

Environmental Protection Operations Directorate
Prairie & Northern Region
5019 52nd Street, 4th Floor
P.O. Box 2310
Yellowknife, NT X1A 2P7

ECCC File: 6100 000 012/012
NWB File: 11MN034



June 3, 2024

via email at: 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: 11MN034 – Agnico Eagle Mines Ltd – Meliadine Gold Mine Project – 2023 Annual Report

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Nunavut Water Board (NWB) regarding the above-mentioned Annual Report.

ECCC provides expert information and knowledge to project assessments on subjects within the department's mandate, including climate change, air quality, water quality, biodiversity, environmental preparedness and emergencies. This work includes reviewing proponent characterization of environmental effects and proposed mitigation measures. We provide advice to decision-makers regarding a proponent's characterization of environmental effects, the efficacy of their proposed mitigation activities, and may suggest additional mitigation measures. Any comments received from ECCC in this context does not relieve the proponent of its obligations to respect all applicable federal legislation.

ECCC did not review the updated management plans provided with the annual report. A different set of updates to many of the same management plans are currently under review for the water licence amendment, and it was not clear if or when or how these potentially diverging updates would be reconciled. ECCC is open to reviewing management plan updates if this clarity can be provided.

The following comments are provided:



ECCC comment #1

Topic: Arsenic in peninsula lakes

Reference(s):

1. Meliadine Gold Mine 2023 Annual Report - Appendix 17: Aquatic Effects Monitoring Program 2023 Annual Report (Azimuth Consulting Group Inc.; March 24, 2024)
 - Section 4.2: Findings from the 2023 Peninsula Lakes Water Quality Program
 - Section 4.4.2: Temporal Trends in the Peninsula Lakes
 - Section 4.5: Conclusion
2. Aquatic Effects Monitoring Program Design Plan, Meliadine Gold Mine, Version 2_NWB (Azimuth Consulting Group Inc.; December 1, 2022)
 - Section 8.2: Action Levels
 - Table 8-2: Examples of Action Levels and Responses

ECCC comment:

Section 4.2 of the Annual Report states “*Arsenic exceeded the AEMP Action Level in Lake B7 in August 2023. Follow-up monitoring was completed in October, and concentrations had decreased from roughly 20 µg/L to 10 µg/L.*” Section 4.5 of the Annual Report concludes: “*Based on the annual mean, there were no exceedances of the AEMP Action Levels in any of the lakes in 2023.*”

Action Levels are defined in the Aquatic Effect Monitoring Program Design Plan. For arsenic, a site-specific water quality objective of 25 µg/L was developed and is used as a benchmark, along with an Action Level at 75% of the value or 18.8 µg/L.

The 2023 measurements bring to light the different possible interpretations. As reported, more samples were collected in Lake B7 at a later date, so the annual mean concentration of arsenic was below 18.8 µg/L. A conclusion of no Action Level exceedances based on annual mean concentrations was determined as a result.

Section 4.4.2 of the Annual Report proposes “*The substantial decrease in arsenic observed in Lake B7 between August and October was likely due to co-precipitation with iron oxy-hydroxides.*” The Design Plan does not specify if the Action Level concentrations are for individual samples, monthly averages or annual averages. Specifying what concentrations will be compared against Action Levels and Benchmarks will help bring clarity to all parties.

Continuing more frequent monitoring of Lake B7 would help further understanding of elevated arsenic concentrations, including of the co-precipitation hypothesis and if sediments in downwind ponds will need to be considered as a potential source of arsenic. Increased monitoring is an example response for Low Action Level and would be appropriate given that arsenic concentrations measured in August 2023 were above the Action Level.

ECCC recommendation:

ECCC recommends the Proponent:

- clarify in the AEMP design plan what concentrations (individual measurements, averages (monthly or annual), annual median) will be compared to Action Levels for each parameter and justify choice; and
- begin more frequent monitoring in Lake B7.

ECCC comment #2

Topic: CP1 Nutrients Predictions

Reference(s):

1. Meliadine Gold Mine 2023 Annual Report - Appendix 05: CP1 Nutrients Predictions (Agnico Eagle Mines Limited - Meliadine Division; March 2024)

ECCC comment:

Appendix 5 discusses causes for the discrepancy between measured and modelled concentrations of phosphorous and ammonia in the principal containment pond, CP1. The report concludes "*The investigation into the nutrient dynamics in CP1 highlights the intricate relationship between nutrients and algae in aquatic ecosystems, and while the ammonia removal mechanism is still unclear in CP1, data shows that natural attenuation by algal growth plays a dominant role in this process.*" No follow-up actions are discussed so it is not clear if this information can be used to improve modelled concentrations of nutrients in CP1.

ECCC recommendation:

ECCC recommends the Proponent discuss if and how findings of the CP1 Nutrient Predictions Report can be used to improve predicted concentrations of phosphorous and ammonia in CP1.

ECCC comment #3

Topic: Alternative sludge management strategies scenario analysis

Reference(s):

1. Meliadine Gold Mine 2023 Annual Report (Agnico Eagle Mines Limited - Meliadine Division; March 2024)
 - Section 7.3.3: Sludge
 - Table 28: Management Plan Revisions

ECCC comment:

Section 7.3.3. of the Annual Report reports a Scenario Analysis on alternative sludge management strategies was completed in Q1 of 2024. Some possibilities and results are briefly discussed and an alternate disposal location is suggested. The revisions of the Water Management Plan described in Table 28 do not mention changes to sludge management. It is not clear why this information was presented because the Scenario Analysis was not shared, changes due to the Analysis are not evident and there is no mention of including this information in a future annual report.

ECCC recommendation:

ECCC recommends the Proponent clarify:

- if and when they will share the Scenario Analysis on alternative sludge management strategies; and
- if and how they will implement findings of their Scenario Analysis.

ECCC comment #4

Topic: Tables missing information

Reference(s):

1. Meliadine Gold Mine 2023 Annual Report - Appendix 4: Water Balance and Water Quality Modeling Tabular Data (WBWQM) (Agnico Eagle Mines Limited - Meliadine Division; March 2024)
 - Pages 427-431: WBWQM forecasted mean annual concentrations and observed mean annual concentration changes between 2020 to 2023.
2. Meliadine Gold Mine 2023 Annual Report - Appendix 20: 2023 Calibration Data (Agnico Eagle Mines Limited - Meliadine Division; March 2024)
 - Page 6: YSI 1 calibration data, date range 01-09-2023 - 12-30-2023
 - Page 10: YSI 5 calibration data, date range 02-03-2023 - 12-29-2023
 - Page 11: Hatch 2100Q calibration data, date range 01-08-2023 - 11-06-2023

ECCC comment:

Several tables are missing precisions that could help confirm context when reviewing the results.

- The tables for WBWQM forecasted mean annual concentrations and observed mean annual concentration changes between 2020 to 2023 do not specify the forecast location. It is presumably CP1, but it would be good to confirm.
- Calibration data tables on pages 6 and 11 are illegible and on page 10, the values are difficult to read.

ECCC recommendation:

ECCC recommends that in future annual reports the Proponent ensure table titles or footnotes are sufficiently descriptive and all data are legible.

ECCC comment #5

Topic: Incinerator stack testing results

References:

1. Meliadine Gold Mine 2023 Annual Report - Section 5.2 Incinerator (Agnico Eagle Mines Limited - Meliadine Division; March 2024)
2. Meliadine Gold Mine 2023 Annual Report - Appendix 23, Appendix A Daily Average Weather Data (Agnico Eagle Mines Limited - Meliadine Division; March 2024)

ECCC Comment:

Section 5.2 of the Annual Report discusses the results of incinerator stack testing that was performed between September 29 and October 2, 2023. ECCC appreciates the efforts involved in the testing and initial analysis. ECCC notes that there is a considerable range in the results reported for dioxins/furans. The concentrations for Test 3 are well below the applicable standard, whereas the results of other two tests, and the average, exceed the maximum allowed concentration to achieve the standard.

This discrepancy in the test results may offer important clues in the investigation, including differences in materials consumed and weather conditions (large drop in temperatures during the testing series and increasing wind speeds, as noted in Appendix 23, Appendix A), and may assist in expediting an explanation for the range in test results.

ECCC Recommendation:

ECCC recommends that temporal changes in consumed materials and weather conditions be included in the analysis of the stack testing results, and an anticipated time frame be provided for the completion of the analysis.

ECCC comment #6

Topic: Large number of days with the same annual minimum temperature

References:

1. Meliadine Gold Mine 2023 Annual Report - Section 7.8.3 Climate (Agnico Eagle Mines Limited - Meliadine Division; March 2024)

ECCC Comment:

Section 7.8.3 of the Annual Report mentions that the annual minimum temperature of -39.8°C was recorded on 16 separate days. This is an unusually large number of days to share the record for coldest minimum temperature. The recorded minimum temperature is similar to that of the freezing point of mercury; and thus, may be due to the use of a mercury thermometer rather than an alcohol-based thermometer. This may also explain the discrepancy with the lowest annual temperature of -44.5°C recorded at Rankin Inlet. Alternately, there may be an error in the data logger or associated software processing of the data. Coldest temperatures are generally associated with strong radiative cooling, and thus a high bias in temperature may downplay the strength of the associated surface-based temperature inversions which vertically trap air emissions.

ECCC Recommendation:

ECCC requests an investigation be performed to explain the large number of days with identical annual lowest minimum temperatures.

ECCC comment #7

Topic: Issues with the table of daily average weather data

References:

1. Meliadine Gold Mine 2023 Annual Report - Appendix 23, Appendix A Daily Average Weather Data (Agnico Eagle Mines Limited - Meliadine Division; March 2024)
2. Environment and Climate Change Canada hourly data report for June 8, 2023 at Rankin Inlet, found at

https://climate.weather.gc.ca/climate_data/hourly_data_e.html?StationID=51277&timeframe=1&StartYear=1840&EndYear=2024&Day=8&Year=2023&Month=6&time=LST

ECCC Comment:

In Table 1 of Appendix A, there is ambiguity with the average wind direction, as it may be a scalar or vector average. Scalar averages of northerly winds may be listed as southerly winds. The precipitation value for 2023-06-08 is suspiciously high at 50.7 mm as hourly reports at Rankin Inlet only indicate rain at 22:00 and 23:00 (and 00:00 the next day). Wind speeds at Rankin Inlet increase to 50 km/h during the rain, so it is possible that rain splash may have contributed to the high precipitation value recorded at Meliadine.

ECCC Recommendation:

ECCC recommends the Proponent provide:

- clarification on whether average wind directions are scalar or vector; and
- a diagnosis of the suspiciously high precipitation value recorded at Meliadine on 2023-06-08.

If you need more information, please contact Russell Wykes at (867) 446-1263 or Russell.Wykes@ec.gc.ca.

Sincerely,

[original signed by]

Russell Wykes
A/ Senior Environmental Assessment Officer

cc: Eva Walker, Head, Environmental Assessment North (NT and NU)