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ECCC File: 6100 000 012/012  
NIRB File: 125515/11MN034



June 5, 2024

via email at: [info@nirb.ca](mailto:info@nirb.ca)

Brittany Hogaluk  
Nunavut Impact Review Board  
29 Mitik Street  
P.O. Box 1360  
Cambridge Bay, NU X0B 0C0

Dear Brittany Hogaluk:

**RE: 125515/11MN034 – Agnico Eagle Mines Ltd – Meliadine Gold Mine Project – 2023  
NIRB Annual Report**

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Nunavut Impact Review Board (NIRB) regarding the above-mentioned 2023 Annual Report. Similar comments were provided to the Nunavut Water Board, who will also be notified of these comments.

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 as updates to many of the same management plans are currently under review for the water licence amendment. It is unclear if or when or how these potentially diverging updates will 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 (AEMP). 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](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 the “2023-06-08” (June 8, 2023) entry 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 for the “2023-06-08” (June 8, 2023) entry.

**ECCC comment #8**

**Topic: Incorrect Appendix reference**

**References:**

1. Meliadine Gold Mine 2023 Annual Report - Appendix 23, Section 4: Meteorological Monitoring (Agnico Eagle Mines Limited - Meliadine Division; March 2024)

**ECCC Comment:**

Section 4 of Appendix 23 states that several parameters are provided in Appendix B. This appears to be an error, as the parameters are actually provided in Appendix A.

**ECCC Recommendation:**

ECCC recommends the Proponent update the reference in Section 4, to state that the parameters are located in Appendix A, and not Appendix B.

**ECCC comment #9**

**Topic: 2023 Compliance Monitoring**

**ECCC Comment:**

No authorizations from ECCC have been issued.

The Agnico Eagle Mines (AEM), Meliadine Gold Mine Project, is captured under several pieces of ECCC legislation, such as subsection 36(3) of the *Fisheries Act* (FA), *Metal and Diamond Mining Effluent Regulations* (MDMER), *Canadian Environmental Protection Act* (CEPA),

*Environmental Emergency Regulations (E2 Regs), Cross-border Movement of Hazardous Waste and Hazardous Recyclable Material Regulations (CBX), Storage Tank Systems for Petroleum Products and Allied Petroleum Products Regulations (STSR), and Greenhouse Gas Pollution Pricing Act/Output-Based Pricing System Regulations.*

In 2023, one on-site inspection was completed:

1. July 26 to 28, 2023:
  - A multi-regulation on-site inspection conducted to verify compliance under FA, MDMER, E2 Regs, CBX, and STSR at Itivia Site, Meliadine Gold Mine site, and the All Weather Access Road via helicopter and truck.
  - MDMER chemistry and toxicity sampling was not conducted at the Final Discharge Points (FDP's) during this inspection.
  - No non-compliance was determined from this inspection.

### **MDMER:**

The Project is subject to the MDMER. The purpose of the MDMER is to authorize a deposit of certain deleterious substance(s) into water frequented by fish while monitoring the environmental effects of those deposits to ensure that deleterious substances are not released in quantities or concentrations that could result in harmful effects on waters frequented by fish. To do this certain effluent deposit conditions (concentrations, limits and parameters) apply so that regulates are exempted and protected from the more stringent prohibition of subsection 36(3) under the Fisheries Act. Samples of the effluent by the Proponent must be taken and tested at the identified Final Discharge Point (FDP) to ensure the above conditions are met on a scheduled basis and reported. The two current FDPs are as follows:

1. FDP MEL-14: Containment Pond 1 discharge into Meliadine Lake. Effluent gets treated at the water treatment plant for total dissolved solids (TDS) and total suspended solids (TSS), then gets sampled after treatment prior to be discharged in Meliadine lake.
2. FDP MEL-26: Discharge from the Tiriganiaq underground mine into Melvin Bay, Hudson Bay, and the Arctic Ocean. Underground effluent gets treated at the water treatment plant, then transported via truck to discharge location.

The MDMER requires reports to be submitted in ECCC's online database (Mine Effluent Reporting System - MERS) which are reviewed by an assigned Enforcement Officer on a quarterly basis. The quarterly administrative regular report verifications are conducted to ensure that the sampling and testing has been conducted in accordance with the MDMER and ensuring the reports are submitted on time. Each Enforcement Activity includes an administrative report verification of each quarterly report, which are due 45 days at the end of each quarter: 1st Quarter (due May 15), 2nd Quarter (due Aug 14), 3rd Quarter (due Nov 14) and 4th Quarter (due Feb 14), as well as a administrative report regular verification of the 2023 Annual Effluent Monitoring Summary Report (due March 31). Furthermore, an administrative report regular verification was completed on the Environmental Effects Monitoring (EEM) 2023 Annual Report (information related to effluent and water quality monitoring studies) and as part of this verification the officer submitted a copy of the report to the EEM Coordinator for review to also confirm compliance.

In 2023, AEM submitted all required MDMER reports:

1. First Quarter:
  - Report submitted on time.
  - FDP MEL-14: No effluent discharged in Q1, therefore no non-compliance was determined.
  - FDP MEL-26: No effluent discharged in Q1, therefore no non-compliance was determined.
2. Second Quarter:
  - Report submitted Late.
  - FDP MEL-14: Effluent discharged in Q2. No non-compliance was determined.
  - FDP MEL-26: No effluent discharged in Q2, therefore no non-compliance was determined.
3. Third Quarter:
  - Report submitted on time.
  - FDP MEL-14: Effluent discharged in Q3. No non-compliance was determined.
  - FDP MEL-26: No effluent discharged in Q3, therefore no non-compliance was determined.
4. Fourth Quarter:
  - Report submitted on time.
  - FDP MEL-14: No effluent discharged in Q4 therefore no non-compliance was determined.
  - FDP MEL-26: No effluent discharged in Q4 therefore no non-compliance was determined.
5. 2023 Annual Effluent Monitoring Report:
  - Report was submitted on time, and no compliance issues noted.
6. 2023 Annual EEM Report:
  - Report was submitted on time, and no compliance issues noted.

**ECCC Files Regarding Reported 2023 Spills:**

1. 2023-068 – Lead agency CIRNAC – Drill Cuttings Release onto A19 Lake Ice - File closed – No Enforcement Action Taken under Fisheries Act 36(3)
2. 2023-151 – Lead agency CIRNAC – Drill Cuttings Release onto unnamed Lake - File closed – No Enforcement Action Taken under Fisheries Act 36(3)
3. 2023-246– Lead agency CIRNAC - Itivia Oil Handling Facility Laydown Area TSS Release into Melvin Bay - File Closed– No Enforcement Action Taken under Fisheries Act 36(3)
4. 2023-462 – Lead agency CIRNAC – MEL-SR-1 TSS Release into Melvin Bay - File Closed– No Enforcement Action Taken under Fisheries Act 36(3)

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