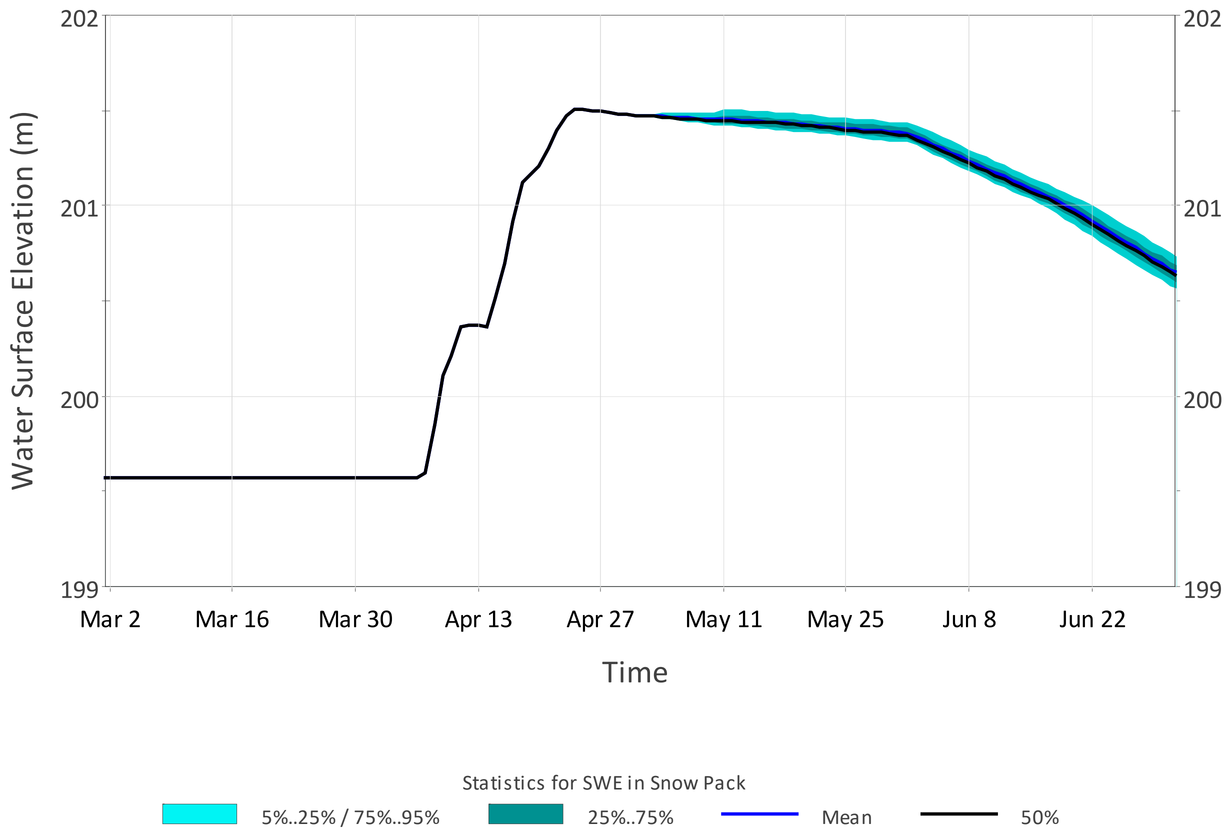



**Figure 2-11 Evolution of the Peak Pond Level Forecast from February through April**

The April 14th modelling forecast, incorporating late March snowpack data and the 14-day weather forecast, predicted the water level to remain below 201.9 m (the trigger level for requiring site presence), shown below in Figure 2-12. Model forecasting was used to inform monitoring and inspection plans, and the timing of the freshet in mid to late April in 2023.




Note: SWE stands for snow-water-equivalent

**Figure 2-12 Forecasted Peak Water Levels in the Main Pond Using the Water Balance Model on April 14, 2023**

Teck tracked water levels daily and provided trigger-action-response-plan (TARP) reports at various frequencies based on water levels and precipitation forecasts throughout the spring and summer. Figure 2-13 shows the model prediction of the Main Pond water level (blue dotted line) from mid-April through the end of May. The pond level observations from Teck are incorporated as small black crosses and are approximately 0.3 m below the forecasted peak. Overall, the model overestimated the actual water level in the Main Pond (and therefore was conservative) in 2023 due to unique freezing and melting cycles and limited precipitation in April. The unique freezing and melting cycles in April caused the melt to start and stop repetitively over the course of a few weeks. In 2021 and 2022, it was estimated that 100% of the freshet runoff would contribute to the Main Pond and observations closely met the forecasts in those years; however, 2023 proved that certain freshet conditions will result in less runoff and higher infiltration. Updating the 2023 model to assume only 84% of the estimated runoff would contribute to the Main Pond matches the model to actual observations. This suggests 16% of the runoff was lost to infiltration in 2023.

Water treatment and discharge started in late July, as seen in the sharp water level decline in Figure 2-13. Teck reported daily discharge volumes, which are also incorporated in Figure 2-13.

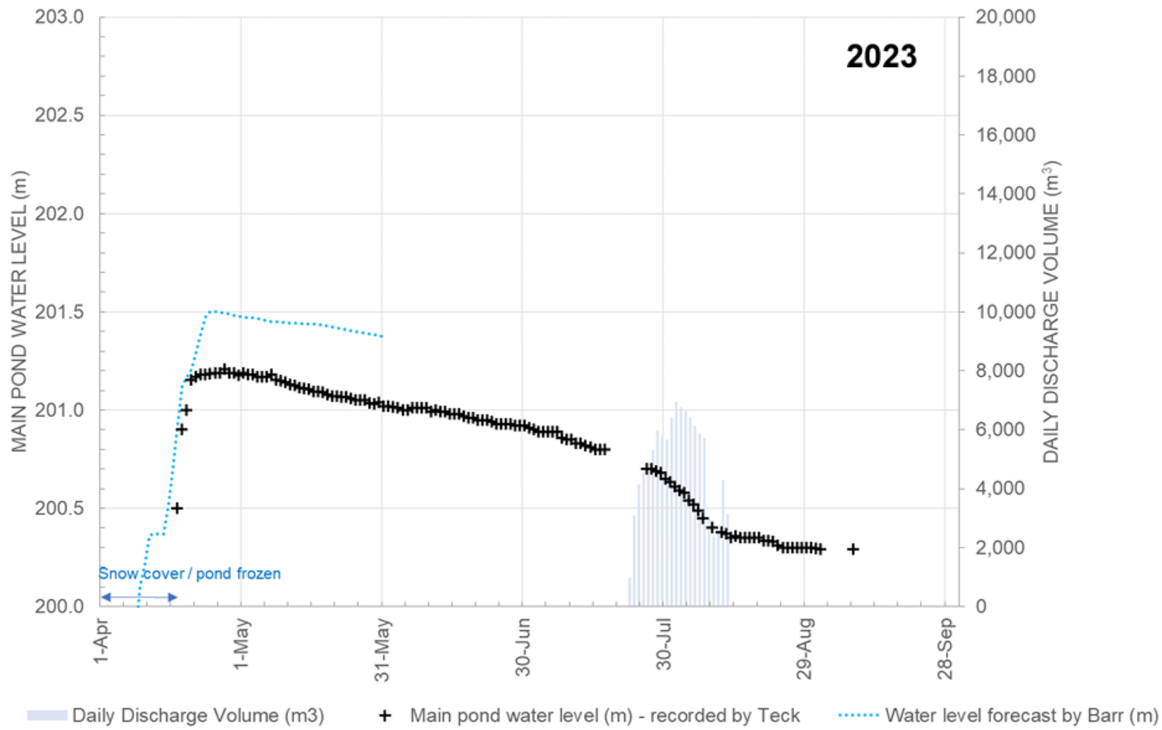



**Figure 2-13 Forecasted and Actual Water Levels in the Main Pond during the Summer of 2023**

### 2.3.1 Snow-Water Equivalent (SWE) Measurements

During the winter, a grid of snowpack monitoring stations was established (Figure 2-14). Each station has a staff gauge and camera. The cameras are set to periodically take pictures of the staff gauge, which is then used to track snow levels throughout the winter months. Snow coring was completed in January, February, and March to collect SWE measurements (Table 2-9). The snow depth and SWE measurements were used as input values in the water balance model to estimate Main Pond water levels during the spring melt.


**Figure 2-14 Snowpack Gauge Monitoring Locations**

**Table 2-9 2021 to 2023 Snowpack Gauge Monitoring Results within the TIA**

| Date | Snow-Water Equivalents (SWE) at Tailings Impoundment Area Gauge Locations (mm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | SPG 1 | SPG 2 | SPG 3 | SPG 4 | SPG 5 | SPG 6 | SPG 7 | SPG 8 | SPG 9 |
| Mar 31, 2023 | 173 | 103 | 117 | 140 | 134 | 133 | 97 | 130 | 110 |
| Feb 27, 2023 | 130 | 137 | 140 | 97 | 107 | 96 | 87 | 133 | 90 |
| Jan 29, 2023 | 100 | 70 | 73 | 97 | 100 | 73 | 53 | 83 | 63 |
| Mar. 30, 2022 | 160 | 153 | 143 | 127 | 163 | 160 | 133 | 130 | 127 |
| Feb. 26, 2022 | 123 | 173 | 120 | 106 | 117 | 130 | 127 | 127 | 133 |
| Jan. 29, 2022 | 103 | 100 | 97 | 80 | 103 | 93 | 100 | 100 | 93 |
| Mar. 23, 2021 | 183 | 140 | 183 | 143 | 147 | 147 | 123 | 170 | 194 |
| Feb. 21, 2021 | 143 | 133 | 150 | 163 | 130 | 137 | 130 | 173 | 127 |
| Jan. 26, 2021 | 204 | 130 | 161 | 146 | 123 | 118 | 153 | 126 | 133 |
| Dec. 22, 2020 | 106 | 93 | 100 | 93 | 107 | 77 | 80 | 83 | 103 |

A meteorological station on the north-central portion of the TIA (installed in 2018) is collecting precipitation, temperature, relative humidity, wind speed, wind direction, evaporation, and short-wave radiation measurements. The snowpack leading up to freshet in 2023 was approximately 130 mm, which is approximately 10% higher than the historical average (approximately 120 mm). The precipitation on site after freshet was low, particularly from May through August (approximately 10 mm in four months), causing the annual total to be less than half of the average. The precipitation on site in 2023 was estimated to be approximately 150 mm, while the annual average is over 300 mm (320 mm climate normal in Hay River). The dry summer contributed to a successful and short treatment season (Section 5.1). All other monitored climate data was similar to what is expected and did not have large deviations from typical values with the exception of temperature in January and May. January and May temperatures in 2023 were observed to be warmer than previous years. The average temperature in January 2023 was approximately -15 ˚C, compared to approximately -24 ˚C in previous years, and the average temperature in May 2023 was approximately 15 ˚C compared to approximately 7 ˚C in previous years.

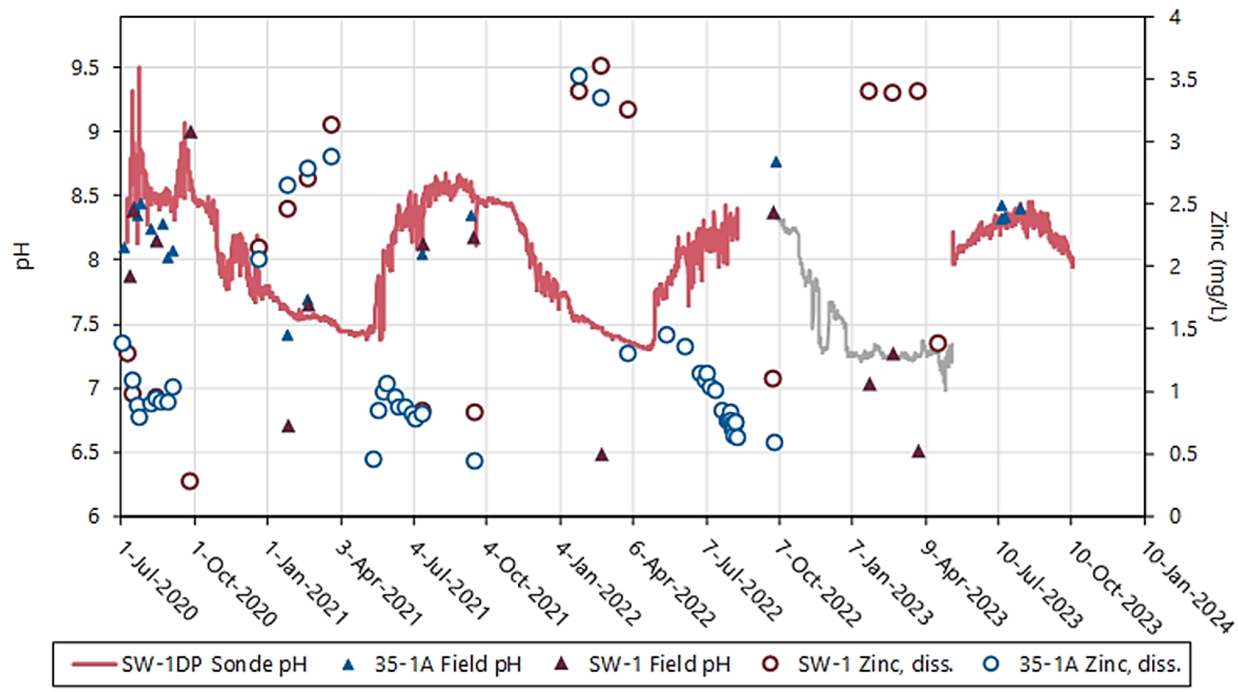
## 2.4 Water Quality Model Development

The water quality model developed in GoldSim using the contaminant transport module (CTM) was further advanced in 2023. The purpose of the water quality model is to forecast water quality changes in the Main Pond over time. Activities completed in 2023 to further refine the model included Main Pond water quality, laboratory column testing, and a drying and shake flask extraction laboratory study (Section 2.5). Main Pond water quality monitoring included periodic sampling and continuous field monitoring with use of a sonde as described in Section 2.1.3.

The conceptual model for the annual cycle of zinc within the Main Pond developed in 2021 and validated in 2022 and 2023, includes the following four general phases as described below and is illustrated in Figure 2-15.

1. Late Summer/Fall
   - pH responsive to Treatment Pond recirculation and surplus lime addition, as observed in July and August of 2020.
   - Dissolved zinc shows a declining trend during the summer months likely due to relatively high pH conditions and development of equilibrium with solid phases in the Main Pond.
2. Winter
   - Sharp pH decrease with onset of ice by approximately 0.5 pH units
   - pH continues to drop by about 1 pH unit through winter
   - Dissolved zinc concentration rises from approximately 1 mg/L to 3 mg/L, predominantly due to ice exclusion
3. Freshet/Early Spring
   - Zinc concentration diluted by ice melt and early freshet.
   - After ice-out, both zinc and pH begin to rise.
   - Zinc rises likely due to contribution from late freshet and equilibrium condition. Net concentration change depends on SWE and net run-off volume.
4. Late Spring/Early Summer
   - pH reaches approximate steady-state (pH 8.5), which is in equilibrium with atmospheric carbon dioxide
   - Zinc concentrations decline.

Water quality monitoring is on-going to confirm this annual cycle for zinc in the Main Pond. Ice cores were collected in winter 2022 confirming the assumption of ice exclusion as the primary mechanism contributing to elevated zinc concentrations in the remaining water phase over the winter period. The water quality collected in the winter of 2023 (shown in Figure 2-15) confirmed the conceptualized annual zinc cycle established in 2021.




Notes: 1. Data gap in pH between August 2022 and October 2022 is due to loss of battery power, 2. The data collected during the deployment period from October 2022 to May 2023 is shown in gray because of a suspected probe malfunction beginning in January 2023. The probe was cleaned and recalibrated in May 2023.

**Figure 2-15 Main Pond Seasonal Water Quality, Summer 2020 through Fall 2023**

The other significant work on the water quality model was the incorporation of the geochemical laboratory work in 2023, which is described in Section 2.5.

The CTM has been developed and calibrated in previous years as discussed in preceding annual reports. The CTM includes release rates from tailings and allows zinc mass to build up in shallow tailings during drying and freezing periods, and then be transported to the Main Pond with run-off derived from freshet and precipitation events.

In 2023, the CTM was reviewed, and some refinement was made to release rates following interpretation of the 2023 geochemical data, which is detailed further in Section 2.5. The implication of refinements to the release rates is that concentrations of zinc in the Main Pond are anticipated to be less than the EQC value of 0.5 mg/L during open water seasons toward the end of the century. Future CTM refinement will be considered as closure planning progresses.

## 2.5 Geochemical

### 2.5.1 Tailings Leachability Testing

Bench scale tests were conducted to provide information related to mass storage and mobility mechanisms from the shallow tailings in the TIA through testing for long-term zinc release as a function of leaching and the accumulation of zinc between storm events and after the winter drying cycle. The conceptual model for the site included weathering of tailings (through oxidation and leaching) that releases zinc which is then available for transport to the Main Pond via surface runoff and interflow through shallow tailings.

The 2023 testing program concluded the column leaching testing and characterization and the tailings oxidation/drying study that were initiated in 2022. The study results are described below.

#### 2.5.1.1 Column Study

The column study was designed with materials and methods to simulate those used in the 1990 study (Gardiner, 1990; McKay and Gardiner, 1992), and consisted of duplicate columns for fine and coarse tailings. To complete the column study, five kilograms (kg) of sample were placed within the column at a specified depth, and the leaching solution (deionized water) was recirculated through the column at a specific rate for seven days. After seven days, the water was drained from the columns and analyzed for major ion chemistry and leached metals. The columns were then allowed to rest for seven days before recirculation began again. Sixteen rest-leach cycles were conducted, followed by a seven-month extended rest period, with five additional rest-leach cycles completed after the rest period.

The results of the column study indicated that the cumulative zinc mass leached during the experiment decreased from 1990 to 2022: 50 percent less from the coarse tailings, and 38 percent less from the fine tailings. Slightly greater zinc mass was leached from the fine tailings than from the coarse tailings (Figure 2-16). This indicates that the bulk leachability for both the coarse and fine tailings have decreased over time.

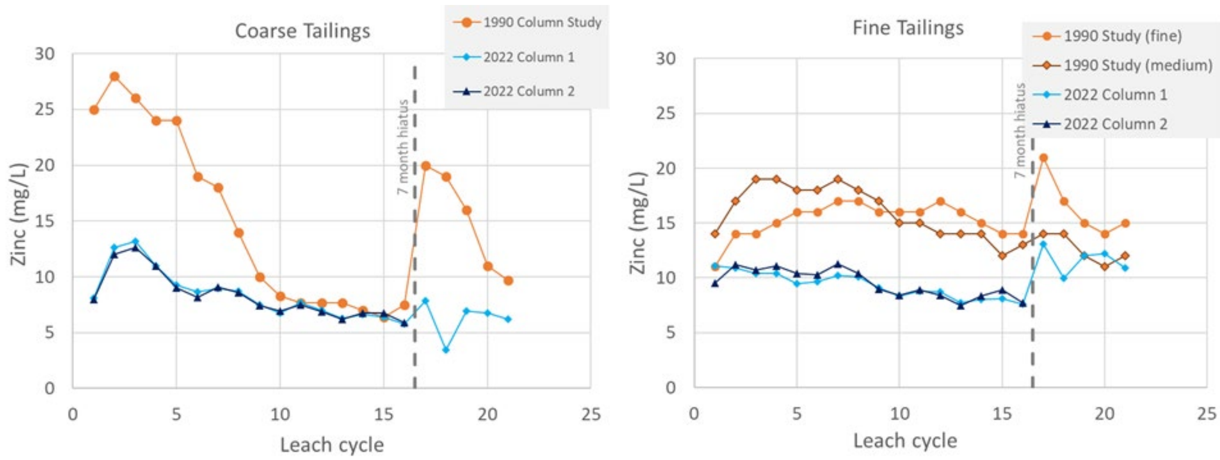



**Figure 2-16 Results from 2022/2023 and 1990 Column Study (McKay and Gardiner, 1992)**

Following the first 16 rest-leach cycles, the tailings leached during the column study were characterized using x-ray diffraction (XRD) and scanning electron microscope (SEM) to identify the presence, composition, and habit of secondary mineral precipitates. Many secondary zinc-containing carbonate/hydroxy minerals were identified by XRD. The SEM images along with elemental analysis from energy dispersive x-ray spectroscopy (EDS) showed coatings of these secondary oxidation products on sphalerite and pyrite, which act to decrease the sulphide oxidation rate (and corresponding release of zinc and acidity) over time (Figure 2-17). A sequential extraction of the leached tailings indicated that most of the zinc (65 to 70%) was associated with the carbonate fraction for both coarse and fine tailings. Less than 10% zinc was bound to iron and manganese oxides, and approximately 15 to 20% of the zinc remained in the residue, mostly as sulphides, silicates and unreacted carbonates.

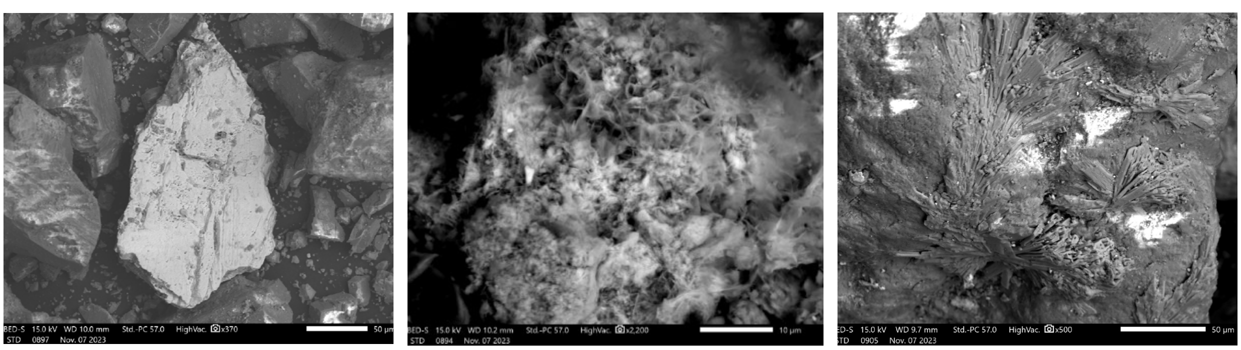


**Figure 2-17 SEM Images Showing (left to right): pitted sphalerite, acicular oxidation products, and platy gypsum**

#### 2.5.1.2 Drying Study

For the drying study, six individual samples (three fine tailings and three coarse tailings, each tested in triplicate) were divided into four subsamples to be analyzed after drying periods of 40 hours, 300 hours, 1,600 hours, and 4,000 hours. All samples underwent an initial shake flask extraction (SFE) using the 3:1 MEND methodology (Price, 2009) and the leachate (deionized water) was analyzed for environmental parameters, major ions, and select dissolved metals. Once the drying times were attained, the samples were subject to another SFE, and the leachate was analyzed for the same parameters.

The results of the drying study suggest that fine tailings accumulate more than twice the amount of zinc as coarse tailings, likely due to the increased surface area associated with fine tailings. The analysis of the triplicate samples with the 1:3 water:solid ratio for the drying times 40, 100 and 400 hours showed little variability, ranging from 1.18 to 1.65 mg/L zinc in the coarse tailings and from 3.6 to 4 mg/L in the fine tailings. Analysis with the PHREEQC modelling software showed that the equilibrium conditions in the SFE were consistent with the column leach tests and were near equilibrium with respect to calcite and gypsum and near quasi-equilibrium with hydrozincite. The concentrations of zinc and other constituents in the 4,000-hour tests with water:solid ratios of 4:1, 10:1, and 20:1 were less than what was dissolved in the 40, 400, 1,600 hour tests. The lower concentrations did not achieve quasi-equilibrium conditions with hydrozincite because of the high dilution factors in the 4,000-hour test.

Converting the concentrations in the extractants to mass per kg of tailings results are shown in Figure 2-18. These data suggest that except for very high water:tailings ratios, the concentration of zinc in water interacting with tailings is determined by solubility with secondary minerals, not the amount of drying time associated with the tailings.

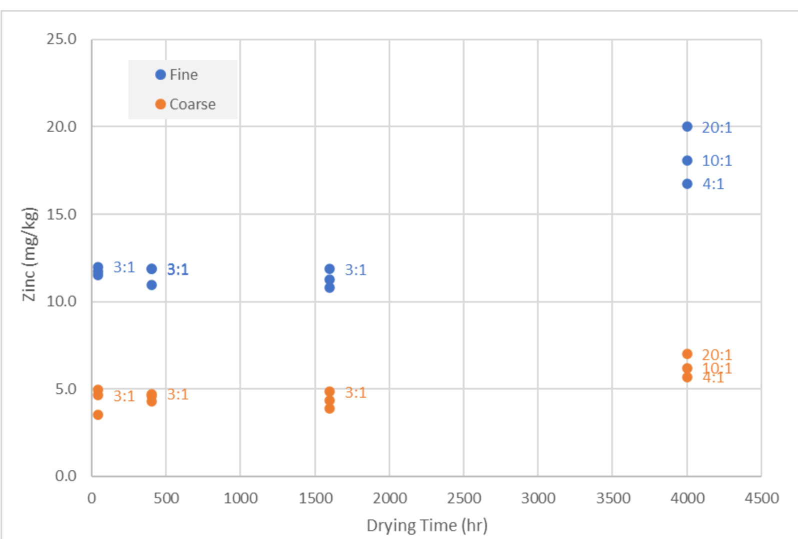



**Figure 2-18 Zinc Concentrations in SFE Extracts**

#### 2.5.1.3 Anticipated Modifications to Conceptual Model and Numerical Model

The tailings investigation data provide a way to directly compare the bulk leaching behaviour of tailings in 1990 with that of tailings having undergone more than 30 years of weathering. These data suggest that the leachability of zinc has decreased in bulk for both coarse and fine tailings, and that the steady-state release rate of zinc may be controlled by pH. The studies suggest that:

- most of the zinc in shallow tailings is stored in carbonate/hydroxide secondary phases and that the mass of zinc released into water contacting the shallow tailings is determined by the pH-dependent solubility of the secondary phases rather than a rate-controlled release of zinc via oxidation of sphalerite; and
- the mineral hydrozincite ($Zn(OH)_{1.2}(CO_3)_{0.4}$) is a reasonable thermodynamic proxy for the carbonate/hydroxide secondary phases that control the zinc solubility. Because the hydrogen ion is involved in the equation of precipitation and dissolution of hydrozincite, the equilibrium zinc concentration is related to changes in pH. As pH in the contact water increases, the aqueous zinc concentration decreases. As less acidity is released over time, the long-term control on zinc concentrations becomes the pH resulting from carbonate minerals in equilibrium with atmospheric carbon dioxide.

The site conceptual model and contaminant transport model (CTM) can both be updated to include these findings. The CTM, as currently configured, uses a calculated zinc release rate (zinc mass per kilogram of tailings per week) determined by short-term leaching characteristics. The CTM will be modified to reflect the updated conceptual model of a solubility-controlled release to aid in water quality evaluations and forecasting.

### 2.5.2 Treatment Pond Lime Sludge Sampling

Samples of lime sludge were collected from the Treatment Pond on November 1, 2023 using a push corer. The lime sludge cores were collected from three locations along the length of the first channel of the Treatment Pond. Based on observations of lime sludge depth in 2022, most of the lime sludge accumulates within the first channel of the Treatment Pond. The sludge core samples were collected to evaluate the depth of sludge accumulation and to analyze the geochemical and physical properties of the lime sludge, including moisture content, bulk density and specific gravity, particle size distribution, paste pH, acid neutralization capacity, total metals by four-acid digestion, x-ray diffraction, and scanning electron microscopy with energy dispersive spectroscopy.

An example sludge core is provided in Figure 2-19, showing approximately 4.5 cm of accumulated lime sludge (i.e., the white material overlying the gray/brown sediments). Of the samples collected from the three locations, samples from one of the three locations were submitted for the analyses listed above. Samples from the other two locations were not submitted for analysis due to minimal sludge retrieval. Complete analytical results have not yet been received.

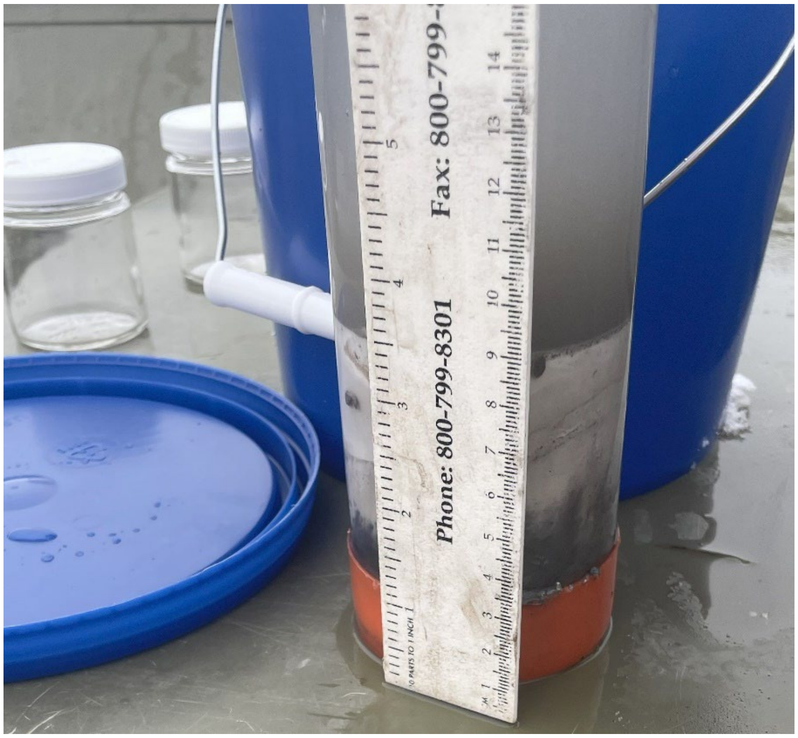


**Figure 2-19 Example Lime Sludge Core from 2023 Sampling**

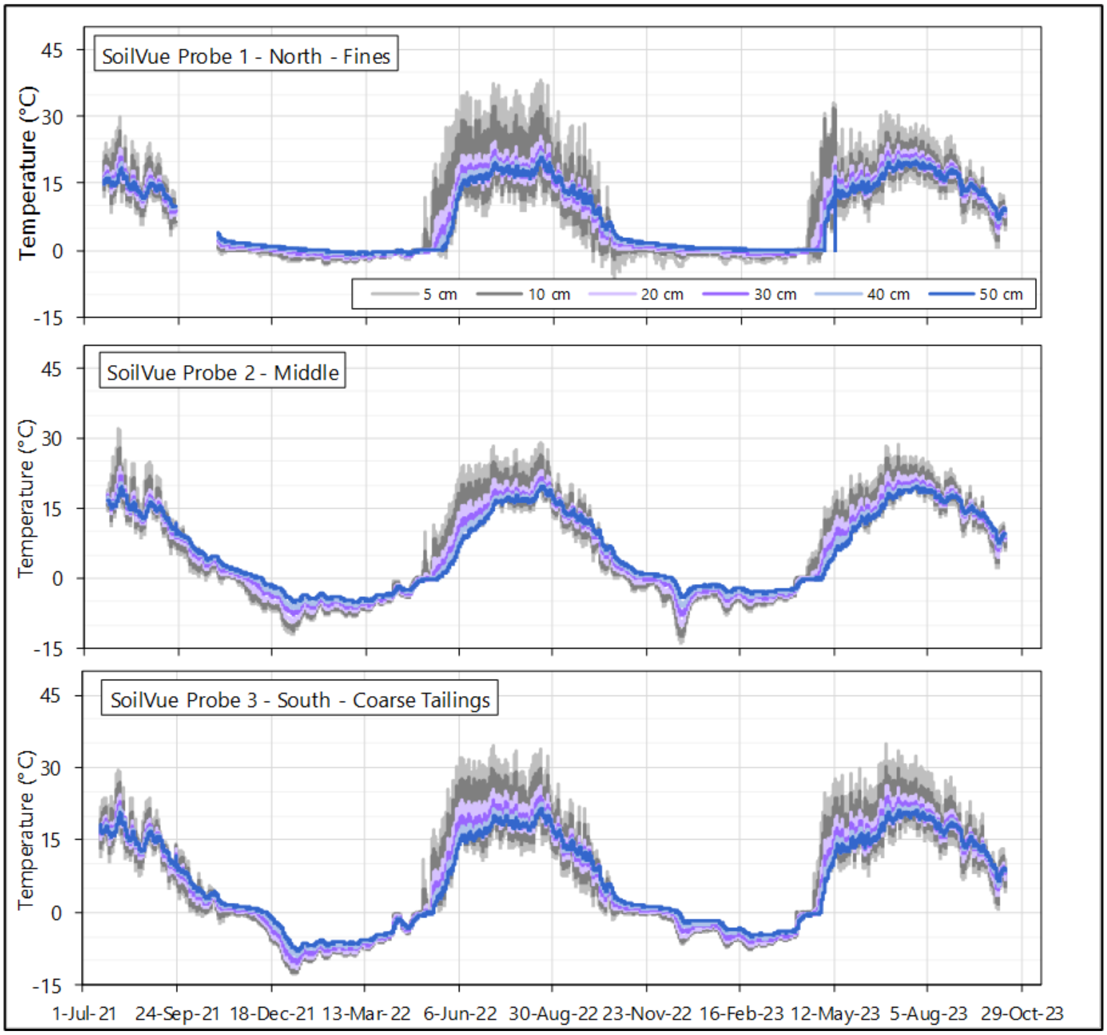
### 2.5.3 SoilVue Probes

Three SoilVue probes were positioned along a north to south transect across the TIA over the 2022/2023 winter season to monitor water infiltration during freshet and throughout the summer months. Probe 1 was installed near BH18-B/G-13 (north), probe 2 was installed at the midpoint of the transect, and probe 3 was installed near BH18-B/G-10 (south). The probes were connected to dataloggers to record sensor temperature, bulk electrical conductivity (EC), volumetric water content, and permittivity every 10-minutes at 5-cm, 10-cm, 20-cm, 30-cm, 40-cm, and 50-cm measurement depths.

The following SoilVue probe maintenance tasks were completed during the spring, summer, and fall: (1) the data was downloaded and reviewed in the field to confirm that the probe was installed correctly, and (2) the condition of the SoilVue probes, solar panels, data loggers, batteries, cables, and insulated coolers were checked. During the spring event, Probe 1 was identified to have heaved and was situated above ground level. The probe was removed, inspected and then re-installed in the same location. The batteries, which were last replaced in September 2021, were in good condition in fall 2023, therefore they were not replaced. The

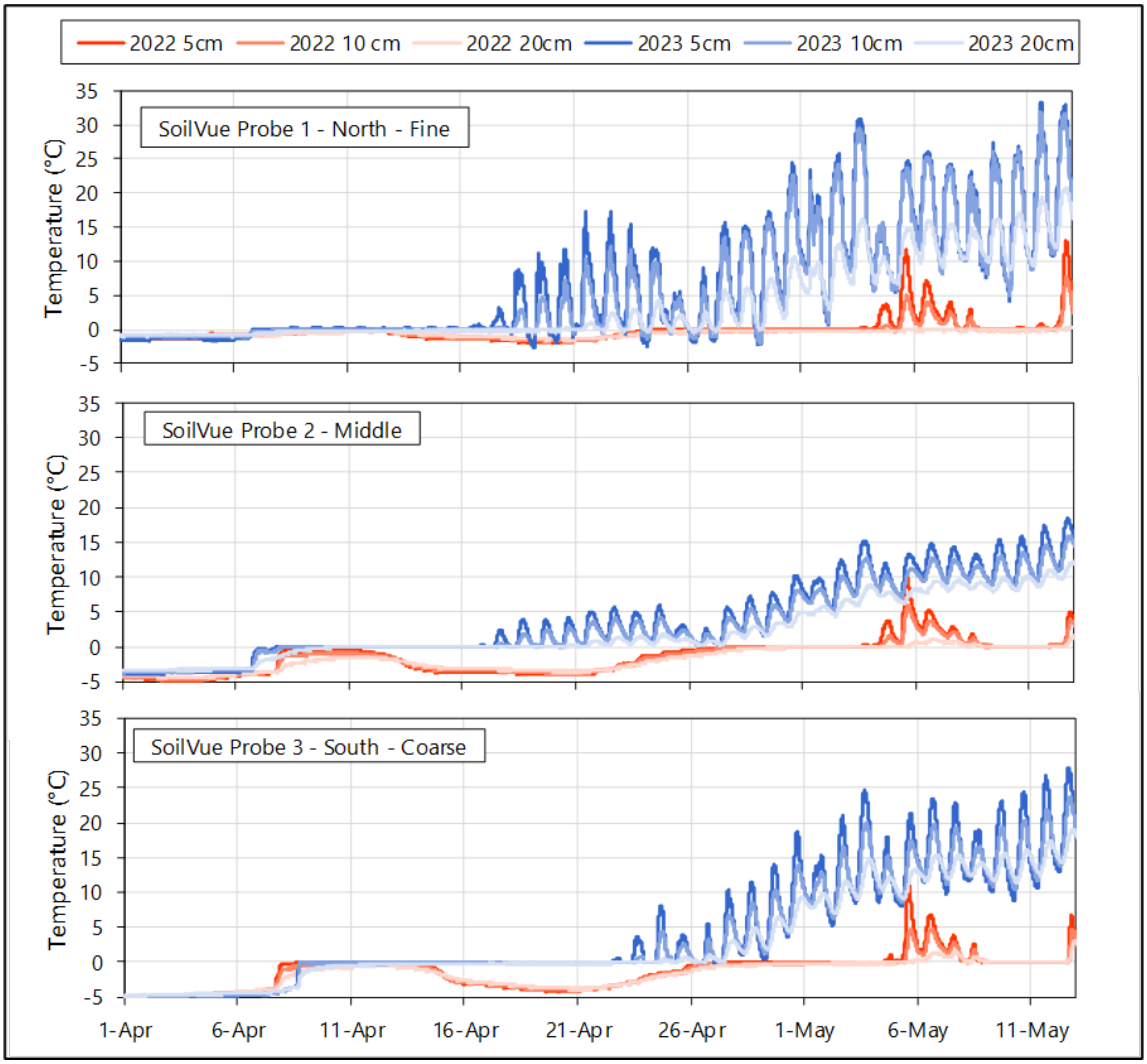
SoilVue probes were left installed for the 2023/2024 winter to collect another spring freshet dataset.

Tailings temperature and volumetric moisture content recorded by the three SoilVue probes are shown in Figure 2-20 and Figure 2-22, respectively. The three probes were deployed from mid-July 2021 through mid-October 2023 with the intent of capturing the changes in tailings temperature and moisture with depth during spring thawing and freshet from April through mid-May. The goal was to gather data to understand the thawing of the surface tailings and how the timing of thawing with depth may influence the depth to which the snowmelt interacts with surface tailings. The data shows that at the beginning of freshet, the tailings were consistently frozen down to approximately 20 cm. Towards the end of freshet, cyclic freezing and thawing temperatures in the surface tailings were observed. Further to the information presented in Section 2.3, this trend suggests that unlike in previous years, some of the snowmelt was able to penetrate below this 20 cm depth and infiltrate further into the tailings, resulting in less interflow through shallow tailings.



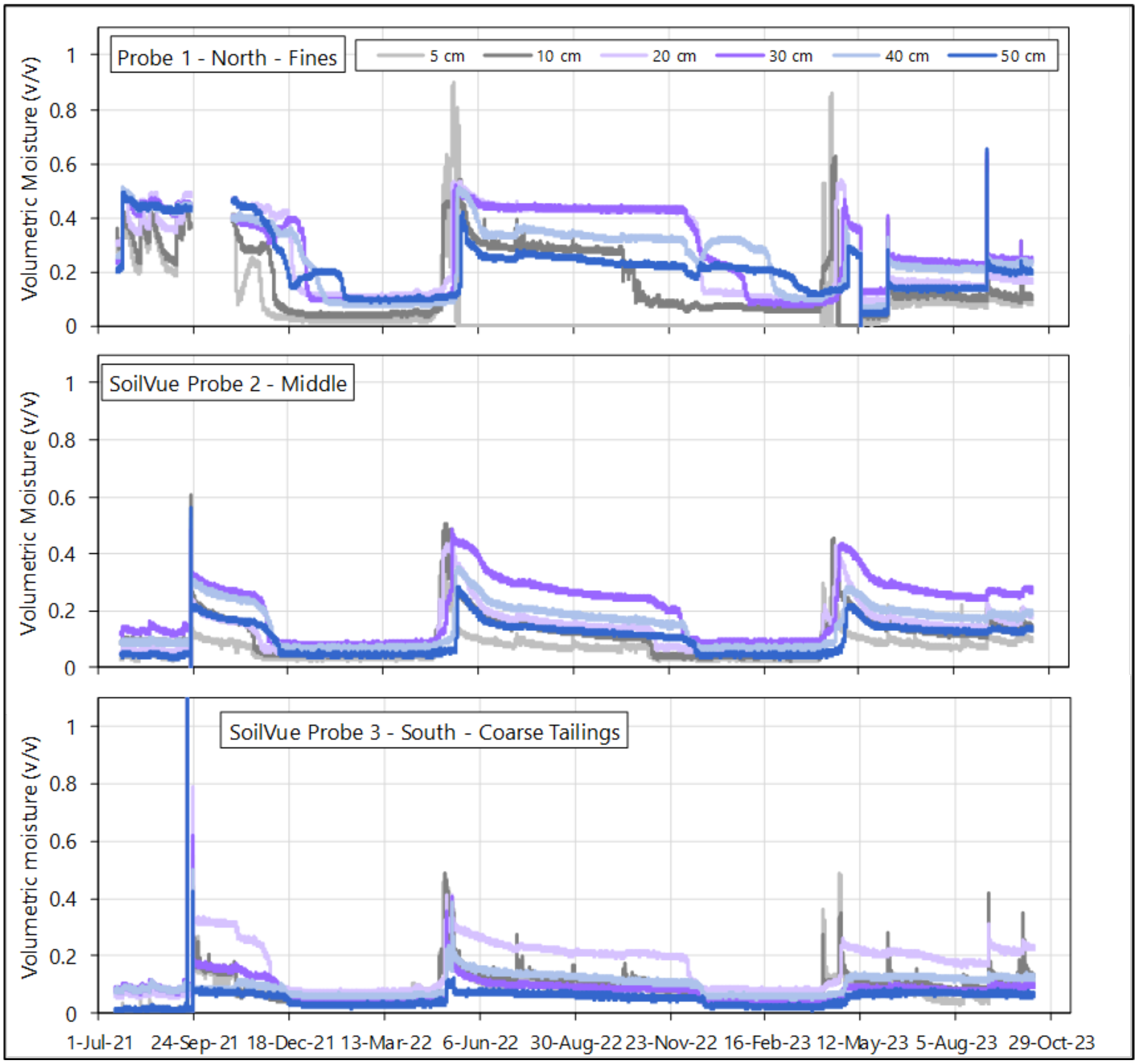

Date=D-M-Y; Probe 1=installed near BH18-B/G-13 (fine tailings; north); Probe 2=installed at the midpoint of the transect (central); Probe 3=installed near BH18-B/G-10 (coarse tailings; south). The data gap between September 21, 2021 and October 29, 2021 for Probe 1 is due to an instrument malfunction; no data were recorded over this period.

**Figure 2-20 Temperature of the Tailings Recorded by the Three SoilVue Probes from July 2021 to October 2023**




Probe 1=installed near BH18-B/G-13 (fine tailings; north); Probe 2=installed at the midpoint of the transect (central); Probe 3=installed near BH18-B/G-10 (coarse tailings; south).

**Figure 2-21 Temperature of the Tailings Recorded by the Three SoilVue Probes during Freshet from April to Mid-May in 2022 and 2023**




Date=D-M-Y; Probe 1=installed near BH18-B/G-13 (fine tailings; north); Probe 2=installed at the midpoint of the transect (central); Probe 3=installed near BH18-B/G-10 (coarse tailings; south). The data gap between September 21, 2021 and October 29, 2021 for Probe 1 is due to an instrument malfunction; no data were recorded over this period.

**Figure 2-22 Volumetric Moisture of the Tailings Recorded from the Three SoilVue Probes from July 2021 to October 2023**

## 2.6 Peat Attenuation Study

In 2023, a desktop study was initiated to evaluate the potential for organic-rich soils below the tailings to attenuate zinc from the porewater that seeps from the tailings to the groundwater. The study will include a literature review, review of available site data, estimations of zinc loading into the subsurface, and estimations of mass retention in organic-rich and native mineral soil layers. Information gathered from the study to date was used to refine the conceptual site model

(CSM) (Figure 2-23) and will be used to conduct preliminary forecasting for the attenuation capacity in the organic rich soils.

### 2.6.1 Conceptual Site Model (CSM) Refinement

The CSM, presented in Figure 2-23, considered characteristics of the organic-rich and native mineral soil layers, influx of groundwater from off-site sources, tailings seepage and the water quality underlying the tailings, which are detailed further in Sections 2.6.1.1 through 2.6.1.4.

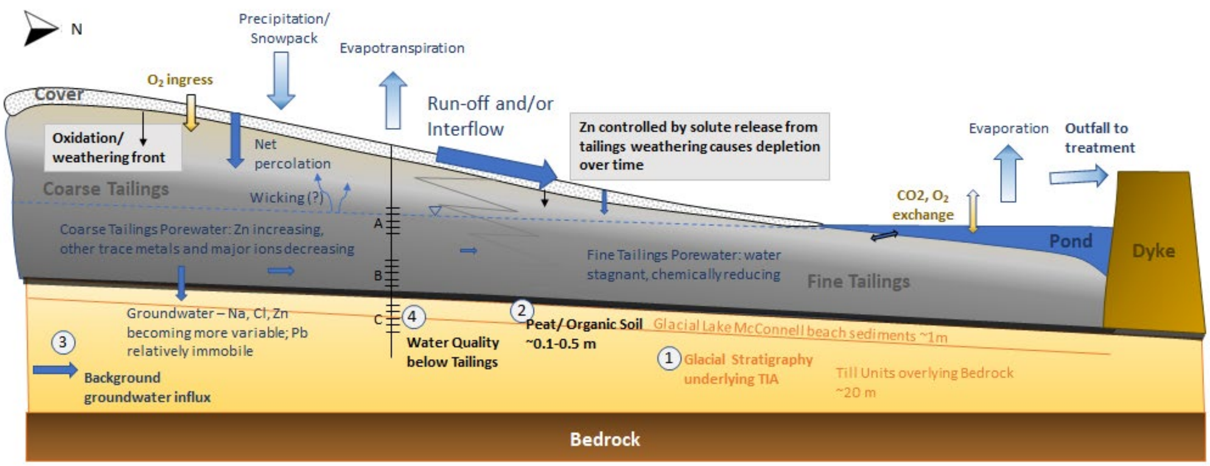



**Figure 2-23 Conceptual Site Model of the TIA**

#### 2.6.1.1 Literature Review

A search was conducted through publicly available documents to identify case studies that included zinc attenuation in organic-rich soils. Six case studies were reviewed in detail, including the *Anvil Range Mining Complex: Rose Creek Tailings Deposit Assessment of Zinc Attenuation* (2006) that was prepared by SRK for the Faro Mine Closure Planning Office. Mechanisms for natural attenuation of zinc along a groundwater or surface water flow path have been found to include formation of zinc sulphide minerals, carbonate mineral precipitation, and adsorption and cation exchange onto organic matter, oxyhydroxide minerals or clay minerals. The effectiveness of each mechanism is determined by the environmental variables of pH, ORP, organic carbon content, and concentrations of other constituents such as iron and alkalinity. Multiple mechanisms for attenuation may occur concurrently. None of the studies are completely analogous to the conditions beneath the Pine Point TIA, but based upon the analysis of groundwater sampled from wells completed in the units below the TIA, the conditions are more anoxic than generally represented in the literature studies. The site data suggests that attenuation mechanisms for zinc likely include 1) formation of zinc sulphide minerals and 2) adsorption and/or cation exchange onto organic matter in the organic-rich soil layer underlying the tailings.

#### 2.6.1.2 Native Organic-Rich and Mineral Soil

Available data was reviewed to identify that the majority of the tailings pile area is underlain by at least 0.1 m of organic-rich soil (average of 36.2% organic carbon, by weight) , which is then underlain by approximately 20 m of glacial deposits (native mineral soil) (Rice et al., 2013). Solid phase soil data indicated that sulphur and zinc concentrations are higher in the organic-rich soil layer underneath the tailings, compared to the organic-rich soil layer outside of the TIA. Additionally, minimal zinc appears to be migrating into the underlying native mineral soil within the footprint of the tailings pile. These observations suggest that sulphide formation and zinc attenuation are occurring in the organic-rich layer beneath the tailings.

#### 2.6.1.3 Porewater and Groundwater Quality

The native groundwater system of the region, assumed to be represented by well BH18-B/G-11, is dominated by calcium-bicarbonate type waters (Figure 2-24). Tailings porewater, represented by nested wells within the tailings footprint (BH18-B/G-10, BH18-B/G-10-13, and BH18-B/G-10-16) from the upper tailings (screened intervals “A”) and saturated tailings (from the screen intervals “B”) is dominated primarily by sulphate, calcium, and magnesium ions. Mixing between the native groundwater system and tailings porewater is evident beneath the tailings (screen intervals “C”), particularly in BH18-B/G-16C. Porewater and groundwater data also indicated that circumneutral pH conditions are present within the saturated tailings and beneath the tailings, suggesting that conditions to support adsorption of zinc to organic carbon are present within the organic-rich soil layer.

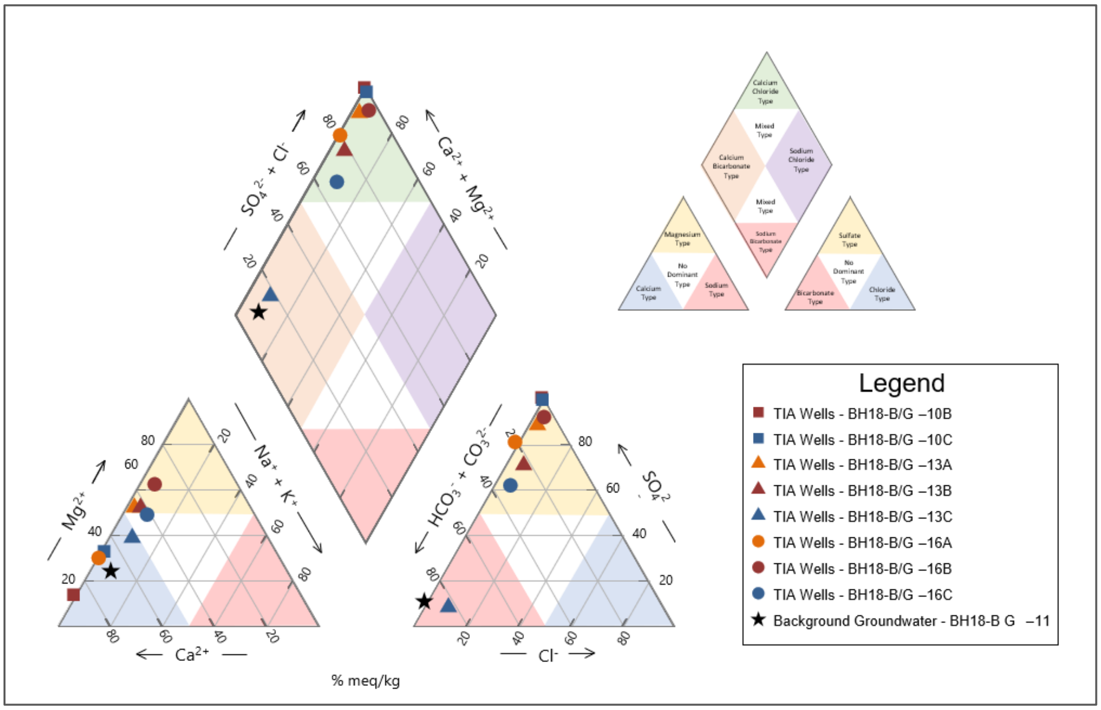



**Figure 2-24 Piper Plot of TIA Well Nest Groundwater Samples and Native Groundwater Data from BH18-B/G-11**

### 2.6.1.4 Anticipated Estimates of Zinc Attenuation

The next steps in the study will be to assess the relative magnitude of zinc reduction via (1) mixing with groundwater, and (2) attenuation by the organic-rich soil layer.

The dilution potential of groundwater mixing with the porewater seepage below the tailings will be assessed using an estimate of groundwater velocity in the direction of groundwater flow (southeast to northwest) in combination with an estimate of vertical seepage rate from the tailings to underlying groundwater. These estimates will be made using site data and the site water balance model. The dilution of seepage from the tailings by lateral groundwater flow will also be assessed by evaluating the change in chloride concentration between the lower tailings (which contain more chloride) and the underlying soil (which will contain less chloride if dominated by groundwater) by comparing water quality in the “B” and “C” wells within in each nested pair (BH18 B/G – 10B/10C, BH18 B/G – 13B/13C, and BH18 B/G – 16B/16C). The dilution factors for sulphate and zinc will be assessed in a similar manner, and will provide an indication of the potential magnitude of attenuation by the organic-rich soil layer when compared to the chloride dilution factors.

Estimates of attenuation capacity of the organic-rich soils underlying the tailings will be made for both mechanisms that appear to be attenuating zinc at the site: adsorption/cation exchange and sulphide precipitation.

Both of the hypothesized zinc attenuation mechanisms depend on the mass of organic carbon present. The mass of organic carbon within the organic rich soil layer has been estimated based on the average thickness of the organic-rich soil layer beneath the tailings (0.2 m – based on borings and test pits completed within the TIA), the total surface area of the tailings pile (540 hectares), the average percentage of organic carbon (by weight) in the organic-rich soil layer (36.2%), and the estimated dry bulk density for the organic-rich soil layer (200 $kg/m^3$). The average total mass of organic carbon in the organic-rich soil layer was estimated to be 78,000 tonnes.

The estimated carbon adsorption capacity will be calculated based on the average total mass of organic carbon in the organic-rich soil layer, the average rate of zinc adsorption to organic carbon, and the estimated total zinc flux from the tailings. The rate of zinc adsorption to organic carbon will be derived from zinc adsorption rates observed during bench tests conducted in the Rose Creek study (SRK, 2006).

The estimated capacity for the sulphide precipitation mechanism will be based on sulphate reduction via organic carbon oxidation, which stipulates that two moles of carbon are needed to produce one mole of sulphide. A single mole of sulphide and a single mole of zinc are needed to form the sulphide mineral ZnS. The calculations will be based on:

- The mass of organic carbon in the organic-rich soil layer;
- An assumption of the organic carbon that is bioavailable for organic carbon respiration/sulphate reduction;
- The ratio of sulphide allocated to zinc precipitation, based on the ratio of zinc to other metals in the tailings porewater that may also produce sulphides (nickel, copper, iron, and cadmium); and
- The total zinc flux from the tailings.

## 2.7 Dust Modelling

Dust modelling for the site was completed to inform closure planning, and in response to community concerns pertaining to dust with the following objectives:

- Determine whether current conditions could lead to visible dust generation;
- Estimate the extent of dust dispersion under current conditions;
- Compare dust emissions from the covered tailings and the exposed tailings on the east side of the TIA; and
- Estimate if tailings could have generated a visible dust plume before the cover was placed.

Initial screening was completed previously to determine one-hour worst case dust potential from uncovered tailings based on on-site meteorological data collected over the course of two years. Follow-up screening was then completed to see the impacts of adding a cover by producing one-hour, 24-hour, and annual worst case dust potential. From the modelling, it was evident that adding a cover on the tailings reduced dust potential.

Additional modelling was completed in 2023 to evaluate the potential risks associated with exposed tailings. In general, modelled levels that could potentially exceed risk thresholds (depending on duration and magnitude of receptor availability) are limited to areas within the lease boundaries in the direct vicinity of the source (exposed tailings) but could extend immediately adjacent to the southeastern corner of the lease boundary at the facility.

In addition to the model refinements and in consideration of community interests in collecting site data to support decision-making, a phased air monitoring program could provide actual observed rates versus modelled rates for the current configuration. Based on previous modelling, recommended sites for $PM_{10}$ concentration monitoring were developed. This phase of gathering $PM_{10}$ air concentrations would be a first step to assess significance of dust in the air from the TIA. Various types of particulate monitors were identified, and various options are currently being evaluated for potential use at the TIA.

## 2.8 Land Use Planning

In 2022, preliminary ecosystem mapping was completed for the pre-mining conditions represented by the current TIA footprint, including a 500-m buffer. Resources reviewed as part of this initial exercise suggest that most of the TIA was historically coniferous forest uplands and lowlands as reported in the 2022 annual report. The work completed to date is currently being reviewed to determine next steps.

## 2.9 East Diversion Ditch (EDD) Capacity Analysis

The East Diversion Ditch (EDD) is a key hydraulic structure that runs along the eastern perimeter of the TIA to re-direct non-contact water from the east/southeast to north of the TIA. In 2023, Barr developed a model to provide a better understanding of the capacity of the EDD to route flood flows away from the TIA, and to determine at what flow rate the EDD may be overwhelmed, and what impact this may have on the Main Pond.

To develop this model, Barr utilized the most current site topographic surface to develop a two-dimensional hydraulic model in HEC-RAS that routes flood flows through the surveyed ditches, and overland wherever water was predicted to breach the ditches. In the model, roughness of surficial features (the EDD, roads, surface of the TIA, etc.) were defined spatially with aerial imagery, and values were selected following guidance in the HEC-RAS manual. Surface roughness was considered in the model to differentiate areas that may impede flow (rougher) from areas that allow water to flow more freely (smoother). To identify flow capacities in the

EDD, the model boundary conditions were set so that flows entered the reaches of the model at constant rates.

For the purpose of the analysis, the EDD was divided into four specific reaches, as shown in Figure 2-25.

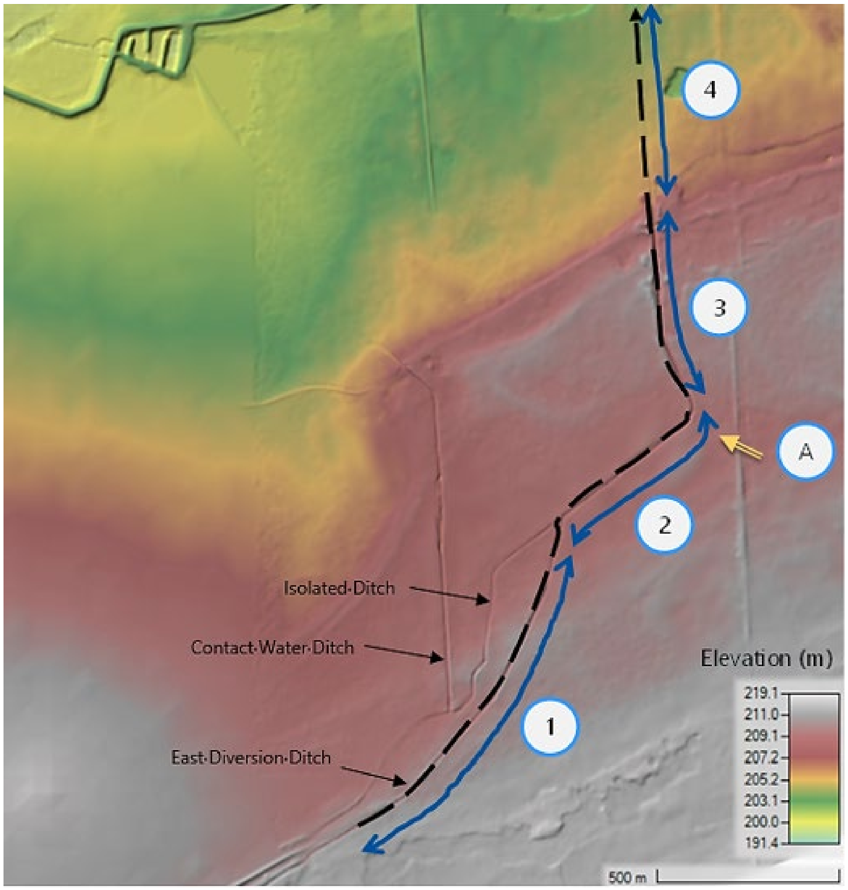



**Figure 2-25 Defined Reaches (1-4) of the EDD, Generalized Flow Direction (dashed line with arrow at the end), and Specific Inflow Location 'A' (large contributing watershed from the east)**

A second analysis will be completed using unsteady hydrographs from the hydrologic routing study being completed by KCB to understand how the duration and magnitude of each event affects the amount of water that can contribute to the TIA during large flood events. Results of these analyses will be reported on once the constant and unsteady assessments have been completed. The results from this work will aid in planning future maintenance needed to maintain and/or improve the functionality of this surface water feature.

### 2.10 2024 Research Activities

The research completed to date established the current conditions and served as input data for water balance and water quality models. The research data also addressed uncertainties and questions about current conditions as identified in the reclamation research plan. Water quality trends and the timeframe for water quality to achieve EQC without active water treatment are becoming more certain based on recent geochemical advancements. However, additional information gathering, and continued research will be necessary to fill remaining data gaps as identified in the CRP. Research activities expected for 2024 are presented in Table 2-10 below.

**Table 2-10 2024 Research Activities**

| Category | Activity |
|---|---|
| Ongoing Monitoring | • Porewater/groundwater water levels and quality<br>• Surface water quality of the Main Pond and downstream drainage network<br>• Field study of infiltration during spring melt for water balance and geochemical evaluation |
| Desktop Assessments | • Validation of GoldSim model for use in current pond operations and to forecast future conditions<br>• Validation of GoldSim model for use in forecasting water quality within the Main Pond.<br>• Use of water model to aid in development of potential passive treatment options that 1) reduce quantity and/or improve quality of impacted surface water, 2) modify hydrology of the tailings pile, and 3) restore natural drainages<br>• Scoping of a dust monitoring program for the site |
| Geochemical Evaluation | • No activities planned at this time |
| East Drainage Area and East Diversion Ditch | • Hydraulic modelling of the EDD using constant rates and unsteady hydrographs to understand capacity during large flood events |
| Future Land Use Planning | • Ecosystem mapping and habitat capability modelling of the pre-mining conditions for the TIA footprint to allow for estimates of residual ecological effects in the next version of the CRP and to inform future land use planning<br>• Next phase of community engagement to collaborate on future land uses envisioned for the site |

## 3.0 Engagement Summary

As per the Public Engagement Plan, affected parties were included in correspondence with information on annual site activities and distribution lists for reports and plans submitted to the MVLWB. Documents submitted for review included the 2023 annual Geotechnical Inspection report, the annual Water Licence report (2022) and the updated CRP. Prior to the submission of the 2023 CRP, a meeting in January 2023 was held to provide an overview to the changes that were made to the document with FRMG and DKFN.

In 2023, DKFN received funding from the NWT Cumulative Impact Monitoring Program for a project titled: Boreal caribou habitat enhancement – lichen habitat restoration on disturbed sites. The purpose of this project is to investigate and accelerate the restoration of functioning winter range for boreal caribou in the South Slave Region of the NWT, particularly in areas that have been impacted by past industrial development. Marc d'Entremont, from LGL Limited, contacted

Teck, on behalf of DKFN, to support the project. Teck agreed to support this project, which was scheduled to occur in August. However, due to the wildfires around Hay River and evacuations, the project did not proceed. Plans to advance the project are scheduled to commence in the summer of 2024.

Fort Resolution residents were employed as wildlife monitors during the reclamation research activities in May and October. A total of 9 working days were completed by members from FRMG (2 days) and DKFN (7 days) in support of field days during which the reclamation research activities occurred.

In 2024, engagement with FRMG and DKFN will continue, and participation from Indigenous representatives during field activities will be requested again. A spring operational update will be planned and next steps in future land use planning are anticipated in 2024.

## 4.0 Major Modification or Construction Activities

There were no major modifications or construction activities in accordance with Part E of the Licence. Maintenance works were conducted and are further discussed in Section 6.2.

## 5.0 Water Management Plan Activities

Water accumulates in the Main Pond every spring from snowmelt and rainfall. Concentrations of zinc in the Main Pond are greater than the Water Licence EQC and cannot be released to the environment without treatment. Arsenic, copper, lead, cyanide, ammonia and TSS concentrations in the Main Pond were all less than the EQC. Each year accumulated water is treated by gravity drainage (i.e., not pumped) through a culvert, where it is mixed with lime, to form insoluble precipitates that settle to form a sludge in the treatment pond. Treated water is released once formal authorization is granted following review of third-party lab results and comparison to EQC. Water is treated until the water level in the Main Pond is lowered such that water can no longer flow through the culvert.

The water treatment plant is a simple lime treatment system that consists of a lime silo, trailer mounted pump/blower unit, lime slurry tank, jet mixer, water pump and a trailer mounted laboratory. Most of the equipment is stored in Hay River through the winter and is assembled on site for the operating period.

Spillway capacity and flood management assessments for the TIA were completed by Golder in 2022 (Golder, 2022). Based on a revised catchment area assumption, the report provided a Normal Operating Water Level (NOWL) of 201.1 m for a closure-passive care phase, and 202.4 m for a closure-active care phase (the current phase of the TIA).

To manage the pond water level in the TIA in 2023, Teck followed the 2021 interim water level qualitative performance objectives (QPOs) and Trigger Action Response Plan (TARP) recommended by Golder (Golder, 2021); and also included additional rainfall forecast and water level monitoring based on the 2022 assessments (Golder, 2022).

There were no changes to any of the following manuals in 2023:

- Pine Point Mine Tailings Impoundment Water Treatment Manual (PP-EP-001)
- Pine Point Mine Tailings Impoundment Waste Management Plan (PP-EP-003;)
- Pine Point Tailings Impoundment Area Quality Assurance and Quality Control Plan for the Surveillance Network Program (PP-EP-004)
- Pine Point Mine Tailings Impoundment Contingency Manual (PP-EP-005)

## 5.1 Annual Water Treatment Summary

### 5.1.1 Annual Water Treatment Kick-off

The annual water treatment kick-off meeting was conducted on site at Pine Point on July 10, 2023 and was attended by Maskwa and the Teck Water Treatment Supervisor. All relevant safety documents including the Mine Emergency Response Plan were reviewed with treatment operators. Current versions of the Pine Point Mine Tailings Impoundment Water Treatment Manual and the Pine Point Mine Tailings Impoundment Contingency Manual were reviewed at the time. Requirements for on-site personnel including spill response, shift coverage and working alone requirements were also discussed.

### 5.1.2 Water Treatment Operations

Water treatment operations in 2023 started later than previous years due to local wildfire requiring resources that would normally be employed for water treatment. At the end of the previous water treatment season (2022), the water level of the Main Pond was drawn down to 200.0 m. During freshet, the water level rose to 200.5 m at the start of the freshet and to a maximum of 201.2 m at the end of freshet on April 27, 2023. By July, the water level had dropped to 200.8 m, primarily due to evaporation.

Water treatment was initiated on July 23, 2023 and completed on August 13, 2023, equating to 22 days of active water treatment. A total of 106,214 $m^3$ of treated water was released during the 2023 water treatment period as recorded by the flow meters on the discharge siphons. The final Main Pond water level was 200.36 m.

Daily discharge volumes and cumulative volumes are shown in Table 5-1. The flow data logger was calibrated in February 2023 prior to operational use and the certificate is included in Appendix C.

**Table 5-1 Discharge Volume at Station 35-1B**

| Discharge Date (YYYY-MM-DD) | Incremental Daily Volume Discharged ($m^3$) | Cumulative Daily Volume Discharged ($m^3$) |
|---|---|---|
| 2023-07-23 | 995 | 995 |
| 2023-07-24 | 3095 | 4091 |
| 2023-07-25 | 4141 | 8232 |
| 2023-07-26 | 4564 | 12,795 |
| 2023-07-27 | 4545 | 17,340 |
| 2023-07-28 | 5317 | 22,657 |
| 2023-07-29 | 5957 | 28,614 |
| 2023-07-30 | 5821 | 34,435 |
| 2023-07-31 | 5663 | 40,099 |
| 2023-08-01 | 6415 | 46,513 |
| 2023-08-02 | 6933 | 53,447 |
| 2023-08-03 | 6748 | 60,194 |
| 2023-08-04 | 6628 | 66,822 |
| 2023-08-05 | 6408 | 73,229 |
| 2023-08-06 | 6136 | 79,365 |
| 2023-08-07 | 5862 | 85,227 |
| 2023-08-08 | 5695 | 90,922 |
| 2023-08-09 | 3010 | 93,933 |
| 2023-08-10 | 2370 | 96,303 |
| 2023-08-11 | 2488 | 98,791 |
| 2023-08-12 | 4280 | 103,071 |
| 2023-08-13 | 3143 | 106,214 |
| **Total Volume** | | **106,214** |

## 5.2 Water Treatment Process Updates

### 5.2.1 Flocculant Blocks

No flocculant blocks were deployed in 2023. Flocculant blocks or additives were not necessary because TSS concentrations were low throughout 2023, which was attributed to favourable wind patterns and the use of turbidity curtains.

### 5.2.2 Coagulant and Flocculant Field Trials

In the Annual Water Licence Report for 2022, results from a week-long field trial completed in August 2022 were presented for zinc removal using a coagulant and flocculant following lime addition. A second, follow-up field trial was tentatively planned for 2023 to evaluate the following items prior to full-scale implementation:

- Trial the coagulant and flocculant during the early period of the treatment season to evaluate whether the use of chemical settling aids may accelerate start-up prior to discharge authorization.
- Complete a field trial over several weeks to allow the coagulant and flocculant doses to be adjusted and optimized toward the benefit of operational control, full scale system sizing, and cost determination.
- Target any random instances of elevated TSS resulting from high-wind events to evaluate effectiveness in reducing levels.
- Allow sufficient time following the field trial to observe water quality rebound and observe changes in treatment performance after stopping use of the coagulant and flocculant. This will also be toward the benefit of operational control, system sizing, and cost determination.

A field trial was not conducted in 2023 due to a relatively short water treatment season, which did not allow sufficient time to test these items. Additional field trialing is tentatively planned for 2025 due to forecasted low water levels and the corresponding expectation of a shortened water treatment season again in 2024.

### 5.2.3 Modelling Seasonal Variation in Lime Use and Zinc Removal

Preliminary modelling was conducted in 2023 to evaluate the effect of temperature and water quality changes on zinc removal and lime usage. The modelling was completed using the software PHREEQC (v. 3.7.3), which is a thermodynamic aqueous chemistry and geochemistry software. The purpose of this modelling exercise was to continue building the understanding of the process sensitivities of the Treatment Pond to inform operational planning and enhance performance forecasting capabilities.

The modelling used water quality conditions from 14 discrete samples that had sufficient water quality information to complete a charge balance. Key results from the modelling are shown in Table 5-2 and summarized below.

- Lime usage to the operational pH setpoint of the Treatment Pond is primarily a function of initial pH with secondary influences from alkalinity and temperature.
- The model estimates that treatment during the winter season would require the highest amount of lime to achieve the operational pH setpoint of the Treatment Pond (approximately 3,300 kg/d at a treatment flowrate of 12,000 $m^3$/d) largely because the starting pH of the Main Pond is relatively low at about pH 7.5. Whereas treatment in

May, June, and July requires the lowest amount of lime (approximately 500 kg/d) due to the increased pH from ice melt and low alkalinity following freshet.

- Based on the data available, the model output suggests the optimal time to treat Main Pond water with respect to the efficiency of mass of zinc removed per mass of lime as well as reliability in meeting the effluent quality criterion is between June and August.
- Availability of water quality data during ice-out and freshet is limited for the Main Pond, when water temperatures and pH are highly dynamic. Additional sampling is tentatively planned for 2024 (snowpack dependent) to collect water samples during this time period to improve confidence in modelling results and update preliminary estimates of zinc removal and lime usage during this period.

**Table 5-2 Summary of Lime Usage and Zinc Removal for Each Model Simulation Using Data from the Main Pond and the Current Operational pH Setpoint in the Treatment Pond**

| Location | Season | Date (DD-MMM-YY) | Temp. (°C) | pH (s.u.) | Influent Zinc (mg/L) | Modelled Effluent Zinc (mg/L) | Modelled Lime Usage (mg/L) | Modelled Treatment Efficiency (mg zinc removed/g lime) |
|---|---|---|---|---|---|---|---|---|
| 35-1A | Winter | 29-Jan-22 | 2.9 | 7.6 | 4.4 | 0.85 | 268.4 | 13.1 |
| 35-1A | Winter | 26-Feb-22 | 2.4 | 7.5 | 4.2 | 1.01 | 274.8 | 11.7 |
| 35-1A | Winter | 30-Mar-22 | 2.2 | 7.4 | 2.8 | 1.07 | 275.2 | 6.2 |
| 35-1A | Spring | 19-May-22 | 8.0 | 7.8 | 1.4 | 0.72 | 49.1 | 14.4 |
| 35-1A | Spring | 10-Jun-22 | 19.1 | 8.1 | 1.4 | 0.39 | 51.7 | 18.9 |
| 35-1A | Summer | 8-Jul-22 | 21.1 | 8.1 | 1.1 | 0.46 | 39.6 | 15.6 |
| SW-1 | Summer | 10-Jul-20 | 19.8 | 8.4 | 1.6 | 0.33 | 41.3 | 30.8 |
| 35-1A | Summer | 10-Aug-22 | 18.2 | 8.3 | 0.71 | 0.29 | 83.2 | 5.00 |
| 35-1A | Summer | 11-Aug-22 | 18.3 | 8.2 | 0.71 | 0.26 | 87.3 | 5.1 |
| 35-1A | Summer | 12-Aug-22 | 18.2 | 8.3 | 0.63 | 0.31 | 80.6 | 4.04 |
| 35-1A | Summer | 13-Aug-22 | 18.3 | 8.3 | 0.71 | 0.30 | 78.04 | 5.3 |
| SW-1 | Fall | 18-Sept-21 | 9.1 | 8.1 | 0.95 | 0.37 | 77.4 | 7.4 |
| SW-1 | Fall | 26-Sept-20 | 10.7 | 8.6 | 1.0 | 0.27 | 75.4 | 9.7 |
| SW-1 | Fall | 29-Sept-22 | 10.8 | 8.4 | 1.0 | 0.31 | 67.3 | 10.2 |

## 6.0 Operations and Maintenance Plan Update and Activities

Teck and the Engineer of Record (EoR) provided an online dam safety and OMS training to personnel involved in maintenance and surveillance activities for the site on July 7, 2023. In 2023, Teck and the EoR conducted an annual review of the Operation, Maintenance and Surveillance (OMS) Manual Version 5 and revised the manual to Version 6, which was submitted to MVLWB in 2024.

### 6.1 Surveillance Activities

Surveillance activities at the Pine Point TIA in 2023 included geotechnical site inspections by both the EoR and by the Tailings Surveillance Officer (Maskwa). As well, a technical meeting with Independent Tailings Review Board (ITRB) was conducted:

- Engineer of Record – Klohn Crippen Berger (KCB)
  - October 1, 2023 – annual geotechnical inspection in summer.
- Independent Tailings Review Board (ITRB)
  - November 7 and 10, 2023 – ITRB technical update meeting.
- Tailings Surveillance Officer – Maskwa
  - June 8, 2023 – after spring freshet routine inspection.
  - October 16, 2023 – fall routine inspection.

The results of the surveillance are documented in the 2023 Annual Facility Performance Review (AFPR) (KCB, 2023) submitted to MVWLB on December 20, 2023.

### 6.2 Maintenance Activities

Maintenance activities in 2023 include the following items completed by the Tailings Surveillance Officer (Maskwa):

- Battery replacement for the vibrating wire piezometers before the freshet season.
- Main Pond remote camera service during summer.

#### 6.2.1 Wildlife Management

No wildlife management activities were required in 2023. No work occurred after October 1 that required wildlife den sweeps. No beaver dams or lodges were removed.

## 7.0 Spill Contingency Plan

Spill response training was included in the water treatment kick-off meeting on July 10, 2023. Training included a review of the contingency plan and confirmation that the necessary response materials, as outlined in the contingency plan, were available on site. In addition, spill response is included in the orientation package that all contractors are required to review annually. All site contractors and visitors to the site are made aware of the requirements for spill response, including communications to the site manager and expected clean up response. There were no spills at the Pine Point TIA in 2023.

There were no updates to the Spill Contingency Plan in 2023.

## 8.0 Surveillance Network Program

Surveillance Network Program (SNP) sampling was conducted according to Annex A Part A and Part B of the Water Licence MV2017L2-0007 and summarized in Table 8-1. More frequent sample collection than specified in Table 8-1 may be required at the request of an Inspector. In 2023, no additional data requests were made by an Inspector.

All sampling methods and analyses were conducted according to the Pine Point Tailings Impoundment Area Quality Assurance and Quality Control Plan for the Surveillance Network Program (Teck, 2019). The Quality Assurance and Quality Control Plan was reviewed in 2023, but no changes were made. Samples were analyzed by ALS Laboratories in Edmonton, which is a Canadian Association for Laboratory Accreditation (CALA) certified laboratory.

**Table 8-1 Summary of SNP Station Monitoring Requirements**

| Station | Location | Parameter | Minimum Frequency |
|---|---|---|---|
| 35-1A | Main Pond Culvert Intake | Water Level | 3 Times per Year (during spring, summer, and fall) |
| | | Water Quality | Weekly |
| 35-1B | End of Water Treatment Pond | Treated Water Discharge Volume | Daily |
| | | Water Quality | Pre-Discharge |
| | | Water Quality | Weekly |
| 35-4,5,6,9,10,12,13 | Downstream of the TIA discharge to Great Slave Lake | Water Quality | Annually |

There are two purposes for the SNP. The first purpose is to measure water quality prior to discharge to confirm that treated water quality achieves the EQC as identified in the Water Licence. The second purpose is to monitor water quality in the receiving environment to confirm that there are no mine-related impacts on the receiving environment. The operational SNP stations are referred to as 35-1A and 35-1B. Station 35-1A is located at the culvert intake and represents water quality prior to water treatment. Station 35-1B is located at the end of the water treatment pond and represents water quality of treated water and is tested to confirm that water quality achieves the EQC prior to discharge. Receiving environment monitoring is conducted at seven water quality stations located between the TIA and Great Slave Lake. Locations of the operational and receiving environment stations are presented in Figure 8-1 and the methods, results, and QA/QC for operational and receiving environment stations are presented in Sections 8.2 and 8.3, respectively.

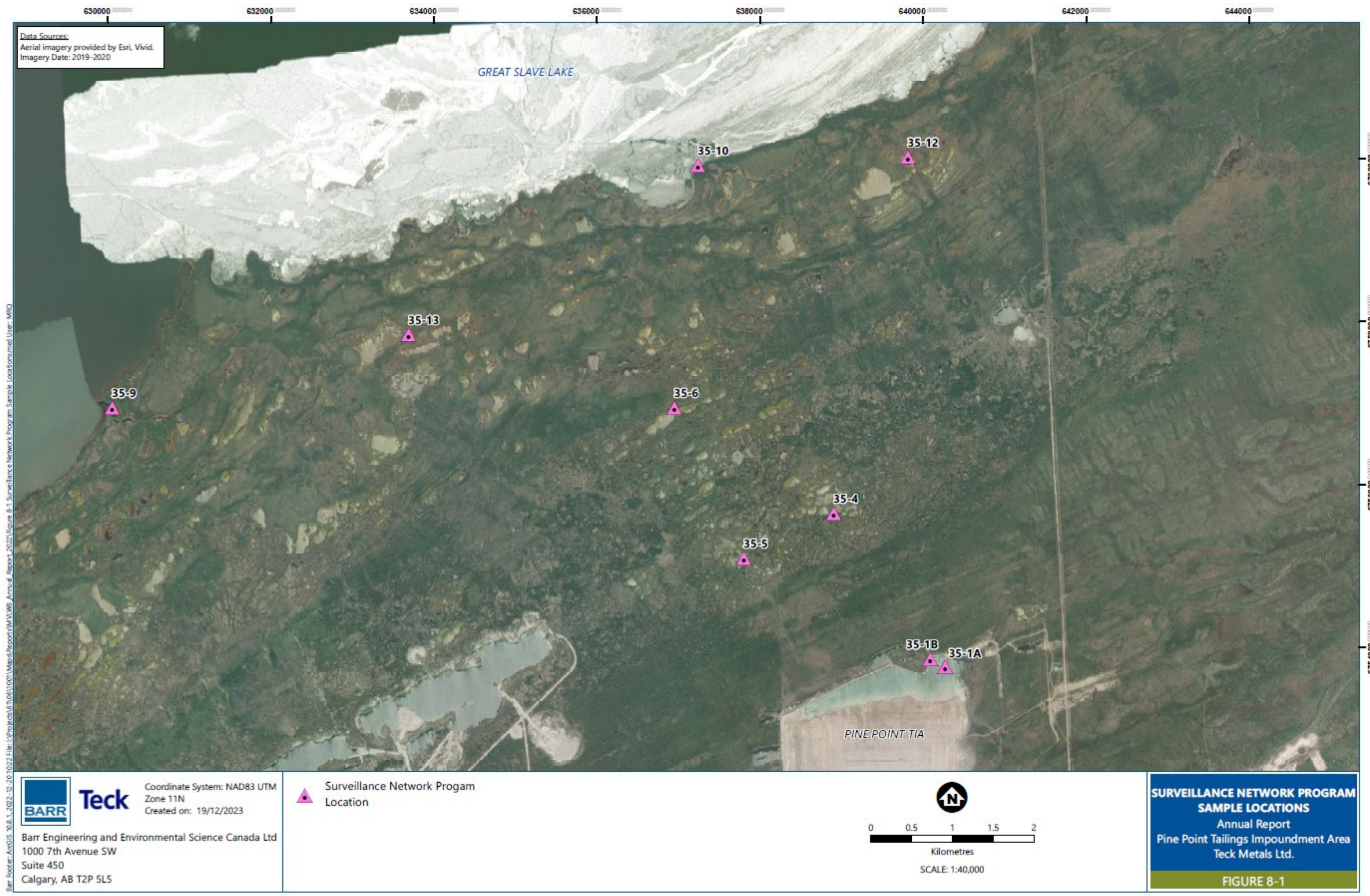



**Figure 8-1 Pine Point SNP Stations**

## 8.1 Station 35-1A

### 8.1.1 Water Level

The Water Licence requires that water levels be recorded three times per year from a staff gauge located at the culvert intake: once in Spring, Summer, and Fall (during periods of open water). The water level is monitored regularly to confirm that the freeboard limit of 1.0 m specified in the Water Licence is not exceeded. A freeboard limit of 1.0 m corresponds to a water level of 202.5 m. Table 8-2 summarizes the 2023 Spring, Summer, and Fall water levels, which are compared to water levels measured in 2022. The water levels did not exceed the Water Licence freeboard limit.

**Table 8-2 Water Levels in the Tailings Pond at 35-1A**

| 2023 Measurement Date | 2023 Water Level (metres above mean sea level) | 2022 Measurement Date | 2022 Water Level (metres above mean sea level) |
|---|---|---|---|
| **Spring (April 24)** | 201.2 | Spring (May 10) | 201.6 |
| **Summer (July 23)** | 200.8 | Summer (July 22) | 200.8 |
| **Fall (October 16)** | 200.3 | Fall (October 19) | 200.0 |

At the end of the 2023 water treatment season, the water level of the Main Pond was nearly drawn down as low as typical. Due to disruption of essential services associated with the evacuation of Hay River due to wildfire activity, water treatment was paused. Effects of evaporation over the following weeks negated the need to continue treatment once crews were allowed to return. By September 1, the water level had dropped to 200.3 m, primarily due to evaporation and remained consistent around this level. A field observation on October 16 confirmed the level at 200.3 m. On average, the water level is drawn down to 200.3 m by the end of the water treatment season.

### 8.1.2 Water Quality

The Water Licence requires water samples from 35-1A to be collected weekly during the active water treatment period and that the samples are analyzed by a third-party laboratory for total copper, lead, zinc, pH, and TSS (Annex A, Part B, Item 2). In addition, ammonia, total arsenic, and cyanide are also measured to confirm that these substances are not present at concentrations that are greater than the EQC prior to treatment.

Table 8-3 summarizes the weekly 2023 laboratory and field results for the water samples collected at 35-1A between June 10 (prior to discharge) and August 13, 2023. Water treatment began on June 30 was completed on August 13. Only concentrations of total zinc were greater than the EQC, which validates the continuation of water treatment to reduce zinc concentrations and confirms that other constituents remain less than the EQC.

### Table 8-3 Weekly Water Quality from Station 35-1A (Main Pond Prior to Treatment)

| Sample Date | Lab pH s.u. | Field pH s.u. | Total Zinc mg/L | Field Zinc mg/L | Total Arsenic mg/L | Total Lead mg/L | Total Copper mg/L | TSS mg/L | Field TSS mg/L | Ammonia mg/L |
|---|---|---|---|---|---|---|---|---|---|---|
| **7/14/2023** | 8.42 | 8.42 | **1.06** | **1.03** | 0.00014 | 0.0386 | 0.00624 | 12.2 | 5.03 | 0.0425 |
| **7/16/2023** | 8.31 | 7.97 | **1.03** | **1.02** | 0.00016 | 0.04 | 0.0069 | 7.4 | 2.9 | < 0.0050 |
| **7/24/2023** | 8.17 | 8.32 | **0.896** | **0.89** | 0.00055 | 0.034 | 0.00602 | 4.4 | 3 | < 0.0050 |
| **7/31/2023** | 8.41 | 8.3 | **0.926** | **0.91** | 0.00026 | 0.0369 | 0.0059 | 5.2 | 4.1 | < 0.0050 |
| **8/7/2023** | 8.42 | 8.4 | **0.827** | **0.75** | 0.00076 | 0.0346 | 0.0064 | 6.8 | 3.9 | 0.0143 |
| **EQC (maximum average** | 6.5-9.5 | | 0.5 | | 0.5 | 0.2 | 0.15 | 25.00 | | 2.00 |

Notes:
Bolded and shaded cells indicate concentrations that were greater than the maximum average EQC as stated in the Water Licence.

## 8.2 Station 35-1B

At Station 35-1B, water quality prior to discharge and the volumes of water discharged are measured. Daily water treatment volumes are presented in Section 5.1. Water quality is presented in this section.

Part F Section 3 of the 2017 Water Licence required that the Operations and Maintenance Plan include action levels. The Water Licence defines an action level as a predetermined qualitative or quantitative trigger which, if exceeded, requires the licensee to take appropriate actions including, but not limited to further investigations, changes to operations, or enhanced mitigation measures and reporting. As such, a water treatment manual was incorporated into the Operations and Maintenance Plan in 2018. Section 6.1 of the Water Treatment Manual defined action levels for grab samples collected prior to discharge and are presented in Table 8-4. The action levels for arsenic, copper, cyanide, lead, zinc, ammonia and TSS were set to the maximum ***average*** concentration defined in the Water Licence EQC. The maximum average concentration is defined in the Water Licence as the discrete average of four consecutive analytical results. Teck used this value to compare analyses from each grab sample as an action level. The intention of this Action Level was to confirm that discharged water quality would be less than the maximum grab concentration and less than the maximum average concentration as identified in the Water Licence. For pH, the Water Licence specifies an acceptable range of pH values. Since the water treatment process includes the addition of lime, water pH tends to reach the higher end of the range rather than the low end of the range. Therefore, the action level for pH was set to 9.3 standard units (s.u.).

At the beginning of water treatment, samples from 35-1B were collected and submitted to the laboratory daily until the EQC specified in the Water Licence were achieved. Both laboratory and field measurements were collected to confirm that field measurements for pH, TSS and zinc were consistent with laboratory measurements. The results were provided to the GNWT Environment and Natural Resources Water Resources Officer to authorize discharge. As per the Water Licence, once discharge is authorized, water samples from 35-1B were collected on a (at least) weekly basis for submission to an analytical laboratory. The water samples were analyzed for ammonia, total arsenic, total copper, cyanide, total lead, total zinc, TSS, and pH.

During water discharge, the water treatment operator measured pH, TSS, and zinc using in-field techniques (pH and turbidity meter, and Hach system for zinc) at least three times each day. If the average values of samples collected that day exceeds the action level, then the response action will be initiated (e.g., adjustments in treatment conditions). If a grab sample is greater than the maximum grab concentration identified in the Water Licence; however, water discharge would be suspended. Notifications as identified in Teck’s Contingency Plan would be initiated. In 2023, water discharge was not suspended at any time due to field or lab measurements that were greater than maximum grab concentration.

**Table 8-4 Action Levels for Station 35-1B**

| Parameter | Water Licence Effluent Quality Criteria | | Water Treatment Manual Action Level |
|---|---|---|---|
| | Maximum Average Concentration (mg/L) | Maximum Grab Concentration (mg/L) | Action Level for Station 35-1B (mg/L) |
| pH (in s.u.) | 6.5 to 9.5 s.u. | 6.5 to 9.5 s.u. | 9.3 s.u. maximum |
| Arsenic, total | 0.50 | 1.00 | 0.50 |
| Copper, total | 0.15 | 0.30 | 0.15 |
| Cyanide, total | 0.10 | 0.20 | 0.10 |
| Lead, total | 0.20 | 0.40 | 0.20 |
| Zinc, total | 0.50 | 1.00 | 0.50 |
| Ammonia as N | 2.00 | 4.00 | 2.00 |
| Total Suspended Solids | 25.00 | 50.00 | 25.00 |

### 8.2.1 Water Quality

Annex A, Part B, Item 2 states that weekly concentrations of total copper, total lead, total zinc, pH and TSS are to be measured in samples submitted to an analytical laboratory. This section of the Water Licence also states that water quality at this station must meet the compliance EQC limits set in Part F of the Water Licence. Since EQC are also provided for arsenic, cyanide and ammonia, these analytes were also measured regularly at Station 35-1B. Teck submitted samples to an analytical laboratory more frequently than required by the Water Licence. Samples were submitted daily during water discharge and analyzed for copper, lead, zinc, pH and TSS. Cyanide analyses were completed weekly. Results from all sample submissions collected at 35-1B between July 23 and August 13, 2023 (active water discharge period) are presented in Table 8-5.

The analytical results show that all daily concentrations were less than the EQC for both the maximum grab concentration and the maximum average concentration for all of the constituents of concern. Cyanide was less than the analytical detection limit in all weekly samples.

**Table 8-5 Tailings Area Discharge at Decant Structure at SNP 35-1B Post Treatment Effluent Discharge**

| Sample Date | Lab pH | Field pH | Total Zinc mg/L | Field Zinc mg/L | Total Arsenic mg/L | Total Lead mg/L | Total Copper mg/L | TSS mg/L | Field TSS mg/L | Cyanide mg/L | Ammonia mg/L |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 2023-07-27 | 8.89 | 8.86 | 0.23 | 0.25 | 0.00021 | 0.00568 | 0.00526 | 7.4 | 5.8 | NM | 0.0221 |
| 2023-07-28 | 8.97 | 8.93 | 0.234 | 0.24 | 0.00028 | 0.00634 | 0.00529 | 7.2 | 5.3 | NM | 0.0652 |
| 2023-07-29 | 8.97 | 8.95 | 0.255 | 0.26 | 0.00019 | 0.00775 | 0.00541 | 3.6 | 5.2 | NM | 0.0077 |
| 2023-07-30 | 9.05 | 9.05 | 0.265 | 0.26 | 0.00016 | 0.00844 | 0.00566 | 6.0 | 5.8 | NM | < 0.0050 |
| 2023-07-31 | 8.92 | 8.95 | 0.28 | 0.24 | 0.0002 | 0.0091 | 0.00574 | 5.2 | 4.8 | < 0.0020 | < 0.0050 |
| 2023-08-01 | 8.81 | 8.92 | 0.284 | 0.30 | 0.00022 | 0.00937 | 0.00602 | 6.2 | 6.2 | NM | < 0.0050 |
| 2023-08-02 | 8.85 | 8.93 | 0.282 | 0.30 | 0.00021 | 0.00936 | 0.00634 | 6.6 | 5.8 | NM | < 0.0050 |
| 2023-08-03 | 8.79 | 8.95 | 0.276 | 0.29 | 0.00022 | 0.00865 | 0.00668 | 8.2 | 5.4 | NM | < 0.0050 |
| 2023-08-04 | 8.91 | 9.00 | 0.276 | 0.26 | 0.00021 | 0.00862 | 0.00683 | 6.4 | 5.3 | NM | 0.0097 |
| 2023-08-05 | 8.89 | 9.01 | 0.29 | 0.28 | 0.00021 | 0.00923 | 0.00723 | 7.4 | 4.6 | NM | < 0.0050 |
| 2023-08-06 | 8.92 | 8.99 | 0.29 | 0.29 | 0.00022 | 0.00934 | 0.0077 | 5.8 | 4.5 | NM | < 0.0050 |
| 2023-08-07 | 8.87 | 8.96 | 0.272 | 0.30 | 0.00023 | 0.00952 | 0.00814 | 5.6 | 5 | < 0.0020 | 0.0075 |
| 2023-08-08 | 8.89 | 8.95 | 0.256 | 0.28 | 0.00022 | 0.00902 | 0.00781 | 9.6 | 4.1 | NM | 0.0074 |
| 2023-08-09 | 8.19 | 8.85 | 0.24 | 0.25 | 0.00022 | 0.00896 | 0.00772 | 8.0 | 5.4 | NM | < 0.0050 |
| 2023-08-10 | 8.19 | 8.75 | 0.231 | 0.26 | 0.00022 | 0.00874 | 0.00755 | 7.0 | 4.8 | NM | 0.0057 |
| 2023-08-11 | 8.77 | NM | 0.228 | NM | 0.00022 | 0.00815 | 0.00738 | 4.8 | NM | NM | 0.0154 |
| **Max Measured Concentration** | 9.05 | 9.05 | 0.290 | 0.300 | 0.00028 | 0.010 | 0.0081 | 9.6 | 6.2 | < 0.0050 | 0.065 |
| **Action Level Concentration** | 9.30 | | 0.50 | | 0.50 | 0.20 | 0.15 | 25.0 | | 0.1 | 2.00 |
| **EQC Max. Average** | 6.50 – 9.50 | | 0.50 | | 0.50 | 0.20 | 0.15 | 25 | | 0.10 | 2.00 |
| **EQC Max Grab** | 6.50 – 9.50 | | 1.00 | | 1.00 | 0.40 | 0.30 | 50.0 | | 0.20 | 4.00 |

Notes:
Analytical data were evaluated upon receipt to confirm that concentrations affirmed field-based measurements and that concentrations were less than the EQC for the constituents of concern.
NM = Not Measured. Cyanide is measured once per week.

During the 2023 active water treatment period, water quality was consistently below the EQC. Field pH was below action levels for all instances. Neither lab nor field pH exceeded the EQC upper limit of 9.5 s.u. The average observed TSS over the entire treatment season was 6.25 mg/L and the maximum grab was 9.6 mg/L, which did not exceed the maximum grab concentration of 50 mg/L.

Plots for lab pH, total zinc, total lead, total copper, and TSS are provided in Figure 8-2 through Figure 8-6, respectively. The plots include the grab samples results, average results, Water Licence limits (maximum average and grab concentrations), and action levels, as applicable. Plots for total arsenic, cyanide and ammonia were not created as the concentrations were near or below the detection limits and significantly less than EQC limits as well as action limits.

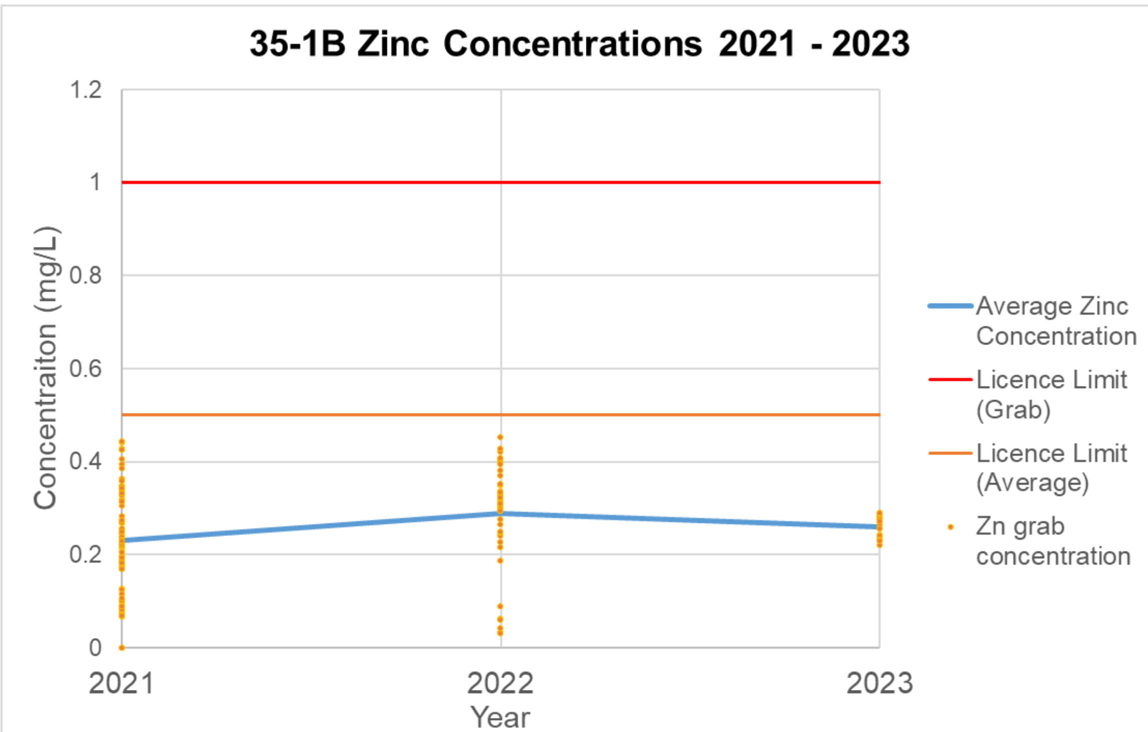



**Figure 8-2 35-1B Zinc Concentrations 2021 – 2023**

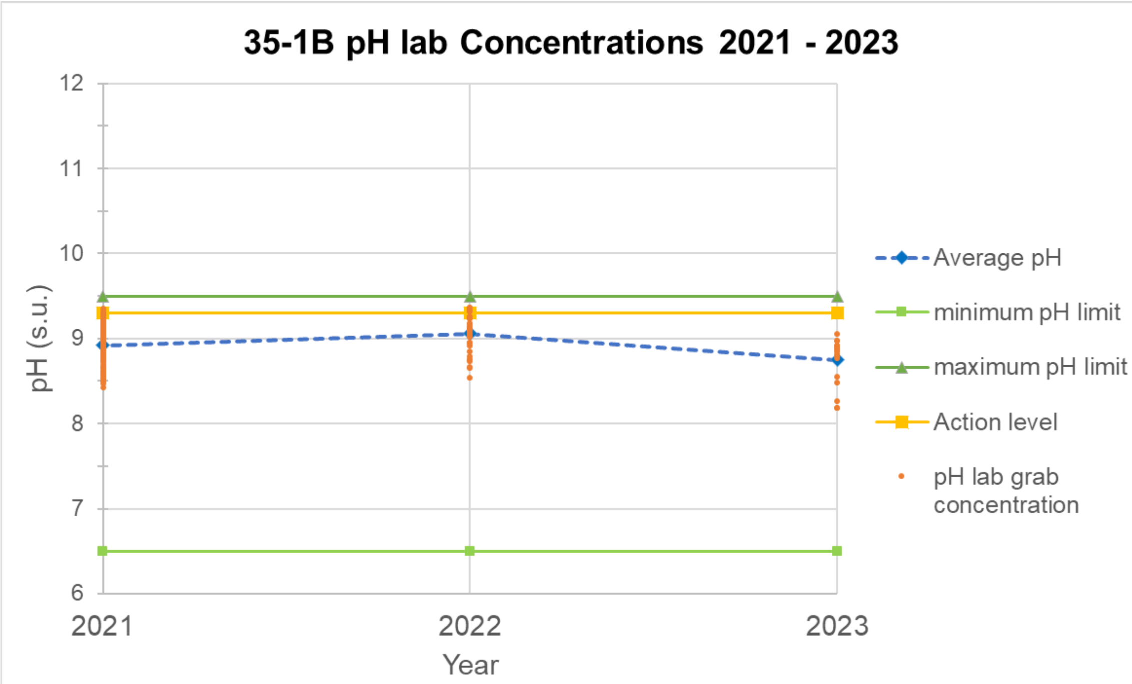



**Figure 8-3 35-1B pH Concentrations 2021 – 2023**

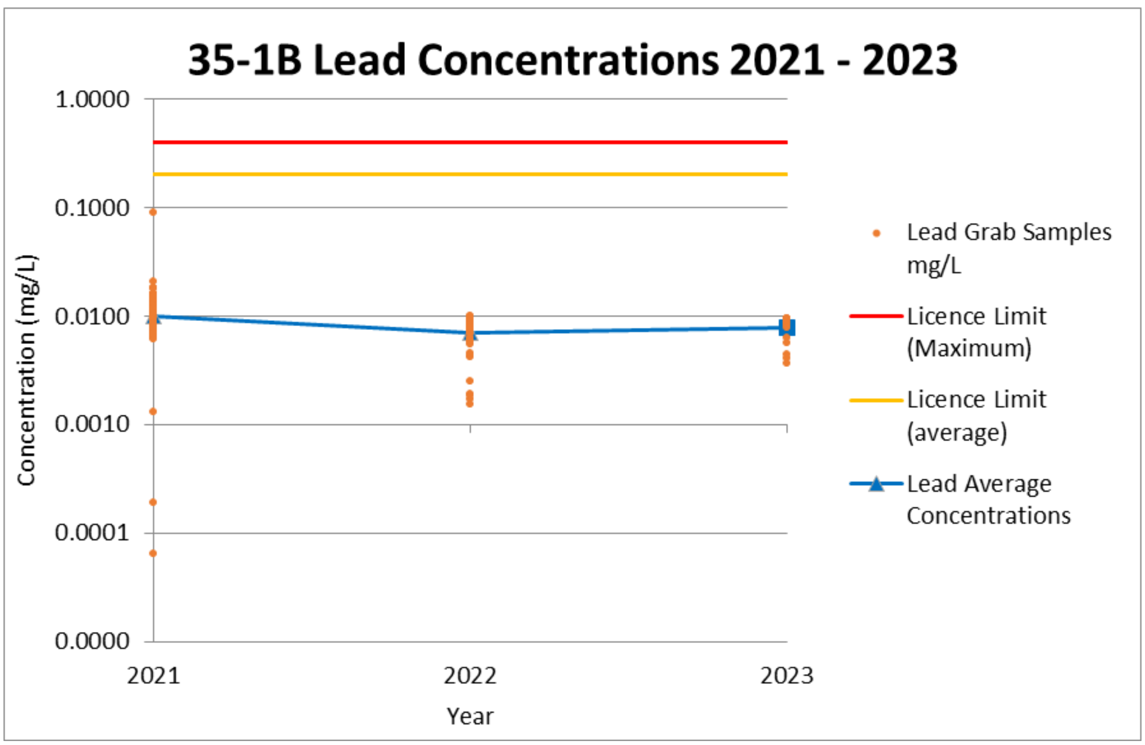



**Figure 8-4 35-1B Lead Concentrations 2021 – 2023**

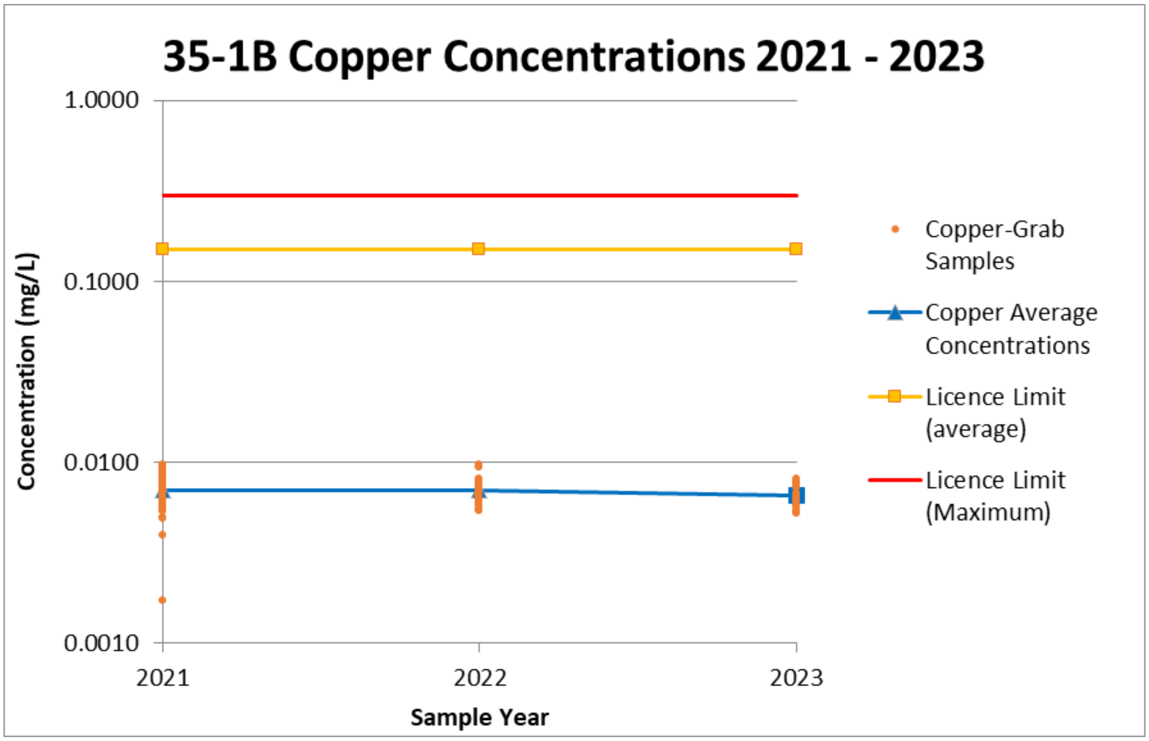



**Figure 8-5 35-1B Copper Concentrations 2021 – 2023**

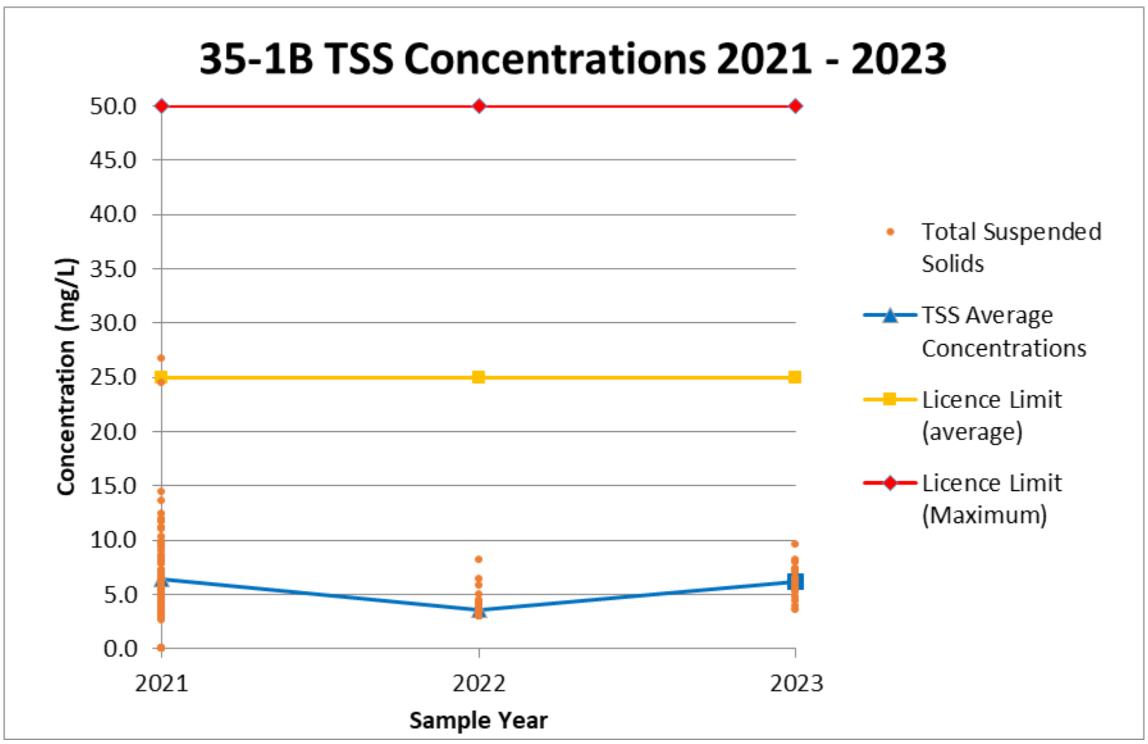



**Figure 8-6 35-1B TSS Concentrations 2021 – 2023**

### 8.2.2 Quality Assurance and Quality Control (QA/QC)

Quality Assurance and Quality Control (QA/QC) for the SNP included calibration of field instruments used to measure pH, TSS and zinc, and duplicate and field blank sample analyses for samples submitted to the analytical laboratory as described below.

#### 8.2.2.1 Calibration

Calibration of the field instruments used to measure daily water quality in the Main Pond and treatment pond is necessary for data reliability. The SNP locations 35-1A and 1B are tested regularly using field instruments to determine pH, TSS, and total zinc concentration. All instruments are calibrated as per the manual instructions with each sample collected. The Hach Company is the manufacturer of the Hach 3900 Spectrophotometer and the Zincon Method with a range of 0-1.5, 0-3.0 mg/L is used to measure zinc concentrations. This instrument is calibrated as per the manual instructions with each sample collected. At the end of each water treatment campaign, the instrument is shipped away for manufacturer calibration manufacturer. The certificate of calibration is included in Appendix C.

The zinc field results are compared to the lab results for SNP location 35-1B. In 2023, there appeared to be a positive correlation of 0.656. On average the difference between the field results and the lab results was 0.01 mg/L.

Field determination of TSS was introduced in 2020. Prior to 2020, turbidity was measured in the field and a correlation between turbidity and TSS from laboratory data was used to provide context for field turbidity values. The TSS meter has proven to be more reliable and a significant improvement over the previous method. The comparison of lab TSS and field TSS produced a positive correlation of 0.244 for the relationship with an average difference of 1.33 mg/L between the field and lab results at SNP location 35-1B.

### 8.2.3 Duplicate and Field Blank Samples

Duplicate samples were collected by collecting a second sample from the same location and depth as the original field sample. Duplicate samples were prepared (i.e., filtered and preserved as required), the same way as field samples, and then submitted to the appropriate analytical laboratory along with the field sample. These samples were used to check for variability in laboratory analyses. Copies of the 2023 lab Certificates of Analysis including the lab's QA/QC data are available upon request.

In 2023, three duplicate samples were taken at location 35-1A, and two duplicate samples were taken at location 35-1B. The location for the duplicate sample is determined randomly for each weekly sample event. In all cases, duplicates were submitted to the laboratory for the same analyses as the parent samples. Results for all analyzed parameters were compared by calculating the Relative Percent Difference (RPD), where RPD was calculated as the absolute difference of two sampling results, divided by the absolute value of their arithmetic mean, as follows:

$$RPD = \left(\frac{2 \cdot (sample - duplicate)}{(sample + duplicate)}\right) \times 100$$

Four types of acceptance or pass criteria were used for the duplicate sample data precision analysis as follows:

- Pass was applied to duplicate results that had an RPD value less than 30%.
- Pass-1 was applied to duplicate results that had an RPD value greater than 30%, but when the measured concentration was less than 10 times the analytical detection limit (concentrations near the analytical detection limit may exaggerate the RPD).
- Pass-2 was applied to duplicate results that had an RPD value greater than 30% but less than 50%, and when the concentration was greater than 10 times, but less than 10 times the analytical detection limit.
- Exceeds RPD Control Limits was applied to duplicate results that had an RPD value greater than 30% and were greater than 20 times the detection limit, and when duplicate results had an RPD value greater than 50%.

The results for duplicate samples and calculated RPD values are presented in Appendix D. More than 96% of the duplicate analyses had an RPD value less than 30% (Pass). Fewer than 4% had an RPD value greater than 30% and were designated as Pass-1. No duplicate analyses were qualified as Pass-2. Only 1 duplicate exceeded RPD Control Limits for dissolved copper.

Field blanks are used to determine whether there is a source of contamination in the field procedures and are indicative of sample integrity. New, lab-provided sample bottles were filled with distilled/deionized water in the field and preserved using the same approach as the other samples. A field blank was collected weekly during water treatment and an additional sample was collected prior to treated water discharge. A total of 6 sets of field blanks were collected in 2023. A total of 444 parameters were analyzed with 41 parameters having concentration greater than Method Detection Limit. Field blank data was reviewed and flagged if metals concentrations were greater than 10 times the analytical detection limit (i.e., indication of false positives). Only two instances where analytes exceeded 10 times the method detection limit occurred among a total of 6 field blank samples. These instances were observed for total calcium and total sodium specific to two field blank prepared on July 16 and July 31, respectively. Overall, acceptability was represented at 91%.

### 8.3 Receiving Environment SNP Monitoring

The Water Licence requires annual sampling in the fall after the water treatment discharge is completed from seven stations located downstream between the TIA and Great Slave Lake. Monitoring SNP locations has been a requirement of the Water Licence since 1997. In 2017, the Water Licence condition was modified to annual sampling rather than twice annual (i.e., spring and fall) samples. The monitoring rationale is to confirm that there are no mine-related water quality impacts to the Receiving Environment and the constituents of concern identified in the Water Licence were pH, and total copper, lead, and zinc.

After water treatment was completed in August, the seven SNP locations were accessed and sampled using a Hagglund on November 7 and 8 by Maskwa. Sampling occurred later in the fall than in previous years. Typically, sampling of the SNP occurred in September. However, due to the evacuations in Hay River resulting from the wildfires and the ongoing wildfire risks, sampling was delayed. As a result of the lateness in the year, water samples were collected from beneath the ice. Samples from the SNP were analyzed by ALS Laboratories for hardness, ammonia, cyanide, pH, total suspended solids, and dissolved and total metals.

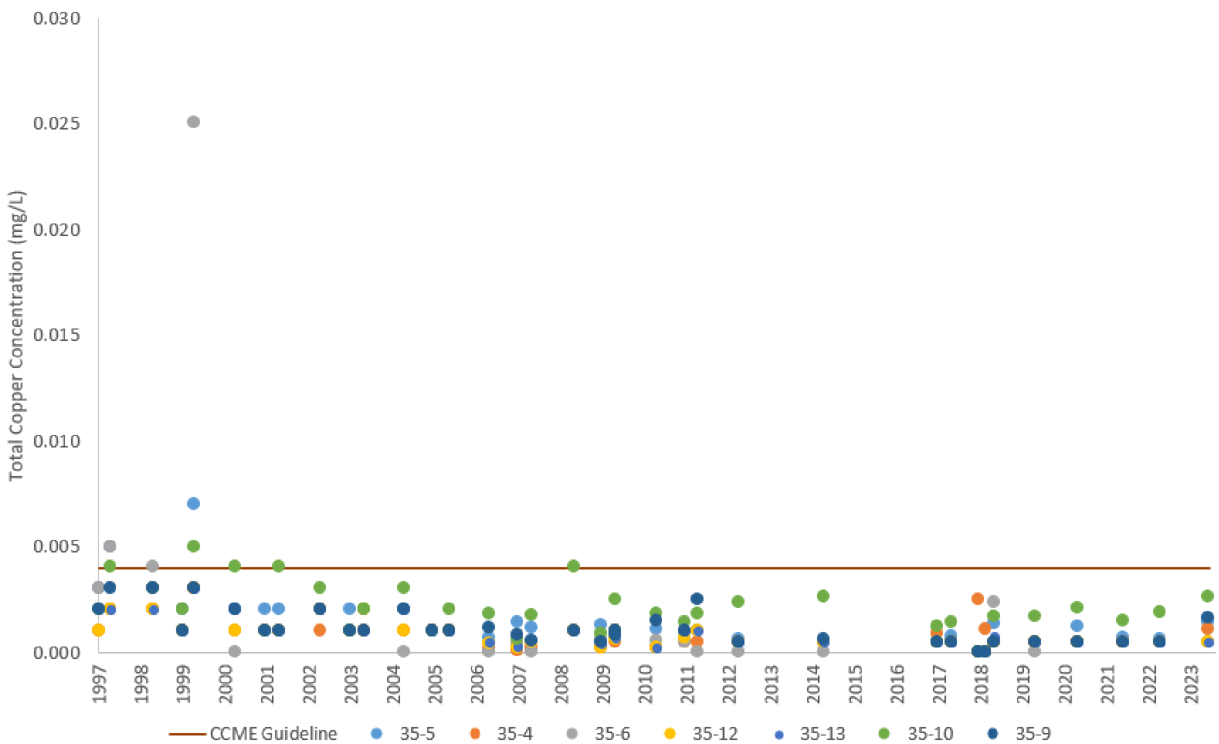
Concentrations of total copper, total lead, total and dissolved zinc, and pH measured from the seven samples in 2023 are presented in Table 8-6. All samples collected from the downstream SNP locations in 2023 had concentrations of copper, lead, zinc, and pH that were less than the CCME Water Quality Guidelines for the Protection of Aquatic Life (CCME, 2023), with the exception of dissolved zinc concentrations at 35-5.

**Table 8-6 2023 Concentrations of Copper, Lead, Zinc, and pH in the SNP Receiving Environment Monitoring Stations**

| Parameter | CCME Aquatic Life Guidelines[(a)] | Concentration (mg/L – unless otherwise indicated) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 35-4 | 35-5 | 35-6 | 35-9 | 35-10 | 35-12 | 35-13 |
| | | 8 Nov | 8 Nov | 8 Nov | 8 Nov | 7 Nov | 7 Nov | 8 Nov |
| Total Copper | 0.004 | 0.00111 | 0.00144 | < 0.00050 | 0.00163 | 0.00265 | < 0.00050 | < 0.00050 |
| Total Lead | 0.007 | 0.000155 | 0.00158 | < 0.000050 | 0.00014 | 0.00081 | < 0.00050 | < 0.00050 |
| Total Zinc | NA | 0.0156 | 0.223 | < 0.0030 | 0.0030 | 0.0073 | 0.0030 | 0.0043 |
| Dissolved Zinc | 0.043 | 0.0037 | **0.155** | 0.0013 | < 0.0010 | < 0.0010 | 0.002 | 0.004 |
| pH (s.u.) | 6.5 to 9.0 | 8.08 | 8.07 | 8.09 | 8.23 | 8.16 | 8.08 | 8.01 |

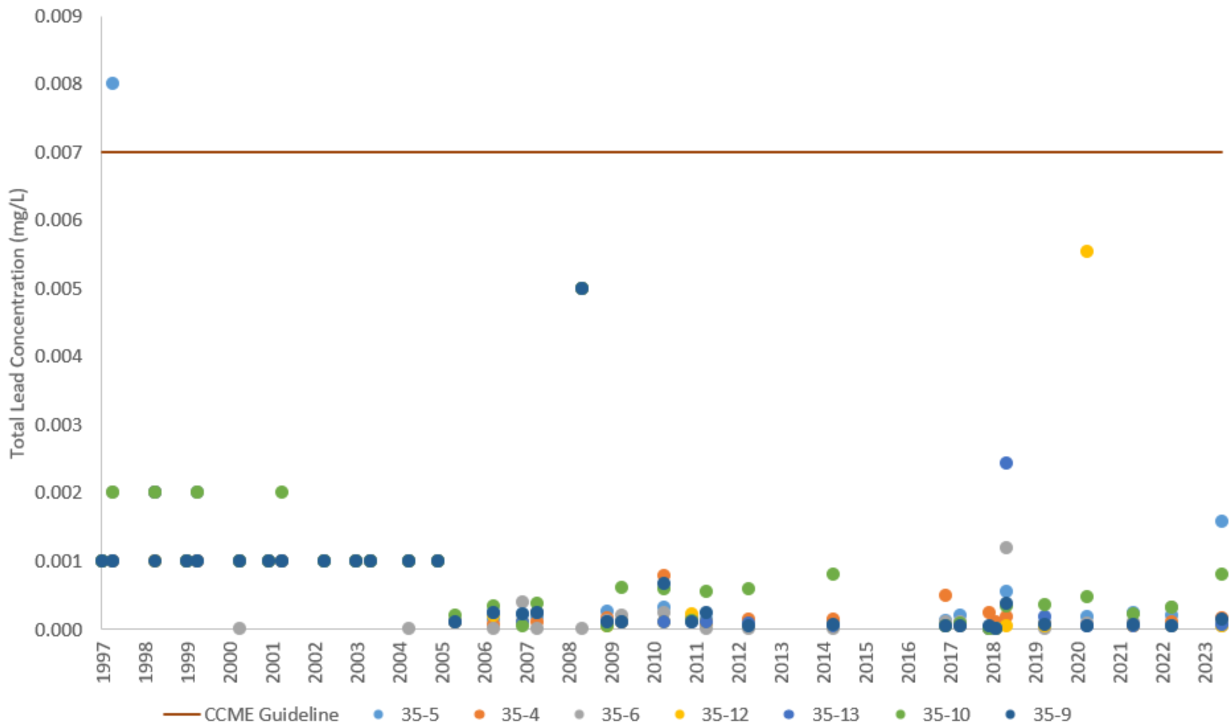
(a) CCME Water Quality Guidelines for Protection of Aquatic Life (CCME 2020) adjusted for site-specific pH, hardness and/or dissolved organic carbon.

Concentrations of copper, lead, zinc, and pH measured in samples from the SNP monitoring stations from 1998 to 2023 are presented in Figure 8-7 to Figure 8-10, respectively. Concentrations have been less than the aquatic life guidelines for these four constituents for the last decade except for two total zinc concentrations both observed at 35-5. A result from 2015 indicated 0.045 mg/L and a result from 2023 provided a result of 0.155 mg/L. Due to the necessity to sample late in 2023, the sample location was significantly disturbed due to the need to break ice to obtain the sample. In addition, the lateness of the year also meant that water levels were at their lowest. As a result, data collected in 2023 may not be comparable with previous years and higher concentrations should not be interpreted as an increasing concentration trend. Based on SNP monitoring results, there is no evidence that concentrations of copper, lead, and zinc are elevated in ponds located between the TIA and Great Slave Lake and therefore, it is unlikely that the TIA is impacting water quality in Great Slave Lake.



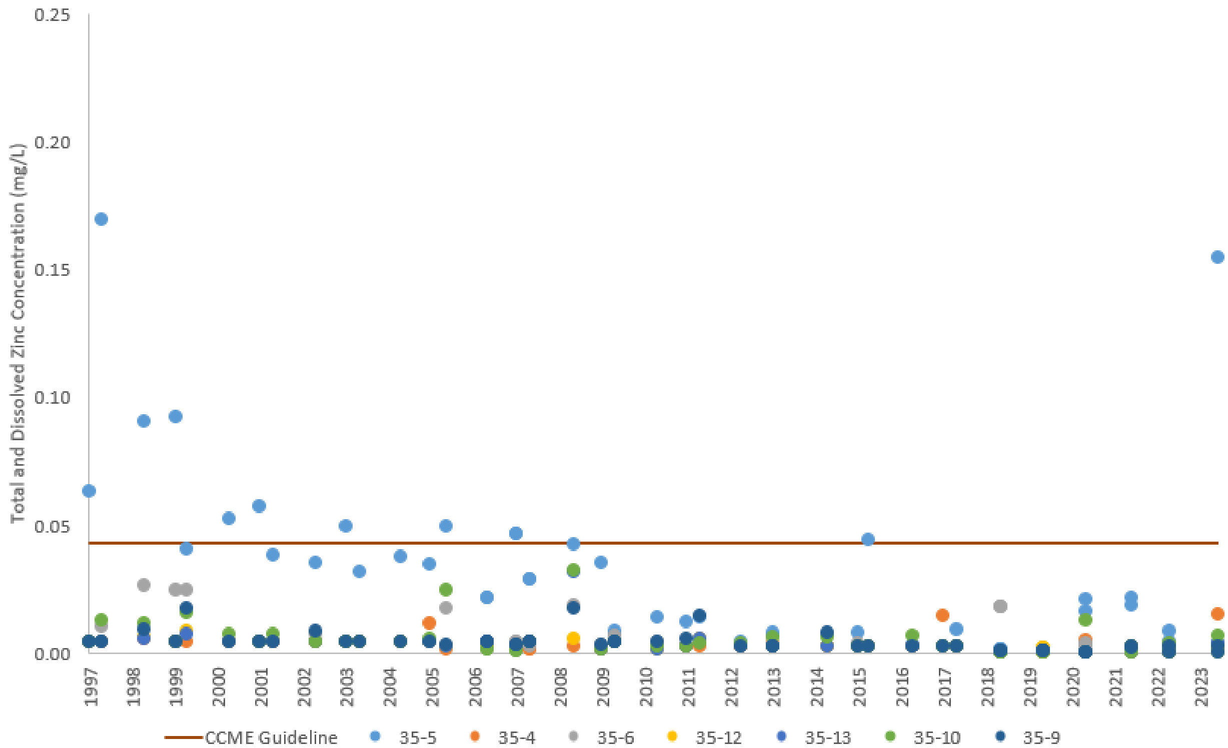

Note: 2023 samples were collected beneath the ice in November

**Figure 8-7 Total Copper Concentrations from 1997 to 2023 in the Downstream Surveillance Network Program Monitoring Stations Compared to CCME Guidelines for the Protection of Aquatic Life**



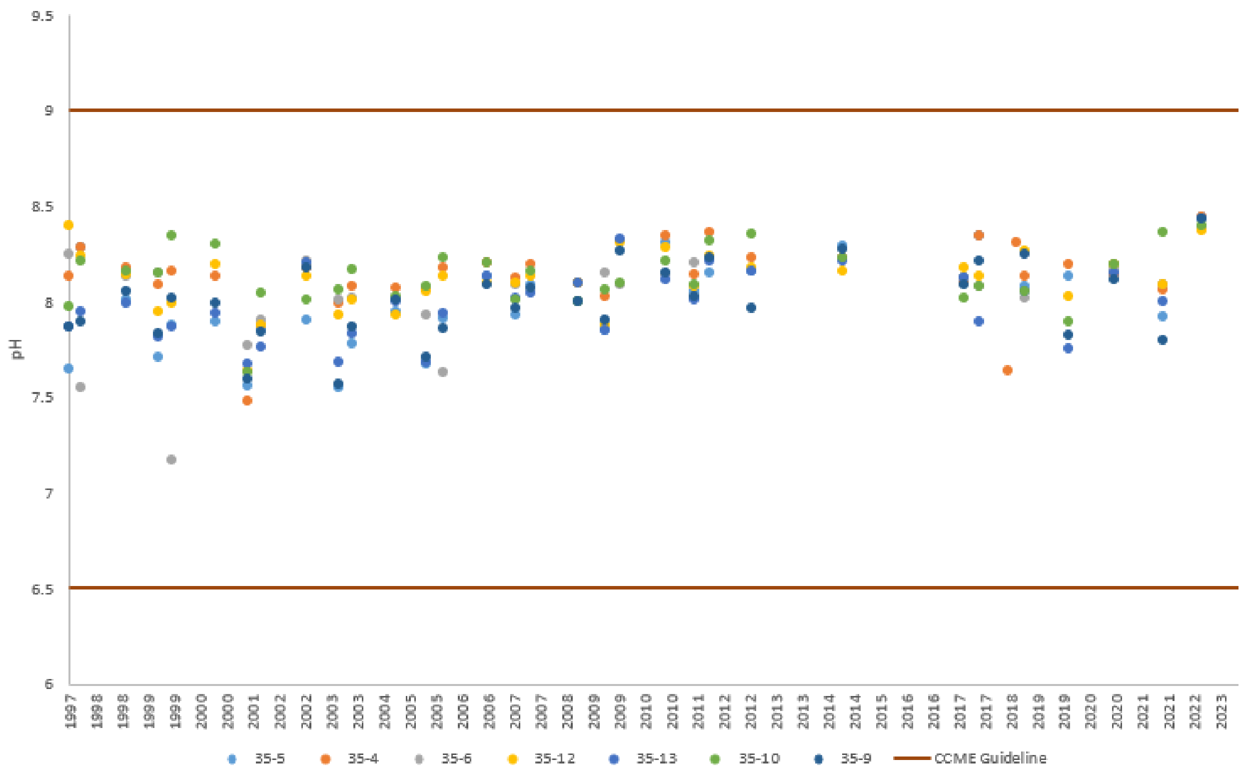

Note: 2023 samples were collected beneath the ice in November

**Figure 8-8 Total Lead Concentrations from 1997 to 2023 in the Downstream Surveillance Network Program Monitoring Stations Compared to CCME Guidelines for the Protection of Aquatic Life**




Note: 2023 samples were collected beneath the ice in November

**Figure 8-9 Total and Dissolved Zinc Concentrations from 1997 to 2023 in the Downstream Surveillance Network Program Monitoring Stations Compared to CCME Guidelines for the Protection of Aquatic Life**




Note: 2023 data collected in beneath the ice in November

**Figure 8-10 pH from 1997 to 2023 in the Downstream Surveillance Network Program Monitoring Stations Compared to the CCME Guidelines for the Protection of Aquatic Life**

### 8.3.1 Receiving Environment SNP QA/QC

One duplicate sample was collected during the fall receiving environment SNP monitoring program. One monitoring station, 35-12, was randomly selected by the water samplers during the field program for the duplicate sample. The sample was collected in the same location and using the same methods as the parent sample. The results from the duplicate samples were reviewed by using the RPD calculation described in Section 8.2.3. The results for duplicate samples and calculated RPD values are presented in Appendix D. 92% of the duplicate analyses had an RPD value less than 30% (Pass). 8% had an RPD value greater than 30% and were designated as Pass-1.

One field blank was collected at the time of the SNP sampling. Field blank data was reviewed and flagged if metals concentrations were greater than 10 times the analytical detection limit (i.e., indication of false positives). There were no instances where analytes exceeded 10 times the method detection limit. A total of 74 parameters were analyzed with 6 parameters having concentration greater than Method Detection Limit. Overall acceptability was determined at 92%.

## 9.0 Regulator Inspections

An annual Water Licence site inspection was conducted by the Senior Water Resource Officer Wendy Bidwell on July 10, 2023. The inspector met with the on-duty Maskwa treatment operator, Jeff Basarich, representing Teck Water Treatment Operations as well as Katie Clark, representing Teck's Health and Safety Department. The inspection covered treatment equipment operation and discharge water quality. Discharge water quality was deemed compliant and field measurements conducted by Teck were consistent with these results. A formal inspection report was not received.

## 10.0 References

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SRK, 2006. *Anvil Range Mining Complex: Rose Creek Tailings Deposit Assessment of Zinc Attenuation, 2005/06 Task 22h(ii).* Prepared for Deloitte & Touche Inc. on behalf of the Faro Mine Closure Planning Office. July 2006.

Teck Resources Ltd. (Teck) (2020). Operations, Maintenance and Surveillance Manual for Pine Point Tailings Impoundment Area, Version 5.

Teck Resources Ltd. (Teck) (2024). Operations, Maintenance and Surveillance Manual for Pine Point Tailings Impoundment Area, Version 6.

Teck (2019a). Pine Point Mine Tailings Impoundment Waste Management Plan

Teck (2019b). Pine Point Tailings Impoundment Area Quality Assurance and Quality Control Plan for the Surveillance Network Program.

Teck (2019c). Pine Point Mine Tailings Impoundment Contingency Manual

Teck (2021). Pine Point Closure and Reclamation Plan. Submitted to the MVLWB on June 1, 2021.

Teck (2023). Updated Pine Point Closure and Reclamation Plan. Submitted to the MVLWB on January 30, 2023.

Teck (2023). 2023 Annual Geotechnical Inspection 0 Water Licence MV2017L2-0007. Letter of submission to MVLWB on December 20, 2023.

# APPENDIX A

# CONCORDANCE TABLE

| Requirement | Conformity |
|---|---|
| a) A summary of the calibration and status of the meters and devices referred to in Part B of this Licence; | Provided in Section 8.2.2.1, Appendix C. |
| b) A summary of engagement activities conducted in accordance with the approved **Engagement Plan**, in Part B of this Licence, undertaken during the previous calendar year and shall include a brief description of activities planned for the forthcoming year; | Provided in Section 3.0. |
| c) A summary of **Construction** activities and major maintenance work conducted in accordance with Part E of this Licence, undertaken during the previous calendar year; | Provided in Sections 4.0 and 6.2. |
| d) A summary of activities conducted in accordance with the approved Water Management Plan, required in Part F of this Licence, undertaken during the previous calendar year, including:<br>i. A summary of updates or changes to the process or facilities required for the management of Water and Wastewater;<br>ii. Daily, monthly, and annual quantities in cubic metres of all Water and Wastewater collected, treated and pumped from the Post-Treatment Effluent Discharge point, identified by Discharge location; | i. Provided in Section 5.0.<br>ii. Provided in Table 5-1 in Section 5.1. |
| e) A summary of activities conducted in accordance with the approved Operations and Maintenance Plan, required in Part F of this Licence, undertaken during the previous calendar year, including:<br>i. A summary of updates or changes to the process or facilities required for the management of the Tailings Impoundment Area;<br>ii. A description of response actions that were carried out if any Action Levels were exceeded. | i. Provided in Section 6.0<br>ii. Provided in Section 8.2. |
| f) A summary of activities conducted in accordance with the approved Spill Contingency Plan, required in Part G of this Licence, undertaken during the previous calendar year, including:<br>i. A list and description for all Unauthorized Discharges that occurred during the previous calendar year, including the date, NWT spill number, volume, location, summary of the circumstances and follow-up actions taken, and status (i.e. open or closed), in accordance with the reporting requirements in Part G of this Licence; and<br>ii. An outline of any spill training and communications exercises carried out during the previous calendar year. | i. Provided in Section 7.0.<br>ii. Provided in Section 7.0. |
| g) A summary of activities conducted in accordance with the **Closure and Reclamation Plan**, required in Part H of this Licence, completed during the year, a summary of updates or changes made, and an outline of any work anticipated for the next year; | 2023 activities are summarized in Section 2.0 (Table 2-1 and Table 2-2).<br><br>Planned 2024 activities are summarized Section 2.10 (Table 2-10). |
| h) Any other details on Water Use or Waste disposal requested by the Board by November 1 of the year being reported; | Not Applicable. |

| Requirement | Conformity |
|---|---|
| i) Electronic and tabular summaries of all data and information generated under the Surveillance Network Program for the previous year, in excel, or an electronic and printed format acceptable to the Board. This shall also include, but not be limited to the following:<br>a. Rationale for SNP stations where samples were not collected and results and interpretation of quality assurance/quality control procedures;<br>b. Graphical summaries and interpretation of the analytical results from the SNP samples collected at the points of compliance (SNP station 35-1) compared to the Effluent Quality Criteria under Part F of this Licence, for the previous two consecutive years;<br>c. An explanation of any actions taken in response to any exceedances of the Effluent Quality Criteria;<br>d. Results from the Hach system monitoring, including all calibration and maintenance records for the Hach system; | Data and information generated for the Surveillance Network Program are provided in Section 8.0. Tabular summary of data is presented for the untreated (Station 35-1A) location in Section 8.1, the treated (Station 35-1B) location in Section 8.2, and for receiving environment monitoring locations in Section 8.3. SNP data tables are also provided in Appendix B.<br><br>a. Provided in Sections 8.2.2 and 8.2.3, Appendix D.<br>b. Provided in Section 8.2.1<br>c. Provided in Section 8.1.2 and 8.2.1<br>d. Results are provided in Table 8-3 and 8-5 in Sections 8.1.2 and 8.2.1, respectfully. The Hach system calibration certificate is provided in Appendix C. |
| j) A summary of actions taken to address concerns, non-conformances, or deficiencies in any reports filed by an Inspector. | Not Applicable. |
| As per the 2022 Annual Water Licence report acknowledgement letter dated Oct 5, 2023 the following needs to be reports<br>The Board requires Teck to include the following in all future Annual Reports:<br>• Discussion about all planned activities that were not completed;<br>• Submission of the raw data in an excel spreadsheet; and<br>• Discussion about all the Geotechnical Implementation Plan activities. | Status of planned 2023 reclamation research activities are provided in Table 2-1<br><br>Raw data provided as a supplementary document to this report |

APPENDIX B

SNP DATA TABLES

Legacy Properties / Teck

**Table A Concentrations of Dissolved Metals from Surveillance Network Program Monitoring Stations**

| Parameter | CCME Long-Term Aquatic Life Guidelines | Concentration (mg/L) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 35-4 | 35-5 | 35-6 | 35-9 | 35-10 | 35-12 | 35-13 |
| | | 8 Nov 2023 | 8 Nov 2023 | 8 Nov 2023 | 8 Nov 2023 | 7 Nov 2023 | 7 Nov 2023 | 8 Nov 2023 |
| Aluminum | 0.1 | 0.0027 | 0.0014 | < 0.0010 | 0.0045 | 0.0125 | 0.0015 | < 0.0010 |
| Antimony | NG [(a)] | 0.00013 | 0.00024 | < 0.00010 | 0.00012 | 0.00012 | < 0.00010 | < 0.00010 |
| Arsenic | 0.005 | 0.00069 | 0.00052 | 0.00045 | 0.00042 | 0.00041 | 0.00056 | 0.00047 |
| Barium | NG | 0.0145 | 0.0398 | 0.0243 | 0.0481 | 0.0506 | 0.0253 | 0.0240 |
| Beryllium | NG | < 0.000100 | < 0.000100 | < 0.000100 | < 0.000100 | < 0.000100 | < 0.000100 | < 0.000100 |
| Boron | 1.5<br>29 (short-term) | 0.087 | 0.080 | 0.085 | 0.022 | 0.018 | 0.117 | 0.084 |
| Cadmium | 0.00037 | < 0.0000050 | 0.0000151 | < 0.0000050 | 0.0000060 | 0.0000104 | < 0.0000050 | < 0.0000050 |
| Calcium | NG | 92.0 | 297 | 242 | 36.8 | 35.0 | 217 | 231 |
| Chromium | 0.0089 | < 0.00050 | < 0.00050 | < 0.00050 | < 0.00050 | < 0.00050 | < 0.00050 | < 0.00050 |
| Cobalt | 0.00283 | < 0.00010 | 0.00026 | < 0.00010 | < 0.00010 | < 0.00010 | < 0.00010 | < 0.00010 |
| Copper | 0.004 | < 0.00020 | 0.00079 | < 0.00020 | 0.00139 | 0.00131 | < 0.00020 | < 0.00020 |
| Iron | 0.3 | 0.018 | 0.050 | < 0.010 | 0.041 | 0.017 | 0.014 | < 0.010 |
| Lead | 0.007 | < 0.000050 | 0.000249 | < 0.000050 | < 0.000050 | < 0.000050 | < 0.000050 | < 0.000050 |
| Lithium | NG | 0.0189 | 0.0238 | 0.0315 | 0.0065 | 0.0049 | 0.0266 | 0.0312 |
| Magnesium | NG | 57.5 | 150 | 129 | 8.97 | 8.80 | 112 | 128 |
| Manganese | 0.46<br>14.9 (short-term) | 0.119 | 0.621 | 0.0153 | 0.0127 | 0.00085 | 0.0171 | 0.0162 |
| Mercury | 0.000026 | < 0.0000050 | < 0.0000050 | < 0.0000050 | < 0.0000050 | < 0.0000050 | < 0.0000050 | < 0.0000050 |
| Molybdenum | 0.073 | < 0.000050 | 0.0242 | 0.000160 | 0.000984 | 0.000852 | 0.000234 | 0.000167 |
| Nickel | 0.15 | < 0.00050 | 0.00124 | < 0.00050 | 0.00155 | 0.00120 | < 0.00050 | < 0.00050 |
| Potassium | NG | 5.22 | 6.75 | 4.41 | 1.48 | 1.37 | 4.19 | 4.39 |
| Selenium | 0.001 | 0.000101 | 0.000191 | 0.000075 | 0.000253 | 0.000245 | 0.000074 | 0.000054 |
| Silver | 0.00025 | < 0.000010 | < 0.000010 | < 0.000010 | < 0.000010 | < 0.000010 | < 0.000010 | < 0.000010 |
| Sodium | NG | 11.9 | 26.0 | 30.4 | 11.1 | 9.88 | 16.7 | 28.8 |
| Thallium | 0.0008 | < 0.000010 | 0.000112 | < 0.000010 | < 0.000010 | < 0.000010 | < 0.000010 | < 0.000010 |
| Tin | NG | < 0.00010 | < 0.00010 | 0.00018 | < 0.00010 | 0.00025 | 0.00025 | < 0.00010 |
| Titanium | NG | < 0.0100 | < 0.0100 | < 0.0100 | < 0.0100 | < 0.0100 | < 0.0100 | < 0.0100 |
| Uranium | 0.015<br>0.033 (short-term) | 0.000016 | 0.00230 | 0.000550 | 0.000589 | 0.000485 | 0.000456 | 0.000540 |
| Vanadium | NG | < 0.00050 | < 0.00050 | < 0.00050 | < 0.00050 | < 0.00050 | < 0.00050 | < 0.00050 |
| Zinc | 0.043<br>0.248 (short-term) | 0.0037 | 0.155 | 0.0013 | < 0.0010 | < 0.0010 U | 0.0020 | 0.0041 |

(a) NG = No guideline
(b) The CCME Aquatic Life Guidelines (CCME 2020) apply to total metals, with the exception of zinc and manganese which apply to dissolved metals only. The dissolved data results have been compared to the total metals guidelines, which is a conservative application.
(c) Shaded cells indicate concentrations that are greater than the CCME long-term aquatic life guideline.

Aluminum: Based on site-wide pH greater than 6.5.
Cadmium long-term guideline: based on site-wide hardness median of 300 mg/L, short-term guideline is based on site-wide hardness median is 300 mg/L and median pH is 8.

Chromium: Guideline is for Chromium III.
Copper, lead and nickel: based on site-wide hardness greater than 180 mg/L.
Manganese (dissolved): based on site-wide hardness median of 300 mg/L and median pH of 8.

Zinc long-term guideline (dissolved): based on site-wide hardness median of 300 mg/L, pH 8, DOC median of 6.3 mg/L. Short-term guideline: 0.248 mg/L based on range graphs DOC median of 6.3 and hardness greater than 250 mg/L. Note that hardness is higher than range deemed applicable in guideline, but hardness decreases toxicity.

**Table B Concentrations of Total Metals from Surveillance Network Program Monitoring Stations**

| Parameter | CCME Long-Term Aquatic Life Guidelines | Concentration (mg/L – unless otherwise indicated) | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | 35-4 | 35-5 | 35-6 | 35-9 | 35-10 | 35-12 | 35-13 |
| | | 8 Nov 2023 | 8 Nov 2023 | 8 Nov 2023 | 8 Nov 2023 | 7 Nov 2023 | 7 Nov 2023 | 8 Nov 2023 |
| Aluminum | 0.1 | 0.0081 | 0.0176 | 0.0037 | 0.178 | 2.78 | 0.0032 | 0.0107 |
| Antimony | NG[(a)] | < 0.00010 | 0.00025 | < 0.00010 | 0.00015 | 0.00019 | < 0.00010 | < 0.00010 |
| Arsenic | 0.005 | 0.00062 | 0.00052 | 0.00048 | 0.00052 | 0.00096 | 0.00055 | 0.00048 |
| Barium | NG | 0.0150 | 0.0414 | 0.0236 | 0.0495 | 0.0737 | 0.0241 | 0.0229 |
| Beryllium | NG | < 0.000020 | < 0.000020 | < 0.000020 | < 0.000020 | 0.000060 | < 0.000020 | < 0.000020 |
| Boron | 1.5<br>29 (short-term) | 0.083 | 0.074 | 0.084 | 0.022 | 0.023 | 0.106 | 0.076 |
| Cadmium | 0.00037 | 0.0000256 | 0.0000729 | 0.0000063 | 0.0000153 | 0.0000488 | 0.0000084 | 0.0000080 |
| Calcium | NG | 90.8 | 301 | 229 | 34.8 | 36.0 | 192 | 202 |
| Chromium | 0.0089 | < 0.00050 | < 0.00050 | < 0.00050 | 0.00054 | 0.00386 | < 0.00050 | < 0.00050 |
| Cobalt | 0.00283 | < 0.00010 | 0.00028 | < 0.00010 | 0.00019 | 0.00066 | < 0.00010 | < 0.00010 |
| Copper | 0.004 | 0.00111 | 0.00144 | < 0.00050 | 0.00163 | 0.00265 | < 0.00050 | < 0.00050 |
| Iron | 0.3 | 0.057 | 0.159 | 0.021 | 0.302 | 1.47 | 0.026 | 0.037 |
| Lead | 0.007 | 0.000155 | 0.00158 | < 0.000050 | 0.000137 | 0.000806 | < 0.000050 | 0.000068 |
| Lithium | NG | 0.0188 | 0.0234 | 0.0311 | 0.0065 | 0.0072 | 0.0241 | 0.0274 |
| Magnesium | NG | 60.4 | 152 | 132 | 8.97 | 9.21 | 111 | 124 |
| Manganese | NG | 0.124 | 0.677 | 0.0183 | 0.0334 | 0.0372 | 0.0180 | 0.0212 |
| Mercury | 0.000026 | < 0.0000050 | < 0.0000050 | < 0.0000050 | < 0.0000050 | < 0.0000050 | < 0.0000050 | < 0.0000050 |
| Molybdenum | 0.073 | < 0.000050 | 0.0241 | 0.000185 | 0.000949 | 0.00102 | 0.000212 | 0.000150 |
| Nickel | 0.15 | < 0.00050 | 0.00125 | < 0.00050 | 0.00154 | 0.00302 | < 0.00050 | < 0.00050 |
| Potassium | NG | 5.08 | 6.54 | 4.20 | 1.44 | 2.26 | 3.89 | 3.97 |
| Selenium | 0.001 | < 0.000050 | 0.000091 | < 0.000050 | 0.000197 | 0.000281 | 0.000056 | < 0.000050 |
| Silver | 0.00025 | 0.000043 | < 0.000010 | < 0.000010 | < 0.000010 | 0.000016 | 0.000025 | < 0.000010 |
| Sodium | NG | 12.3 | 24.4 | 29.2 | 10.4 | 9.15 | 15.3 | 28.6 |
| Thallium | 0.0008 | < 0.000010 | 0.000126 | < 0.000010 | < 0.000010 | 0.000029 | < 0.000010 | < 0.000010 |
| Tin | NG | < 0.00010 | < 0.00010 | < 0.00010 | < 0.00010 | 0.00015 | 0.00112 | < 0.00010 |
| Titanium | NG | < 0.00030 | 0.00112 | < 0.00030 | 0.00437 | 0.116 | < 0.00030 | < 0.00030 |
| Uranium | 0.015<br>0.033 (short-term) | 0.000018 | 0.00228 | 0.000548 | 0.000583 | 0.000592 | 0.000399 | 0.000491 |
| Vanadium | NG | < 0.00050 | < 0.00050 | < 0.00050 | 0.00085 | 0.00753 | < 0.00050 | < 0.00050 |
| Zinc | NG | 0.0156 | 0.223 | < 0.0030 | 0.0030 | 0.0073 | 0.0030 | 0.0043 |

(a) NG = No guideline
(b) The CCME Aquatic Life Guidelines (CCME 2020) apply to total metals, with the exception of zinc and manganese which apply to dissolved metals only. The dissolved data results have been compared to the total metals guidelines, which is a conservative application. However, the comparison of guidelines derived for dissolved concentrations were not compared to total concentrations.
(c) Shaded cells indicate concentrations that are greater than the CCME long-term aquatic life guideline.

Aluminum: Based on site-wide pH greater than 6.5.
Cadmium long-term guideline: based on site-wide hardness median of 300 mg/L, short-term guideline is based on site-wide hardness median is 300 mg/L and median pH is 8.
Chromium: Guideline is for Chromium III
Copper, lead and nickel: based on site-wide hardness greater than 180 mg/L.

APPENDIX C

CALIBRATION CERTIFICATES

HACH®
SERVICEPLUS
CERTIFIED PROGRAMS

# Certificate of Instrument Performance
# Certificat de Conformité

Company Name / Nom de la Compagnie: TECK METALS LTD (KIMBERLEY)

Account Number / No. de compte: 40277765

Certification Number / Numéro du Certificat: 1352122

| | |
|---|---|
| Part Number / No. de pièce: LPG440.99.00012 | |
| Serial Number / No. de série: 1719627 | |
| External Reference / Référence externe: | |

Hach Sales & Service Canada Ltd. certifies that your instrument has been serviced, calibrated, and verified with standards and now meets new product specifications.

Hach Sales & Service Canada Ltd. atteste que votre instrument a été entretenu, calibré et vérifié selon les normes en vigueur. Ses spécifications actuelles sont équivalentes à celles d'un produit neuf.

Certified by / Certifié par:

Jordan Showers, C.Tech.

Certification Date / Date de certification:

January 18, 2023

# Calibration Certificate



**Calibration Procedure No.**
PR-017-ISO

CERT #4227.01

| | | | |
|---|---|---|---|
| **Date of Issue:** | February 2, 2023 | **Customer:** | **Teck Resources Limited** |
| **Certificate Number:** | ISO_D202302-001-0 | | |
| **RMA Number:** | 30809 | | 400 Jim Ogilvie Way |
| **Description:** | Data Logger | | Kimberley BC |
| **Manufacturer:** | Campbell Scientific | | Canada V1A 3J6 |
| **Model:** | CR800 Series | **Lab Temperature** | 21.0°C |
| **Serial Number:** | 12700 | **Lab Relative Humidity:** | 24.9% |
| **As Found Condition:** | In Tolerance | **Date of Calibration:** | February 1, 2023 |
| **As Left Condition:** | In Tolerance | **Calibration Due Date:** | February 1, 2025 |
| **Adjustment Made:** | Yes | **Interval:** | 2 Years |
| **Comments:** | The lithium battery and desiccant were replaced. | | |

**Calibration Equipment**

| | Manufacturer | Model | Serial No. | Certificate No. | Cal Due Date |
|---|---|---|---|---|---|
| DC Calibration Source | Krohn-Hite | 523 | AV51106 | 17557891 | September 12, 2023 |
| Function Generator | BK Precision | 4054B | 515C20148 | 16931157 | December 2, 2023 |
| Frequency Counter | Agilent | 53220A | MY50005174 | 16648203 | July 29, 2023 |

The instrument listed above has been calibrated using policies and procedures that comply with ISO/IEC 17025:2017, equipment traceable through NIST standards and the International System of Units (SI). The statement of conformity is only for the instrument listed above. The calculated uncertainty was scaled with a K = 2 coverage factor that results in an expanded uncertainty with a confidence level of 95%. Any statement of compliance is made without taking uncertainty into account and is based on the Unit Under Test performance against tolerance only.

The data on the certificate is accurate at the time of calibration and depending on certain factors such as environmental, duration of use, or location of installation, the accuracy of the instrument may be reduced.

# Calibration Certificate



**Calibration Procedure No.**
PR-017-ISO

CERT #4227.01

| | | | |
|---|---|---|---|
| **Certificate Number:** | ISO_D202302-001-0 | **Description:** | Data Logger |
| **RMA Number:** | 30809 | **Manufacturer:** | Campbell Scientific |
| **Date of Calibration:** | February 1, 2023 | **Model:** | CR800 Series |
| **Calibration Due Date:** | February 1, 2025 | **Serial Number:** | 12700 |

**Voltage Calibration**

| | Type | Range | As found | Result | As left | Result | Tolerance | Uncertainty |
|---|---|---|---|---|---|---|---|---|
| * | Single | 2.5 mV | 2.49820 mV | PASS | 2.49783 mV | PASS | ±6 µV | 3.3 µV |
| * | Single | -2.5 mV | -2.50154 mV | PASS | -2.50185 mV | PASS | ±6 µV | 3.3 µV |
| * | Single | 7.5 mV | 7.49916 mV | PASS | 7.49790 mV | PASS | ±13 µV | 3.6 µV |
| | Single | 25 mV | 25.0002 mV | PASS | 24.9984 mV | PASS | ±38 µV | 4.6 µV |
| | Single | 250 mV | 249.9255 mV | PASS | 249.9272 mV | PASS | ±353 µV | 79 µV |
| | Single | 2500 mV | 2499.582 mV | PASS | 2499.582 mV | PASS | ±3.50 mV | 0.86 mV |
| | Single | 5000 mV | 5001.009 mV | PASS | 5001.009 mV | PASS | ±6.99 mV | 1.2 mV |
| | Single | -5000 mV | -5002.354 mV | PASS | -5002.354 mV | PASS | ±6.99 mV | 1.2 mV |
| * | Differential | 2.5 mV | 2.49853 mV | PASS | 2.49817 mV | PASS | ±3 µV | 3.3 µV |
| * | Differential | -2.5 mV | -2.50154 mV | PASS | -2.50118 mV | PASS | ±3 µV | 3.3 µV |
| * | Differential | 7.5 mV | 7.49916 mV | PASS | 7.49790 mV | PASS | ±8 µV | 3.5 µV |
| | Differential | 25 mV | 25.0035 mV | PASS | 25.0017 mV | PASS | ±26 µV | 3.9 µV |
| | Differential | 250 mV | 249.9926 mV | PASS | 249.9944 mV | PASS | ±251 µV | 40 µV |
| | Differential | 2500 mV | 2499.916 mV | PASS | 2499.916 mV | PASS | ±2.50 mV | 0.42 mV |
| | Differential | 5000 mV | 5001.682 mV | PASS | 5001.681 mV | PASS | ±4.99 mV | 0.54 mV |
| | Differential | -5000 mV | -5001.682 mV | PASS | -5001.681 mV | PASS | ±4.99 mV | 0.54 mV |

**Frequency Calibration**

| | Type | Range | As found | Result | As left | Result | Tolerance | Uncertainty |
|---|---|---|---|---|---|---|---|---|
| | Low Level AC | 20 Hz | 20.00 Hz | PASS | As Found | PASS | ±1 Hz | 0.24 Hz |
| | Low Level AC | 200 Hz | 200.00 Hz | PASS | As Found | PASS | ±1 Hz | 0.24 Hz |
| | Low Level AC | 20 kHz | 20.000 kHz | PASS | As Found | PASS | ±1 Hz | 0.25 Hz |
| | Switch Closure | 100 Hz | 100.00 Hz | PASS | As Found | PASS | ±1 Hz | 0.24 Hz |
| * | High Frequency | 110 kHz | 110.0000 kHz | PASS | As Found | PASS | ±1 Hz | 0.32 Hz |

*The decision rule used is Simple Acceptance as per G8:09/2019 guidelines with a TUR of 4:1 or greater. TURs that are not at least 4:1 are marked with an asterisk (*).

**Calibrated by:** **Michael Dar** **Reviewed by:** **Jacques Bouchard**

Calibration Procedure No.
PR-017-ISO

ACCREDITED CERT #4227.01

| | | | |
|---|---|---|---|
| **Date of Issue:** | February 2, 2023 | **Customer:** | **Teck Resources Limited** |
| **Certificate Number:** | ISO_D202302-002-0 | | |
| **RMA Number:** | 30809 | | 400 Jim Ogilvie Way |
| **Description:** | Data Logger | | Kimberley BC |
| **Manufacturer:** | Campbell Scientific | | Canada V1A 3J6 |
| **Model:** | CR800 Series | **Lab Temperature** | 21.0°C |
| **Serial Number:** | 41678 | **Lab Relative Humidity:** | 25.0% |
| **As Found Condition:** | In Tolerance | **Date of Calibration:** | February 1, 2023 |
| **As Left Condition:** | In Tolerance | **Calibration Due Date:** | February 1, 2025 |
| **Adjustment Made:** | Yes | **Interval:** | 2 Years |
| **Comments:** | The lithium battery and desiccant were replaced. | | |

**Calibration Equipment**

| | Manufacturer | Model | Serial No. | Certificate No. | Cal Due Date |
|---|---|---|---|---|---|
| DC Calibration Source | Krohn-Hite | 523 | AV51106 | 17557891 | September 12, 2023 |
| Function Generator | BK Precision | 4054B | 515C20148 | 16931157 | December 2, 2023 |
| Frequency Counter | Agilent | 53220A | MY50005174 | 16648203 | July 29, 2023 |

The instrument listed above has been calibrated using policies and procedures that comply with ISO/IEC 17025:2017, equipment traceable through NIST standards and the International System of Units (SI). The statement of conformity is only for the instrument listed above. The calculated uncertainty was scaled with a K = 2 coverage factor that results in an expanded uncertainty with a confidence level of 95%. Any statement of compliance is made without taking uncertainty into account and is based on the Unit Under Test performance against tolerance only.

The data on the certificate is accurate at the time of calibration and depending on certain factors such as environmental, duration of use, or location of installation, the accuracy of the instrument may be reduced.

Calibration Procedure No.
PR-017-ISO

CERT #4227.01

| | | | |
|---|---|---|---|
| **Certificate Number:** | ISO_D202302-002-0 | **Description:** | Data Logger |
| **RMA Number:** | 30809 | **Manufacturer:** | Campbell Scientific |
| **Date of Calibration:** | February 1, 2023 | **Model:** | CR800 Series |
| **Calibration Due Date:** | February 1, 2025 | **Serial Number:** | 41678 |

**Voltage Calibration**

| Type | Range | As found | Result | As left | Result | Tolerance | Uncertainty |
|---|---|---|---|---|---|---|---|
| * Single | 2.5 mV | 2.49743 mV | PASS | 2.49828 mV | PASS | ±6 µV | 3.3 µV |
| * Single | -2.5 mV | -2.50149 mV | PASS | -2.50165 mV | PASS | ±6 µV | 3.3 µV |
| * Single | 7.5 mV | 7.49630 mV | PASS | 7.49775 mV | PASS | ±13 µV | 3.6 µV |
| Single | 25 mV | 24.9936 mV | PASS | 24.9954 mV | PASS | ±38 µV | 4.6 µV |
| Single | 250 mV | 249.9878 mV | PASS | 250.0099 mV | PASS | ±353 µV | 79 µV |
| Single | 2500 mV | 2499.279 mV | PASS | 2499.938 mV | PASS | ±3.50 mV | 0.86 mV |
| Single | 5000 mV | 4997.618 mV | PASS | 4998.979 mV | PASS | ±6.99 mV | 1.2 mV |
| Single | -5000 mV | -4998.979 mV | PASS | -5000.340 mV | PASS | ±6.99 mV | 1.2 mV |
| * Differential | 2.5 mV | 2.49777 mV | PASS | 2.49828 mV | PASS | ±3 µV | 3.3 µV |
| * Differential | -2.5 mV | -2.50115 mV | PASS | -2.50165 mV | PASS | ±3 µV | 3.3 µV |
| * Differential | 7.5 mV | 7.49731 mV | PASS | 7.49978 mV | PASS | ±8 µV | 3.5 µV |
| Differential | 25 mV | 24.9936 mV | PASS | 25.0020 mV | PASS | ±26 µV | 3.9 µV |
| Differential | 250 mV | 249.9878 mV | PASS | 250.0099 mV | PASS | ±251 µV | 40 µV |
| Differential | 2500 mV | 2499.618 mV | PASS | 2500.277 mV | PASS | ±2.50 mV | 0.42 mV |
| Differential | 5000 mV | 4998.298 mV | PASS | 4999.659 mV | PASS | ±4.99 mV | 0.54 mV |
| Differential | -5000 mV | -4998.298 mV | PASS | -4999.659 mV | PASS | ±4.99 mV | 0.54 mV |

**Frequency Calibration**

| Type | Range | As found | Result | As left | Result | Tolerance | Uncertainty |
|---|---|---|---|---|---|---|---|
| Low Level AC | 20 Hz | 20.00 Hz | PASS | As Found | PASS | ±1 Hz | 0.24 Hz |
| Low Level AC | 200 Hz | 200.00 Hz | PASS | As Found | PASS | ±1 Hz | 0.24 Hz |
| Low Level AC | 20 kHz | 20.000 kHz | PASS | As Found | PASS | ±1 Hz | 0.25 Hz |
| Switch Closure | 100 Hz | 100.00 Hz | PASS | As Found | PASS | ±1 Hz | 0.24 Hz |
| * High Frequency | 110 kHz | 110.0000 kHz | PASS | As Found | PASS | ±1 Hz | 0.32 Hz |

*The decision rule used is Simple Acceptance as per G8:09/2019 guidelines with a TUR of 4:1 or greater. TURs that are not at least 4:1 are marked with an asterisk (*).

| | | | |
|---|---|---|---|
| **Calibrated by:** | **Michael Dar** | **Reviewed by:** | **Jacques Bouchard** |

Campbell Scientific

Campbell Scientific (Canada) Corp.
14532 131 Avenue NW Edmonton AB T5L 4X4
780.454.2505 | fax 780.454.2655 | campbellsci.ca

# Repair Summary

Repair ............: 30809

Date ..............: 2/02/2023
Courier ...........:
Delivery terms ....: FOB Edmonton Plant
Delivery mode ....: Prepaid
Collect Acct. No. .:

**Contact:**
Kurt Ljungberg
Phone ....: (780) 266-2510
Fax .......:
Email .....: Kurt.Ljungberg@teck.com

**Ship To:**
Attention: Kurt Ljungberg - (780) 266-2510
Teck Resources Limited
400 Jim Ogilvie Way
Kimberley BC V1A 3J6

| Qty | Item number | Serial number | Description | Options | Apr By | Status |
|---|---|---|---|---|---|---|
| 1 | CR800 | 12700 | Datalogger with 4M RAM Memory (2,000,000 data values) (Operating Range -25 to +50 C) | OS: CR800.std.32.05 | jb | Done |

Accessories ......: pow conn, SC12R, in enclosure 'B' with CD294 2276, PS100 18265 and wall adapter, bag of screws. Enclosure B is packed in wooden crate.

**Repair Summary** : Routine maintenance, OS update and calibration with certificate. Configuration reset to factory defaults.

| Qty | Item number | Serial number | Description | Options | Apr By | Status |
|---|---|---|---|---|---|---|
| 1 | PS100 | | ** SUPERCEDED to PS100-8.5 ** POWER SUP Chrgr/Reg to 12VDC w/Rechargeable LA Batt (7 Ahr) (DOES NOT INCL AC ADAPTER) | | jb | Done |

Accessories ......: sn 18265 w/L9591 adapter, LA batt @12.4V when received, in enclosure 'B' with CR800 12700

**Repair Summary** : A load test was performed.

| Qty | Item number | Serial number | Description | Options | Apr By | Status |
|---|---|---|---|---|---|---|
| 1 | CR800 | 41678 | Datalogger with 4M RAM Memory (2,000,000 data values) (Operating Range -25 to +50 C) | OS: CR800.std.32.05 | jb | Done |

Accessories ......: pow conn, RS232 cable, in enclosure 'A' with CD295 2275, PS150 2900 and wall adapter, bag of screws. Enclosure A is packed in wooden crate.

**Repair Summary** : Routine maintenance, OS update and calibration with certificate. Configuration reset to factory defaults. The enclosure desiccant packs were replaced.

| Qty | Item number | Serial number | Description | Options | Apr By | Status |
|---|---|---|---|---|---|---|
| 1 | PS150 | | Power Supply 12V with Charging Regulator & 8.5Ah Sealed Rechargeable Battery | | jb | Done |

Accessories ......: 2900 w/ac adapter, LA batt @ 12.45V when received, in enclosure 'A' with CR800 41678

**Repair Summary** : A load test was performed.

| Qty | Item number | Serial number | Description | Options | Apr By | Status |
|---|---|---|---|---|---|---|
| 1 | SC115 | 4136 | CS I/O 2G Flash Memory Drive with USB Interface | | jb | Done |

**Repair Summary** : A functional checkout of the SC115 was performed.

# APPENDIX D

# QAQC RELATIVE PERCENT DIFFERENCE FOR DUPLICATE SAMPLES

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| | |
|---|---|
| **Duplicate Location** | PP_35-1A |
| **Date** | 2023-07-16 |

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| ALUMINUM, D | mg/l | 0.001 | 0.001 | 0.0038 | 0.0027 | 33.85% | Pass-1 |
| ALUMINUM, T | mg/l | 0.003 | 0.003 | 0.0234 | 0.0263 | 11.67% | Pass |
| ANTIMONY, D | mg/l | 0.0001 | 0.0001 | <0.00005 | <0.00005 | 0.00% | Pass |
| ANTIMONY, T | mg/l | 0.0001 | 0.0001 | <0.00005 | <0.00005 | 0.00% | Pass |
| ARSENIC, D | mg/l | 0.0001 | 0.0001 | 0.00015 | 0.00013 | 14.29% | Pass |
| ARSENIC, T | mg/l | 0.0001 | 0.0001 | 0.00016 | 0.00019 | 17.14% | Pass |
| BARIUM, D | mg/l | 0.0001 | 0.0001 | 0.0347 | 0.0344 | 0.87% | Pass |
| BARIUM, T | mg/l | 0.0001 | 0.0001 | 0.0355 | 0.0356 | 0.28% | Pass |
| BERYLLIUM, D | mg/l | 0.0001 | 0.0001 | <0.00005 | <0.00005 | 0.00% | Pass |
| BERYLLIUM, T | mg/l | 0.00002 | 0.00002 | <0.000010 | <0.000010 | 0.00% | Pass |
| BISMUTH, D | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| BISMUTH, T | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| BORON, D | mg/l | 0.01 | 0.01 | 0.017 | 0.016 | 6.06% | Pass |
| BORON, T | mg/l | 0.01 | 0.01 | 0.019 | 0.017 | 11.11% | Pass |
| CADMIUM, D | mg/l | 0.000005 | 0.000005 | 0.000662 | 0.000657 | 0.76% | Pass |
| CADMIUM, T | mg/l | 0.000005 | 0.000005 | 0.000946 | 0.000855 | 10.11% | Pass |
| CALCIUM, D | mg/l | 0.05 | 0.05 | 105 | 104 | 0.96% | Pass |
| CALCIUM, T | mg/l | 0.05 | 0.05 | 105 | 102 | 2.90% | Pass |
| CHROMIUM, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| CHROMIUM, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| COBALT, D | mg/l | 0.0001 | 0.0001 | 0.00046 | 0.00044 | 4.44% | Pass |
| COBALT, T | mg/l | 0.0001 | 0.0001 | 0.00048 | 0.00046 | 4.26% | Pass |
| COPPER, D | mg/l | 0.0002 | 0.0002 | 0.00456 | 0.00469 | 2.81% | Pass |
| COPPER, T | mg/l | 0.0005 | 0.0005 | 0.00690 | 0.00657 | 4.90% | Pass |
| Hardness, Total or Dissolved CaCO3, D | mg/l | 0.6 | 0.6 | 341 | 338 | 0.88% | Pass |
| Hardness, Total or Dissolved CaCO3, T | mg/l | 0.6 | 0.6 | 342 | 335 | 2.07% | Pass |

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| IRON, D | mg/l | 0.01 | 0.01 | <0.0050 | <0.005 | 0.00% | Pass |
| IRON, T | mg/l | 0.01 | 0.01 | 0.046 | 0.05 | 8.33% | Pass |
| LEAD, D | mg/l | 0.00005 | 0.00005 | 0.0301 | 0.0301 | 0.00% | Pass |
| LEAD, T | mg/l | 0.00005 | 0.00005 | 0.0400 | 0.039 | 2.53% | Pass |
| LITHIUM, D | mg/l | 0.001 | 0.001 | 0.0023 | 0.0023 | 0.00% | Pass |
| LITHIUM, T | mg/l | 0.001 | 0.001 | 0.0023 | 0.0023 | 0.00% | Pass |
| MAGNESIUM, D | mg/l | 0.1 | 0.1 | 19.1 | 19 | 0.52% | Pass |
| MAGNESIUM, T | mg/l | 0.1 | 0.1 | 19.5 | 19.6 | 0.51% | Pass |
| MANGANESE, D | mg/l | 0.0001 | 0.0001 | 0.0104 | 0.0104 | 0.00% | Pass |
| MANGANESE, T | mg/l | 0.0001 | 0.0001 | 0.0130 | 0.0131 | 0.77% | Pass |
| MERCURY, D | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| MERCURY, T | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| MOLYBDENUM, D | mg/l | 0.00005 | 0.00005 | 0.000880 | 0.000885 | 0.57% | Pass |
| MOLYBDENUM, T | mg/l | 0.00005 | 0.00005 | 0.000950 | 0.000926 | 2.56% | Pass |
| NICKEL, D | mg/l | 0.0005 | 0.0005 | 0.00250 | 0.00255 | 1.98% | Pass |
| NICKEL, T | mg/l | 0.0005 | 0.0005 | 0.00266 | 0.00271 | 1.86% | Pass |
| NITROGEN, AMMONIA (AS N), T | mg/l | 0.005 | 0.005 | <0.0025 | <0.0025 | 0.00% | Pass |
| pH, LAB | ph units | 0.1 | 0.1 | 8.31 | 8.35 | 0.48% | Pass |
| PHOSPHORUS, D | mg/l | 0.3 | 0.3 | <0.150 | <0.15 | 0.00% | Pass |
| PHOSPHORUS, T | mg/l | 0.05 | 0.05 | <0.025 | <0.025 | 0.00% | Pass |
| POTASSIUM, D | mg/l | 0.05 | 0.05 | 1.26 | 1.28 | 1.57% | Pass |
| POTASSIUM, T | mg/l | 0.1 | 0.1 | 1.28 | 1.29 | 0.78% | Pass |
| SELENIUM, D | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| SELENIUM, T | mg/l | 0.00005 | 0.00005 | <0.000025 | 0.000065 | 88.89% | Pass-1 |
| SILICON, D | mg/l | 0.05 | 0.05 | 0.806 | 0.819 | 1.60% | Pass |
| SILICON, T | mg/l | 0.1 | 0.1 | 0.87 | 0.89 | 2.27% | Pass |
| SILVER, D | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| SILVER, T | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| SODIUM, D | mg/l | 0.05 | 0.05 | 1.92 | 1.91 | 0.52% | Pass |
| SODIUM, T | mg/l | 0.05 | 0.05 | 1.98 | 1.96 | 1.02% | Pass |
| STRONTIUM, D | mg/l | 0.0002 | 0.0002 | 0.266 | 0.261 | 1.90% | Pass |
| STRONTIUM, T | mg/l | 0.0002 | 0.0002 | 0.265 | 0.272 | 2.61% | Pass |

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| SULFUR, T | mg/l | 0.5 | 0.5 | 100 | 101 | 1.00% | Pass |
| THALLIUM, D | mg/l | 0.00001 | 0.00001 | 0.000314 | 0.00031 | 1.28% | Pass |
| THALLIUM, T | mg/l | 0.00001 | 0.00001 | 0.000305 | 0.000312 | 2.27% | Pass |
| TIN, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| TIN, T | mg/l | 0.0001 | 0.0001 | 0.00024 | 0.00013 | 59.46% | Pass-1 |
| TITANIUM, D | mg/l | 0.01 | 0.01 | <0.005 | <0.005 | 0.00% | Pass |
| TITANIUM, T | mg/l | 0.0003 | 0.0003 | 0.00040 | 0.00069 | 53.21% | Pass-1 |
| TOTAL SUSPENDED SOLIDS, LAB | mg/l | 3 | 3 | 7.4 | 7.2 | 2.74% | Pass |
| URANIUM, D | mg/l | 0.00001 | 0.00001 | 0.000201 | 0.0002 | 0.50% | Pass |
| URANIUM, T | mg/l | 0.00001 | 0.00001 | 0.000211 | 0.000203 | 3.86% | Pass |
| VANADIUM, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| VANADIUM, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| ZINC, D | mg/l | 0.001 | 0.001 | 0.989 | 0.979 | 1.02% | Pass |
| ZINC, T | mg/l | 0.003 | 0.003 | 1.03 | 1.02 | 0.98% | Pass |
| ZIRCONIUM, T | mg/l | 0.0002 | 0.0002 | <0.00010 | <0.0001 | 0.00% | Pass |

| | |
|---|---|
| **Location:** | PP_35-1A |
| **Date Sampled:** | 2023-04-25 |

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| ALKALINITY, TOTAL (As CaCO3) | mg/l | 2 | 2 | 48.5 | 46.6 | 4.00% | Pass |
| ALUMINUM, D | mg/l | 0.001 | 0.001 | 0.0034 | 0.0031 | 9.23% | Pass |
| ALUMINUM, T | mg/l | 0.003 | 0.003 | 0.112 | 0.111 | 0.90% | Pass |
| ANTIMONY, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| ANTIMONY, T | mg/l | 0.0001 | 0.0001 | 0.00010 | <0.000050 | 66.67% | Pass-1 |
| ARSENIC, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| ARSENIC, T | mg/l | 0.0001 | 0.0001 | 0.00013 | 0.00014 | 7.41% | Pass |
| BARIUM, D | mg/l | 0.0001 | 0.0001 | 0.0168 | 0.0167 | 0.60% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| BARIUM, T | mg/l | 0.0001 | 0.0001 | 0.0169 | 0.0173 | 2.34% | Pass |
| BERYLLIUM, D | mg/l | 0.00002 | 0.00002 | <0.000010 | <0.000010 | 0.00% | Pass |
| BERYLLIUM, T | mg/l | 0.00002 | 0.00002 | <0.000010 | <0.000010 | 0.00% | Pass |
| BISMUTH, D | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| BISMUTH, T | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| BORON, D | mg/l | 0.01 | 0.01 | <0.0050 | <0.005 | 0.00% | Pass |
| BORON, T | mg/l | 0.01 | 0.01 | <0.0050 | <0.005 | 0.00% | Pass |
| CADMIUM, D | mg/l | 0.000005 | 0.000005 | 0.00193 | 0.00197 | 2.05% | Pass |
| CADMIUM, T | mg/l | 0.000005 | 0.000005 | 0.00206 | 0.00206 | 0.00% | Pass |
| CALCIUM, D | mg/l | 0.05 | 0.05 | 73.8 | 74.3 | 0.68% | Pass |
| CALCIUM, T | mg/l | 0.05 | 0.05 | 71.4 | 69.8 | 2.27% | Pass |
| CESIUM, D | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| CESIUM, T | mg/l | 0.00001 | 0.00001 | 0.000042 | <0.000041 | 2.41% | Pass |
| CHLORIDE, D | mg/l | 0.5 | 0.5 | 1.39 | 1.33 | 4.41% | Pass |
| CHROMIUM, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| CHROMIUM, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| COBALT, D | mg/l | 0.0001 | 0.0001 | 0.00048 | 0.00048 | 0.00% | Pass |
| COBALT, T | mg/l | 0.0001 | 0.0001 | 0.00049 | 0.00051 | 4.00% | Pass |
| COPPER, D | mg/l | 0.0002 | 0.0002 | 0.00258 | 0.0049 | 62.03% | Fail |
| COPPER, T | mg/l | 0.0005 | 0.0005 | 0.00489 | 0.00606 | 21.37% | Pass |
| IRON, D | mg/l | 0.01 | 0.01 | <0.0050 | <0.005 | 0.00% | Pass |
| IRON, T | mg/l | 0.01 | 0.01 | 0.228 | 0.217 | 5% | Pass |
| LEAD, D | mg/l | 0.00005 | 0.00005 | 0.0112 | 0.0115 | 2.64% | Pass |
| LEAD, T | mg/l | 0.00005 | 0.00005 | 0.0537 | 0.0543 | 1.11% | Pass |
| LITHIUM, D | mg/l | 0.001 | 0.001 | <0.00050 | 0.001 | 66.67% | Pass-1 |
| LITHIUM, T | mg/l | 0.001 | 0.001 | 0.0012 | 0.0012 | 0.00% | Pass |
| MAGNESIUM, D | mg/l | 0.005 | 0.005 | 9.17 | 9.24 | 0.76% | Pass |
| MAGNESIUM, T | mg/l | 0.005 | 0.005 | 9.64 | 9.55 | 0.94% | Pass |
| MANGANESE, D | mg/l | 0.0001 | 0.0001 | 0.0343 | 0.0341 | 0.58% | Pass |
| MANGANESE, T | mg/l | 0.0001 | 0.0001 | 0.0401 | 0.0401 | 0.00% | Pass |
| MERCURY, D | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| MERCURY, T | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| MOLYBDENUM, D | mg/l | 0.00005 | 0.00005 | 0.000365 | 0.000341 | 6.80% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| MOLYBDENUM, T | mg/l | 0.00005 | 0.00005 | 0.000365 | 0.000389 | 6.37% | Pass |
| NICKEL, D | mg/l | 0.0005 | 0.0005 | 0.00172 | 0.00178 | 3.43% | Pass |
| NICKEL, T | mg/l | 0.0005 | 0.0005 | 0.00204 | 0.0022 | 7.55% | Pass |
| NITROGEN, AMMONIA (AS N), T | mg/l | 0.005 | 0.005 | 0.0467 | 0.0443 | 5.27% | Pass |
| pH, LAB | ph units | 0.1 | 0.1 | 7.69 | 7.66 | 0.39% | Pass |
| PHOSPHORUS, D | mg/l | 0.05 | 0.05 | <0.025 | <0.025 | 0.00% | Pass |
| PHOSPHORUS, T | mg/l | 0.05 | 0.05 | <0.025 | <0.025 | 0.00% | Pass |
| POTASSIUM, D | mg/l | 0.05 | 0.05 | 0.772 | 0.76 | 1.57% | Pass |
| POTASSIUM, T | mg/l | 0.05 | 0.05 | 0.811 | 0.796 | 1.87% | Pass |
| RUBIDIUM, D | mg/l | 0.0002 | 0.0002 | 0.00058 | 0.00056 | 3.51% | Pass |
| RUBIDIUM, T | mg/l | 0.0002 | 0.0002 | 0.00086 | 0.00089 | 3.43% | Pass |
| SELENIUM, D | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| SELENIUM, T | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| SILICON, D | mg/l | 0.05 | 0.05 | 0.338 | 0.338 | 0.00% | Pass |
| SILICON, T | mg/l | 0.1 | 0.1 | 0.60 | 0.56 | 6.90% | Pass |
| SILVER, D | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| SILVER, T | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| SODIUM, D | mg/l | 0.05 | 0.05 | 0.943 | 0.935 | 0.85% | Pass |
| SODIUM, T | mg/l | 0.05 | 0.05 | 0.952 | 0.947 | 0.005266 | Pass |
| STRONTIUM, D | mg/l | 0.0002 | 0.0002 | 0.156 | 0.153 | 1.94% | Pass |
| STRONTIUM, T | mg/l | 0.0002 | 0.0002 | 0.168 | 0.166 | 1.20% | Pass |
| SULFATE (AS SO4), D | mg/l | 0.3 | 0.3 | 182 | 182 | 0.00% | Pass |
| SULFUR, D | mg/l | 0.5 | 0.5 | 61.4 | 60.4 | 1.64% | Pass |
| SULFUR, T | mg/l | 0.5 | 0.5 | 64.8 | 64.3 | 0.77% | Pass |
| TELLURIUM, D | mg/l | 0.0002 | 0.0002 | <0.00010 | <0.0001 | 0.00% | Pass |
| TELLURIUM, T | mg/l | 0.0002 | 0.0002 | <0.00010 | <0.0001 | 0.00% | Pass |
| THALLIUM, D | mg/l | 0.00001 | 0.00001 | 0.000170 | 0.000169 | 0.59% | Pass |
| THALLIUM, T | mg/l | 0.00001 | 0.00001 | 0.000190 | 0.000186 | 2.13% | Pass |
| THORIUM, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| THORIUM, T | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| TIN, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| TIN, T | mg/l | 0.0001 | 0.0001 | 0.00014 | <0.000050 | 94.74% | Pass-1 |
| TITANIUM, D | mg/l | 0.0003 | 0.0003 | <0.00015 | <0.00015 | 0.00% | Pass |
| TITANIUM, T | mg/l | 0.0003 | 0.0003 | 0.00402 | 0.00334 | 18.48% | Pass |
| TOTAL SUSPENDED SOLIDS, LAB | mg/l | 3 | 3 | 7.4 | 7.8 | 5.26% | Pass |
| TUNGSTEN, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| TUNGSTEN, T | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| URANIUM, D | mg/l | 0.00001 | 0.00001 | 0.000110 | 0.000109 | 0.91% | Pass |
| URANIUM, T | mg/l | 0.00001 | 0.00001 | 0.000130 | 0.000137 | 5.24% | Pass |
| VANADIUM, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| VANADIUM, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| ZINC, D | mg/l | 0.001 | 0.001 | 1.38 | 1.38 | 0.00% | Pass |
| ZINC, T | mg/l | 0.003 | 0.003 | 1.51 | 1.48 | 2.01% | Pass |
| ZIRCONIUM, D | mg/l | 0.0003 | 0.0003 | <0.00015 | <0.00015 | 0.00% | Pass |
| ZIRCONIUM, T | mg/l | 0.0002 | 0.0002 | <0.00010 | <0.0001 | 0.00% | Pass |

| | |
|---|---|
| **Location:** | PP_35-1A |
| **Date Sampled:** | 2023-07-31 |

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| ALUMINUM, D | mg/l | 0.001 | 0.001 | 0.0050 | 0.0048 | 4.08% | Pass |
| ALUMINUM, T | mg/l | 0.003 | 0.003 | 0.0220 | 0.0213 | 3.23% | Pass |
| ANTIMONY, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| ANTIMONY, T | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| ARSENIC, D | mg/l | 0.0001 | 0.0001 | 0.00016 | 0.00016 | 0.00% | Pass |
| ARSENIC, T | mg/l | 0.0001 | 0.0001 | 0.00026 | 0.0002 | 26.09% | Pass |
| BARIUM, D | mg/l | 0.0001 | 0.0001 | 0.0355 | 0.0355 | 0.00% | Pass |
| BARIUM, T | mg/l | 0.0001 | 0.0001 | 0.0367 | 0.0368 | 0.27% | Pass |
| BERYLLIUM, D | mg/l | 0.0001 | 0.0001 | <0.0000500 | <0.000050 | 0.00% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| BERYLLIUM, T | mg/l | 0.00002 | 0.00002 | <0.000010 | <0.000010 | 0.00% | Pass |
| BISMUTH, D | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| BISMUTH, T | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| BORON, D | mg/l | 0.01 | 0.01 | 0.018 | 0.018 | 0.00% | Pass |
| BORON, T | mg/l | 0.01 | 0.01 | 0.021 | 0.02 | 4.88% | Pass |
| CADMIUM, D | mg/l | 0.000005 | 0.000005 | 0.000551 | 0.000559 | 1.44% | Pass |
| CADMIUM, T | mg/l | 0.000005 | 0.000005 | 0.000648 | 0.000633 | 2.34% | Pass |
| CALCIUM, D | mg/l | 0.05 | 0.05 | 115 | 111 | 3.54% | Pass |
| CALCIUM, T | mg/l | 0.05 | 0.05 | 114 | 115 | 0.87% | Pass |
| CHROMIUM, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| CHROMIUM, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| COBALT, D | mg/l | 0.0001 | 0.0001 | 0.00042 | 0.0004 | 4.88% | Pass |
| COBALT, T | mg/l | 0.0001 | 0.0001 | 0.00042 | 0.00043 | 2.35% | Pass |
| COPPER, D | mg/l | 0.0002 | 0.0002 | 0.00403 | 0.00394 | 2.26% | Pass |
| COPPER, T | mg/l | 0.0005 | 0.0005 | 0.00590 | 0.00588 | 0.34% | Pass |
| Hardness, Total or Dissolved CaCO3, D | mg/l | 0.6 | 0.6 | 375 | 362 | 3.53% | Pass |
| Hardness, Total or Dissolved CaCO3, T | mg/l | 0.6 | 0.6 | 372 | 378 | 1.60% | Pass |
| IRON, D | mg/l | 0.01 | 0.01 | <0.0050 | <0.005 | 0.00% | Pass |
| IRON, T | mg/l | 0.01 | 0.01 | 0.043 | 0.038 | 12.35% | Pass |
| LEAD, D | mg/l | 0.00005 | 0.00005 | 0.0268 | 0.0266 | 0.75% | Pass |
| LEAD, T | mg/l | 0.00005 | 0.00005 | 0.0369 | 0.0362 | 1.92% | Pass |
| LITHIUM, D | mg/l | 0.001 | 0.001 | 0.0026 | 0.0027 | 3.77% | Pass |
| LITHIUM, T | mg/l | 0.001 | 0.001 | 0.0027 | 0.0027 | 0.00% | Pass |
| MAGNESIUM, D | mg/l | 0.1 | 0.1 | 21.3 | 20.6 | 3.34% | Pass |
| MAGNESIUM, T | mg/l | 0.1 | 0.1 | 21.3 | 22 | 3.23% | Pass |
| MANGANESE, D | mg/l | 0.0001 | 0.0001 | 0.0107 | 0.0102 | 4.78% | Pass |
| MANGANESE, T | mg/l | 0.0001 | 0.0001 | 0.0122 | 0.012 | 1.65% | Pass |
| MERCURY, D | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| MERCURY, T | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| MOLYBDENUM, D | mg/l | 0.00005 | 0.00005 | 0.000986 | 0.001 | 1.41% | Pass |
| MOLYBDENUM, T | mg/l | 0.00005 | 0.00005 | 0.00102 | 0.00104 | 1.94% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| NICKEL, D | mg/l | 0.0005 | 0.0005 | 0.00246 | 0.00247 | 0.41% | Pass |
| NICKEL, T | mg/l | 0.0005 | 0.0005 | 0.00244 | 0.00253 | 3.62% | Pass |
| NITROGEN, AMMONIA (AS N), T | mg/l | 0.005 | 0.005 | <0.0025 | <0.0025 | 0.00% | Pass |
| pH, LAB | ph units | 0.1 | 0.1 | 8.41 | 8.36 | 0.60% | Pass |
| PHOSPHORUS, D | mg/l | 0.3 | 0.3 | <0.150 | <0.15 | 0.00% | Pass |
| PHOSPHORUS, T | mg/l | 0.05 | 0.05 | <0.025 | <0.025 | 0.00% | Pass |
| POTASSIUM, D | mg/l | 0.05 | 0.05 | 1.37 | 1.32 | 3.72% | Pass |
| POTASSIUM, T | mg/l | 0.1 | 0.1 | 1.36 | 1.33 | 2.23% | Pass |
| SELENIUM, D | mg/l | 0.00005 | 0.00005 | 0.000054 | 0.000063 | 15.38% | Pass |
| SELENIUM, T | mg/l | 0.00005 | 0.00005 | 0.000058 | <0.000025 | 79.52% | Pass-1 |
| SILICON, D | mg/l | 0.05 | 0.05 | 0.916 | 0.9 | 1.76% | Pass |
| SILICON, T | mg/l | 0.1 | 0.1 | 0.98 | 0.97 | 1.03% | Pass |
| SILVER, D | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| SILVER, T | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| SODIUM, D | mg/l | 0.05 | 0.05 | 2.04 | 1.98 | 2.99% | Pass |
| SODIUM, T | mg/l | 0.05 | 0.05 | 2.05 | 2.01 | 1.97% | Pass |
| STRONTIUM, D | mg/l | 0.0002 | 0.0002 | 0.278 | 0.281 | 1.07% | Pass |
| STRONTIUM, T | mg/l | 0.0002 | 0.0002 | 0.285 | 0.285 | 0.00% | Pass |
| SULFUR, T | mg/l | 0.5 | 0.5 | 106 | 105 | 0.95% | Pass |
| THALLIUM, D | mg/l | 0.00001 | 0.00001 | 0.000327 | 0.000324 | 0.92% | Pass |
| THALLIUM, T | mg/l | 0.00001 | 0.00001 | 0.000336 | 0.000335 | 0.30% | Pass |
| TIN, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| TIN, T | mg/l | 0.0001 | 0.0001 | 0.00012 | 0.00012 | 0.00% | Pass |
| TITANIUM, D | mg/l | 0.01 | 0.01 | <0.00500 | <0.005 | 0.00% | Pass |
| TITANIUM, T | mg/l | 0.0003 | 0.0003 | <0.00015 | <0.00015 | 0.00% | Pass |
| TOTAL SUSPENDED SOLIDS, LAB | mg/l | 3 | 3 | 5.2 | 5.6 | 7.41% | Pass |
| URANIUM, D | mg/l | 0.00001 | 0.00001 | 0.000237 | 0.000235 | 0.85% | Pass |
| URANIUM, T | mg/l | 0.00001 | 0.00001 | 0.000242 | 0.00023 | 5.08% | Pass |
| VANADIUM, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| VANADIUM, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| ZINC, D | mg/l | 0.001 | 0.001 | 0.870 | 0.847 | 2.68% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| ZINC, T | mg/l | 0.003 | 0.003 | 0.926 | 0.918 | 0.87% | Pass |
| ZIRCONIUM, T | mg/l | 0.0002 | 0.0002 | <0.00010 | <0.0001 | 0.00% | Pass |

| | |
|---|---|
| **Location:** | PP_35-1B |
| **Date Sampled:** | 2023-07-24 |

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| ALUMINUM, D | mg/l | 0.001 | 0.001 | 0.0035 | 0.0041 | 15.79% | Pass |
| ALUMINUM, T | mg/l | 0.003 | 0.003 | 0.0122 | 0.011 | 10.34% | Pass |
| ANTIMONY, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| ANTIMONY, T | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| ARSENIC, D | mg/l | 0.0001 | 0.0001 | 0.00016 | 0.00015 | 6.45% | Pass |
| ARSENIC, T | mg/l | 0.0001 | 0.0001 | 0.00020 | 0.00019 | 5.13% | Pass |
| BARIUM, D | mg/l | 0.0001 | 0.0001 | 0.0298 | 0.0294 | 1.35% | Pass |
| BARIUM, T | mg/l | 0.0001 | 0.0001 | 0.0303 | 0.0291 | 4.04% | Pass |
| BERYLLIUM, D | mg/l | 0.0001 | 0.0001 | <0.00005 | <0.00005 | 0.00% | Pass |
| BERYLLIUM, T | mg/l | 0.00002 | 0.00002 | <0.000010 | <0.000010 | 0.00% | Pass |
| BISMUTH, D | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| BISMUTH, T | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| BORON, D | mg/l | 0.01 | 0.01 | 0.015 | 0.015 | 0.00% | Pass |
| BORON, T | mg/l | 0.01 | 0.01 | 0.017 | 0.017 | 0.00% | Pass |
| CADMIUM, D | mg/l | 0.000005 | 0.000005 | 0.000115 | 0.000116 | 0.87% | Pass |
| CADMIUM, T | mg/l | 0.000005 | 0.000005 | 0.000138 | 0.000136 | 1.46% | Pass |
| CALCIUM, D | mg/l | 0.05 | 0.05 | 73.3 | 73.4 | 0.14% | Pass |
| CALCIUM, T | mg/l | 0.05 | 0.05 | 70.0 | 71.2 | 1.70% | Pass |
| CHROMIUM, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| CHROMIUM, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| COBALT, D | mg/l | 0.0001 | 0.0001 | 0.00010 | 0.00011 | 9.52% | Pass |
| COBALT, T | mg/l | 0.0001 | 0.0001 | 0.00012 | 0.00012 | 0.00% | Pass |
| COPPER, D | mg/l | 0.0002 | 0.0002 | 0.00577 | 0.00573 | 0.70% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| COPPER, T | mg/l | 0.0005 | 0.0005 | 0.00663 | 0.00652 | 1.67% | Pass |
| CYANIDE, T | mg/l | 0.002 | 0.002 | <0.0010 | <0.001 | 0.00% | Pass |
| Hardness, Total or Dissolved CaCO3, D | mg/l | 0.6 | 0.6 | 292 | 290 | 0.69% | Pass |
| Hardness, Total or Dissolved CaCO3, T | mg/l | 0.6 | 0.6 | 282 | 285 | 1.06% | Pass |
| IRON, D | mg/l | 0.01 | 0.01 | <0.0050 | <0.005 | 0.00% | Pass |
| IRON, T | mg/l | 0.01 | 0.01 | 0.012 | <0.005 | 82.35% | Pass-1 |
| LEAD, D | mg/l | 0.00005 | 0.00005 | 0.00241 | 0.00241 | 0.00% | Pass |
| LEAD, T | mg/l | 0.00005 | 0.00005 | 0.00368 | 0.00364 | 1.09% | Pass |
| LITHIUM, D | mg/l | 0.001 | 0.001 | 0.0023 | 0.0023 | 0.00% | Pass |
| LITHIUM, T | mg/l | 0.001 | 0.001 | 0.0022 | 0.0022 | 0.00% | Pass |
| MAGNESIUM, D | mg/l | 0.1 | 0.1 | 26.4 | 26 | 1.53% | Pass |
| MAGNESIUM, T | mg/l | 0.1 | 0.1 | 26.0 | 26.1 | 0.38% | Pass |
| MANGANESE, D | mg/l | 0.0001 | 0.0001 | 0.00450 | 0.00453 | 0.66% | Pass |
| MANGANESE, T | mg/l | 0.0001 | 0.0001 | 0.00545 | 0.00544 | 0.18% | Pass |
| MERCURY, D | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| MERCURY, T | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| MOLYBDENUM, D | mg/l | 0.00005 | 0.00005 | 0.000989 | 0.000944 | 4.66% | Pass |
| MOLYBDENUM, T | mg/l | 0.00005 | 0.00005 | 0.000998 | 0.000992 | 0.60% | Pass |
| NICKEL, D | mg/l | 0.0005 | 0.0005 | 0.00128 | 0.0013 | 1.55% | Pass |
| NICKEL, T | mg/l | 0.0005 | 0.0005 | 0.00158 | 0.00136 | 14.97% | Pass |
| NITROGEN, AMMONIA (AS N), T | mg/l | 0.005 | 0.005 | 0.0113 | <0.0025 | 127.54% | Pass-1 |
| pH, LAB | ph units | 0.1 | 0.1 | 8.27 | 8.36 | 1.08% | Pass |
| PHOSPHORUS, D | mg/l | 0.3 | 0.3 | <0.150 | <0.15 | 0.00% | Pass |
| PHOSPHORUS, T | mg/l | 0.05 | 0.05 | <0.025 | <0.025 | 0.00% | Pass |
| POTASSIUM, D | mg/l | 0.05 | 0.05 | 1.37 | 1.33 | 2.96% | Pass |
| POTASSIUM, T | mg/l | 0.1 | 0.1 | 1.33 | 1.29 | 3.05% | Pass |
| SELENIUM, D | mg/l | 0.00005 | 0.00005 | 0.000068 | 0.000053 | 24.79% | Pass |
| SELENIUM, T | mg/l | 0.00005 | 0.00005 | 0.000051 | 0.000059 | 14.55% | Pass |
| SILICON, D | mg/l | 0.05 | 0.05 | 0.726 | 0.708 | 2.51% | Pass |
| SILICON, T | mg/l | 0.1 | 0.1 | 0.84 | 0.76 | 10.00% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| SILVER, D | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| SILVER, T | mg/l | 0.00001 | 0.00001 | 0.000014 | 0.000011 | 24.00% | Pass |
| SODIUM, D | mg/l | 0.05 | 0.05 | 2.32 | 2.32 | 0.00% | Pass |
| SODIUM, T | mg/l | 0.05 | 0.05 | 2.39 | 2.3 | 3.84% | Pass |
| STRONTIUM, D | mg/l | 0.0002 | 0.0002 | 0.206 | 0.208 | 0.97% | Pass |
| STRONTIUM, T | mg/l | 0.0002 | 0.0002 | 0.208 | 0.211 | 1.43% | Pass |
| SULFUR, T | mg/l | 0.5 | 0.5 | 85.0 | 85.9 | 1.05% | Pass |
| THALLIUM, D | mg/l | 0.00001 | 0.00001 | 0.000176 | 0.000172 | 2.30% | Pass |
| THALLIUM, T | mg/l | 0.00001 | 0.00001 | 0.000167 | 0.00017 | 1.78% | Pass |
| TIN, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| TIN, T | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| TITANIUM, D | mg/l | 0.01 | 0.01 | <0.00500 | <0.005 | 0.00% | Pass |
| TITANIUM, T | mg/l | 0.0003 | 0.0003 | <0.00015 | <0.00015 | 0.00% | Pass |
| TOTAL SUSPENDED SOLIDS, LAB | mg/l | 3 | 3 | 5.4 | 4.8 | 11.76% | Pass |
| URANIUM, D | mg/l | 0.00001 | 0.00001 | 0.000333 | 0.00034 | 2.08% | Pass |
| URANIUM, T | mg/l | 0.00001 | 0.00001 | 0.000337 | 0.000328 | 2.71% | Pass |
| VANADIUM, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| VANADIUM, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| ZINC, D | mg/l | 0.001 | 0.001 | 0.231 | 0.235 | 1.72% | Pass |
| ZINC, T | mg/l | 0.003 | 0.003 | 0.282 | 0.276 | 2.15% | Pass |
| ZIRCONIUM, T | mg/l | 0.0002 | 0.0002 | <0.00010 | <0.0001 | 0.00% | Pass |

| | |
|---|---|
| **Location:** | PP_35-1B |
| **Date Sampled:** | 2023-08-07 |

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| ALUMINUM, D | mg/l | 0.001 | 0.001 | 0.0088 | 0.0087 | 1.14% | Pass |
| ALUMINUM, T | mg/l | 0.003 | 0.003 | 0.0272 | 0.0284 | 4.32% | Pass |
| ANTIMONY, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| ANTIMONY, T | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| ARSENIC, D | mg/l | 0.0001 | 0.0001 | 0.00014 | 0.00015 | 6.90% | Pass |
| ARSENIC, T | mg/l | 0.0001 | 0.0001 | 0.00023 | 0.00024 | 4.26% | Pass |
| BARIUM, D | mg/l | 0.0001 | 0.0001 | 0.0280 | 0.0278 | 0.72% | Pass |
| BARIUM, T | mg/l | 0.0001 | 0.0001 | 0.0281 | 0.0282 | 0.36% | Pass |
| BERYLLIUM, D | mg/l | 0.00002 | 0.00002 | <0.000010 | <0.000010 | 0.00% | Pass |
| BERYLLIUM, T | mg/l | 0.00002 | 0.00002 | <0.000010 | <0.000010 | 0.00% | Pass |
| BISMUTH, D | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| BISMUTH, T | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| BORON, D | mg/l | 0.01 | 0.01 | 0.019 | 0.019 | 0.00% | Pass |
| BORON, T | mg/l | 0.01 | 0.01 | 0.020 | 0.02 | 0.00% | Pass |
| CADMIUM, D | mg/l | 0.000005 | 0.000005 | 0.0000680 | 0.0000684 | 0.59% | Pass |
| CADMIUM, T | mg/l | 0.000005 | 0.000005 | 0.000158 | 0.00016 | 1.26% | Pass |
| CALCIUM, D | mg/l | 0.05 | 0.05 | 95.4 | 96.1 | 0.73% | Pass |
| CALCIUM, T | mg/l | 0.05 | 0.05 | 97.8 | 100 | 2.22% | Pass |
| CESIUM, D | mg/l | 0.00001 | 0.00001 | 0.000016 | 0.000016 | 0.00% | Pass |
| CESIUM, T | mg/l | 0.00001 | 0.00001 | 0.000020 | 0.000019 | 5.13% | Pass |
| CHROMIUM, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| CHROMIUM, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| COBALT, D | mg/l | 0.0001 | 0.0001 | 0.00015 | 0.00014 | 6.90% | Pass |
| COBALT, T | mg/l | 0.0001 | 0.0001 | 0.00018 | 0.00021 | 15.38% | Pass |
| COPPER, D | mg/l | 0.0002 | 0.0002 | 0.00540 | 0.00556 | 2.92% | Pass |
| COPPER, T | mg/l | 0.0005 | 0.0005 | 0.00814 | 0.00826 | 1.46% | Pass |
| CYANIDE, T | mg/l | 0.002 | 0.002 | <0.0010 | <0.001 | 0.00% | Pass |
| IRON, D | mg/l | 0.01 | 0.01 | <0.0050 | <0.005 | 0.00% | Pass |
| IRON, T | mg/l | 0.01 | 0.01 | 0.041 | 0.042 | 2.41% | Pass |
| LEAD, D | mg/l | 0.00005 | 0.00005 | 0.00203 | 0.00214 | 5.28% | Pass |
| LEAD, T | mg/l | 0.00005 | 0.00005 | 0.00952 | 0.00956 | 0.42% | Pass |
| LITHIUM, D | mg/l | 0.001 | 0.001 | 0.0028 | 0.0029 | 3.51% | Pass |
| LITHIUM, T | mg/l | 0.001 | 0.001 | 0.0028 | 0.0029 | 3.51% | Pass |
| MAGNESIUM, D | mg/l | 0.005 | 0.005 | 21.8 | 21.4 | 1.85% | Pass |
| MAGNESIUM, T | mg/l | 0.005 | 0.005 | 21.9 | 22 | 0.46% | Pass |
| MANGANESE, D | mg/l | 0.0001 | 0.0001 | 0.00419 | 0.00389 | 7.43% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| MANGANESE, T | mg/l | 0.0001 | 0.0001 | 0.00757 | 0.0077 | 1.70% | Pass |
| MERCURY, D | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| MERCURY, T | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| MOLYBDENUM, D | mg/l | 0.00005 | 0.00005 | 0.000999 | 0.00105 | 4.98% | Pass |
| MOLYBDENUM, T | mg/l | 0.00005 | 0.00005 | 0.00105 | 0.0011 | 4.65% | Pass |
| NICKEL, D | mg/l | 0.0005 | 0.0005 | 0.00182 | 0.00194 | 6.38% | Pass |
| NICKEL, T | mg/l | 0.0005 | 0.0005 | 0.00246 | 0.00244 | 0.82% | Pass |
| NITROGEN, AMMONIA (AS N), T | mg/l | 0.005 | 0.005 | 0.0075 | 0.0059 | 23.88% | Pass |
| pH, LAB | ph units | 0.1 | 0.1 | 8.87 | 8.88 | 0.11% | Pass |
| PHOSPHORUS, D | mg/l | 0.05 | 0.05 | <0.025 | <0.025 | 0.00% | Pass |
| PHOSPHORUS, T | mg/l | 0.05 | 0.05 | <0.025 | <0.025 | 0.00% | Pass |
| POTASSIUM, D | mg/l | 0.05 | 0.05 | 1.37 | 1.32 | 3.72% | Pass |
| POTASSIUM, T | mg/l | 0.05 | 0.05 | 1.31 | 1.32 | 0.76% | Pass |
| RUBIDIUM, D | mg/l | 0.0002 | 0.0002 | 0.00143 | 0.00132 | 8.00% | Pass |
| RUBIDIUM, T | mg/l | 0.0002 | 0.0002 | 0.00139 | 0.00128 | 8.24% | Pass |
| SELENIUM, D | mg/l | 0.00005 | 0.00005 | 0.000070 | 0.000064 | 8.96% | Pass |
| SELENIUM, T | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| SILICON, D | mg/l | 0.05 | 0.05 | 1.08 | 1.06 | 1.87% | Pass |
| SILICON, T | mg/l | 0.1 | 0.1 | 1.16 | 1.16 | 0.00% | Pass |
| SILVER, D | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| SILVER, T | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| SODIUM, D | mg/l | 0.05 | 0.05 | 2.22 | 2.14 | 3.67% | Pass |
| SODIUM, T | mg/l | 0.05 | 0.05 | 2.22 | 2.26 | 1.79% | Pass |
| STRONTIUM, D | mg/l | 0.0002 | 0.0002 | 0.261 | 0.266 | 1.90% | Pass |
| STRONTIUM, T | mg/l | 0.0002 | 0.0002 | 0.271 | 0.276 | 1.83% | Pass |
| SULFUR, D | mg/l | 0.5 | 0.5 | 99.0 | 100 | 1.01% | Pass |
| SULFUR, T | mg/l | 0.5 | 0.5 | 105 | 105 | 0.00% | Pass |
| TELLURIUM, D | mg/l | 0.0002 | 0.0002 | <0.00010 | <0.0001 | 0.00% | Pass |
| TELLURIUM, T | mg/l | 0.0002 | 0.0002 | <0.00010 | <0.0001 | 0.00% | Pass |
| THALLIUM, D | mg/l | 0.00001 | 0.00001 | 0.000278 | 0.000307 | 9.91% | Pass |
| THALLIUM, T | mg/l | 0.00001 | 0.00001 | 0.000311 | 0.000309 | 0.65% | Pass |
| THORIUM, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| THORIUM, T | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| TIN, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| TIN, T | mg/l | 0.0001 | 0.0001 | 0.00014 | 0.00013 | 7.41% | Pass |
| TITANIUM, D | mg/l | 0.0003 | 0.0003 | <0.00015 | <0.00015 | 0.00% | Pass |
| TITANIUM, T | mg/l | 0.0003 | 0.0003 | 0.00060 | 0.00035 | 52.63% | Pass-1 |
| TOTAL SUSPENDED SOLIDS, LAB | mg/l | 3 | 3 | 5.6 | 3.6 | 43.48% | Pass-1 |
| TUNGSTEN, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| TUNGSTEN, T | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| URANIUM, D | mg/l | 0.00001 | 0.00001 | 0.000242 | 0.00025 | 3.25% | Pass |
| URANIUM, T | mg/l | 0.00001 | 0.00001 | 0.000265 | 0.000253 | 4.63% | Pass |
| VANADIUM, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| VANADIUM, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| ZINC, D | mg/l | 0.001 | 0.001 | 0.120 | 0.123 | 2.47% | Pass |
| ZINC, T | mg/l | 0.003 | 0.003 | 0.272 | 0.276 | 1.46% | Pass |
| ZIRCONIUM, D | mg/l | 0.0003 | 0.0003 | <0.00015 | <0.00015 | 0.00% | Pass |
| ZIRCONIUM, T | mg/l | 0.0002 | 0.0002 | <0.00010 | <0.0001 | 0.00% | Pass |

| | |
|---|---|
| **Location:** | PP_35-12 |
| **Date Sampled:** | 2023-11-07 |

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| ALUMINUM, D | mg/l | 0.001 | 0.001 | 0.0015 | 0.0019 | 23.53% | Pass |
| ALUMINUM, T | mg/l | 0.003 | 0.003 | 0.0032 | 0.003 | 6.45% | Pass |
| ANTIMONY, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| ANTIMONY, T | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| ARSENIC, D | mg/l | 0.0001 | 0.0001 | 0.00056 | 0.00056 | 0.00% | Pass |
| ARSENIC, T | mg/l | 0.0001 | 0.0001 | 0.00055 | 0.00053 | 3.70% | Pass |
| BARIUM, D | mg/l | 0.0001 | 0.0001 | 0.0253 | 0.0254 | 0.39% | Pass |
| BARIUM, T | mg/l | 0.0001 | 0.0001 | 0.0241 | 0.0243 | 0.83% | Pass |
| BERYLLIUM, D | mg/l | 0.0001 | 0.0001 | <0.0000500 | <0.000050 | 0.00% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| BERYLLIUM, T | mg/l | 0.00002 | 0.00002 | <0.000010 | <0.000010 | 0.00% | Pass |
| BISMUTH, D | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| BISMUTH, T | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| BORON, D | mg/l | 0.01 | 0.01 | 0.117 | 0.116 | 0.86% | Pass |
| BORON, T | mg/l | 0.01 | 0.01 | 0.106 | 0.11 | 3.70% | Pass |
| CADMIUM, D | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| CADMIUM, T | mg/l | 0.000005 | 0.000005 | 0.0000084 | 0.0000071 | 16.77% | Pass |
| CALCIUM, D | mg/l | 0.05 | 0.05 | 217 | 212 | 2.33% | Pass |
| CALCIUM, T | mg/l | 0.05 | 0.05 | 192 | 189 | 1.57% | Pass |
| CARBON, DISSOLVED ORGANIC, D | mg/l | 0.5 | 0.5 | 29.2 | 30.9 | 5.66% | Pass |
| CHROMIUM, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| CHROMIUM, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| COBALT, D | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| COBALT, T | mg/l | 0.0001 | 0.0001 | <0.000050 | <0.000050 | 0.00% | Pass |
| COPPER, D | mg/l | 0.0002 | 0.0002 | <0.00010 | <0.0001 | 0.00% | Pass |
| COPPER, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| CYANIDE, T | mg/l | 0.002 | 0.002 | 0.0029 | <0.001 | 97.44% | Pass-1 |
| Hardness, Total or Dissolved CaCO3, D | mg/l | 0.6 | 0.6 | 1000 | 982 | 1.82% | Pass |
| Hardness, Total or Dissolved CaCO3, T | mg/l | 0.6 | 0.6 | 936 | 941 | 0.53% | Pass |
| IRON, D | mg/l | 0.01 | 0.01 | 0.014 | 0.012 | 15.38% | Pass |
| IRON, T | mg/l | 0.01 | 0.01 | 0.026 | 0.017 | 41.86% | Pass-1 |
| LEAD, D | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| LEAD, T | mg/l | 0.00005 | 0.00005 | <0.000025 | <0.000025 | 0.00% | Pass |
| LITHIUM, D | mg/l | 0.001 | 0.001 | 0.0266 | 0.0268 | 0.75% | Pass |
| LITHIUM, T | mg/l | 0.001 | 0.001 | 0.0241 | 0.0246 | 2.05% | Pass |
| MAGNESIUM, D | mg/l | 0.1 | 0.1 | 112 | 110 | 1.80% | Pass |
| MAGNESIUM, T | mg/l | 0.1 | 0.1 | 111 | 114 | 2.67% | Pass |
| MANGANESE, D | mg/l | 0.0001 | 0.0001 | 0.0171 | 0.0175 | 2.31% | Pass |
| MANGANESE, T | mg/l | 0.0001 | 0.0001 | 0.0180 | 0.0183 | 1.65% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| MERCURY, D | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| MERCURY, T | mg/l | 0.000005 | 0.000005 | <0.0000025 | <0.0000025 | 0.00% | Pass |
| MOLYBDENUM, D | mg/l | 0.00005 | 0.00005 | 0.000234 | 0.000255 | 8.59% | Pass |
| MOLYBDENUM, T | mg/l | 0.00005 | 0.00005 | 0.000212 | 0.000222 | 4.61% | Pass |
| NICKEL, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| NICKEL, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| NITROGEN, AMMONIA (AS N), T | mg/l | 0.005 | 0.005 | 0.482 | 0.482 | 0.00% | Pass |
| pH, LAB | ph units | 0.1 | 0.1 | 8.08 | 8.09 | 0.12% | Pass |
| PHOSPHORUS, D | mg/l | 0.3 | 0.3 | <0.150 | <0.15 | 0.00% | Pass |
| PHOSPHORUS, T | mg/l | 0.05 | 0.05 | <0.025 | <0.025 | 0.00% | Pass |
| POTASSIUM, D | mg/l | 0.05 | 0.05 | 4.19 | 4.13 | 1.44% | Pass |
| POTASSIUM, T | mg/l | 0.1 | 0.1 | 3.89 | 3.86 | 0.77% | Pass |
| SELENIUM, D | mg/l | 0.00005 | 0.00005 | 0.000074 | 0.000074 | 0.00% | Pass |
| SELENIUM, T | mg/l | 0.00005 | 0.00005 | 0.000056 | 0.000057 | 1.77% | Pass |
| SILICON, D | mg/l | 0.05 | 0.05 | 2.65 | 2.6 | 1.90% | Pass |
| SILICON, T | mg/l | 0.1 | 0.1 | 2.50 | 2.52 | 0.80% | Pass |
| SILVER, D | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| SILVER, T | mg/l | 0.00001 | 0.00001 | 0.000025 | <0.0000050 | 133.33% | Pass-1 |
| SODIUM, D | mg/l | 0.05 | 0.05 | 16.7 | 16.5 | 1.20% | Pass |
| SODIUM, T | mg/l | 0.05 | 0.05 | 15.3 | 15.7 | 2.58% | Pass |
| STRONTIUM, D | mg/l | 0.0002 | 0.0002 | 2.24 | 2.24 | 0.00% | Pass |
| STRONTIUM, T | mg/l | 0.0002 | 0.0002 | 2.06 | 2.06 | 0.00% | Pass |
| SULFUR, T | mg/l | 0.5 | 0.5 | 274 | 275 | 0.36% | Pass |
| THALLIUM, D | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| THALLIUM, T | mg/l | 0.00001 | 0.00001 | <0.0000050 | <0.0000050 | 0.00% | Pass |
| TIN, D | mg/l | 0.0001 | 0.0001 | 0.00025 | 0.00024 | 4.08% | Pass |
| TIN, T | mg/l | 0.0001 | 0.0001 | 0.00112 | 0.00113 | 0.89% | Pass |
| TITANIUM, D | mg/l | 0.01 | 0.01 | <0.00500 | <0.005 | 0.00% | Pass |
| TITANIUM, T | mg/l | 0.0003 | 0.0003 | <0.00015 | <0.00015 | 0.00% | Pass |
| TOTAL SUSPENDED SOLIDS, LAB | mg/l | 3 | 3 | 12.0 | 8.4 | 35.29% | Pass-1 |
| URANIUM, D | mg/l | 0.00001 | 0.00001 | 0.000456 | 0.000452 | 0.88% | Pass |

Appendix D
Relative Percent Difference for Duplicate Samples
Teck Pine Point

| Analyte | Units | Detection Limit for Primary Sample | Detection Limit for Duplicate Sample | Primary Sample Concentration | Duplicate Sample Concentration | Primary vs. Duplicate | Result Category |
|---|---|---|---|---|---|---|---|
| URANIUM, T | mg/l | 0.00001 | 0.00001 | 0.000399 | 0.000424 | 6.08% | Pass |
| VANADIUM, D | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| VANADIUM, T | mg/l | 0.0005 | 0.0005 | <0.00025 | <0.00025 | 0.00% | Pass |
| ZINC, D | mg/l | 0.001 | 0.001 | 0.0020 | <0.0005 | 120.00% | Pass-1 |
| ZINC, T | mg/l | 0.003 | 0.003 | 0.0030 | <0.0015 | 66.67% | Pass-1 |
| ZIRCONIUM, T | mg/l | 0.0002 | 0.0002 | <0.00010 | <0.0001 | 0.00% | Pass |

| **RPD Control Limits** |
|---|
| Pass - RPD ≤ 30% |
| Pass-1 - RPD > 30%, Analysis results < 10 times Detection Limit |
| Pass-2 - RPD > 30% and RPD ≤ 50%, Analysis results ≥ 10 times Detection Limit and < 20 times Detection Limit |
| **Exceeds RPD Control Limits** |