Kivalliq Inuit Association
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Chesterfield Inlet

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Coral Harbour

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Whale Cove

APPLICATION: NWB 2AM-MEL1631

DATE: 31 August, 2023

SUBJECT: Meliadine Gold Mine Extension Proposal – NWB Licence Amendment Application

Dear Mr. Dwyer,

The Kivalliq Inuit Association ("KivIA") has reviewed the technical information presented by the Proponent, Agnico Eagle Mines Limited ("Agnico Eagle") to the Nunavut Water Board ("NWB") regarding the amendment request to Water Licence No: 2AM-MEL1631. The KivIA has completed this technical review with the support of the following external consultants to ensure that the potential impacts and benefits of the Meliadine Extension Proposal were comprehensively assessed through scientific and socio-economic best practices, and to ensure Inuit Qaujimajatuqangit (IQ) values continue to be given great weight and incorporated into impact determination, mitigation, project design and monitoring:

- Prairie Scientific Inc. (Matt McDougall), aquatic environment specialist;
- GeoVector Management Inc. (Alan Sexton), geoscience specialist.

KivIA Technical Review Comment 1: In-Pit Disposal of Tailings and/or Waste Rock

References:

Appendix E3 – Meliadine Extension 2022 Thermal Assessment; Appendix E4 – Updated Hydrogeology Modelling; Appendix E5 – Hydrogeology Closure Report; Appendix E6 – Updated Summary of Hydrogeology Existing Conditions.

Detailed Comment:

The storage of tailings and waste rock in exhausted open pits has been successful, with positive benefits at other mining operations, globally. In-pit storage of mine materials can be especially advantageous for mitigation of acid rock drainage for potentially acid

generating (PAG) materials. However, there may be confounding issues related to the salinity associated with the rock and process water quality associated with the tailings.

There may be confounding factors at this operating related to permafrost, saline waters and process water quality that should be considered for the potential effects on the surrounding environment to confirm that in-pit storage can be safely managed.

Recommendation/Request:

The KivIA recommends the following:

Agnico Eagle must define the package of information on a "pit by pit" basis that will be submitted to the NWB one (1) year prior to starting the in-pit disposal of tailings and/or waste rock. At a minimum, the request for approval on a "pit by pit" basis should include the information in the following items:

1) Thermal study to assess the degradation of permafrost within the in-pit lakes specific to the final pit shell of each open pit.

2) Hydrogeological study to assess the groundwater contaminant transport to the receiving environment.

3) Update the water balance and water quality model, including the source terms, with the most current monitoring data considering environmental quality criteria in the water and sediments of the open pits.

4) Update the Water Management Plan including an update of the monitoring section and an updated water balance.

5) Update the Mine Waste Management Plan including detailed descriptions and analysis of the placement methods, waste balance adjustments to the authorized quantities of waste to be disposed of in previously approved tailings and waste rock storage facilities and detailed pit closure strategies.

6) Update the Interim Closure and Reclamation Plan upon completion of each open pit with the detailed pit closure strategies.

7) Update the Water Management Plan, Mine Waste Management Plan and adaptive management strategies upon completion of mining of each open pit.

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KivIA Technical Review Comment 2: Limits on Annual Discharge to Meliadine Lake

References:

Agnico Eagle Meliadine Gold Mine 2023 Annual Report, March 2023; Agnico Eagle Meliadine Extension Response to Information Requests, September 2023; Agnico Eagle Letter to the Kivalliq Inuit Association, June 2022; Agnico Eagle 2AM-MEL1631 Meliadine Water Licence Amendment Application, Appendix F21 Water Management Plan v12_NWB, Appendix E Water Balance and Water Quality Forecast, January 2023; Nunavut Impact Review Board Reconsideration Report and Recommendations for the Saline Effluent Discharge to Marine Environment Proposal- Agnico Eagle Mines Limited's Meliadine Gold Mine Project, Project Certificate No. 006 NIRB File No. 11MN034, July 2021.

Detailed Comment:

Impacts due to the Meliadine project as a whole have already been observed in Meliadine Lake. Productivity in Meliadine Lake has been increasing despite assurances that these are not mine related. Concentrations of chlorophyll and phosphorus are increased over baseline and relative to control sampling points. Metals, such as arsenic, strontium, and molybdenum have been increasing in water and fish tissue, and the average temperature of the southeast basin of Meliadine Lake has increased. Many local Inuit have also moved away from collecting drinking water at Ijiraliq, a traditional water gathering area, and have instead moved to collect water from Diana River. Diana River is less convenient as it is further from the community and difficult to access by vehicle.

Meliadine Lake is extremely important to local Inuit as a source of drinking water, fish, and access to caribou hunting grounds. Preservation of Meliadine Lake is of utmost importance to the KivIA and Kivallarmiut. In 2018, Agnico Eagle applied for an amendment to NIRB Project Certificate No.006, allowing the saline groundwater to be trucked to Itivia Harbour near Rankin Inlet and discharged into the Hudson Bay. This was then followed in 2021 by a request by Agnico Eagle to construct a 'dual waterline' system to carry the saline groundwater and reduce the traffic and costs associated with transporting the water by truck. The capacity of the dual waterline is projected to be ~2 million m^3 annually. The KivIA and Agnico Eagle saw this dual waterline infrastructure as an opportunity to mitigate the mining-related impacts to Meliadine Lake, and, following negotiations between Agnico Eagle and the KivIA, Term and Condition 25 was added to NIRB Project Certificate No. 006, requiring Agnico Eagle to use 8,000 to 14,000 m3 of the 20,000 m^3 daily capacity of the waterline to transport surface contact water, and to minimize or eliminate discharge to Meliadine Lake. Using the projected 100-day discharge window, this works out to 800,000 to 1.4 million m^3 of surface contact water annually, effectively eliminating discharge to Meliadine Lake under the current operational parameters.

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The NIRB assessment of the 2022 Meliadine Extension Proposal is focused on impacts that differ from those already assessed at the outset of the project in 2014. Agnico Eagle maintains that the volumes of surface contact water, and associated impacts to Meliadine Lake, do not differ significantly from the initial environmental impact statement. Modelled discharges were not updated with the 2021 amendment application. However, the KivIA has received consistent messaging from Agnico Eagle stating that the waterlines would be used to reduce discharge to Meliadine Lake to near zero.

During the 2021 NIRB hearings, Agnico Eagle stated that "... with the waterline, we reduced significantly the amount of water going to Meliadine Lake. Some years, it might be zero, and others we might have more, but less than we were originally planning. So overall the impact will be less." In a June 2022 letter to the KivIA, while referring to the Extension Proposal, it was stated by the Agnico Eagle that "we still expect to discharge basically all surface contact water through the waterline." These statements are belied by the fact that, according to the most recent Water Quality Water Balance Model (WQWBM) provided by Agnico Eagle to the NWB, discharge to Meliadine Lake is expected to average 1.43 million m^3 annually, with a peak discharge volume of 2.5 million m^3 in 2035. For comparison, according to Agnico Eagle in response to KivIA's NIRB Information Request-10 (IR-10) , the average discharge to Meliadine Lake throughout the operation of the mine to date is approximately 475,000 m^3 annually, and the annual reports describe a maximum discharge of 1.03 million m^3 in 2020. These modelled quantities assume the waterline operates uninterrupted during the summer discharge window, while a more realistic operational efficiency as presented by Agnico Eagle is approximately 85%. These models also rely on accurate determination of groundwater inflows to the pits and underground workings, which have been underestimated in the past for this project.

The total discharge volumes as a result of the Meliadine Extension Proposal will also significantly increase beyond what was contemplated during the 2014 FEIS. According to the NWB licence application WQWBM, Agnico Eagle projects a total discharge volume of 24.8 million m^3 to Meliadine Lake throughout the project life from 2025 to 2043. At the Meliadine site, 2020 saw higher than average levels of precipitation, which resulted in a discharge of 1.03 million m^3 to the lake. If the current conditions of the project continue in the absence of the extension, conservative estimation would suggest that the volume of discharge would not exceed 9.27 million m^3 through the period of 2025 to 2032, the current expected end of life for the project (1.03 million m^3 per year for 9 years).

Taken together, it is apparent that the current planned infrastructure for surface contact water management is wholly inadequate to meet the obligations of Term and Condition 25 of NIRB Project Certificate No.006, specifically, to minimize or eliminate discharge to Meliadine Lake.

Recommendation/Request:

1) A Condition to the Water Licence be added to limit the annual discharge to Meliadine Lake to 1.1 million m^3 annually.

2) With the reduced discharge, Agnico Eagle must provide details on water management infrastructure, including construction plans, updated management plans, and updated water quality water balance models prior to commencement of the Meliadine Extension, including impacts to levels on Meliadine Lake and downstream waterbodies.

KivIA Technical Review Comment 3: Site Specific Water Quality Objectives in Meliadine Lake

References:

2022 Agnico Eagle Aquatic Effects Monitoring Plan Design Plan, December 2022; Health Canada Guidelines for Drinking Water Quality, September 2022.

Detailed Comment:

Traditionally, Inuit have used the water from Meliadine Lake for drinking while fishing, hunting, or camping in the area. Currently, the water in Meliadine Lake meets Health Canada Drinking Water guidelines for maximum acceptable concentrations of arsenic, fluoride, and iron, however, AEMP benchmarks for these compounds exceed the guidelines.

	Proposed AEMP Benchmark	90th percentile of baseline	CDWQG	Note on guideline
Arsenic	25 µg/L	25 µg/L	10 µg/L	Health basis - causes cancer (lung, bladder, liver, skin) and vascular & neurological effects
Fluoride	2.8 mg/L	0.028 mg/L	1.5 mg/L	Small amount of fluoride is beneficial for preventing

				cavities. CDWQG set for moderate dental fluorosis (speckled teeth in children developing permanent teeth - this is an aesthetic effect). Much higher concentrations (10 mg/L) are a health concern - start causing skeletal fluorosis, where bones are brittle.
Iron	1060 µg/L	15 µg/L	300 µg/L	An aesthetic objective base and taste and staining of laundry fixtures and plumbing

While it is unlikely that concentrations of the above would exceed drinking water guidelines in Meliadine Lake, it is important that site specific water quality objectives for Meliadine Lake are below these thresholds to ensure the safety of local Inuit, as well as Agnico Eagle employees who drink water from Meliadine Lake on site.

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Recommendation/Request:

Site Specific Water Quality Objectives in the Aquatic Effects Monitoring Plan below the Health Canada Drinking Water Guidelines should be adopted in Meliadine Lake for arsenic, fluoride, and iron.

KivIA Technical Comment 4- Contact Water Management

References:

Agnico Eagle 2AM-MEL1631 Meliadine Water Licence Amendment Application, Appendix F21 Water Management Plan v12_NWB, January 2023; Agnico Eagle Adaptive Management Plan for Water Management, v2_NWB January 2023.

Detailed Comment:

The construction of a dual waterline from the Meliadine Site to Itivia Harbour has been approved by all regulatory bodies, and is expected to be operational in 2024. The waterline is expected to manage all saline groundwater on site, and be used to minimize or eliminate discharge to Meliadine Lake by diverting surface contact water to Itivia Harbour. The KivIA has requested that a prioritized discharge strategy be used for managing contact water, where water with higher concentrations of contaminants of concern is prioritized for discharge to Itivia Harbour. This would include water from CP3, Sewage water, CP5, and CP4. While the Water Quality Water Balance Models contemplate these changes, they are not reflected in the Water Management Plan or the Adaptive Management Plan.

Recommendation/Request:

The Water Management Plan/Adaptive Management Plan should be updated to include a prioritized discharge strategy.

KivIA Technical Comment 5- Saline Enrichment of Lake B7 Sediment

References:

Meliadine Extension Water Licence 2AM-MEL1631 Amendment Main Application Document, January 2023; Agnico Eagle 2AM-MEL1631 Meliadine Water Licence Amendment Application,

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Appendix F21 Water Management Plan v12_NWB, Appendix E Water Balance and Water Quality Forecast, January 2023

Detailed Comment:

The KivIA reiterates the concerns of Environment and Climate Change Canada on salt enrichment of the sediment of Lake B7 (SP6) during operations and potential impacts to aquatic biota and downstream water bodies, including Meliadine Lake, during post-closure.

Recommendation/Request:

Guidelines for the protection of aquatic life are used to assess Lake B7 (SP6) for post-closure water quality.

Conclusion

The KivIA thanks the NWB for the opportunity to present these technical review comments, and looks forward to participating in the Technical Meeting in October.

Regards,

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