Crown-Indigenous Relations and Northern Affairs Canada
Relations Couronne-Autochtones et Affaires du Nord Canada

Water Resources Division
Resource Management Directorate
Nunavut Regional Office
P.O. Box 100
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Your file - Votre référence
2AM-MEL1631
Our file - Notre référence
GCDocs#115466163

July 04, 2023

Robert Hunter
Licensing Administrator
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 2022 Annual Report for Meliadine Gold Mine Project, Type A Water Licence No. 2AM-MEL1631.

Dear Mr. Hunter,

Thank you for your April 04, 2023, invitation to review the 2022 Annual Report for the Meliadine Gold Mine Project, submitted by Agnico Eagle Mines Limited, for Type A Water Licence No. 2AM-MEL1631.

Crown-Indigenous Relations and Northern Affairs Canada (CIRNAC) examined the Report and its attachments 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 for the Nunavut Water Board's consideration.

If there are any questions or concerns, please contact me at Aminul.Haque@rcaanc-cirnac.gc.ca or (867) 975-4555 or Andrew Keim at (867) 975-4550 or Andrew.Keim@rcaanc-cirnac.gc.ca.

Sincerely,

আমিনুল

Aminul Haque
Regional Water Management Coordinator

Technical Review Memorandum

Date: July 04, 2023

To: Robert Hunter, Licensing Administrator, Nunavut Water Board

From: Aminul Haque, Regional Water Management Coordinator, CIRNAC

Subject: **Crown-Indigenous Relations and Northern Affairs Canada's (CIRNAC's) Review of the 2022 Annual Report for Meliadine Gold Mine Project, Type A Water Licence No. 2AM-MEL1631.**

Region: ☐ Kitikmeot ☒ Kivalliq ☐ Qikiqtani

A. BACKGROUND

Agnico Eagle Mines' (AEM's) Meliadine Gold Mine Project is located near the western shore of Hudson Bay in the Kivalliq Region of Nunavut, approximately 25 km north of Rankin Inlet, 80 km southwest of Chesterfield Inlet, and 290 km southeast of the Meadowbank mine. The Project site is situated on a peninsula amongst the east, south, and west basins of Meliadine Lake (63°1'23.8''N, 92°13'6.42''W), on Inuit owned land. The 111,358-hectare property covers an 80-km-long greenstone belt. A 24-km all-weather gravel access road (built in October 2013) links the Meliadine project site with Rankin Inlet. The NIRB Project Certificate (PC No. 006) was issued to AEM on February 26, 2015. AEM was issued a water licence for this project by the Nunavut Water Board (NWB) on April 15, 2016. The mine commenced its commercial production on May 14, 2019. The project is anticipated to have a mine life of about 14 years with the potential for extension to 25 years should more ore be identified.

Meliadine includes seven gold deposits: Tiriganiaq, Normeg, Wesmeg, Pump, F-Zone, Wolf and Discovery. The approved Project consists of mining at five deposits (Tiriganiaq, Wesmeg, Pump, F Zone, and Discovery) through a phased approach and processing of the ore at an on-site milling operation at a rate of 8,500 tonnes per day, as well as transportation of the gold bullion south for final refinement and sale. The deposits are all within five (5) km of Tiriganiaq except for Discovery, which is 17 km southeast of Tiriganiaq. Each of these deposits has mineralization within 120 metres of the surface, making them potentially mineable by open pit methods. Also, because of their deeper mineralization, they could be mined with underground methods. The current mineral reserves are mainly in the Tiriganiaq deposit at underground and open pit depths. In Phase 1 of the mine, the ore is being sourced underground with access by decline, using long-hole mining methods. In Phase 2, the ore will be sourced from both the underground and open pits. A conventional truck/shovel operation is anticipated for the open pits. The Project includes the extended exploration, construction, operation, closure, and reclamation of underground and open-pit mines and associated infrastructure for extracting, processing and transporting gold. Tiriganiaq mining will occur using above-

ground and underground methods, with the other four (4) deposits mined using open pit methods. There are three (3) main Project areas: the Tiriganiaq mine site (Underground Mine, Open Pits 1 & 2), the Discovery deposit, and the Itivia Harbour.

The Tiriganiaq mine site includes the camp, landfarm, landfill, incinerator, and fuel tank farms, all of which were completed in late 2017. In addition, the underground portal has been active since 2007/2008, when it was constructed for bulk sampling. The mine site also includes three (3) waste rock piles, three (3) ore stockpiles, and a tailings storage facility. Transportation of personnel and supplies occurs via the All-Weather Access Road (AWAR) between Rankin Inlet and the Meliadine site; Phase 1 of the AWAR was approved by the NIRB in 2012 as an exception to the review of the Meliadine Gold Mine project and was completed in 2013. Agnico Eagle anticipates Phase 2 of the AWAR, which would include widening the existing Phase 1 road, twinning part of the road to separate oncoming traffic, and developing a spur road to the Discovery deposit, is to occur in 2024.

Supplies and equipment for the Project are barged into Itivia Harbour, Melvin Bay in Rankin Inlet, during the open water season. The Itivia project area includes quarry operations that began in 2017 and a laydown area and fuel tank farm completed in the summer of 2018. Construction of the bypass road from Itivia to the start of the AWAR was completed in the fall of 2018. The bypass road is to enable mine traffic to avoid the community of Rankin Inlet while transporting fuel and equipment to the Project mine site.

CIRNAC provides the following comments and recommendations pertaining to the 2022 Meliadine Gold Mine Annual Report. 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	Permafrost Monitoring
R-02	Improvements to Annual Report
R-03	Marine Discharge to Melvin Bay
R-04	Sludge Disposal in Tiriganiaq Open Pit 2
R-05	Saline Water Storage in Tiriganiaq Open Pit 2 (Tiri 02)
R-06	Impacts of Effluent Discharge on Phytoplankton in Meliadine Lake
R-07	Adaptive Management
R-08	Aquatic Ecosystem Monitoring Program (AEMP)
R-09	Geotechnical Recommendations

B. DOCUMENTS REVIEWED AND REFERENCED

The following table (Table 2) lists the documents reviewed under the submission and references during the review.

Table 2: Documents Reviewed and Referenced

Document Title	Author, File No., Rev., Date
230417 2AM-MEL1631 2022 Annual Report & Appendices	
Meliadine Gold Mine – 2022 Annual Report, Main Document	AEM, March 2023
Appendix Documents	
Appendix 01 - 2022 Annual Report Appendix Summary Table	AEM, March 2023
Appendix 02 - 2022 Drill Site Locations	AEM, March 2023
Appendix 03 - 2023 Mine Plan (Production Lease KVP11D01)	AEM, March 2023
Appendix 04 - General Site Layout	AEM, March 2023
Appendix 05 - Water Balance and Water Quality Modelling Tabular Data and Figures	AEM, March 2023
Appendix 06 - 2022 Annual Geotechnical Inspection	Tetra Tech, 17 February 2023
Appendix 07 - 2021 Annual Geotechnical Report Agnico Eagle Responses and Action Table	AEM, March 2023
Appendix 08 - 2022 Annual Geotechnical Report Agnico Eagle Responses and Action Table	AEM, March 2023
Appendix 09 - As-built Drawing of the Fill Placed Near Containment Pond 4 and Downstream of D-CP1	AEM, 22 February 2023
Appendix 10 - 2022 Annual Geochemical Report (Metal Leaching and Acid Rock Drainage Monitoring Report)	AEM, March 2023
Appendix 11 - Results of the 2022 Tailings Supernatant Sampling	AEM, March 2023
Appendix 12 – WRSF1 and WRSF2 Plans and Sections at the end of 2022	AEM, March 2023
Appendix 13 – TSF Plans and Sections at the end of 2022	AEM, March 2023
Appendix 14 – 2022 Shipping Documentation	Sanexen, 17 March 2023
Appendix 15 - 2022 Stack Testing Report	Bureau Veritas, August 31 – September 8, 2022
Appendix 16 - 2022 Reportable Spills	AEM, March 2023
Appendix 17 – 2022 Non-Reportable Spills	AEM, March 2023
Appendix 18 – 2022 Mock Scenario Spill Report	AEM, 22 July 2022
Appendix 19 - Aquatic Effects Monitoring Program (AEMP) Report	Azimuth, 29 March 2023
Appendix 20 – 2022 Water Monitoring Station Results	AEM, March 2023
Appendix 21 – 2022 Diamond Drill Hole (DDH) Water Sample Results	AEM, March 2023
Appendix 22 – 2022 Calibration Data	AEM, March 2023
Appendix 23 - 2022 Blast Monitoring Report (for the Protection of Nearby Fish Habitat)	AEM, March 2023
Appendix 24 - 2022 Noise Monitoring Report	AEM, March 2023
Appendix 25 - 2022 Air Quality Monitoring Report	AEM, March 2023
Appendix 26 - 2022 Toolbox Presentations	AEM, March 2023
Appendix 27 - 2022 Terrestrial Effects Monitoring and Mitigation Program Annual Report	WSP, 29 March 2023
Appendix 28 - 2022 Wildlife Observations	AEM, March 2023

Document Title	Author, File No., Rev., Date
Appendix 29 - 2022 Technical Analysis to Support Response to NIRB PC No. 006 & T&C No. 68	ERM, 24 March 2023
Appendix 30 - 2022 Marine Mammal and Seabird Observations (MMSO) Annual Report	ERM, March 2023
Appendix 31 - Management Plans	
31-1 Ammonia Management Plan	AEM, March 2023, V4
31-2 2022 Aquatic Effects Monitoring Program Design Plan	Azimuth, 1 December 2022, V2
31-3 2022 Blast Monitoring Program	AEM, March 2023, V5
31-4 Cyanide Management Plan	AEM, March 2023, V2
31-5 2022 Explosives Management Plan	AEM, March 2023, V9
31-6 2022 Mine Waste Management Plan	AEM, March 2023, V10
31-7 2022 Oil Pollution Emergency Plan / Oil Pollution Preventions Plan (OPEP/OPPP)	AEM, March 2023, V8
31-8 2022 Ore Storage Management Plan	AEM, March 2023, V5
31-9 Spill Contingency Plan	AEM, March 2023, V13
31-10 Water Management Plan	AEM, March 2023, V13
Appendix 32 - 2022 Post-Oil Transfer Reports	March 2023
Appendix 33 - 2022 Community Engagement Table	AEM, March 2023
Appendix 34 – 2022 Community Liaison Committee Newsletter (IU &ENG)	AEM, March 2023
Appendix 35 – 2022 Terrestrial Advisory Group (TAG) Annual Report	TAG, April 2023
Appendix 36 - Socio-Economic Monitoring Program	Stratos, March 2022, V4
Appendix 37 – 2022 Socio-Economic Monitoring Program Report	Aglu and Stratos, March 2023
Appendix 38 - 2022 Training	AEM, March 2023
Appendix 39 – 2021 Kivalliq Labour Market Analysis Report	Aglu, Stratos and Impact Economics, 5 November 2021
Appendix 40 – 2022 NIRB Project Certificate Concording Table	AEM, March 2023
Appendix 41 – 2022 NWB Concording Table	AEM, March 2023
Appendix 42 – 2021 Annual Report Comments Concordance Table	AEM, March 2023
Appendix 43 - Inuktitut Summaries of Monitoring Results	AEM, March 2023
Other Reports/Information	
Nunavut Water Board Amended Water Licence No: 2AM-MEL1631	Issued 13 May 2021
CIRNAC's Review of the 2021 Annual Report for Meliadine Gold Mine Project, Type A Water Licence No. 2AM-MEL 1631	CIRNAC, 22 July 2022
NWB Technical Review of the 2021 Annual Report for the Meliadine Project; Water Licences Nos: 2AM-MEL 1631 and 2BB-MEL 1424	AEM, 9 September 2022
CIRNAC's Reply to AEM Responses on the 2021 Annual Report for the Meliadine Gold Mine Project, Type A Water Licence No. 2AM-Mel 1631	CIRNAC, 23 September 2022
Written Warning *Nunavut Waters and Nunavut Surface Rights Tribunal Act* issued to AEM	CIRNAC, 21 December 2022
Written Warning *Nunavut Waters and Nunavut Surface Rights Tribunal Act* issued to Orbit Garant Drilling Inc.	CIRNAC, 21 December 2022

Document Title	Author, File No., Rev., Date
Exploration, Drilling On-Ice Procedures	AEM, 22 December 2023
Exploration, Surface Exploration Drilling – Environmental Management	AEM, 22 December 2022
Technical Memorandum no. 003 – Channel 2 Berm Design, Meliadine Mine, Nunavut.	Agnico Eagle Mines Limited, February 16, 2023
Amended Water Licence 2AM-MEL1631	Nunavut Water Board, May 13, 2021
2021 Annual Geotechnical Inspection Meliadine Gold Project, Rankin Inlet, Nunavut	Tetra Tech, March 17, 2022

C. RESULTS OF REVIEW

1. Permafrost Monitoring

Comment:

CIRNAC previously recommended that AEM provide a discussion on the status of permafrost degradation that may be occurring because of AEM's construction and operation activities. To address this request, AEM included Section 4.1.9 in the 2022 Annual Report, which provided the following discussion:

"In general, permafrost aggrades into the fills placed on the natural ground, and Agnico Eagle has not observed permafrost degradation across the industrial pad. Some localized permafrost degradation has been observed within/adjacent to some of the water management structures (downstream collection channel of D-CP1, CP3, CP4, channel 1, channel 3 and access, channel 5, channel 9, and channel 10) as well as the saline water treatment plant. These areas correspond to areas where ice-rich materials are present within the natural ground, where the natural vegetation has been removed, and/or where water is allowed to accumulate. Agnico Eagle monitors these areas and repairs them when required. Additionally, the lessons learned from the performance of older infrastructure are being implemented into new infrastructure to minimize future permafrost degradation.

Further information on the observed localized permafrost degradation (areas of settlement) can be found in the 2022 Annual Geotechnical Inspection Report (Appendix 6)".

From CIRNAC's review of the 2022 Annual Report and the 2022 Geotechnical Report, CIRNAC concurs with the observations and information provided by AEM.

CIRNAC notes that while Section 4.1.9 of the 2022 Annual Report provides general comments on permafrost degradation across the site, there is no detailed discussion of permafrost condition of areas of interest across the site, including areas between critical infrastructure such as dikes, channels, and tailings and waste rock facilities and adjacent to water conveyance features at which permafrost degradation has been noted. Similarly, there needs to be a discussion of permafrost conditions adjacent to the roads (site roads, All Weather Access Road, bypass roads) and borrow areas. This information is important for understanding potential long-term impacts on presently stable infrastructure due to long-term permafrost degradation around, and in the vicinity, of these features (for example, permafrost degradation within water diversion channels as noted in the 2022 Geotechnical Inspection Report).

Further to the comments above, the results of the 2022 Annual Geotechnical Inspection Report also identified concerns regarding the operation and performance of instrumentation being used to record thermal conditions within the subsurface in locations where permafrost is expected to aggregate with time and development of the mine site. Specifically, the horizontal GTC units in WRSF3 and Berm CP6 were reported to be only partially functioning. AEM stated that the equipment supplier had reviewed the instrumentation status and reported that it could not be repaired. It is CIRNAC's opinion that the instrumentation required for thermal monitoring should be operational throughout the life of mine. Any damaged equipment should be replaced if it cannot be repaired.

Recommendation:

(R-01) CIRNAC recommends that AEM:

a) Monitor thermal conditions at the portions of the site in the vicinity of areas where permafrost degradation has been observed, including areas adjacent to channels and ditches close to existing berms and material storage facilities, to ensure that any permafrost degradation does not impact the long-term stability of these infrastructure elements. This should include the installation of horizontal and/or vertical thermistors in critical areas where degradation has already begun,
b) Comment on the monitoring of thermal conditions at ancillary facilities (e.g., roads, borrow areas) where standing water continues to be observed,
c) Expand the discussion in Section 4.1.9 of the Annual Report to include additional permafrost thermal monitoring and discussions as per items 1 and 2 above, and
d) Replace the horizontal GTC units in WRSF3 and Berm CP6 that were reported to be only partially functioning and any other damaged thermal monitoring instrumentation if it cannot be repaired.

2. Improvements to Annual Report

Comment:

The Annual Report is a comprehensive document responding to both NIRB and NWB terms and conditions. Review of this document and its numerous appendices requires extensive time and effort, and CIRNAC would like to see additional improvements to ease the review and understanding of a) items referenced, b) information on site conditions, and c) information on Milling operations. These aspects are expanded on below.

a) Although AEM included references to supporting documents in discussions within the main body of the Annual Report (e.g., Golder 2014; OKC 2022a; 2022b), the report lacks a reference section where the full citation of each document is included, so the reader can verify the document being referred to.

b) AEM's geotechnical report provided photographs of site conditions during annual inspections. While all photographs are labelled, it is often difficult for interested parties to specifically identify the location of the item/area being photographed (e.g., regarding the site photograph of the north side toe of the tailings storage facility and associated channel, it is unclear where this specific location occurs along the north side (east, west or center?). This makes it particularly challenging to assess AEM comments regarding a location condition and potential impacts/statements as the reviewer may not be sure what area they are actually looking at in a photograph.

c) Several activities planned for 2023, as listed in Section 2.2 of the Annual Report, are listed as "pending regulatory approval". These include widening of the AWAR from km 6 to 19.6, construction of the waterlines for discharge to sea, and construction of the haul road pump. It is not clear why regulatory approval to complete these activities is needed, as CIRNAC is of the understanding that such regulatory approvals have already been received.

d) The Meliadine Gold Mine project includes an on-site milling operation to process ore at a rate of 8,500 tonnes per day. Milling operations at Meliadine were initiated in 2019. In the 2022 Annual Report, as noted in previous reviews, there is no discussion regarding mill operations (e.g., days of milling, tons of ore processed, tailings generated, water used, and related activities on cyanide management and consumption and tailings detoxification). This is important with respect to understanding total ore storage volumes on the surface during the year and assessing ore storage management and the potential impacts of ore storage on water quality. CIRNAC is confident that a discussion of the milling operations during the year would provide reviewers and stakeholders with a more fulsome perspective of the Meliadine operations and would be a useful addition to the Annual Report.

e) Appendix 13 provides actual plans and sections of 2021 and 2022 TSF conditions. CIRNAC notes that a single cross-section (A-A generally east-west) is provided for each year. An additional, perpendicular cross-section (north-south) would be helpful to understand the development of the TSF fully.

Furthermore, providing hyperlinks in the pdf to the table of contents and lists of tables and figures, as well as to table and figure references within the text, would lend functionality to the document making it easier to navigate and scroll through it and would ultimately facilitate the review of the report. This, in turn, would help track information that responds to specific NWB terms and conditions.

Recommendation:

(R-02) CIRNAC recommends that AEM include:

a) A reference section in future Annual Reports providing full citations to documents referenced in the main body of the report,
b) Hyperlinks in the pdf to the table of contents, list of tables and figures and references to tables and figures in the text,
c) A site plan that clearly indicates the location and view direction of each photograph in future reporting that provides site-specific photographs, especially in the Geotechnical Report, and
d) In addition to the section A-A (east-west), a section B-B (north-south) of the tailings facility should be added to Appendix 13,
e) A section in future Annual Reports describing mill operations at the Meliadine site (e.g., days of milling, tons of ore processed, tailings generated, water used, and related activities on cyanide management and consumption and tailings detoxification).

3. Marine Discharges to Melvin Bay

Comment:

Sections 3.1.6 and 7.3.1.24 of the Annual Report noted that 2022 there was no saline effluent discharge to sea at Melvin Bay through MEL-26 at Itivia Harbour.

In the 2022 Annual Report, Section 3.2.2.2 describing the water balance model setup stated that “currently, saline water from the underground mine is stored in Tiriganiaq Open Pit 2 (Tiri 02) and as such no actual discharge quantities were applied in the 2022 model year update. Previous discharges applied to the WBWQM [Water Balance Water Quality Model] include using trucks to discharge saline water from SP4 to Itivia Harbour. The proposed Waterline (i.e., the installation of an effluent waterline discharging to Itivia Harbour) will deliver treated effluent to Itivia Harbour via a diffuser. This model assumes the waterline will be operational beginning in 2025 with a seasonal discharge from June 20th to September 29th at 20,000 m3/day”.

Section 3.11 of Appendix 31-10 Water Management Plan of the 2022 Annual Report stated, “Currently due to sufficient forecasted storage capacity until 2026, saline water on site is managed through storage and treatment of marginally saline water. Punctual operations of hauling of saline water treated by the SETP to Melvin Bay are only conducted if necessary. The suspension of continuous hauling operation followed the approval of the waterline to discharge to sea (section 3.3.3) under the Amendment 002 of the NIRB Project Certificate No. 006 issued on March 2nd. The waterline is currently under construction and is expected to be commissioned in 2025, once in operation, the waterline

will be used in combination with the SETP-WTC to discharge treated saline water to Melvin Bay."

When describing the water balance model set up in the 2021 Annual Report, Section 3.2.3 stated that "Discharge of saline water to Melvin Bay is assumed to continue by trucks for the operation years 2022 and 2023 and to change to waterline discharge in 2024" and that "Based on the discharge to sea schedule in the model and considering TIRI02 as a major saline water surface storage with a capacity of 1,616,554 m3, a maximum of 46% of TIRI02 storage capacity will be utilized in future years (2022 - 2027). In 2022, a maximum of 500,000 m3 saline water is expected to be stored in TIRI02, which accounts for 30% of the TIRI02 capacity."

While there is the capacity for the temporary storage of saline water in TIRI02 to manage saline water in the short-term, it is not clear from the 2022 Annual Report why the approved discharge of 1,600 m3/day to the marine environment, as planned in the 2021 Annual Report, was stopped completely in 2022.

Recommendation:
(R-03) CIRNAC recommends that AEM provide:

a) Justification for no saline water discharge in 2022 and why no saline water discharge is planned to occur until 2025,
b) Justification for the rescheduling of the waterline construction completion to 2025,
c) Potential consequences of any schedule delays in saline water discharge via the waterline.

4. Sludge Disposal in Tiriganiaq Open Pit 2

Comment:
Sludge production from the Effluent Water Treatment Plant-Water Treatment Complex (EWTP-WTC) treatment process during 2022 totalled 3,350 m3, which was pumped to Tiriganiaq Open Pit 2.

As noted in Section 3.9.4.3 of Appendix 31-10 Water Management Plan, sludge produced as part of the total suspended solids (TSS) removal process at the WTC is discharged into the saline water storage and is sampled monthly for metal content, hydrocarbons (C10-C50) and organic carbon to determine the potential impact on the receiving saline ponds.

AEM state that they may also explore other alternatives for sludge disposition in future years, such as dewatering using geotextile bags (e.g., Geotubes™) or mechanical dewatering, which could include technology such as filter press, centrifuge, or belt filters. The dewatered sludge could then be disposed of as a solid.

CIRNAC is concerned that the disposal of sludge in the open pit as practiced now has not been properly assessed nor approved.

Recommendation:

(R-04) CIRNAC recommends that AEM provide:

a) Additional details of past studies supporting in-pit sludge disposal,
b) Interpretation of monthly sludge sampling results,
c) Clarify what AEM means by "may also explore other alternatives for sludge disposition in future years", and provide clear commitments on studies and timelines, and
d) Evidence of approval of its current practice of sludge disposal into the saline water being stored in the Tiriganiaq 2 Open Pit.

5. Saline Water Storage in Tiriganiaq Open Pit 2 (Tiri 02)

Comment:

In the 2022 Annual Report, Section 3.2.2.2 describing the water balance model setup stated that:

"The proposed Waterline (i.e., the installation of an effluent waterline discharging to Itivia Harbour) will deliver treated effluent to Itivia Harbour via a diffuser. This model assumes the waterline will be operational beginning in 2025 with a seasonal discharge from June 20th to September 29th at 20,000 m3/day".

Furthermore, it notes that:

"The model assumes the waterline discharge will be sourced as 60% saline water from Tiri 02 and 40% surface contact water from CP1 until the volume of saline water in Tiri 02 is drawn below 25,000 m^3. After this, the waterline discharge will be sourced as 100% surface contact water from CP1 to minimize discharge to Meliadine Lake. During this period, saline water from the underground mine will continue to fill Tiriganiaq Open Pit 2 (Tiri 02). If the volume in Tiri 02 reaches 50,000 m^3, the source water will revert to 60% saline water and 40% surface contact water until the Tiri 02 drawdown target is met again."

Section 3.11 of Appendix 31-10 Water Management Plan of the 2022 Annual Report states that:

"Currently due to sufficient forecasted storage capacity until 2026, saline water on site is managed through storage and treatment of marginally saline water. Punctual operations of hauling of saline water treated by the SETP to Melvin Bay are only conducted if necessary. The suspension of continuous hauling operation followed the approval of the waterline to discharge to sea (section 3.3.3) under the Amendment 002 of the NIRB

Project Certificate No. 006 issued on March 2nd. The waterline is currently under construction and is expected to be commissioned in 2025. Once in operation, the waterline will be used in combination with the SETP-WTC to discharge treated saline water to Melvin Bay."

When describing the water balance model set up in the 2021 Annual Report, Section 3.2.3 stated that:

"Based on the discharge to sea schedule in the model and considering TIRI02 as a major saline water surface storage with a capacity of 1,616,554 m3, a maximum of 46% of TIRI02 storage capacity will be utilized in future years (2022 - 2027). In 2022, a maximum of 500,000 m3 saline water is expected to be stored in TIRI02, which accounts for 30% of the TIRI02 capacity."

Given the above, it is apparent that AEM has planned for the continuous use of the TIRI02 pit for the storage of saline ground waters.

Recommendation:
(R-05) CIRNAC recommends that AEM:

a) Confirm how long it intends to use the TIRI02 pit for storage of saline groundwater,
b) Provide evidence that the use of the TIRI02 pit, or any other open pits, for more than emergency temporary storage has been reviewed and approved by regulatory authorities.

6. Impacts of Effluent Discharge on Phytoplankton in Meliadine Lake

Comment:
In the review of the 2021 Annual Report, CIRNAC noted the observation of algal blooms in Meliadine Lake as a clear indication that something was affecting the phytoplankton community in Meliadine Lake. CIRNAC had recommended that AEM conduct additional studies to determine the root cause of the algal blooms and determine whether the impact directly results from effluent discharge to Meliadine Lake.

In their response, AEM maintained that data from the multi-year phytoplankton study conducted annually in August has not shown evidence of "algal blooms" in Meliadine Lake. Cyanobacteria, which are commonly associated with algal blooms related to nutrient enrichment, comprise less than 1% of the phytoplankton biomass in Meliadine Lake. Furthermore, AEM indicated that the results from the 2021 phytoplankton study demonstrate that effluent is not causing a shift in the phytoplankton community in the near-field or mid-field areas of Meliadine Lake, consistent with FEIS predictions.

CIRNAC was not satisfied with AEM's response because while AEM confirmed evidence of abundant increases in both the phytoplankton biomass and chlorophyll-a in the east basin of Meliadine Lake, they did not attribute these increases to mining activities.

Pursuant to AEM's response, CIRNAC reiterated its recommendation requesting AEM to conduct additional studies to determine the root cause of the algal blooms in Meliadine Lake and whether the impact is a direct result of effluent and/or sewage discharges to Meliadine Lake.

Some additional analyses were included in the 2022 AEMP report (Appendix 19) examining the effect of high rainfall events on water quality and phytoplankton indicators in Meliadine Lake. The analysis suggests that differences in the phytoplankton community composition among the different areas of Meliadine Lake and between years may be partly related to changes in water quality associated with high rainfall in the preceding years.

Recommendation:
(R-06) CIRNAC recommends that AEM:

a) Design a study to investigate and identify the root cause of the algal blooms for review with CIRNAC and other interested parties,
b) Based on review and feedback, conduct agreed studies to determine the root cause of the algal blooms, and
c) If the studies indicate effluent and/or sewage discharges are a potential contributor, develop action plans to mitigate impacts to Meliadine Lake.

7. Adaptive Management

Comment:
The 2022 Annual Report states that "Schedule B, Item 6 of the Amended Water Licence 2AM-MEL1631 will come into effect following the commissioning of the Waterline (approved by the Minister of Northern Affairs on January 31st, 2022).

Operation of the waterline for discharge to Melvin Bay is anticipated to significantly minimize or eliminate discharges to Meliadine Lake throughout the open water season each year. A summary of the Adaptive Management procedures implemented following the commissioning of the Waterline will be available in future annual reports once the Waterline is operational.

More information regarding applicable Adaptive Management strategies can be found in the most up-to-date version of the Adaptive Management Plan (Agnico Eagle, 2022)."

In regard to these statements, CIRNAC notes that:

1. The 2022 Annual Report did not provide the Adaptive Management Plan as referenced above,
2. No details were provided on timelines and actual expected reductions of discharge to Meliadine Lake, and
3. While a summary of procedures implemented following commissioning will be provided, no information was provided as to the "planned" Adaptive Management Procedures expected to be carried out with the commissioning of the waterline.

Recommendation:
(R-07) CIRNAC recommends that AEM provide:

a) The Adaptive Management Plan (Agnico Eagle, 2022),
b) History of discharge to Meliadine Lake to date and details and timelines of expected discharge reductions to Meliadine Lake, and
c) Information on planned Adaptive Management Procedures expected to be carried out with the commissioning of the waterline.

8. Aquatic Ecosystem Monitoring Program (AEMP)

Comment:
The 2022 AEMP involved water quality monitoring, a phytoplankton community study in Meliadine Lake, and water quality monitoring in three smaller lakes near the mine: Lake B7, Lake D7, and Lake A8. The results are summarized in Section 7.1 and Appendix 19 of the 2022 Annual Report.

The Annual Report notes that monitoring for the AEMP in 2022 was completed according to the approved AEMP Design Plan, and no exceedances of AEMP Action Levels were observed.

However, the emergence of a couple of concerning trends was noted in the AEMP with respect to accumulating levels of arsenic and iron in the snowpack south of the open pits near the shore of Lake A8 and the increasing trend in arsenic concentrations in Lake B7, which are on track to exceed the AEMP Action Level in 2023 should this trend continue.

Recommendation:
(R-08) CIRNAC recommends that AEM identify what, if any actions have been undertaken to assess these trends further and identify actions that could be taken to reduce the levels while they are still below the threshold.

9. Geotechnical Inspection Program

Comment:
As required by the licence, third-party Annual Geotechnical Inspections are undertaken annually. A review of AEM 2021 and 2022 inspection recommendations and

implementation plans suggests that some low-priority minor/repetitive recommendations have not been addressed in a timely manner (or at all) and have no timelines. CIRNAC has the following observation based on the review of the 2022 Geotechnical Inspection Report Recommendations:

1. Repair of the crest subsidence along the seepage collection channel downstream of D-CP1 should be undertaken, not just monitored as suggested by AEM.
2. Sediment within Channel 3 should be removed so as to maintain proper drainage within the structure.
3. Tetra Tech recommended extending the Channel 4 Berm. However, AEM did not address this topic in their responses (Appendix 8 2022 Geotechnical Inspection Report).
4. No clear reason was given by AEM as to why the completion of the CP6 access ramp is being extended out to Q4 of 2023 when it should be done during the snow-free period on site.
5. A legacy issue regarding the management of cover material over debris within the landfill should be appropriately addressed, as this topic has been raised since 2020.
6. A legacy issue with respect to supporting pipes within the Itivia Fuel Storage site should be addressed before the liner is damaged.
7. The fuel storage and generator system at the Exploration Camp should be taken out of service and appropriately decommissioned if the camp is not going to be used in the future.
8. Based on the photograph taken at Culvert 25.8 km (along the AWAR) and previous inspection comments, CIRNAC will like to see the culvert repaired during the 2023 Open Water season.
9. Based on the photograph taken at Culvert 26.8 km (along the AWAR) and previous inspection comments, CIRNAC will like to see the culvert repaired during the 2023 Open Water season.
10. Based on the photograph taken at Bridge M-5 and previous inspection comments, CIRNAC will like to see repairs to gabion baskets undertaken and concerns with major erosion addressed promptly.

Recommendation:

(R-09) CIRNAC recommends that AEM:

a) Provide justification for not completing repetitive recommendations raised during geotechnical inspections, and
b) Provide a timeline for the implementation of the 2022 geotechnical inspection recommendations listed above.