AGNICO EAGLE

WHALE TAIL PROJECT

# Monitoring Program Summary Report

## December 2019

Type A Water License 2AM-WTP1826

# Table of Contents

## SECTION 1 • BACKGROUND

As required under Part I, Item 23 of Type A Water License 2AM-WTP1826, this report documents the water management and monitoring activities at the mine site for the month. This includes water usage, water and seepage monitoring around site, sewage treatment plan discharge, Whale Tail North Basin dewatering, Quarry 1 discharge and Whale Tail South Basin water transfer.

In addition, a summary of spills/actions for the month is reported.

# SECTION 2 • WATER MANAGEMENT

## 2.1 WATER USAGE

All water withdrawals related to Exploration activities is currently managed by Part C Item 1 of the Exploration Water License 2BB-MEA1828. All of the information regarding the use under this License 2BB-MEA1828 will be provided via the Annual Report required by Part B Item 6.

Agnico Eagle is authorized as per Part E Item 1 of the Water License 2AM-WTP1826 to intake water from Nemo Lake for a total year to date of 240,000 m³/year. A total volume of 2,978 m³ was withdrawn from Nemo Lake in December. Details are provided in Table 2.1.1 below.

**Table 2.1.1: December 2019 – Freshwater Consumption**

| Water Location | Source Lake | Jan | Feb | March | April | May | June |
|---|---|---|---|---|---|---|---|
| Camp | Nemo | 1 306 | 1 396 | 1 179 | 1 192 | 1 806 | 1 940 |
| Construction/Operation | Nemo | 1 283 | 2 188 | 3 076 | 2 206 | 2 831 | 2 829 |
| Dust Suppression | Nemo / WTHR Pond | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total Freshwater Usage (m³)** | | **2 589** | **3 584** | **4 255** | **3 398** | **4 637** | **4 769** |

| Water Location | Source Lake | July | Aug | Sept | Oct | Nov | Dec | Total |
|---|---|---|---|---|---|---|---|---|
| Camp | Nemo | 1 882 | 1 825 | 1 760 | 2 051 | 2 068 | 2 136 | 20 541 |
| Construction/Operation | Nemo | 3 431 | 3 094 | 2 445 | 3 337 | 2 456 | 842 | 30 018 |
| Dust Suppression | Nemo / WTHR Pond | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Total Freshwater Usage (m³)** | | **5 313** | **4 919** | **4 205** | **5 388** | **4 524** | **2 978** | 50 559 |

## 2.2 LAKE WATER MONITORING

Lake around the Whale Tail Project were monitored on a monthly basis during the open water season. In December, no monthly samples were taken at Lake A47 (ST-WT-6), Lake A45 (ST-WT-13), Lake A16 (ST-WT-14) and Lake A15 (ST-WT-15) due to freezing conditions.

## 2.3 WHALE TAIL DIKE SEEPAGE MONITORING

In December, the Whale Tail North dewatering continued and seepage water was still observed at the toe of the structure. Seepage was estimated at 400 m³/h based on pumping rate and visual observation.

Work continued on the construction of a downstream grouting blanket (10 % completed) at Whale Tail Dike in an effort to reduce the seepage reporting to WTN.

Agnico continue to manage water from WTD seepage as part of the dewatering of the Whale Tail North Basin and is be monitored for Water License 2AM-WTP1826 Part D Item 7. Refer to Section 2.6 below for the water quality monitoring results.

Seepage water quality is also monitored as per the requirement of the Water License. The sampling station is named ST-WT-17 and is minimally sampled on a monthly basis for Group 1.

## 2.4 WRSF FLOW TOWARD MAMMOTH LAKE

As required by Part H, Item 8b of Water License 2AM-WTP1826, Agnico Eagle Mine Limited – Meadowbank Division ("Agnico") informed regulators via email on August 25 that during an inspection of the Whale Tail WRSF Dike carried out on August 24 at 10:30hrs, a water flow was observed at the toe of the dike flowing toward Mammoth Lake. A first follow up report was submitted on September 20, 2019 and a second one was submitted on January 28, 2020. Agnico will refer to this second follow up report in Appendix A for a complete review of the event.

## 2.5 SEWAGE TREATMENT PLANT

Effluent from the Exploration Camp Sewage Treatment Plan (STP) is discharged to the Whale Tail Lake North Basin and is monitored as per the Water License 2BB-MEA1828 Part D Item 10. All of the information regarding this discharge will be provided via the Annual Report required by 2BB-MEA1828 Part B Item 6. The STP associated to the exploration camp was permanently stopped in November.

The Sewage Treatment Plan located in the permanent camp associated with the Water License 2AM-WTP1826 was commissioned on April 12, 2019. Effluent is discharge in the future Whale Tail Attenuation Pond. As per Water License Schedule I Sampling Station ST-WT-11, effluent is to be sample four time per calendar year. Agnico is currently sampling the STP on a monthly basis and thus sample was taken in December. A total of 2,145 $m^3$ was discharged during the month.

## 2.6 WHALE TAIL NORTH BASIN DEWATERING

As describe in Section 2.3 above, Agnico has discharge the Whale Tail Dike (WTD) seepage as part of the Whale Tail North Dewatering to Whale Tail South Basin (ST-DD-7). A total volume of 353,131 $m^3$ was discharged in December.

No dewatering of the Whale Tail North Basin to Mammoth Lake (ST-DD-9), via the temporary diffuser, in December.

As per Water License Part D Item 7, the effluent from Whale Tail North dewatering, either to Whale Tail South or Mammoth Lake shall not exceed the following quality limits:

| Parameter | Maximum Monthly Mean | Short Term Maximum |
|---|---|---|
| Total Suspended Solids | 15.0 mg/L | 22.5 mg/L |
| Turbidity | 15 NTU | 30 NTU |
| pH | 6.0 to 9.0 | 6.0 to 9.0 |
| Total Aluminum | 1.5 mg/L | 3.0 mg/L |

The pH and Aluminum concentrations were as follows for ST-DD-7:

• pH 24 hour minimum/maximum: 6.60 / 7.72 (Limit is 6-9 units)
• pH 30 days minimum/maximum: 6.98 / 7.11 (Limit is 6-9 units)
• Al 24 hour maximum concentration: 0.006 mg/L (Limit is 3.0 mg/L)
• Al 30 days maximum concentration: 0.051 mg/L (Limit is 1.5 mg/L)

The turbidity and Total Suspended Solids (TSS) concentrations were as follows:

• NTU 24 hour maximum concentration: 2.76 NTU (Maximum Limit is 30 NTU)
• NTU 30 days mean maximum concentration: 3.33 NTU (Maximum Limit is 15 NTU).
• TSS 24 hour maximum concentration: 9 mg/L (Maximum Limit is 22.5 mg/L)
• TSS 30 days mean maximum concentration: 4.38 mg/L (Maximum Limit is 15 mg/L)

Table 2.6.1 summarizes the dewatering monitoring results for pH, aluminum, turbidity and TSS for the month. No non-compliance was observed in December.

**Table 2.6.1: Whale Tail North Basin Dewatering Monitoring ST-DD-7**

| Date | ST-DD-7 | | | | License Requirement | | | |
|---|---|---|---|---|---|---|---|---|
| | Turbidity[1] | TSS[2] | pH[1] | Total Al[2] | NTU 30-day Mean | TSS 30-day Mean | pH 30-day Mean | Al 30-day Mean |
| | NTU | mg/L | | mg/L | 15 | 15 | 6.0 - 9.0 | 3 |
| 01-12-2019 | 0.71 | 1 | 7.07 | | 3.33 | 4.08 | 7.00 | |
| 02-12-2019 | 1.18 | <1 | 7.12 | 0.006 | 3.22 | 3.83 | 6.99 | 0.051 |
| 03-12-2019 | 2.76 | 7 | 6.73 | | 3.20 | 3.94 | 6.98 | |
| 04-12-2019 | 0.63 | 7 | 7.40 | | 3.11 | 4.05 | 7.00 | |
| 05-12-2019 | 0.54 | 9 | 7.28 | <0.005 | 3.02 | 4.22 | 7.01 | 0.046 |
| 06-12-2019 | 0.67 | 9 | 7.10 | | 2.94 | 4.38 | 7.01 | |
| 07-12-2019 | 2.55 | 5 | 7.42 | | 2.48 | 3.98 | 7.02 | |
| 08-12-2019 | 0.83 | 5 | 7.62 | | 1.98 | 4.02 | 7.01 | |
| 09-12-2019 | 1.13 | 5 | 7.05 | <0.005 | 1.88 | 3.88 | 7.01 | 0.015 |
| 10-12-2019 | 0.72 | 2 | 7.06 | | 1.73 | 3.82 | 7.00 | |
| 11-12-2019 | 0.81 | 2 | 7.20 | | 1.60 | 3.68 | 7.01 | |
| 12-12-2019 | 0.76 | 3 | 7.00 | <0.005 | 1.52 | 3.65 | 7.00 | 0.011 |
| 13-12-2019 | 0.74 | 3 | 6.93 | | 1.50 | 3.65 | 7.00 | |
| 14-12-2019 | 0.74 | 4 | 6.79 | | 1.50 | 3.52 | 7.01 | |
| 15-12-2019 | 0.59 | 3 | 6.97 | | 1.41 | 3.48 | 7.02 | |
| 16-12-2019 | 0.37 | 3 | 7.47 | <0.005 | 1.39 | 3.55 | 7.04 | 0.009 |
| 17-12-2019 | 0.37 | 7 | 7.42 | | 1.38 | 3.77 | 7.04 | |
| 18-12-2019 | 0.59 | Sample Frozen | 6.78 | | 1.37 | 3.88 | 7.03 | |
| 19-12-2019 | 0.48 | 1 | 7.72 | <0.005 | 1.33 | 3.78 | 7.06 | 0.008 |
| 20-12-2019 | 1.54 | 2 | 6.73 | | 1.27 | 3.53 | 7.05 | |
| 21-12-2019 | 0.84 | 1 | 7.03 | | 1.23 | 3.36 | 7.06 | |
| 22-12-2019 | 0.96 | 2 | 6.97 | | 1.20 | 3.40 | 7.06 | |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| 23-12-2019 | 1.13 | 1 | 6.96 | <0.005 | 1.16 | 3.33 | 7.06 | 0.004 |
| 24-12-2019 | 1.51 | <1 | 6.60 | | 1.15 | 3.28 | 7.06 | |
| 25-12-2019 | 0.84 | <1 | 7.29 | | 1.11 | 3.22 | 7.07 | |
| 26-12-2019 | 0.83 | <1 | 7.13 | | 1.08 | 3.22 | 7.09 | |
| 27-12-2019 | 0.85 | 1 | 7.29 | | 1.02 | 3.19 | 7.10 | |
| 28-12-2019 | 0.56 | <1 | 6.95 | | 0.93 | 3.19 | 7.11 | |
| 29-12-2019 | 0.81 | 1 | 7.05 | | 0.93 | 3.09 | 7.11 | |
| 30-12-2019 | 0.91 | <1 | 7.11 | | 0.93 | 3.00 | 7.11 | |
| 31-12-2019 | 0.94 | 2 | 7.09 | | 0.94 | 3.03 | 7.11 | |
| 1 - Measures taken in the field | | | | | | | | |
| 2- Results from the certified laboratory | | | | | | | | |
| Half-detection limit use in the mean calculation | | | | | | | | |

## 2.7 QUARRY 1 DISCHARGE

No discharge from Quarry to Mammoth Lake in December.

## 2.8 WHALE TAIL SOUTH WATER TRANSFER

Water transfer between Whale Tail South to Mammoth Lake was stopped on December 18. A total volume of 438,244 $m^3$ was transferred. As per Water License Part F Item 6, the effluent from this discharge shall not exceed the limits detailed in Table 2.8.1 below. No non-compliance observed during the month of December related to this non-contact water transfer to Mammoth Lake.

**Table 2.8.1: Whale Tail South Water Transfer**

| Parameter | Maximum Authorized Monthly Mean Concentration | Maximum Authorized Concentration Grab Sample | Unit | Sample Date | | | Average |
|---|---|---|---|---|---|---|---|
| | | | | ST-WT-25 2019-12-02 | ST-WT-25 2019-12-09 | ST-WT-25 2019-12-16 | |
| **Conventional Constituents** | | | | | | | |
| pH | | | N/A | 7.21 | 7.26 | 7.21 | 7.23 |
| Turbidity | | | NTU | 1.00 | 0.66 | 0.66 | 0.77 |
| Total suspended solids | 15 | 30 | mg/L | <1 | 8 | 2 | 3.5 |
| Sulphate | | | mg/L | 6.3 | 5.4 | 9.0 | 6.9 |
| **Total Metals** | | | | | | | |
| Aluminum | | | mg/L | 0.010 | <0.005 | 0.021 | 0.0112 |
| Arsenic | | | mg/L | 0.0025 | 0.0016 | 0.0025 | 0.0022 |
| Copper | | | mg/L | 0.0013 | 0.0013 | 0.0011 | 0.0012 |
| Lead | | | mg/L | <0.0003 | <0.0003 | <0.0003 | 0.00015 |
| Nickel | | | mg/L | 0.0021 | 0.0023 | 0.0025 | 0.0023 |
| Zinc | | | mg/L | <0.001 | 0.030 | 0.002 | 0.011 |

| Parameter | Maximum Authorized Monthly Mean Concentration | Maximum Authorized Concentration Grab Sample | Unit | Sample Date | | Average |
|---|---|---|---|---|---|---|
| | | | | ST-WT-25a 2019-12-02 | ST-WT-25a 2019-12-09 | |
| **Conventional Constituents** | | | | | | |
| pH | | | N/A | 7.25 | 7.40 | 7.33 |
| Turbidity | | | NTU | 0.75 | 0.57 | 0.66 |
| Total suspended solids | 15 | 30 | mg/L | 2.0 | 6.0 | 4.0 |
| Sulphate | | | mg/L | 6.6 | 7.5 | 7.1 |
| **Total Metals** | | | | | | |
| Aluminum | | | mg/L | 0.012 | <0.005 | 0.007 |
| Arsenic | | | mg/L | 0.0005 | 0.0024 | 0.0015 |
| Copper | | | mg/L | 0.0007 | 0.0009 | 0.0008 |
| Lead | | | mg/L | <0.0003 | <0.0003 | 0.00015 |
| Nickel | | | mg/L | 0.0022 | 0.0021 | 0.0022 |
| Zinc | | | mg/L | <0.001 | <0.001 | 0.0005 |

## SECTION 3 • SPILL MANAGEMENT

Figure 3.1 shows reported and non-reported spills for 2019 broken down per month and Table 3.1 summarizes Agnico Eagle spill reports for December.

All spills reported internally (14) were managed appropriately on site according to Agnico's spill contingency plan. Three (3) spills were reported to regulators in December. Spills were contained and cleaned, contaminated material was disposed to the appropriate area, and the clean-up actions were monitored closely by the Environment Department. There was no off site impact to any watercourses.

**Figure 3.1 2019 Reported and Non-Reported Spills**

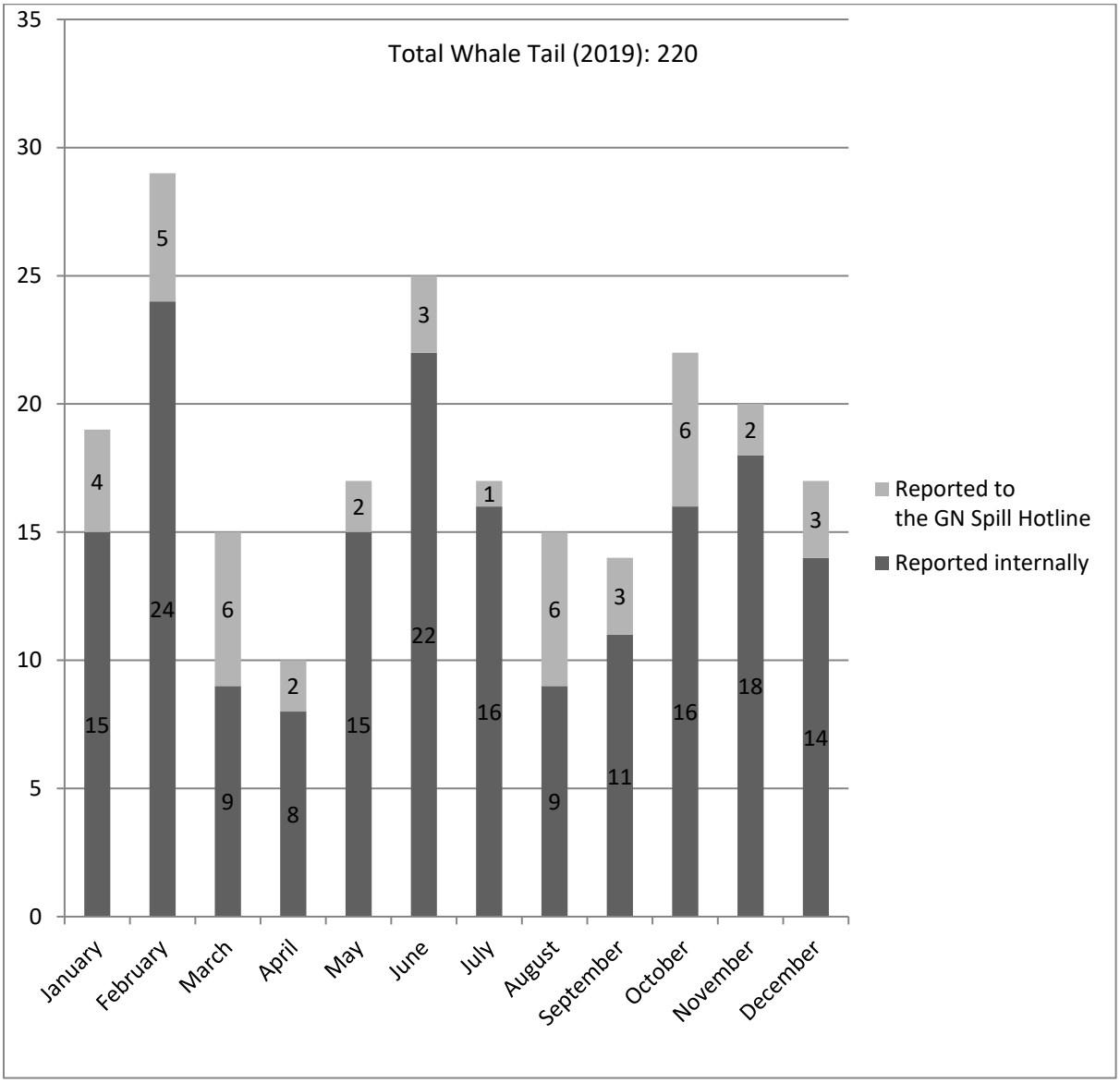


**Table 3.1: Summary of Agnico Eagle Internal and Reported Spill Reports, December 2019**

| Date of Spill | Hazardous Material | Qty | Units (L / Kg) | Location | Cause of spill | Clean-up action taken |
|---|---|---|---|---|---|---|
| December 1, 2019 | Coolant | 30 | L | Quarry 2 | Coolant hose failure | The operator parked the truck, shut the truck down and called dispatch to report that the truck was down. Maintenance was called to fix the truck. Spill was contained and contaminated soil picked up and disposed of appropriately |
| December 1, 2019 | Hydraulic Oil | 40 | L | Whale Tail Pit | During routine loading operations, the operator noticed a spray of hydraulic oil in his window | Operator stopped the truck, and put absorbing materials to contain the spill. Maintenance was called to repair the equipment. Spill was contained and contaminated soil picked up and disposed of appropriately |
| December 2, 2019 | Hydraulic Oil | 30 | L | Whale Tail Pit | Hydraulic system worn out part | Equipment was repaired. Spill was contained and contaminated soil picked up and disposed of appropriately |
| December 4, 2019 | Diesel | 80 | L | Fuel Farm Amaruq | During refuelling operation, the ground cable unclipped from the truck and stopped the pump. The operator clipped the ground cable back on the truck. When the pump started, the pressure lifted the fuel filler pipe out the truck top of the fuel truck. The fuel truck operator then put the filler pipe back into the fuel truck tank to stop the spill. | Placed socks around the spill and spill pads to contain the fuel. Spill was contained and contaminated soil picked up and disposed of appropriately |
| December 6, 2019 | Engine Oil | 20 | L | Waste Dump | Engine failure | Stopped the equipment and put some absorbent material on the spill. Contaminated soil picked up and disposed of appropriately |

| | | | | | | |
|---|---|---|---|---|---|---|
| December 7, 2019 | Engine Oil | 2 | L | Sana Crusher 3/4" STP | Engine oil leak | Shut off engine and call mechanic for repair. Contaminated soil picked up and disposed of appropriately |
| December 10, 2019 | Hydraulic Oil | 10 | L | Whale Tail Haul Road KM 154 | Operator saw some oil leaking from the nose of the equipment. | Operator inspected the leaking area, couldn't identify the origin but identify hydraulic oil. Reported to dispatcher and requested mechanics. Put a few absorbent pads to contain the spill. Contaminated soil picked up and disposed of appropriately |
| December 14, 2019 | Coolant | 10 | L | Whale Tail Haul Road KM 150 | Faulty radiator cap caused coolant to spill out | Radiator cap was replaced. Contaminated soil picked up and disposed of appropriately |
| December 14, 2019 | Hydraulic Oil | 125 | L | Bottom of phase 2 ramp | Operator made contact with spill rock from haul truck | Operator shut off drill and contacted drill and blast supervisor. Contacted mechanics for repairs. Spill was contained and contaminated soil picked up and disposed of appropriately at the MBK landfarm |
| December 15, 2019 | Hydraulic Oil | 75 | L | Haul truck parking | Tote of oil came out a sea can while moving it | Stopped the leak from the tote and brought the contaminated material into the yellow bin. Asked the supervisor to dispose of the tote appropriately at the Hazmat area |
| December 19, 2019 | Hydraulic Oil | 150 | L | Quarry 2 | Hydraulic hose for clam of the bucket failure | Contaminated soil picked up and disposed of appropriately at the MBK landfarm |
| December 21, 2019 | Coolant | 2 | L | Camp | Coolant system failure | Contaminated snow picked up and disposed of adequately |

| | | | | | | |
|---|---|---|---|---|---|---|
| December 23, 2019 | Diesel | 20 | L | WT pit washroom parking | Fuel cap failure | Contaminated soil picked up and disposed of appropriately |
| December 26, 2019 | Hydraulic Oil | 80 | L | Whale Tail Pit | Hydraulic hose failure | Equipment was shut down, absorbent pads were placed on the spill and a mechanic was called. Spill was contained and contaminated soil picked up and disposed of appropriately |
| December 26, 2019 | Diesel | 15 | L | Quarry | Fuel truck was refueling the drill and the fuel started to leak through the vent breather on the tank. | Fueling was stopped and mechanic was called right away. Spill was immediately cleaned up and placed in a contaminated soil roll-off bin |
| December 28, 2019 | Hydraulic Oil | 200 | L | Whale Tail Rock Facility Storage | Hydraulic system failure | Contaminated soil picked up and disposed of in the landfarm |
| December 28, 2019 | Coolant | 8 | L | Whale Tail Haul Road KM 166 | Radiator leak | Truck brought to shop for repairs. Contaminated soil picked up and disposed of appropriately |

**APPENDIX A**
**WRSF Flow Follow up (2019-339) - Additional Information**

AGNICO EAGLE

January 27th, 2020

**Re.: Agnico Eagle Whale Tail Project – WRSF Flow Follow up (2019-333) - Additional Information**

This letter provides additional information following the water flow through the Whale Tail Waste Rock Storage Facility (WRSF) Dike reported on August 25, 2019. Specifically, this letter includes:

- a summary of the background information on the event,
- water quality test results,
- results of the investigation of the event and additional actions taken,
- instrumentation monitoring results,
- discussion of possible mechanisms leading to the event, and
- the proposed path forward.

Please note that an initial follow-up document was submitted on September 20, 2019. This letter provides additional information to the earlier document.

## Background

Agnico Eagle Mines Limited – Meadowbank Division (Agnico Eagle) informed you via email on August 25, 2019, that during a routine inspection of the Whale Tail WRSF Dike carried out on August 24, 2019 at 10:30 am, a water flow was observed at the toe of the dike flowing toward Mammoth Lake (UTM 14W 0605380 7255454) (see Figure 1).

This event report was submitted in compliance with the requirements of Part H, Item 8b of Water License 2AM-WTP1826 (Water License), subsection 12(3) of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* (Canada), paragraph 5.1(a) of the *Environmental Protection Act* (Nunavut), subsection 38(5) of the *Fisheries Act* (Canada) and paragraph 24(1)(a) of the *Metal and Diamond Mining Effluent Regulations* (MDMER) made under the *Fisheries Act* (Canada). A follow-up document was submitted on September 20, 2019, providing additional details and information.

Following observation of the water flow, special measures were immediately put in place on August 24th to reduce the flowrate by pumping water out of the WRSF collection pond, with the ultimate objective to stop the flow as quickly as possible. Given the nature of the topography at the toe of the WRSF Dike (flat terrain at an elevation close to the lake elevation with the presence of a boulder field), and its difficult access, we realized that installing a pumping station at the toe could not be done rapidly and that the best course of action was a rapid head reduction in the pond by emptying it.

The WRSF pond was considered to be essentially empty by September 1st, within one week of the first observation. In the meantime, an access road to the toe of the dike was constructed to allow the installation of a water collection system to pump the water back upstream. The collection system was operated until the onset of freezing conditions on September 30th but after the pond was emptied. By this time it was mostly collecting drainage water downstream of the dike.

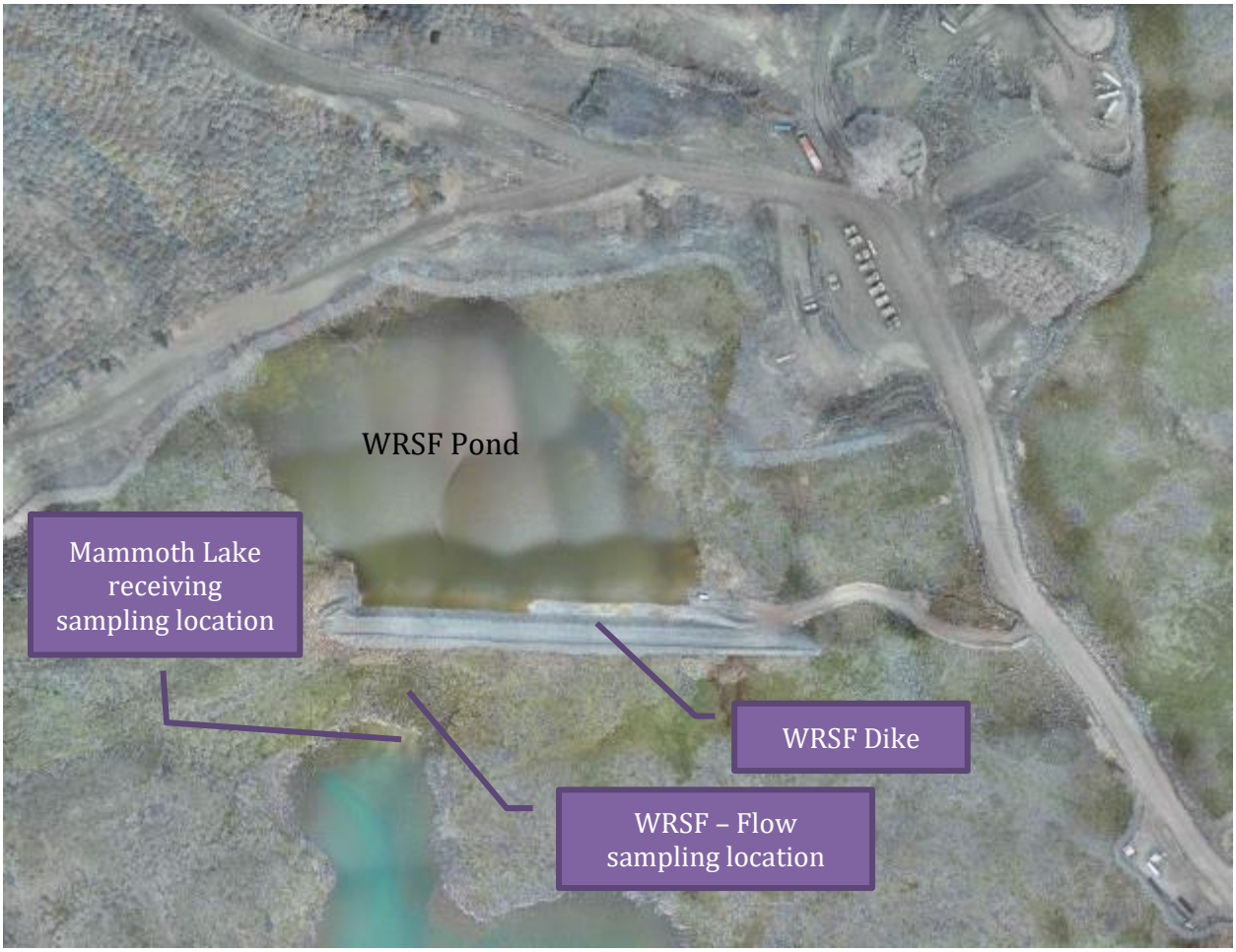


Figure 1: WRSF Flow and Receiving Environment Location

The initial estimate provided of the quantity of water released from the flow through the WRSF pond dike between August 15 and September 1 was approximately 15,000 $m^3$. Verification of pumping rates, along with bathymetry of the WRSF pond and the water elevation, have enabled us to refine this estimate. As shown on Figure 2, on August 15, the volume of water in the pond was estimated at 99,657$m^3$. From that volume, 38,135$m^3$ was pumped to Quarry 1 to empty the pond. This meant that the rest of the water, or approximately 61,500$m^3$, had seeped through the dike. This estimate is intended to be conservative.

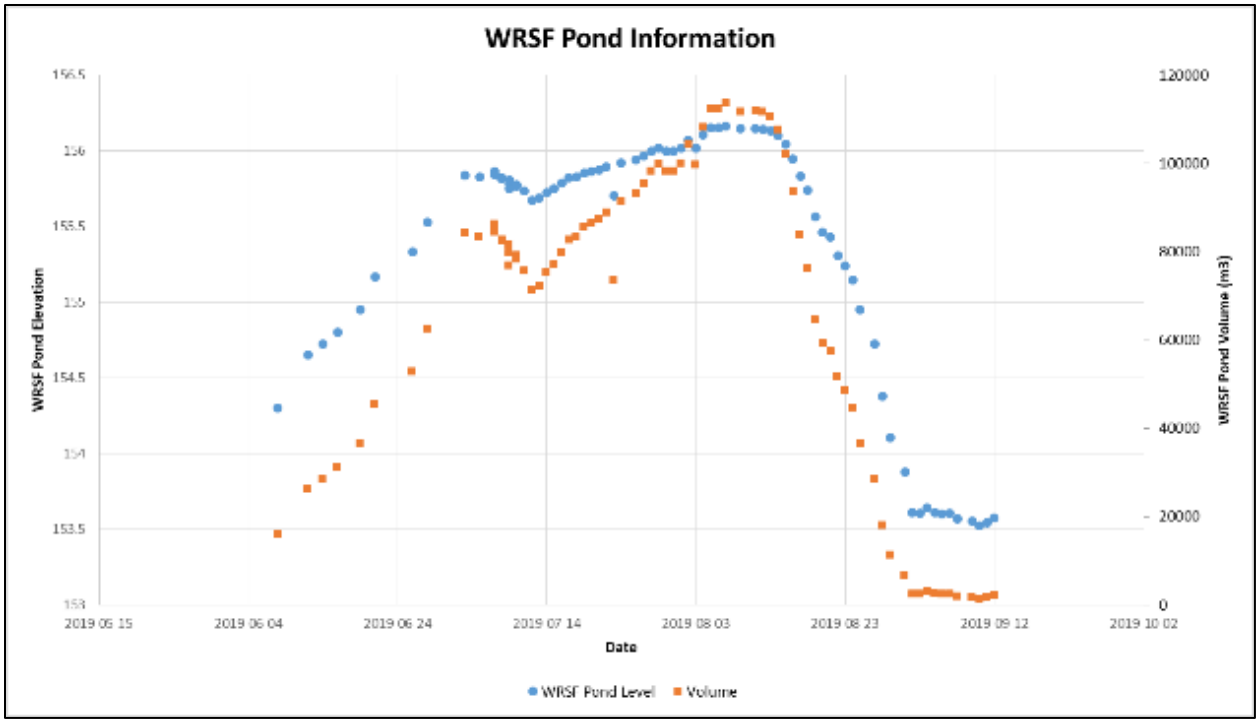


Figure 2: WRSF pond water elevation and associated volume

At peak conditions, the flow has been estimated to be approximately 172 $m^3$/hour. These estimates have been done by comparing the actual rate of decrease of the pond level compared to the expected rate of decrease of the pond resulting only from the pumping activities.

As mentioned in our earlier communications, the visual detection of this seepage downstream of the dike was difficult because of the presence of a boulder field at the toe which caused the flow to be somewhat diffuse as well as the presence of natural runoff reporting in this area.

**Toxicity and water quality results**

Toxicity tests

A series of samples were taken for analysis on August 26th from the water source (WRSF Pond) as well as from the receiving waterbody (Mammoth Lake). The toxicity test results were provided in the September 20, 2019 report and showed no mortalities.

Water quality sampling

Samples were also taken to test the water quality specifically for MDMER related parameters (Table 1 and Table 2, below) on August 26th. Sampling locations were identified as WRSF flow (water sampled downstream of the dike, where the flow was first observed and where a sump was excavated) and Mammoth Lake receiving (water sampled within a few meters of the shoreline of Mammoth Lake north).

Sampling and subsequent sample shipment were executed according to site Standard Operating Procedures and samples were sent on the same day via charter and transported directly to an accredited and certified laboratory (H2Lab) in Val d'Or, Quebec.

Analysis results from these samples and from subsequent samples taken at both locations showed no exceedances of the MDMER water quality criteria. These results are consistent with the expected water quality for this contact water.

A full complement of samples for extended parameters were also collected on August 27th, 30th, September 2nd and on a weekly basis until freeze up (September 29, 2019) and sent to the accredited laboratory. Water quality results from these additional samples are shown in Appendix A. No MDMER or Water License exceedances were shown for this complement of sampling.

Table 1: WRSF- MDMER related water quality results: Mammoth Lake North

| Sample Date | | | 26 Aug, 2019 | 27 Aug. 2019 | 2 Sept. 2019 | 9 Sept. 2019 | 16 Sept. 2019 | 22 Sept. 2019 | 29 Sept. 2019 |
|---|---|---|---|---|---|---|---|---|---|
| Location | | | Mammoth Lake receiving water area (North) | | | | | | |
| Parameter | Unit | MDMER Limits | | | | | | | |
| pH | pH units | 6.0 - 9.5 | 7.47 | 7.32 | 7.18 | 7.68 | 7.74 | 7.9 | 6.9197 |
| Conductivity | uS/cm | - | 642.6 | 630.2 | 559.6 | 332.2 | 195 | 202.4 | 278.5 |
| Temperature | °C | - | 8.95 | 8.56 | 8.39 | 6.65 | 7.01 | 7.23 | 7.14 |
| Dissolved oxygen | mg/L | - | 9.23 | 10.19 | 10.29 | 10.57 | 11.8 | 11.68 | 12.05 |
| Dissolved oxygen | % | - | 81.2 | 89.7 | 90.5 | 89.2 | 99.4 | 98.9 | 100 |
| Turbidity | NTU | - | 6.71 | 6.26 | 3.62 | 1.18 | 1.7 | 1.73 | 1.41 |
| Total susp.solids | mg/L | 30 | 5 | 4 | 2 | 2 | 1 | 5 | 1 |
| Cyanide | mg/L | 2 | 0.003 | - | - | - | - | - | - |
| Arsenic | mg/L | 1 | 0.008 | 0.0079 | 0.0052 | 0.0022 | 0.0016 | 0.0017 | 0.0013 |
| Copper | mg/L | 0.6 | 0.0046 | 0.0048 | 0.0043 | 0.0008 | 0.001 | 0.0007 | 0.0006 |
| Lead | mg/L | 0.4 | 0.00015 | 0.00015 | 0.00015 | 0.00015 | 0.00015 | 0.00015 | 0.00015 |
| Nickel | mg/L | 1 | 0.0212 | 0.023 | 0.0186 | 0.006 | 0.0049 | 0.0036 | 0.0033 |
| Zinc | mg/L | 1 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 |
| Radium-226 | Bq/l | 1.11 | 0.02 | - | 0.011 | 0.007 | 0.034 | 0.001 | 0.001 |

Table 2: WRSF- MDMER related Water quality results: WRSF flow

| Sample Date | | | 8/26/2019 | 8/27/2019 | 8/30/2019 | 9/2/2019 |
|---|---|---|---|---|---|---|
| Location | | | WRSF downstream flow in boulders | | | |
| Parameter | Unit | MDMER limits | | | | |
| pH | pH units | 6.0 - 9.5 | 6.79 | 7.17 | 7.54 | 7.03 |
| Conductivity | uS/cm | - | 640.6 | 621 | 671.7 | 682.3 |
| Temperature | °C | - | 8.59 | 9.99 | 11.05 | 9.76 |
| Dissolved oxygen | mg/L | - | 8.54 | 8.59 | 8.91 | 10.34 |
| Dissolved oxygen | % | - | 76.3 | 78 | 93.1 | 93.7 |
| Turbidity | NTU | - | 7.36 | 7.18 | 7.47 | 5.1 |
| Total suspended solids | mg/L | 30 | 6 | 4 | 4 | 3 |
| Cyanide | mg/L | 2 | 0.003 | - | 0.0005 | - |
| Arsenic | mg/L | 1 | 0.0078 | 0.0077 | 0.0087 | 0.0082 |
| Copper | mg/L | 0.6 | 0.0044 | 0.0054 | 0.0051 | 0.005 |
| Lead | mg/L | 0.4 | 0.00015 | 0.00015 | 0.00015 | 0.00015 |
| Nickel | mg/L | 1 | 0.0214 | 0.0226 | 0.0239 | 0.0252 |
| Zinc | mg/L | 1 | 0.0005 | 0.0005 | 0.0005 | 0.0005 |
| Radium-226 | Bq/l | 1.11 | 0.02 | - | - | 0.025 |

Data from Tables 1 and 2 show water quality of the water flow at the toe of the WRSF dike and within the near field receiving water of Mammoth Lake over the period reported.

As shown in Table 1, the prescribed deleterious substances regulated pursuant to MDMER were below the prescribed limits in the receiving water of Mammoth Lake and were decreasing over time, which coincides with the reduction in water flow through the

dike as the water in the WRSF pond was pumped out (pond empty by September 1st). Arsenic concentrations, the main parameter of concern identified during the Environmental Assessment process of the Whale Tail Project, are shown in Figure 3 below in both the seepage flow and in the receiving water, as an example to show the low concentrations of arsenic relative to the MDMER limit for discharge.

At no time did water quality in either the location, WRSF flow or Mammoth Lake Receiving, exceed any of the MDMER prescribed limits or Water License criteria.

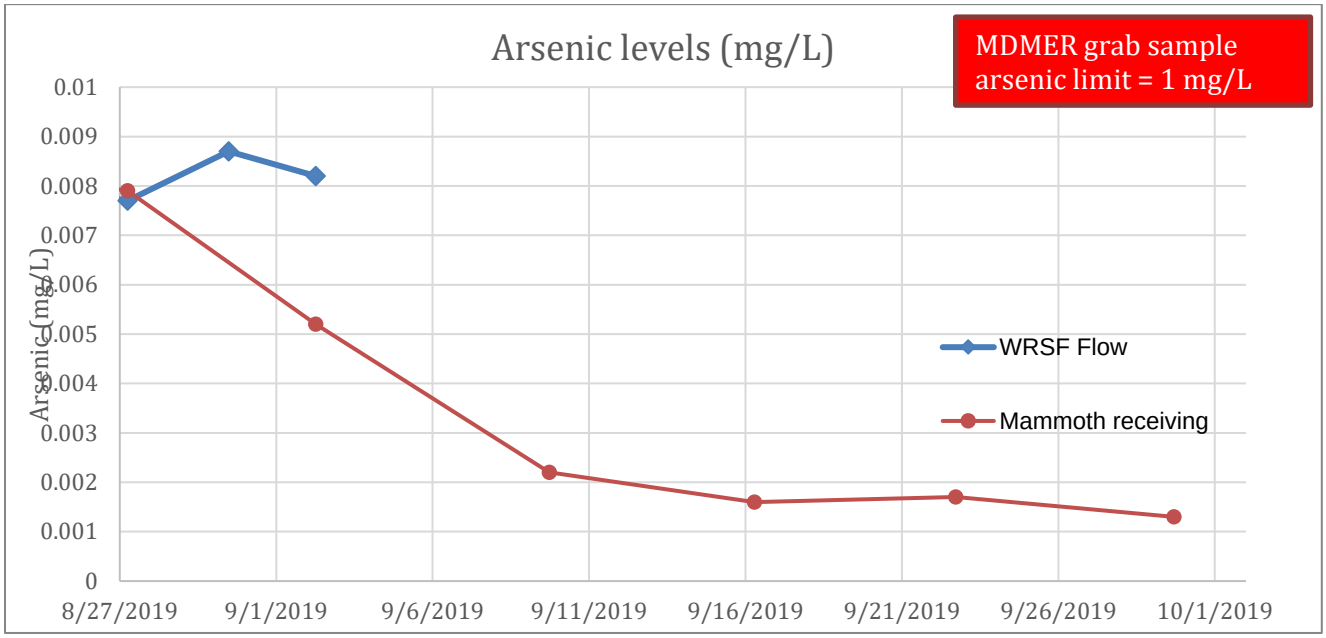


Figure 3: Arsenic Concentrations in Water of Mammoth North

**Additional investigations, analysis and actions**

Further investigations and analysis were completed to understand the cause of the seepage observed on August 25, 2019:

- Agnico Eagle's geotechnical engineers, along with the dike designer (SNC Lavalin) and the Engineer of Record (EoR), conducted a site visit/inspection on September 9, 2019, reviewed the available data and installed new instrumentation;
- A tracer test was conducted on October 8, 2019 and confirmed that the water levels were maintained below the authorized levels as per the dike design; and
- The Meadowbank Dike Review Board (MDRB) conducted a site visit and they supported the recommendation put forward, to keep a low water level in the pond and ensure freeze back during upcoming winter.

The following additional actions were taken:

- The downstream water was pumped back to the WRSF pond as much as possible:
  - An access road was constructed;
  - A sump was excavated;
  - A pump was installed, and flow was continuously directed back into the WRSF pond (then directed towards Quarry 1);
- The pumping was continued until September 30, 2019 at which time it was no longer possible to pump because of the decrease in flow and the freezing conditions.

The observations confirmed the initial assessment that, once low levels were maintained in the WRSF pond, no water originating from this pond was flowing towards Mammoth Lake. The pond has been kept at low levels since September 1, 2019.

The Trigger Action Response Plan status of the dike was elevated as per the OMS manual and this higher level resulted in a more intense surveillance program.

**Instrumentation Monitoring Results**

Installation of additional thermal monitoring instrumentation was completed in October 2019 in response to the seepage event. In addition to the existing 3 thermistors (TH-01, TH-02, TH-03), 4 new vertical instruments were installed (TH-04, TH-05, TH-06, TH-07). Locations are detailed in Figures 4 and 5 below. Figures 6 to 12 show collected data for the thermistors along with a short explanation of each instrument configuration and an interpretation of each thermistor data set. All data are logged into an existing data collection system.

Figure 4: WRSF Thermistor locations

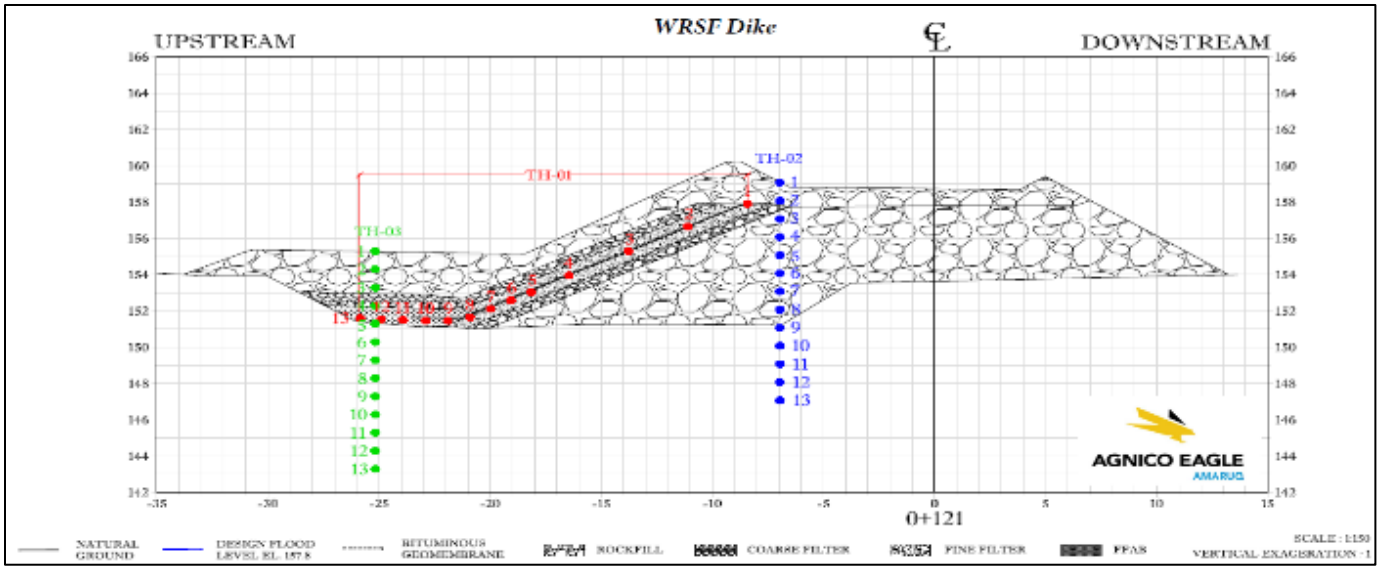
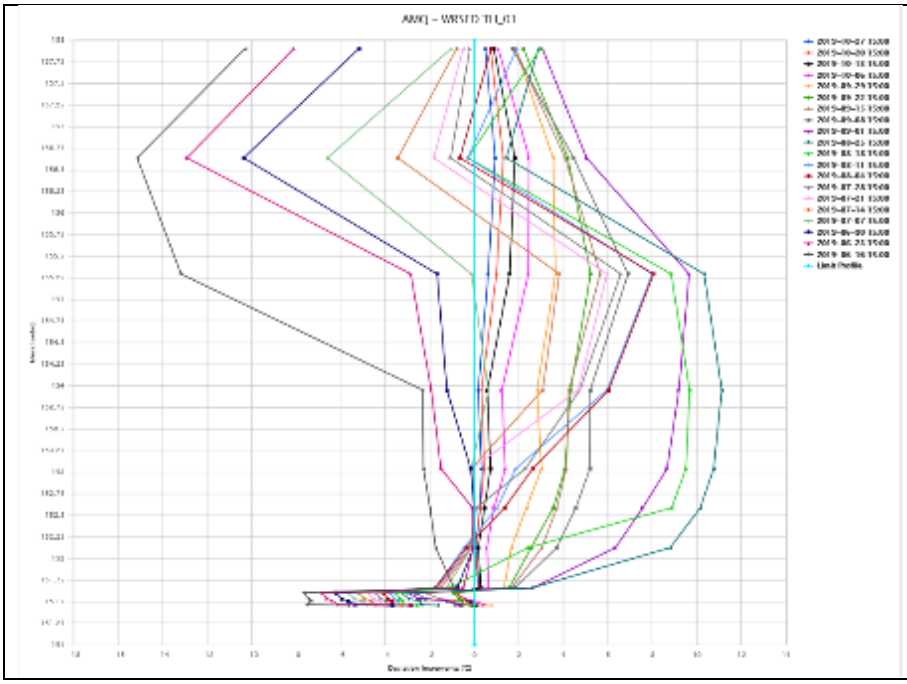


Figure 5: WRSF Thermistor TH1, TH2, TH3 locations (profile view)



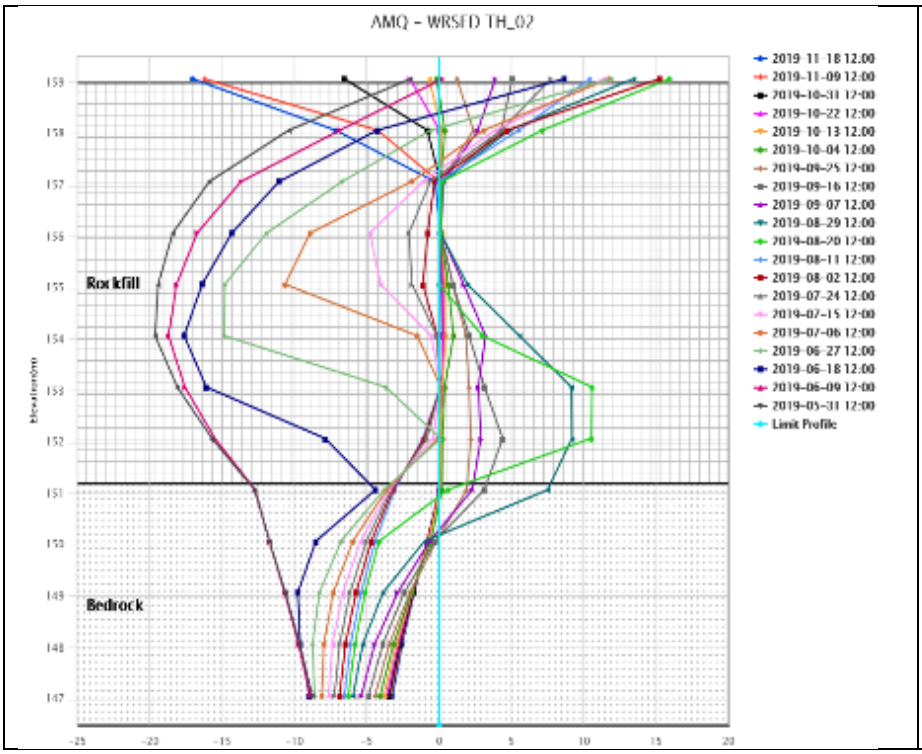
*Configuration*

- Installed March 2019
- 13 Beads TH
- Bead #1 (upper) to 8 in upstream slope
- Bead #9 to 13 in key trench
- No beads underneath FFAB (i.e. no bead in foundation)

*Interpretation*

- Upstream slope progressively warms as water raise in pond (water in contact with liner & TH)
- Peak temperature (11ºC) at elevation 154 occurred around August 20th in response to key trench excavation filling up with warm seepage water
- Beads in FFAB (#9+) show frozen condition until October 2019. Temperature reached slightly above 0ºC in FFAB in October

Figure 6: WRSF Temperature profile of thermistor TH-01



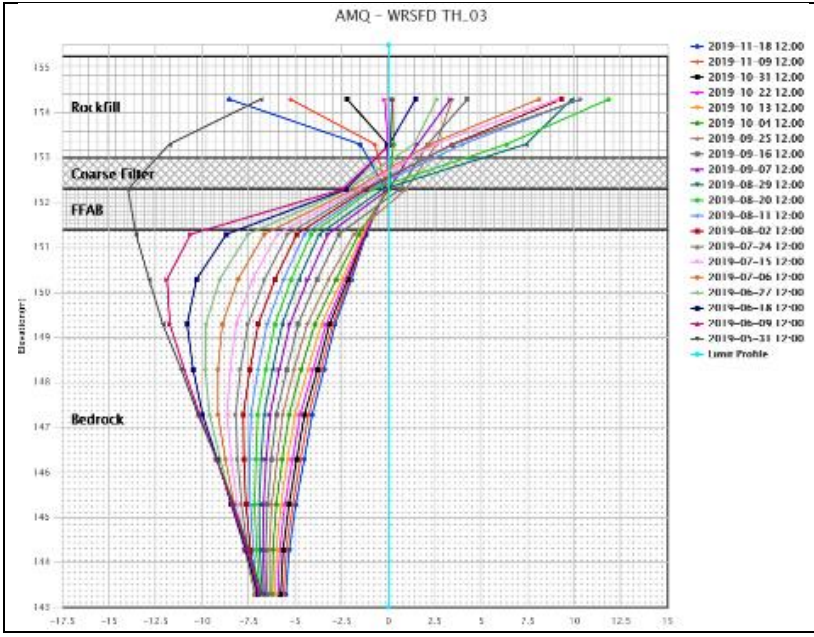

*Configuration*

- Installed March 2019
- 13 Beads TH
- Located downstream of liner
- Bead #1 (upper) to 8 in rockfill
- Bead #9 to 13 in bedrock

*Interpretation*

- All beads (except surface ones) were showing frozen (<0ºC) rockfill/bedrock before August 15 but with gradual warming up. Most likely due to key trench void filling slowly (over 2 months) with runoff water
- Sudden peak temperature (11ºC) at elevation 152.5 m occurred around August 20th in response to key trench excavation filling up with warm seepage water
- Since this event, temperatures are going back to freezing condition (close to 0ºC)

Figure 7: WRSF Temperature profile of thermistor TH-02



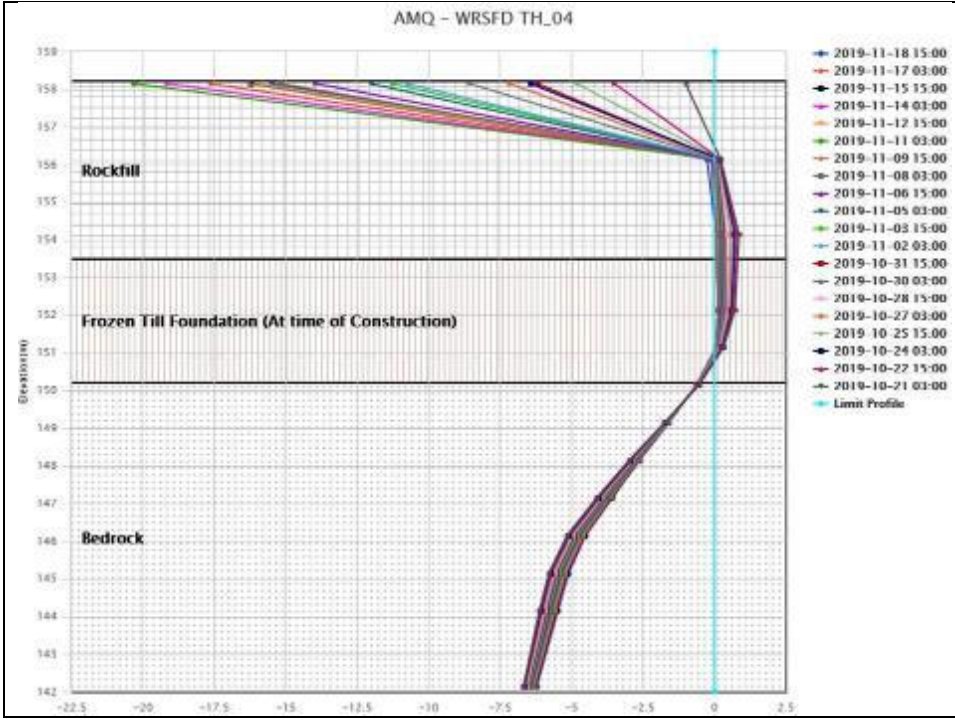

*Configuration*

- Installed March 2019
- 13 Beads TH
- Located upstream of liner, through FFAB and foundation
- Bead #1 (upper) to 3 in rockfill/coarse filter or FFAB
- Bead #4 to 13 in bedrock

*Interpretation*

- FFAB layer did not thaw completely over the summer months but coarse filter did
- No sudden peak of temperature observable in this TH
- Bedrock foundation remained frozen

Figure 8: WRSF Temperature profile of thermistor TH-03



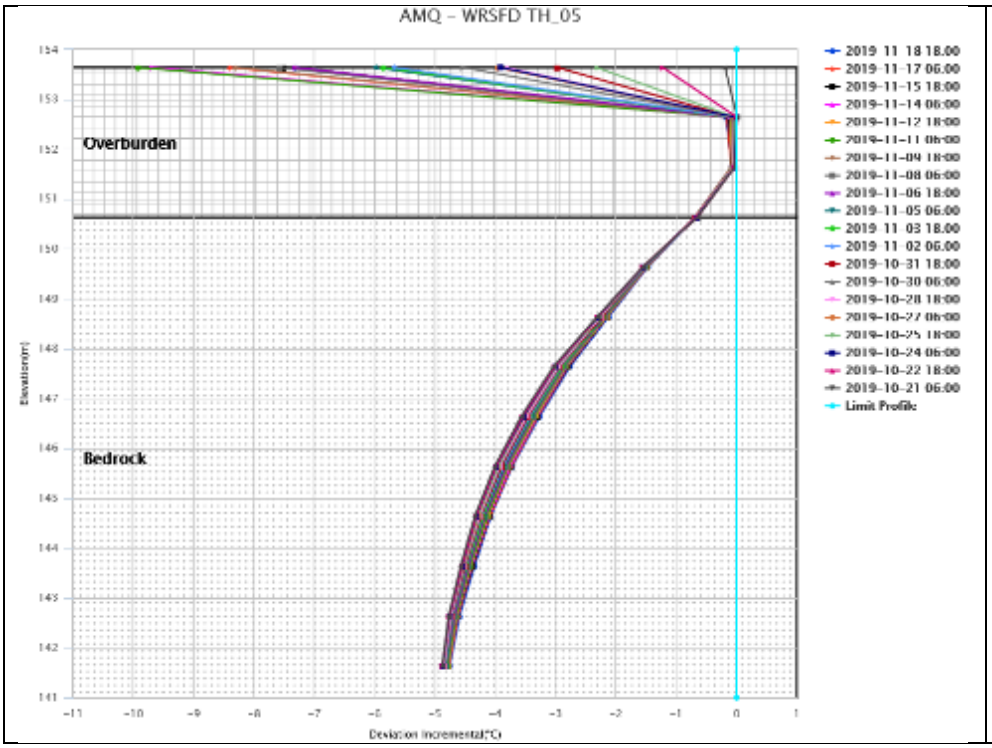

*Configuration*

- Installed October 2019
- 13 Beads TH
- Located downstream of liner
- Bead #1 (upper) to 3 in rockfill
- Bead #4 to 13 in bedrock

*Interpretation*

- TH installation was in response to seepage. No data of the critical period available
- Even in October, portion of the till foundation was still unfrozen
- No sudden peak of temperature observable in this TH
- Bedrock foundation remained frozen
- Very similar trend to TH2 for October/November

Figure 9: WRSF Temperature profile of thermistor TH-04



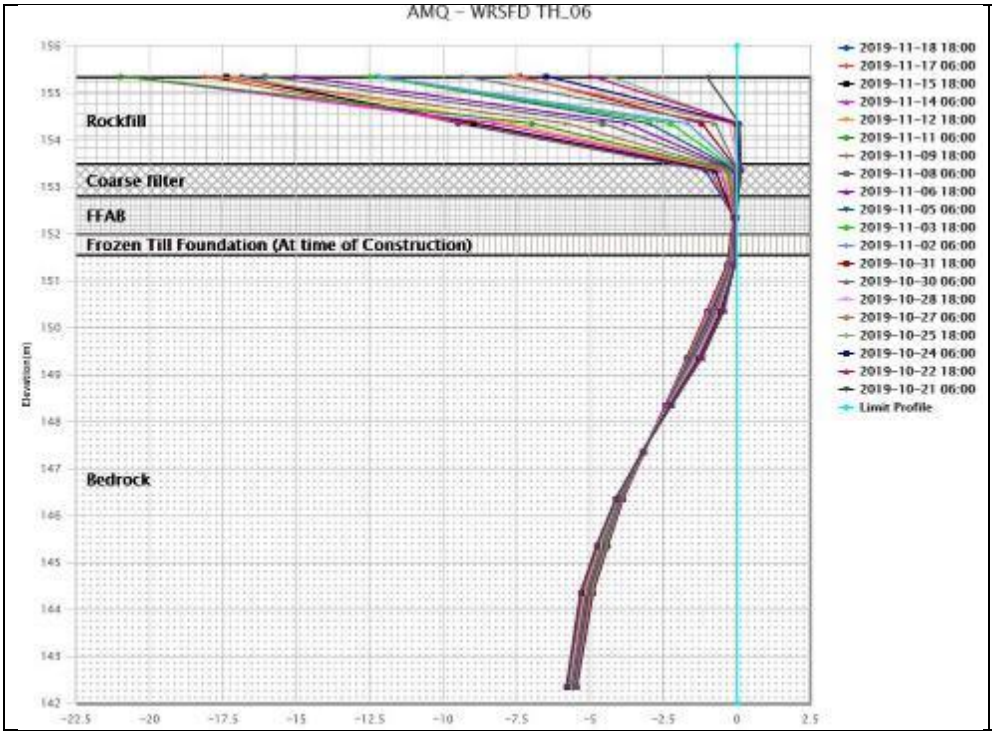

## *Configuration*

- Installed October 2019
- 13 Beads TH
- Located 20m upstream of liner in low spot
- Bead #1 (upper) to 4 in overburden
- Bead #5 to 13 in bedrock

## *Interpretation*

- TH installation was in response to seepage. No data of the critical period available
- Partial, results seem to suggest that active layer in overburden was around 2m (153.5 to 151.5)

Figure 10: WRSF Temperature profile of thermistor TH-05



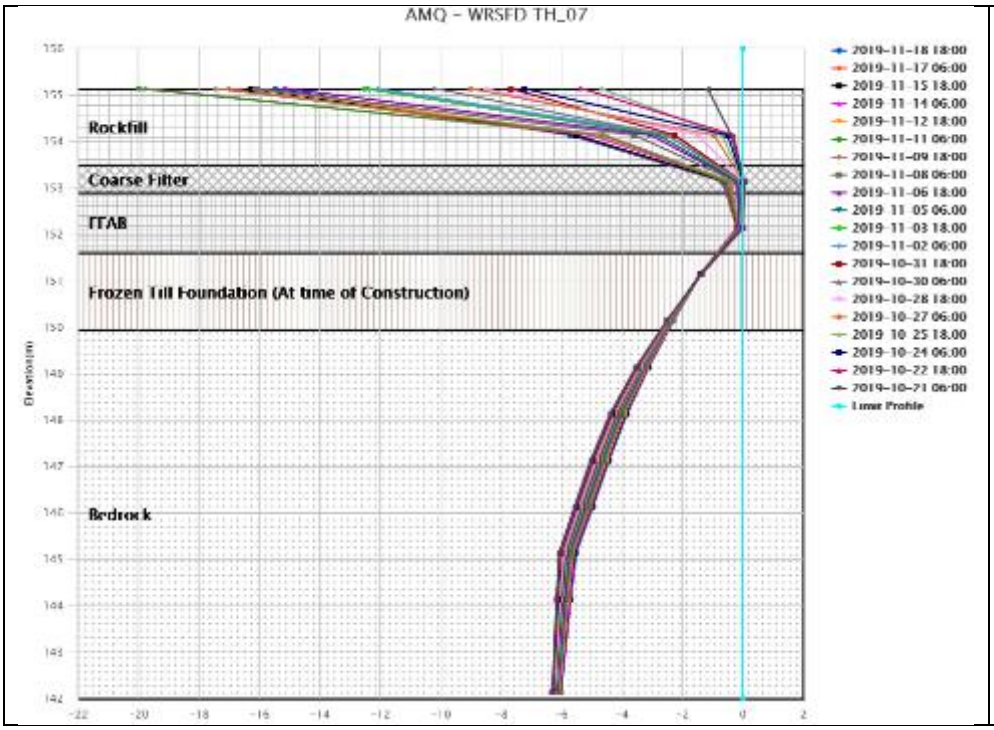

## *Configuration*

- Installed October 2019
- 13 Beads TH
- Located through key trench, upstream of liner (similar to TH3)
- Bead #1 (upper) to 4 in overburden or filter
- Bead #5 to 13 in foundation

## *Interpretation*

- TH installation was in response to seepage. No data of the critical period available
- Partial, results seem to suggest that active layer penetrated down to the foundation (elevation 151.0)

Figure 11: WRSF Temperature profile of thermistor TH-06




*Configuration*

- Installed October 2019
- 13 Beads TH
- Located through key trench, upstream of liner (similar to TH3)
- Bead #1 (upper) to 4 in overburden or filter
- Bead #5 to 13 in foundation

*Interpretation*

- TH installation was in response to seepage. No data of the critical period available.
- Partial, results seem to suggest that active layer stayed in FFAB

Figure 12: Temperature profile of thermistor TH-07

## Seepage Mechanism Determination

Ongoing work to identify the exact mechanism that led to the seepage of water through the WRSF dike highlighted the following mechanisms: degradation of the permafrost within the dike foundation, damage to the liner, or a combination of both.

Degradation of the permafrost within the dike foundation:

Thermal monitoring results suggest that thawing of the dike foundation occurred, resulting in an increase of its hydraulic conductivity that led to the seepage. Thawing of the foundation has probably been induced by the higher than anticipated accumulation of water in the pond coupled with an insufficient thermal protection on the upstream toe of the dike.

Over the summer, the pond experienced high water levels (still within design limits) resulting from higher than anticipated precipitation. These sustained high water levels led to warming/thawing of the key trench plug (FFAB, Fine Filter Amended with Bentonite) at approximately elevation 152.5 m as shown in Figure 8 (TH-03). Thawing of the key trench created a sudden pathway for water to migrate downstream.

Damage to the liner:

While unlikely, it cannot be excluded that potential damages to the liner occurred as a result of excessive differential settlement between the dike and its foundation. However, the magnitude of the flowrate is such that it would have required an important defect in the liner. It is unlikely that excessive differential settlement could have resulted in such

large-scale damage. It is therefore more likely that if any defects were present, they could account for only a portion of the flow.

Exposing the liner to investigate its integrity risks damaging it. The strategy is to monitor the thawing of the foundation using thermistors. If thermistor data do not show any thawing and seepage beyond the design value is observed, more intrusive verification of the liner would need to be done and could lead to its replacement.

**Path Forward**

A series of measures have been or will be implemented to minimize the risk of a similar occurrence in the future:

- The water level in the WRSF pond will be maintained at a low level throughout 2020 as per recommendation from the MDRB as a precautionary measure and to ensure protection of the freeze-back of the key trench;
- Permafrost penetration will be promoted during winter 2019-2020 by implementing a series of additional measures to increase the robustness of the infrastructure and in particular the upstream toe against permafrost degradation:
  - Strategic snow removal to keep the toe more exposed to winter conditions;
  - Keeping a low water level (if any) in the pond during winter and summer months;
  - Placing additional thermal cover material on the upstream portion of the dike; and
  - Assessing freeze back performance with periodic instrumentation review;
- A more robust downstream water collection system will be designed and constructed; and
- Thermistors monitoring will continue.

In addition, the following environmental monitoring will be conducted:

- A monthly limnology profile of Mammoth Lake will be completed over the winter and open water conditions;
- A core receiving environment monitoring program will be carried out, including Mammoth lake; and
- A sediment sampling campaign will be executed in the summer at Mammoth Lake.

This path forward was presented and approved by the MDRB during a meeting held in late November.

## Conclusion

Agnico Eagle's team responded well to the event and was able to rapidly implement a series of measures when the water flow was observed. Following the emptying of the WRSF pond, the water flow was stopped by September 1st (which was later supported by a tracer test that did not show connectivity afterward). Also, water quality data showed that the overall impact of this event in the receiving environment was minimal.

It is important to mention that while this dike did not perform as intended, at no time was there an issue with its overall integrity. While it is difficult to conclude on the exact mechanism that led to the flow of water through the dike, thermistor evidence seems to point toward the thawing of the foundation on the upstream side of the dike as the main contributor. Therefore, improving the robustness of this infrastructure by providing additional thermal cover on the upstream toe is considered the most effective measure to implement at this stage. This measure is fully supported by our external and internal technical specialists who believe that promoting freeze back during the winter of 2019-2020 (to be confirmed by monitoring data from the thermistors already installed) and maintaining low water levels in the pond, should reduce the risk of similar occurrence in the coming years.

Agnico Eagle is committed to maintaining very close monitoring of this area. Additional instrumentation in the structure have been installed, strict inspection as per the OMS manual will be conducted and water quality sampling downstream of the location of the seepage will be maintained with the core receiving environment monitoring program in Mammoth Lake.

Should you have any questions regarding this report, please do not hesitate to contact the undersigned.

Regards,

Robin Allard
General Supervisor
Environment
Meadowbank Division

# Appendix A

| **Sample Date** | | | 8/27/2019 | 8/30/2019 | 9/2/2019 | 9/2/2019 | 9/9/2019 | 9/16/2019 | 9/22/2019 | 9/29/2019 |
|---|---|---|---|---|---|---|---|---|---|---|
| **Location** | | | Mammoth Receiving | WRSF flow in boulders | Mammoth Receiving | WRSF flow in boulders | Mammoth Receiving | Mammoth Receiving | Mammoth Receiving | Mammoth Receiving |
| **Parameter** | **MDMER Limit** | **Unit** | | | | | | | | |
| pH | | pH units | 7.32 | 7.54 | 7.18 | 7.03 | 7.68 | 7.74 | 7.9 | 6.97 |
| Conductivity | | uS/cm | 630.2 | 671.7 | 559.6 | 682.3 | 332.2 | 195 | 202.4 | 278.5 |
| Temperature | | °C | 8.56 | 11.05 | 8.39 | 9.76 | 6.65 | 7.01 | 7.23 | 7.14 |
| Dissolved oxygen | | mg/L | 10.19 | 8.91 | 10.29 | 10.34 | 10.57 | 11.8 | 11.68 | 12.05 |
| Dissolved oxygen | | % | 89.7 | 93.1 | 90.5 | 93.7 | 89.2 | 99.4 | 98.9 | 102.4 |
| pH | 6.0 - 9.5 | pH units | 7.77 | 7.66 | 7.69 | 7.77 | 6.76 | 7.25 | 7.42 | 7.35 |
| Hardness | | mg CaCO3/L | 216 | 243 | 186 | 254 | 105 | 69 | 69 | 73 |
| Total dissolved solids | | mg/L | 406 | 445 | 374 | 447 | 191 | 131 | 132 | 167 |
| Total suspended solids | 30 | mg/L | 4 | 4 | 2 | 3 | 2 | 1 | 5 | 1 |
| Turbidity | | NTU | 4.9 | - | 3.23 | 4.43 | 1.21 | 0.77 | 1.19 | 1.45 |
| Total alkalinity, as CaCO3 | | mg CaCO3/L | 52 | 58 | 63 | 70 | 28 | 21 | 23 | 22 |
| Chloride | | mg/L | 26.9 | 28.6 | 27.5 | 29.1 | 23.5 | 25.4 | 25.7 | 27.1 |
| Fluoride | | mg/L | 0.11 | 0.11 | 0.08 | 0.09 | 0.06 | 0.06 | 0.06 | 0.07 |
| Sulphate | | mg/L | 160 | 162 | 127 | 167 | 48.3 | 24.7 | 24.7 | 36.4 |
| Total ammonia as NH4 | | mg/L | 0.85 | 0.67 | 0.55 | 0.79 | 0.25 | 0.11 | 0.09 | 0.16 |
| Un-Ionized Ammonia, | | mg/L | 0.01 | 0.005 | 0.005 | 0.01 | 0.005 | 0.005 | 0.005 | 0.005 |
| Total phosphorus | | mg/L | 0.04 | 0.05 | 0.04 | 0.05 | 0.005 | 0.02 | 0.01 | 0.01 |
| Total orthophosphate (P) | | mg/L | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.02 |
| **Total Metals** | | | | | | | | | | |
| Aluminum | | mg/L | 0.064 | 0.194 | 0.027 | 0.087 | 0.0025 | 0.0025 | 0.006 | 0.023 |
| Arsenic | 1 | mg/L | 0.0079 | 0.0087 | 0.0052 | 0.0082 | 0.0022 | 0.0016 | 0.0017 | 0.0013 |
| Barium | | mg/L | 0.0779 | 0.083 | 0.0582 | 0.0811 | 0.035 | 0.027 | 0.0257 | 0.0305 |
| Cadmium | | mg/L | 0.00005 | 0.00005 | 0.00001 | 0.00005 | 0.00001 | 0.00001 | 0.00001 | 0.00002 |
| Chromium | | mg/L | 0.0011 | 0.0015 | 0.0007 | 0.0009 | 0.0003 | 0.001 | 0.0003 | 0.0003 |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Copper | 0.6 | mg/L | 0.0048 | 0.0051 | 0.0043 | 0.005 | 0.0008 | 0.001 | 0.0007 | 0.0006 |
| Iron | | mg/L | 0.44 | 0.67 | 0.42 | 0.74 | 0.11 | 0.07 | 0.09 | 0.09 |
| Lead | 0.4 | mg/L | 0.00015 | 0.00015 | 0.00015 | 0.00015 | 0.00015 | 0.00015 | 0.00015 | 0.00015 |
| Manganese | | mg/L | 0.3666 | 0.5358 | 0.3486 | 0.6314 | 0.109 | 0.0137 | 0.0212 | 0.0542 |
| Mercury | | mg/L | 0.000005 | 0.000005 | 0.000005 | 0.000005 | 0.000005 | 0.00002 | 0.000005 | 0.000005 |
| Molybdenum | | mg/L | 0.0021 | 0.0023 | 0.0016 | 0.0026 | 0.0013 | 0.0009 | 0.0011 | 0.0009 |
| Nickel | 1 | mg/L | 0.023 | 0.0239 | 0.0186 | 0.0252 | 0.006 | 0.0049 | 0.0036 | 0.0033 |
| Selenium | | mg/L | 0.0034 | 0.0027 | 0.0017 | 0.0044 | 0.0009 | 0.00025 | 0.0015 | 0.00025 |
| Silver | | mg/L | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 |
| Titanium | | mg/L | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 | 0.005 |
| Zinc | 1 | mg/L | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 |
| **Dissolved Metals** | | | | | | | | | | |
| Aluminum | | mg/L | 0.00025 | 0.00025 | 0.00025 | 0.00025 | 0.00025 | 0.00025 | 0.00025 | 0.00025 |
| Arsenic | | mg/L | 0.0059 | 0.0058 | 0.0043 | 0.0047 | 0.0015 | 0.0011 | 0.001 | 0.0008 |
| Barium | | mg/L | 0.0676 | 0.0743 | 0.0551 | 0.0668 | 0.0368 | 0.0218 | 0.0242 | 0.0309 |
| Cadmium | | mg/L | 0.00004 | 0.00001 | 0.00001 | 0.00009 | 0.00004 | 0.00001 | 0.00001 | 0.00001 |
| Chromium | | mg/L | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 | 0.0003 |
| Copper | | mg/L | 0.0022 | 0.0026 | 0.0024 | 0.003 | 0.0009 | 0.0006 | 0.00025 | 0.00025 |
| Iron | | mg/L | 0.1 | 0.18 | 0.11 | 0.11 | 0.01 | 0.005 | 0.005 | 0.005 |
| Lead | | mg/L | 0.00015 | 0.00015 | 0.008 | 0.00015 | 0.00015 | 0.00015 | 0.00015 | 0.00015 |
| Manganese | | mg/L | 0.3613 | 0.5351 | 0.3335 | 0.5612 | 0.0941 | 0.012 | 0.0145 | 0.0491 |
| Mercury | | mg/L | 0.000005 | 0.000005 | 0.000005 | 0.000005 | 0.000005 | 0.000005 | 0.000005 | 0.000005 |
| Molybdenum | | mg/L | 0.0019 | 0.0022 | 0.002 | 0.0022 | 0.0012 | 0.0008 | 0.0006 | 0.0009 |
| Nickel | | mg/L | 0.0206 | 0.0226 | 0.0177 | 0.0216 | 0.0053 | 0.0041 | 0.0028 | 0.0032 |
| Selenium | | mg/L | 0.0026 | 0.0043 | 0.001 | 0.0027 | 0.00025 | 0.00025 | 0.00025 | 0.00025 |
| Silver | | mg/L | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 | 0.00005 |
| Thallium | | mg/L | 0.0006 | 0.0005 | 0.0008 | 0.0006 | 0.0001 | 0.0001 | 0.0001 | 0.0001 |
| Zinc | | mg/L | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 | 0.0005 |
| Radium-226 | 1.11 | Bq/l | - | - | 0.011 | 0.025 | 0.007 | 0.034 | 0.001 | 0.001 |