

Environmental Protection Operations Directorate
Prairie & Northern Region
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ECCC File: 6100 000 012/023
NWB File: 2AM-MEL1631



June 16, 2020

via email at: licensing@nwb-oen.ca

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

Dear Richard Dwyer:

RE: 2AM-MEL1631 – Agnico Eagle Mines Limited – Meliadine Mine – Water Quality and Management Optimization Plan

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Nunavut Water Board (NWB) regarding the above-mentioned plan for 2AM-MEL1631 Type A Water Licence by Agnico Eagle Mines Ltd. (The Proponent).

ECCC's specialist advice is based on our mandate pursuant to the *Canadian Environmental Protection Act* and the pollution prevention provisions of the *Fisheries Act*.

ECCC has the following comments:

1. Receiving Environment – Mid-field Sampling

Reference(s)

- Water Quality Management and Optimization Plan – Implementation Plan for Total Dissolved Solids June 2020, Golder and Associates. Table 3
- Water Licence Amendment Application Section 15

Comment

The proponent proposes sampling in the midfield be done monthly, with one sample per station. If ice delays sampling until July, and if there are safety concerns in October, then this could equate to as few as three samples for the entire program. A single sample once a month may not provide enough information regarding what is happening in the receiving environment. Shifts in plume behaviour due to winds or changes in currents or inflows can potentially influence where the effluent disperses.



ECCC Recommendation(s)

ECCC recommends that the proponent increase the frequency and spatial coverage for the water quality monitoring in the mid-field. ECCC recommends that the proponent consider increasing sampling to twice monthly, and broadening the number of stations to three sampled across that channel of the lake.

2. Sublethal Toxicity Testing

Reference(s)

- Water Quality Management and Optimization Plan – Implementation Plan for Total Dissolved Solids June 2020, Golder and Associates. Table 3
- Water Quality Management and Optimization Plan – Implementation Plan for Total Dissolved Solids June 2020, Golder and Associates. Section 3.2 Sampling for Toxicity Testing

Comment

The design proposes monthly sublethal toxicity testing on composite samples taken at the edge of the mixing zone and in the mid-field and reference stations. Doing the initial suite of tests could provide a benchmark for these toxicity tests for Meliadine Lake, because the low background levels of solutes can influence lab test results. It may be helpful to run tests side-by-side for effluent, exposure, and reference samples to assess whether there may be effects due to differences in solute concentrations. Note that in other northern projects, *cladoceran* tests using with lake water (which is close to distilled quality) have failed bioassay tests due to insufficient major ions for the lab-acclimated test organisms. Chronic toxicity testing of the reference and potentially the mid-field sites may be of limited utility, due to the above noted effect, unless there are measureable near-field effects.

The proponent has only proposed sublethal toxicity testing for the near and mid-field stations. Pursuant to the *Metal and Diamond Mining Regulations*, sublethal tests are to be done twice per year on fish early life stages (Fathead Minnow or Rainbow Trout), the *cladoceran Ceriodaphnia dubia*, duckweed (*Lemna minor*), and an algal species (usually *Selenastrum*). The proponent should report the effluent sublethal toxicity testing with the receiving environment tests. The proponent's previous sublethal testing only looked at total dissolved solid (TDS) concentrations below 2500 mg/L, lower than the proposed end of pipe concentrations of 3,500 mg/L. Note that effluent testing could provide comparison data for higher concentrations. As such, it would be useful to do the same sublethal tests on effluent for "non-MDMER" months as are being done on receiving environment samples.

Sublethal toxicity tests differ from acute tests in that there is not a concentration that is considered a "fail" for the former. The adaptive management section does not discuss how the proponent will assess the sublethal results, what constitutes "unacceptable chronic toxicity", and what actions would be linked to test results.

ECCC Recommendation(s)

ECCC recommends that:

- the proponent provide further discussion of the role of reference and mid-field bioassay testing, and how the results will be assessed.
- the proponent conduct and report the sublethal toxicity testing of the effluent alongside the receiving environment tests.
- the proponent incorporate the sublethal toxicity test results into the adaptive management approach, and triggers be identified.

3. Plume Delineation Study Frequency and Timing

Reference(s)

- Water Quality Management Optimization Plan (WQMOP), Golder Associates Ltd., March 2020. Section 3.3 Plume Delineation Study

Comment

The proponent has proposed that the plume delineation study be conducted once ice is gone and access to the discharge area is safe. Plume behaviour will be affected by lake characteristics at the time of the study, which can include temperature, stratification, winds, and stream inflow volumes. Over the course of the discharge, the plume may shift due to such changes in conditions. Additionally, pumping rates may vary and change the extent and shape of the plume. It is anticipated that with ongoing discharge, the plume extent may increase and be measureable beyond the proposed 250 m out from the diffuser. A second plume delineation may be useful, and could be incorporated into the adaptive management response.

ECCC Recommendation(s)

ECCC recommends that the proponent give consideration to conducting a second plume delineation study in order to validate plume behaviour following ongoing discharge. .

4. Adaptive Management

Reference(s)

- Water Quality Management Optimization Plan (WQMOP), Golder Associates Ltd., March 2020. Section 3.5 Adaptive Management

Comment

Two preliminary adaptive management triggers have been set. Specifically, that of two consecutive exceedances of the permitted discharge concentration of 3500 mg/L at end-of-pipe, and that of two TDS measurements at the edge of the mixing zone that exceed 750 mg/L.

- In the case of effluent, weekly measurements are required. Thus, an increase in sample frequency would effectively be an almost immediate confirmatory sample.

- In the case of receiving environment results, sampling the proponent intends to only sample once monthly. Thus, increasing the sampling frequency could be more meaningful, would be timelier and be linked to corrective actions.

ECCC acknowledges that the use of 75% of the target concentration of 1000 mg/L at the edge of the mixing zone gives more time to react. However, further details on what is intended by increasing sampling frequency in the plan, and what would trigger changes in discharge rates, would be helpful.

ECCC notes that the TDS measurement protocol has not been specified for the concentrations identified.

ECCC Recommendation(s)

ECCC recommends that the proponent provide clarification of whether the referenced concentrations are measured or calculated TDS levels. ECCC continues to recommend the use of measured TDS instead of calculated TDSs.

ECCC recommends that the proponent provide further details on what is intended by increasing sampling frequency in the plan, and what would trigger changes in discharge rates.

ECCC recommends that further details on management responses be developed and provided as an update to the plan.

If you need more information, please contact Eva Walker at (867) 669-4744 or Eva.Walker@Canada.ca.

Sincerely,

[Original signed by]

John Olyslager, Acting Head, Environmental Assessment North (NT and NU)