



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#104447113

July 22, 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 2021 Annual Report for Meliadine Gold Mine Project, Type A Water Licence
No. 2AM-MEL1631**

Dear Mr. Dwyer,

Thank you for your May 9, 2022 invitation to review the 2021 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.

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, CIRNAC



Technical Review Memorandum

Date: July 22, 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 2021 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 among 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 Nunavut Impact Review Board (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 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 potential for extension to 25 years should more ore be identified.

Meliadine includes seven gold deposits namely 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 km of Tiriganiaq except for Discovery, which is 17 km southeast of Tiriganiaq. Each of these deposits has mineralization within 120 metres of surface, making them potentially mineable by open pit methods. Also, because of their having deeper mineralization they could potentially 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 from 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 both underground and open-pit mines and associated infrastructure for extraction, processing and transportation of gold. Mining at Tiriganiaq will occur using both above ground and underground methods, with the other four deposits mined using open pit methods. There are three main Project areas: the Tiriganiaq mine site, 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 waste rock piles, three 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. AEM anticipates Phase 2 of the AWAR, which would include widening of the existing Phase 1 road, twinning part of the road to separate oncoming traffic, and developing a spur road to the Discovery deposit, 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 2021 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	Follow-up from 2020 Annual Report: Higher than Expected Total Dissolved Solids (TDS) in CP1 (A Partially Addressed 2020 CIRNAC- #01 Recommendation)
R-02	Follow-up from 2020 Annual Report: Surface Disposition of Waste Rock (2020 CIRNAC- #03 Recommendation)
R-03	Follow-up from 2020 Annual Report: Tailings Storage Facility (TSF) Capacity (2020 CIRNAC- #04 Recommendation)
R-04	Follow-up from 2020 Annual Report: Tracking Volume of Freshwater Obtained from Other Permitted Locations for Road Dust Suppression Activities (2020 CIRNAC- #10 Recommendation)
R-05	Quantities of Ore Production and Storage
R-06	Quantities of Waste Rock Production and Storage
R-07	Management Plans



R-08	Inspection Reports and/or Compliance Reports
R-09	Geotechnical Inspection Concerns/Issues
R-10	Impacts of Effluent Discharge on Phytoplankton in Meliadine Lake

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
220502-2AM-MEL1631 Meliadine Gold Project 2021 Annual Report & Appendices	
Meliadine Gold Mine – 2021 Annual Report, Main Document	AEM, April 2022
Appendix Documents	
Appendix 01 - 2021 Annual Report Appendix Summary Table	AEM, April 2022
Appendix 02 - 2021 Drill Site Locations	AEM, April 2022
Appendix 03 - 2022 Mine Plan (Production Lease KVP11D01)	AEM, April 2022
Appendix 04 - General Site Layout	AEM, April 2022
Appendix 05 - Water Balance and Water Quality Modelling Tabular Data and Figures	AEM, April 2022
Appendix 06 - 2021 Annual Geotechnical Inspection (Parts 1 to 12)	Tetra Tech, 17 March 2022
Appendix 07 - 2020 Annual Geotechnical Report Agnico Eagle Responses and Action Table	AEM, March 2021
Appendix 08 - 2021 Annual Geotechnical Report Agnico Eagle Responses and Action Table	AEM, April 2022
Appendix 09 - As-Built Drawing of the fill placed near Containment Pond 6	AEM, 27 July 2021
Appendix 10 - 2021 Annual Geochemical Report (Metal Leaching and Acid Rock Drainage Monitoring Report)	AEM, April 2022
Appendix 11 - 2021 Results of the Tailings Supernatant Sampling	AEM, April 2022
Appendix 12 – WRSF1 and WRSF2 Plans and Sections	AEM, 30 December 2021
Appendix 13 – TSF Plans and Sections	AEM, 16 March 2022
Appendix 14 – 2021 Shipping Documentation	2021
Appendix 15 - 2021 Stack Testing Report (Source Emission Survey Report)	Bureau Veritas, 19-23 October 2021
Appendix 16 - 2021 Reportable Spills (and Follow-up Reports)	AEM, March 2022
Appendix 17 - Mock Scenario Spill Report (Mock Spill Itivia 2021)	AEM, 26 September 2021
Appendix 18 - 2021 Aquatic Effects Monitoring Program (AEMP) Report (Parts 1 to 3)	Azimuth, 10 April 2022
Appendix 19 – 2021 Water Monitoring Stations Results	AEM, April 2022
Appendix 20 – Diamond Drill Hole (DDH) Water Sample Results	AEM, April 2022
Appendix 21 – Calibration Data	AEM, April 2022
Appendix 22 - 2021 Blast Monitoring Report (for the Protection of Nearby Fish Habitat)	AEM, April 2022
Appendix 23 - 2021 Noise Monitoring Report	AEM, March 2022



Document Title	Author, File No., Rev., Date
Appendix 24 - 2021 Air Quality Monitoring Report	AEM, March 2022
Appendix 25 - 2021 Toolbox Presentations	AEM, April 2022
Appendix 26 - 2021 Terrestrial Effects Monitoring and Mitigation Program Annual Report	Golder, 06 April 2022
Appendix 27 - 2021 Caribou Behaviour Study	ERM, January 2022
Appendix 28 - 2021 Caribou Trail Camera Study (Parts 1 & 2)	ERM, January 2022
Appendix 29 - 2021 Wildlife Observations	AEM, April 2022
Appendix 30 - 2020 Marine Mammal and Seabird Report (Parts 1 to 6)	ERM, March 2022
Appendix 31 - 2021 Natural Recovery and Active Restoration of Tundra Plant-soil Systems Report	Drs. Standen & Stewart, March 2022
Appendix 32 - Management Plans	
32-1 Aquatic Effects Monitoring Program Design Plan (Parts 1 & 2)	Azimuth, 11 April 2022
32-2 Blast Monitoring Program	AEM, April 2022, V4
32-3 Explosives Management Plan	AEM, April 2022, V8
32-4 Incineration Management Plan	AEM, April 2022, V7
32-5 Landfarm Management Plan	AEM, April 2022, V4
32-6 Landfill and Waste Management Plan (Parts 1 & 2)	AEM, April 2022, V8
32-7 Mine Waste Management Plan	AEM, April 2022, V9
32-8 Oil Pollution Emergency Plan / Oil Pollution Preventions Plan (OPEP/OPPP)	AEM, April 2022, V6
32-9 Ore Storage Management Plan	AEM, April 2022, V4
32-10 Quality Assurance / Quality Control Plan	AEM, April 2022, V4
32-11 Shipping Management Plan (Parts 1 to 3)	AEM, April 2022, V9
32-12 Spill Contingency Plan	AEM, April 2022, V11
32-13 Terrestrial Environment Management and Monitoring Plan (TEMMP)	AEM, April 2022, V4
32-14 Water Management Plan	AEM, April 2022, V12
Appendix 33 - 2021 All-Weather Access Road (AWAR) Traffic Data	AEM, April 2022
Appendix 34 - 2021 Community Engagement Table	AEM, April 2022
Appendix 35 – 2021 Tea Testing Event Summary Report	Azimuth, 28 April 2021
Appendix 36 – 2021 Kivalliq Inuit Elders Advisory Committee Report	Kivalliq Inuit Elders Advisory Committee, 23 November 2021
Appendix 37 - Socio-Economic Monitoring Program	Stratos, March 2022
Appendix 38 – 2021 Socio-Economic Monitoring Program Report	Stratos, March 2022, V4
Appendix 39 - 2021 Training	AEM, April 2022
Appendix 40 – 2021 Kivalliq Labour Market Analysis Report	Aglu, Stratos and Impact Economics, 05 November 2021
Appendix 41 - NIRB Project Certificate Concordance Table	AEM, April 2022
Appendix 42 - NWB Water Licences Concordance Table	AEM, April 2022
Appendix 43 – 2020 Annual Report Comments Concordance Table	AEM, April 2022
Other Reports/Information	
Nunavut Water Board Amended Water Licence No: 2AM-MEL1631	Issued 13 May 2021
AEM Responses on 2020 Annual Report Comments	AEM, 10 December 2021



C. RESULTS OF REVIEW

1. Follow-up from 2020 Annual Report: Higher than Expected Total Dissolved Solids (TDS) in CP1 (A Partially Addressed 2020 CIRNAC- #01 Recommendation)

Comment:

CIRNAC Recommended that AEM provide information with the 2021 Annual Report on the nature and make-up of “rest of site” (as per the SNC upper bound model report) areas/facilities that contributed so significantly to the total dissolved solids (TDS) loadings to CP1. AEM acknowledged CIRNAC’s request for better understanding of TDS loading contributions, and committed to work towards a model reporting method within annual reports with a focus on improving clarity. Within this improved reporting method, discussion would focus on the behavior of TDS concentrations in surface Contact Water reporting to CP1 during the reported year, and, if any TDS concentration peaks are observed, potential sources that might have contributed to higher loads of TDS would be identified. AEM also noted that with respect to the requested information regarding areas and conditions of facilities such as WRSF1 and OP2, this information is provided in the most up to date versions of the Mine Waste Management Plan (MWMP) and Ore Storage Management Plan (OSMP).

While CIRNAC appreciates AEM’s commitment to improve the model and the discussions provided in the Annual Report, CIRNAC is seeking to fully understand the TDS loading contributed by the Ore Stockpile component (OP2) of the rest of site. From CIRNAC’s review of Table 1 of Appendix 5 – Water Balance and Water Quality Modelling Data included with the 2021 Annual Report, it is not clear if the model appropriately reflects the ore piles and runoff surface characteristics. From review of site plans, monitoring stations, and the MWMP, it does not appear that the actual contribution of loading from OP2 is presently included.

Recommendation:

(R-01) CIRNAC recommends that AEM:

- a) Establish a program to measure runoff quantity and quality from OP2.
- b) Provide additional details and discussion of the OP2 component of the water balance model.
- c) Provide additional information on actual quantities and the physical and chemical nature of ore stockpiled in OP2 with emphasis on TDS loadings to CP1.



2. Follow-up from 2020 Annual Report: Surface Disposition of Waste Rock (2020 CIRNAC- #03 Recommendation)

Comment:

With respect to waste rock disposal and placement CIRNAC requested that AEM provide:

- a) Additional discussion/information in the Annual Report with respect to distribution by location and quantity of waste rock used for construction and placed in the waste rock storage facilities;
- b) Information confirming that waste rock used for construction was Non-PAG;
- c) Summary tables of annual and cumulative waste rock volumes in the Annual Report that use the same formats as Tables 3.3 and 4.3 of the Mine Waste Management Plan; and
- d) As Built update (plans and sections) illustrating 2019 additions and configuration of the WRSFs as at the end of 2021.

AEM and CIRNAC held discussions to address these recommendations and agreed on a path forward. However, based on review of the 2021 Annual Report, CIRNAC notes that not all of the above items were addressed in the report.

Recommendation:

(R-02) CIRNAC re-iterates its request for additional discussion of where/how waste rock was used for construction, where/how it was placed in the WRSFs and TSF and confirmation that it was placed according to approved plans and procedures.

3. Follow-up from 2020 Annual Report: Tailings Storage Facility (TSF) Capacity (2020 CIRNAC- #04 Recommendation)

Comment:

CIRNAC recommended that AEM provide additional information in the Annual Report verifying that tailings placement in the Tailings Storage Facility (TSF) was in accordance with the Mine Waste Management Plan (MWMP).

In response, AEM committed to providing a statement in future annual reports to indicate whether placement was in accordance with the MWMP.

CIRNAC accepted AEM's commitments to this and other recommendations. CIRNAC notes that in reviewing the 2021 Annual Report, no specific statement was found clarifying that placement was carried out in accordance with the MWMP as committed to by AEM in their response.



Recommendation:

(R-03) CIRNAC reminds AEM of its commitments and requests inclusion of a statement in future annual reports verifying that tailings placement was in accordance with the MWMP.

4. Follow-up from 2020 Annual Report: Tracking Volume of Freshwater Obtained from Other Permitted Locations for Road Dust Suppression Activities (2020 CIRNAC- #10 Recommendation)

Comment:

CIRNAC requested that AEM provide information with respect to “Schedule C, Item #1 (Amend)” of the Water Licence 2BB-MEL1424 for the 2020 Annual Report that includes a breakdown of the monthly and annual volumes of freshwater obtained from other permitted freshwater bodies (locations) other than Meliadine Lake, used for the purpose of road dust suppression activities.

In their response, AEM provided the volume of water that was withdrawn from the small ponds proximal to the All-Weather Access Road (AWAR) for dust suppression activities during the month of August 2020, and committed to better tracking the quantity and locations of water taking activities along the AWAR for the purpose of dust suppression.

Section 3.2.1 of the 2021 Annual Report states “In 2021, no water was obtained from the Meliadine River for road dust suppression activities; instead water was withdrawn from other permitted locations, including small ponds proximal to the AWAR”. No information was again provided in the Annual Report on the volume of water withdrawn from these small ponds proximal to the AWAR or the locations of these ponds.

Recommendation:

(R-04) CIRNAC recommends the inclusion of more detailed information in future annual reports regarding the locations of small ponds proximal to the AWAR from which water is taken for dust suppression as well as a matrix detailing the volume of water collected from each of these locations.

5. Quantities of Ore Production and Storage

Comment:

Section 2.1.3 of the 2021 Annual Report states that during 2021 a total of 1,960,544 tonnes of ore (404,569 tonnes from open pit #1 (OP1), 110,361 tonnes from open pit #2 (OP2), 1,445,614 tonnes from underground (U/G)) were mined at Meliadine.



The body of the 2021 Annual Report is silent on the nature and extent of ore stockpiled in the OP2 ore stockpile area. Given that a total of 1,714,892 tonnes of tailings were produced in 2021 (1,363,855 tonnes to the Tailings Storage Facility (TSF), 351,037 tonnes to U/G), it would appear that a significant quantity of ore (~245,652 tonnes) was added to the ore stockpile during 2021 assuming ore production was as stated in the text of the report (i.e., 1,960,544 tonnes - 1,714,892 tonnes).

In Section 4.3 Waste Rock Volume, Table 12 is provided, which presents quantities of ore (and waste) stockpiles on site excluding major locations on a monthly basis. AEM notes that these values vary according to production and construction needs. The Table 12 values for ore range from a July low of 147,392 tonnes to a December high of 422,284 tonnes. Given the description and title of Table 12, it is not clear to CIRNAC how the Table 12 ore figures relate to the OP2 storage area as CIRNAC interprets the OP2 area to be considered by AEM as a “major location”.

CIRNAC is concerned that the information in the Annual Report does not provide clear and consistent numbers with respect to the locations and quantity of ore stored on site as ore storage runoff from OP2 has the potential to be a significant contributor to contaminant loads (e.g., total dissolved solids) in CP1.

Recommendation:

(R-05) CIRNAC recommends that AEM:

- a) Discuss and clarify apparent discrepancies in information provided for ore storage in 2021.
- b) Provide maximum tonnes of ore stored on site in any month in 2021.
- c) Provide maximum tonnes of ore stored in OP2 in any month in 2021.
- d) Provide descriptions and discussions of “ore stockpiles on site, excluding major locations” presented in Table 12 and show where is this ore stored.

6. Quantities of Waste Rock Production and Storage

Comment:

Section 2.1.3 of the 2021 Annual Report states that 3,211,951 tonnes of waste rock were excavated from Tiriganiaq Open Pit #1, 1,216,825 tonnes of waste rock were excavated from Tiriganiaq Open Pit #2, and 265,204 tonnes of waste rock were trucked to surface from the underground mine for a total 2021 waste rock production of 4,693,170 tonnes.

In Appendix 32-7 Mine Waste Management Plan (MWMP), Section 3.2.2, Table 3.3 “*Summary of Mine Waste Production Schedule and Bank Quantities (V15_MILLE)*” provides waste rock quantities for 2021 open pit and underground operations totaling 5,081,872



tonnes. Table 4.1 of the MWMP provides the 2021 quantity distribution by major utilization type and WRSF. Total waste rock quantities in Tables 3.3 and 4.1 match.

Based on the above, CIRNAC notes that there is a discrepancy of 388,702 tonnes between waste rock quantities reported in Section 2.1.3 of the Annual Report and Sections 3 and 4 of the MWMP.

In addition, Section 4.3 of the Annual Report contains Table 12 “*Ore and Waste Rock Stockpiles on Site Excluding Major Locations (Tonnes)*”. This table shows that waste rock quantities at non major site locations range between a low of 880 tonnes in a month to a high of 12,425 tonnes. Given the scale of total waste rock production these quantities are relatively minor. While these quantities are clearly not included in major locations, it is not clear if they were included in the quantities in Section 2.3.1.

Recommendation:

(R-06) CIRNAC recommends that AEM:

- a) Clarify discrepancies in waste rock production reported in the body of the Annual Report and MWMP.
- b) Provide descriptions and discussions of “waste rock stockpiles on site excluding major locations” presented in Table 12.

7. Management Plans

Comment:

The Mine Waste Management Plan (MWMP) and Ore Storage Management Plan (OSMP) each provides information on the size, location, capacity, and life of the waste management facilities. The plans also provide overall design parameters, performance expectations, and general approaches to construction, deposition, site plans and typical sections, monitoring as well as dust and water management during operations. In addition, general comments on Closure and Reclamation approaches for these facilities are also provided; general statements are made that monitoring data are to be reported in the Annual Report or Annual Inspection report.

As noted in CIRNAC’s recommendations #5 and #6, inconsistencies were identified in the quantities of ore and waste rock in these plans as compared to the quantities provided in the body of the Annual Report.

This comment addresses other observations noted by CIRNAC’s review as follows:



Mine Waste Management Plan (MWMP)

- i) The tables related to the Tailings Storage Facility (TSF) clearly indicate which numbers are actual numbers, whereas the overburden and waste rock tables (Tables 3.3, 4.1, 4.2) do not.
- ii) The MWMP does not provide a comparison to Final Environmental Impact Statement (FEIS) predictions.
- iii) The MWMP includes a design plan and typical sections but does not include an actual as built plan or actual as built sections of the TSF as at 2021

Ore Storage Management Plan (OSMP)

- iv) The OSMP indicates quantities have been updated to the latest mine plan but similar to waste rock in the MWMP, the OSMP does not clearly indicate that prior year data are actuals.
- v) The OSMP does not provide a comparison to FEIS predictions.
- vi) The OSMP notes that OP2 is located within the CP1 catchment, the pad is sloped to direct any contact water towards Channel 1, then diverted into CP1 via the Culvert 3 system. There is no discussion of water management control features within the document, other than showing that the actual design slope of the pad to CP1 is 1.14% for Stage 1 and the design for Stage 2 is 1%. The collected contact water is treated by the Effluent Water Treatment Plant (EWTP) prior to discharge to Meliadine Lake. CIRNAC notes that the OSMP refers to the Water Management Plan (WMP) for “*detailed information on the management of runoff water and seepage from the ore stockpiles ...*” however, review of the WMP found no such additional information regarding OP2.

Water Management Plan (WMP)

- vii) Table 24 of the Annual Report provides a list of all management plans and identifies those that were updated for the 2021 Annual Report submission. The table notes that the WMP was updated in 2021 and describes the update as “*Update to include RO use strategy for treating marginally saline water*”. On review of the WMP, CIRNAC notes that the description in Table 24 can be misunderstood as the WMP revision record shows that many updates were made in 2021 (see revision record for Version 11 dated August 2021). The revision record is confusing with respect to Version 10, which is dated “July 2020 2021” so it is not clear if these are 2020 or 2021 revisions.
- viii) Appendix A of the WMP is the Meliadine Groundwater Management Plan (GMP), Version 7, dated August 2021. AEM’s figure included in Appendix A of the GMP titled “Site Location and Mine Site Layout dated 1-22-2020” is out of



date and still shows the WRSF2 and needs to be replaced to reflect the current approved project.

Recommendation:

(R-07) CIRNAC recommends the following:

Mine Waste Management Plan (MWMP)

- a) Tables 3.3, 4.1, 4.2 be updated to include an asterisk (*) so as to clearly identify actual quantities.
- b) The MWMP should provide information illustrating actual vs. FEIS predicted quantities of overburden, waste rock and tailings.
- c) The MWMP should include an actual as built plan or actual as built sections of the TSF for each year of the report.

Ore Storage Management Plan (OSMP)

- d) The OSMP be updated to include asterisk (*) so as to clearly identify actual quantities.
- e) The OSMP should provide information illustrating actual vs. FEIS predicted quantities of ore stored annually.
- f) Assess the modelled and actual runoff quality, quantity and TDS loads from the ore storage area and investigate if viable alternatives to surface runoff from the ore storage to CP1 could be developed so as to reduce TDS levels in CP1 and discharge to Meliadine Lake.

Water Management Plan (WMP)

- g) AEM should replace the Site Location and Mine Site Layout dated “1-22-2020” of Appendix A of the Meliadine Groundwater Management Plan (GMP) which is Appendix A of the WMP.

8. Inspection Reports and/or Compliance Reports

Comment:

The NWB Amended Water License 2AM-MEL1631 Schedule B, Item 24 requires that a summary of actions taken to address concerns or deficiencies listed in inspection reports and/or compliance reports filed by an Inspector be included in the Annual Report. In response to this condition, AEM has provided a brief overview in Section 10.2 along with Table 26, which provides summary information on the number, nature, timing and findings of the inspections.



CIRNAC notes that AEM's introductory discussion clearly states that there were no Action Required or Non-compliances identified in the 2021 inspections and CIRNAC acknowledges AEM's performance in that regard. CIRNAC also notes AEM's improvements in its discussion under the Feedback/Outcome heading of Table 26.

On the latter matter, CIRNAC also notes that for one of its inspections (18 May 2021), AEM did not provide any discussion of inspection observations or a concluding statement to clearly illustrate to other readers that no issues or concerns had been raised.

As no copies of the actual inspection reports were included as part of the Annual Report Appendix package, it was not possible for other reviewers to verify AEM's specific statements with respect to inspection results or assess whether there were any issues where explicit statements were not provided in the Feedback/Outcome cell of an inspection.

Recommendation:

(R-08) CIRNAC recommends that in future annual reports, AEM provide an appendix containing reports of any formal inspections/compliance carried out during the year of the annual report.

9. Geotechnical Inspection Concerns/Issues

Comment:

Comprehensive geotechnical inspections have been carried out annually by Tetra Tech for all project facilities. Observations and recommendations are provided to AEM for consideration and AEM provides responses. CIRNAC has no issues with the inspection findings and recommendations, nor issues with AEM's responses, with the following exceptions: .

- Continued monitoring of soft ground conditions between CP6 and WRSF is needed to determine if additional waste rock should be placed in the area to mitigate any associated risks.
- Based on photographs and previous inspection comments, CIRNAC is of the opinion that repairs are needed on the AWAR at Culvert 25.8 km and Culvert 26.8 km.
- Based on photographs and previous inspection comments, CIRNAC is of the opinion that repairs are needed at Bridge M-5.

In reviewing the 2021 Annual Report, CIRNAC notes that as in the past, while permafrost degradation is discussed with respect to the site's critical infrastructure, it is not discussed for other elements of the operation in particular the roads (site, AWAR, Bypass) and borrow



areas nor areas in between major infrastructure, and inclusion of such a discussion would be helpful to address NWB Schedule B requirements.

Recommendation:

(R-09) CIRNAC recommends that AEM:

- a) Add a section to the Geotechnical Inspection Report that provides clear and concise information on the status of any permafrost degradation that may be occurring on site.
- b) Continue monitoring of soft ground conditions in 2022 between CP6 and WRSF to determine if additional waste rock is needed to mitigate associated risks.
- c) Repairs at AWAR Culvert 25.8 km and Culvert 26.8 km be carried out during open water season 2022.
- d) Repairs at Bridge M- 5 be carried out during open water season 2022.

10. Impacts of Effluent Discharge on Phytoplankton in Meliadine Lake

Comment:

The Meliadine Aquatic Effects Monitoring Program (AEMP) includes an annual phytoplankton study conducted in August at the near-field and mid-field areas of Meliadine Lake and reference lakes to help understand whether effluent discharged to Meliadine Lake is affecting the health of the phytoplankton community.

As noted in Section 7.1.4 of the Annual Report and in the AEMP report (Appendix 18), in 2021, chlorophyll-a trended higher at the near-field and mid-field exposure areas compared to previous years (1 µg/L and 2.5 µg/L in 2020 compared to 2.5 µg/L and 3.3 µg/L in 2021, respectively) whereas chlorophyll-a at reference locations remained stable relative to previous years. Phytoplankton biomass was also slightly higher in the near-field area in 2021. With the increased high potential for algal growth, it is understood that there were visual observations of algal blooms in Meliadine Lake in 2022.

AEM states that the pattern of higher chlorophyll-a and biomass suggest that the east basin may be becoming more productive over time, but whether this change is natural or related to mining activities is unclear. AEM indicated that while discharge of effluent has resulted in higher loading for some nutrients (especially nitrogen as nitrate), phosphorus and nitrogen concentrations have not increased appreciably over time in the east basin.

AEM concluded that the results of the 2021 phytoplankton study are aligned with the Final Environmental Impact Assessment (FEIS), which predicted only a minor change in phytoplankton community structure compared to baseline conditions, and that



phytoplankton productivity would remain similar to baseline in response to the predicted increase in nitrogen concentration in the east basin of Meliadine Lake (Section 6.7 AEMP).

Recommendation:

(R-10) Given the recent observation of algal blooms in Meliadine Lake, which is a clear indication that something is affecting the phytoplankton community in Meliadine Lake, CIRNAC recommends that AEM should conduct additional studies to determine the root cause of the algal blooms and determine whether the impact is the direct result of effluent discharge to Meliadine Lake.

D. REFERENCES

Agnico Eagle Mines (2022), Meliadine Gold Mine – 2021 Annual Report, Main Document; April, 2022

Agnico Eagle Mines (2022), Appendix 01 - 2021 Annual Report Appendix Summary Table; April, 2022

Agnico Eagle Mines (2022), Appendix 02 - 2021 Drill Site Locations; April, 2022

Agnico Eagle Mines (2022), Appendix 03 - 2022 Mine Plan (Production Lease KVP11D01); April, 2022

Agnico Eagle Mines (2022), Appendix 04 - General Site Layout; April, 2022

Agnico Eagle Mines (2022), Appendix 05 - Water Balance and Water Quality Modelling Tabular Data and Figures; April, 2022

Agnico Eagle Mines (2022), Appendix 06 - 2021 Annual Geotechnical Inspection (Parts 1 to 12); Tetra Tech, 17 March, 2022

Agnico Eagle Mines (2022), Appendix 07 - 2020 Annual Geotechnical Report Agnico Eagle Responses and Action Table; March, 2021

Agnico Eagle Mines (2022), Appendix 08 - 2021 Annual Geotechnical Report Agnico Eagle Responses and Action Table; April, 2022

Agnico Eagle Mines (2022), Appendix 09 - As-Built Drawing of the fill placed near Containment Pond 6; 27 July, 2021

Agnico Eagle Mines (2022), Appendix 10 - 2021 Annual Geochemical Report (Metal Leaching and Acid Rock Drainage Monitoring Report); April, 2022

Agnico Eagle Mines (2022), Appendix 11 - 2021 Results of the Tailings Supernatant Sampling; April, 2022

Agnico Eagle Mines (2022), Appendix 12 – WRSF1 and WRSF2 Plans and Sections; 30 December, 2021

Agnico Eagle Mines (2022), Appendix 13 – TSF Plans and Sections; 16 March, 2022

Agnico Eagle Mines (2022), Appendix 14 – 2021 Shipping Documentation; 2021



Agnico Eagle Mines (2022), Appendix 15 - 2021 Stack Testing Report (Source Emission Survey Report); Bureau Veritas, 19-23 October 2021

Agnico Eagle Mines (2022), Appendix 16 - 2021 Reportable Spills (and Follow-up Reports); March 2022

Agnico Eagle Mines (2022), Appendix 17 - Mock Scenario Spill Report (Mock Spill Itivia 2021); 26 September 2021

Agnico Eagle Mines (2022), Appendix 18 - 2021 Aquatic Effects Monitoring Program (AEMP) Report (Parts 1 to 3); Azimuth, 10 April 2022

Agnico Eagle Mines (2022), Appendix 19 – 2021 Water Monitoring Stations Results; April 2022

Agnico Eagle Mines (2022), Appendix 20 – Diamond Drill Hole (DDH) Water Sample Results; April 2022

Agnico Eagle Mines (2022), Appendix 21 – Calibration Data; April 2022

Agnico Eagle Mines (2022), Appendix 22 - 2021 Blast Monitoring Report (for the Protection of Nearby Fish Habitat); April 2022

Agnico Eagle Mines (2022), Appendix 23 - 2021 Noise Monitoring Report; April 2022

Agnico Eagle Mines (2022), Appendix 24 - 2021 Air Quality Monitoring Report; March 2022

Agnico Eagle Mines (2022), Appendix 25 - 2021 Toolbox Presentations; April 2022

Agnico Eagle Mines (2022), Appendix 26 - 2021 Terrestrial Effects Monitoring and Mitigation Program Annual Report; Golder, 06 April 2022

Agnico Eagle Mines (2022), Appendix 27 - 2021 Caribou Behaviour Study; ERM, January 2022

Agnico Eagle Mines (2022), Appendix 28 - 2021 Caribou Trail Camera Study (Parts 1 & 2); ERM, January 2022

Agnico Eagle Mines (2022), Appendix 29 - 2021 Wildlife Observations; AEM, April 2022

Agnico Eagle Mines (2022), Appendix 30 - 2020 Marine Mammal and Seabird Report (Parts 1 to 6); ERM, March 2022

Agnico Eagle Mines (2022), Appendix 31 - 2021 Natural Recovery and Active Restoration of Tundra Plant-soil Systems Report; Drs. Standen & Stewart, March 2022

Agnico Eagle Mines (2022), Appendix 32-1 Aquatic Effects Monitoring Program Design Plan (Parts 1 & 2); Azimuth, 11 April 2022

Agnico Eagle Mines (2022), Appendix 32-2 Blast Monitoring Program; AEM, April 2022, V4

Agnico Eagle Mines (2022), Appendix 32-3 Explosives Management Plan; AEM, April 2022, V8

Agnico Eagle Mines (2022), Appendix 32-4 Incineration Management Plan; AEM, April 2022, V7

Agnico Eagle Mines (2022), Appendix 32-5 Landfarm Management Plan; AEM, April 2022, V4

Agnico Eagle Mines (2022), Appendix 32-6 Landfill and Waste Management Plan (Parts 1 & 2); AEM, April 2022, V8

Agnico Eagle Mines (2022), Appendix 32-7 Mine Waste Management Plan; AEM, April 2022, V9



Agnico Eagle Mines (2022), Appendix 32-8 Oil Pollution Emergency Plan / Oil Pollution Preventions Plan (OPEP/OPPP); AEM, April 2022, V6

Agnico Eagle Mines (2022), Appendix 32-9 Ore Storage Management Plan; AEM, April 2022, V4

Agnico Eagle Mines (2022), Appendix 32-10 Quality Assurance / Quality Control Plan; AEM, April 2022, V4

Agnico Eagle Mines (2022), Appendix 32-11 Shipping Management Plan (Parts 1 to 3); AEM, April 2022, V9

Agnico Eagle Mines (2022), Appendix 32-12 Spill Contingency Plan; AEM, April 2022, V11

Agnico Eagle Mines (2022), Appendix 32-13 Terrestrial Environment Management and Monitoring Plan (TEMMP); AEM, April 2022, V4

Agnico Eagle Mines (2022), Appendix 32-14 Water Management Plan; AEM, April 2022, V12

Agnico Eagle Mines (2022), Appendix 33 - 2021 All-Weather Access Road (AWAR) Traffic Data; AEM, April 2022

Agnico Eagle Mines (2022), Appendix 34 - 2021 Community Engagement Table; AEM, April 2022

Agnico Eagle Mines (2022), Appendix 35 – 2021 Tea Testing Event Summary Report; Azimuth, 28 April 2021

Agnico Eagle Mines (2022), Appendix 36 – 2021 Kivalliq Inuit Elders Advisory Committee Report; Kivalliq Inuit Elders Advisory Committee, 23 November 2021

Agnico Eagle Mines (2022), Appendix 37 - Socio-Economic Monitoring Program; Stratos, March 2022

Agnico Eagle Mines (2022), Appendix 38 – 2021 Socio-Economic Monitoring Program Report; Stratos, March 2022, V4

Agnico Eagle Mines (2022), Appendix 39 - 2021 Training; AEM, April 2022

Agnico Eagle Mines (2022), Appendix 40 – 2021 Kivalliq Labour Market Analysis Report; Aglu, Stratos and Impact Economics, 05 November 2021

Agnico Eagle Mines (2022), Appendix 41 - NIRB Project Certificate Concordance Table; AEM, April 2022

Agnico Eagle Mines (2022), Appendix 42 - NWB Water Licences Concordance Table; AEM, April 2022

Agnico Eagle Mines (2022), Appendix 43 – 2020 Annual Report Comments Concordance Table; AEM, April 2022

Agnico Eagle Mines (AEM) Responses on 2020 Annual Report Comments; AEM, 10 December 2021

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