



Meliadine Gold Project  
2020 Emergency Amendment Report

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## APPENDICES

### APPENDIX A

Water Licence 2AM-MEL1631 Emergency Amendment 1 Decision

### APPENDIX B

WQ-MOP Rev4a

### APPENDIX C

Water Management Working Group Presentations and Meeting Minutes

## ABBREVIATIONS AND UNITS

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Agnico Eagle	Agnico Eagle Mines Limited
AMP	Adaptive Management Plan
CIRNAC	Crown Indigenous Relations Northern Affairs Canada
CP1	Containment Pond 1 (also referred to as Collection Pond 1 or Control Pond 1)
e.g.	for example
ECCC	Environment and Climate Change Canada
EQC	effluent quality criteria
i.e.	that is
KivIA	Kivalliq Inuit Association
km	kilometres
m	metres
m <sup>3</sup>	cubic metres
MAC	maximum average concentration
MAEC	maximum allowable effluent concentration
mg/L	milligrams per litre
MGC	maximum grab concentration
NIRB	Nunavut Impact Review Board
NPC	Nunavut Planning Commission
NuPPAA	<i>Nunavut Planning and Project Assessment Act</i>
NWB	Nunavut Water Board
SSWQO	site-specific water quality objective
TDS	Total Dissolved Solids
µS/cm	microsiemens per centimetre
UV	ultraviolet
WMWG	Water Management Working Group
W-N-E	West-Northeast
WQ-MOP	Water Quality Management and Optimization Plan

## SECTION 1 • INTRODUCTION

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Agnico Eagle Mines Limited (Agnico Eagle) operates the Meliadine Gold Project (the Project or Mine), located approximately 25 kilometres (km) north of Rankin Inlet, and 80 km southwest of Chesterfield Inlet in the Kivalliq Region of Nunavut, on Inuit Owned Lands. The Mine is located within the Meliadine Lake watershed of the Wilson Water Management Area (Nunavut Water Regulations Schedule 4).

Through the Nunavut Water Board (NWB), Agnico Eagle applied for an Emergency Amendment to the Meliadine Type A Water Licence (2AM-MEL1631) to release, during the discharge season 2020, the water from the existing Containment Pond 1 (CP1). The water released from CP1 would exceed the Total Dissolved Solids (TDS) concentration limits prescribed under Part F, Item 3 of the Licence (1,400 milligrams per litre [mg/L]), and an Amendment to the Type A Water Licence was required before the discharge from CP1 could take place. This Emergency Amendment was subsequently approved on April 29, 2020 by the NWB as per the Decision in Appendix A. Specifically, under the approved temporary (May to October 2020) amendment to Agnico Eagle's Type A Water Licence (No. 2AM-MEL1631), Agnico Eagle was permitted the following:

*Authorization to temporarily discharge water from CP1 to Meliadine Lake that contains a maximum average concentration of TDS up to 3,500 mg/L, which exceeds the current limit described in Part F, Item 3 of the current Water Licence of 1,400 mg/L*

In conjunction with the 2020 discharge to Meliadine Lake, as approved under Amendment 1 of the Mine's Type "A" Water Licence, comprehensive studies were conducted to monitor conditions and validate the temporary increased TDS discharge, as well as produce additional information on receiving environment assimilation (including plume delineation). An overview of the validation monitoring results conducted in 2020 is presented in the Water Quality Management and Optimization Plan (WQ-MOP Rev 4a; Appendix B) and summarized in the following sections.

In summary, the comprehensive monitoring conducted under the WQ-MOP concluded that there were no adverse effects to water quality or to aquatic biota. Further, the interim TDS target for the discharge and that proposed for the receiving environment in Lake Meliadine (i.e., 1,000 mg/L) developed as part of the WQ-MOP were ratified from the monitoring data as appropriate regulatory limits for discharge as effluent quality criteria (EQC) and site-specific Water Quality Objectives (SSWQO) for the receiving environment that will be applicable to future operating conditions at the Meliadine Mine for the protection of water quality and aquatic biota in Meliadine Lake.

Agnico Eagle is submitting a report on the work and activities undertaken as part of the Emergency Amendment per *Nunavut Planning and Project Assessment Act* (NuPPAA) section 152 (2). This report is submitted independent from the Annual Reporting process and will be provided to the Nunavut Impact Review Board (NIRB) and shared with the Nunavut Planning Commission (NPC) and the Minister.

## SECTION 2 • OVERVIEW OF WATER QUALITY MANAGEMENT AND OPTIMIZATION PLAN

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The WQ-MOP was developed by Agnico Eagle as a commitment to the Emergency Amendment to provide a procedure for determining acceptable discharge criteria and an in-lake monitoring benchmark in Meliadine Lake and to design and implement a comprehensive monitoring program to track the quality of the discharge and its effects in Meliadine Lake. This plan included three phases:

- Phase 1 – Develop TDS discharge criteria for CP1 water and an in-lake monitoring benchmark for Meliadine Lake during the 2020 discharge season
- Phase 2 – Design a detailed monitoring study that would be implemented during discharge that included the regular collection of field water quality data and water samples of the discharge (one station) and the receiving environment (seven stations) for chemistry analysis, and toxicity testing of fish and *Daphnia magna* survival tests for the discharge and growth and reproduction tests for a range of aquatic organisms in the lake
- Phase 3 – Develop long-term discharge criteria for CP1 water and an in-lake monitoring benchmark for Meliadine Lake using the water quality and toxicity testing data collected over the discharge period, which will be applicable to future operating conditions at the Meliadine Mine

Since March 2020, several versions of the WQ-MOP have been prepared. The initial version (WQ-MOP Rev1; Golder 2020a) and subsequent versions followed updates to the WQ-MOP based on feedback and recommendations following review by the NWB, Kivalliq Inuit Association (KivIA), Environment and Climate Change Canada (ECCC), and Crown Indigenous Relations Northern Affairs Canada (CIRNAC), and results of the detailed field study. These versions are summarised below:

- The WQ-MOP Rev1 (Golder 2020a) comprised primarily Phase 1, which utilized existing site monitoring work, particularly toxicity testing data for CP1 water back to 2018, to establish interim TDS targets. It also described the supporting studies to validate the science-based interim targets and produce additional information on receiving environment assimilation.
- The WQ-MOP Rev2 (Golder 2020b) was submitted to the NWB as a requirement under NWB's Reason for Decision (NWB 2020) to approve the Emergency Amendment. This version of the WQ-MOP formalized the procedure for management of CP1 discharges that followed a systematic and science-based framework for determining acceptable discharge quality conditions. It also included a description of adaptive management thresholds associated with the management of water in CP1 and in the receiving environment (edge of mixing zone in Meliadine Lake) that would trigger the implementation of measures (i.e., responses, actions, mitigation), if required, to reduce the potential for the targets associated with discharge to Meliadine Lake to be exceeded.

- The WQ-MOP Rev2a (Golder 2020c) was submitted to NWB on August 24, 2020 in response to questions and information requests following review of the WQ-MOP Rev 2 from ECCC and the KivIA during the initial Water Management Working Group (Working Group<sup>1</sup>) meeting for the 2020 discharge. The Working Group was established by Agnico Eagle as a component of the Emergency Amendment; Agnico Eagle committed to establish a Working Group and work collaboratively with the members of the group to exchange water quality data collected during discharge and to discuss the progress of water management activities at CP1. The WQ-MOP Rev2a also provided a summary of water quality and toxicity testing results collected to date from the Phase 2 validation.
- The WQ-MOP Rev3 was prepared on 24 August 2020 and submitted with the 2020 Meliadine Mine Water Licence Amendment. This version included the supplemental adaptive management trigger for discharge quality for discharge that stated, “If the maximum allowable effluent concentration (MAEC) of TDS (as measured TDS) in effluent to be discharged to Meliadine Lake is equivalent to, or greater than, 5,000 mg/L, Agnico Eagle will temporarily decrease the rate of effluent discharges by up to 50% until TDS concentrations in the effluent are less than 5,000 mg/L.”.
- The WQ-MOP Rev 4 (Golder 2020e) was issued on November 13, 2020 in response to Technical Comments related to the Water Licence Amendment and included all of the available 2020 water quality and toxicity monitoring results for the discharge and from the receiving environment at the time of submission, including the supplemental testing studies, continuous in lake monitoring, and plume delineation studies. It also included the Phase 3 component, which ratified the EQCs and SSWQO benchmark for the long-term water management of CP1 discharge to Meliadine Lake. An update to the version, Rev 4a (Appendix B), included all water quality and toxicity monitoring results for the discharge and from the receiving environment for the monitoring conducted in 2020.

As each of the versions represented a progression through the phases that were supplemented by reviewer feedback, and data pertaining to the quality of the discharge and its effects to the receiving environment, the following outcomes for each of the phases can be summarized as follows:

- Phase 1 of the WQ-MOP recommended TDS discharge criteria up to 3,500 mg/L and in-lake monitoring benchmark, located at 100 metres (m) from the discharge point, of 1,000 mg/L during the 2020 discharge season.
- Phase 2 of the WQ-MOP (Conduct Validation Study) detailed the validation studies specific to the emergency amendment, which commenced in conjunction with the release of discharge from the Meliadine Mine to Meliadine Lake on June 5, 2020. The sampling stations assessed during this monitoring program are shown in Figure 1 and described in Table 1.

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<sup>1</sup> The Water Management Working Group is discussed in more detail in Section 6.

- Phase 3 (Finalize Meliadine Mine Benchmarks) is currently under revision by the NWB as per the Water Licence Amendment process and involved incorporating the findings of Phase 1 into the assessment of results from the Phase 2 validation studies and confirming and setting the EQCs and SSWQO benchmarks, which will provide for the ongoing long-term protection of Meliadine Lake from unacceptable effects. Specifically:
  - the maximum average concentration (MAC) of TDS of 3,500 mg/L and the maximum grab concentration (MGC) of TDS of 5,000 mg/L for discharge from CP1 to Meliadine Lake (i.e., EQC); and
  - the benchmark concentration of TDS of 1,000 mg/L to be achieved at the edge of the mixing zone in Meliadine Lake, which would also be consistent with the SSWQO for longer-term management of the receiving environment of Meliadine Lake.



**Table 1: Conceptual Design for Validation of Interim Total Dissolved Solids Limits for Discharge and Receiving Environment Conducted in 2020 as Part of the Emergency Amendment to Agnico Eagle Mine's Type "A" Water Licence (No. 2AM-MEL1631)**

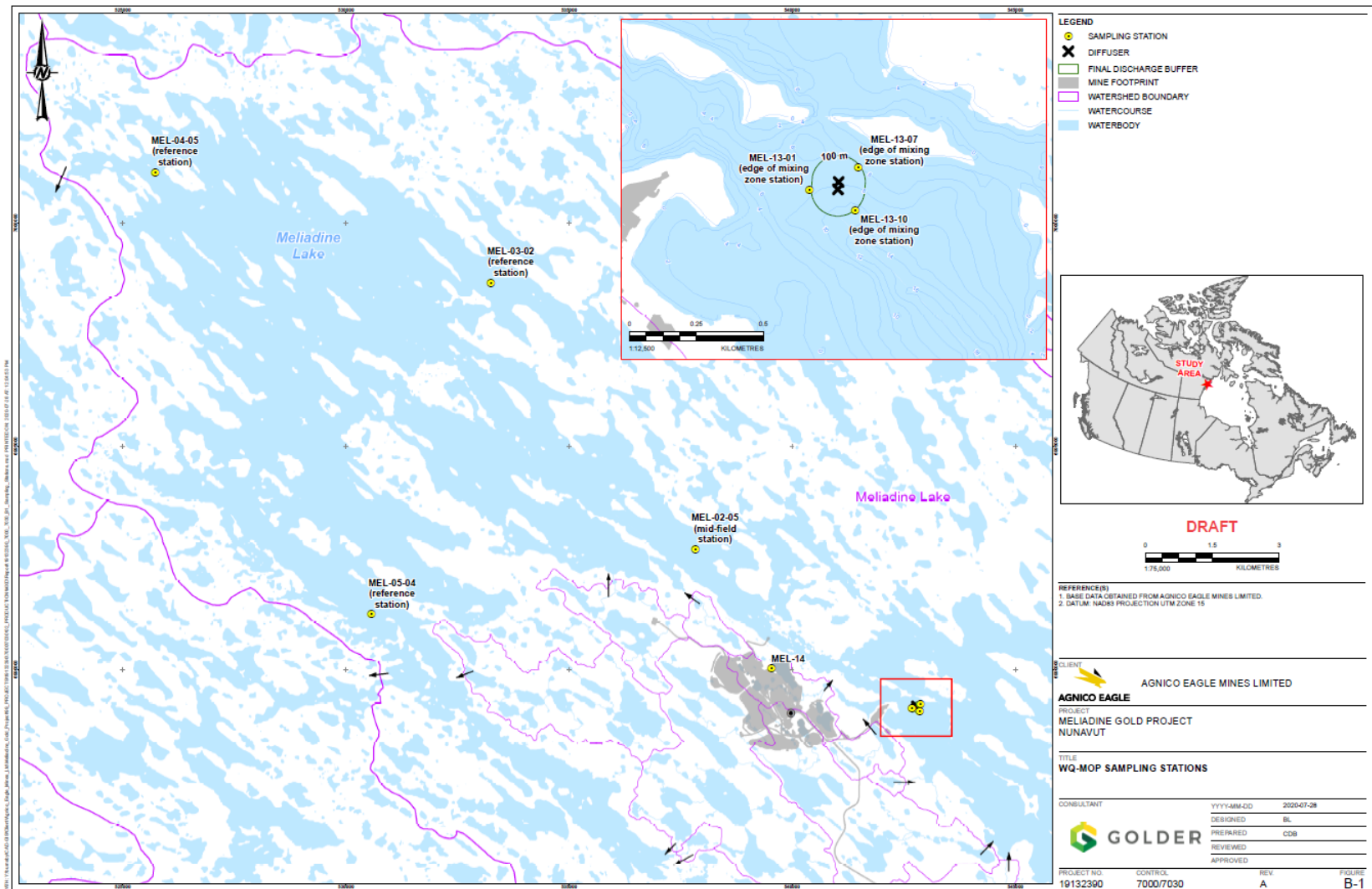
Water Quality Monitoring Program			
Sampling Media	Discharge	Mixing Zone Surface Water <sup>(a)</sup>	Receiving Environment Surface Water <sup>(a)</sup> (beyond mixing zone)
Sample Timing	During discharge and during collection of samples for toxicity testing	During discharge <sup>(b)</sup>	During discharge <sup>(b)</sup>
Sampling Locations	MEL-14	3 stations at the edge of the mixing zone (MEL-13-01, MEL-13-07 and MEL-13-10) <sup>(c)</sup>	4 stations—1 mid-field (MEL-02-05), 3 references (MEL-03-02, MEL-04-05, and MEL-05-04)
Number of Samples	Per regulatory and operational requirements	1 sample per station	1 sample per station
Frequency of Sampling	Weekly during discharge	Weekly during discharge or as per NWB's direction	Monthly during discharge or as per NWB's direction
Test Parameters	<ul style="list-style-type: none"> <li>Daily monitoring of discharge flow volumes</li> <li>Parameters as listed in Schedule I Group 2 of the 2AM-MEL1631 NWB Water Licence<sup>(c)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Field physico-chemical water column profile measurements (temperature, specific conductivity, pH, DO)</li> <li>Parameters as listed in Schedule I Group 2 of the 2AM-MEL1631 NWB Water Licence<sup>(d)</sup></li> </ul>	<ul style="list-style-type: none"> <li>Field physico-chemical water column profile measurements (temperature, specific conductivity, pH, DO)</li> <li>Parameters as listed in Schedule I Group 2 of the 2AM-MEL1631 NWB Water Licence</li> </ul>
Toxicity Testing Program			
Sampling Media	Discharge	Mixing Zone Surface Water <sup>(a)</sup>	Receiving Environment Surface Water <sup>(a)</sup> (beyond mixing zone)
Sample Timing	During discharge	During discharge <sup>(b)</sup>	During discharge <sup>(b)</sup>
Sampling Locations	MEL-14	3 stations at the edge of the mixing zone (MEL-13-01, MEL-13-07 and MEL-13-10) <sup>(c)</sup>	4 stations—1 mid-field (MEL-02-05), 3 references (MEL-03-02, MEL-04-05, and MEL-05-04)
Number of Samples	Per regulatory and operational requirements	1 composite sample per station	1 composite sample per station
Frequency of Sampling	Weekly acute tests during discharge; monthly chronic toxicity tests beginning during the second monthly event <sup>(e)</sup>	Monthly during discharge	Monthly during discharge or as per NWB direction
Test Parameters	Acute toxicity tests with: <ul style="list-style-type: none"> <li>Rainbow Trout</li> <li><i>Daphnia magna</i></li> </ul> Chronic toxicity tests <sup>(e)</sup> with: <ul style="list-style-type: none"> <li>Pelagic crustacean (<i>Daphnia magna</i>)</li> <li>Epibenthic Invertebrate (<i>Hyalella azteca</i>)</li> <li>Macrophyte (<i>Lemna minor</i> [duckweed])</li> <li>Larval fish (<i>Pimephales promelas</i> [Fathead Minnow])</li> </ul>	Chronic toxicity tests with: <ul style="list-style-type: none"> <li>Pelagic crustacean (<i>Daphnia magna</i>)</li> <li>Epibenthic Invertebrate (<i>Hyalella azteca</i>)</li> <li>Macrophyte (<i>Lemna minor</i> [duckweed])</li> <li>Larval fish (<i>Pimephales promelas</i> [Fathead Minnow])</li> </ul>	Chronic toxicity tests with: <ul style="list-style-type: none"> <li>Pelagic crustacean (<i>Daphnia magna</i>)</li> <li>Epibenthic Invertebrate (<i>Hyalella azteca</i>)</li> <li>Macrophyte (<i>Lemna minor</i> [duckweed])</li> <li>Larval fish (<i>Pimephales promelas</i> [Fathead Minnow])</li> </ul>

Plume Delineation Study		
Sampling Media	Discharge	Receiving Environment (within mixing zone and beyond)
Sample Timing	During discharge <sup>(f)</sup>	During discharge <sup>(f)</sup>
Sampling Locations	MEL-14	22 survey locations (see Appendix C) at distance intervals of 50 m from the diffuser, 100 m (i.e., edge of mixing zone), 175 m, and 250 m; potentially adjusted to include more distant samples if necessary <sup>(g)</sup>
Frequency of Program	2 events during discharge (early and late summer)	2 events during discharge (early and late summer)
Test Parameters	<ul style="list-style-type: none"> <li>• TDS and major ions</li> <li>• General parameters<sup>(h)</sup></li> </ul>	<ul style="list-style-type: none"> <li>• Field physico-chemical water column profile measurements (temperature and specific conductivity)</li> <li>• Water quality samples collected at a subset (a maximum of 10 stations) alongside profile measurements and analyzed for TDS, major ions, and general parameters<sup>(g)</sup></li> </ul>

**Notes:**

- (a) "Surface Water" means near surface water, plus the selected sample depth for testing was the depth with the highest conductivity from the vertical profile (unless the highest specific conductivity was measured in the last profile reading above the lakebed. If so, the sample was collected at the depth 1 m above the bottom reading).
- (b) The timing of sampling for each program occurs continuously during the discharge period as outlined in the sample frequencies listed above for each sample media and test type. However, sample timing is dependent on safe access to the lake. The period of anticipated discharge coincides with the transition period between ice covered and open water conditions on Meliadine Lake. Where samples cannot be collected at the required time due to safety considerations, contingency measures are implemented, as outlined in Section 3.4.
- (c) Parameters as listed in Schedule I Group 2 of the 2AM-MEL1631 NWB Water Licence include Conventional Parameters (bicarbonate alkalinity, chloride, carbonate alkalinity, turbidity, conductivity, hardness, calcium, potassium, magnesium, sodium, sulphate, pH, total alkalinity, TDS, TSS, total cyanide, free cyanide, and weak acid dissociable [WAD] cyanide), Nutrients (ammonia-nitrogen, total Kjeldahl nitrogen, nitrate-nitrogen, nitrite-nitrogen, orthophosphate, total phosphorus, total organic carbon, dissolved organic carbon, and reactive silica), and Total and Dissolved Metals (aluminum, antimony, arsenic, barium, beryllium, boron, cadmium, chromium, copper, iron, lead, lithium, manganese, mercury, molybdenum, nickel, selenium, silver, strontium, thallium, tin, titanium, uranium, vanadium, and zinc).
- (d) Mixing zone stations MEL-13-01 and MEL-13-07 are routinely sampled by the mine during the EEM/AEMP programs. MEL-13-10 represents a new sampling station. Further details on the selected mixing zone sampling stations are provided in Section 3.1.
- (e) Per commitments arising from responses to comments from ECCC and KivIA and discussions through the WMWG following the first monthly sampling event, chronic toxicity testing of the MEL-14 discharge is conducted monthly beginning on the second monthly sampling event.
- (f) Sample timing is dependent on boat access to the lake. The period of anticipated discharge coincides with the transition period between ice covered and open water conditions on Meliadine Lake. Access of the lake occurs as soon as open water conditions permit safe boat access.
- (g) The maximum spatial extent of plume delineation monitoring may be extended past 250 m should the proportion of discharge be estimated to contribute >10% of TDS at 250 m (estimated based on field specific conductivity measurements).
- (h) General parameters = total and bicarbonate/carbonate alkalinity, turbidity, laboratory specific conductivity, hardness, laboratory pH, and total suspended solids.
- TDS = total dissolved solids.

Figure 1: WQ-MOP Validation Study Sampling Stations



### SECTION 3 • MONITORING RESULTS OF THE EMERGENCY AMENDMENT

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Under the approved Water Licence Emergency Amendment, Meliadine Mine discharged water from CP1 to Meliadine Lake from June 5 to October 4, 2020, a period of just over 17 weeks. The water quality monitoring program as described in Phase 2 of the WQ-MOP was undertaken from June 5 to October 4. The monitoring program included:

- Weekly in situ water quality measurements and sample collection from MEL-14 for water quality analysis, weekly acute toxicity testing, and monthly chronic toxicity testing beginning during the second monthly event
- Weekly in situ water column water quality measurements and sample collection at the edge of the mixing zone stations in Meliadine Lake for water quality analysis and monthly chronic toxicity testing
- Monthly in situ water column water quality measurements and sample collection at near-field and far-field (reference) stations in Meliadine Lake for water quality analysis and chronic toxicity testing
- Hourly in situ water quality (temperature and specific conductivity) monitoring data logging stations at each of the three edge of mixing zone stations
- Completion of two plume delineation studies during the discharge (in July and August) with stations extending 250 m away from the diffuser
- One post-discharge sample from MEL-14 for toxicity and limited chemistry testing.

Additionally, a post-discharge sample from MEL-14 was collected on October 26, 2020. The rationale for this sample collection was because the TDS concentrations continued to increase following discharge, which presented an opportunity to collect a sample for chronic toxicity testing at a higher TDS concentration than tested during the discharge period to limit the uncertainty around the exposure range. The overall composition of this sample was similar to those collected during the discharge period.

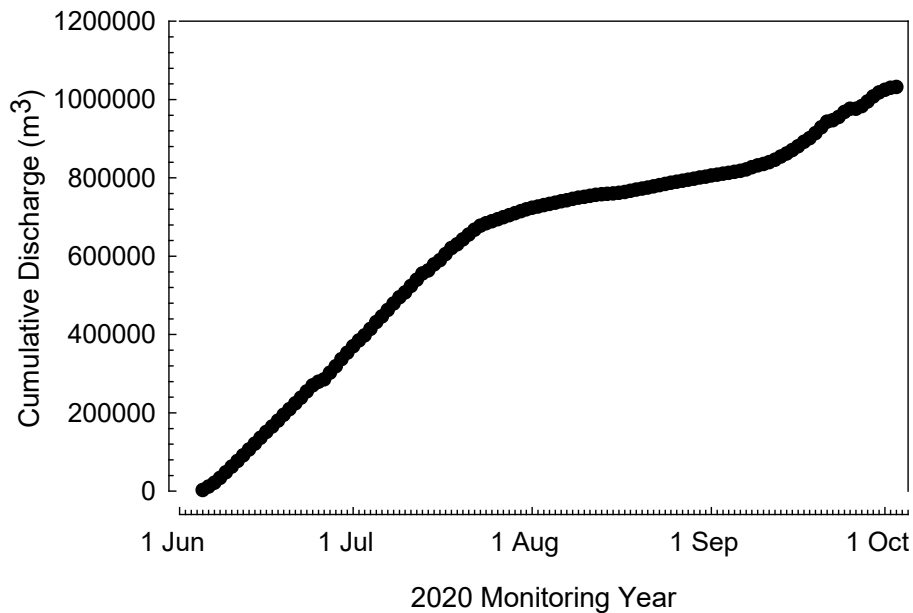
#### ***Water Chemistry***

The comprehensive water quality monitoring program provided information on the quality of the discharge from CP1 in 2020 and the influence of the discharge on Meliadine Lake. Although the emphasis of the monitoring was TDS (TDS represented the primary parameter of interest in CP1 water), water samples collected from these stations typically were analyzed for a comprehensive analytical suite (i.e., parameters as listed in Schedule I Group 2 of the 2AM-MEL1631 NWB Water Licence).

During the discharge period (i.e., 5 June 2020 to 4 October 2020), 1,031,177 cubic metres (m<sup>3</sup>) of water was discharged from CP1 to Meliadine Lake (Figure 2). The daily discharge volume ranged from

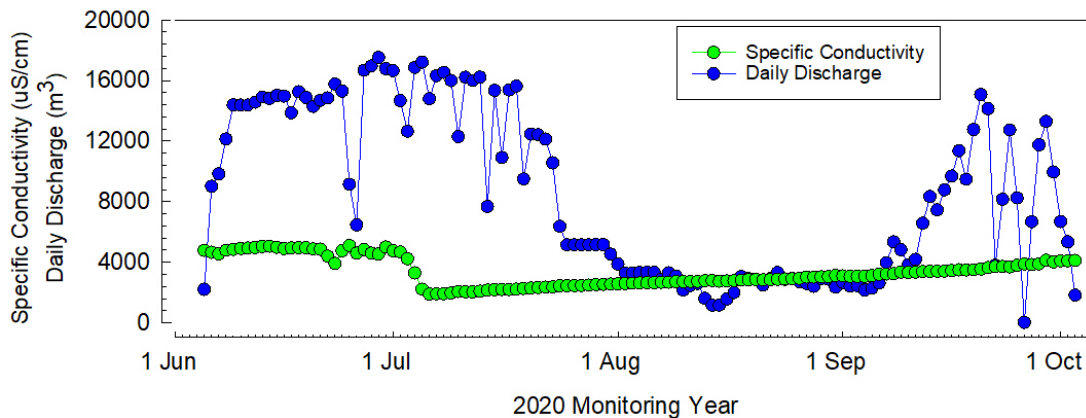
15 m<sup>3</sup> to 17,518 m<sup>3</sup>, with a daily average of 8,522 m<sup>3</sup> (Figure 3). The TDS (measured) concentrations in the discharge ranged from 1,340 mg/L to 3,100 mg/L (Figure 4). Full chemical analyses were conducted and all regulated parameters in the Water Licence remained below regulated discharge limits. Throughout the duration of the discharge, the release of the water went as planned and testing and continuous monitoring showed that there was no occurrence of harmful effects on the environment, fish, and other aquatic life.

**Figure 2: Cumulative CP1 Water Discharge to Meliadine Lake between 5 June 2020 and 4 October 2020**



m<sup>3</sup> = cubic metres.

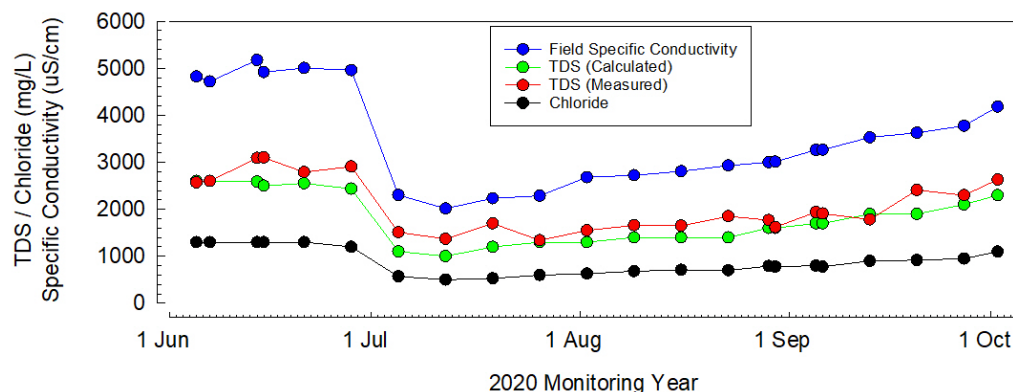
**Figure 3: MEL-14 Daily Discharge Rates and Specific Conductivity Measurements between 5 June 2020 and 4 October 2020**



**Notes:** Complete open-water conditions in Meliadine Lake achieved on 15 July 2020

m<sup>3</sup> = cubic metres;  $\mu\text{S/cm}$  = microsiemens per centimetre.

**Figure 4: MEL-14 Total Dissolved Solids (Calculated and Measured), Laboratory Specific Conductivity and Chloride Measurements between 5 June 2020 and 2 October 2020**



mg/L = milligrams per litre;  $\mu\text{S/cm}$  = microsiemens per centimetre.

Several in-lake monitoring stations were located in Meliadine Lake (Figure 1):

- three monitoring stations were established at 100 m from the discharge point (MEL-13-01, MEL-13-07, and MEL-13-10). These stations represented the edge of the mixing zone, which are established monitoring stations for the discharge as per the Water Licence (2AM-MEL1631)
- a mid-field station (MEL-02-05), which was located approximately 6 km downstream of the discharge point
- three reference stations (MEL-03-02, MEL-04-05, and MEL-05-04) were located downstream from the discharge point at the most western edge of the lake; two locations were located at the lake outlets

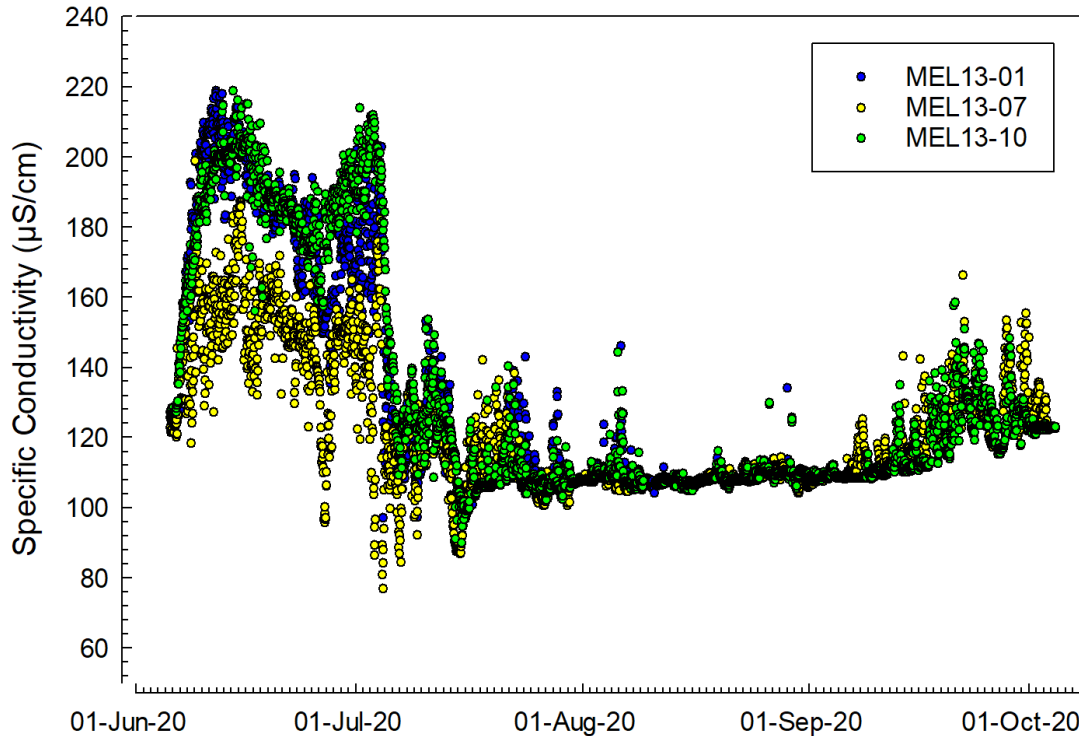
Each monitoring station used in the monitoring program represented a sampling station that was already in use either as a regulated compliance monitoring station through the water licence or as part of the mine's existing effects monitoring program (e.g., Aquatic Effects Monitoring Program).

Sampling at the Meliadine Lake stations commenced under-ice on June 7, 2020, with continuous sampling commencing immediately after the initiation of discharge of CP1 water to Meliadine Lake on July 12, 2020, which occurred during ice-cover conditions. Discharge continued on a regular basis until October 4, 2020 after which discharge ceased. Sampling was completed weekly at the edge of the mixing zone and monthly at the mid-field and reference stations, except when access to the lake was unsafe, such as during ice melt.

Between June 5, 2020 and October 4, 2020, continuous data loggers were used to measure specific conductivity at 2 m above the lakebed at each of the edge-of-mixing zone during discharge (Figure 5 and Appendix B). The intent of the in situ monitoring component of the program was to collect temperature and specific conductivity data at the edge of the mixing zone stations during the transition from ice-cover to open water conditions in the lake when access to the lake was not possible due to unsafe conditions. These remote monitoring stations were maintained for the entire period of

discharge. The logged specific conductivity measurements at the edge of the mixing zone stations (Figure 5) showed a relatively similar conductivity among the stations; there was heightened conductivity at the edge of the mixing zone during under ice conditions, which decreased by 50% following ice-off. The discharge plume during ice-cover extended somewhat consistently throughout the mixing zone, with a slightly more pronounced W-N-E lateral spread.

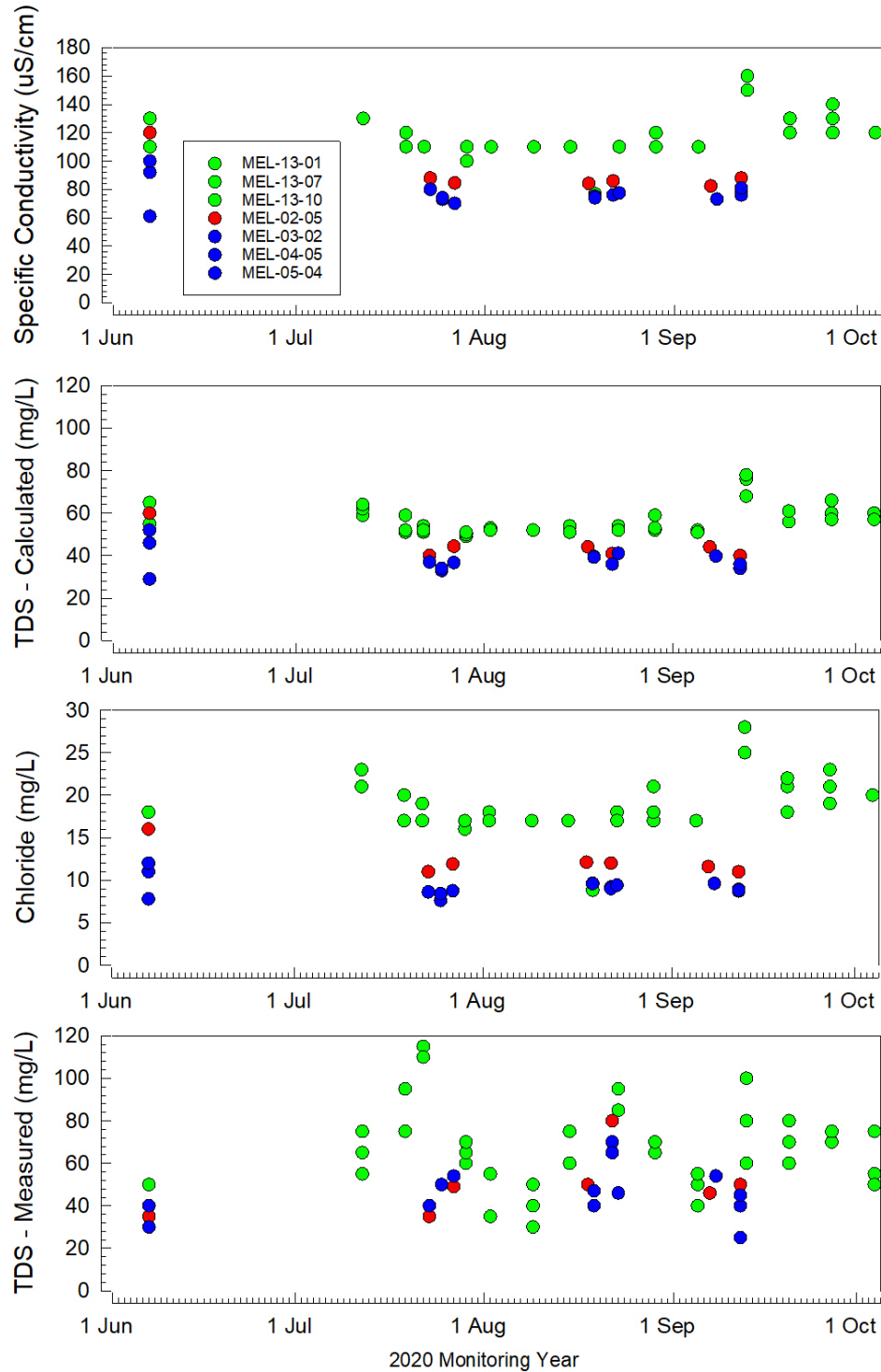
**Figure 5: Continuous Specific Conductivity Measurements at the Edge of Mixing Zone Stations Collected 2 m above the Lakebed from 5 June 2020 to 4 October 2020**



**Notes:** Complete open-water conditions in Meliadine Lake achieved on 15 July 2020  
 $\mu\text{S/cm}$  = microsiemens per centimetre.

Over the discharge period, TDS concentrations measured at the in-lake monitoring stations ranged from 30 mg/L to 115 mg/L, with the highest concentrations measured at the edge of the mixing zone (Figure 6). All water quality parameters analyzed for the program over the discharge period were measured below guidelines, except for dissolved zinc at one edge of mixing zone station on August 2, 2020 and at a reference station on July 27, 2020 (Appendix B). This elevated concentration at the edge of the mixing zone was attributed to analytical variability as it was within five times the detection limit, and corresponding zinc concentrations in the discharge and at the other edge of mixing zone stations were below guidelines. Concentrations of TDS at the mid-field and reference locations decreased with distance from the diffuser. Throughout the duration of the discharge, all in-lake measurements at 100 m from the discharge point remained well below the interim benchmark of 1,000 mg/L (Figure 5). Water quality measured at the in-lake monitoring stations showed that harmful effects on the environment, fish, and other aquatic life were not occurring.

**Figure 6: Total Dissolved Solids (Calculated and Measured), Laboratory Specific Conductivity and Chloride Measurements for the Receiving Environment Stations in Meliadine Lake between 5 June 2020 and 4 October 2020**



**Notes:** Complete open-water conditions in Meliadine Lake achieved on 15 July 2020

TDS = total dissolved solids; mg/L = milligrams per litre;  $\mu\text{S}/\text{cm}$  = microsiemens per centimetre.



Additional monitoring under Phase 2 included the collection of measurements of water quality through the water column at each in lake monitoring station and two plume delineation studies (in early summer [21 July 2020] and late summer [13 August 2020]). The plume delineation studies involved the collection of specific conductivity and TDS measurements at different depths at 22 sampling stations located up to 250 m from the discharge point to understand how the discharge water is mixing in Meliadine Lake. These monitoring components determined that:

- During ice-cover conditions, specific conductivity, and TDS measurements in the lake near the discharge point were at their highest.
- Water column profile monitoring of specific conductivity near the discharge point showed that the discharge dispersed rapidly but could be identified often in the lower portions of the water column. The discharge was more apparent in the water column at the edge of the mixing zone during ice cover conditions and during periods of higher discharge rates and higher TDS concentrations in the discharge in open water conditions. During other periods of discharge, the discharge was not discernible at the edge of the mixing zone; it was well dispersed.
- The general direction that the discharge plume moved from the discharge point was in an easterly direction.
- The submerged diffuser at the discharge point was able to effectively disperse the discharge into Meliadine Lake.

As a result of the water monitoring conducted under Phase 2, discharge under ice cover and open water conditions has been shown to remain within the TDS discharge criteria and the in-lake monitoring benchmark for Meliadine Lake, and showed that harmful effects on the environment, fish, and other aquatic life were not occurring. Monitoring confirmed that the submerged diffuser was able to effectively disperse the discharge into Meliadine Lake.

### ***Toxicity Testing***

Weekly acute toxicity tests were conducted on water samples from CP1 throughout the discharge period from June 5, 2020 to October 4, 2020 (Table 2). The test results indicated that the discharge has not been acutely toxic to Rainbow Trout or *Daphnia magna* across the range of TDS concentrations tested (i.e., between 1,340 and 3,090 mg/L measured TDS).

**Table 2: Weekly Acute Toxicity Test Results from MEL-14 During the Emergency Discharge Monitoring Program (5 June 2020 to 4 October 2020)**

Sample Date	TDS Concentration (mg/L as Measured)	96-hour Rainbow Trout Survival Results		48-hour <i>Daphnia magna</i> Survival Results	
		LC50 Value (% Discharge)	Survival in 100% Full Strength Discharge (%)	LC50 Value (% Discharge)	Survival in 100% Full Strength Discharge (%)
7 June 2020	2,570	>100	100	>100	100
14 June 2020	3,090	>100	100	>100	100
21 June 2020	2,790	>100	100	>100	100
28 June 2020	2,910	>100	100	>100	100
5 July 2020	1,510	>100	100	>100	100
12 July 2020	1,370	>100	100	>100	100
19 July 2020	1,430	>100	100	>100	100
26 July 2020	1,340	>100	100	>100	100
2 August 2020	1,550	>100	100	>100	100
9 August 2020	1,660	>100	100	>100	100
16 August 2020	1,650	>100	100	>100	100
23 August 2020	1,850	>100	100	>100	90
30 August 2020	1,620	>100	90	>100	100
6 September 2020	1,910	>100	100	>100	100
13 September 2020	1,780	>100	100	>100	100
20 September 2020	2,410	>100	100	>100	100
27 September 2020	2,300	>100	100	>100	100
2 October 2020	2,630	>100	100	>100	100

**Notes:** TDS = total dissolved solids; mg/L = milligrams per litre; % = percent; LC<sub>50</sub> = lethal concentration effecting 50% of organisms.

Chronic toxicity testing, to assess the potential for chronic effects to aquatic receptors at, and beyond, the edge of the mixing zone (i.e., a 100 m radius surrounding the diffuser in Meliadine Lake), were conducted on four chronic toxicity test species: Fathead Minnow, *Lemna minor*, *Hyalella azteca*, and *Daphnia magna* (Appendix B). The chronic toxicity testing concluded that:

- Sporadic mortality occurred during the Fathead minnow testing during the summer and fall (Tables 3 and 4). As described in Downey et al. (2000), and experienced frequently in regulatory testing conducted for many northern regions during summer and fall, sporadic mortality in samples collected from control/reference water is a relatively common complication in larval fathead minnow tests and can confound test results. Re-testing using an ultraviolet (UV) filtration pre-treatment indicated that the higher variability in mortality was likely due to bacterial and fungal growth consistent with laboratory observations of “fuzzy” organisms (i.e., visual evidence of fungal coating). Side by side (i.e., untreated and treated) testing is recommended especially during the summer and fall when pathogens appear to be a confounding factor in the test results.
- Discharges have not resulted in unacceptable chronic toxicity at the edge of the mixing zone following initial dilution (i.e., at a 100 m radius surrounding the diffuser in Meliadine Lake; Table 4).

- Discharges have not resulted in unacceptable chronic toxicity for fathead minnow, *Hyalella azteca*, or *Daphnia magna* at TDS concentrations ranging between 1,700 and 2,740 mg/L measured TDS (1,200 and 2,500 mg/L calculated TDS; Table 3 and 4).
- One sample collected at MEL-14 post-discharge at a measured TDS concentration of 2,740 mg/L (2,500 mg/L calculated TDS) indicated some chronic effects to *Lemna minor* frond count when compared to the laboratory controls; however, these results do not align with the previous rounds of testing (Table 3).

### **Monitoring Program Outcome**

Based on the results of this detailed water quality and toxicity testing program, the following regulatory discharge limits and in-lake benchmark were therefore recommended for the long-term water management of CP1 discharge to Meliadine Lake:

- Water Licence regulatory limits: MAC of TDS of 3,500 mg/L and the MGC of TDS of 5,000 mg/L for discharge from MEL-14 to Meliadine Lake (i.e., EQC); and
- An in-lake benchmark concentration of TDS of 1,000 mg/L to be achieved at the edge of the mixing zone in Meliadine Lake, which would also be consistent with the SSWQO for longer-term management of the receiving environment of Meliadine Lake.

**Table 3: Chronic Toxicity Dilution Series Results from MEL-14 (Discharge) from the June to October 2020 Sampling Events**

Sample Date	Fathead Minnow		Lemna minor (duckweed)		Hyalella azteca		Daphnia magna		
	Survival LC <sub>50</sub> Value (95% CI; %)	Growth IC <sub>25</sub> Value (95% CI; %)	Fronnd Count IC <sub>50</sub> Value (95% CI; %)	Growth IC <sub>25</sub> Value (95% CI; %)	Survival LC <sub>50</sub> Value (95% CI; %)	Growth IC <sub>25</sub> Value (95% CI; %)	Survival LC <sub>50</sub> Value (95% CI; %)	Reproduction IC <sub>25</sub> Value (95% CI; %)	Growth IC <sub>25</sub> Value (95% CI; %)
7 June 2020	—	—	—	—	—	—	—	—	—
20–25 July 2020	>100	>100	>97	>97	>100	>100	>100	>100	>100
22–23 August 2020	13.5 (8.9, 20.5)	8.7 (2.2, 21.9)	>97	>97	>100	>100	>100	37.6 (4.9, N/A)	>100
22–23 August 2020 UV-Filtered	>100	>100	—	—	—	—	—	—	—
12–13 September 2020	43.2 (30.1, 62.0)	24.2 (13.7, 36.4)	>97	>97	>100	>100	90.3 (30.0, >100)	93.8 (4.6, N/A)	>100
12–13 September 2020 UV-Filtered	>100	>100	—	—	—	—	—	—	—
26 October 2020	25.4 (15.9, 40.7)	15.9 (3.1, 46.2)	40.4 (26.0, 69)	>97	>100	>100	>100	61.6 (10.2, N/A)	>100

**Notes:** % = percent; CI = confidence interval; LC<sub>50</sub> = lethal concentration effecting 50% of organisms; IC<sub>25</sub> = inhibitory concentration affecting 25% of organisms; N/A = not available; — = not applicable/no testing completed (no results).

**Table 4: Chronic Toxicity Dilution Series Results from MEL-13 (edge of mixing zone) Stations from the June to October 2020 Sampling Events**

Sample Date			6–7 June 2020			20–25 July 2020			22–23 August 2020			12–13 September 2020		
Species	Endpoint	Units	MEL-13-01	MEL-13-07	MEL-13-10	MEL-13-01	MEL-13-07	MEL-13-10	MEL-13-01	MEL-13-07	MEL-13-10	MEL-13-01	MEL-13-07	MEL-13-10
Fathead Minnow	Survival LC <sub>50</sub> Value	% (95% CI)	>100	>100	—	>100	>100	>100	15.2 (11.8, 19.6)*	N/C	37.6 (30.1, 47.0)*	>100*	100 (N/A, N/A)*	>100*
	Growth IC <sub>25</sub> Value	% (95% CI)	>100	>100	—	>100	>100	>100*	5.6 (2.8, 24.8)*	N/C	34.9 (18.4, 47.4)*	>100 (53.0, >100)*	53.9 (27.3, 86.6)*	>100*
Lemna minor (duckweed)	Frond Count IC <sub>50</sub> Value	% (95% CI)	>97	>97*( <sup>l</sup> )	—	>97	>97*( <sup>l</sup> )	>97	>97	>97*( <sup>s</sup> )	>97	>97	>97*( <sup>s</sup> )	>97*( <sup>s</sup> )
	Growth IC <sub>25</sub> Value	% (95% CI)	>97	>97*( <sup>l</sup> )	—	>97	>97	>97	>97	>97*( <sup>s</sup> )	>97	>97	>97*( <sup>s</sup> )	>97*( <sup>s</sup> )
Hyalella azteca	Survival LC <sub>50</sub> Value	% (95% CI)	>100	>100	—	>100	>100	>100	>100*	>100	>100*	>100	>100*	>100
	Growth IC <sub>25</sub> Value	% (95% CI)	2.3 (<1.6, N/A)	>100	—	>100	>100	>100	61.0 (N/A, N/A)*	>100*	>100*	>100	>100*	>100
Daphnia magna	Survival LC <sub>50</sub> Value	% (95% CI)	>100	N/C	—	>100	>100	>100	>100	>100	>100	>100	>100	>100
	Reproduction IC <sub>25</sub> Value	% (95% CI)	>100	>100	—	>100	>100	>100	>100*( <sup>s</sup> )	>100*( <sup>s</sup> )	>100*( <sup>s</sup> )	>100*	>100*	>100
	Growth IC <sub>25</sub> Value	% (95% CI)	>100*	>100*	—	>100	>100*	>100*	>100*( <sup>s</sup> )	>100	>100	>100*	>100	>100

**Notes:** % = percent; CI = confidence interval; LC<sub>50</sub> = lethal concentration effecting 50% of organisms; IC<sub>25</sub> = inhibitory concentration affecting 25% of organisms; N/A = not available; N/C = not calculable – The LC<sub>50</sub> for survival was not able to be calculated due to an interrupted dose response; (<sup>s</sup>) = sample stimulation; (<sup>l</sup>) = sample inhibition; \* = significant effect vs MEL-03-02, MEL-04-05, MEL-05-04, or Pooled references; — = not applicable/no testing completed (no results).

## SECTION 4 • IMPACTS ON THE RECEIVING ENVIRONMENT

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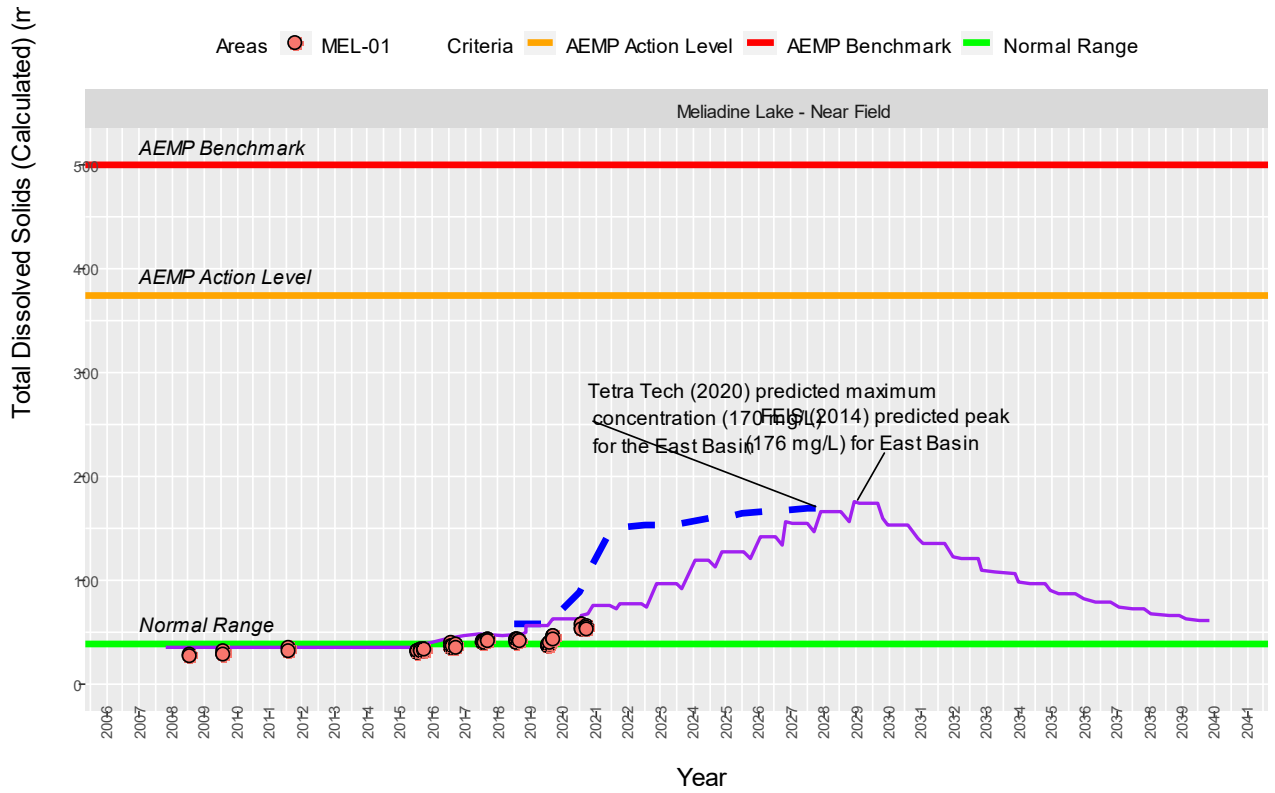
As a result of the comprehensive monitoring conducted under Phase 2, minor changes in the receiving environment at the edge-of-mixing-zone were noted, which were shown to have negligible effects in Meliadine Lake. Further discharge under a range of discharge rates and TDS concentrations were shown to rapidly and effectively disperse within close proximity to the diffuser.

Discharge under ice cover and open water conditions during the Emergency Amendment period in 2020 was shown to remain within the interim EQC targets for TDS and not be acutely toxic or result in sub-lethal effects to aquatic biota. Further, Meliadine Lake, from the edge of the mixing zone through to the far-field (reference) locations, has remained protected with no adverse effects identified to aquatic biota. Monitoring of the in situ water quality conditions through the water column at the edge of the mixing zone (field measurements and continuous logging data), as well as the water chemistry sampling results, confirmed the effectiveness of the diffuser in consistently dispersing the discharge within the 100 m regulated mixing zone in Meliadine Lake. As a result, edge of mixing zone requirements using the interim TDS target were met. The monitoring results also confirmed the further attenuation of the discharge with distance from the diffuser.

With respect to the results of the acute and chronic toxicity testing during the discharge (i.e., no identified adverse specific effects to aquatic biota at each of the monitoring stations), the data were consistent with the results of other lines of evidence that are complementary to the 2020 monitoring program, including literature and previous site-specific toxicity tests with multiple species and additional validation of *Ceriodaphnia dubia* toxicity.

Based on the comprehensive monitoring conducted under Phase 2, which concluded that there were no adverse effects to water quality or to aquatic biota, the interim TDS targets for the discharge and receiving environment developed under Phase 1 were ratified as regulatory targets for TDS as EQC for discharge and SSWQO for the receiving environment that will be applicable to future operating conditions at the Meliadine Mine. As shown in Figure 7, calculated TDS monitoring results are within range of the 2014 FEIS predictions.

**Figure 7 : Calculated TDS monitoring results, 2014 FEIS predictions and 2020 modelling results**



TDS has increased over time relative to pre-development conditions (green line), but the changes are consistent with predicted changes in the 2014 FEIS (purple line), and recent modelling in 2020 (blue line)

## SECTION 5 • APPLIED MITIGATIONS

Mitigations associated with the discharge included an adaptive management approach associated with the discharge and the receiving environment (Meliadine Lake) and operational processes. The adaptive management applied to the discharge associated with the 2020 Emergency Amendment was developed specific to this amendment.

Discharge of CP1 water to Meliadine Lake during the 2020 Emergency Amendment was managed through an adaptive management approach, which included the comparison of chemical and toxicity monitoring data collected at the end of pipe or at the edge of the mixing zone to thresholds, as well as a list of management actions or protocols that could be implemented in response to any non-compliance. Specifically, water quality (i.e., TDS) and toxicity testing monitoring data collected in CP1 (representing the discharge) and at the edge of the mixing zone was compared to the discharge limit (end-of-pipe) and SSWQO (edge-of-mixing-zone) benchmarks.

The thresholds and management responses associated with adaptive management used during the discharge are detailed in Table 5. This table represents the current status of adaptive management as presented in the WQ-MOP Rev 4, which was updated to reflect a standalone Adaptive Management Plan (AMP) for water management at the Meliadine Mine (Agnico Eagle 2021), which includes operational discharges the Meliadine Lake beyond 2020. The table identifies an operating level ranging from Normal Operating, Caution, and At-Risk conditions, the thresholds that trigger each level, and a list of management strategies and actions for consideration in response to mitigate and/or rectify the condition, if required.

**Table 5: Surface Water Quality Adaptive Management Strategy for CP1 Discharge to Meliadine Lake**

Adaptive Management Level	Threshold	Management Activity / Response /Action
Normal Operating Condition	Measured concentrations are less than the MAC discharge limit	<ul style="list-style-type: none"> <li>Continue monitoring as per Water Licence requirements</li> <li>Continue water management as per Water Management Plan</li> <li>Continue management as per the Adaptive Management Plan</li> </ul>
Caution	Two consecutive weekly end-of-pipe TDS concentrations equivalent to, or greater than, the MAC discharge limit	<ul style="list-style-type: none"> <li>Conduct a follow up sampling event to confirm trigger</li> <li>Increase sampling frequency at end of pipe</li> <li>Follow management activity options as per the Adaptive Management Plan</li> </ul>
At Risk	Three consecutive weekly end-of-pipe TDS concentrations equivalent to, or greater than, the MAC discharge limit, or A single end-of-pipe TDS exceedance of the MGC discharge limit	<ul style="list-style-type: none"> <li>Conduct a follow up sampling event to confirm trigger</li> <li>Follow management activity options as per the Adaptive Management Plan</li> </ul>

MAC = maximum average concentration based on four consecutive sampling results (this applies to TDS and equates to 3,500 mg/L); MGC = maximum grab concentration (this applies to TDS and equates to 5,000 mg/L).



Water quality (i.e., TDS) and toxicity testing monitoring data collected in CP1 (representing the discharge) and at the edge of the mixing zone will be compared to the benchmarks as determined by Phase 3 of the WQ-MOP.

Adaptive management measures will be implemented if management thresholds are triggered. Since submission of the WQ-MOP Rev4 an AMP has been prepared, with input from KivIA, CIRNAC, and ECCC (Agnico Eagle 2021). The AMP was submitted to the NIRB board as a commitment for the Saline Effluent Disposal to the Marine Environment Proposal, with a copy to the NWB as a commitment for the renewal of Water Licence 2AM-MEL1631. The AMP outlines water management activities that will be taken to reduce discharge of contact water to Meliadine Lake and maximize use of the waterline. During the 2020 discharge period, the adaptive management level remained normal; no thresholds were triggered in CP1 or within Meliadine Lake (the edge of the mixing zone) that required any mitigation responses through the adaptive management plan.

## **SECTION 6 • CONSULTATION OUTCOMES FROM THE WATER MANAGEMENT WORKING GROUP MEETINGS**

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On May 12, 2020, the Minister of Northern Affairs approved the issuance of Amendment No. 1 to Type A Water Licence 2AM-MEL1631 (Amendment No. 1), as recommended by the NWB. As part of the Amendment, Agnico Eagle committed to establish and work collaboratively with a Water Management Working Group (WMWG), which was to be a platform to exchange water quality data collected in accordance with the Emergency Amendment Monitoring Plan (i.e., WQ-MOP) and to discuss the progress of water management activities at CP1.

The members of the Working Group included:

- Agnico Eagle
- Nunavut Water Board
- Kivalliq Inuit Association
- Crown-Indigenous Relations and Northern Affairs
- Environment and Climate Change Canada

Monthly meetings occurred with the WMWG, where Agnico Eagle provided updates of the water quality and toxicity testing monitoring results and the interpretation of those data through the support of a third-party consultant (Golder Associates Ltd.). Working group meetings included an initial meeting on June 3, 2020 to discuss the Terms of Reference for the Working Group. Discharge data review meetings were then subsequently held on 25 June, 2 July, 26 August, 16 September, 2 October, and 6 November 2020.

An outcome from each of these discharge data review meetings was the regular provision of summary monitoring data and evaluation to the public through a variety of public access forums. Copies of the presentations and meeting minutes, including any responses to information requests or issues raised by the parties during the meetings, were submitted to the NWB for uploading to the Project NWB FTP site. These copies are provided in Appendix C.

Mutually agreed key messages were also broadcast and uploaded to the Mine's public-access website and other social media platforms (e.g., [http://aemnunavut.ca/emergency\\_amendment/](http://aemnunavut.ca/emergency_amendment/), the Mine's Facebook page, etc.). The key messages were focused on the quality of the discharge and its influence on Meliadine Lake and based on the results of the water chemistry and toxicity testing during monitoring. They were initially drafted following the July 2 meeting, one month after the initiation of discharge. These key messages were ratified by the Working Group following the August 26 meeting after review of the previous month's data. They remained consistent through the remaining discharge period:

- Constituents in the discharge are not being released at levels which are harmful in Meliadine Lake.
- The monitoring data confirms that the diffuser is working as planned and that the water being released is not harmful to Meliadine Lake.

- The release of the water is going as planned and testing and continuous monitoring shows that harmful effects on the environment, fish and other aquatic life are not occurring.
- Discharge volumes are lower than planned, as precipitation has been lower than average this year.
- Agnico Eagle is working on alternative strategies for discharging CP1 water into Meliadine Lake, one of which consists of recirculating CP1 water into the Process Plant.
- Meliadine Lake is the source of freshwater for the camp and we have not observed changes in the drinking water quality at the camp.

## SECTION 7 • CONCLUSIONS

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Discharge associated with the emergency amendment to the Meliadine Type A Water Licence (2AM-MEL1631), approved on April 29, 2020 by the NWB (Appendix A), commenced on June 5, 2020 and ceased on October 4, 2020. This amendment permitted the 2020 release of water from CP1 to Meliadine Lake, through an existing engineered diffuser, that could contain up to 3,500 mg/L TDS compared to the current Water Licence of 1,400 mg/L. In conjunction with the 2020 discharge to Meliadine Lake, as approved under Amendment 1 of the Mine's Type "A" Water Licence, comprehensive monitoring of the discharge, and at near-field (edge of mixing zone), mid-field, and far-field (reference) locations was required. The details of the comprehensive monitoring, and the results of this monitoring, are provided in the WQ-MOP Rev4a.

Over the period of discharge, the monitoring showed that the release of the water from CP1 to Meliadine Lake during ice cover and open water conditions consistently remained within the TDS discharge criteria and the in-lake monitoring benchmark (i.e., the TDS SSWQO) for Meliadine Lake. Monitoring also confirmed that the diffuser was able to effectively disperse the discharge into Meliadine Lake. In Meliadine Lake, all other water quality constituents were measured below guidelines or SSWQOs, except for dissolved zinc on one occasion at a 100 m edge of the mixing zone (at a far-field location). This elevated concentration at the edge of the mixing zone was attributed to analytical variability as it was within five times the detection limit, and corresponding zinc concentrations in the discharge and at the other edge of mixing zone stations were below guidelines.

Acute toxicity test results indicated that the discharge has not been acutely toxic to Rainbow Trout or *Daphnia magna* across the range of TDS concentrations tested. Additionally, discharges did not result in unacceptable chronic toxicity at the 100 m edge of the mixing zone.

The comprehensive monitoring program undertaken in Meliadine Lake to track the quality of the discharge and its influence in Meliadine Lake showed that there was no occurrence of harmful effects on the environment, fish, and other aquatic life. Throughout the discharge, Meliadine Lake remained protective of aquatic life.

Finally, based on the results of this detailed water quality and toxicity testing program, the following regulatory discharge limits and in-lake benchmark as developed under the WQ-MOP for the long-term water management of CP1 discharge to Meliadine Lake are recommended:

- Water Licence regulatory limits: MAC of TDS of 3,500 mg/L and the MGC of TDS of 5,000 mg/L for discharge from MEL-14 to Meliadine Lake (i.e., EQC); and
- An in-lake benchmark concentration of TDS of 1,000 mg/L to be achieved at the edge of the mixing zone in Meliadine Lake, which would also be consistent with the SSWQO for longer-term management of the receiving environment of Meliadine Lake.

## SECTION 8 • REFERENCES

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- Agnico Eagle (Agnico Eagle Mines Limited). 2021. Adaptive Management Plan for Water Management, Meliadine Mine. Submitted to Nunavut Impact Review Board. February 2021.
- Downey, P.J., Fleming, K., Guinn, R., Chapman, N., Varner, P. and Cooney, J.D. 2000. Sporadic mortality in chronic toxicity tests using *Pimephales promelas* (rafinesque): Cases of characterization and control. *Environmental Toxicology and Chemistry*, 19: 248-255. <https://doi.org/10.1002/etc.5620190130>
- Golder (Golder Associates Ltd.). 2020a. Water Quality Management and Optimization Plan: Implementation Plan for Total Dissolved Solids. Rev1. Submitted to Agnico Eagle Mining Limited. 24 March 2020.
- Golder. 2020b. Water Quality Management and Optimization Plan: Implementation Plan for Total Dissolved Solids. Rev2. Submitted to Agnico Eagle Mining Limited. 2 June 2020.
- Golder. 2020c. Water Quality Management and Optimization Plan: Implementation Plan for Total Dissolved Solids. Rev2a. Submitted to Agnico Eagle Mining Limited. 21 August 2020.
- Golder. 2020d. Water Quality Management and Optimization Plan Progress Update: Phase 3: Final Meliadine Mine Effluent Discharge Benchmark for Total Dissolved Solids. Rev3. Submitted to Agnico Eagle Mining Limited. 24 August 2020.
- Golder. 2020e. Water Quality Management and Optimization Plan Progress Update Rev4: Phase 3 Meliadine Mine Effluent Discharge Benchmarks for Total Dissolved Solids. Submitted to Agnico Eagle Mining Limited. 13 November 2020.
- NWB (Nunavut Water Board). 2020. NWB Water Licence Type “A” No: 2AM-MEL1631 – Request for the Minister’s Consent to Process Amendment No. 1 on an Emergency Basis and Attached Reasons for Decision and Amendment No. 1 for the Minister’s Consideration. File No. 2AM-MEL1631/Emergency Amendment No. 1.

## **APPENDIX A: WATER LICENCE 2AM-MEL1631 EMERGENCY AMENDMENT 1 DECISION**

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## DECISION

### **WATER LICENCE NO: 2AM-MEL1631 - EMERGENCY AMENDMENT NO. 1**

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<b>Licensee:</b>	<b>Agnico Eagle Mines Limited</b>
<b>Licence No:</b>	<b>2AM-MEL1631 Type “A”</b>
<b>Licence Issued:</b>	<b>April 15, 2016</b>
<b>Amendment No. 1 Effective:</b>	<b>April 29, 2020</b>
<b>Amendment No. 1 Expiry:</b>	<b>October 31, 2020</b>
<b>Licence Expiry:</b>	<b>March 31, 2031</b>

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Pursuant to its authority under Article 13 of the *Agreement between the Inuit of the Nunavut Settlement Area and Her Majesty the Queen in Right of Canada (Nunavut Agreement)* and the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, S.C. 2002, c. 10 (*NWNSRTA* or Act), with respect to the Application for an emergency amendment to the Licence noted above, dated March 24, 2020, provided by Agnico Eagle Mines Limited (Agnico Eagle or Applicant), the Nunavut Water Board (NWB or Board) hereby grants the following licence amendments (Amendment No. 1).

The Licence issued April 1, 2016, with an expiry date of March 31, 2031, shall be amended (as set out in the attached Amendment No. 1) to include terms and conditions, with respect to the use of Waters and the deposit of Waste, to allow for:

- the time-limited discharge (May 2020 – October 2020) of effluent from the Containment Pond 1 (CP1) into Meliadine Lake through the Meliadine Lake Outfall Diffuser (Monitoring Program Station MEL-14) and the Water discharged shall not exceed 3,500 mg/L for the Maximum Average Concentration (MAC) of the Total Dissolved Solids (TDS).

The Board notes that the activities approved under this Amendment do not include changes to the management and discharge of saline groundwater into the marine environment recently proposed by Agnico Eagle and currently being considered under a separate application that was filed with the Nunavut Impact Review Board (NIRB File No. 11MN034).

### **Procedural and Regulatory History**

#### ***The Application Before the Board***

On March 24, 2020, the Nunavut Water Board (NWB or Board) received a request to amend Type “A” Water Licence No: 2AM-MEL1631 (Licence) submitted by Agnico Eagle Mines Limited

(Agnico Eagle or Applicant).<sup>4</sup> This request sought amendments to the Licence to be considered on an emergency basis under ss. 43, 52 and 55 of the *Nunavut Waters and Nunavut Surface Rights Tribunal Act*, S.C. 2002, c. 10 (*NWNSRTA*) to authorize the time-limited release of effluent from the Containment Pond 1 (CP1) that exceeds the Total Dissolved Solids (TDS) concentration limits prescribed under Part F, Item 3 of the Licence prior to the 2020 freshet expected in May (Amendment Application).

The Scope of the Amendment Application includes the following activities:

- Time-limited discharge (May 2020 – October 2020) of effluent from the Containment Pond 1 (CP1) into Meliadine Lake through the Meliadine Lake Outfall Diffuser (Monitoring Program Station MEL-14) not exceeding 3,500 mg/L for the Maximum Average Concentration (MAC) of the TDS; and
- Approval of the “*Water Quality Management and Optimization Plan (WQMOP), Implementation Plan for Total Dissolved Solids*”, dated March 24, 2020, prepared by Golder Associates Ltd.

### ***Regulatory Requirements***

Sections 52(2)(c) and 55(5) of the *NWNSTRA*, state:

*52(2) A public hearing need not be held...*

*(c) in the case of an application for the amendment of a licence where the Board, with the consent of the Minister, declares the amendment to be required on an emergency basis.*

*55 (5) Subsections (1) and (4) [requiring Notice of an Application, a public comment period and advance notice of Public Hearings] do not apply in respect of an application for the amendment of a licence where the Board, with the consent of the Minister, declares the amendment to be required on an emergency basis.*

On this basis, with the consent of the Minister, the Board may declare that an amendment is required on an emergency basis. If the Minister consents to the NWB’s declaration, this allows the Board to waive the normal notice, public hearing and comment requirements typically associated with the Board’s consideration of an application to amend a Type “A” Water Licence and to process the amendment application on an expedited basis.

With respect to the pre-licensing requirements associated with the Amendment Application, (land use plan conformity review by the Nunavut Planning Commission and impact assessment by the

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<sup>4</sup> Jamie Quesnel (Agnico Eagle) to Karen Kharatyan (NWB); RE: Request for Expedited Amendment to Permit Ministerial Approval of Amendment to 2AM-MEL1631 on or before May 1, 2020; March 24, 2020.



Nunavut Impact Review Board) under the *Nunavut Agreement* and the *Nunavut Planning and Project Assessment Act*, S.C. 2013, c. 14, s. 2 (*NuPPAA*), the Emergency Situations part of the s. 152(1)(c) specifies the following:

*152. (1) This Part does not apply in respect of any project that is carried out in response to*

*(c) an emergency if the federal Minister certifies that an emergency exists and that it is in the interest of ensuring the health or safety of an individual or the general public, or of protecting property or the environment that the project be carried out without delay.*

Consequently, if the Minister certifies that the amendments proposed in the Amendment Application are required on an emergency basis, the conformity and assessment requirements of the *NuPPAA* do not apply. However, the NWB notes that if s. 152(1)(c) applies, the proponent of the emergency activities is required to report to the Nunavut Planning Commission, the Nunavut Impact Review Board and the federal Minister under s. 152(2) of the *NuPPAA*:

*152(2) As soon as practicable after undertaking a project referred to in subsection (1), the person or entity carrying it out must submit a written report to the Commission, the Board and the federal Minister describing*

*(a) all of the works or activities that have been undertaken or carried out in response to the emergency referred to in paragraph (1) (a), (b) or (c), as the case may be; and*

*(b) any further works or activities required after the end of that emergency to complete the project or maintain a work referred to in paragraph (a).*

### **Technical and Procedural History**

The following table summarizes the technical and procedural history associated with the Amendment Application to date:

<b>Date</b>	<b>Procedural Milestone</b>
Early March, 2020	Agnico Eagle initiated a discussion with the NWB and other parties to inform them about the elevated TDS concentrations of the Water currently contained in CP1 and the necessity to discharge this Water from CP1 in order to protect the integrity of the infrastructure (DCP1 Dike).
March 24, 2020	Agnico Eagle submitted the Amendment Application to the NWB requesting to amend the Water Licence on an emergency basis.
March 25, 2020	NWB distributed the Amendment Application for public review and requested the interested parties to provide their comments on the following:

Date	Procedural Milestone
	<ol style="list-style-type: none"> <li>1. whether they were in agreement that emergency circumstances exist;</li> <li>2. identify any questions or technical review comments about the Amendment Application; and</li> <li>3. indicate whether they were interested and available to participate in a Board-hosted teleconference.</li> </ol>
April 2, 2020	KivIA, CIRNA and ECCC filed written submissions regarding the Amendment Application and these submissions were subsequently forwarded to Agnico Eagle.
April 6, 2020	Agnico Eagle submitted their responses to the interveners' comments.
April 7, 2020	NWB forwarded Agnico Eagle's responses to the interveners for their review and consideration of whether the interveners were satisfied with the response, and the NWB sent out the Agenda for the teleconference scheduled to Wednesday, April 15, 2015, asking to submit the parties' presentations by Thursday, April 9, 2020. Note: the deadline to receive presentations was extended to April 14, 2020 as per KivIA's request.
April 14, 2020	<p>The parties filed their presentation materials in preparation for the teleconference.</p> <ul style="list-style-type: none"> <li>• KivIA, CIRNA and Agnico Eagle submitted their presentation materials.</li> <li>• ECCC indicated that they would not be providing a formal presentation, but expressed their interest in participating in the Teleconference.</li> </ul>
April 16, 2020	<ul style="list-style-type: none"> <li>• The NWB conducted the discussion of the technical and procedural aspects of the Amendment Application via teleconference between 9:00 am – 2:00 pm (MDT). Representatives of Agnico Eagle, the KivIA, CIRNA, and ECCC participated to discuss the Amendment Application, the technical comments provided by parties and to briefly discuss the process associated with the Board's consideration of the Amendment Application.</li> <li>• Following the conclusion of the teleconference, Agnico Eagle provided a written closing statement summarizing their final responses to the questions and comments provided by the parties and the NWB staff during the Board's consideration of the Amendment Application, including issues raised during the teleconference.</li> </ul>
April 17, 2020	The NWB issued follow up guidance to all parties and issued a further request for comments regarding the limitations and contingencies that may be necessary if Water sampling and laboratory testing is impacted

Date	Procedural Milestone
	by on-going travel restriction resulting from the public health response to the COVID-19 (novel coronavirus) pandemic.
April 21, 2020	Agnico Eagle and KivIA provided responses to the NWB's request for comments.
April 23, 2020	The NWB's decision-making panel responsible for the file, Meliadine Panel (Panel P15), met via teleconference and concluded that emergency circumstances have been established. Panel P15 also granted Amendment No. 1 to the Licence and directed the staff to issue this correspondence seeking the Minister's consent for the Board to process the Amendment Application on an emergency basis, these Reasons for Decision and Emergency Amendment No. 1 to Type "A" Water Licence No: 2AM-MEL1631

### **Summary of Technical Comments Provided During the Board's Consideration of the Amendment Application:**

#### ***Kivalliq Inuit Association (KivIA):***

The KivIA participated throughout the Board's consideration of the Amendment Application and identified the following issues, comments and concerns:

- Expressed concern regarding the timeline and emergency process requested by Agnico Eagle, as this process would not give the community a chance to engage on this issue (the KivIA identified that the public may have concerns about how higher TDS levels may be perceived to affect drinking Water quality in Meliadine Lake);
- Agreed that some draw down of water in CP1 must occur in May to prevent impacts to DCP1, but did not agree that the full dewatering of CP1 proposed by Agnico Eagle is necessary as the preparation for 2021 should be included within the scope of the next amendment application (on the basis that a longer-term amendment application that Agnico Eagle expects to file in the summer of 2020 could be reviewed and processed by the NWB prior to freshet of 2021);
- Concluded that the scope of the emergency should be confined to what is necessary for freshet 2020, and not extended to 2021;
- Requested to include Maximum Grab Sample limit, as well as the Maximum Average Concentration limit proposed by Agnico Eagle;
- Did not see any reason why the interim TDS target at the edge of the mixing zone should be increased from 500 mg/L to 1,000 mg/L;
- Requested that additional testing and modeling be conducted;
- Requested more robust monitoring (weekly at the edge of the mixing zone, monthly in the reference areas) during the discharge from CP1;
- Requested further information as to why Reverse Osmosis (RO) treatment of the water in CP1 or transfer of the Water into other containment ponds on-site were not considered to be alternatives to this amendment;
- Proposed that Agnico Eagle develop thresholds that would trigger the requirement for

- adaptive management prior to discharges from CP1 commencing;
- Proposed contingency measures that could be implemented if the sampling and laboratory analysis proposed by Agnico Eagle under the monitoring program to be carried out during the CP1 discharge becomes unavailable due to the public health measures associated with the COVID-19 pandemic.

### ***Crown-Indigenous Relations and Northern Affairs (CIRNA):***

CIRNA participated throughout the Board's consideration of the Amendment Application and provided the following comments:

- Agreed that time is of the essence in terms of the discharge from CP1, and that emergency circumstances have been established; and
- Asked for Agnico Eagle to provide their rationale regarding why the discharge from CP1 as proposed in the Amendment Application is the only reasonable course of action at this time.

### ***Environment and Climate Change Canada (ECCC):***

ECCC participated throughout the Board's consideration of the Amendment Application and provided the following comments:

- Indicated that ECCC defers to the NWB as to whether the Amendment Application is required on an emergency basis;
- Proposed that Agnico Eagle consider remote monitoring options for when the ice is present; and
- Proposed that Agnico Eagle develop thresholds that would trigger the requirement for adaptive management prior to discharges from CP1 commencing.

### ***Agnico Eagle Mines Limited (Agnico Eagle):***

In the Amendment Application and Agnico Eagle's responses to the comments and questions of interveners, Agnico Eagle indicated the following:

- Emphasized that the current situation is an emergency and to prevent an emergency, both in the near term and in the longer term;
- Emphasized that the third-party experts from Tetra Tech clearly support the view that delay of the Amendment Application could result in significant, and, in some cases, irreversible adverse effects;
- Emphasized that the proposed discharges would not be toxic to aquatic life, as demonstrated in the report prepared by Golder<sup>5</sup>, but conceded that the TDS may exceed the aesthetic limits applicable to drinking water;
- Clarified that the scope of the Amendment Application includes discharges commencing prior to the May freshet, and periodically from May through to October 2020 in order to dewater CP1 to an elevation of 63.0 metres (the operating standard) by the end of October 2020;

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<sup>5</sup> *Water Quality Management and Optimization Plan (WQMOP), Implementation Plan for Total Dissolved Solids*; Golder Associates Ltd.; March 24, 2020.