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ECCC File: 6100 000 012/015  
NWB File: 2AM-MEL1613



July 3, 2019

via email at: [licensing@nwb-oen.ca](mailto:licensing@nwb-oen.ca)

Richard Dwyer  
Manager of Licensing  
Nunavut Water Board  
P.O. Box 119  
Gjoa Haven, NU X0B 1J0

Dear Richard Dwyer:

**RE: 2AM-MEL1613 – Agnico Eagle Mines Limited – Meliadine Gold Project – 2018 Annual Report**

Environment and Climate Change Canada (ECCC) has completed a review of information submitted to the Nunavut Water Board (NWB) regarding the above-mentioned Annual Report. However, ECCC's review did not include a review of the Aquatic Effects Monitoring Program (AEMP) report. This letter provides ECCC's specialist advice based on our mandate, in the context of the *Canadian Environmental Protection Act*, and the pollution prevention provisions of the *Fisheries Act*.

The following comments are provided:

**1. 2019 Total Dissolved Solids Predictions**

Reference(s)

- Agnico Eagle Mines Limited. Meliadine Gold Project 2018 Annual Report
  - Section 3.2 and Table 3.7
  - Appendix I: Water Management Plan Ver.6, Appendix H

Comment

In the Annual Report, Section 3.2 states that:

*“The water quality model was updated in January 2019 to provide a forecast of monthly average TDS concentrations for the 2019 calendar year in CP1, CP3, CP5, Saline Pond, Underground Mine, and P-Area (P1, P2, and P3). This update was generated by means of a mass balance applied to the water balance model update. As such, the water quality results are limited to the framework of the model and therefore do not account for saline*



*water originating from the underground mine that will be removed from the site via discharge to Melvin Bay.*

*The presented TDS concentrations are the result of overly-conservative assumptions applied to the model update. As such, both the water balance and water quality model are undergoing revision in 2019 to address these deficiencies. Reporting results of the water quality forecast are presented in Table 3.7” (Page 12).*

It is not clear whether the saline minewater inflows have been accounted for in the model, but not their disposal, or whether neither the flows nor the disposal have been incorporated. ECCC acknowledges that the proposed update will address inclusion of the disposal of saline water.

Annual Report Table 3.7 (Page 13; Summary of Water Quality Model Predictions Generated in the January 2019 Model Update) presents total dissolved solids (TDS) concentrations for the various water management ponds. Predicted levels in the P-Area pond peak at 193,116 mg/L. Notwithstanding the statement about overly conservative assumptions, it would be helpful to understand the reasons for such high levels (i.e., is this due to the use of the evaporators, and/or source water quality).

The Water Management Plan (WMP) includes the 2019 Water Balance and Quality Forecast Results (Appendix H) which shows the above-noted high TDS concentrations for CP1 and other containment structures. Section 7.3 of the WMP lists several of the assumptions, but not all of them would have resulted in the high TDS predictions. Section 7.3 of the WMP states that the model will be updated following the commissioning of additional treatment options.

#### Recommendation(s)

ECCC recommends that the Proponent provide:

- Clarification on the source of high modeled salinity levels in P-Area, and whether saline minewater has been incorporated in the modeling, noting that discharge to the marine environment was not included in the modelling.
- Updates to the 2019 Water Balance and Quality Forecast Results for review when available, and include a description of the assumptions and inputs used.

## **2. Sampling Station Designators**

#### Reference(s)

- Agnico Eagle Mines Limited. Meliadine Gold Project 2018 Annual Report
  - Sections 7.3.1.1 and 7.3.1.2; Table 7.1
  - Appendix I: Environmental Management and Protection Plan (EMPP), Table 4.1

#### Comment

The Annual Report and the EMPP contain contradictory descriptions for the mixing zone sample stations. Table 4.1 (Page 17) of the EMPP shows MEL-03-01 as the mixing zone in Meliadine Lake; Table 7.1 (Page 38) of the Annual Report shows MEL-03-01 as the Water Quality Monitoring Reference Area and has MEL-13 as the mixing zone in Meliadine Lake.

### Recommendation(s)

ECCC recommends that the Proponent provide corrected station lists.

## **3. Surface Runoff Quality Samples - Monitoring Locations**

### Reference(s)

- Agnico Eagle Mines Limited. Meliadine Gold Project 2018 Annual Report
  - Appendix I: Water Management Plan Ver.6, Section 7.2.2
  - Appendix H-3: Water Monitoring Stations Results

### Comment

As required by Part D, Item 18 surface runoff is being monitored at various stations designated MEL-SR1 up to MEL-SR11. AEM has provided analytical data for samples MEL-SR1, MEL-SR2, MEL-SR7, MEL-SR9, and MEL-SR11.

The Annual Report Management Plans do not appear to include a figure showing the locations of the Surface Runoff monitoring sites. Runoff from some of the facilities is collected and put in the P-area ponds, but it is not clear if there is any runoff that is not captured.

### Recommendation(s)

ECCC recommends that the Proponent provide a map showing the location of surface runoff sampling sites, noting which report to surface waters.

## **4. Clarification of Tables – Appendix H-2**

### Reference(s)

- Agnico Eagle Mines Limited. Meliadine Gold Project 2018 Annual Report
  - Appendix H-2: EEM and MDMER monthly mean concentrations, pH range and effluent volume

### Comment

The data tables on pages 2-5 do not have titles or location descriptors. It is unclear if the data are for the Final Discharge Point although this is indicated by cross-checking with the table on page 6, which appears to be a summary of the preceding tables' totals.

### Recommendation(s)

ECCC recommends that the Proponent:

- Clarify the location of the sampling station(s) for the data tables on Pages 2-5 of Appendix H-2.
- Provide a list of the tables with titles.

## 5. TSS-turbidity correlation

### Reference(s)

- Agnico Eagle Mines Limited. Meliadine Gold Project 2018 Annual Report
  - Appendix I: Environmental Management and Protection Plan (EMPP), Page 38 Thresholds for contaminant levels in CP1 and triggers for mitigation measures

### Comment

Turbidity trigger limits have been identified based on a correlation determined for turbidity and TSS in CP1. The approach is conservative, but ECCC notes that the regression line is based on only eight data points, and recommends that ongoing/periodic calibration/confirmatory paired samples be done. This will also update the relationship between turbidity and TSS if there are changes in particle sizes and characteristics over time, which would affect the correlation.

### Recommendation(s)

ECCC recommends that the Proponent review the need for periodic calibration of the TSS/turbidity correlation for CP1 discharges, confirming whether operational data demonstrate the turbidity readings are consistently representative of TSS.

## 6. Disposal of wastewater treatment sludges

### Reference(s)

- Agnico Eagle Mines Limited. Meliadine Gold Project 2018 Annual Report
- Appendix I: Water Management Plan Ver.6, Section 4.3 Discharge Diffuser Effluent Flow Rates; Table 16: Key Water Management Activities during Mine Closure

### Comment

Water treatment will be done at a rate of 12,000 m<sup>3</sup>/day, less the 312 m<sup>3</sup>/day of sludge returned back to CP1. It is not clear what parameters the treatment sludges will contain in addition to TSS and treatment residuals.

Table 16 (Page 37) states that at closure, the Proponent will breach water retention dikes D-CP1, D-CP3, D-CP4, D-CP5, and D-CP6 once water quality monitoring results meet discharge criteria to allow water to naturally flow to the outside environment. It is unclear to ECCC if the sludge quality has been characterized to evaluate any issues with sediment quality once the pond is again connected to surface waters (noting that there will be the potential for seasonal fish use).

### Recommendation(s)

ECCC recommends that the Proponent provide a characterization of treatment sludges to identify potential closure concerns with sediment quality in the sludge disposal area.

Please contact Emily Nichol at (867) 669-4732 or [Emily.Nichol@Canada.ca](mailto:Emily.Nichol@Canada.ca) should you require more information.

Sincerely,

*[original signed by]*

Emily Nichol  
Environmental Assessment Coordinator

cc: Georgina Williston, Head, Environmental Assessment North (NT and NU)  
Nunavut Impact Review Board (NIRB)