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Prairie & Northern Region
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ECCC File: 6100 000 012/015
NWB File: 2AM-MEL1631



March 17, 2021

via email at: licensing@nwb-oen.ca

Richard Dwyer
Manager Licencing
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0B 1J0

Dear Richard Dwyer:

RE: 2AM-MEL1631 Agnico Eagle Mines Ltd. – Meliadine Water Licence Amendment Application

Environment and Climate Change Canada (ECCC) has reviewed the information submitted to the Nunavut Water Board (NWB) regarding the above mentioned amendment application for water licence 2AM-MEL1631 by Agnico Eagle Mining Ltd. (the Proponent) and is submitting the attached final written submission to the NWB via email for consideration.

ECCC's specialist advice is based on our mandate pursuant to the *Canadian Environmental Protection Act* and the pollution prevention provisions of the *Fisheries Act*.

If you need more information, please contact Victoria Shore at Victoria.Shore@canada.ca.

Sincerely,

Margaret Fairbairn, Acting Regional Director
Environmental Protection Operations Directorate, Prairie Northern Region

Attachment:

20210317 – 2AM-MEL1631_meliadine_agnico_WL Amendment_Final Written Submission_ECCC

cc: Jody Small, Acting Head, Environmental Assessment North (NT and NU)





ENVIRONMENT AND CLIMATE CHANGE CANADA'S FINAL WRITTEN SUBMISSION TO THE NUNAVUT WATER BOARD

RESPECTING THE MELIADINE GOLD PROJECT TYPE A
WATER LICENCE AMENDMENT APPLICATION

MARCH 17, 2021



Executive Summary

Agnico Eagle Mines Limited (the Proponent) is proposing to amend their Type A Water Licence (WL). The scope of the amended Type A WL (2AM-MEL1631) includes updated thresholds for total dissolved solids (TDS) in effluent discharged to Meliadine Lake, increased annual freshwater consumption, expansion of the laydown area, an updated waste management strategy, construction of site access roads, and an updated Interim Closure and Reclamation Plan.

Environment and Climate Change Canada (ECCC) has participated in all phases of the WL process, providing its specialist, expert information or knowledge available to the department in accordance with the Nunavut Agreement. ECCC has provided comments on the preliminary technical assessment-completeness check and has undertaken a full technical review of the application. ECCC also attended the Technical Meeting and Pre-Hearing Conference held via teleconference November 30, 2020 and January 19, 2021, respectively.

This final written submission summarizes the results of ECCC's technical review of information provided by the Proponent throughout the review process thus far. The comments and recommendations provided relate to ECCC's mandate in the context of the *Canadian Environmental Protection Act* and the pollution prevention provisions of the *Fisheries Act* and its associated regulations, such as the *Metal and Diamond Mining Effluent Regulations*. These comments and recommendations are provided for consideration by the Nunavut Water Board.

ECCC has identified concerns and is providing recommendations with regard to proposed treatment sludge disposal, the water balance, the proposed TDS effluent quality criteria and comments on the Draft Water Licence.

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1.0 List of Acronyms

AEM – Agnico Eagle Mines Ltd.

AEMP – Aquatic Effects Monitoring Program

CEPA – *Canadian Environmental Protection Act*

ECCC – Environment and Climate Change Canada

EQC – Effluent Quality Criteria

NWB – Nunavut Water Board

MAC – Maximum Average Concentration

MDMER – Metal and Diamond Mining Effluent Regulations

MGC – Maximum Grab Concentration

TDS – Total Dissolved Solids

WL – Water Licence

WQMOP – Water Quality Management and Optimization Plan

2.0 Introduction

Agnico Eagle Mines Limited (AEM; the Proponent) is proposing to amend their Type A Water Licence (WL). The scope of the amended Type A WL (2AM-MEL1631) includes updated thresholds for total dissolved solids (TDS) in effluent discharged to Meliadine Lake, increased annual freshwater consumption, expansion of the laydown area, an updated waste management strategy, construction of site access roads, and an updated Interim Closure and Reclamation Plan.

AEM previously received an Emergency Amendment in April 2020, which allowed a time-limited higher threshold for TDS in effluent discharged to Meliadine Lake during the 2020 discharge season.

The current amendment application was received by the Nunavut Water Board (NWB) on August 27, 2020. Environment and Climate Change Canada (ECCC) has participated in all phases of the review thus far. ECCC provided comments on the preliminary technical assessment-completeness check and has undertaken a full technical review of the application. ECCC participated in a Technical Meeting and Pre-Hearing Conference that were held via teleconference on November 30, 2020 and January 19, 2021, respectively. Our expert advice is based on the departmental mandate in the context of the *Canadian Environmental Protection Act* and the pollution prevention provisions of the *Fisheries Act* and its associated regulations, such as the *Metal and Diamond Mining Effluent Regulations*.

ECCC is continuing its participation in this WL process by way of this final written submission intended for the consideration by the NWB. The submission summarizes ECCC's technical review of the information provided in the WL review process. ECCC has identified concerns and provides recommendations with regard to treatment sludge disposal, the water balance, the proposed TDS effluent quality criteria and comments on the Draft Water Licence.

3.0 ECCC's Mandate

Environment and Climate Change Canada's (ECCC) review of the Project is based on the Department's mandate which is conferred by the federal statutes and regulations administered under the authority of the Minister of Environment and Climate Change. ECCC's legislative framework for protecting and managing the environment is founded on various statutes, guidelines, codes of practice, and inter-jurisdictional and international agreements.

ECCC's specialist advice for this review has been provided pursuant to the *Canadian Environmental Protection Act* (CEPA) and the pollution prevention provisions of the *Fisheries Act*. ECCC regulates the use of toxic chemicals, and develops and implements environmental quality guidelines pursuant to CEPA. ECCC is also responsible for the pollution prevention provisions of the *Fisheries Act* and its associated regulations, such as the *Metal and Diamond Mining Effluent Regulations* (MDMER). The deposit of a deleterious substance to water frequented by fish constitutes a violation of the *Fisheries Act* except where federal regulations under subsection 36(5) of the Act apply.

The MDMER regulates the deposit of mine effluent and mine waste into water frequented by fish and places referred to in subsection 36(3) of the *Fisheries Act*. Section 4 of the MDMER authorizes the deposit of effluent containing any deleterious substance that is prescribed in section 3. Section 3 of the MDMER prescribes the following deleterious substances: arsenic, copper, cyanide, lead, nickel, zinc, suspended solids and radium 226. Total Dissolved Solids (TDS) are not included in the list of substances prescribed in section 3 of the MDMER.

Any violation of the pollution prevention provisions of the *Fisheries Act* and its regulations, including the MDMER, is subject to enforcement action in accordance with the *Compliance and Enforcement Policy for Habitat and Pollution Provisions of Fisheries Act* (<https://www.canada.ca/en/environment-climate-change/services/environmental-enforcement/publications/compliance-enforcement-policy-fisheries-act.html>). Agnico Eagle Mines Limited is responsible for complying with the applicable legislation.

In case of discrepancy between this communication and the MDMER, the Regulations shall prevail. A copy of the MDMER is available at the following website:
<http://laws.justice.gc.ca/eng/regulations/SOR-2002-222/>

Additional information on ECCC's mandate can be found at <https://www.canada.ca/en/environment-climate-change/corporate/mandate.html>.

4.0 ECCC's Technical Review Comments

4.1 ECCC #1 – Treatment Sludge Disposal

Reference(s):

- Water Management Plan V.9; Section 4.3
- 2AM-MEL1631 Water Licence Amendment Technical Comment Responses submitted by AEM to the NWB Nov. 13, 2020

Comments:

ECCC requested the Proponent provide timelines for their development of alternative options for sludge disposal and requested that analytical results for sludge characterization be provided. AEM responded on Nov. 13, 2020 that evaluation of sludge disposal alternatives is still ongoing. also committed that the sludge would not be deposited in CP1 in 2021. AEM indicated that the primary sludge treatment disposal option would be the use of a saline pond for storage, while they continue to evaluate alternative storage solutions. A chemical characterization of a sludge sample was also provided.

Recommendation(s):

ECCC recommends that options for sludge disposal be identified and incorporated into the Water Management Plan for 2022 disposal.

4.2 ECCC #2 – Water Balance

Reference(s):

- Water Management Plan; Table 13 Estimated Effluent Flow Rates over Mine Operating Life
- Meliadine Site Water Balance and Water Quality Model; Section 2.1.2 Freshwater Consumption
- 2AM-MEL1631 Water Licence Amendment Technical Comment Responses submitted by AEM to the NWB Nov. 13, 2020

Comments:

AEM has provided clarification regarding the fate of additional freshwater volumes, for which they are applying. ECCC has no further comments concerning the water balance.

Recommendation(s):

No recommendations.

4.3 ECCC #3 – Total Dissolved Solids (TDS) Effluent Quality Criteria (EQC)

Reference(s):

- Water Quality Management and Optimization Plan (WQMOP) Progress Update Rev4. Phase 3: Meliadine Mine Effluent Discharge Benchmarks for Total Dissolved Solids. Nov. 13, 2020
- Technical Memorandum dated Dec. 8, 2020. Meliadine Lake Effluent – Summary of Rationale for Effluent Quality Criterion – Maximum Grab Concentration
- Technical Memorandum – Meliadine Lake Effluent – Summary of Rationale for Effluent Quality Criterion – Maximum Grab Concentration. Golder. Dec. 8, 2020
- Adaptive Management Plan Draft V.1 January 202.1 Table 3 Adaptive Thresholds for Development of a Chloride SSWQO

Comments:

AEM has applied to increase the effluent discharge limits for Total Dissolved Solids (TDS) to 3500 mg/L Maximum Average Concentration (MAC) and 5000 mg/L Maximum Grab Concentration (MGC). Extensive work has been done by AEM on the 2020 Emergency Amendment to characterize the effluent and the effects of the higher-TDS discharge on the receiving environment. Concentrations measured in the receiving environment during the discharge indicated the assimilative capacity of Meliadine Lake was sufficient such that effluent discharges did not result in TDS concentrations approaching the 'edge-of-mixing zone' objective of 1000 mg/L (WQMOP Rev. 4).

During the 2020 Emergency Amendment, effluent TDS concentrations did not approach the proposed MAC or MGC, ranging from 1150 – 2150 mg/L (calculated); however, supplemental toxicity testing was conducted on *Ceriodaphnia dubia* using test solutions comprised of the same proportion of major ions occurring in Meliadine effluent, at concentrations up to 5000 mg/L TDS. ECCC noted concerns with the toxicity to *C. dubia* at 5000 mg/L as well as with the use of calculated TDS rather than measured TDS in the November 30, 2020, Technical Meeting. The difference between calculated and measured TDS could result in a variance of 20-25% higher measured TDS in effluent compared to calculated concentrations.

Although the effluent was found to pass acute lethality toxicity bioassays, toxicity to *C. dubia* at 5000 mg/L indicates that the effluent TDS MGC limit may not be protective to sensitive species in the aquatic environment, and the effects of impacts at higher discharge concentrations have not been assessed. However, the potential effects to sensitive species may be mitigated by the Adaptive Management Strategy (Table 3, page 9, WQMOP Rev. 4) which includes thresholds that trigger action should the 3500 mg/L MAC be exceeded two or more times, or if the proposed MGC is reached, and should substantially enable protection of the receiving environment. Notwithstanding this conclusion, the deposit of a deleterious substance to water frequented by fish constitutes a violation of the *Fisheries Act* except where federal regulations under subsection 36(5) of the Act apply.

The January 29, 2021 update of the Adaptive Management Plan (which focused on waterline management) included a decision tree identifying conditions under which a site-specific water quality objective for chloride would be developed. Chloride is the primary parameter of concern with respect to toxicity in the effluent, and it currently comprises approximately 50% of the calculated TDS concentration. As outlined in the updated Adaptive Management Plan, if the ionic composition of the effluent changes and the proportion of chloride increases above prescribed limits, AEM will identify a site-specific water

quality objective for chloride within the WQMOP. A future chloride EQC, which would be an enforceable criteria under the water license, could be identified, if warranted.

Ongoing monitoring of the effluent quality and toxicity test data can indicate the need to revisit the proposed EQC. Toxicity testing (acute and chronic) will be conducted under the requirements of the MDMER and the water licence.

Recommendation(s):

ECCC recommends that:

- The use of a lower TDS Maximum Grab Concentration limit would be more protective of the receiving environment and in line with observed and evaluated concentrations;
- If the proposed TDS EQC of 5000 mg/L (calculated) Maximum Grab Concentration is granted, that ongoing review of sublethal toxicity testing conducted under the Environmental Effects Monitoring Program and/or other routine monitoring be done, along with monitoring of receiving environment conditions. This monitoring can be used as an indicator of the need to revisit the proposed EQC;
- Changes (increases) in the chloride proportion in effluent be monitored, and if there are any changes in the composition, the need for site-specific water quality objectives be evaluated for chloride.

4.4 ECCC #4 – Comments on Draft Water Licence

Reference(s):

- AEM proposed Draft Water Licence dated Dec. 17, 2020

Comments & Recommendations:

ECCC has reviewed the Draft Water Licence submitted by AEM, and in general finds the proposed changes provide clarity and update the terms and conditions. The following comments are provided for the Board's consideration.

- Part B.10. Deemed approval of plans – It is not clear what constitutes “no action” by the Board. Plans are typically circulated for review, and longer than 45 days may be required for larger or complex items. For clarity, approval of plans should be explicit; ECCC recommends retaining the original clause.
- Part E. 14 AEM proposes to include limitations to the water quality model updates, such that only regulated parameters will be reviewed, and of those, only parameters which are within 10% of the MAC discharge limit. ECCC suggests that this is too narrow of a parameter list, and that non-regulated parameters such as chloride and nitrate should be modeled. The purpose of doing updated modeling is to confirm/examine earlier predictions and to identify trends which might warrant management response. Further, the threshold of 10% is not defined; i.e. is this on the basis of a single occurrence, or averaged on a monthly or annual basis? ECCC recommends further discussion of the best approach to refining and focusing modeling efforts.

- Part E. 18. ECCC notes that the referenced pit lake water quality predictions (Table 7.4-22 of the 2014 FEIS) do not specify Total Metals, and suggests that this be clarified.
- Part F.4; Schedule A: Scope, Definitions, and Enforcement. AEM proposes to remove the wording identifying standard test methods, leaving just the statement that effluent shall be demonstrated to be non-Acutely Lethal. For clarity and consistency, ECCC recommends that this section include a reference to the tests to be used, either explicitly or by reference to acute toxicity tests prescribed under the MDMER for Rainbow Trout (*Oncorhynchus mykiss*) and *Daphnia magna*.
- Part I.2. The requirements for the Aquatic Effects Monitoring Program (AEMP) along with associated text have been removed and should be retained. ECCC acknowledges that the terms of Part B.12 and 14 require implementation of the approved Plans, including the AEMP, and that Part I.1 references the overarching Environmental Management and Protection Plan. However, ECCC notes that the most recently approved version of the Environmental Management and Protection Plan (Jan. 2019) includes references (p. 27) to the text proposed for deletion in Part I.2 and suggests the licence sections should be retained for Part I.2.

5.0 Closing Remarks

ECCC acknowledges and appreciates the effort that the Proponent has taken to provide information and address concerns brought forward by parties through the WL process. ECCC would like to thank the NWB for this opportunity to provide input to the Meliadine Gold Project's WL amendment review and looks forward to continuing its participation.

ECCC's technical review comments and recommendations are not to be interpreted as any type of acknowledgement, compliance, permission, approval, authorization, or release of liability related to any requirements for the Proponent to comply with federal or territorial statutes and regulations.