Water Resources Division
Resource Management Directorate
Nunavut Regional Office
P.O. Box 100
Iqaluit, NU, X0A 0H0

Your file - Votre référence
2AM-MEL1631
Our file - Notre référence
GCDocs#101820769

March 23, 2022

Richard Dwyer
Manager of Licensing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU, X0B 1J0
E-mail: licensing@nwb-oen.ca

Re: Crown-Indigenous Relations and Northern Affairs Canada's (CIRNAC's) Review of the Meliadine Mine Design Reports and Operation and Maintenance Manual, Type "A" Water Licence No. 2AM-MEL1631

Dear Mr. Dwyer,

Thank you for the February 22, 2022 invitation to review the Meliadine Mine Design Reports and Operation and Maintenance Manual, submitted by Agnico Eagle Mines Limited (AEM), for Type "A" Water Licence No. 2AM-MEL1631.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the Meliadine Mine Design Reports and Operation and Maintenance Manual pursuant to its mandated responsibilities under the *Nunavut Waters and Nunavut Surface Rights Tribunal Act* and the *Department of Crown-Indigenous Relations and Northern Affairs Act*. Please find CIRNAC comments and recommendations in the attached Technical Memorandum.

CIRNAC appreciates the opportunity to participate in this review. If there are any questions, please contact John Onita at john.onita@rcaanc-cirnac.gc.ca; or (867) 975-3876 or Andrew Keim at (867) 975-4550 or andrew.keim@rcaanc-cirnac.gc.ca

Sincerely,

John Onita
Regional Water Coordinator

Technical Review Memorandum

Date: March 23, 2022

To: Richard Dwyer – Manager of Licensing, Nunavut Water Board

From: John Onita – Regional Water Coordinator, CIRNAC

Subject: Crown-Indigenous Relations and Northern Affairs Canada's (CIRNAC's) Review of the Meliadine Mine Design Reports and Operation and Maintenance Manual, Type "A" Water Licence No. 2AM-MEL1631

Region: ☐ Kitikmeot ☒ Kivalliq ☐ Qikiqtani

A. BACKGROUND

In section 1.2. of the Design Report – Saline Effluent Treatment Plant (SETP-WTC) for Meliadine Gold Mine Project, AEM states that, *"The current mine plan focuses on the development of the Tiriganiaq gold deposit which will be mined using both conventional open-pit and underground mining operations. Current mining facilities to support the mine include a plant site and accommodations, tailings storage facility, waste rock storage facilities, ore storage pads, process plant, power plant, maintenance facilities, water management treatment plants and supporting infrastructures'.*

Such infrastructure includes: water retention dikes, berms, culverts, channels, collection ponds, pumping stations, freshwater intake and water treatment plants. This infrastructure is required to manage water during preproduction, operation, and interim mine closure. In 2019, a Saline Effluent Treatment Plant (SETP) was constructed that provides water treatment prior to discharge into Melvin Bay, at a rate of 800 m^3/day. The facility was upgraded in 2020 to treat up to 1600 m^3/day (see design report 6526-680-132-REP-001).

To support the water management plan for the Life of Mine (LOM), a new saline effluent treatment plant located in the water treatment complex (WTC), is required. This plant will be referred to as 'SETP-WTC' within the remainder of this response. It will be located in the WTC building already approved by the Nunavut Water Board (NWB) (see design report 6526-694-132-REP-001 and As Built Report 6526-694-132-REP-002). The SETP-WTC will be co-located with the Effluent Water Treatment Plant (EWTP-WTC). The EWTP-WTC has been already approved within the Design report 6526-693-132-REP-001 and the As Built Report 6526-693-132-REP-003. No change to the functionality of the EWTP-WTC is anticipated from the addition of the SETP-WTC.

Similarly, in section 1.0. of the Design Report – Ore Storage Pad 2, AEM presents the design for the Stage 2 expansion of Ore Storage Pad 2 (OP2).

AEM acknowledges in section 2.1. of the Design Report – Ore Storage Pad 2 that *"since the preparation of the 2021 Ore Storage Management Plan, several modifications to the mine plan and operation of OP2 have occurred, which have resulted in increased ore storage requirements. As a result, the Stage 2 expansion of OP2 is now required. Key modifications to the mine plan and operation of OP2 include the following:*

- *The Site Water Treatment Plant now occupies approximately 8,000 m^2 that was previously identified for ore storage, which has reduced the overall ore capacity of OP2.*
- *Six classes of material are now identified for the underground mine: super high grade, high grade, mid-grade, low grade, marginal grade, and waste, and are required to be stored separately. Three classes of ore are identified for the open pit mine: high grade, low grade, and marginal grade – these too are required to be stored separately. To efficiently operate the mill, the different classes of ore are stored separately, resulting in more ore stockpiles than originally assumed and a reduction in the overall capacity of OP2.*
- *Operational and safety constraints have led to additional space between the ore stockpile which has reduced the overall ore capacity of OP2"*.

CIRNAC provides the following comments and recommendations pertaining to the Meliadine Mine Design Reports and Operation and Maintenance Manual. A summary of the subjects of recommendations can be found in Table 1. Documents reviewed as part of this submission can be found in Table 2 of Section B. Detailed technical review comments can be found in Section C.

Table 1: Summary of Recommendations

Recommendation Number	Subject
R-01	Key design considerations
R-02	Volume of Sludge from SETP-WTC and EWTP-WTC
R-03	Designation codes

B. DOCUMENTS REVIEWED AND REFERENCED

The following table (Table 2) provides a list of the documents reviewed under the submission and reference during the review.

Table 2: Documents Reviewed and Referenced

Document Title	Author, File No., Rev., Date
Design Report Saline Effluent Treatment Plant (SETP-WTC)	Agnico Eagle Mines Limited, Meliadine Division; December 2021; 6526-680-132-REP-006
Ore Storage Pad 2 Stage 2 Design Report and Drawings	Agnico Eagle Mines Limited, Meliadine Division; February 2022; 65-530-230-REP-001
Operation & Maintenance Manual Saline Effluent Treatment Plant (SETP-WTC) Water Treatment Complex	Agnico Eagle Mines Limited, Meliadine Division; January 2022

C. RESULTS OF REVIEW

1. Key design considerations

Comment:

In section 3.1 of the Design Report - Ore Storage Pad 2, AEM states that OP2 Stage 2 was designed based on the following consideration:

- Fill will be placed to follow the natural topography, thereby reducing the likelihood of water ponding on the surface of the pads requiring additional maintenance. A final grade of about 1% sloping towards the CP1 containment area will be achieved. Any surface run off from the ore stockpiles or the pad will therefore be directed to the CP1 containment area.

CIRNAC is concerned that without the inclusion of a water collection system as part of the design considerations, AEM does not provide information on how it intends to safely direct any surface runoff from the ore stockpiles or the pad to CP1 containment area on a long-term basis (i.e., end of project life). The proposed final grade of about 1% sloping towards the CP1 containment area to direct surface runoff from the ore stockpiles cannot be considered as a permanent and reliable measure to precisely and safely direct the runoff into the CP1 containment pond. Natural factors such as snow/ice melt and precipitation (rain fall) can alter the direction of the surface runoff from the ore stockpiles, hence the need to put in place a water collection system to collect the surface runoff and precisely deliver it into the CP1 containment pond.

Recommendation:
(R-01) CIRNAC recommends that, AEM put in place a water collection system as part of the key design considerations; to more precisely direct surface runoff water from the ore stockpiles or pad to the CP1 containment area on a long-term basis.

2. Volume of Sludge from SETP-WTC and EWTP-WTC

Comment:
As part of the solid waste management strategy described in section 3.9 of the Design Report – Saline Effluent Treatment Plant (SETP-WTC), AEM states that *"Sludge produced in the SETP-WTC and EWTP-WTC system will be stored in the sludge tank prior to being disposed in saline contact water ponds according to the water management plan"*.

CIRNAC notes that Schedule B, Item 7, of the Water Licence 2AM-MEL1631 requires AEM to provide details of the storage capacity for saline water including its associated components (e.g., sludge) in the Annual Reports.

Thus, Schedule B, Item 7 states, *"The Annual Report referred to in Part B, Item 2 shall include: Discussions on the available storage capacity for both saline and fresh Water, including the volumes of Water transported to Melvin Bay and the volumes of Water discharged into Meliadine Lake, as well as the projected volumes of water requiring storage in the upcoming year".*

Based on this Water Licence condition, CIRNAC requests that AEM maintain records of sludge produced in the SETP-WTC and EWTP-WTC systems by tracking daily/monthly/yearly volumes before it is stored in the sludge tank prior to disposal in saline contact water ponds in accordance with the water management plan.

Recommendation:
(R-02) CIRNAC recommends that AEM maintain records of sludge produced in the SETP-WTC and EWTP-WTC system by tracking daily/monthly/yearly volumes before it is stored in the sludge tank and report this information in its Annual Reports.

3. Designation codes

Comment:
The saline water management strategy, as described by AEM in section 2.4 of the Design Report – Saline Effluent Treatment Plant (SETP-WTC) indicates that AEM intends to transfer the saline water from underground mines to storage and pre-mixing ponds before feeding saline water to SETP-WTC for treatment. Thus, AEM's description states: *"Saline water from the underground mine is transferred at the surface to the saline contact water pond storage. The saline water, as well as other contact water, will be pumped to the SETP-*

WTC (raw water source) through an in-line blending system, or will alternatively be fed to premixing pond, which will be used as a feed source for the SETP-WTC. Treated water exiting the SETP-WTC is discharged to the water line towards Melvin Bay".

CIRNAC acknowledges that Part F, Item 2 of the Water Licence 2AM-MEL1631 requires AEM to direct all Contact Water from Collection Ponds to CP1. While CIRNAC understands that the described saline contact water storage and pre-mixing pond may qualify as "Collection Ponds" under Water Licence 2AM-MEL1631. The Licence Terms and Conditions, highlight the specific designation code for each of these storage ponds that will be used to store the saline water before treatment. Using these codes would make it easier for reviewers such as CIRNAC to follow the description. There was no mention of any specific designation code (e.g., CP1, MEL-14 etc.) attached to; (a) the alternative pre-mixing pond; and (b) saline contact water pond storage; in the description that AEM provided.

CIRNAC requests that AEM provide information on the location(s) of the saline water storages and pre-mixing ponds that will be used to store the saline water before treatment, along with their specific designation codes in order to facilitate CIRNAC Inspectors in locating them and carrying out routine inspection duties.

Recommendation:

(R-03) CIRNAC recommends that AEM provide information on the location(s) of the saline water storages and pre-mixing pond designated for storage of saline water before treatment in the Meliadine mine site map, along with their specific identification codes and report this information in its Annual Reports.

D. REFERENCES

Agnico Eagle Mines Limited, Meliadine Division; Design Report Saline Effluent Treatment Plant (SETP-WTC); December 2021; 6526-680-132-REP-006

Agnico Eagle Mines Limited, Meliadine Division; Ore Storage Pad 2 Stage 2 Design Report and Drawings; February 2022; 65-530-230-REP-001

Agnico Eagle Mines Limited, Meliadine Division; Operation & Maintenance Manual Saline Effluent Treatment Plant (SETP-WTC) Water Treatment Complex; January 2022